



Packaging Specification

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ISBN: 978-1-62077-150-1

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NOTES:

Packaging Diagrams and Parameters

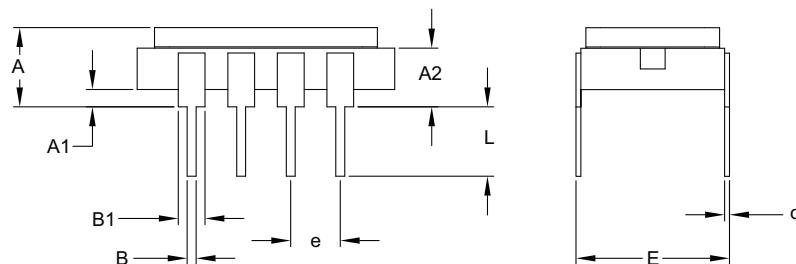
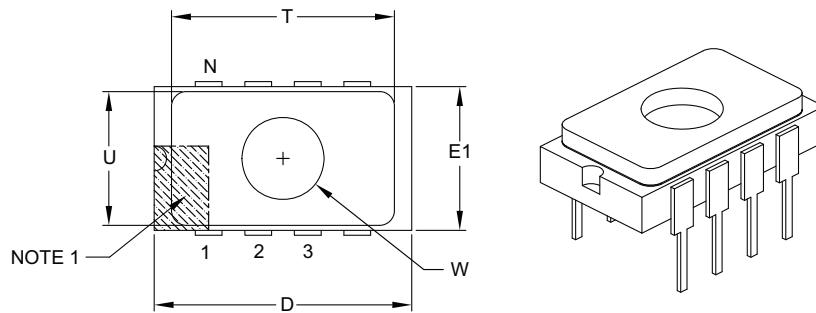
SIDEBRAZE Family

Ceramic Side Brazed Dual In-Line Packages

Packaging Diagrams and Parameters

8-Lead Ceramic Side Brazed Dual In-Line with Window (JW) – .300" Body

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



	Dimension Limits	INCHES		
		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		.100 BSC	
Top to Seating Plane	A	.085	—	.200
Top of Body to Seating Plane	A2	.103	—	.143
Standoff	A1	.025	—	.070
Package Width	E1	.280	—	.310
Overall Length	D	.500	—	.540
Tip to Seating Plane	L	.125	—	.200
Lead Thickness	c	.008	—	.015
Upper Lead Width	B1	.045	—	.065
Lower Lead Width	B	.015	—	.022
Overall Row Spacing §	E	.300	—	.325
Window Diameter	W	.161	—	.171
Lid Length	T	.440	—	.460
Lid Width	U	.260	—	.280

Notes:

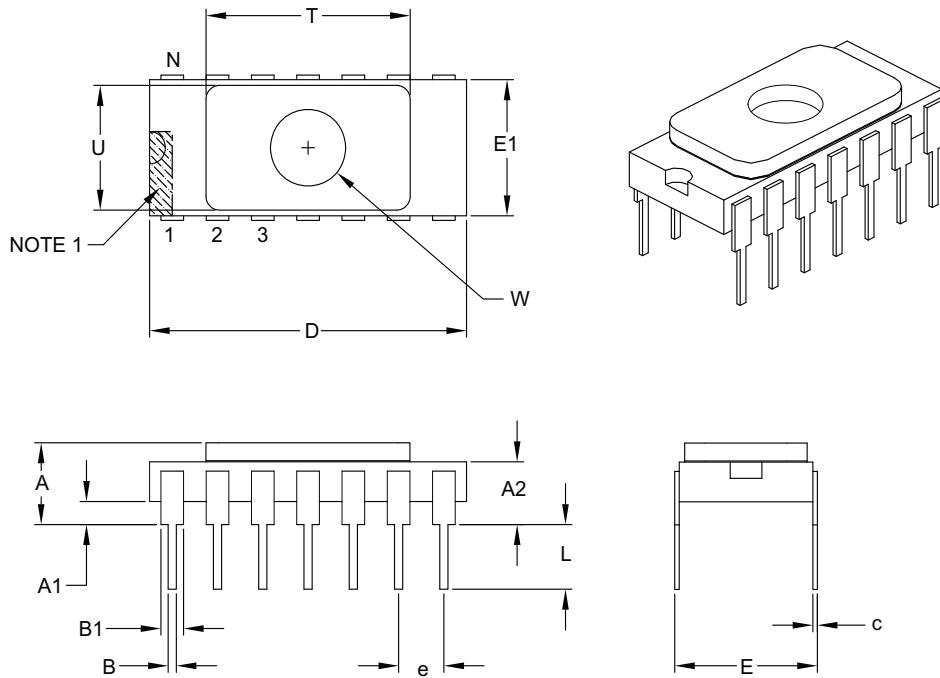
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include burrs and/or projections of package material. These particles shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

14-Lead Ceramic Side Braze Dual In-Line with Window (JW) – .300" Body

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		14		
Pitch	e		.100 BSC		
Top to Seating Plane	A	.085	–	.200	
Top of Body to Seating Plane	A2	.100	–	.140	
Standoff	A1	.025	–	.070	
Package Width	E1	.280	–	.310	
Overall Length	D	.693	–	.770	
Tip to Seating Plane	L	.125	–	.200	
Lead Thickness	c	.008	–	.015	
Upper Lead Width	B1	.045	–	.065	
Lower Lead Width	B	.015	–	.022	
Overall Row Spacing §	E	.300	–	.325	
Window Diameter	W	.161	–	.171	
Lid Length	T	.440	–	.460	
Lid Width	U	.260	–	.280	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include burrs and/or projections of package material. These particles shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

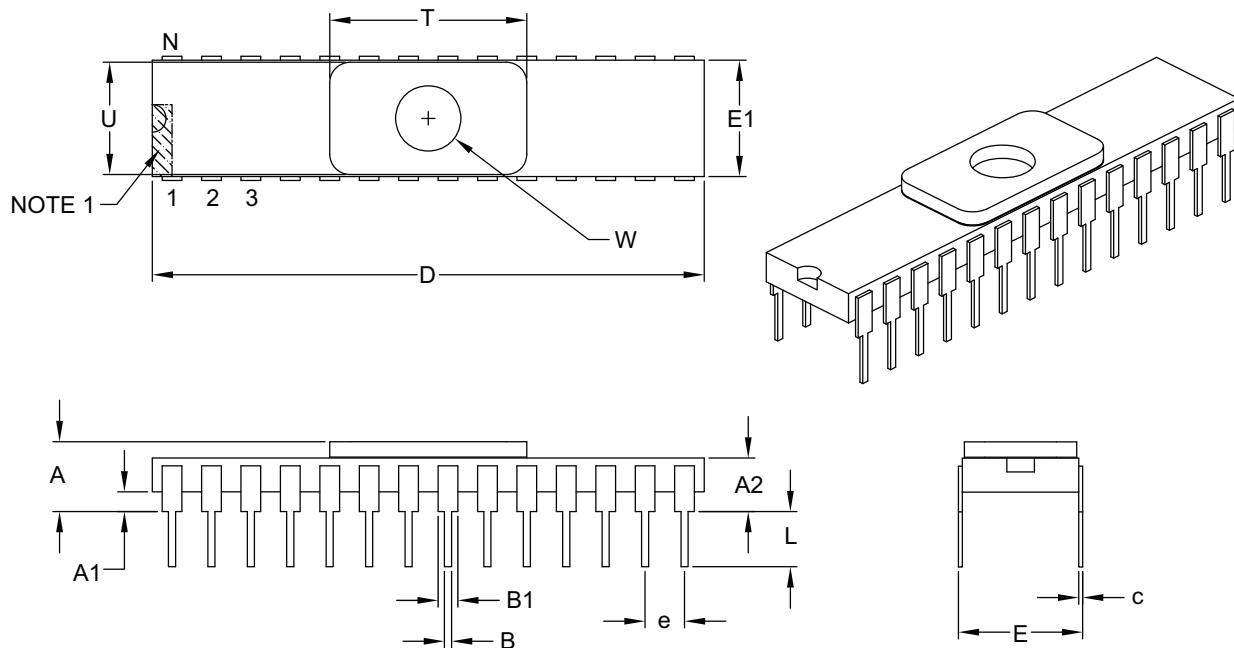
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-107B

Packaging Diagrams and Parameters

28-Lead Ceramic Side Brazed Dual In-Line with Window (JW) – .300" Body

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		.100 BSC	
Top to Seating Plane	A	.085	—	.200
Top of Body to Seating Plane	A2	.115	—	.155
Standoff	A1	.025	—	.070
Package Width	E1	.280	—	.310
Overall Length	D	1.380	—	1.420
Tip to Seating Plane	L	.125	—	.200
Lead Thickness	c	.008	—	.015
Upper Lead Width	B1	.045	—	.065
Lower Lead Width	B	.015	—	.022
Overall Row Spacing §	E	.300	—	.325
Window Diameter	W	.161	—	.171
Lid Length	T	.490	—	.510
Lid Width	U	.275	—	.295

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include burrs and/or projections of package material. These particles shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-084B

Packaging Diagrams and Parameters

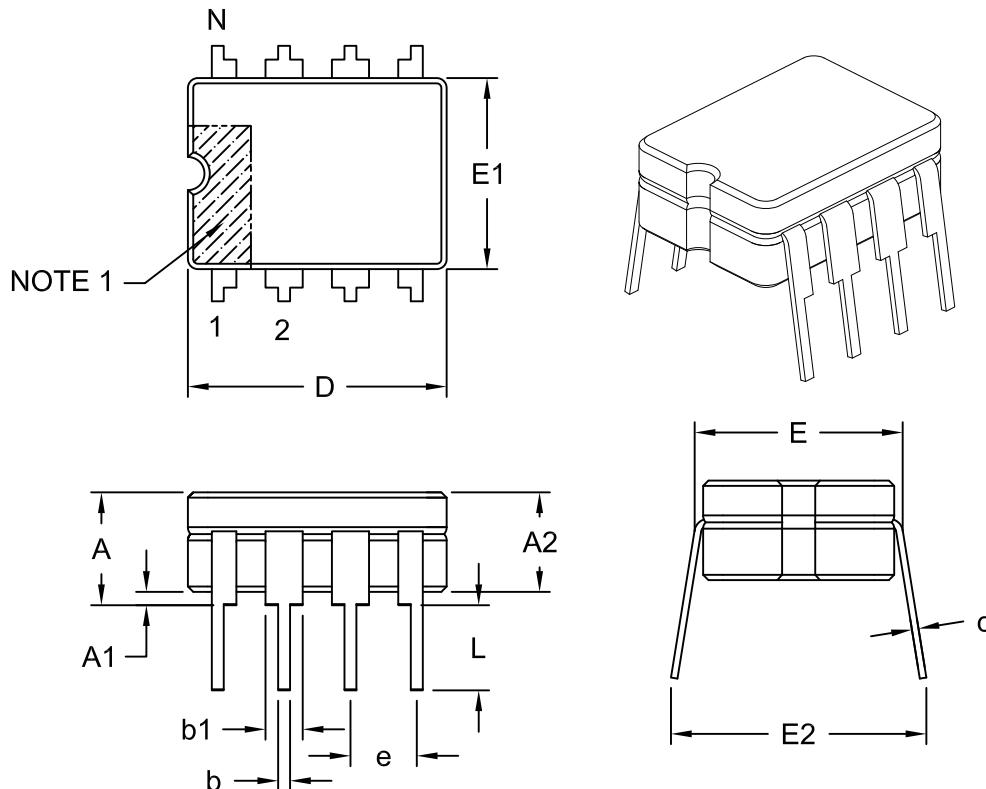
CERDIP Family

Ceramic Dual In-Line Packages

Packaging Diagrams and Parameters

8-Lead Ceramic Dual In-Line (JA) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		.100 BSC	
Top to Seating Plane	A	-	-	.200
Base to Seating Plane §	A1	.015	-	-
Ceramic Package Height	A2	.140	-	.175
Shoulder to Shoulder Width	E	.290	-	.320
Ceramic Pkg. Width	E1	.230	.248	.300
Overall Length	D	.370	.380	.400
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.314	-	.410

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

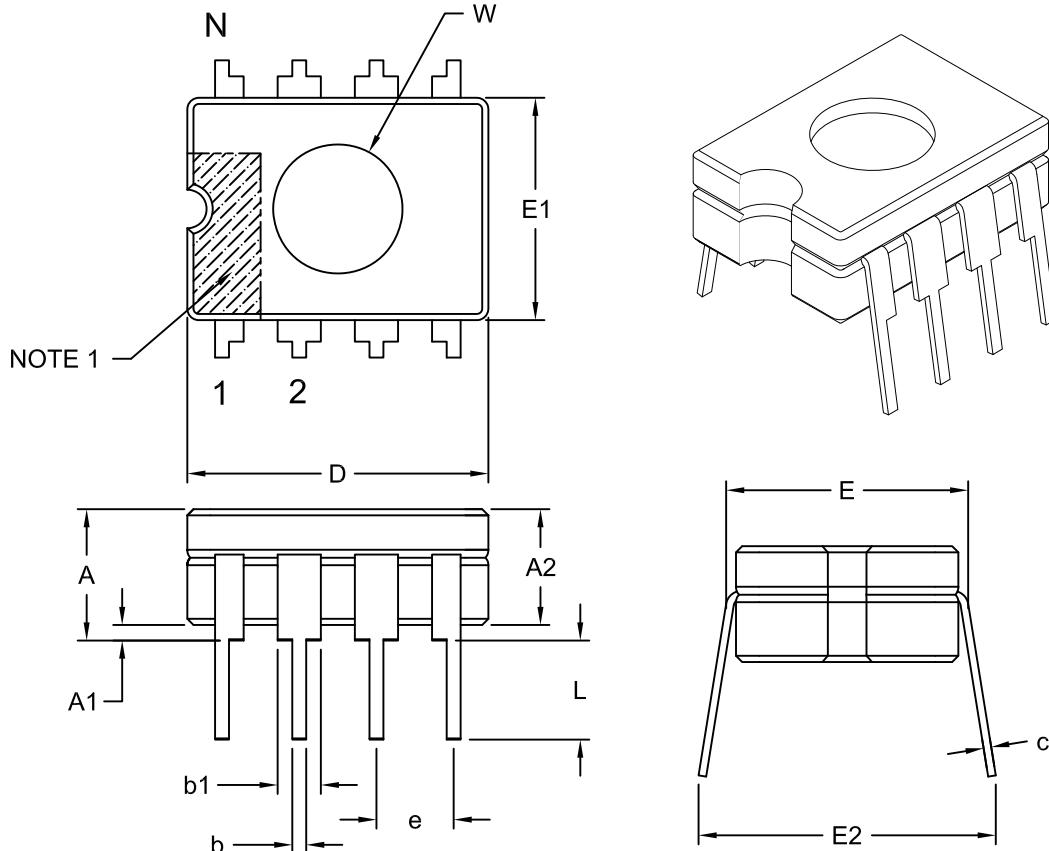
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-001C

Packaging Diagrams and Parameters

8-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	N			.230	.248	.300
Pitch	e			.100	BSC	
Top to Seating Plane	A	-	-	.140		.200
Base to Seating Plane §	A1	.015		.015		
Ceramic Package Height	A2			.065		.175
Shoulder to Shoulder Width	E	.290		.290		.320
Ceramic Pkg. Width	E1			.045		.055
Overall Length	D	.370	.380	.370	.380	.400
Tip to Seating Plane	L	.125		.125		.200
Lead Thickness	c	.008		.008		.015
Upper Lead Width	b1			.015		.023
Lower Lead Width	b			.314		.410
Overall Row Spacing	E2			.267	.270	.273
Window Diameter	W					

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.

2. § Significant Characteristic

3. Dimensioning and tolerancing per ASME Y14.5M

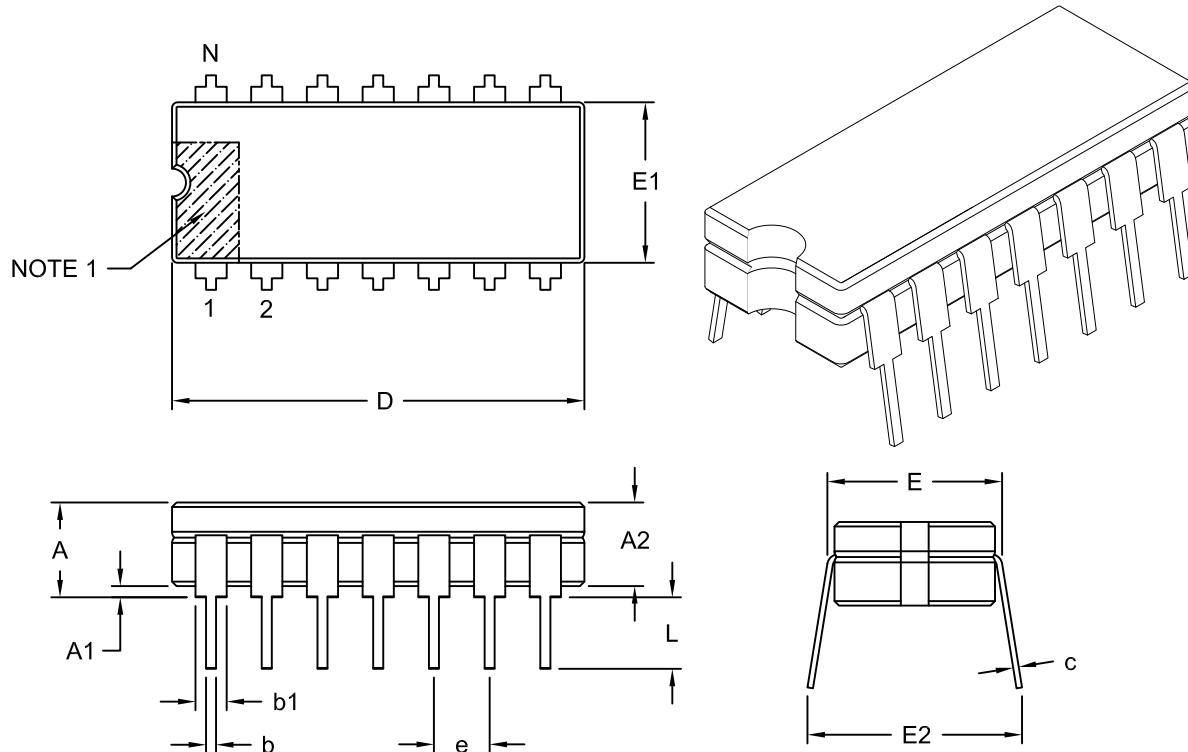
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-027C

Packaging Diagrams and Parameters

14-Lead Ceramic Dual In-Line (JD) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		14		
Pitch	e		.100	BSC	
Top to Seating Plane	A	-	-	.200	
Base to Seating Plane §	A1	.015	-	-	
Ceramic Package Height	A2	.140	-	.175	
Shoulder-to-Shoulder Width	E	.290	-	.325	
Ceramic Pkg. Width	E1	.230	.288	.300	
Overall Length	D	.740	.760	.780	
Tip to Seating Plane	L	.125	-	.200	
Lead Thickness	c	.008	-	.015	
Upper Lead Width	b1	.045	-	.065	
Lower Lead Width	b	.015	-	.023	
Overall Row Spacing	E2	.320	-	.410	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

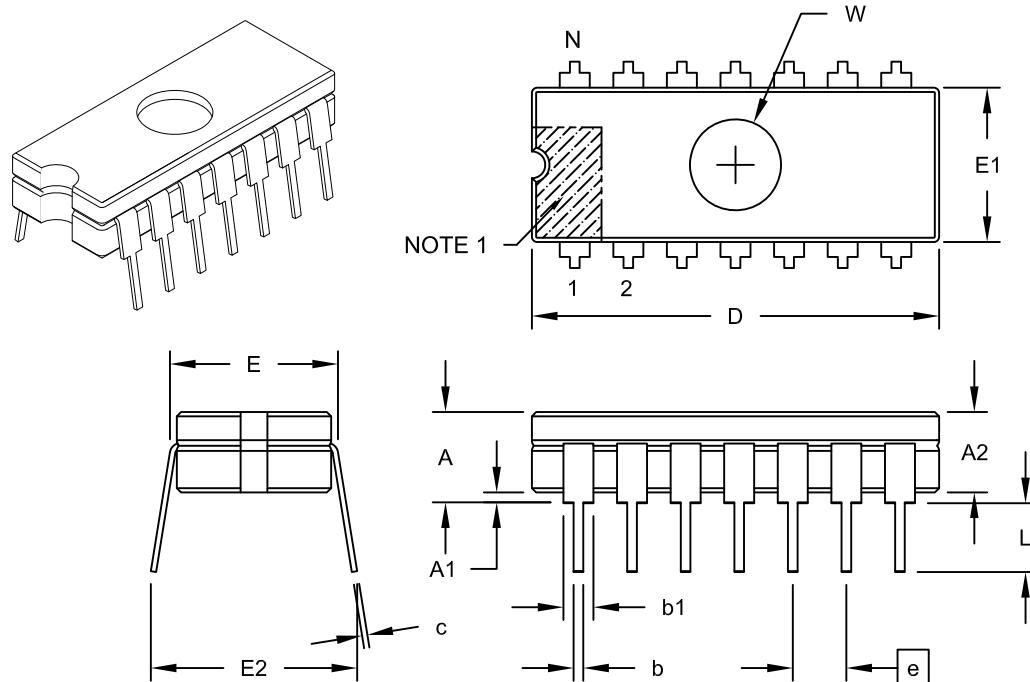
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-002C

Packaging Diagrams and Parameters

14-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		14	
Pitch	e		.100 BSC	
Top to Seating Plane	A	-	-	.200
Base to Seating Plane §	A1	.015	-	-
Ceramic Package Height	A2	.140	-	.175
Shoulder to Shoulder Width	E	.290	-	.325
Ceramic Pkg. Width	E1	.230	.288	.300
Overall Length	D	.740	.760	.780
Window Diameter	W	.125	.170	.210
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.320	-	.410

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.

2. § Significant Characteristic

3. Dimensioning and tolerancing per ASME Y14.5M.

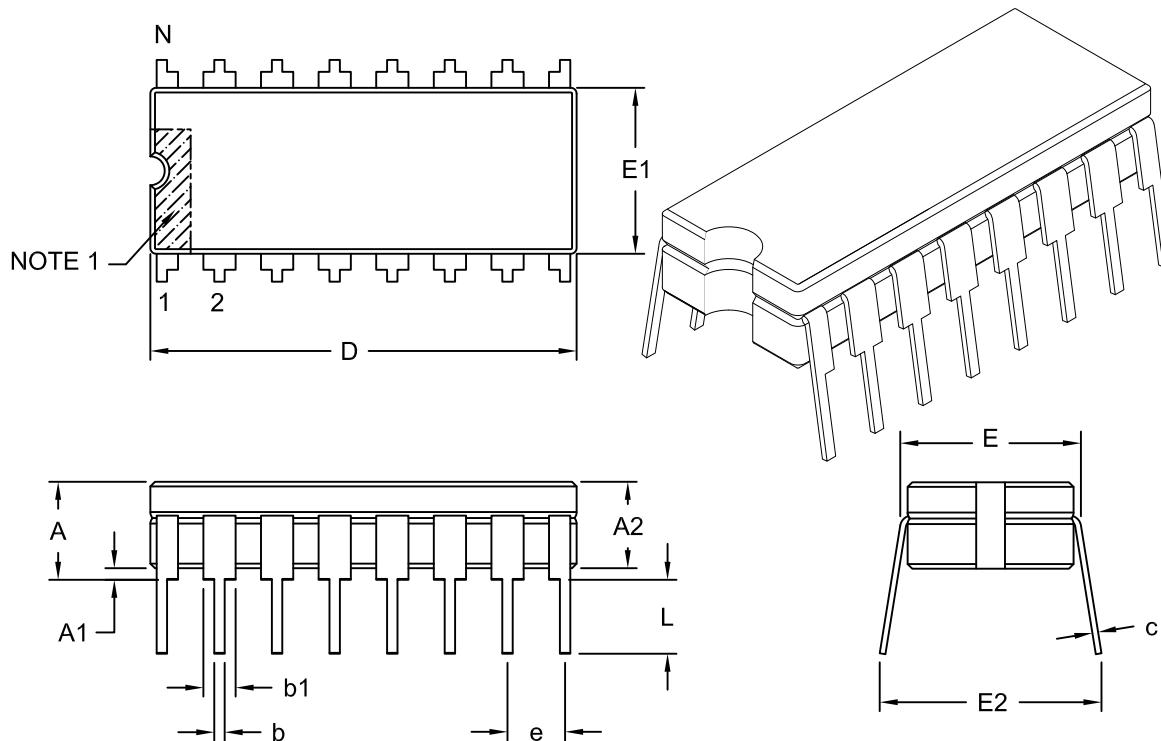
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

16-Lead Ceramic Dual In-Line (JE) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits		INCHES		
		MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		.100 BSC	
Top to Seating Plane	A	-	-	.200
Base to Seating Plane §	A1	.015	-	-
Ceramic Package Height	A2	.140	-	.175
Shoulder to Shoulder Width	E	.290	-	.325
Ceramic Pkg. Width	E1	.245	.288	.300
Overall Length	D	.740	.760	.780
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.320	-	.410

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

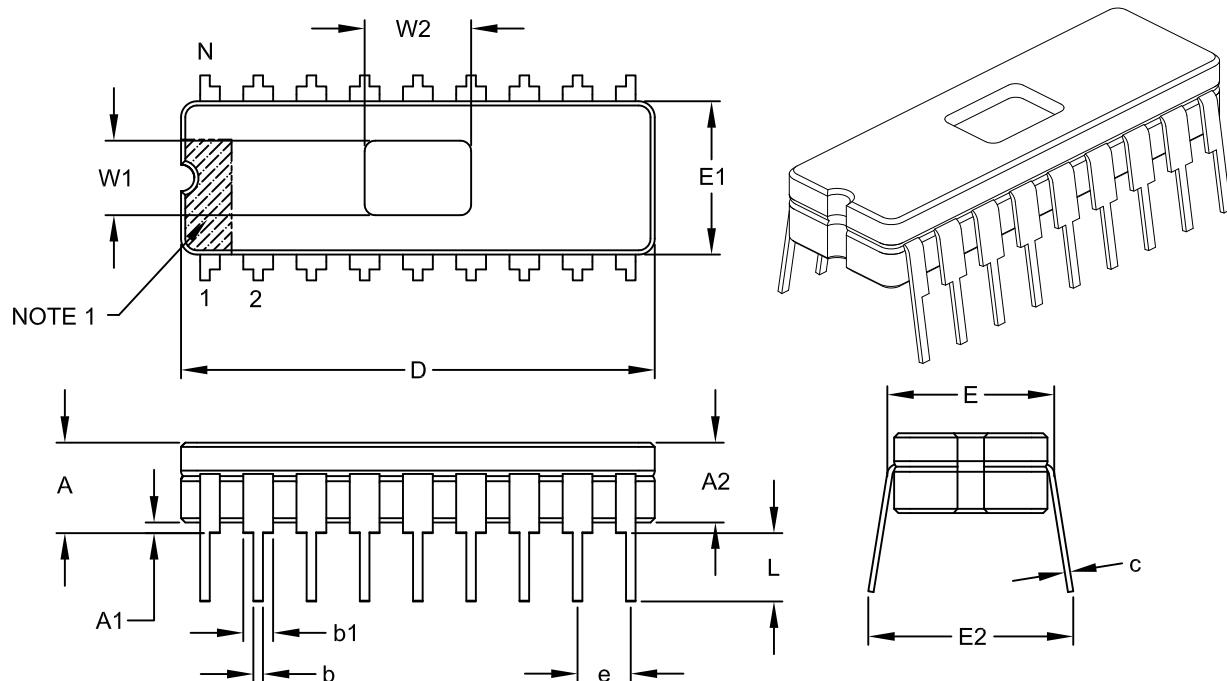
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-003C

Packaging Diagrams and Parameters

18-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units			INCHES		
	N	MIN	NOM	MAX		
Number of Pins	18					
Pitch	e	.100	BSC			
Top to Seating Plane	A	-	-	.200		
Ceramic Package Height	A2	.140	-	.175		
Base to Seating Plane §	A1	.015	-	-		
Shoulder to Shoulder Width	E	.308	-	.325		
Ceramic Pkg. Width	E1	.280	.288	.296		
Overall Length	D	.882	.890	.910		
Tip to Seating Plane	L	.125	-	.200		
Lead Thickness	c	.008	-	.014		
Upper Lead Width	b1	.045	-	.065		
Lower Lead Width	b	.015	-	.023		
Overall Row Spacing	E2	.325	-	.410		
Window Width	W1	.130	.140	.150		
Window Length	W2	.190	.200	.210		

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

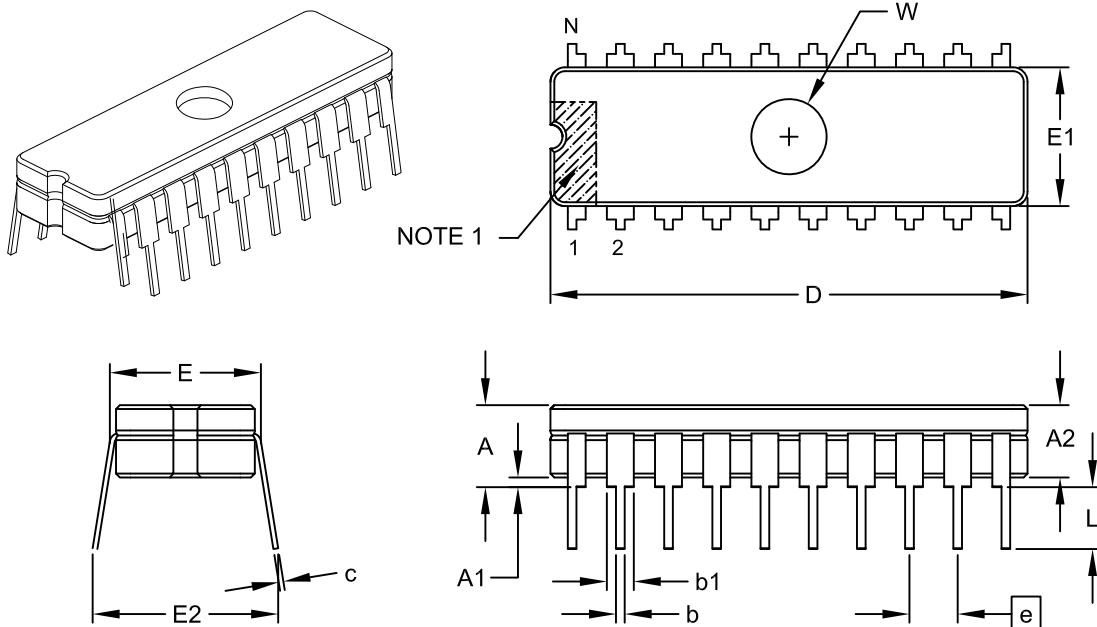
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-010C

Packaging Diagrams and Parameters

20-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N	20		
Pitch	e	.100	BSC	
Top to Seating Plane	A	-	-	.200
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.308	-	.325
Ceramic Package Width	E1	.280	.288	.296
Overall Length	D	.942	.950	.970
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.014
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.325	-	.410
Window Diameter	W	.167	.170	.173

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

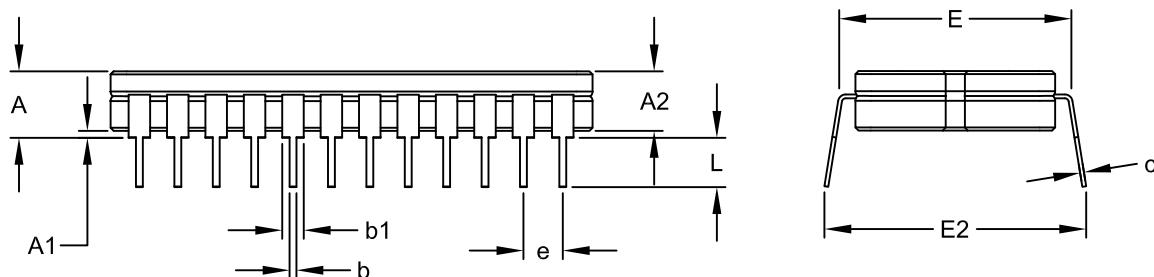
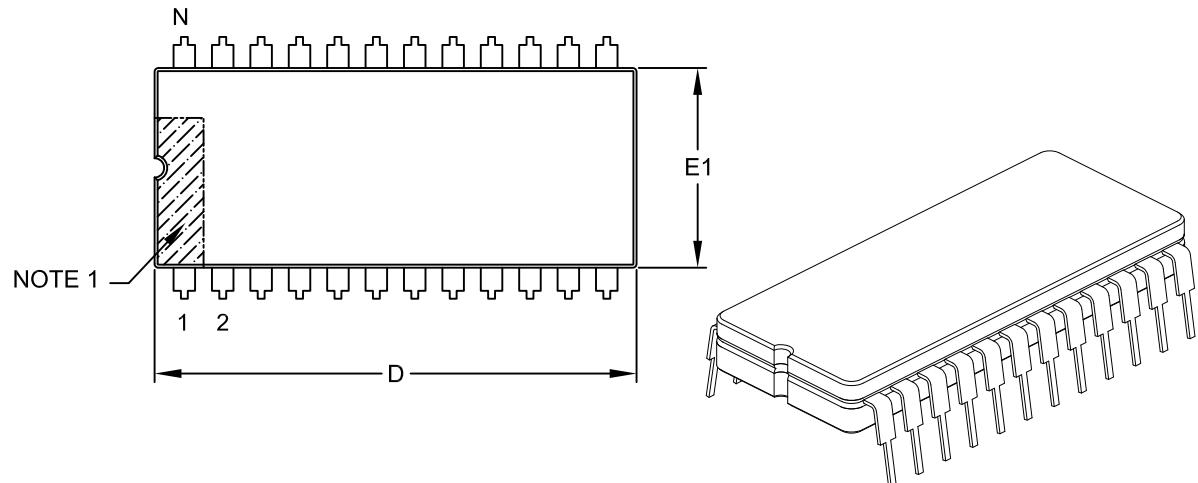
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-115C

Packaging Diagrams and Parameters

24-Lead Ceramic Dual In-Line (JG) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	INCHES		
		MIN	NOM	MAX
Number of Pins	N		24	
Pitch	e		.100 BSC	
Top to Seating Plane	A	-	-	.225
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.590	-	.625
Ceramic Pkg. Width	E1	.510	.520	.540
Overall Length	D	1.240	1.250	1.270
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.620	-	.710

Notes:

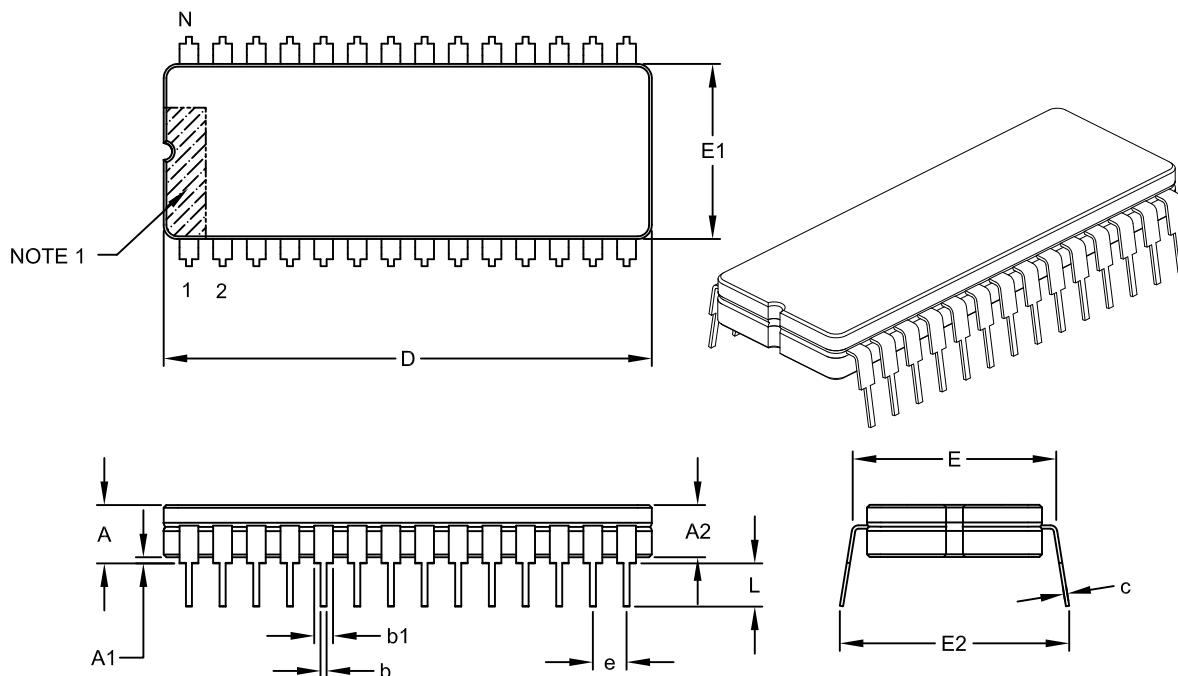
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

28-Lead Ceramic Dual In-Line (JN) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N			28	
Pitch	e			.100 BSC	
Top to Seating Plane	A	-	-	.225	
Ceramic Package Height	A2	.140	-	.175	
Base to Seating Plane §	A1	.015	-	-	
Shoulder to Shoulder Width	E	.590	-	.625	
Ceramic Pkg. Width	E1	.510	.520	.540	
Overall Length	D	1.440	1.450	1.470	
Tip to Seating Plane	L	.125	-	.200	
Lead Thickness	c	.008	-	.015	
Upper Lead Width	b1	.045	-	.065	
Lower Lead Width	b	.015	-	.023	
Overall Row Spacing	E2	.620	-	.710	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

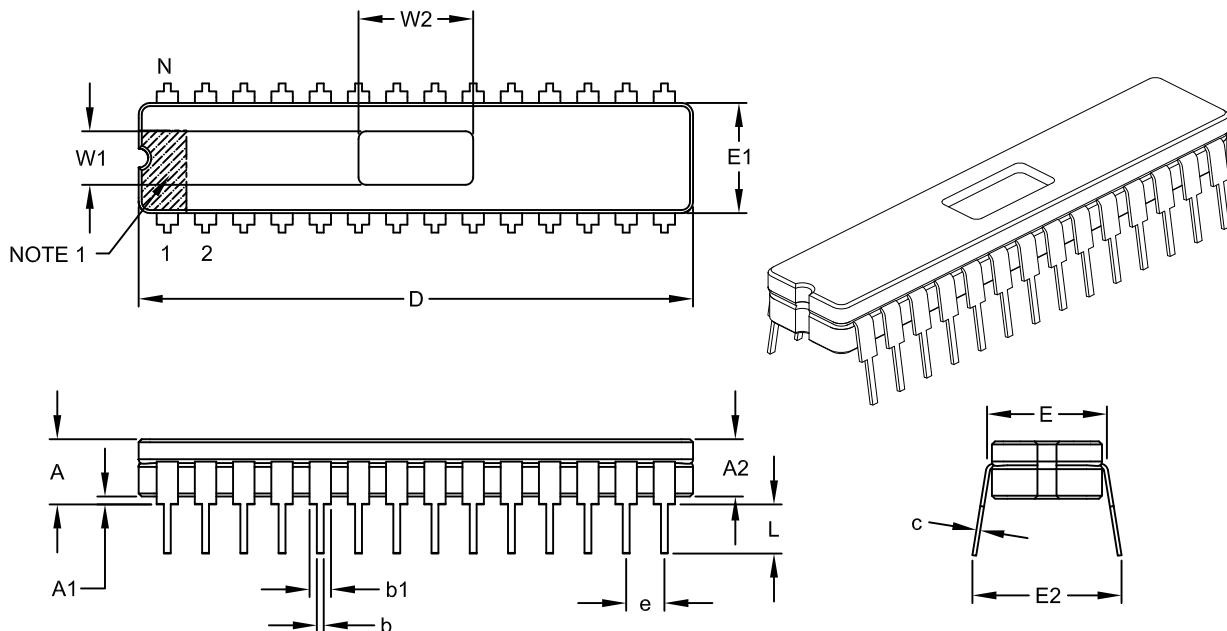
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-006C

Packaging Diagrams and Parameters

28-Lead Ceramic Dual In-Line with Window (JW) ~ .300" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Limits	INCHES		
		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		.100 BSC	
Top to Seating Plane	A	-	-	.200
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.308	-	.325
Ceramic Package Width	E1	.280	.288	.296
Overall Length	D	1.442	1.450	1.470
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.014
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.325	-	.410
Window Width	W1	.130	.140	.150
Window Length	W2	.290	.300	.310

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

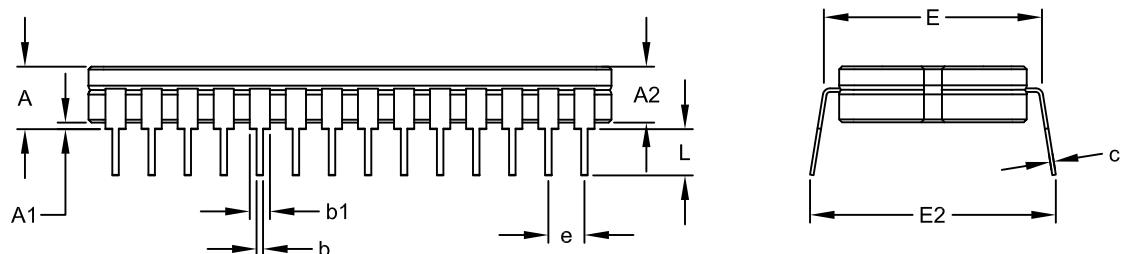
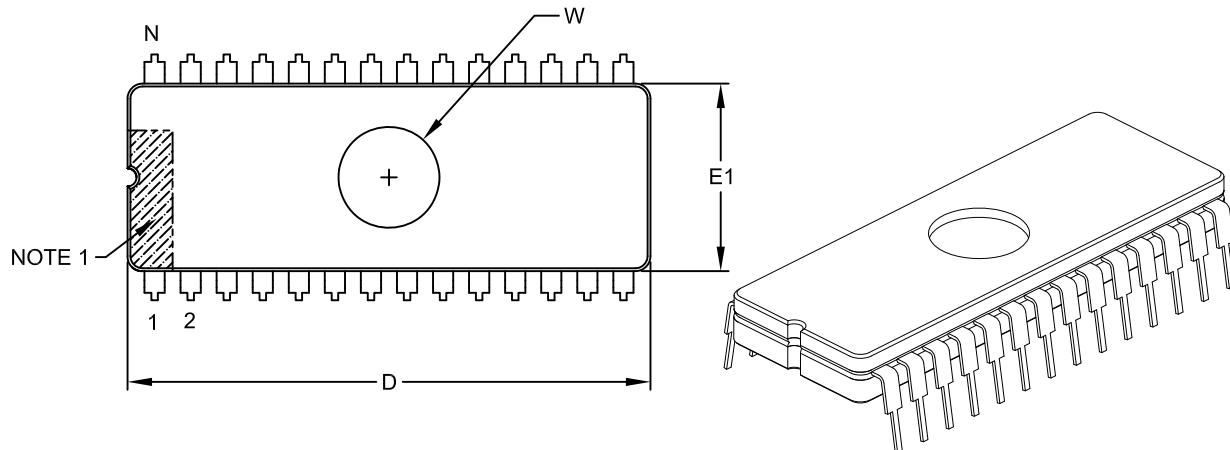
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-080C

Packaging Diagrams and Parameters

28-Lead Ceramic Dual In-Line with Window (JW) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



	Dimension Limits	Units INCHES		
		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		.100 BSC	
Top to Seating Plane	A	-	-	.225
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.590	-	.625
Ceramic Package Width	E1	.510	.520	.540
Overall Length	D	1.440	1.450	1.470
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.620	-	.710
Window Diameter	W	.270	.280	.290

Notes:

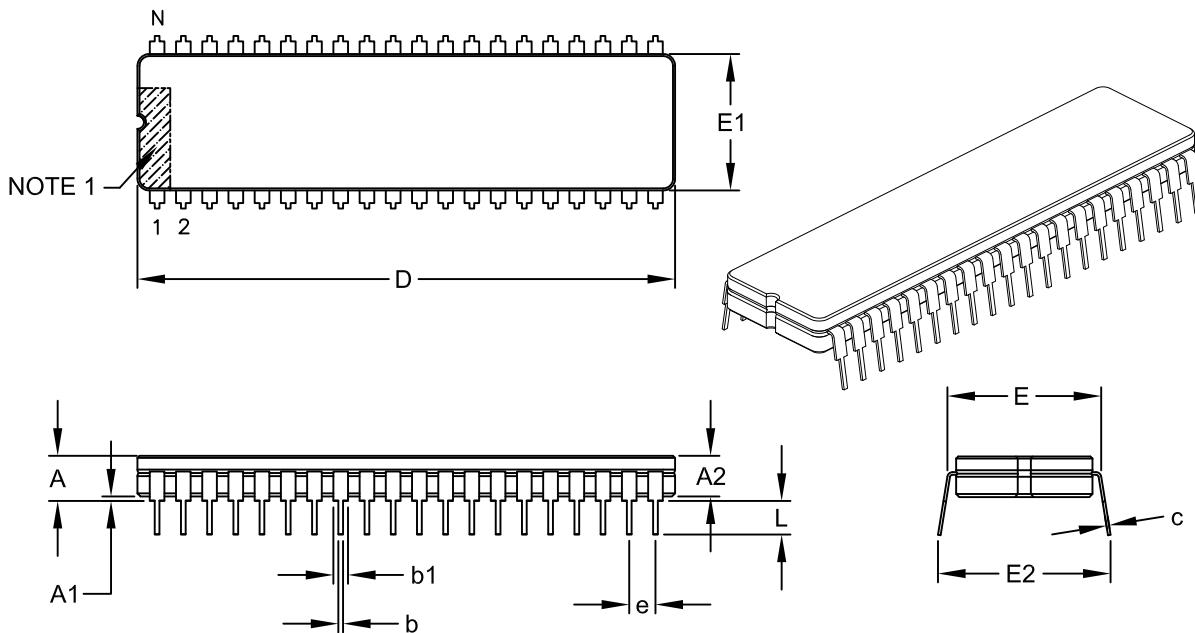
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

40-Lead Ceramic Dual In-Line (JK) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	N	40				
Pitch	e	.100 BSC				
Top to Seating Plane	A	-	-	.225		
Ceramic Package Height	A2	.140	-	.175		
Base to Seating Plane §	A1	.015	-	-		
Shoulder to Shoulder Width	E	.590	-	.625		
Ceramic Package Width	E1	.510	.520	.540		
Overall Length	D	2.030	2.050	2.070		
Tip to Seating Plane	L	.125	-	.200		
Lead Thickness	c	.008	-	.015		
Upper Lead Width	b1	.045	-	.065		
Lower Lead Width	b	.015	-	.023		
Overall Row Spacing	E2	.620	-	.710		

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

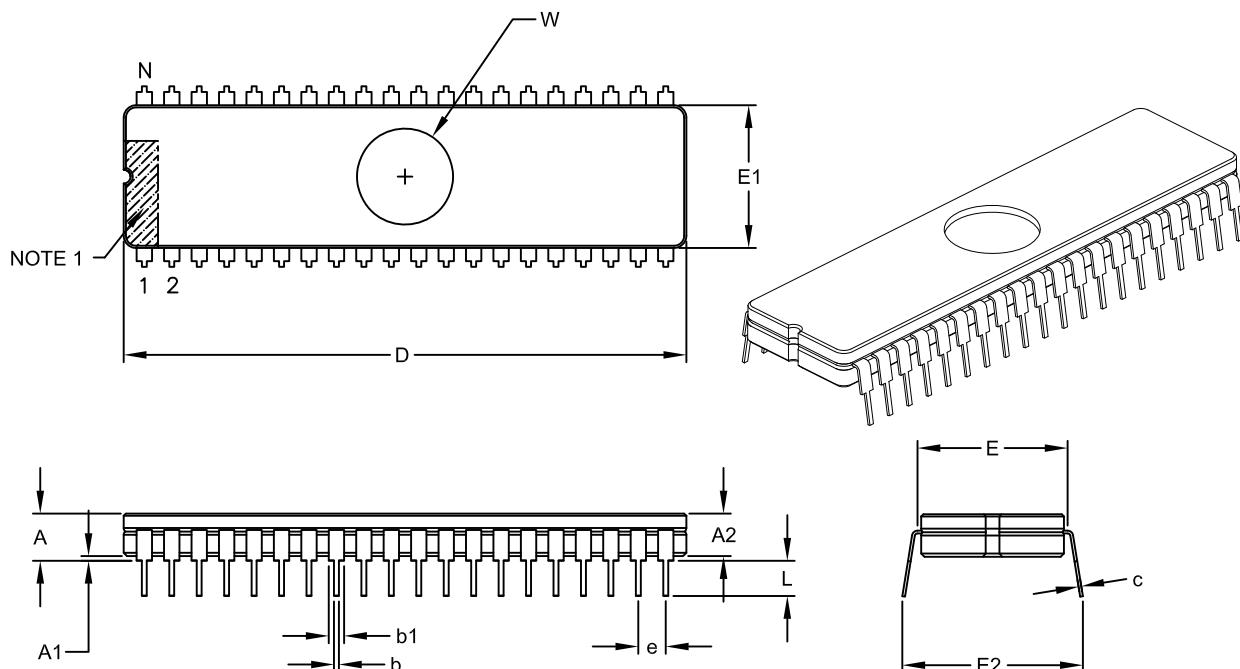
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-008C

Packaging Diagrams and Parameters

40-Lead Ceramic Dual In-Line with Window (JW) ~ .600" Body [CERDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	40		
Pitch	e	.100	BSC	
Top to Seating Plane	A	-	-	.225
Ceramic Package Height	A2	.140	-	.175
Base to Seating Plane §	A1	.015	-	-
Shoulder to Shoulder Width	E	.590	-	.625
Ceramic Package Width	E1	.510	.520	.583
Overall Length	D	2.030	2.050	2.070
Tip to Seating Plane	L	.125	-	.200
Lead Thickness	c	.008	-	.015
Upper Lead Width	b1	.045	-	.065
Lower Lead Width	b	.015	-	.023
Overall Row Spacing	E2	.620	-	.710
Window Diameter	W	.340	.350	.360

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

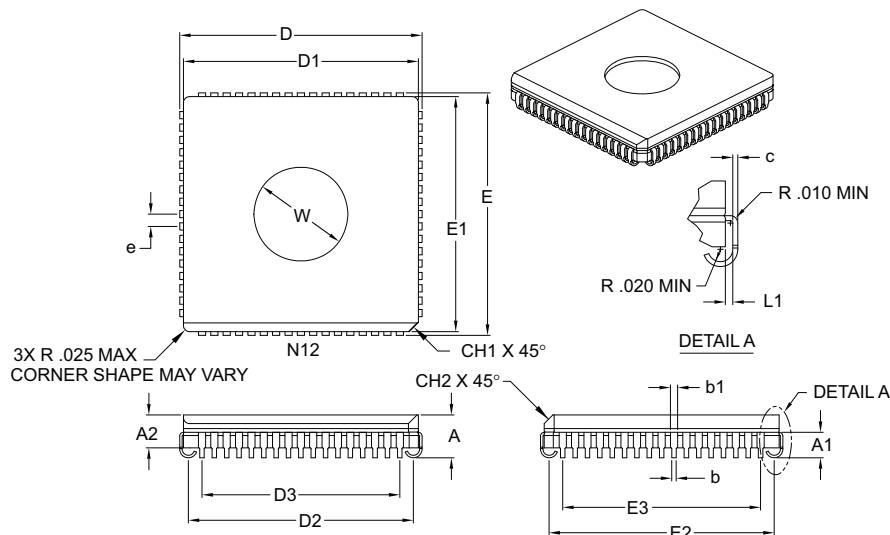
CERQUAD Family

Ceramic Leaded Chip Carrier Packages

Packaging Diagrams and Parameters

68-Lead Ceramic Leaded (CL) Chip Carrier with Window – Square [CERQUAD]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		68		
Pitch	e		.050	BSC	
Overall Height	A	.155	.172	.190	
Package Thickness	A2		.132	REF	
Lead Height	A1	0.90	.100	.120	
Side Chamfer	CH2		.035	REF	
Corner Chamfer	CH1		.040	REF	
Overall Package Width	E	.985	.990	.995	
Overall Package Length	D	.985	.990	.995	
Ceramic Package Width	E1	.930	.950	.965	
Ceramic Package Length	D1	.930	.950	.965	
Overall Lead Centers	E3		.800	REF	
Overall Lead Centers	D3		.800	REF	
Footprint Width	E2	.880	.910	.940	
Footprint Length	D2	.880	.910	.940	
Lead Length	L1	.006	—	—	
Lead Thickness	c	.006	.007	.010	
Upper Lead Width	b1	.026	.029	.032	
Lower Lead Width	b	.017	.019	.021	
Window Diameter	W	.370	.380	.390	

Notes:

- Dimensions D1 and E1 do not include glass protrusion. These protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

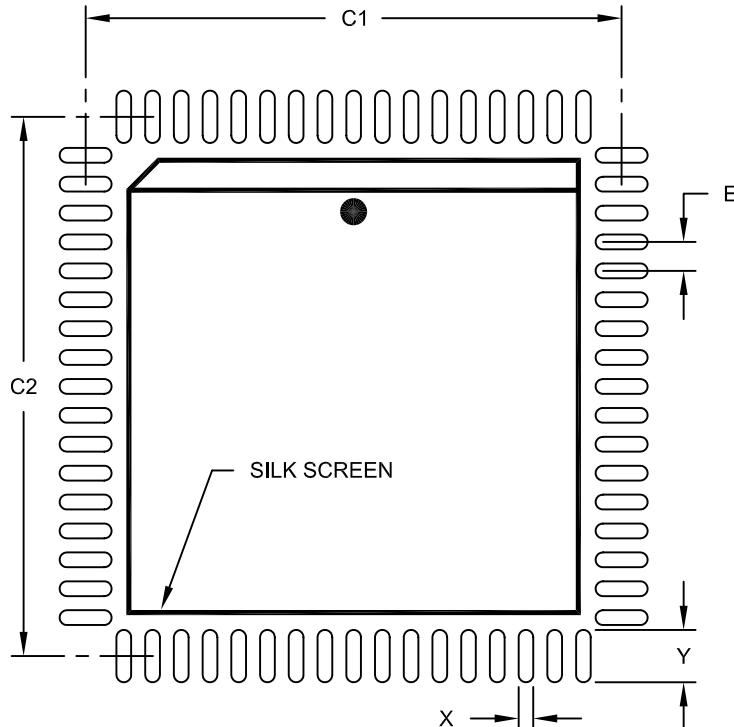
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-097B

Land Pattern (Footprint)

68-Lead Ceramic Leaded (CL) Chip Carrier with Window - Square [CERQUAD]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	INCHES		
		MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.933	
Contact Pad Spacing	C2		.933	
Contact Pad Width (X68)	X1			.026
Contact Pad Length (X68)	Y1			.091

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

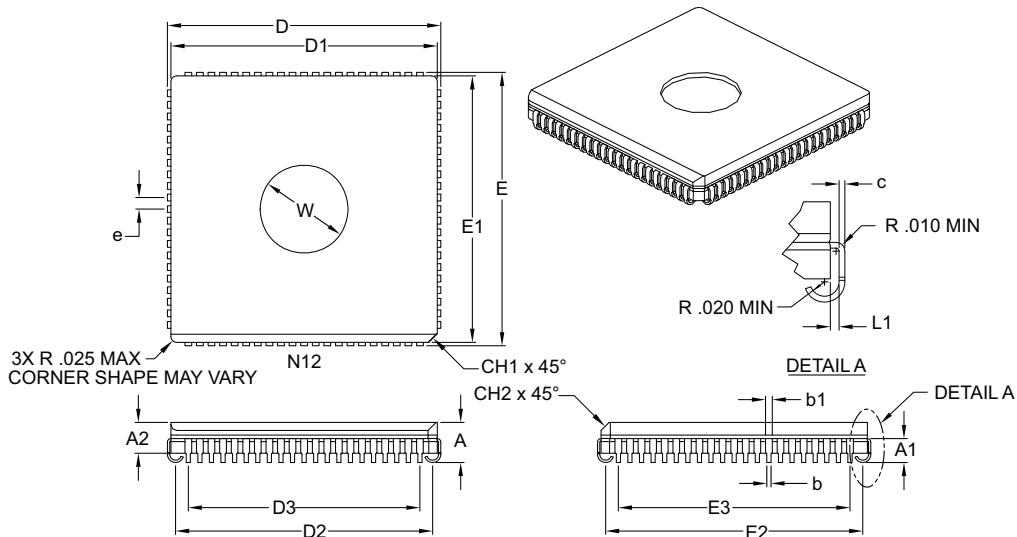
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2097A

Packaging Diagrams and Parameters

84-Lead Ceramic Leaded (CL) Chip Carrier with Window – Square [CERQUAD]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N			84	
Pitch	e			.050 BSC	
Overall Height	A		.155	.172	.190
Package Thickness	A2			.132 REF	
Lead Height	A1		0.90	.100	.120
Side Chamfer	CH2			.035 REF	
Corner Chamfer	CH1			.040 REF	
Overall Package Width	E		1.185	1.190	1.195
Overall Package Length	D		1.185	1.190	1.195
Ceramic Package Width	E1		1.130	1.150	1.165
Ceramic Package Length	D1		1.130	1.150	1.165
Overall Lead Centers	E3			1.00 REF	
Overall Lead Centers	D3			1.00 REF	
Footprint Width	E2		1.080	1.110	1.140
Footprint Length	D2		1.080	1.110	1.140
Lead Length	L1		.006	–	–
Lead Thickness	c		.006	.007	.010
Lower Lead Width	b		.017	.019	.021
Upper Lead Width	b1		.026	.029	.032
Window Diameter	W		.395	.400	.405

Notes:

- Dimensions D1 and E1 do not include glass protrusion. These protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

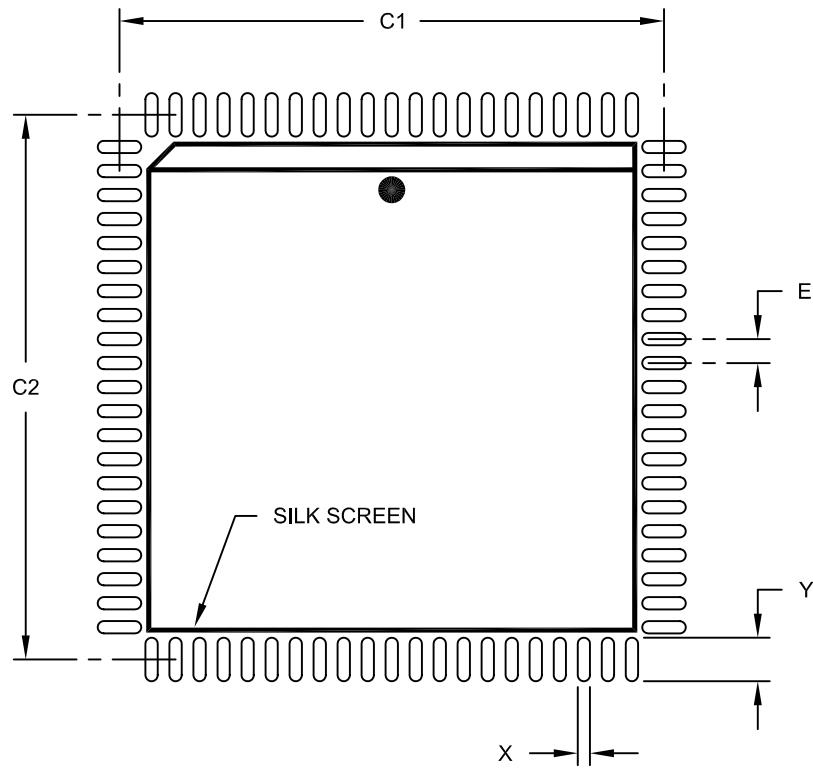
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-112B

Land Pattern (Footprint)

84-Lead Ceramic Leaded (CL) Chip Carrier with Window - Square [CERQUAD]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		.050	
Contact Pad Spacing	C1		1.134	
Contact Pad Spacing	C2		1.134	
Contact Pad Width (X84)	X			.026
Contact Pad Length (X84)	Y			.091

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2112A

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

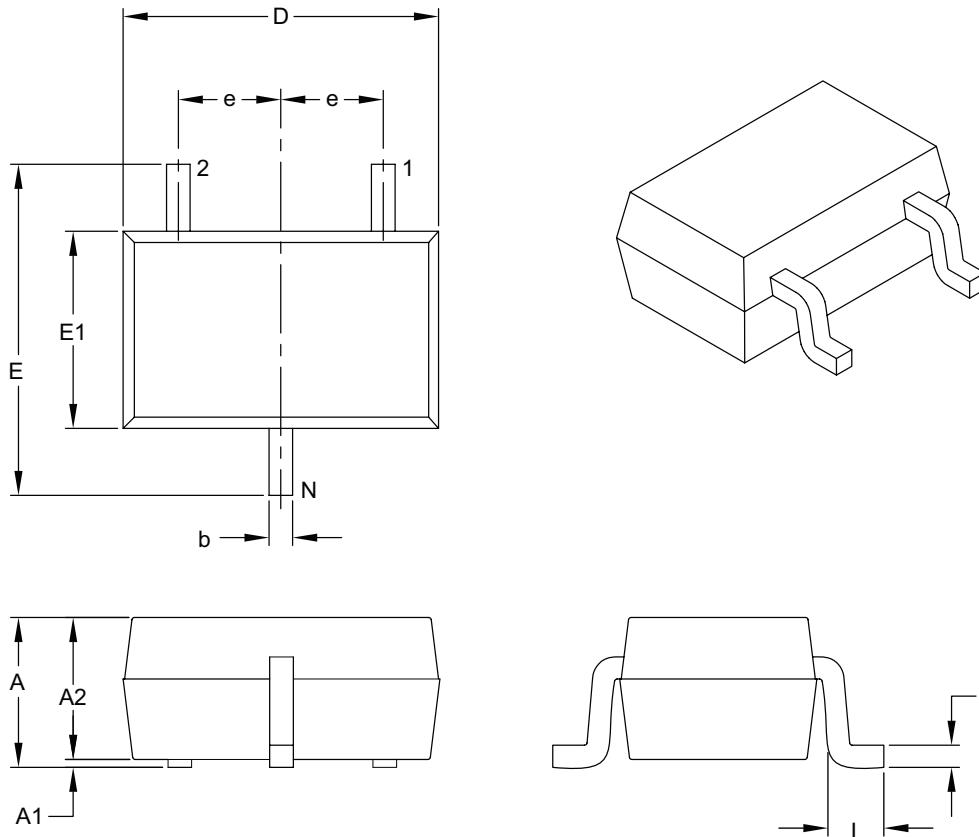
SOT Family

Small Outline Transistor Packages

Packaging Diagrams and Parameters

3-Lead Plastic Small Outline Transistor (LB) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		UNITS			MILLIMETERS		
		DIMENSION LIMITS			MIN	NOM	MAX
Number of Pins	N				3		
Pitch	e				0.65	BSC	
Overall Height	A	0.80		—	1.10		
Molded Package Thickness	A2	0.80		—	1.00		
Standoff	A1	0.00		—	0.10		
Overall Width	E	1.80		2.10	2.40		
Molded Package Width	E1	1.15		1.25	1.35		
Overall Length	D	1.80		2.00	2.25		
Foot Length	L	0.10		0.20	0.46		
Lead Thickness	c	0.08		—	0.26		
Lead Width	b	0.15		—	0.40		

Notes:

- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

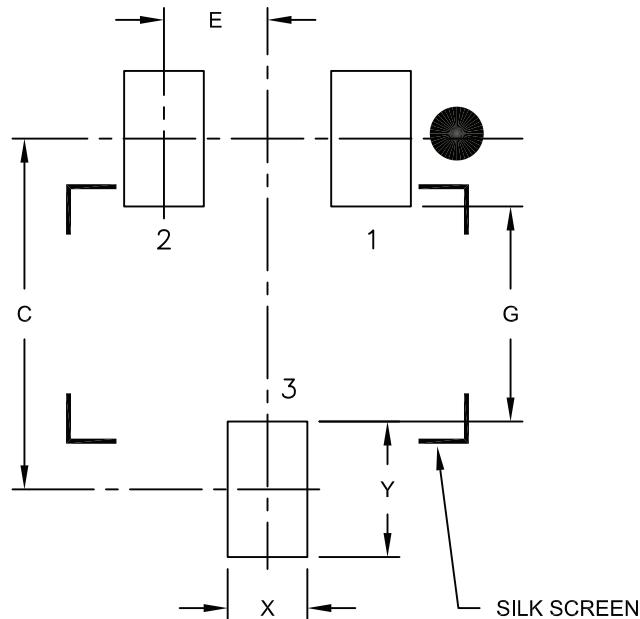
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-060B

Land Pattern (Footprint)

3-Lead Plastic Small Outline Transistor (LB) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65	BSC	
Contact Pad Spacing	C		2.20		
Contact Pad Width	X			0.50	
Contact Pad Length	Y			0.95	
Distance Between Pads	G	1.25			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

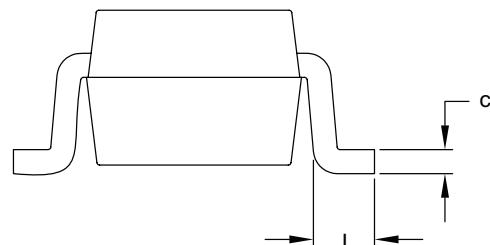
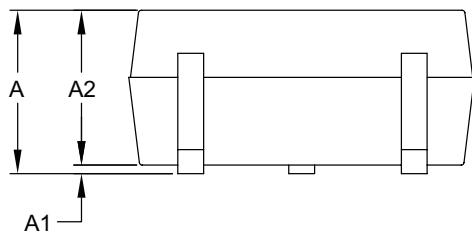
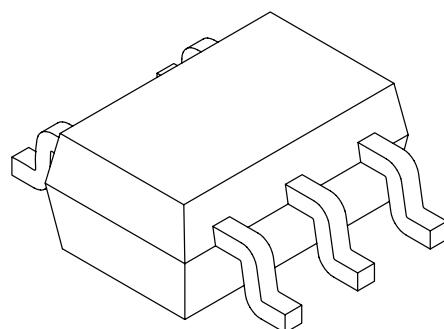
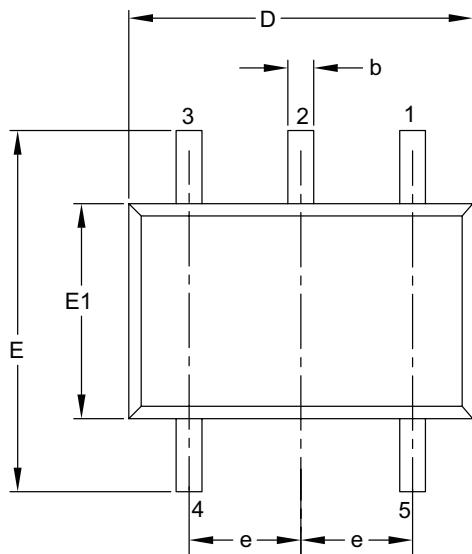
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2060A

Packaging Diagrams and Parameters

5-Lead Plastic Small Outline Transistor (LT) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		5		
Pitch	e		0.65	BSC	
Overall Height	A	0.80	—	1.10	
Molded Package Thickness	A2	0.80	—	1.00	
Standoff	A1	0.00	—	0.10	
Overall Width	E	1.80	2.10	2.40	
Molded Package Width	E1	1.15	1.25	1.35	
Overall Length	D	1.80	2.00	2.25	
Foot Length	L	0.10	0.20	0.46	
Lead Thickness	c	0.08	—	0.26	
Lead Width	b	0.15	—	0.40	

Notes:

- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

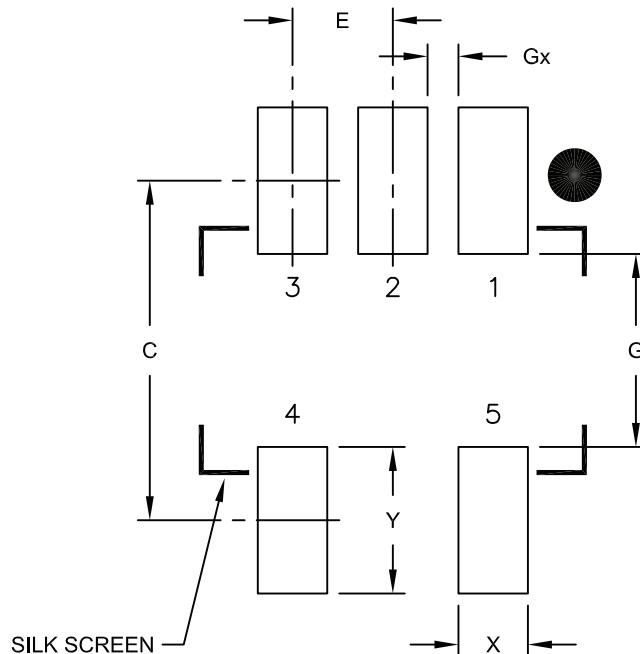
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-061B

Land Pattern (Footprint)

5-Lead Plastic Small Outline Transistor (LT) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.65	BSC	
Contact Pad Spacing	C		2.20		
Contact Pad Width	X			0.45	
Contact Pad Length	Y			0.95	
Distance Between Pads	G	1.25			
Distance Between Pads	Gx	0.20			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

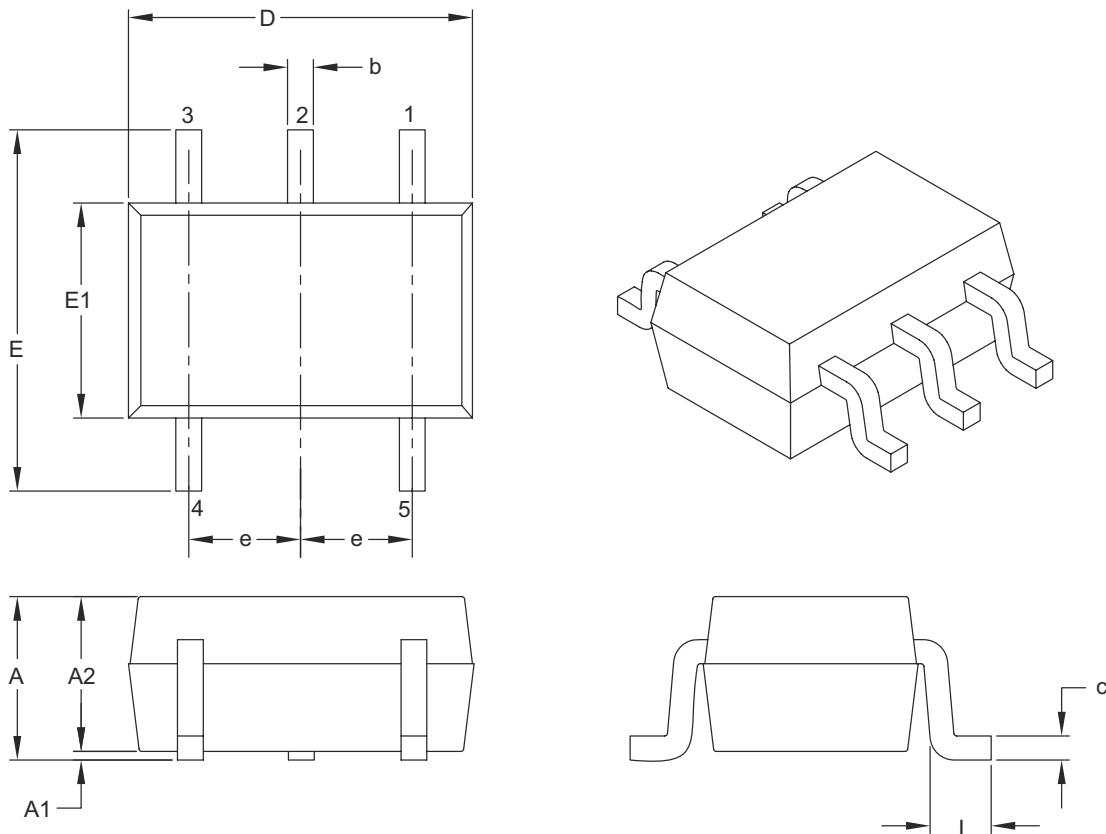
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2061A

Packaging Diagrams and Parameters

5-Lead Plastic Small Outline Transistor (LTY) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		5	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	—	1.10
Molded Package Thickness	A2	0.80	—	1.00
Standoff	A1	0.00	—	0.10
Overall Width	E	1.80	2.10	2.40
Molded Package Width	E1	1.15	1.25	1.35
Overall Length	D	1.80	2.00	2.25
Foot Length	L	0.10	0.20	0.46
Lead Thickness	c	0.08	—	0.26
Lead Width	b	0.15	—	0.40

Notes:

- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

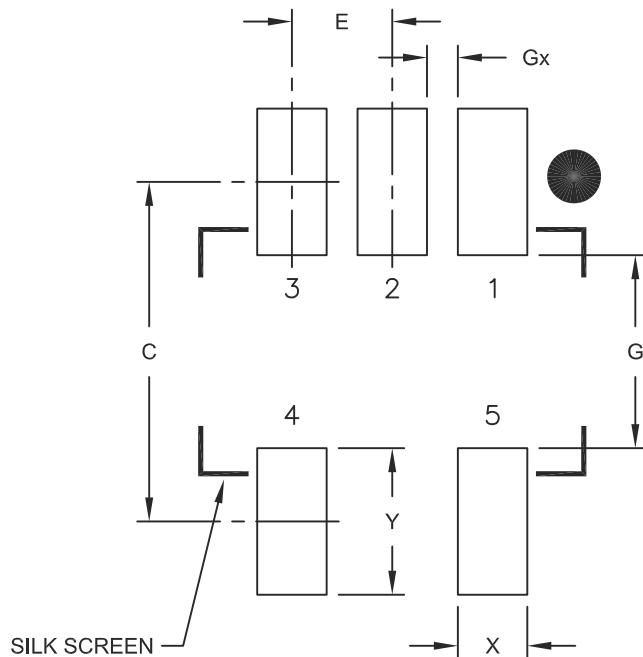
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-061B

Land Pattern (Footprint)

5-Lead Plastic Small Outline Transistor (LTY) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65	BSC
Contact Pad Spacing	C		2.20	
Contact Pad Width	X			0.45
Contact Pad Length	Y			0.95
Distance Between Pads	G	1.25		
Distance Between Pads	Gx	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

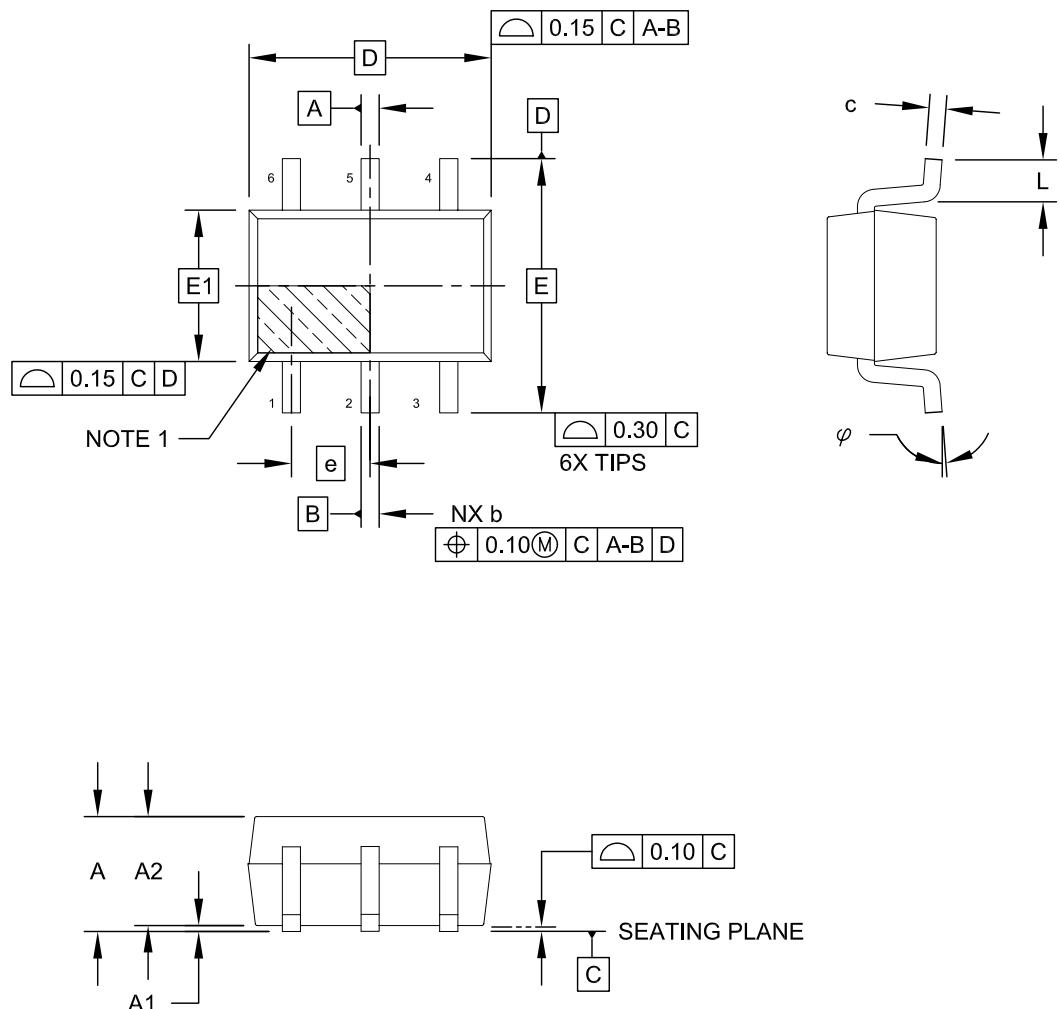
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2061A

Packaging Diagrams and Parameters

6-Lead Plastic Small Outline Transistor (LT) [SC70]

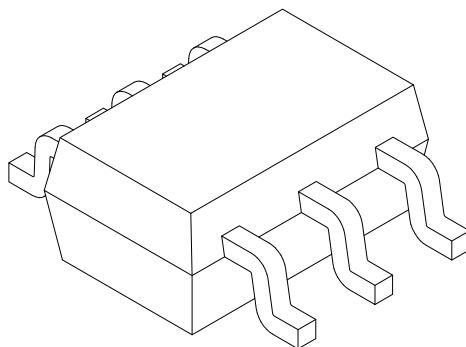
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

6-Lead Plastic Small Outline Transistor (LT) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		6		
Pitch	e		0.65	BSC	
Overall Height	A	0.80	-	1.10	
Molded Package Thickness	A2	0.70	0.90	1.00	
Standoff	A1	0.00	-	0.10	
Overall Width	E	2.10 BSC			
Molded Package Width	E1	1.25 BSC			
Overall Length	D	2.00 BSC			
Foot Length	L	0.10	0.20	0.46	
Lead Thickness	c	0.08	-	0.22	
Lead Width	b	0.15	-	0.30	

Notes:

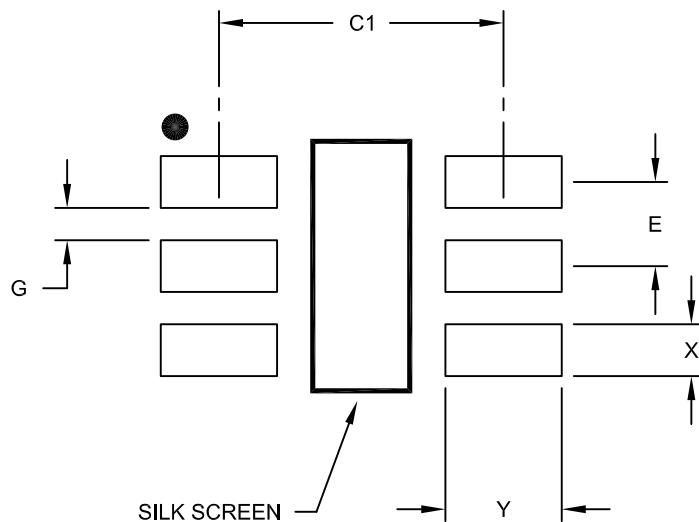
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

6-Lead Plastic Small Outline Transistor (LT) [SC70]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch		E			0.65 BSC		
Contact Pad Spacing		C			2.20		
Contact Pad Width (X6)		X			0.40		
Contact Pad Length (X6)		Y			0.90		
Distance Between Pads		G			0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

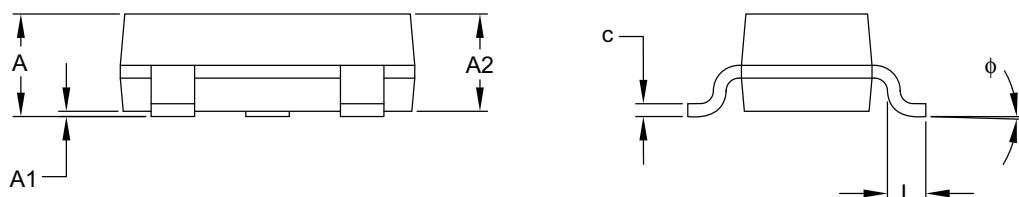
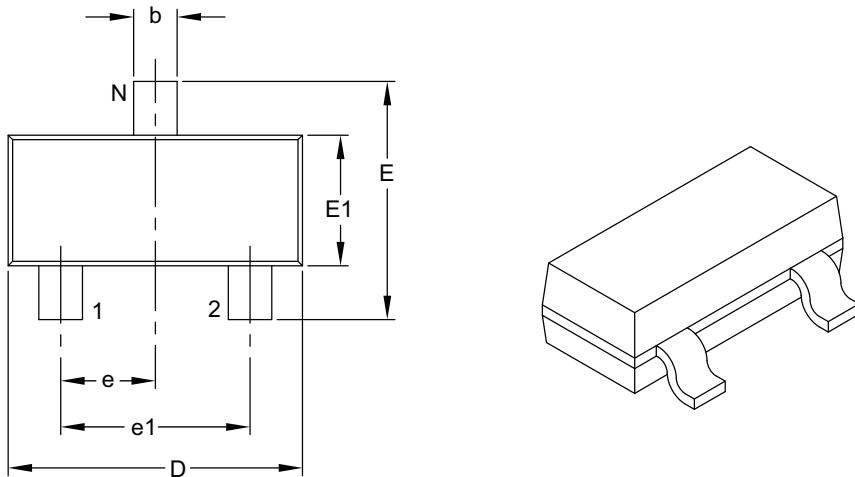
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2151A

Packaging Diagrams and Parameters

3-Lead Plastic Small Outline Transistor (NB) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		3		
Lead Pitch	e		0.95 BSC		
Outside Lead Pitch	e1		1.90 BSC		
Overall Height	A	0.89	—	1.12	
Molded Package Thickness	A2	0.79	0.95	1.02	
Standoff	A1	0.01	—	0.10	
Overall Width	E	2.10	—	2.64	
Molded Package Width	E1	1.16	1.30	1.40	
Overall Length	D	2.67	2.90	3.05	
Foot Length	L	0.13	0.50	0.60	
Foot Angle	ϕ	0°	—	10°	
Lead Thickness	c	0.08	—	0.20	
Lead Width	b	0.30	—	0.54	

Notes:

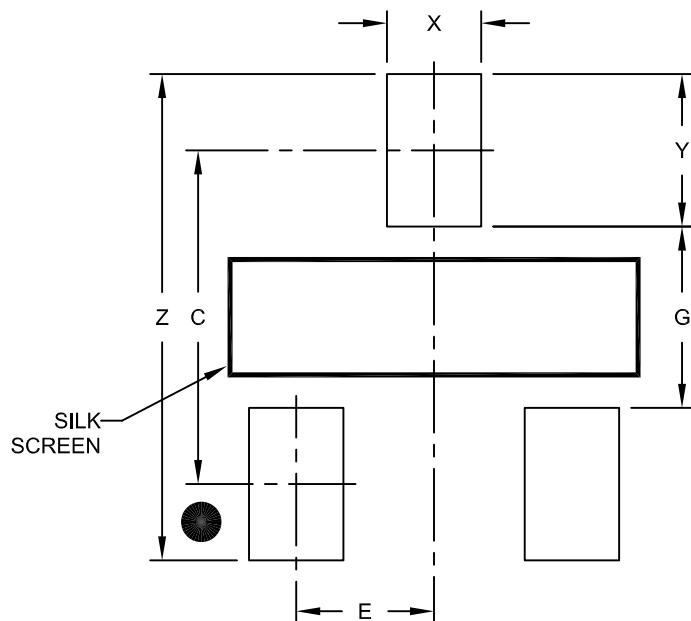
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

3-Lead Plastic Small Outline Transistor (NB) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.95	BSC	
Contact Pad Spacing	C		2.30	
Contact Pad Width (X3)	X			0.65
Contact Pad Length (Y3)	Y			1.05
Distance Between Pads	G	1.25		
Overall Width	Z			3.35

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

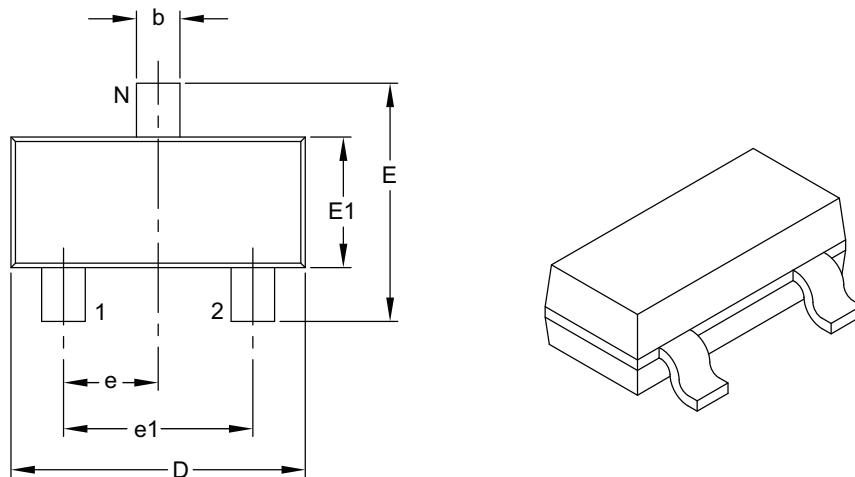
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2104A

Packaging Diagrams and Parameters

3-Lead Plastic Small Outline Transistor (TT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N			3	
Lead Pitch	e			0.95 BSC	
Outside Lead Pitch	e1			1.90 BSC	
Overall Height	A	0.89	—	1.12	
Molded Package Thickness	A2	0.79	0.95	1.02	
Standoff	A1	0.01	—	0.10	
Overall Width	E	2.10	—	2.64	
Molded Package Width	E1	1.16	1.30	1.40	
Overall Length	D	2.67	2.90	3.05	
Foot Length	L	0.13	0.50	0.60	
Foot Angle	phi	0°	—	10°	
Lead Thickness	c	0.08	—	0.20	
Lead Width	b	0.30	—	0.54	

Notes:

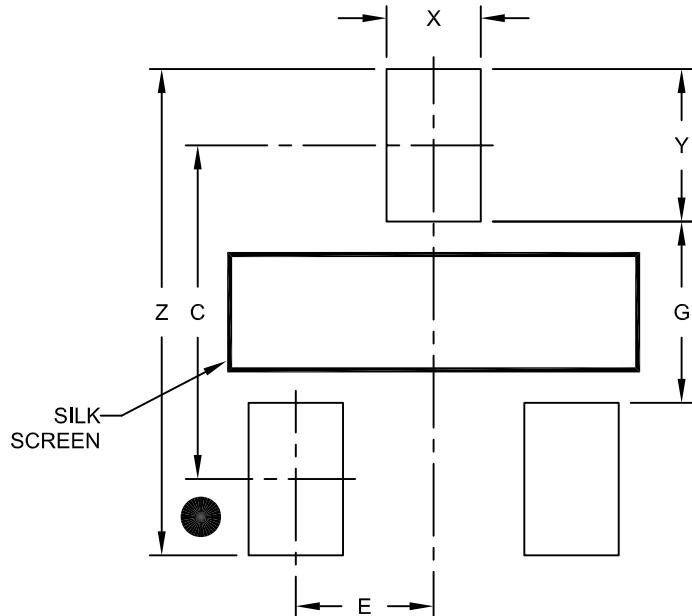
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

3-Lead Plastic Small Outline Transistor (TT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E				0.95	BSC	
Contact Pad Spacing	C				2.30		
Contact Pad Width (X3)	X					0.65	
Contact Pad Length (X3)	Y					1.05	
Distance Between Pads	G	1.25					
Overall Width	Z				3.35		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

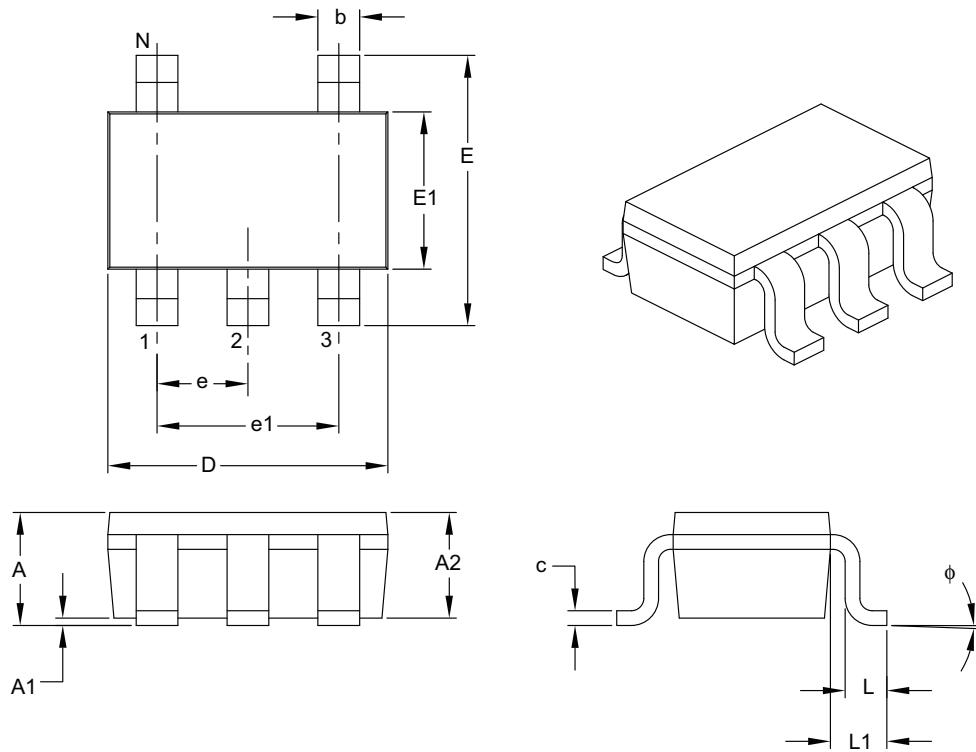
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2104A

Packaging Diagrams and Parameters

5-Lead Plastic Small Outline Transistor (CT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		5		
Lead Pitch	e		0.95 BSC		
Outside Lead Pitch	e1		1.90 BSC		
Overall Height	A	0.90	—	1.45	
Molded Package Thickness	A2	0.89	—	1.30	
Standoff	A1	0.00	—	0.15	
Overall Width	E	2.20	—	3.20	
Molded Package Width	E1	1.30	—	1.80	
Overall Length	D	2.70	—	3.10	
Foot Length	L	0.10	—	0.60	
Footprint	L1	0.35	—	0.80	
Foot Angle	φ	0°	—	30°	
Lead Thickness	c	0.08	—	0.26	
Lead Width	b	0.20	—	0.51	

Notes:

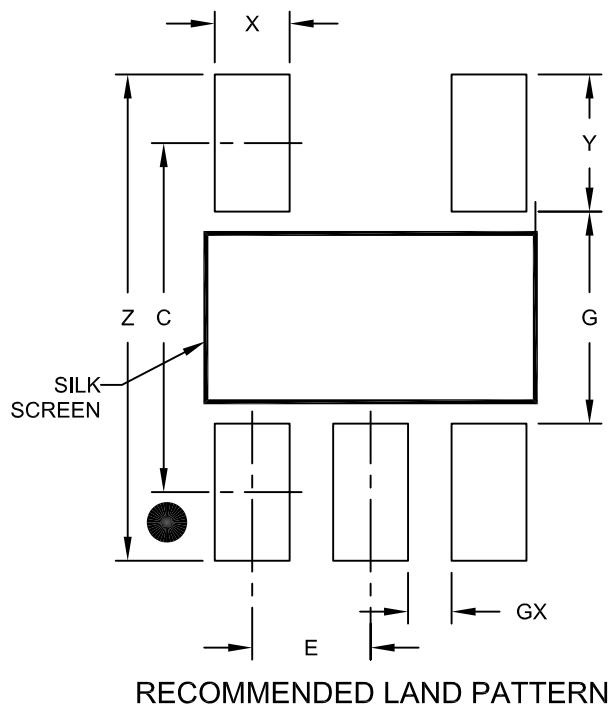
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

5-Lead Plastic Small Outline Transistor (CT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.95	BSC	
Contact Pad Spacing	C		2.80	
Contact Pad Width (X5)	X			0.60
Contact Pad Length (X5)	Y			1.10
Distance Between Pads	G	1.70		
Distance Between Pads	GX	0.35		
Overall Width	Z			3.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

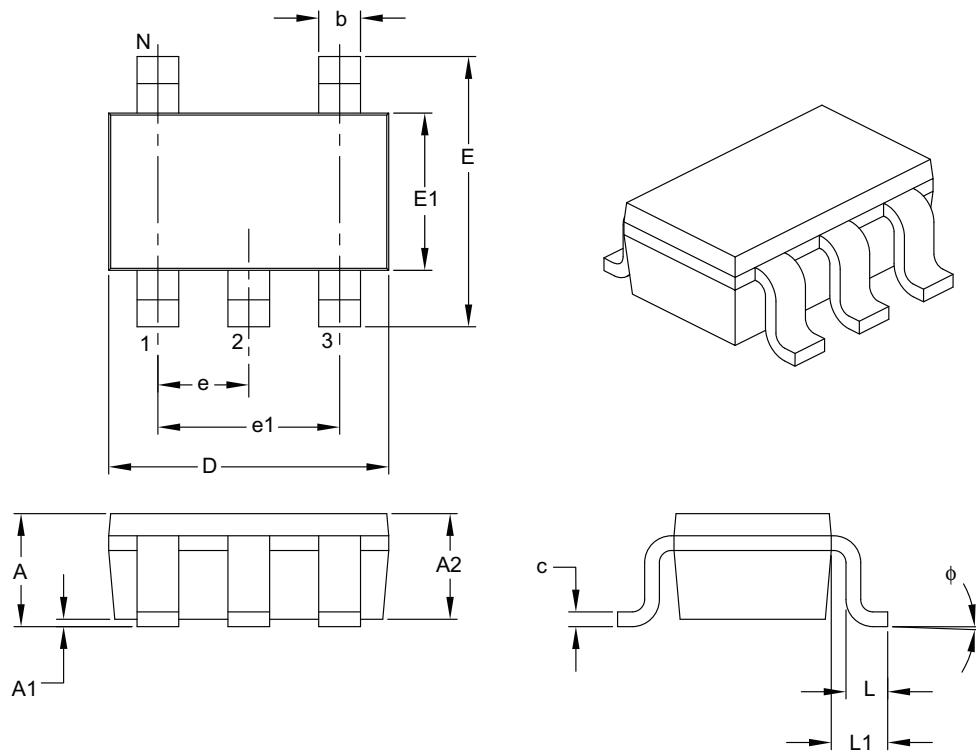
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2091A

Packaging Diagrams and Parameters

5-Lead Plastic Small Outline Transistor (OT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		5	
Lead Pitch	e		0.95 BSC	
Outside Lead Pitch	e1		1.90 BSC	
Overall Height	A	0.90	—	1.45
Molded Package Thickness	A2	0.89	—	1.30
Standoff	A1	0.00	—	0.15
Overall Width	E	2.20	—	3.20
Molded Package Width	E1	1.30	—	1.80
Overall Length	D	2.70	—	3.10
Foot Length	L	0.10	—	0.60
Footprint	L1	0.35	—	0.80
Foot Angle	phi	0°	—	30°
Lead Thickness	c	0.08	—	0.26
Lead Width	b	0.20	—	0.51

Notes:

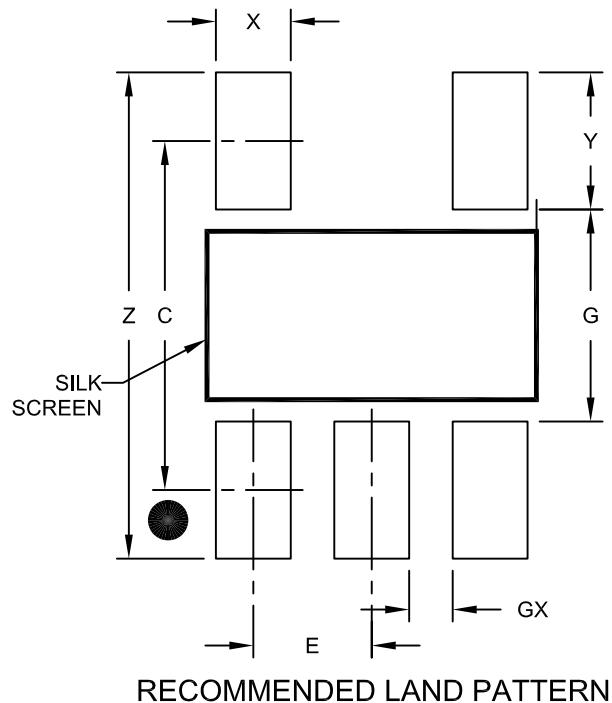
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

5-Lead Plastic Small Outline Transistor (OT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.95	BSC
Contact Pad Spacing	C		2.80	
Contact Pad Width (X5)	X			0.60
Contact Pad Length (X5)	Y			1.10
Distance Between Pads	G	1.70		
Distance Between Pads	GX	0.35		
Overall Width	Z			3.90

Notes:

- ## 1. Dimensioning and tolerancing per ASME Y14.5M

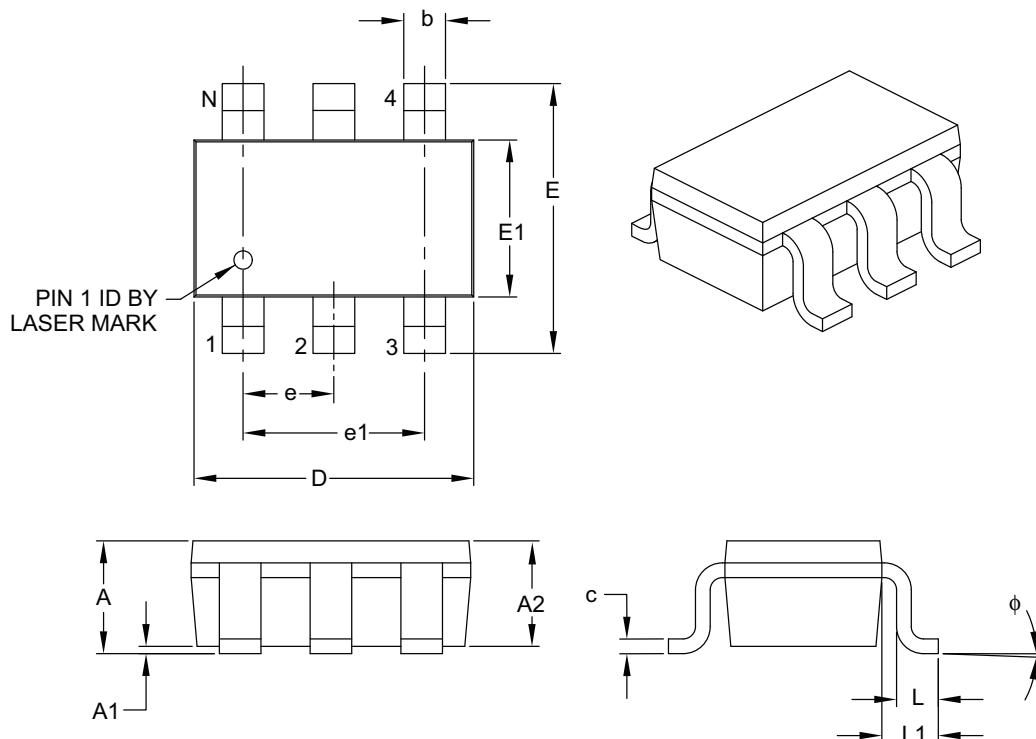
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2091A

Packaging Diagrams and Parameters

6-Lead Plastic Small Outline Transistor (CH) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		6	
Pitch	e		0.95 BSC	
Outside Lead Pitch	e1		1.90 BSC	
Overall Height	A	0.90	—	1.45
Molded Package Thickness	A2	0.89	—	1.30
Standoff	A1	0.00	—	0.15
Overall Width	E	2.20	—	3.20
Molded Package Width	E1	1.30	—	1.80
Overall Length	D	2.70	—	3.10
Foot Length	L	0.10	—	0.60
Footprint	L1	0.35	—	0.80
Foot Angle	ϕ	0°	—	30°
Lead Thickness	c	0.08	—	0.26
Lead Width	b	0.20	—	0.51

Notes:

- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

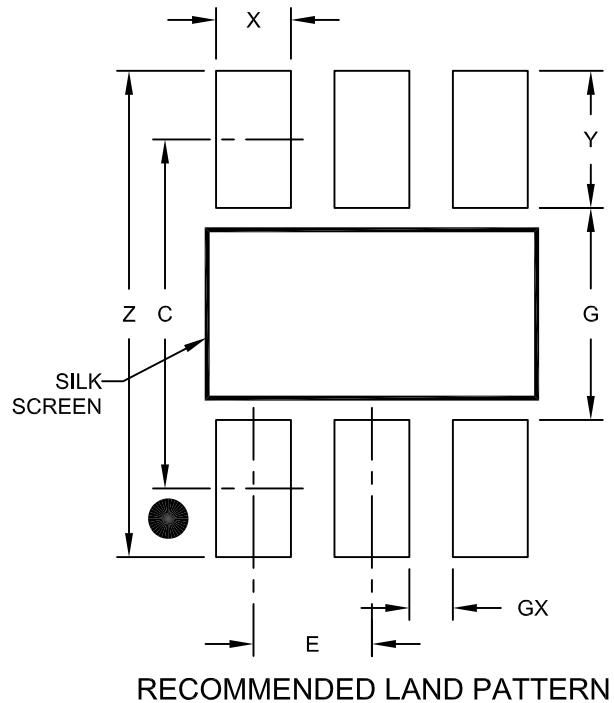
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-028B

Land Pattern (Footprint)

6-Lead Plastic Small Outline Transistor (CH) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.95	BSC	
Contact Pad Spacing	C		2.80	
Contact Pad Width (X6)	X			0.60
Contact Pad Length (X6)	Y			1.10
Distance Between Pads	G	1.70		
Distance Between Pads	GX	0.35		
Overall Width	Z			3.90

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

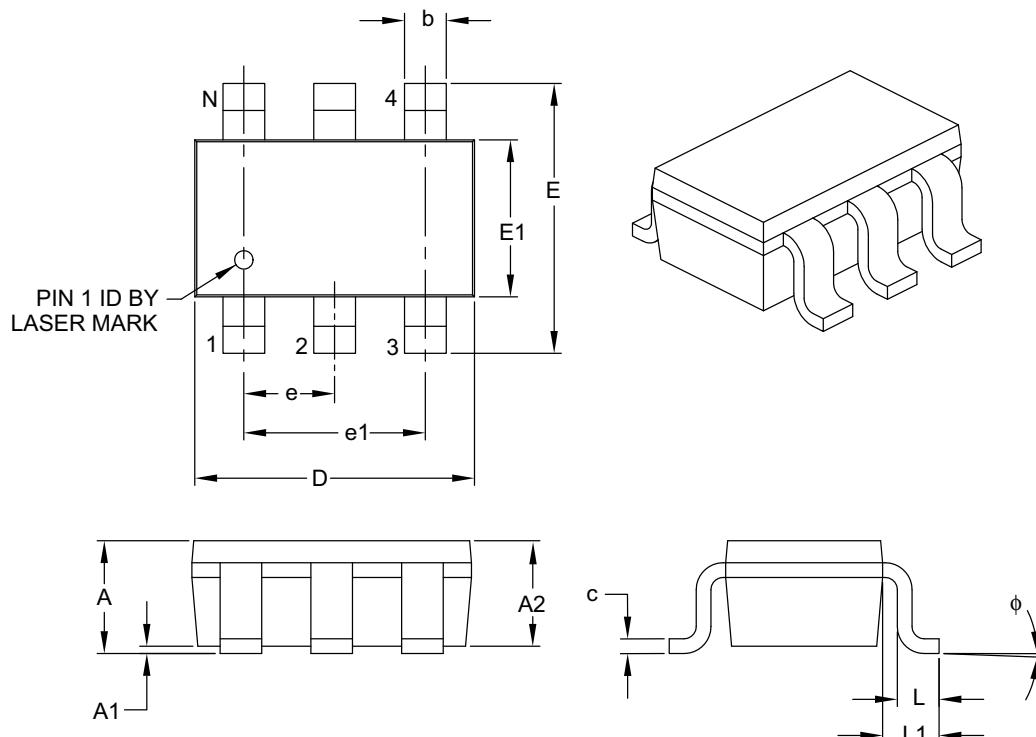
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2028A

Packaging Diagrams and Parameters

6-Lead Plastic Small Outline Transistor (CHY) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Number of Pins	N			6	
Pitch	e			0.95 BSC	
Outside Lead Pitch	e1			1.90 BSC	
Overall Height	A	0.90	—	1.45	
Molded Package Thickness	A2	0.89	—	1.30	
Standoff	A1	0.00	—	0.15	
Overall Width	E	2.20	—	3.20	
Molded Package Width	E1	1.30	—	1.80	
Overall Length	D	2.70	—	3.10	
Foot Length	L	0.10	—	0.60	
Footprint	L1	0.35	—	0.80	
Foot Angle	φ	0°	—	30°	
Lead Thickness	c	0.08	—	0.26	
Lead Width	b	0.20	—	0.51	

Notes:

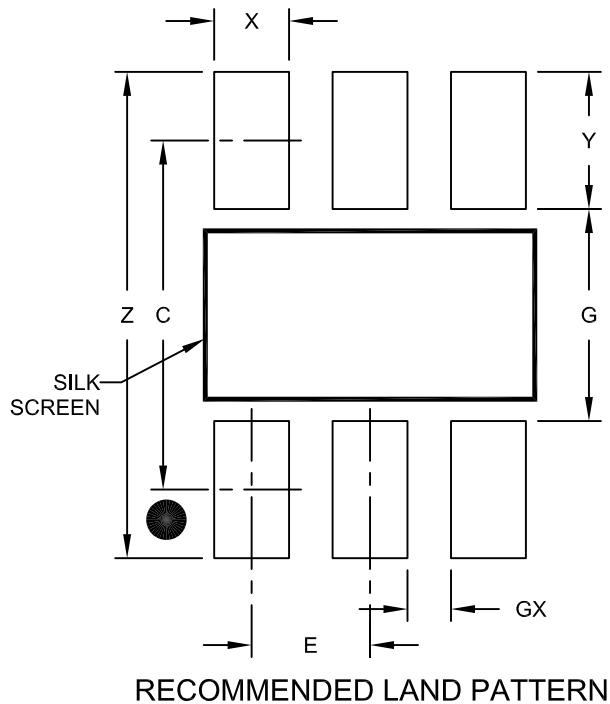
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

6-Lead Plastic Small Outline Transistor (CHY) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		UNITS			MILLIMETERS		
Dimension Limits		MIN	NOM	MAX			
Contact Pitch	E		0.95	BSC			
Contact Pad Spacing	C		2.80				
Contact Pad Width (X6)	X			0.60			
Contact Pad Length (X6)	Y			1.10			
Distance Between Pads	G	1.70					
Distance Between Pads	GX	0.35					
Overall Width	Z			3.90			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

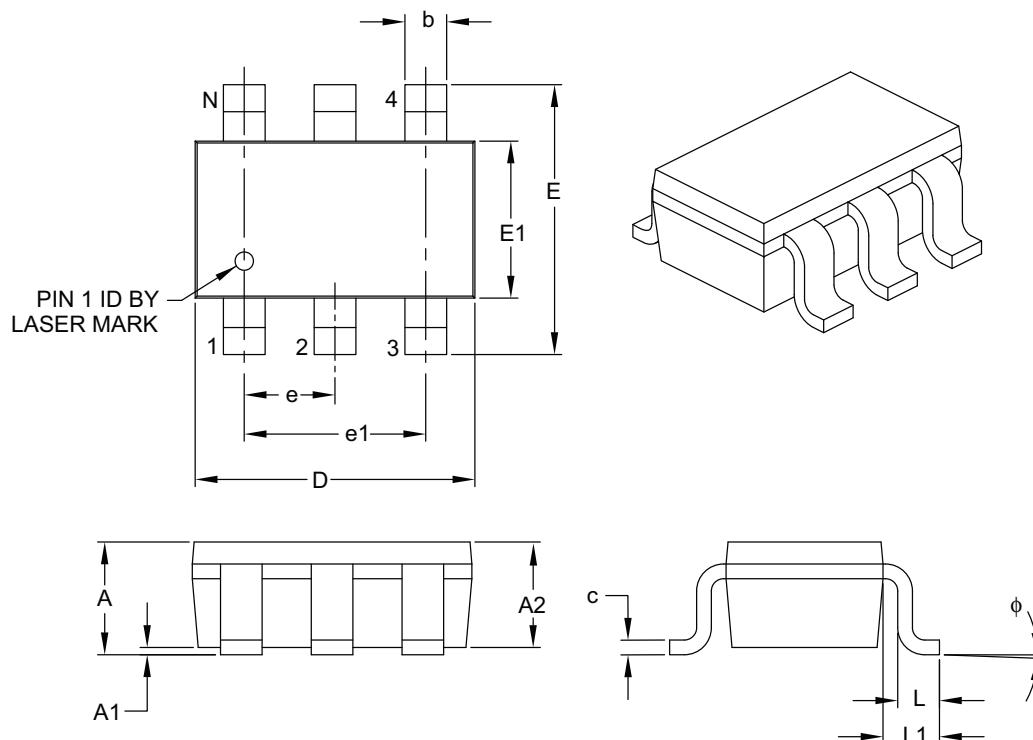
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2028A

Packaging Diagrams and Parameters

6-Lead Plastic Small Outline Transistor (OT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	6		
Pitch	e	0.95	BSC	
Outside Lead Pitch	e1	1.90	BSC	
Overall Height	A	0.90	—	1.45
Molded Package Thickness	A2	0.89	—	1.30
Standoff	A1	0.00	—	0.15
Overall Width	E	2.20	—	3.20
Molded Package Width	E1	1.30	—	1.80
Overall Length	D	2.70	—	3.10
Foot Length	L	0.10	—	0.60
Footprint	L1	0.35	—	0.80
Foot Angle	φ	0°	—	30°
Lead Thickness	c	0.08	—	0.26
Lead Width	b	0.20	—	0.51

Notes:

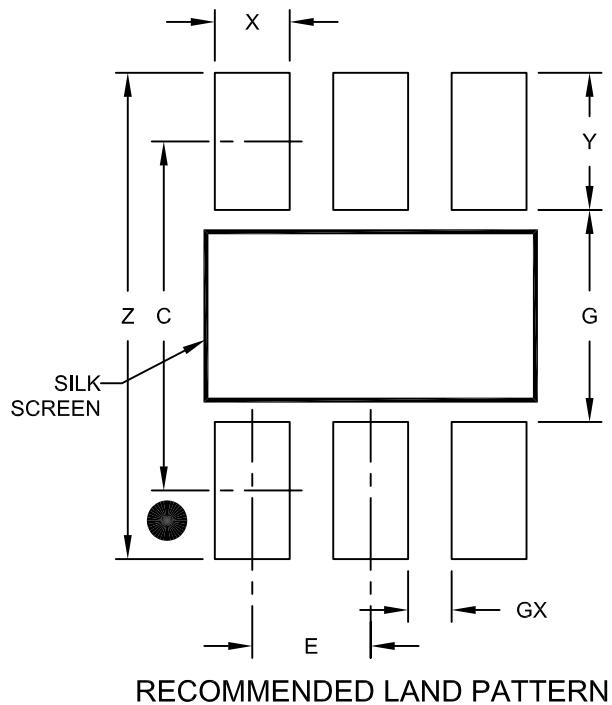
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

6-Lead Plastic Small Outline Transistor (OT) [SOT-23]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.95	BSC	
Contact Pad Spacing	C			2.80	
Contact Pad Width (X6)	X			0.60	
Contact Pad Length (X6)	Y			1.10	
Distance Between Pads	G	1.70			
Distance Between Pads	GX	0.35			
Overall Width	Z			3.90	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

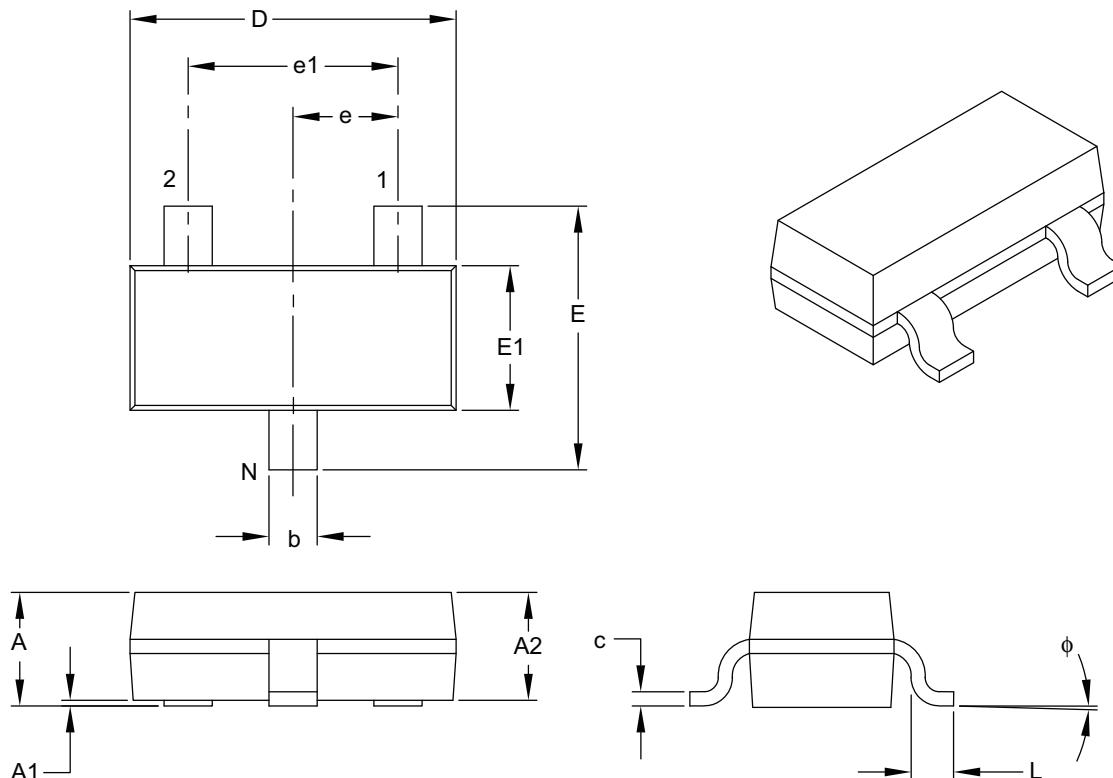
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2028A

Packaging Diagrams and Parameters

3-Lead Plastic Small Outline Transistor (CB) [SOT-23A]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		3	
Lead Pitch	e		0.95 BSC	
Outside Lead Pitch	e1		1.90 BSC	
Overall Height	A	0.89	—	1.45
Molded Package Thickness	A2	0.90	—	1.30
Standoff	A1	0.00	—	0.15
Overall Width	E	2.10	—	3.00
Molded Package Width	E1	1.20	—	1.80
Overall Length	D	2.70	—	3.10
Foot Length	L	0.15	—	0.60
Foot Angle	ϕ	0°	—	30°
Lead Thickness	c	0.09	—	0.26
Lead Width	b	0.30	—	0.51

Notes:

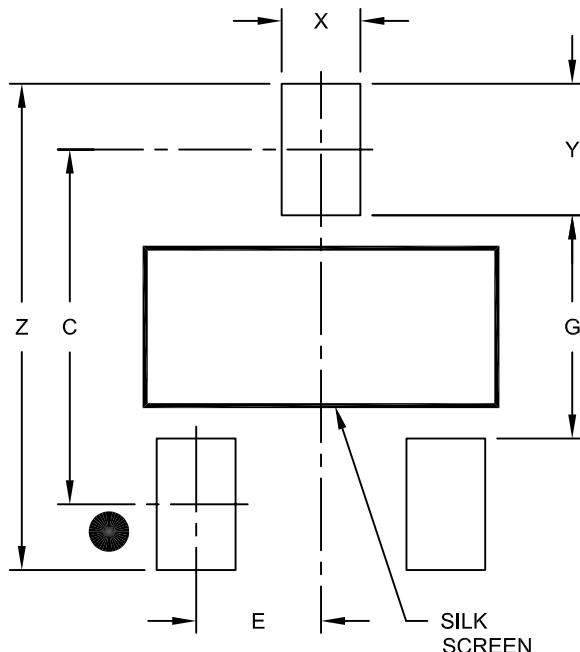
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

3-Lead Plastic Small Outline Transistor (CB) [SOT-23A]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.95	BSC	
Contact Pad Spacing	C			2.70	
Contact Pad Width (X3)	X				0.60
Contact Pad Length (Y3)	Y				1.00
Distance Between Pads	G	1.70			
Overall Width	Z				3.70

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

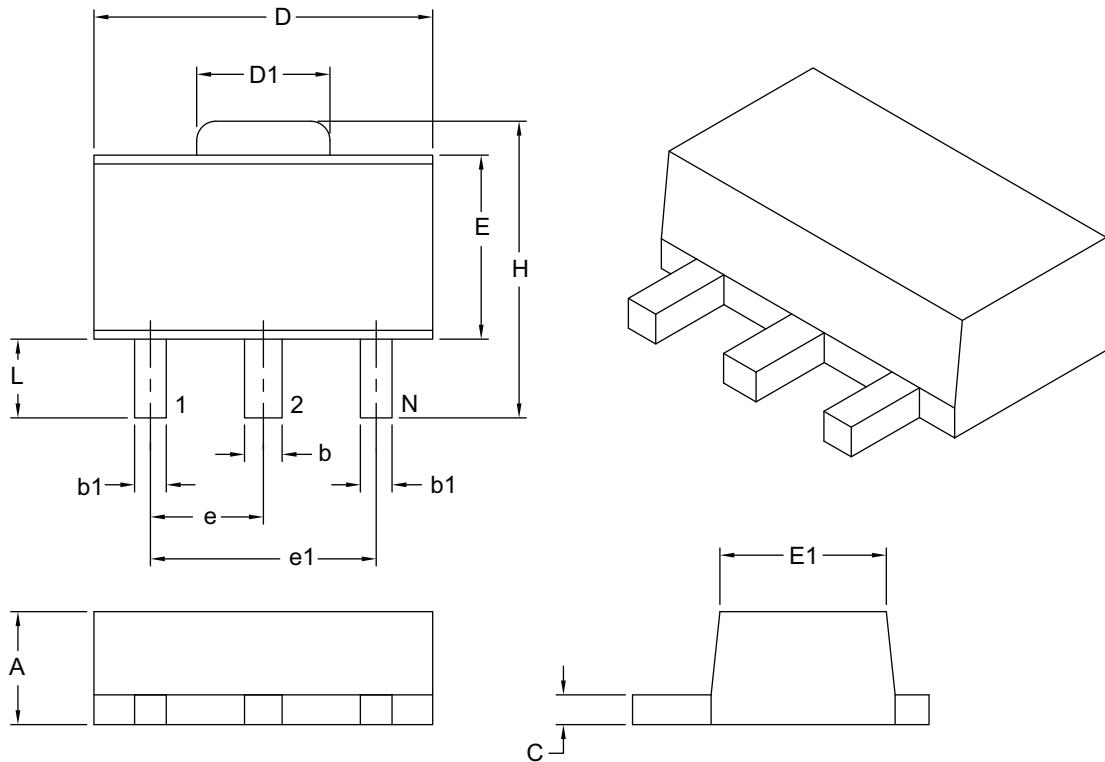
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2130A

Packaging Diagrams and Parameters

3-Lead Plastic Small Outline Transistor Header (MB) [SOT-89]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS	
		Dimension Limits	MIN	MAX
Number of Leads	N		3	
Pitch	e		1.50 BSC	
Outside Lead Pitch	e1		3.00 BSC	
Overall Height	A	1.40	1.60	
Overall Width	H	3.94	4.25	
Molded Package Width at Base	E	2.29	2.60	
Molded Package Width at Top	E1	2.13	2.29	
Overall Length	D	4.39	4.60	
Tab Length	D1	1.40	1.83	
Foot Length	L	0.79	1.20	
Lead Thickness	c	0.35	0.44	
Lead 2 Width	b	0.41	0.56	
Leads 1 & 3 Width	b1	0.36	0.48	

Notes:

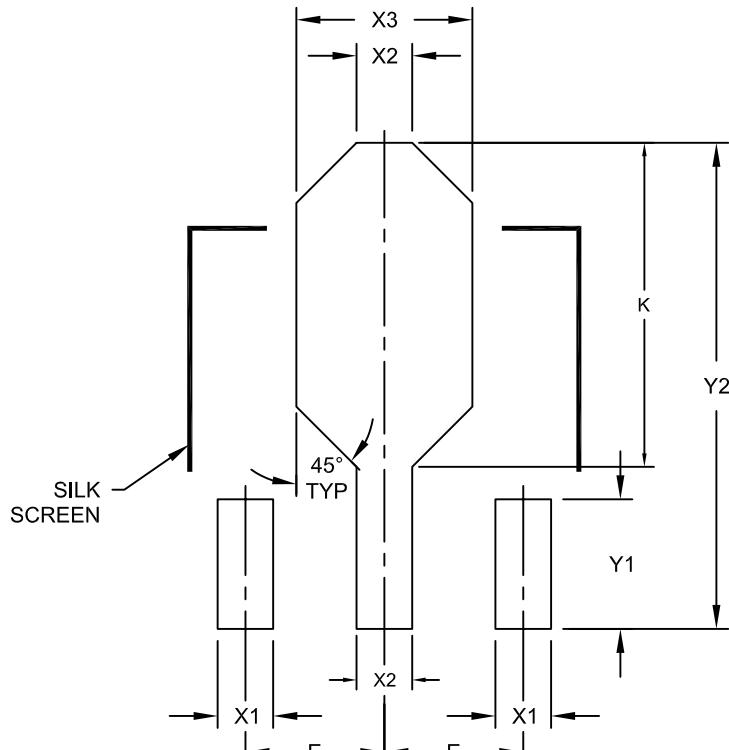
- Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

3-Lead Plastic Small Outline Transistor Header (MB) [SOT-89]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits		MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E		1.50 BSC	
Contact Pads 1 & 3 Width	X1			0.48
Contact Pad 2 Width	X2			0.56
Heat Slug Pad Width	X3			1.20
Contact Pads 1 & 3 Length	Y1		1.40	
Contact 2 Pad Length	Y2			4.25
-	K	2.60		2.85

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

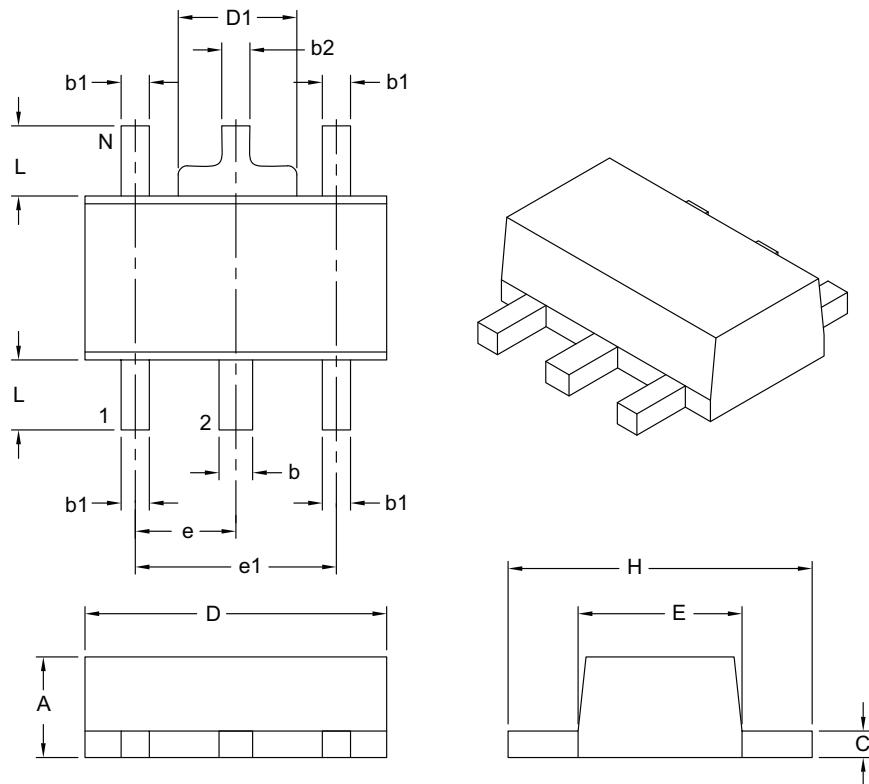
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2029A

Packaging Diagrams and Parameters

5-Lead Plastic Small Outline Transistor Header (MT) [SOT-89]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS	
Dimension Limits			MIN	MAX
Number of Leads	N		5	
Lead Pitch	e		1.50 BSC	
Outside Lead Pitch	e1		3.00 BSC	
Overall Height	A	1.40	1.60	
Overall Width	H	3.94	4.50	
Molded Package Width	E	2.29	2.60	
Overall Length	D	4.40	4.60	
Tab Width	D1	1.40	1.83	
Foot Length	L	0.80	1.20	
Lead Thickness	c	0.35	0.44	
Lead 2 Width	b	0.41	0.56	
Leads 1, 3, 4 & 5 Width	b1	0.36	0.48	
Tab Lead Width	b2	0.32	0.48	

Notes:

1. Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

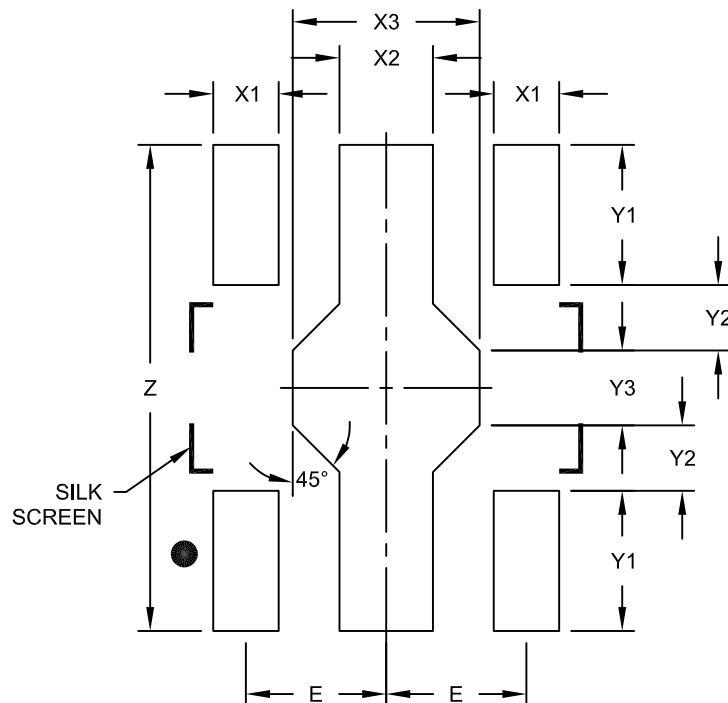
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-030B

Land Pattern (Footprint)

5-Lead Plastic Small Outline Transistor Header (MT) [SOT-89]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.50 BSC	
Contact Pad Width (X4)	X1			0.70
Contact Pad Width	X2		1.00	
Contact Pad Width	X3		2.00	
Contact Pad Length (X4)	Y1		1.50	
Contact Pad Length (X2)	Y2		0.70	
Contact Pad Length	Y3		0.80	
Overall Length	Z		5.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

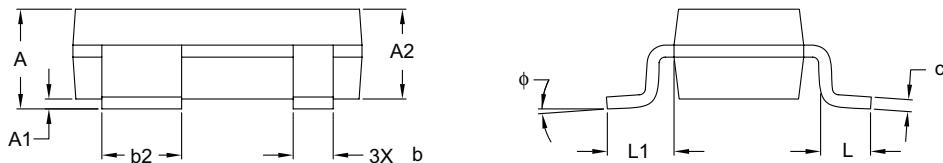
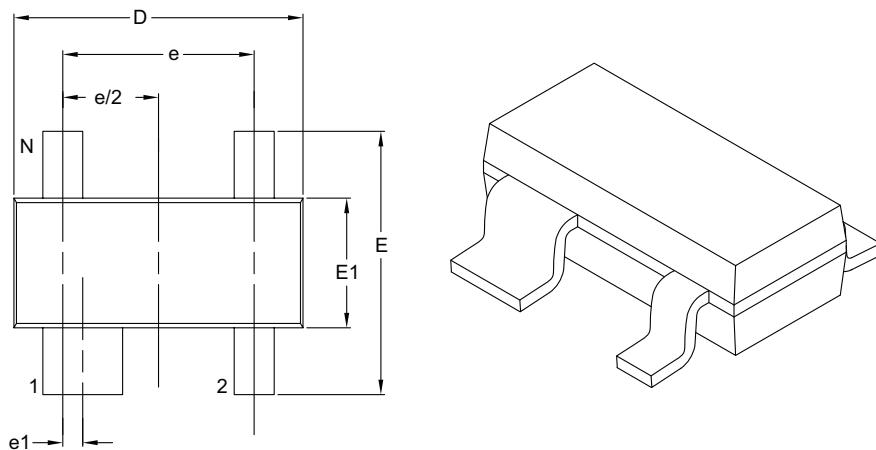
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2030C

Packaging Diagrams and Parameters

4-Lead Plastic Small Outline Transistor (RC) [SOT-143]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		4	
Pitch	e		1.92 BSC	
Lead 1 Offset	e1		0.20 BSC	
Overall Height	A	0.80	—	1.22
Molded Package Thickness	A2	0.75	0.90	1.07
Standoff §	A1	0.01	—	0.15
Overall Width	E	2.10	—	2.64
Molded Package Width	E1	1.20	1.30	1.40
Overall Length	D	2.67	2.90	3.05
Foot Length	L	0.13	0.50	0.60
Footprint	L1	0.54 REF		
Foot Angle	ϕ	0°	—	8°
Lead Thickness	c	0.08	—	0.20
Lead 1 Width	b1	0.76	—	0.94
Leads 2, 3 & 4 Width	b	0.30	—	0.54

Notes:

- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

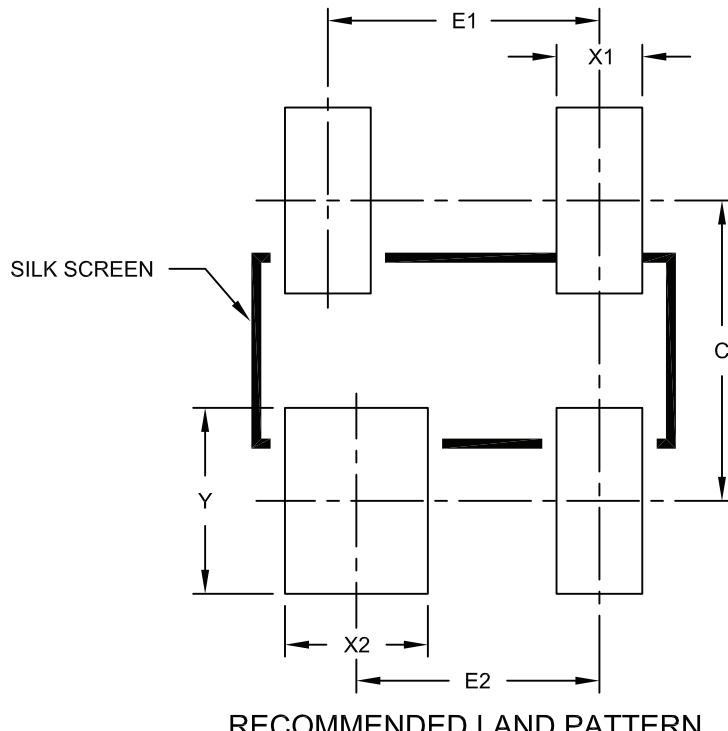
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

4-Lead Plastic Small Outline Transistor (RC) [SOT-143]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
Dimension Limits				MIN	NOM	MAX	
Contact Pitch	E1			1.90	BSC		
Contact Pitch	E2			1.60	BSC		
Contact Width	X1					0.60	
Contact Width	X2					1.00	
Contact Length	Y					1.30	
Contact Pad Spacing	C			2.10			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

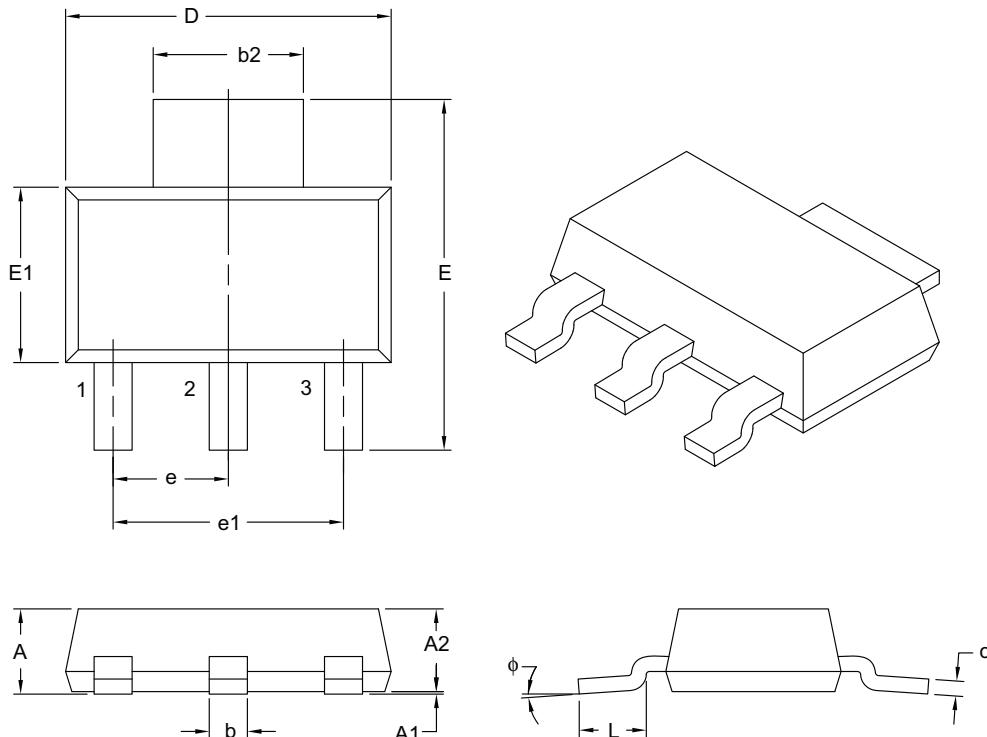
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2031A

Packaging Diagrams and Parameters

3-Lead Plastic Small Outline Transistor (DB) [SOT-223]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N		3	
Lead Pitch	e		2.30 BSC	
Outside Lead Pitch	e1		4.60 BSC	
Overall Height	A	—	—	1.80
Standoff	A1	0.02	—	0.10
Molded Package Height	A2	1.50	1.60	1.70
Overall Width	E	6.70	7.00	7.30
Molded Package Width	E1	3.30	3.50	3.70
Overall Length	D	6.30	6.50	6.70
Lead Thickness	c	0.23	0.30	0.35
Lead Width	b	0.60	0.76	0.84
Tab Lead Width	b2	2.90	3.00	3.10
Foot Length	L	0.75	—	—
Lead Angle	ϕ	0°	—	10°

Notes:

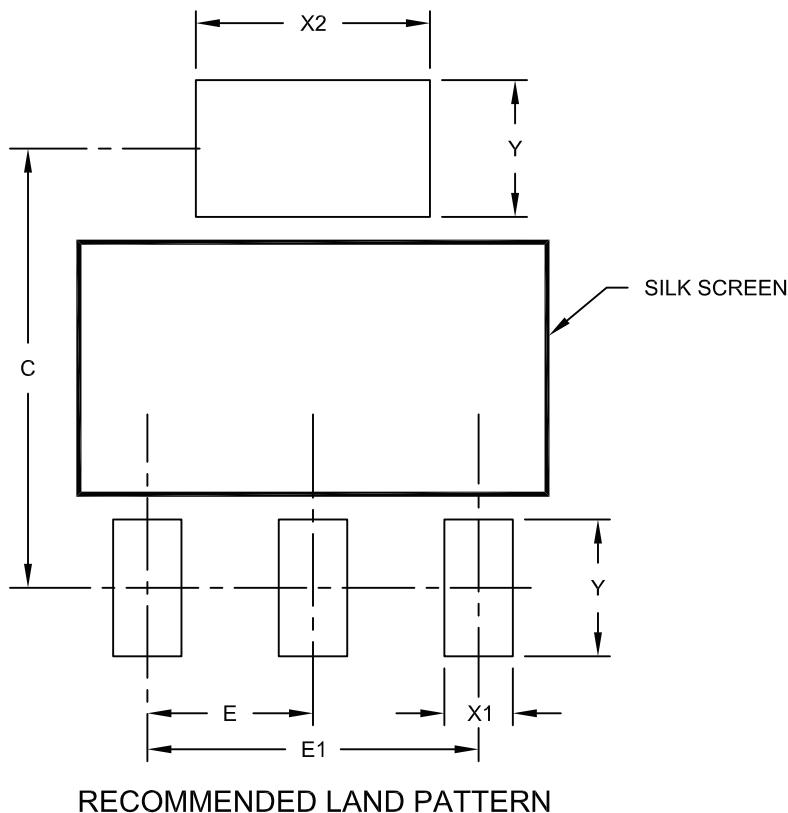
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

3-Lead Plastic Small Outline Transistor (DB) [SOT-223]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E				2.30	BSC	
Overall Pitch	E1				4.60	BSC	
Contact Pad Spacing	C				6.10		
Contact Pad Width	X1					0.95	
Contact Pad Width	X2					3.25	
Contact Pad Length	Y					1.90	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

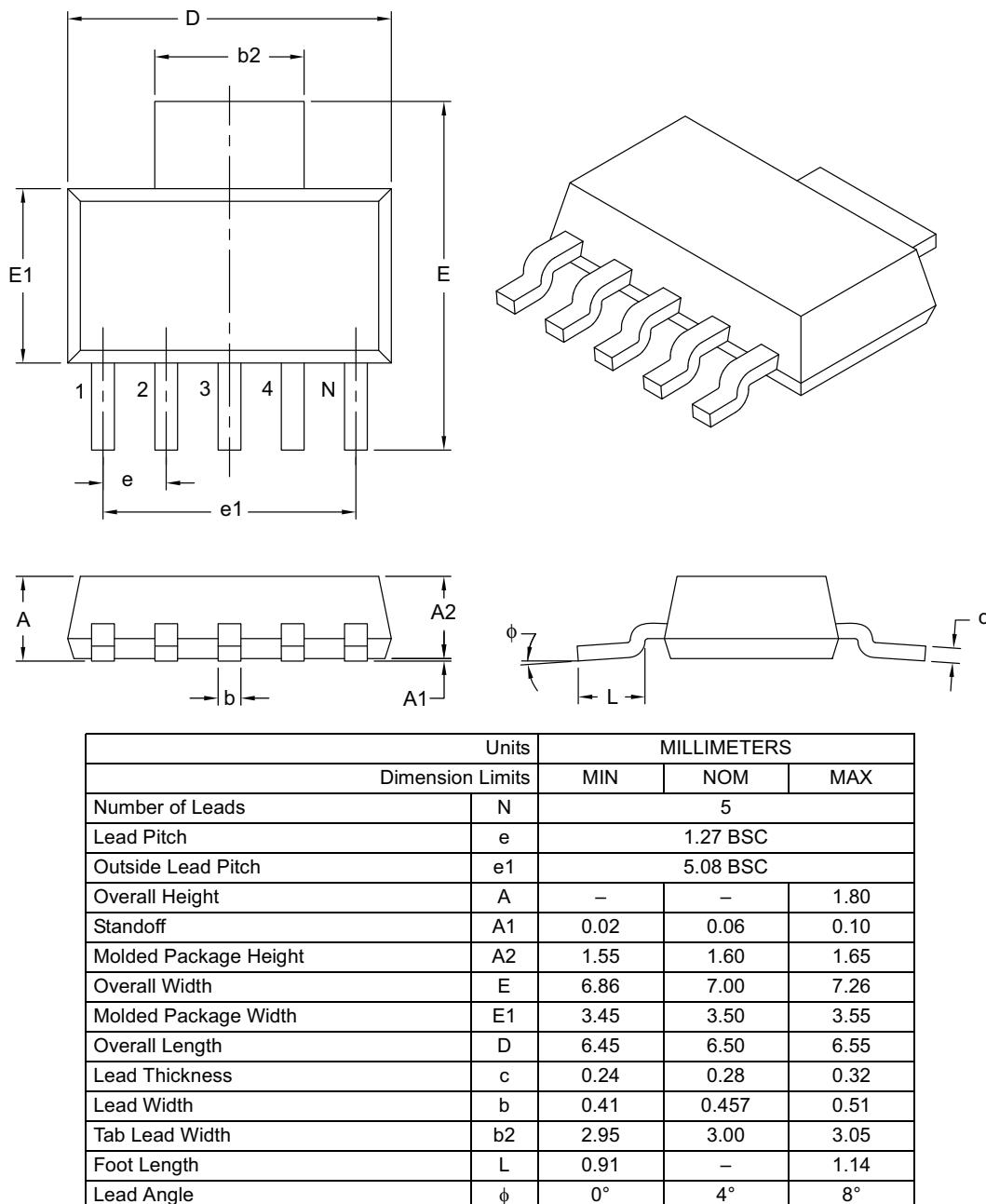
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2032A

Packaging Diagrams and Parameters

5-Lead Plastic Small Outline Transistor (DC) [SOT-223]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Notes:

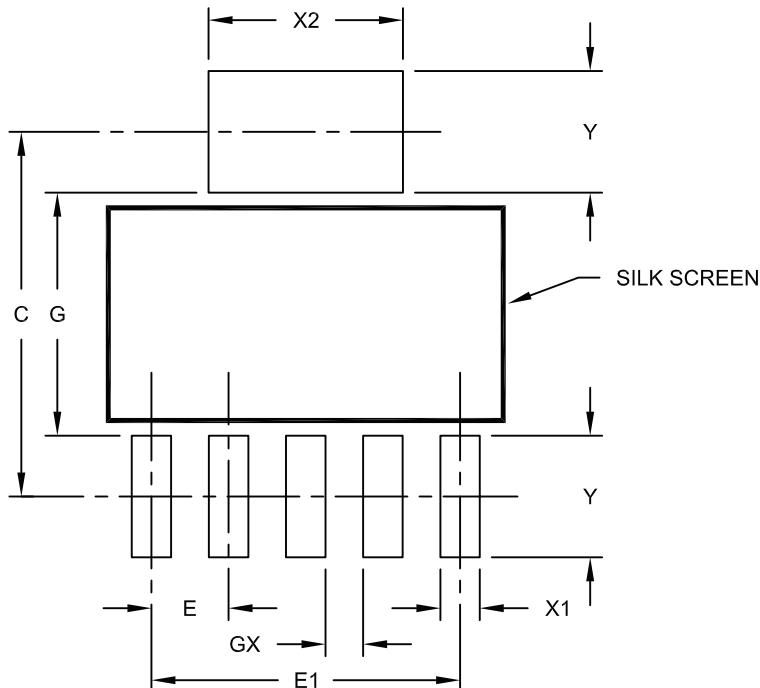
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Land Pattern (Footprint)

5-Lead Plastic Small Outline Transistor (DC) [SOT-223]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Pad Pitch	E	1.27	BSC	
Overall Pad Pitch	E1	5.08	BSC	
Pad Spacing	C	6.00		
Pad Width	X1		0.65	
Pad Width	X2		3.20	
Pad Length	Y		2.00	
Distance Between Pads	G	4.00		
Distance Between Pads	GX	0.62		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

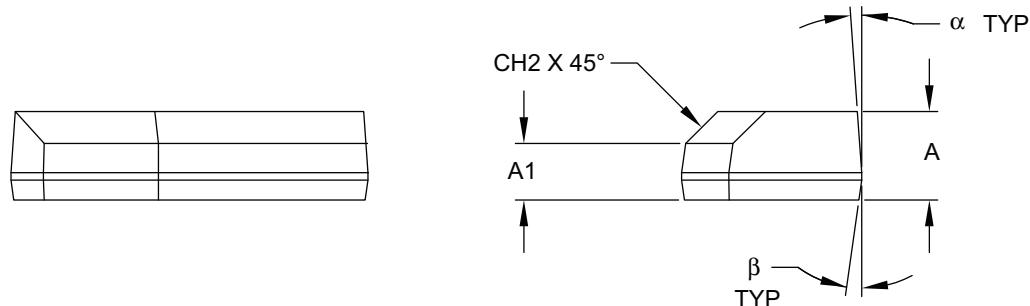
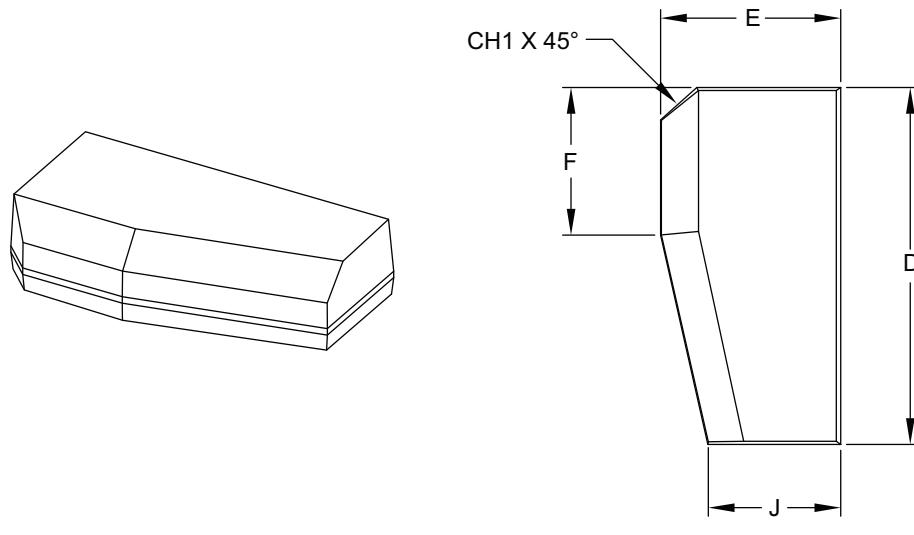
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2137A

Packaging Diagrams and Parameters

Leadless Wedge Module Plastic Small Outline Transistor (WM) [SOT-385]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Overall Height	A	2.90	3.00	3.05
Bottom of Package to Chamfer	A1	1.90	2.00	2.10
Overall Width	E	6.00	6.10	6.20
Overall Length	D	12.00	12.10	12.20
Width at Tapered End	J	4.40	4.50	4.60
Length of Flat	F	4.90	5.00	5.10
Chamfer Distance, Horizontal	CH1	1.00	1.10	1.20
Chamfer Distance, Vertical	CH2	1.00	1.10	1.20
Mold Draft Angle Top	α	4°	6°	8°
Mold Draft Angle Bottom	β	4°	6°	8°

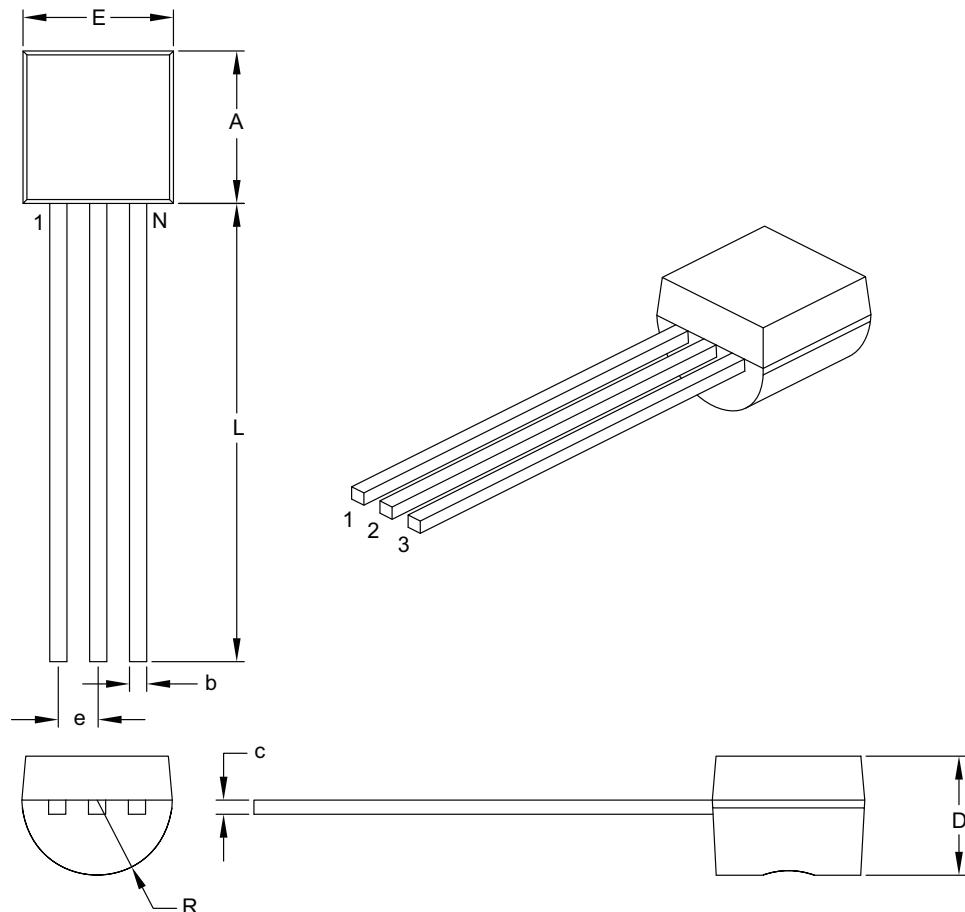
Note:

- Dimensions D, E, F and J do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.

Packaging Diagrams and Parameters

3-Lead Plastic Transistor Outline (TO) [TO-92]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES	
Dimension Limits			MIN	MAX
Number of Pins	N		3	
Pitch	e		.050 BSC	
Bottom to Package Flat	D		.125	.165
Overall Width	E		.175	.205
Overall Length	A		.170	.210
Molded Package Radius	R		.080	.105
Tip to Seating Plane	L		.500	—
Lead Thickness	c		.014	.021
Lead Width	b		.014	.022

Notes:

- Dimensions A and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

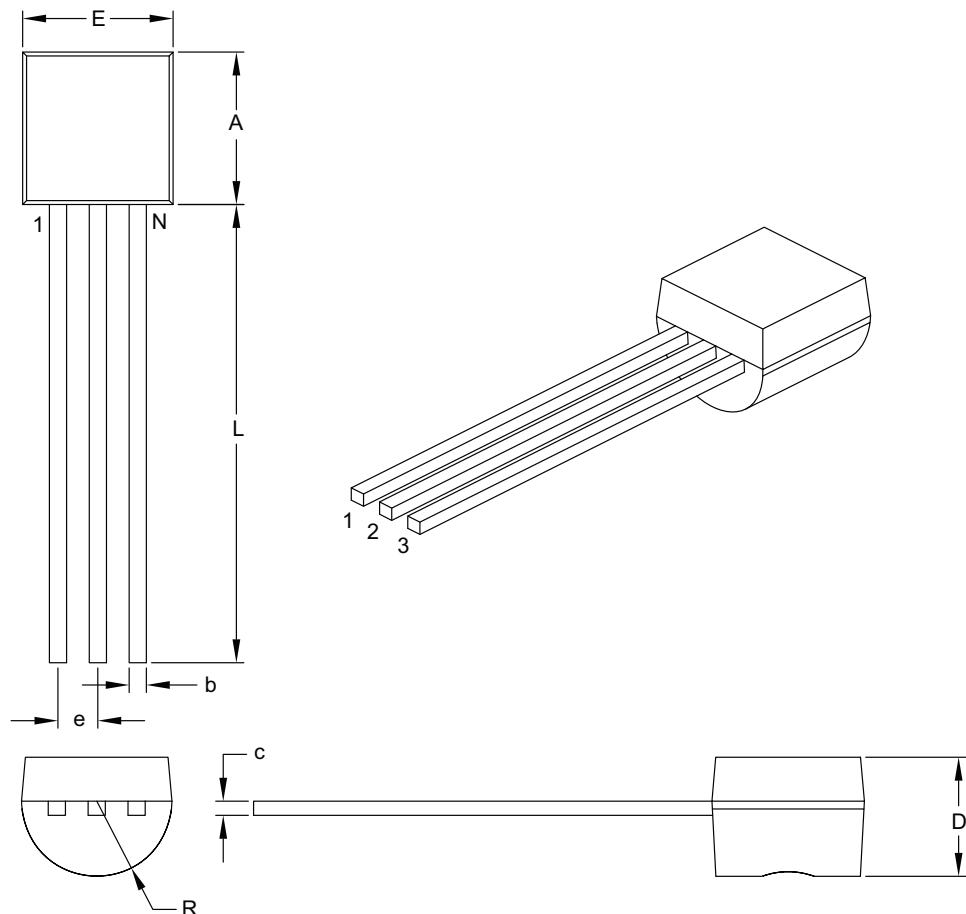
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-101B

Packaging Diagrams and Parameters

3-Lead Plastic Transistor Outline (ZB) [TO-92]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits		Units	INCHES	
			MIN	MAX
Number of Pins	N		3	
Pitch	e		.050 BSC	
Bottom to Package Flat	D		.125	.165
Overall Width	E		.175	.205
Overall Length	A		.170	.210
Molded Package Radius	R		.080	.105
Tip to Seating Plane	L		.500	—
Lead Thickness	c		.014	.021
Lead Width	b		.014	.022

Notes:

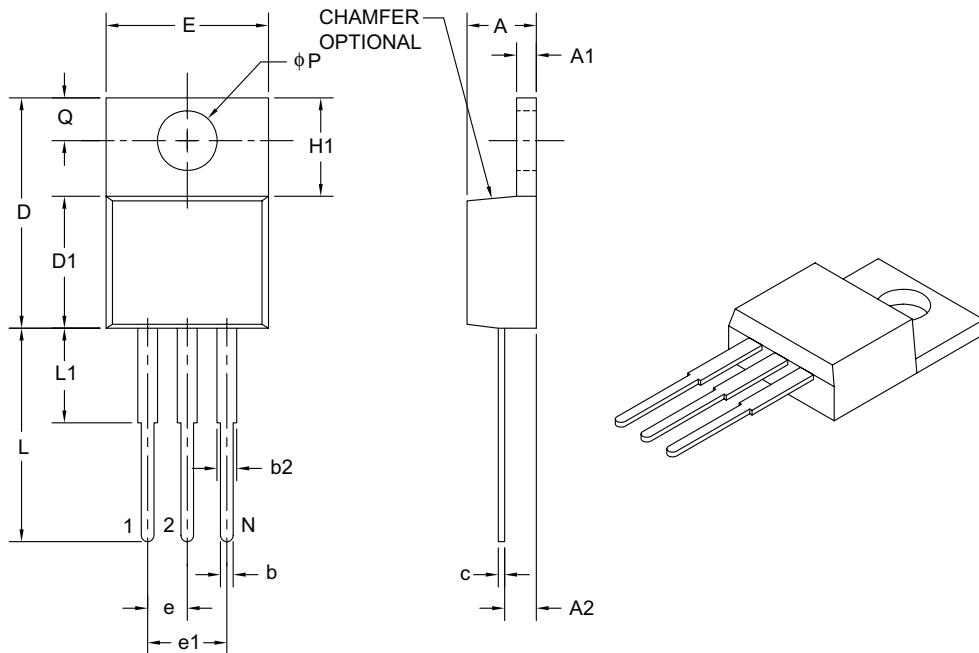
- Dimensions A and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

3-Lead Plastic Transistor Outline (AB) [TO-220]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N			3	
Pitch	e		.100	BSC	
Overall Pin Pitch	e1		.200	BSC	
Overall Height	A	.140	—	.190	
Tab Thickness	A1	.020	—	.055	
Base to Lead	A2	.080	—	.115	
Overall Width	E	.357	—	.420	
Mounting Hole Center	Q	.100	—	.120	
Overall Length	D	.560	—	.650	
Molded Package Length	D1	.330	—	.355	
Tab Length	H1	.230	—	.270	
Mounting Hole Diameter	φP	.139	—	.156	
Lead Length	L	.500	—	.580	
Lead Shoulder	L1	—	—	.250	
Lead Thickness	c	.012	—	.024	
Lead Width	b	.015	.027	.040	
Shoulder Width	b2	.045	.057	.070	

Notes:

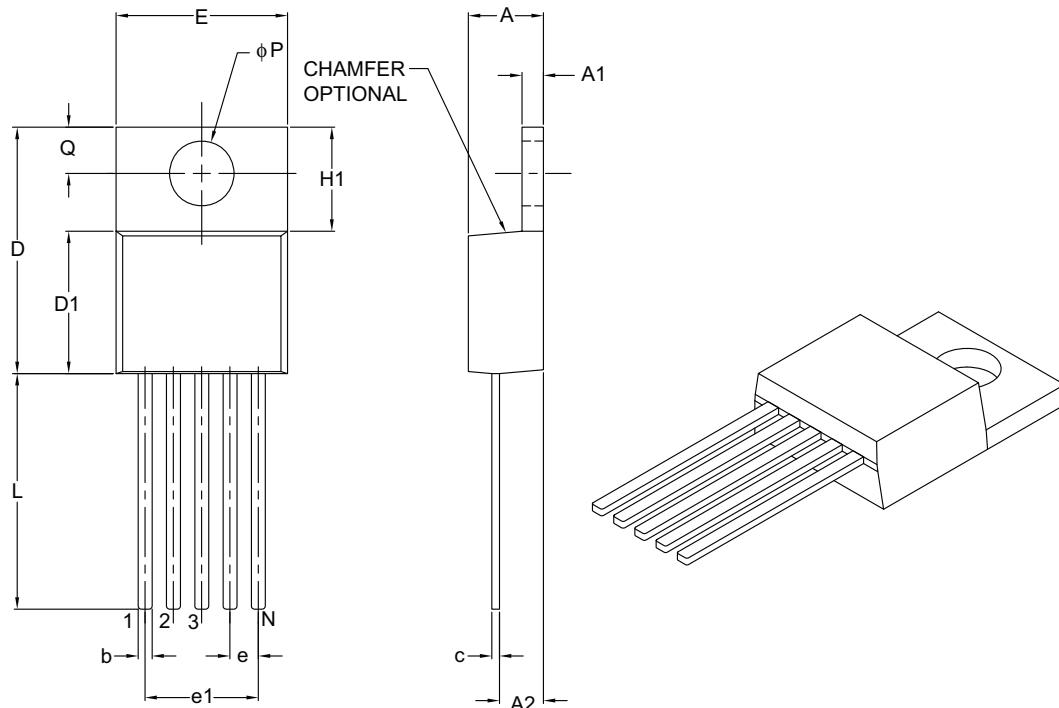
- Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

5-Lead Plastic Transistor Outline (AT) [TO-220]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		5	
Pitch	e		.067 BSC	
Overall Pin Pitch	e1		.268 BSC	
Overall Height	A	.140	—	.190
Overall Width	E	.380	—	.420
Overall Length	D	.560	—	.650
Molded Package Length	D1	.330	—	.355
Tab Length	H1	.204	—	.293
Tab Thickness	A1	.020	—	.055
Mounting Hole Center	Q	.100	—	.120
Mounting Hole Diameter	φP	.139	—	.156
Lead Length	L	.482	—	.590
Base to Bottom of Lead	A2	.080	—	.115
Lead Thickness	c	.012	—	.025
Lead Width	b	.015	.027	.040

Notes:

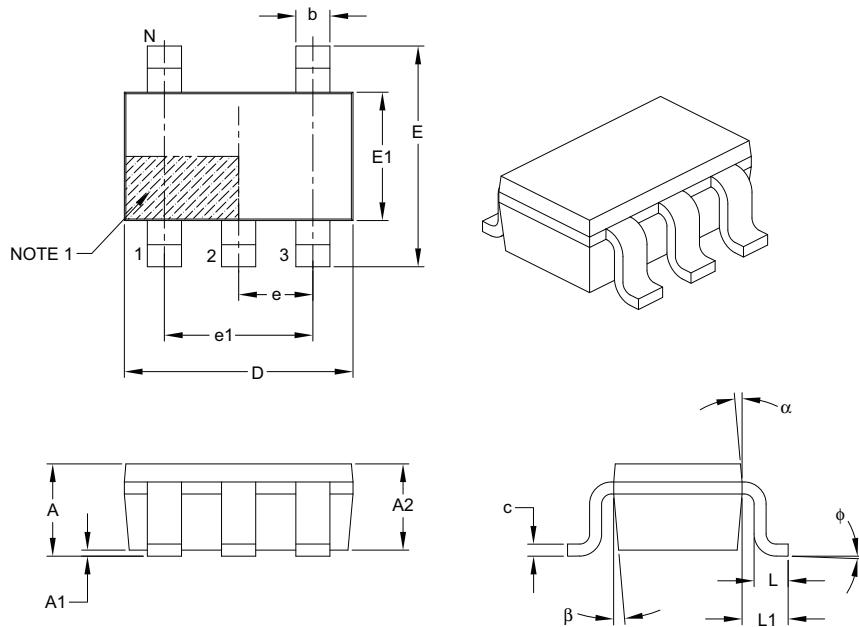
- Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

5-Lead Plastic Thin Small Outline Transistor (OS) [TSOT]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Number of Leads	N				5		
Lead Pitch	e				0.95	BSC	
Outside Lead Pitch	e1				1.90	BSC	
Overall Height	A	—	—	—	—	1.10	
Molded Package Thickness	A2	0.70	0.90	1.00			
Standoff	A1	0.00	—	0.10			
Overall Width	E	2.80 BSC					
Molded Package Width	E1	1.60 BSC					
Overall Length	D	2.90 BSC					
Foot Length	L	0.30	0.45	0.60			
Footprint	L1	0.60 REF					
Foot Angle	phi	0°	4°	8°			
Lead Thickness	c	0.08	—	0.20			
Lead Width	b	0.30	—	0.50			
Mold Draft Angle Top	alpha	4°	10°	12°			
Mold Draft Angle Bottom	beta	4°	10°	12°			

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

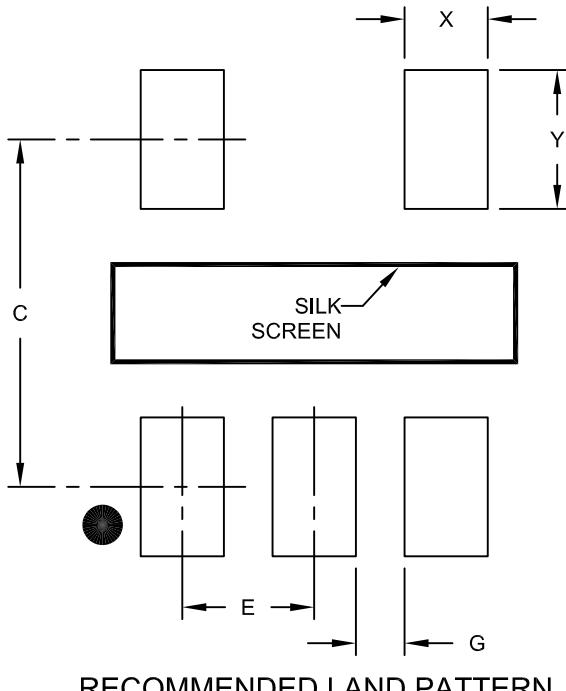
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

5-Lead Plastic Thin Small Outline Transistor (OS) [TSOT]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits		MIN	NOM	MAX	
Contact Pitch		E		0.95 BSC			
Contact Pad Spacing		C		2.80			
Contact Pad Width (X5)		X		0.60			
Contact Pad Length (X5)		Y		1.10			
Distance Between Pads		G		0.35			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

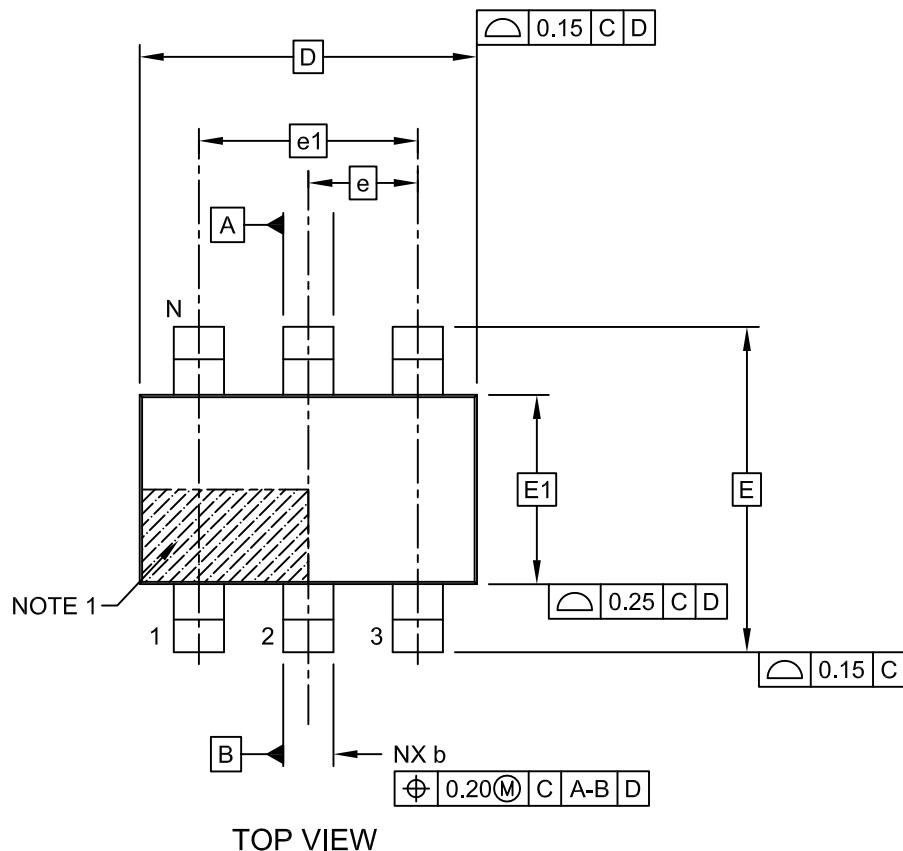
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2128A

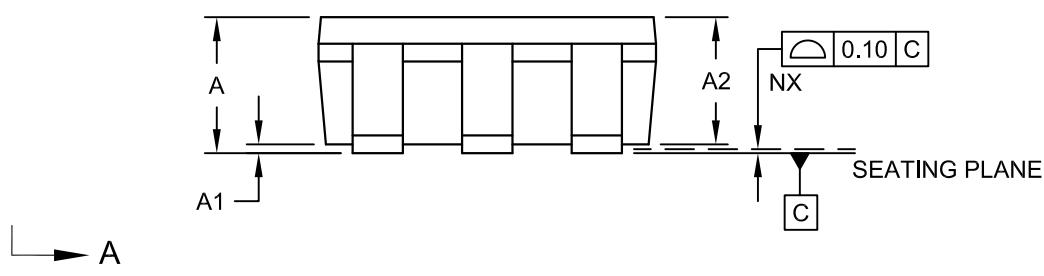
Packaging Diagrams and Parameters

6-Lead Thin Small Outline Transistor (OS) [TSOT]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



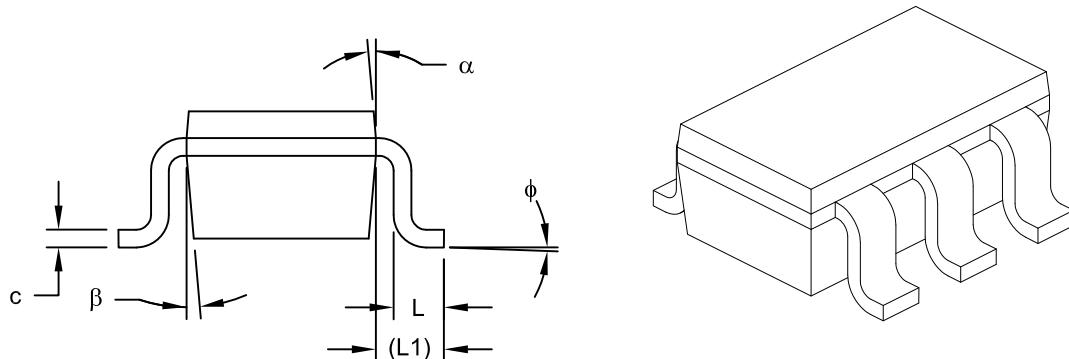
→ A



Packaging Diagrams and Parameters

6-Lead Thin Small Outline Transistor (OS) [TSOT]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



VIEW A-A

Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Leads	N	6		
Lead Pitch	e	0.95	BSC	
Outside Lead Pitch	e1	1.90	BSC	
Overall Height	A	-	-	1.10
Molded Package Thickness	A2	0.70	0.90	1.00
Standoff	A1	0.00	-	0.10
Overall Width	E	2.80	BSC	
Molded Package Width	E1	1.60	BSC	
Overall Length	D	2.90	BSC	
Foot Length	L	0.30	0.45	0.60
Footprint	L1	0.60	REF	
Foot Angle	phi	0°	4°	8°
Lead Thickness	c	0.08	-	0.20
Lead Width	theta	0.30	-	0.50
Mold Draft Angle Top	alpha	4°	10°	12°
Mold Draft Angle Bottom	beta	4°	10°	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.

2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.

3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

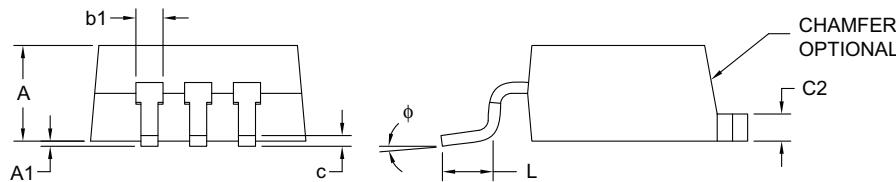
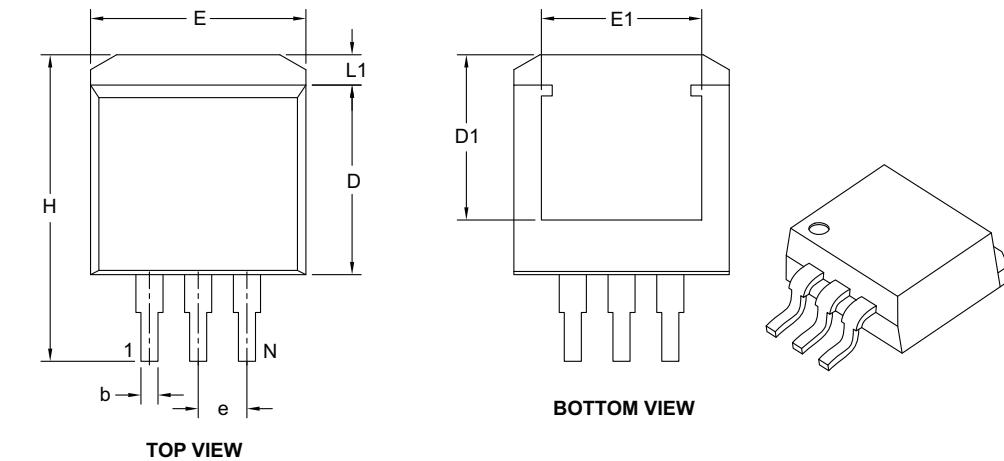
DDPAK Family

Double Deca-Watt Packages

Packaging Diagrams and Parameters

3-Lead Plastic (EB) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	3		
Pitch	e	.100	BSC	
Overall Height	A	.160	—	.190
Standoff §	A1	.000	—	.010
Overall Width	E	.380	—	.420
Exposed Pad Width	E1	.245	—	—
Molded Package Length	D	.330	—	.380
Overall Length	H	.549	—	.625
Exposed Pad Length	D1	.270	—	—
Lead Thickness	c	.014	—	.029
Pad Thickness	C2	.045	—	.065
Lower Lead Width	b	.020	—	.039
Upper Lead Width	b1	.045	—	.070
Foot Length	L	.068	—	.110
Pad Length	L1	—	—	.067
Foot Angle	φ	0°	—	8°

Notes:

- § Significant Characteristic.
- Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

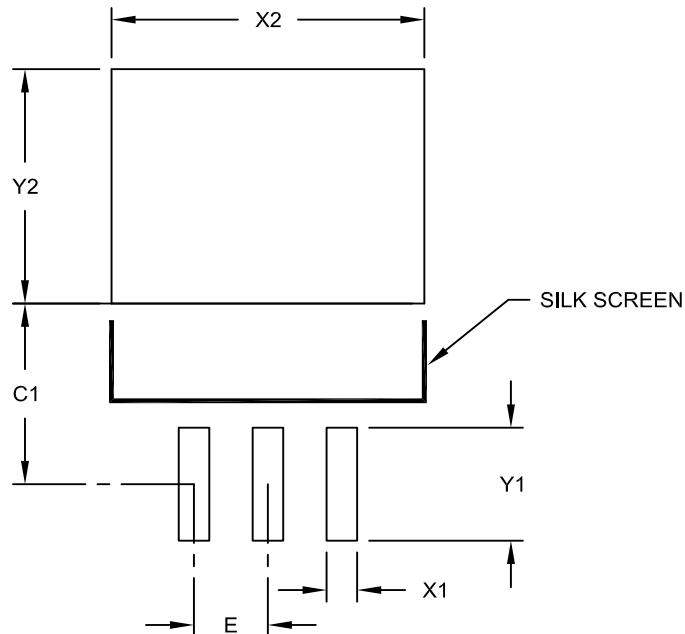
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-011B

Land Pattern (Footprint)

3-Lead Plastic (EB) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			INCHES		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E				.100	BSC	
Pad Width	X2					.423	
Pad Length	Y2					.327	
Contact Pad Spacing	C1				.252		
Contact Pad Width (X3)	X1					.041	
Contact Pad Length (X3)	Y1					.157	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

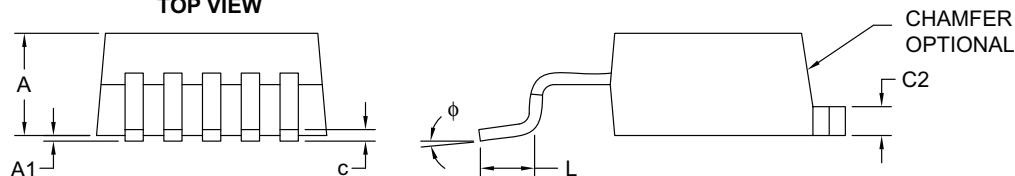
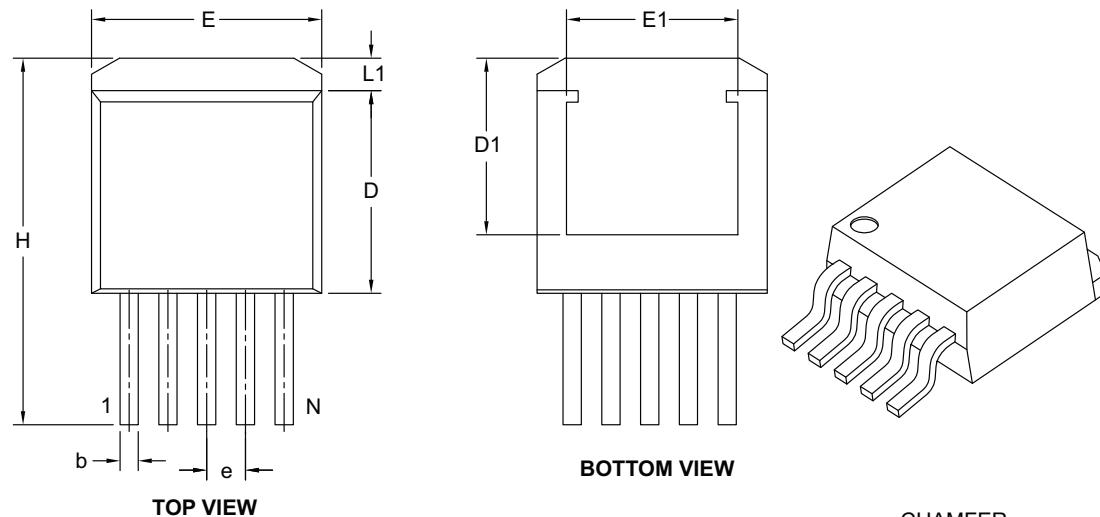
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2011A

Packaging Diagrams and Parameters

5-Lead Plastic (ET) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N			5	
Pitch	e			.067 BSC	
Overall Height	A	.160	—	.190	
Standoff §	A1	.000	—	.010	
Overall Width	E	.380	—	.420	
Exposed Pad Width	E1	.245	—	—	
Molded Package Length	D	.330	—	.380	
Overall Length	H	.549	—	.625	
Exposed Pad Length	D1	.270	—	—	
Lead Thickness	c	.014	—	.029	
Pad Thickness	C2	.045	—	.065	
Lead Width	b	.020	—	.039	
Foot Length	L	.068	—	.110	
Pad Length	L1	—	—	.067	
Foot Angle	ϕ	0°	—	8°	

Notes:

- § Significant Characteristic.
- Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

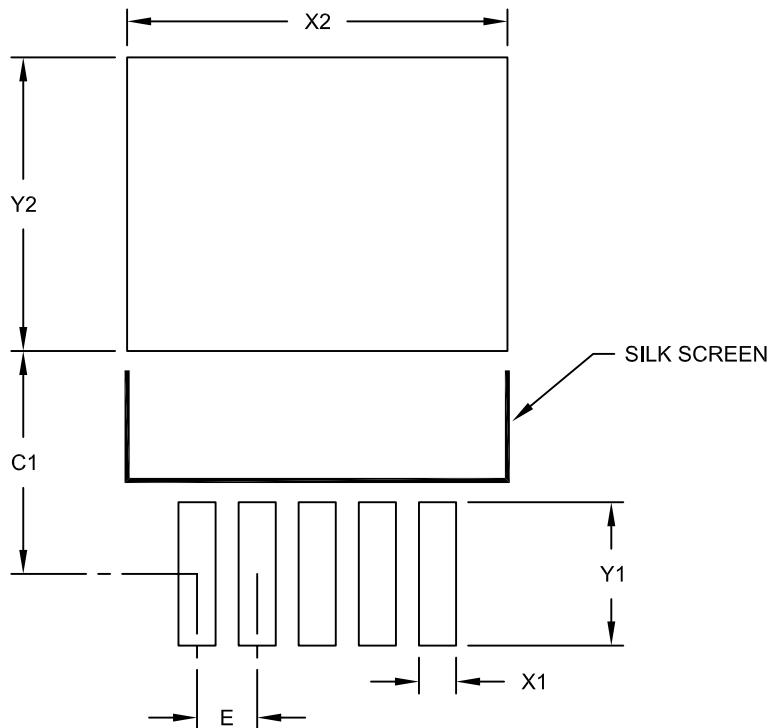
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-012B

Land Pattern (Footprint)

5-Lead Plastic (ET) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		.067	BSC	
Optional Center Pad Width	X2			.423	
Optional Center Pad Length	Y2			.327	
Contact Pad Spacing	C1		.248		
Contact Pad Width (X5)	X1			.041	
Contact Pad Length (X5)	Y1			.159	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

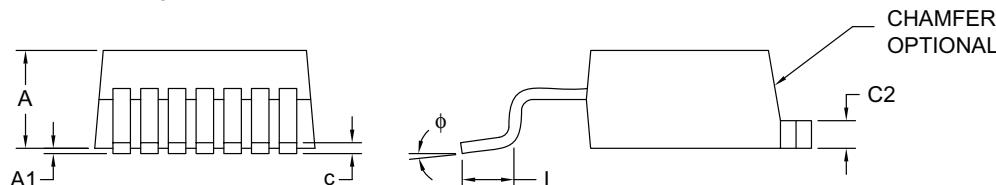
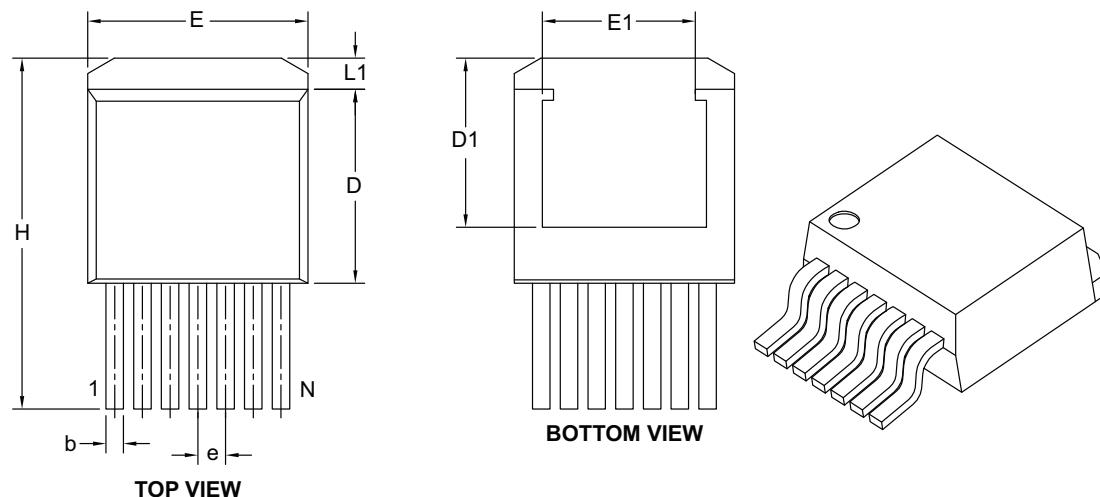
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2012A

Packaging Diagrams and Parameters

7-Lead Plastic (EK) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		7	
Pitch	e		.050 BSC	
Overall Height	A	.160	—	.190
Standoff §	A1	.000	—	.010
Overall Width	E	.380	—	.420
Exposed Pad Width	E1	.245	—	—
Molded Package Length	D	.330	—	.380
Overall Length	H	.549	—	.625
Exposed Pad Length	D1	.270	—	—
Lead Thickness	c	.014	—	.029
Pad Thickness	C2	.045	—	.065
Lead Width	b	.020	—	.037
Foot Length	L	.068	—	.110
Pad Length	L1	—	—	.067
Foot Angle	ϕ	0°	—	8°

Notes:

- § Significant Characteristic.
- Dimensions D and E do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" per side.
- Dimensioning and tolerancing per ASME Y14.5M.

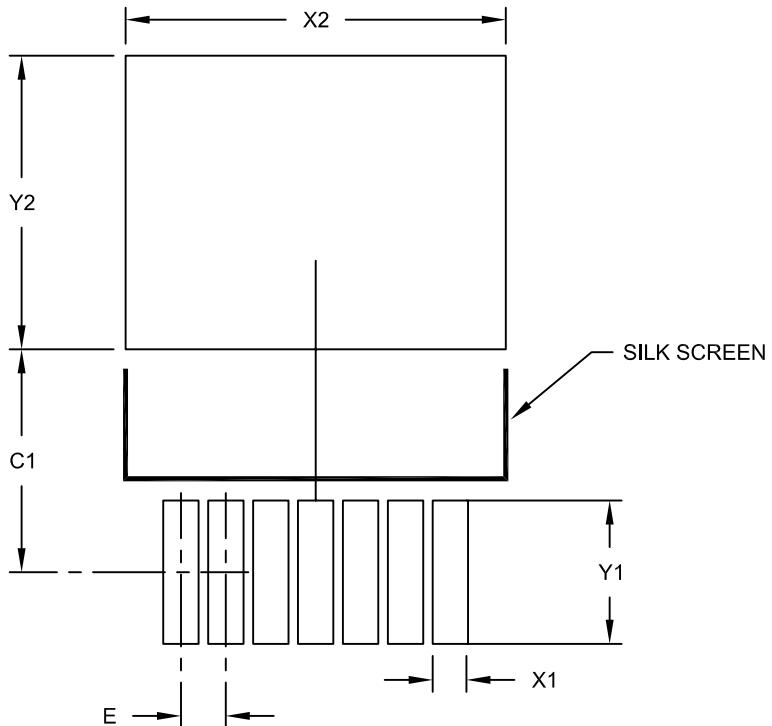
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-015B

Land Pattern (Footprint)

7-Lead Plastic (EK) [DDPAK]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		.050	BSC
Optional Center Pad Width	X2			.423
Optional Center Pad Length	Y2			.327
Contact Pad Spacing	C1		.248	
Contact Pad Width (X7)	X1			.039
Contact Pad Length (X7)	Y1			.159

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2015B

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

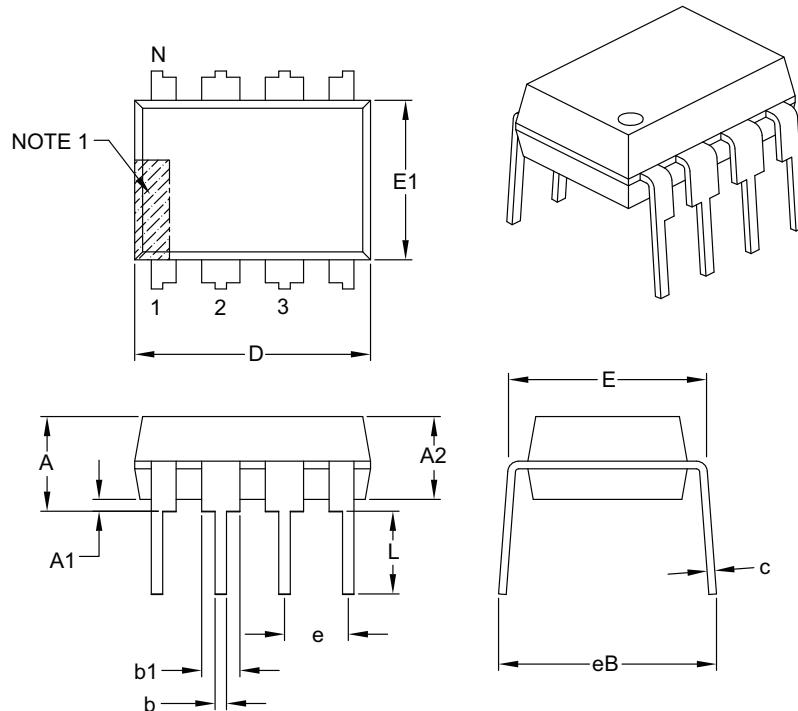
PDIP Family

Plastic Dual In-Line Packages

Packaging Diagrams and Parameters

8-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		.100 BSC	
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.348	.365	.400
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.040	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	–	–	.430

Notes:

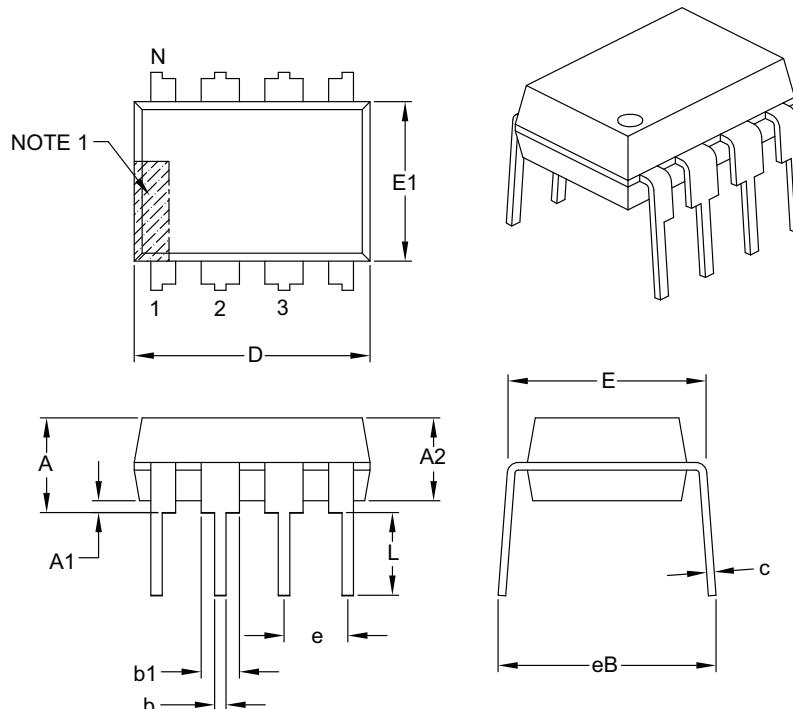
1. Pin 1 visual index feature may vary, but must be located with the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

8-Lead Plastic Dual In-Line (PA) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N			8	
Pitch	e			.100 BSC	
Top to Seating Plane	A	—	—	.210	
Molded Package Thickness	A2	.115	.130	.195	
Base to Seating Plane	A1	.015	—	—	
Shoulder to Shoulder Width	E	.290	.310	.325	
Molded Package Width	E1	.240	.250	.280	
Overall Length	D	.348	.365	.400	
Tip to Seating Plane	L	.115	.130	.150	
Lead Thickness	c	.008	.010	.015	
Upper Lead Width	b1	.040	.060	.070	
Lower Lead Width	b	.014	.018	.022	
Overall Row Spacing §	eB	—	—	.430	

Notes:

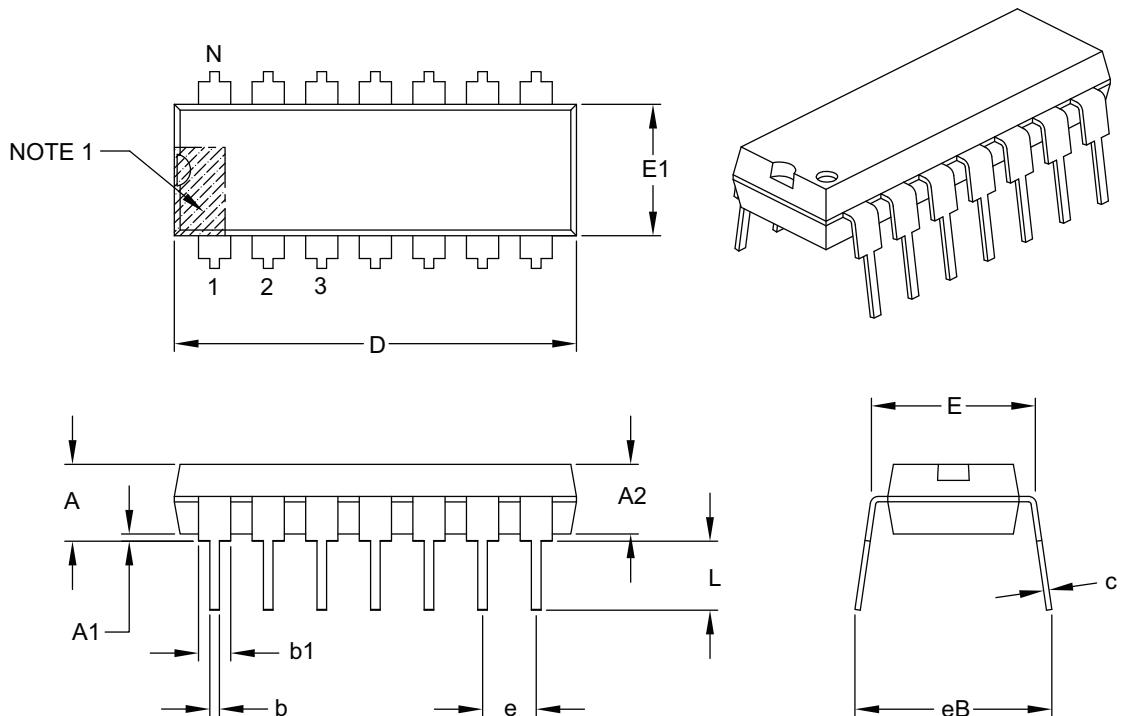
1. Pin 1 visual index feature may vary, but must be located with the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

14-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		14	
Pitch	e		.100 BSC	
Top to Seating Plane	A	—	—	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	—	—
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.735	.750	.775
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	—	—	.430

Notes:

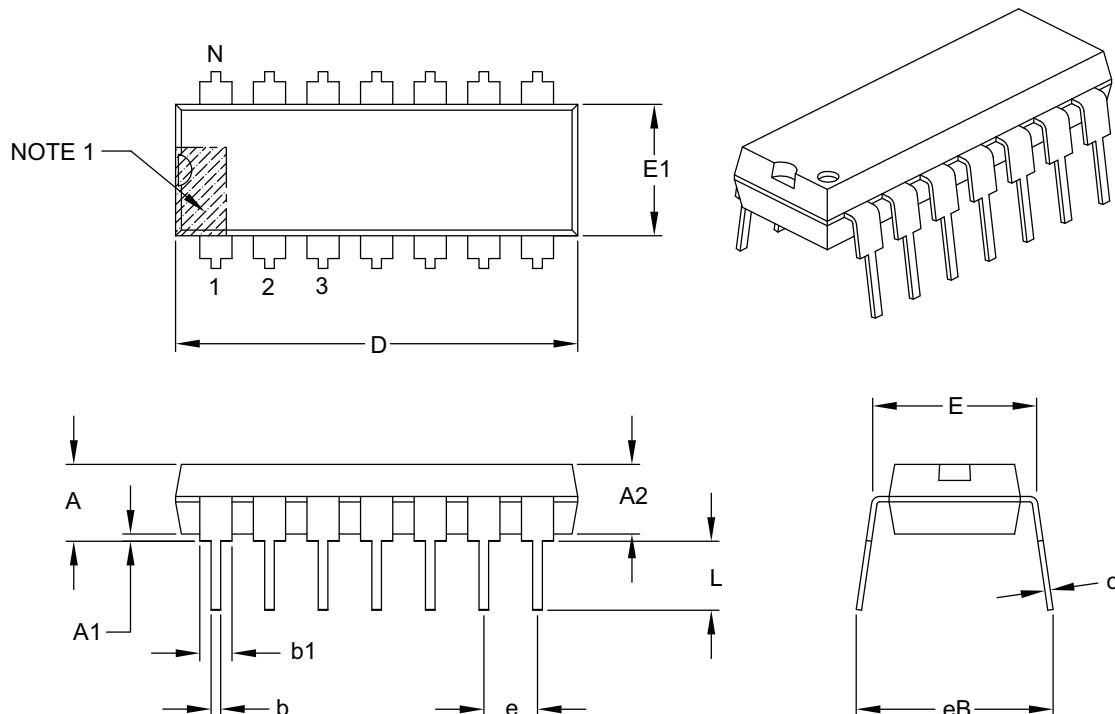
1. Pin 1 visual index feature may vary, but must be located with the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

14-Lead Plastic Dual In-Line (PD) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		14	
Pitch	e		.100 BSC	
Top to Seating Plane	A	—	—	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	—	—
Shoulder to Shoulder Width	E	.290	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.735	.750	.775
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	—	—	.430

Notes:

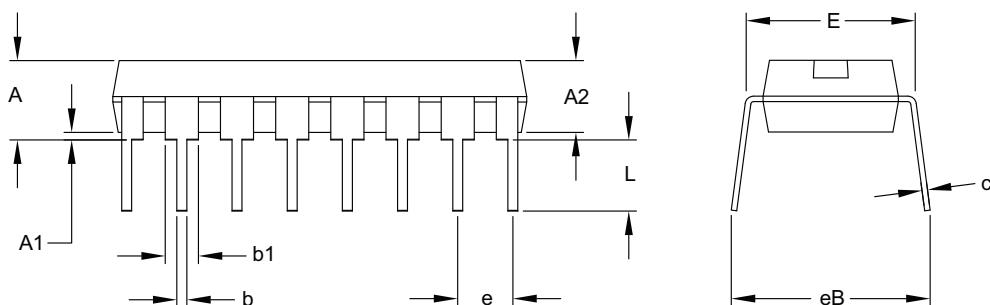
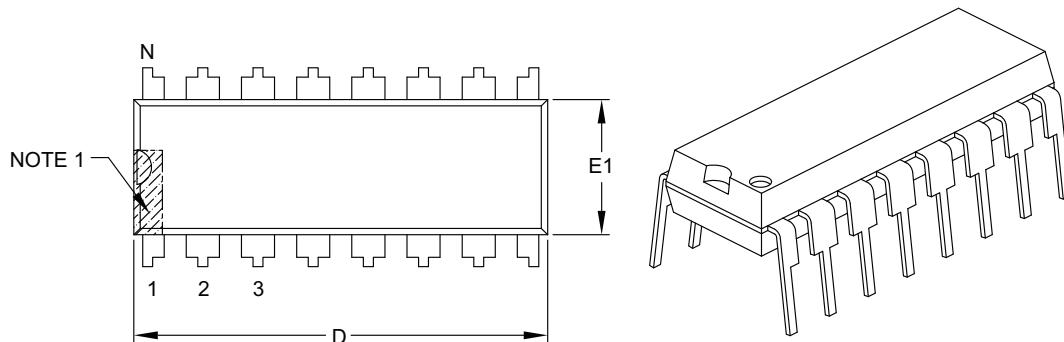
1. Pin 1 visual index feature may vary, but must be located with the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

16-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N			16	
Pitch	e			.100 BSC	
Top to Seating Plane	A	—	—	.210	
Molded Package Thickness	A2	.115	.130	.195	
Base to Seating Plane	A1	.015	—	—	
Shoulder to Shoulder Width	E	.290	.310	.325	
Molded Package Width	E1	.240	.250	.280	
Overall Length	D	.735	.755	.775	
Tip to Seating Plane	L	.115	.130	.150	
Lead Thickness	c	.008	.010	.015	
Upper Lead Width	b1	.045	.060	.070	
Lower Lead Width	b	.014	.018	.022	
Overall Row Spacing §	eB	—	—	.430	

Notes:

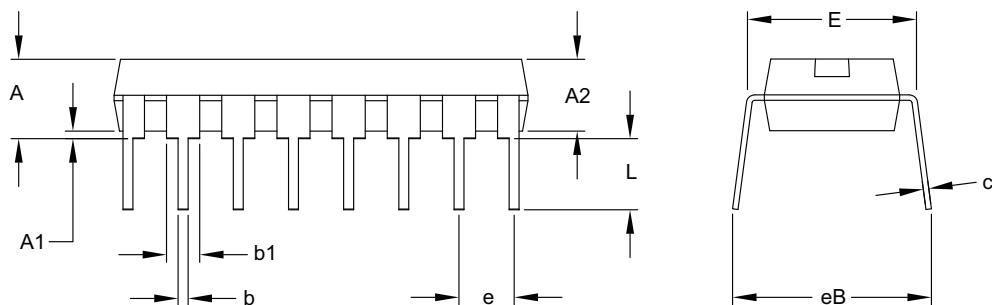
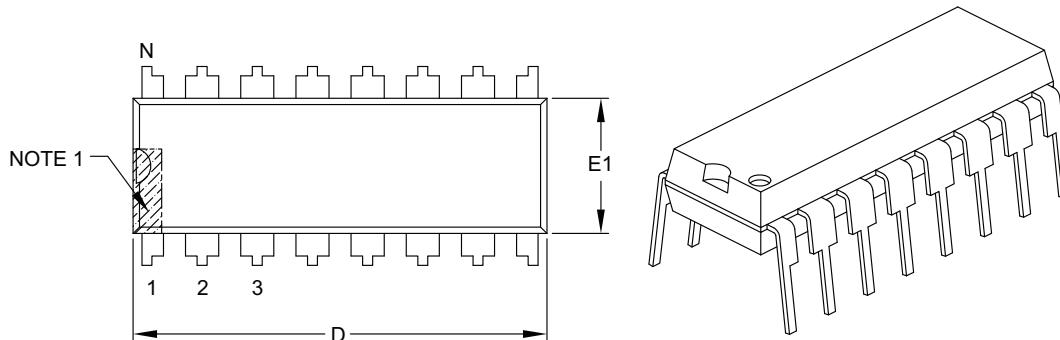
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

16-Lead Plastic Dual In-Line (PE) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins		N	16		
Pitch		e	.100 BSC		
Top to Seating Plane		A	–	–	.210
Molded Package Thickness		A2	.115	.130	.195
Base to Seating Plane		A1	.015	–	–
Shoulder to Shoulder Width		E	.290	.310	.325
Molded Package Width		E1	.240	.250	.280
Overall Length		D	.735	.755	.775
Tip to Seating Plane		L	.115	.130	.150
Lead Thickness		c	.008	.010	.015
Upper Lead Width		b1	.045	.060	.070
Lower Lead Width		b	.014	.018	.022
Overall Row Spacing §		eB	–	–	.430

Notes:

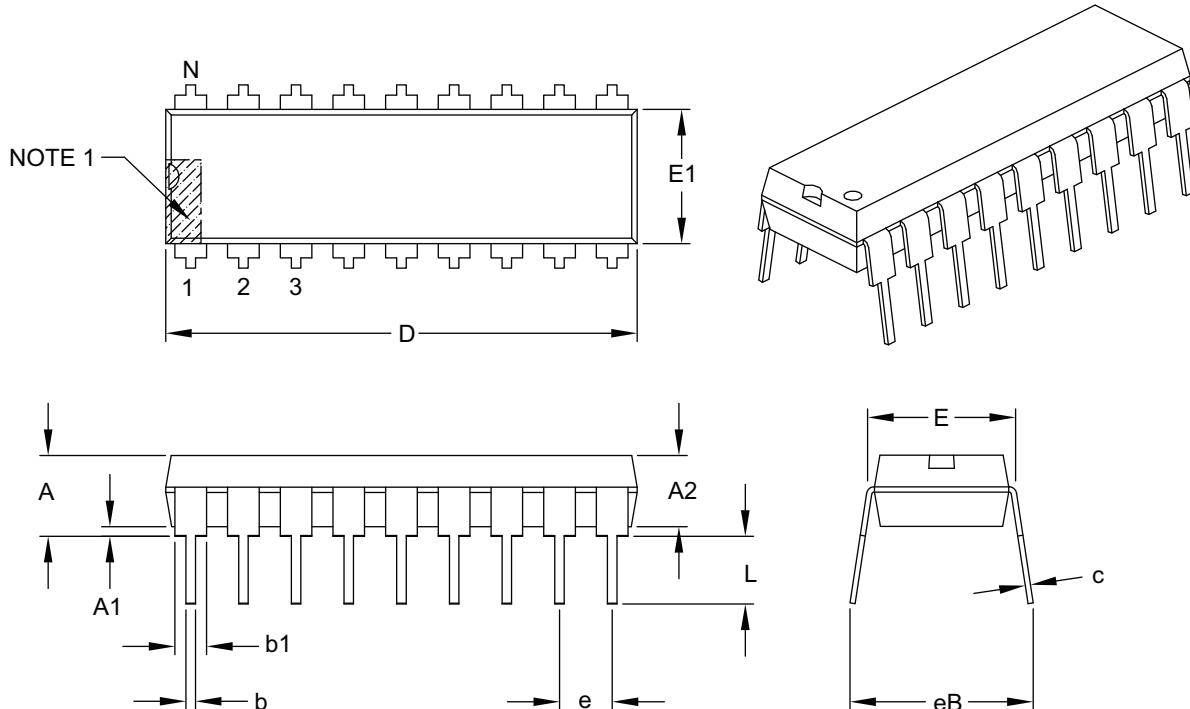
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

18-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		18	
Pitch	e		.100 BSC	
Top to Seating Plane	A	—	—	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	—	—
Shoulder to Shoulder Width	E	.300	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	.880	.900	.920
Tip to Seating Plane	L	.115	.130	.150
Lead Thickness	c	.008	.010	.014
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	—	—	.430

Notes:

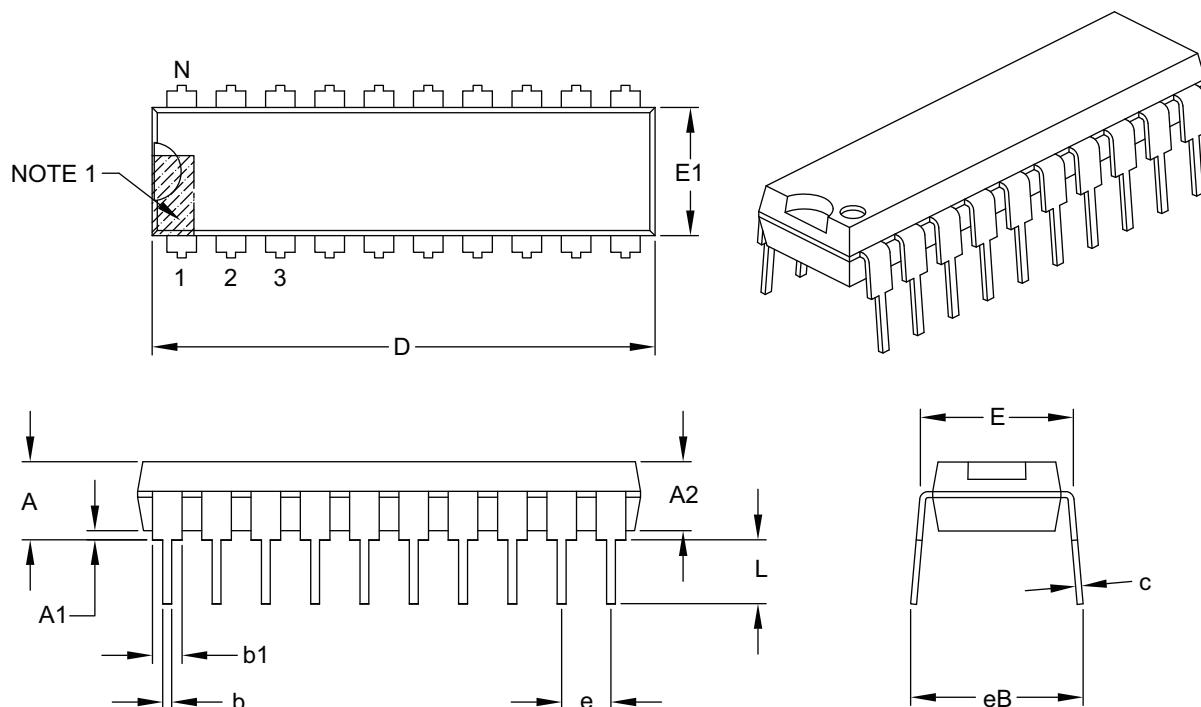
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

20-Lead Plastic Dual In-Line (P) – 300 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N			20	
Pitch	e			.100 BSC	
Top to Seating Plane	A	—	—	.210	
Molded Package Thickness	A2	.115	.130	.195	
Base to Seating Plane	A1	.015	—	—	
Shoulder to Shoulder Width	E	.300	.310	.325	
Molded Package Width	E1	.240	.250	.280	
Overall Length	D	.980	1.030	1.060	
Tip to Seating Plane	L	.115	.130	.150	
Lead Thickness	c	.008	.010	.015	
Upper Lead Width	b1	.045	.060	.070	
Lower Lead Width	b	.014	.018	.022	
Overall Row Spacing §	eB	—	—	.430	

Notes:

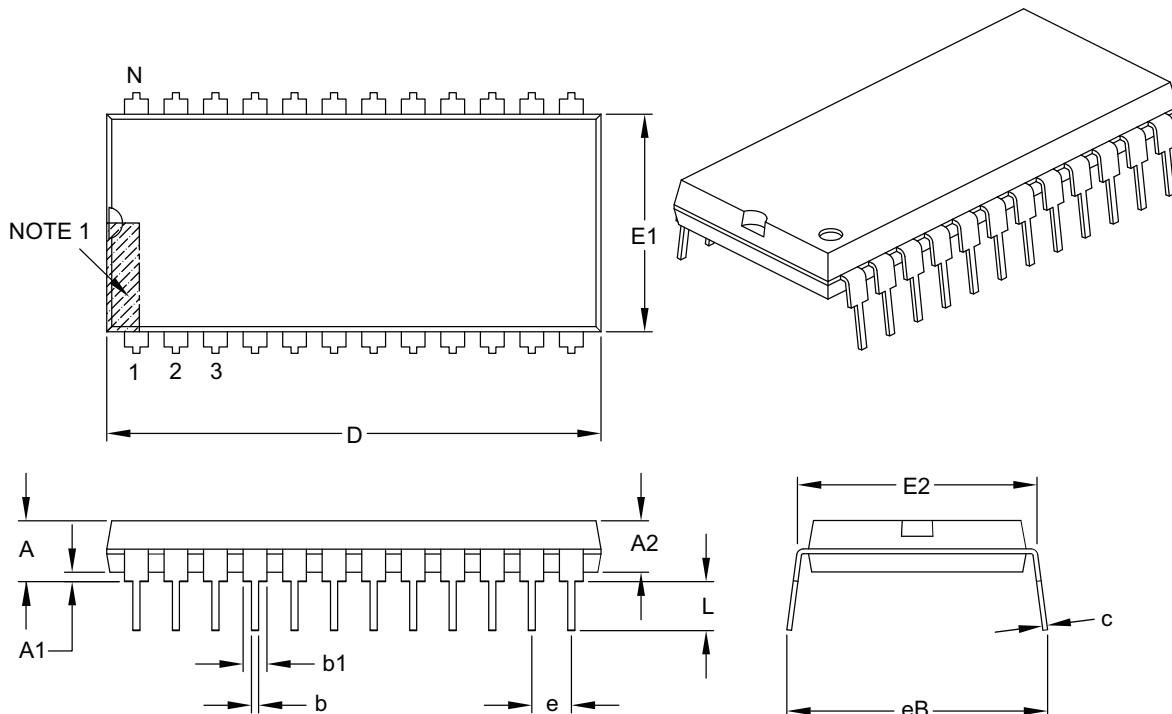
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

24-Lead Plastic Dual In-Line (P) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	24		
Pitch	e	.100	BSC	
Top to Seating Plane	A	—	—	.250
Molded Package Thickness	A2	.125	—	.195
Base to Seating Plane	A1	.015	—	—
Shoulder to Shoulder Width	E	.590	—	.625
Molded Package Width	E1	.485	—	.580
Overall Length	D	1.150	—	1.290
Tip to Seating Plane	L	.115	—	.200
Lead Thickness	c	.008	—	.015
Upper Lead Width	b1	.030	—	.070
Lower Lead Width	b	.014	—	.022
Overall Row Spacing §	eB	—	—	.700

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

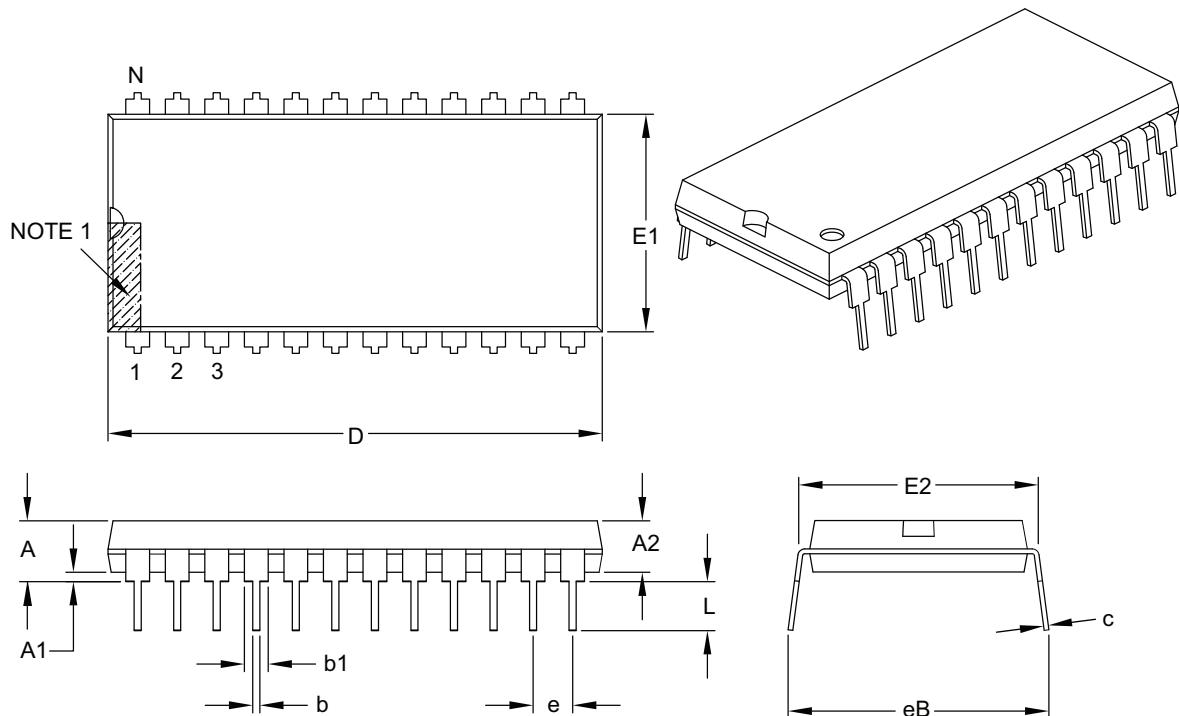
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-081B

Packaging Diagrams and Parameters

24-Lead Plastic Dual In-Line (PG) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins		N	24		
Pitch		e	.100 BSC		
Top to Seating Plane		A	–	–	.250
Molded Package Thickness		A2	.125	–	.195
Base to Seating Plane		A1	.015	–	–
Shoulder to Shoulder Width		E	.590	–	.625
Molded Package Width		E1	.485	–	.580
Overall Length		D	1.150	–	1.290
Tip to Seating Plane		L	.115	–	.200
Lead Thickness		c	.008	–	.015
Upper Lead Width		b1	.030	–	.070
Lower Lead Width		b	.014	–	.022
Overall Row Spacing §		eB	–	–	.700

Notes:

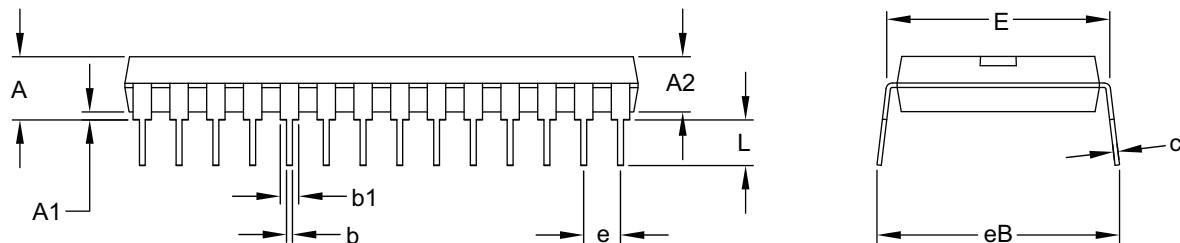
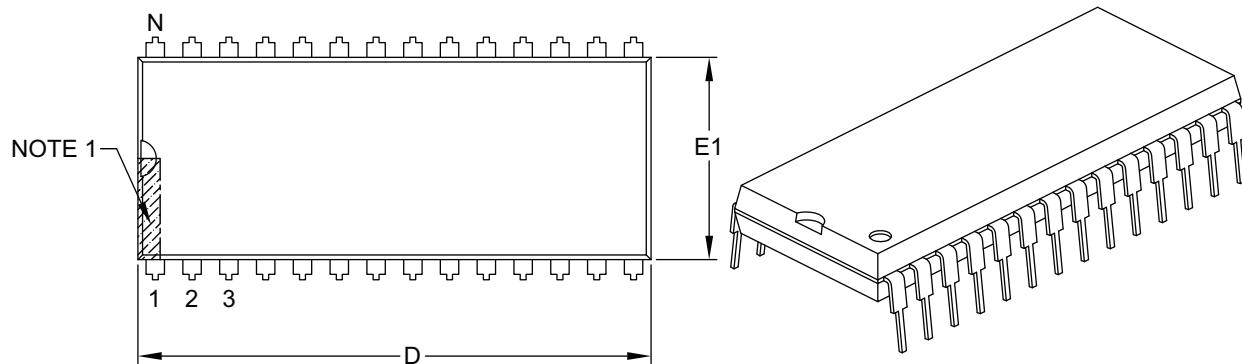
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

28-Lead Plastic Dual In-Line (P) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		.100 BSC	
Top to Seating Plane	A	—	—	.250
Molded Package Thickness	A2	.125	—	.195
Base to Seating Plane	A1	.015	—	—
Shoulder to Shoulder Width	E	.590	—	.625
Molded Package Width	E1	.485	—	.580
Overall Length	D	1.380	—	1.565
Tip to Seating Plane	L	.115	—	.200
Lead Thickness	c	.008	—	.015
Upper Lead Width	b1	.030	—	.070
Lower Lead Width	b	.014	—	.022
Overall Row Spacing §	eB	—	—	.700

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

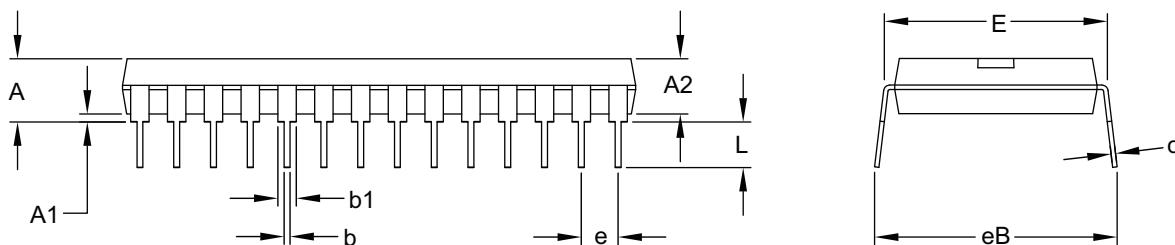
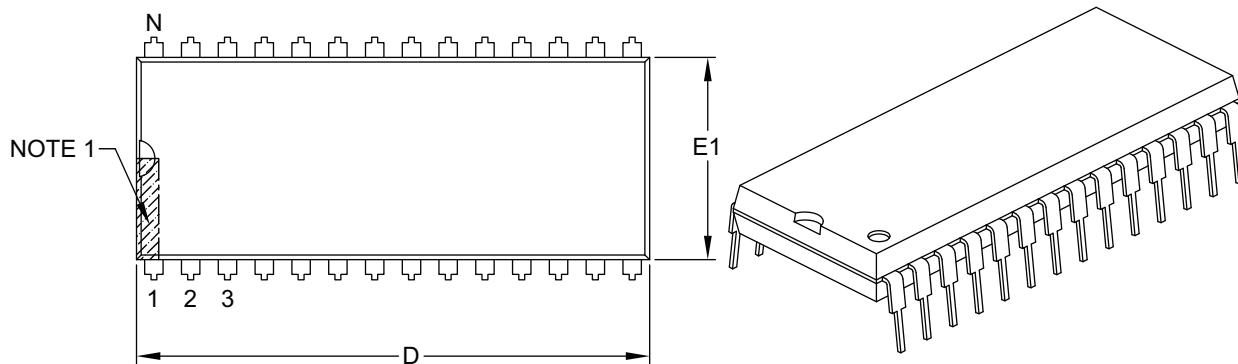
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-079B

Packaging Diagrams and Parameters

28-Lead Plastic Dual In-Line (PI) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		.100 BSC	
Top to Seating Plane	A	—	—	.250
Molded Package Thickness	A2	.125	—	.195
Base to Seating Plane	A1	.015	—	—
Shoulder to Shoulder Width	E	.590	—	.625
Molded Package Width	E1	.485	—	.580
Overall Length	D	1.380	—	1.565
Tip to Seating Plane	L	.115	—	.200
Lead Thickness	c	.008	—	.015
Upper Lead Width	b1	.030	—	.070
Lower Lead Width	b	.014	—	.022
Overall Row Spacing §	eB	—	—	.700

Notes:

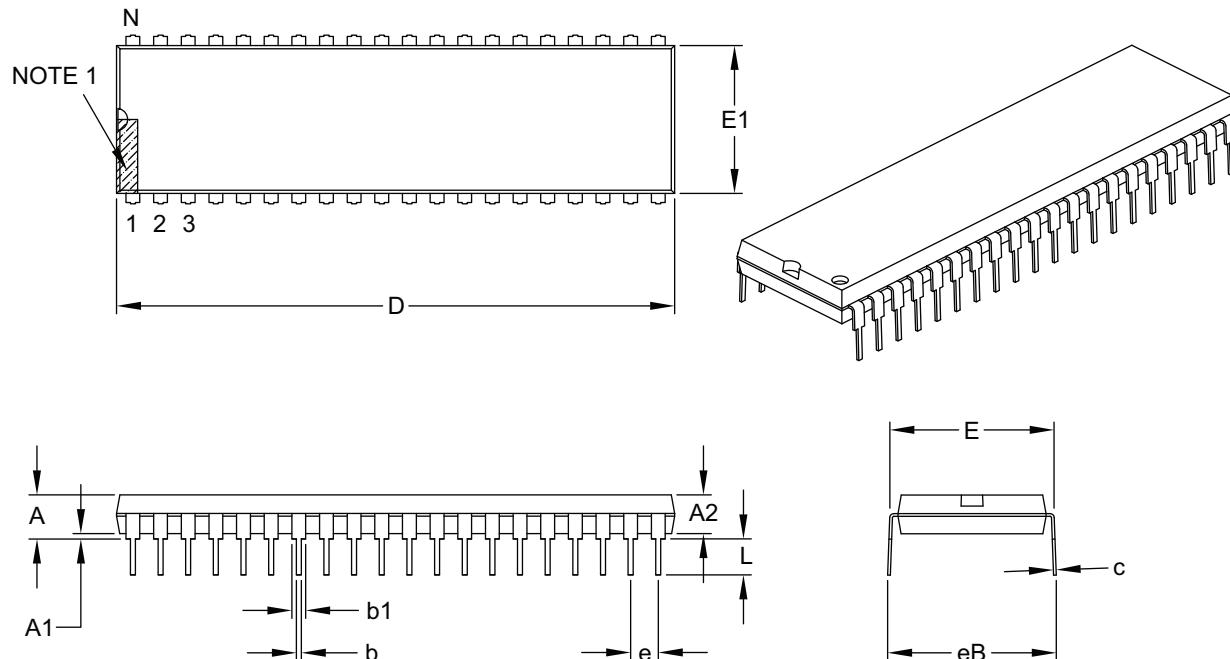
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

40-Lead Plastic Dual In-Line (P) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		40	
Pitch	e		.100 BSC	
Top to Seating Plane	A	—	—	.250
Molded Package Thickness	A2	.125	—	.195
Base to Seating Plane	A1	.015	—	—
Shoulder to Shoulder Width	E	.590	—	.625
Molded Package Width	E1	.485	—	.580
Overall Length	D	1.980	—	2.095
Tip to Seating Plane	L	.115	—	.200
Lead Thickness	c	.008	—	.015
Upper Lead Width	b1	.030	—	.070
Lower Lead Width	b	.014	—	.023
Overall Row Spacing §	eB	—	—	.700

Notes:

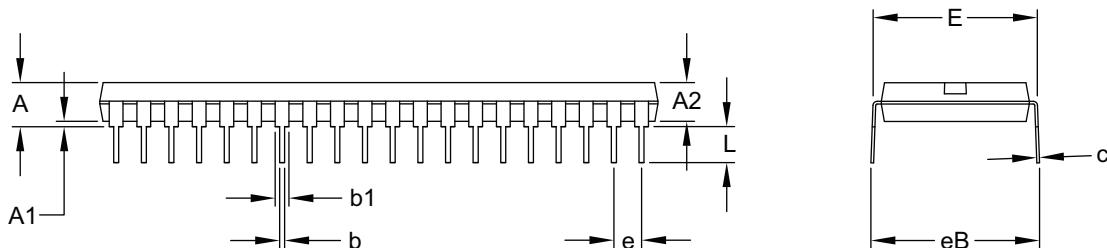
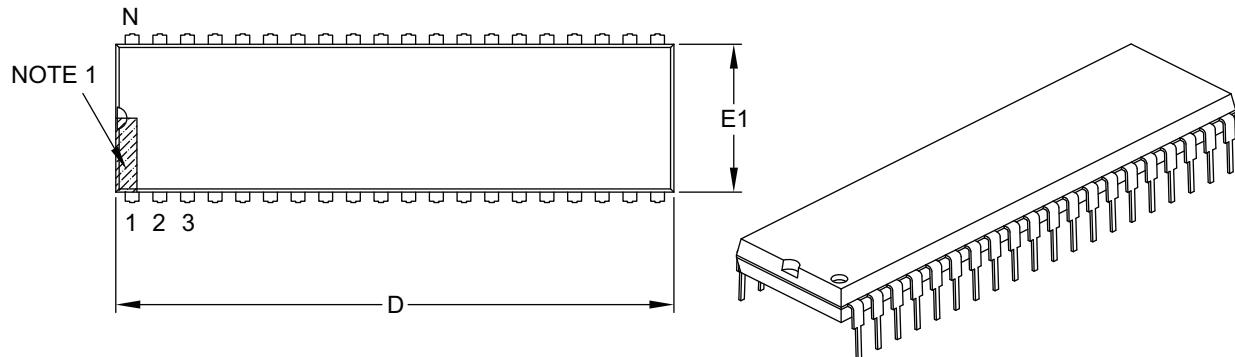
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

40-Lead Plastic Dual In-Line (PL) – 600 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins		N	40		
Pitch		e	.100 BSC		
Top to Seating Plane		A	–	–	.250
Molded Package Thickness		A2	.125	–	.195
Base to Seating Plane		A1	.015	–	–
Shoulder to Shoulder Width		E	.590	–	.625
Molded Package Width		E1	.485	–	.580
Overall Length		D	1.980	–	2.095
Tip to Seating Plane		L	.115	–	.200
Lead Thickness		c	.008	–	.015
Upper Lead Width		b1	.030	–	.070
Lower Lead Width		b	.014	–	.023
Overall Row Spacing §		eB	–	–	.700

Notes:

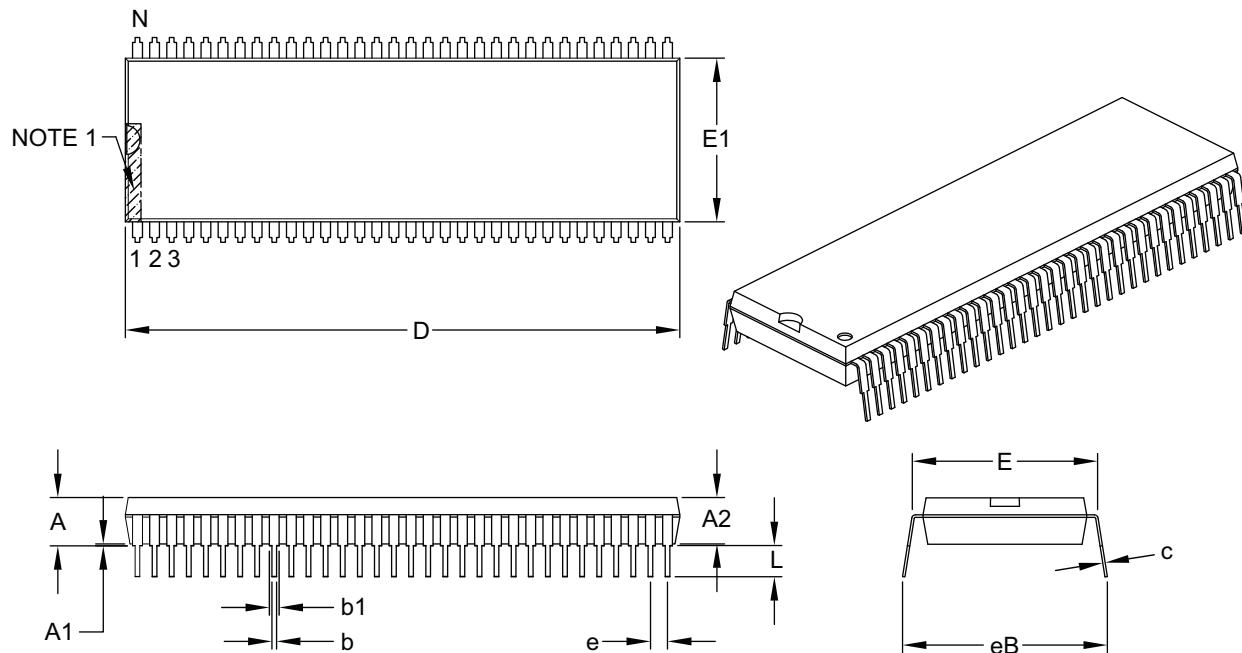
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

64-Lead Shrink Plastic Dual In-Line (SP) – 750 mil Body [PDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		64	
Pitch	e		.070 BSC	
Top to Seating Plane	A	—	—	.200
Molded Package Thickness	A2	.120	.150	.180
Base to Seating Plane	A1	.020	—	—
Shoulder to Shoulder Width	E	.750	—	.785
Molded Package Width	E1	.650	.670	.690
Overall Length	D	2.260	2.270	2.280
Tip to Seating Plane	L	.100	.130	.150
Lead Thickness	c	.009	.010	.015
Upper Lead Width	b1	.035	.040	.045
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	—	—	.880

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-090B

Packaging Diagrams and Parameters

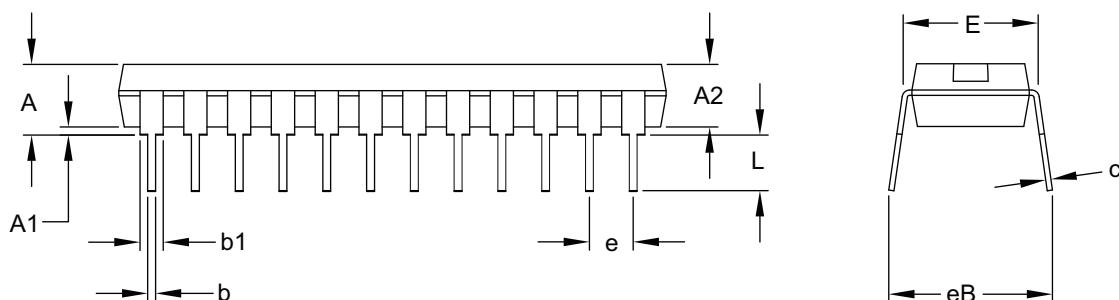
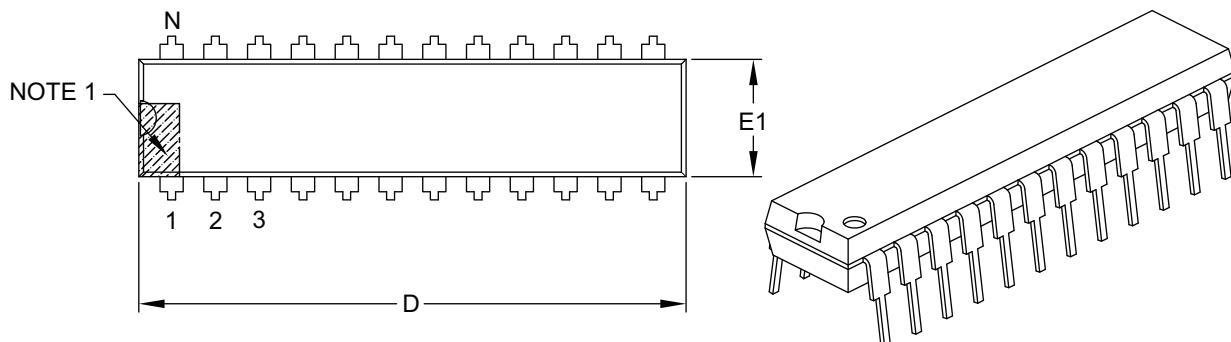
SPDIP Family

Skinny Plastic Dual In-Line Packages

Packaging Diagrams and Parameters

24-Lead Skinny Plastic Dual In-Line (PF) – 300 mil Body [SPDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		24	
Pitch	e		.100 BSC	
Top to Seating Plane	A	–	–	.210
Molded Package Thickness	A2	.115	.130	.195
Base to Seating Plane	A1	.015	–	–
Shoulder to Shoulder Width	E	.280	.310	.325
Molded Package Width	E1	.240	.250	.280
Overall Length	D	1.155	1.250	1.280
Tip to Seating Plane	L	.115	.130	.160
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.045	.060	.070
Lower Lead Width	b	.014	.018	.023
Overall Row Spacing §	eB	–	–	.430

Notes:

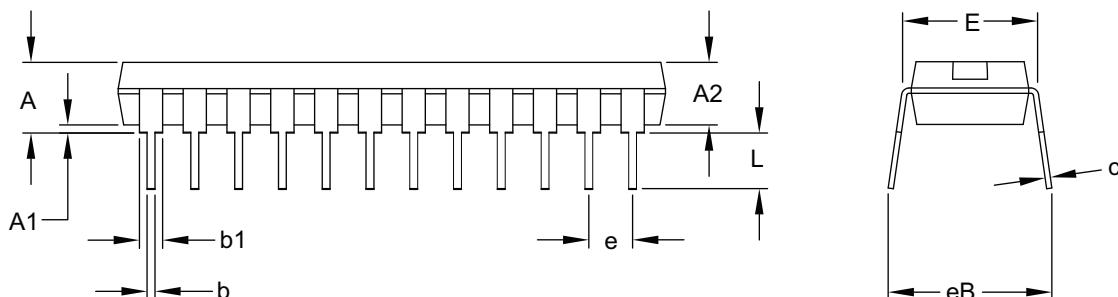
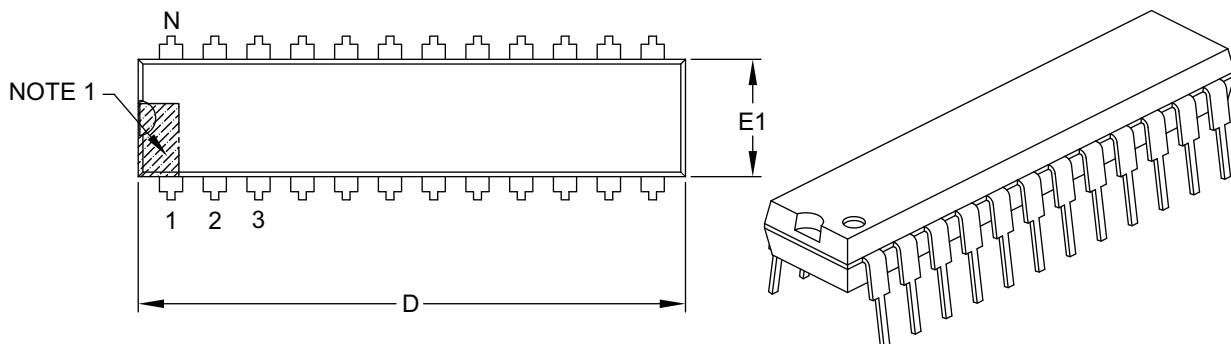
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

24-Lead Skinny Plastic Dual In-Line (SP) – 300 mil Body [SPDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins		N	24		
Pitch		e	.100 BSC		
Top to Seating Plane		A	–	–	.210
Molded Package Thickness		A2	.115	.130	.195
Base to Seating Plane		A1	.015	–	–
Shoulder to Shoulder Width		E	.280	.310	.325
Molded Package Width		E1	.240	.250	.280
Overall Length		D	1.155	1.250	1.280
Tip to Seating Plane		L	.115	.130	.160
Lead Thickness		c	.008	.010	.015
Upper Lead Width		b1	.045	.060	.070
Lower Lead Width		b	.014	.018	.023
Overall Row Spacing §		eB	–	–	.430

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

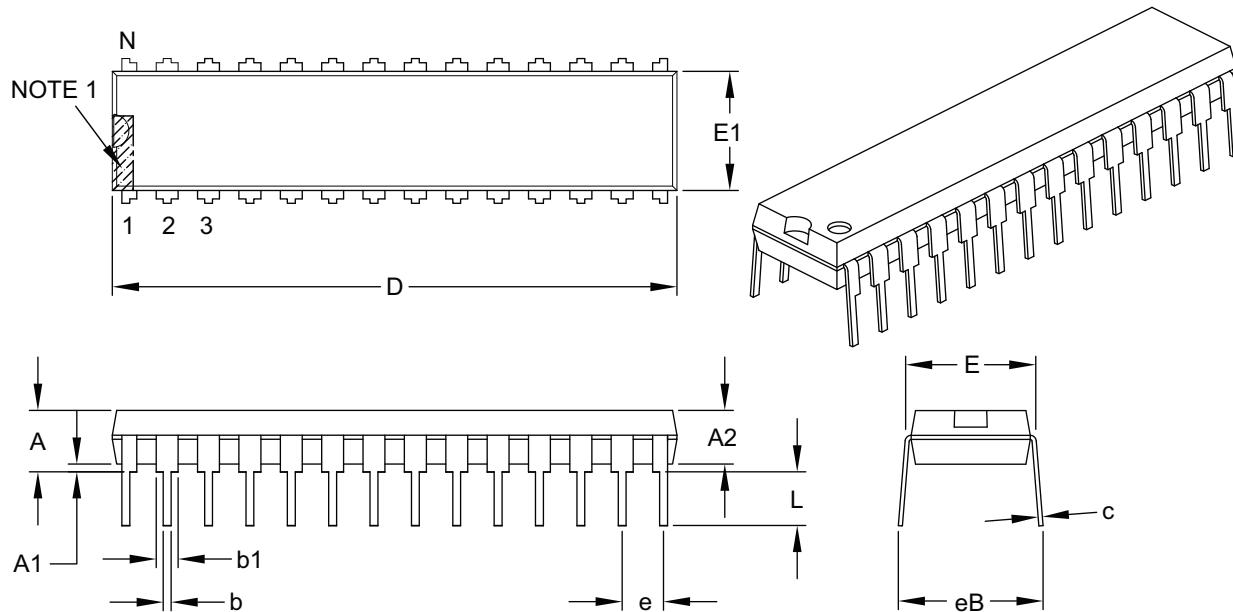
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-043B

Packaging Diagrams and Parameters

28-Lead Skinny Plastic Dual In-Line (PJ) – 300 mil Body [SPDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins		N		
Pitch		e		
Top to Seating Plane		A		
Molded Package Thickness		A2		
Base to Seating Plane		A1		
Shoulder to Shoulder Width		E		
Molded Package Width		E1		
Overall Length		D		
Tip to Seating Plane		L		
Lead Thickness		c		
Upper Lead Width		b1		
Lower Lead Width		b		
Overall Row Spacing §		eB		

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

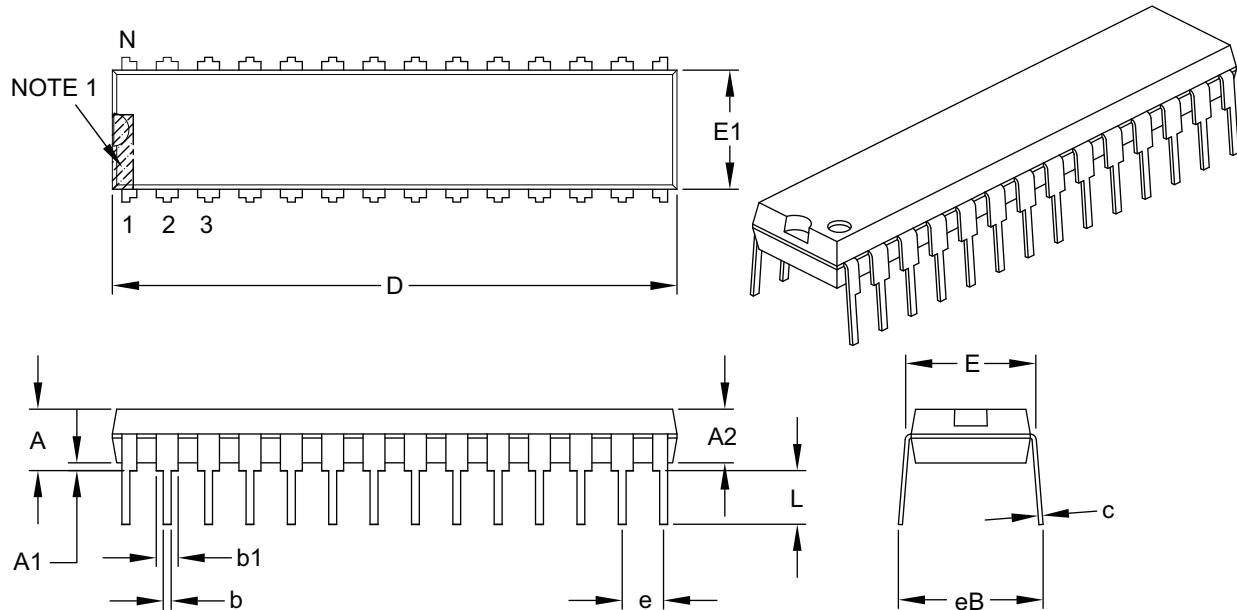
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-070B

Packaging Diagrams and Parameters

28-Lead Skinny Plastic Dual In-Line (SP) – 300 mil Body [SPDIP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		.100 BSC	
Top to Seating Plane	A	—	—	.200
Molded Package Thickness	A2	.120	.135	.150
Base to Seating Plane	A1	.015	—	—
Shoulder to Shoulder Width	E	.290	.310	.335
Molded Package Width	E1	.240	.285	.295
Overall Length	D	1.345	1.365	1.400
Tip to Seating Plane	L	.110	.130	.150
Lead Thickness	c	.008	.010	.015
Upper Lead Width	b1	.040	.050	.070
Lower Lead Width	b	.014	.018	.022
Overall Row Spacing §	eB	—	—	.430

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

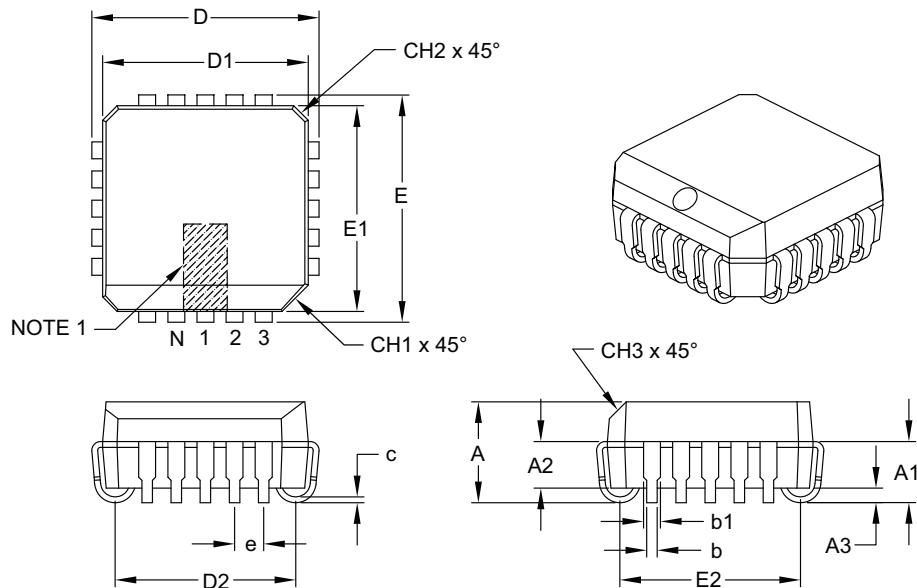
PLCC Family

Plastic Leaded Chip Carrier Packages

Packaging Diagrams and Parameters

20-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N			20	
Pitch	e			.050	
Overall Height	A	.165	.172	.180	
Contact Height	A1	.090	.105	.120	
Molded Package to Contact	A2	.062	—	.083	
Standoff §	A3	.020	—	—	
Corner Chamfer	CH1	.042	—	.048	
Chamfers	CH2	—	—	.020	
Side Chamfer	CH3	.042	—	.056	
Overall Width	E	.385	.390	.395	
Overall Length	D	.385	.390	.395	
Molded Package Width	E1	.350	.353	.356	
Molded Package Length	D1	.350	.353	.356	
Footprint Width	E2	.282	.310	.338	
Footprint Length	D2	.282	.310	.338	
Lead Thickness	c	.0075	—	.0125	
Upper Lead Width	b1	.026	—	.032	
Lower Lead Width	b	.013	—	.021	

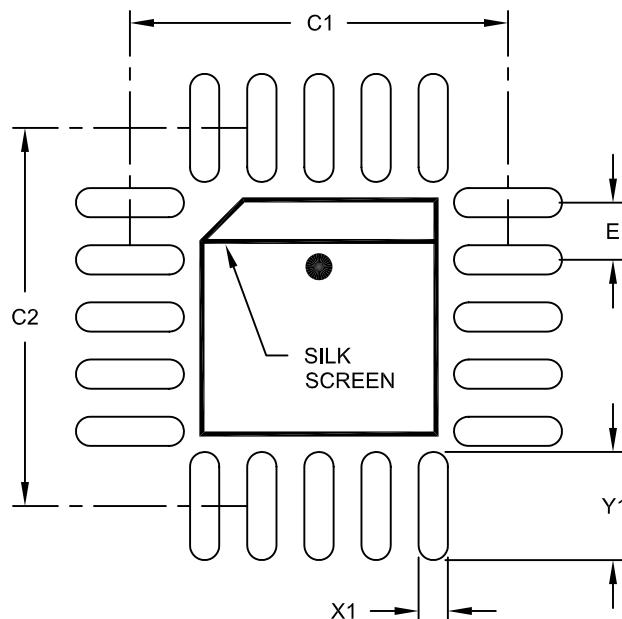
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

20-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			INCHES		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E				.050	BSC	
Contact Pad Spacing	C1				.331		
Contact Pad Spacing	C2				.331		
Contact Pad Width (X20)	X1					.026	
Contact Pad Length (X20)	Y1						.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

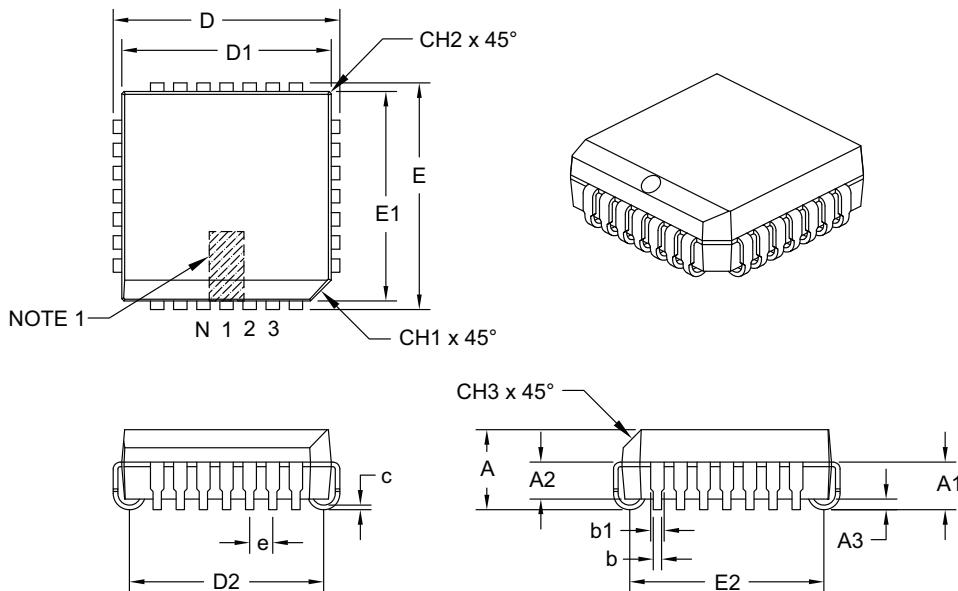
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2064A

Packaging Diagrams and Parameters

28-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		.050	
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	–	.083
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	.485	.490	.495
Overall Length	D	.485	.490	.495
Molded Package Width	E1	.450	.453	.456
Molded Package Length	D1	.450	.453	.456
Footprint Width	E2	.382	.410	.438
Footprint Length	D2	.382	.410	.438
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

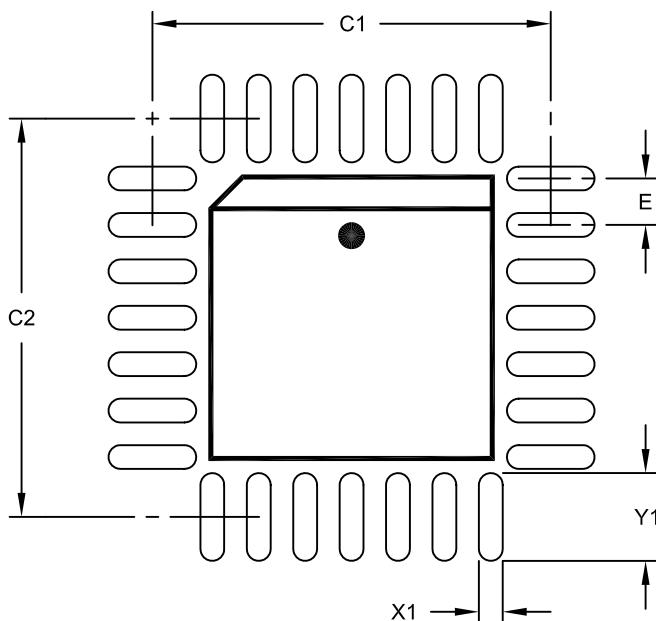
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

28-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			INCHES		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E				.050	BSC	
Contact Pad Spacing	C1				.429		
Contact Pad Spacing	C2				.429		
Contact Pad Width (X28)	X1					.026	
Contact Pad Length (X28)	Y1					.094	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

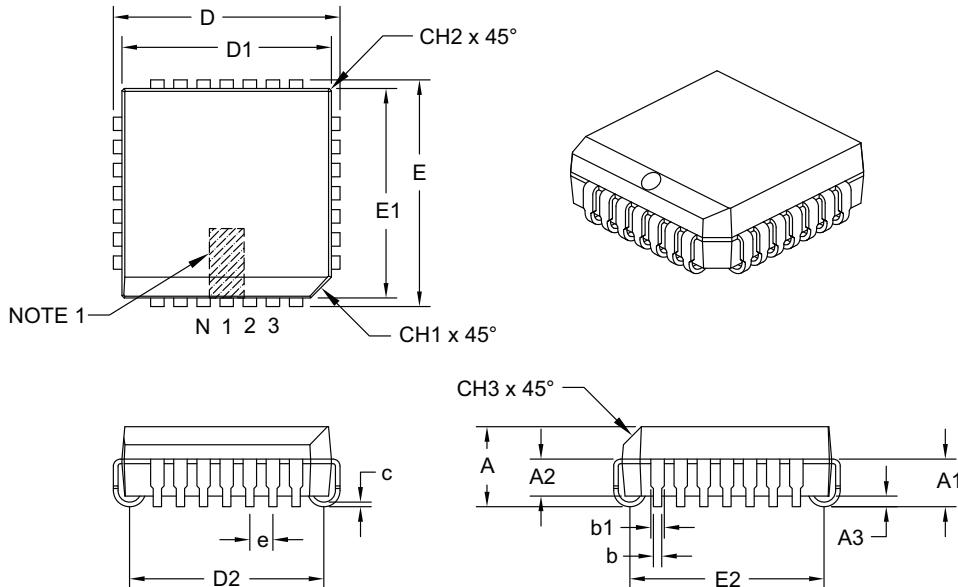
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2026A

Packaging Diagrams and Parameters

28-Lead Plastic Leaded Chip Carrier (LI) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits		INCHES		
	N	MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		.050	
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	–	.083
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	.485	.490	.495
Overall Length	D	.485	.490	.495
Molded Package Width	E1	.450	.453	.456
Molded Package Length	D1	.450	.453	.456
Footprint Width	E2	.382	.410	.438
Footprint Length	D2	.382	.410	.438
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

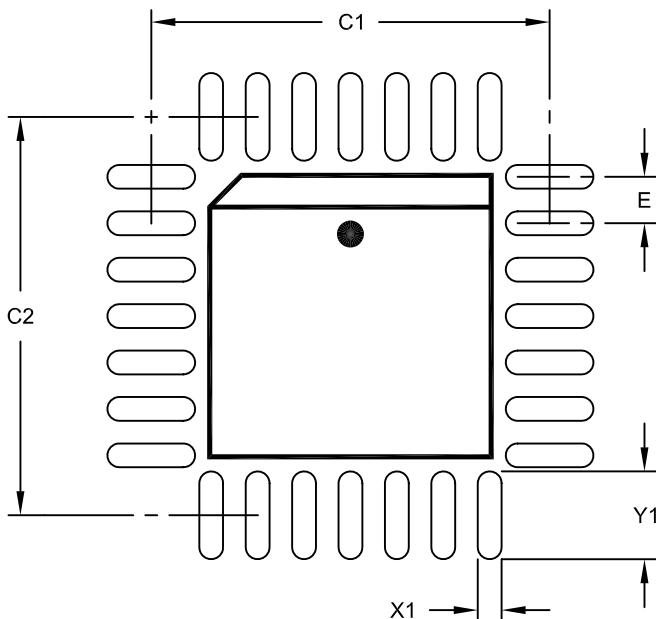
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

28-Lead Plastic Leaded Chip Carrier (L1) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			INCHES		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E				.050	BSC	
Contact Pad Spacing	C1				.429		
Contact Pad Spacing	C2				.429		
Contact Pad Width (X28)	X1					.026	
Contact Pad Length (X28)	Y1						.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

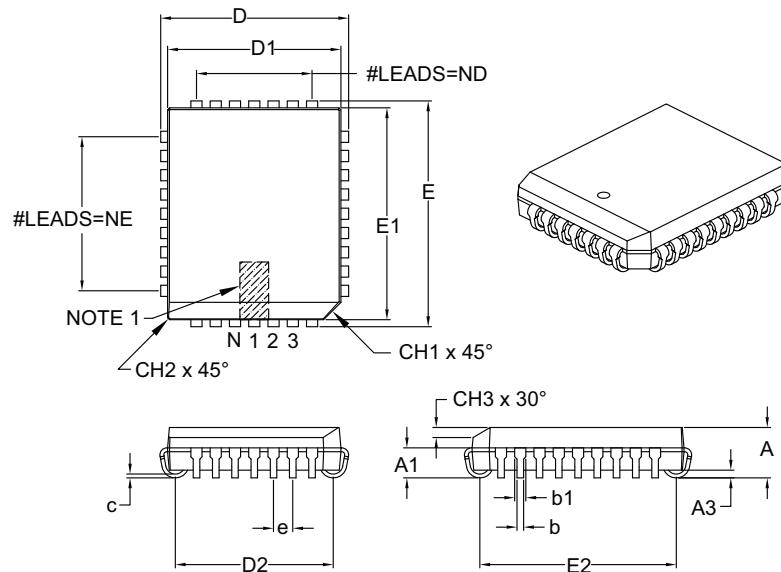
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2026A

Packaging Diagrams and Parameters

32-Lead Plastic Leaded Chip Carrier (L) – Rectangle [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits		INCHES		
		MIN	NOM	MAX
Number of Pins	N		32	
Pitch	e		.050	
Pins along Length	ND		7	
Pins along Width	NE		9	
Overall Height	A	.125	—	.140
Contact Height	A1	.060	—	.095
Standoff §	A3	.015	—	—
Corner Chamfer	CH1	.042	—	.048
Chamfers	CH2	—	—	.020
Side Chamfer Height	CH3	.023	—	.029
Overall Length	D	.485	—	.495
Overall Width	E	.585	—	.595
Molded Package Length	D1	.447	—	.453
Molded Package Width	E1	.547	—	.553
Footprint Length	D2	.376	—	.446
Footprint Width	E2	.476	—	.546
Lead Thickness	c	.008	—	.013
Upper Lead Width	b1	.026	—	.032
Lower Lead Width	b	.013	—	.021

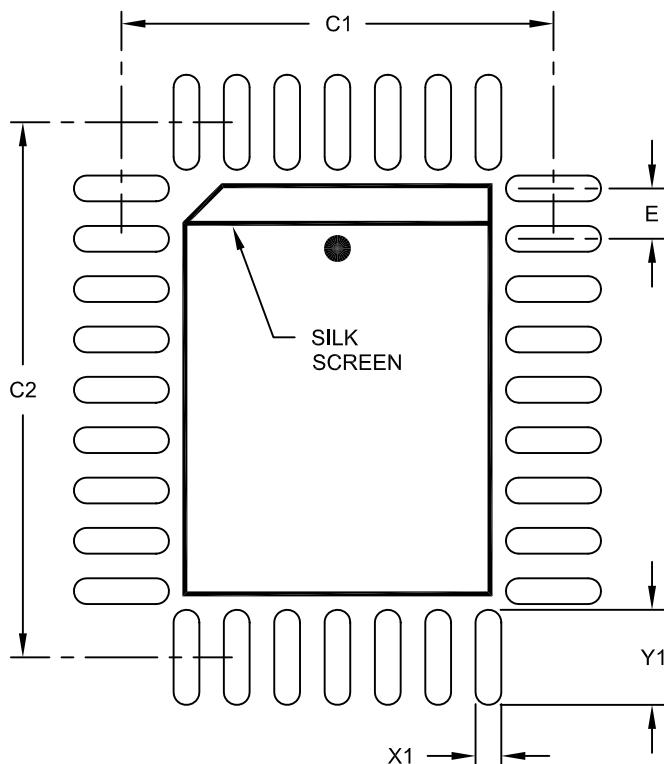
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

32-Lead Plastic Leaded Chip Carrier (L) - Rectangle [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			INCHES		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E				.050	BSC	
Contact Pad Spacing	C1				.429		
Contact Pad Spacing	C2				.531		
Contact Pad Width (X32)	X1					,026	
Contact Pad Length (X32)	Y1						.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

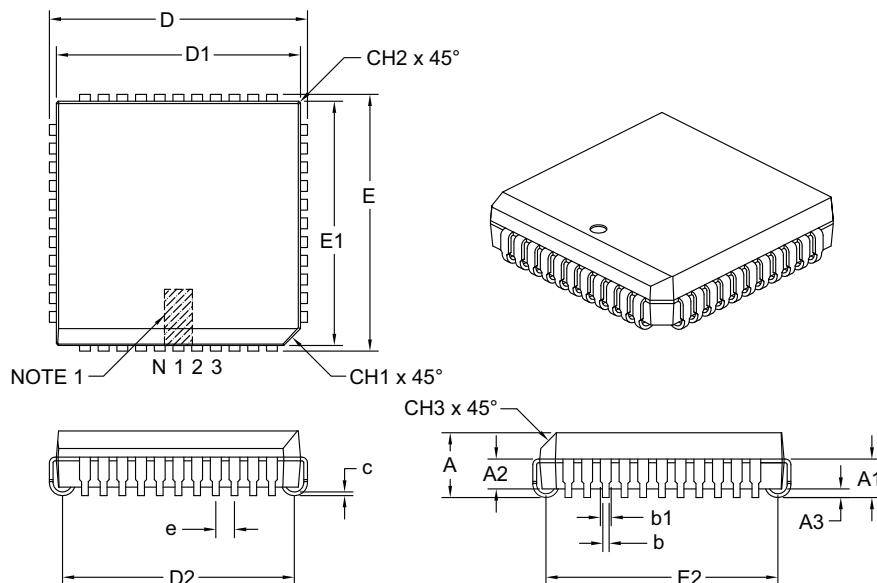
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2023A

Packaging Diagrams and Parameters

44-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins		44		
Pitch		.050		
Overall Height		A	.165	.172
Contact Height		A1	.090	.105
Molded Package to Contact		A2	.062	–
Standoff §		A3	.020	–
Corner Chamfer		CH1	.042	–
Chamfers		CH2	–	–
Side Chamfer		CH3	.042	–
Overall Width		E	.685	.690
Overall Length		D	.685	.690
Molded Package Width		E1	.650	.653
Molded Package Length		D1	.650	.653
Footprint Width		E2	.582	.610
Footprint Length		D2	.582	.610
Lead Thickness		c	.0075	–
Upper Lead Width		b1	.026	–
Lower Lead Width		b	.013	–
				.021

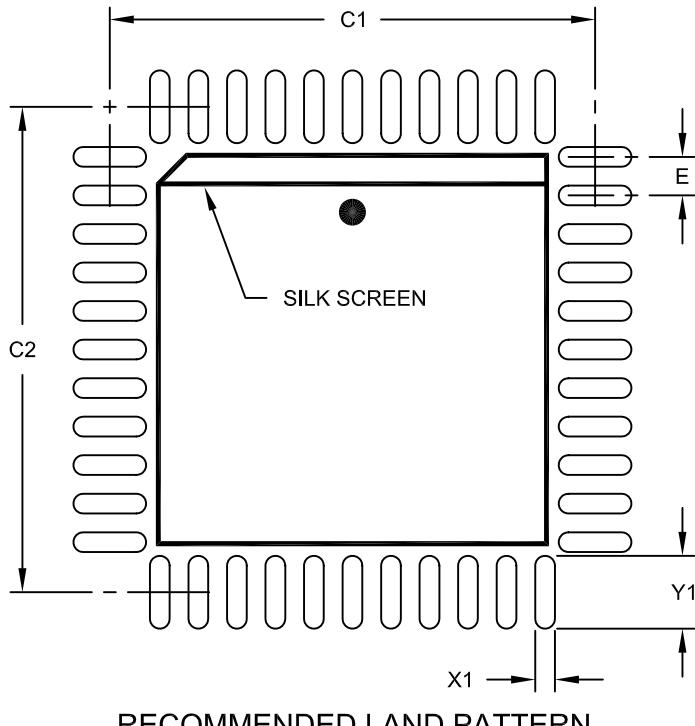
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

44-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	INCHES		
		MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.630	
Contact Pad Spacing	C2		.630	
Contact Pad Width (X44)	X1			.026
Contact Pad Length (X44)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

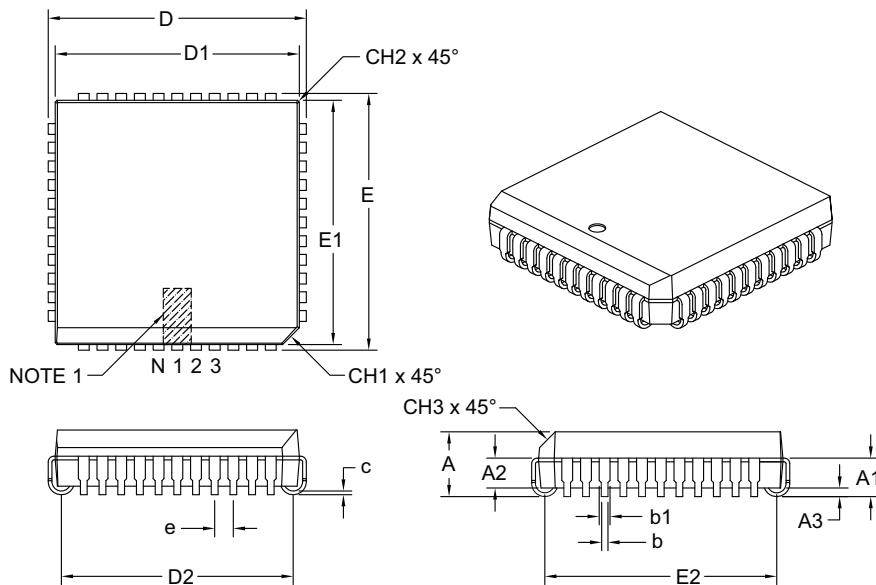
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2048A

Packaging Diagrams and Parameters

44-Lead Plastic Leaded Chip Carrier (LW) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	INCHES		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		44		
Pitch	e		.050		
Overall Height	A	.165	.172	.180	
Contact Height	A1	.090	.105	.120	
Molded Package to Contact	A2	.062	—	.083	
Standoff §	A3	.020	—	—	
Corner Chamfer	CH1	.042	—	.048	
Chamfers	CH2	—	—	.020	
Side Chamfer	CH3	.042	—	.056	
Overall Width	E	.685	.690	.695	
Overall Length	D	.685	.690	.695	
Molded Package Width	E1	.650	.653	.656	
Molded Package Length	D1	.650	.653	.656	
Footprint Width	E2	.582	.610	.638	
Footprint Length	D2	.582	.610	.638	
Lead Thickness	c	.0075	—	.0125	
Upper Lead Width	b1	.026	—	.032	
Lower Lead Width	b	.013	—	.021	

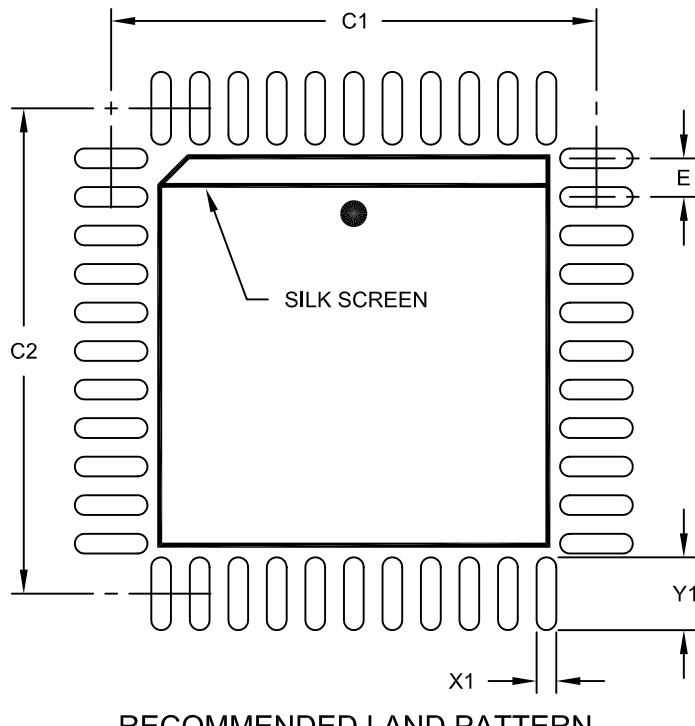
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

44-Lead Plastic Leaded Chip Carrier (LW) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	INCHES		
		MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.630	
Contact Pad Spacing	C2		.630	
Contact Pad Width (X44)	X1			.026
Contact Pad Length (X44)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

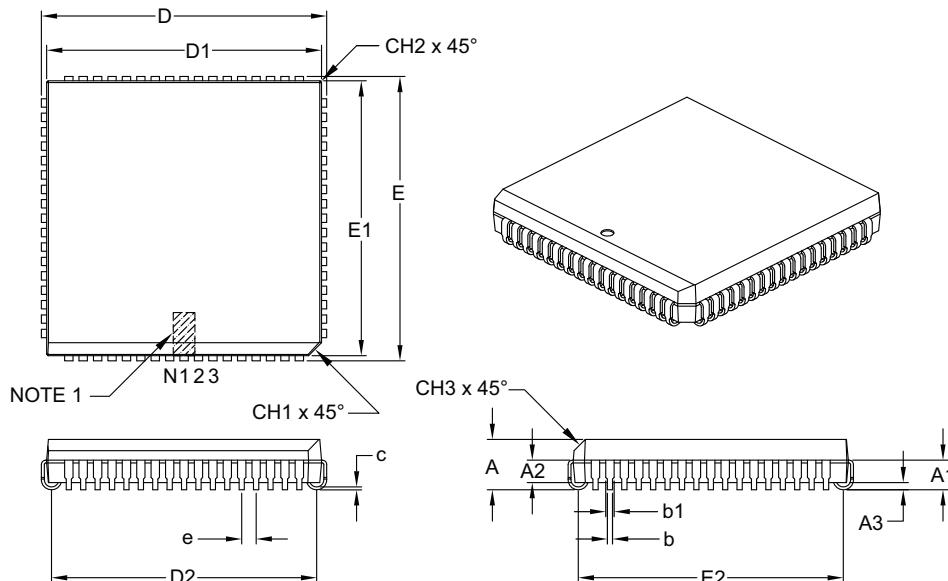
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2048A

Packaging Diagrams and Parameters

68-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		68	
Pitch	e		.050	
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	—	.083
Standoff §	A3	.020	—	—
Corner Chamfer	CH1	.042	—	.048
Chamfers	CH2	—	—	.020
Side Chamfer	CH3	.042	—	.056
Overall Width	E	.985	.990	.995
Overall Length	D	.985	.990	.995
Molded Package Width	E1	.950	.954	.958
Molded Package Length	D1	.950	.954	.958
Footprint Width	E2	.882	.910	.938
Footprint Length	D2	.882	.910	.938
Lead Thickness	c	.0075	—	.0125
Upper Lead Width	b1	.026	—	.032
Lower Lead Width	b	.013	—	.021

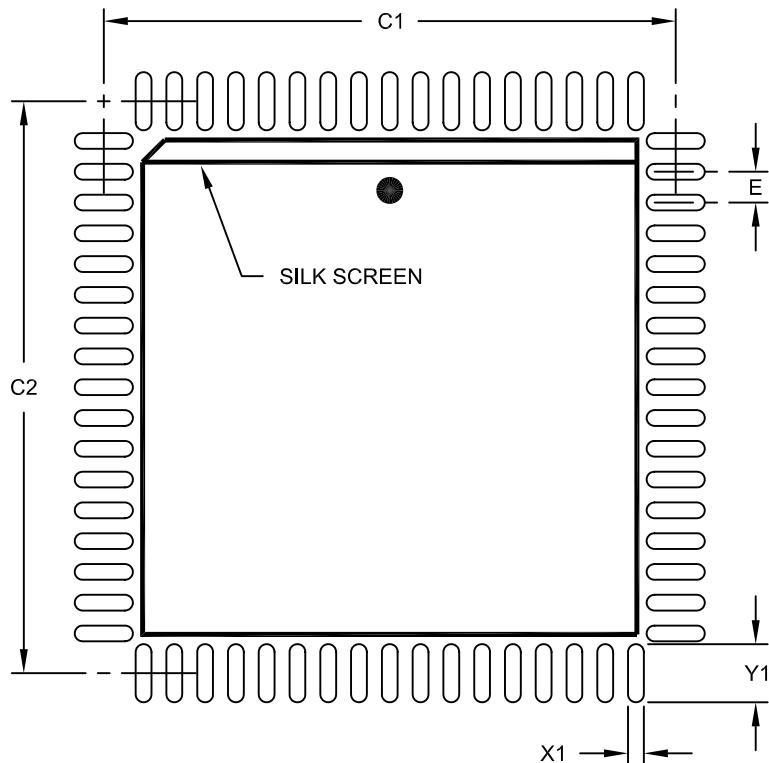
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

68-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension	Limits	INCHES		
		MIN	NOM	MAX
Contact Pitch	E	.050	BSC	
Contact Pad Spacing	C1		.929	
Contact Pad Spacing	C2		.929	
Contact Pad Width (X68)	X1			.026
Contact Pad Length (X68)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

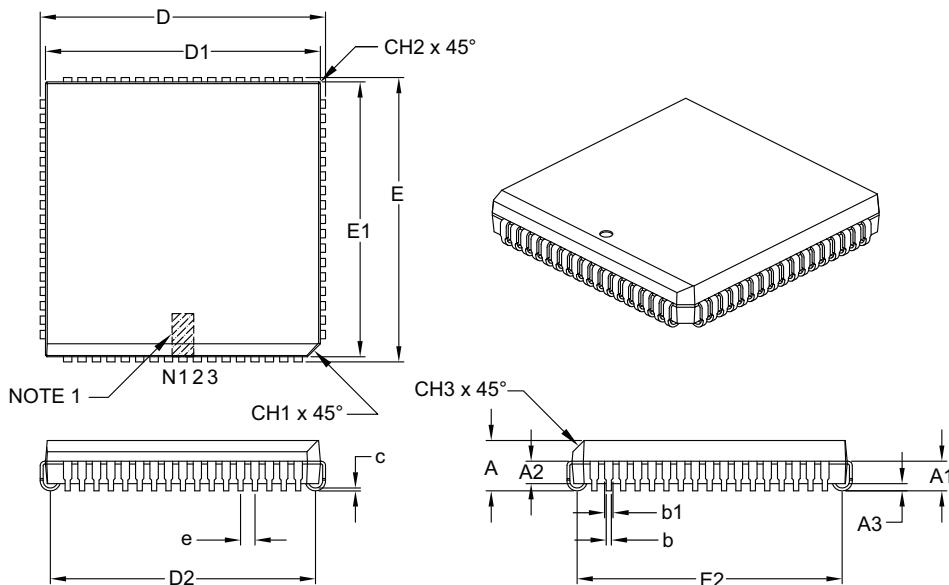
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2049A

Packaging Diagrams and Parameters

68-Lead Plastic Leaded Chip Carrier (LS) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		68	
Pitch	e		.050	
Overall Height	A	.165	.172	.180
Contact Height	A1	.090	.105	.120
Molded Package to Contact	A2	.062	–	.083
Standoff §	A3	.020	–	–
Corner Chamfer	CH1	.042	–	.048
Chamfers	CH2	–	–	.020
Side Chamfer	CH3	.042	–	.056
Overall Width	E	.985	.990	.995
Overall Length	D	.985	.990	.995
Molded Package Width	E1	.950	.954	.958
Molded Package Length	D1	.950	.954	.958
Footprint Width	E2	.882	.910	.938
Footprint Length	D2	.882	.910	.938
Lead Thickness	c	.0075	–	.0125
Upper Lead Width	b1	.026	–	.032
Lower Lead Width	b	.013	–	.021

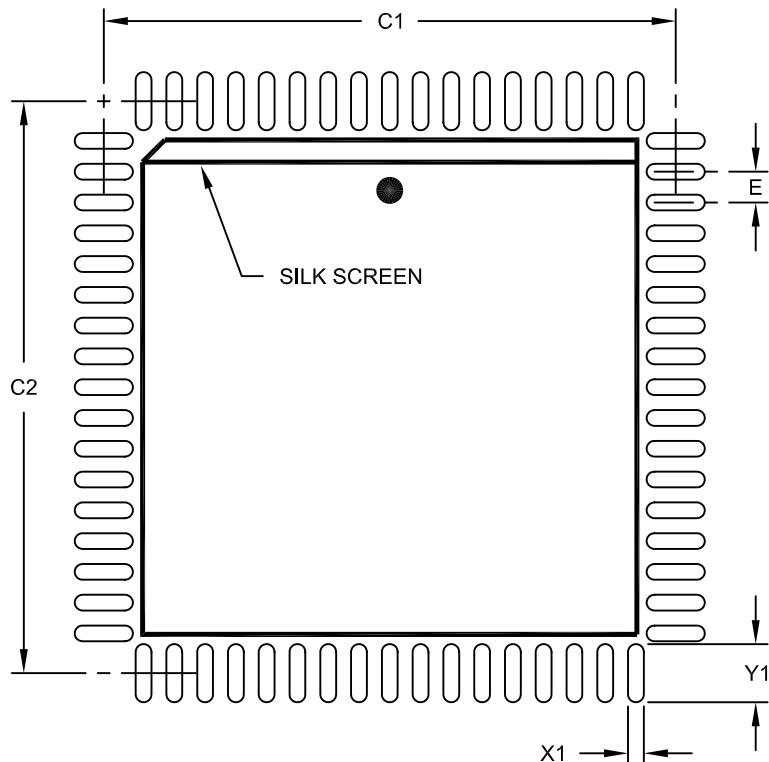
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

68-Lead Plastic Leaded Chip Carrier (LS) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension	Limits	Units INCHES		
		MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		.929	
Contact Pad Spacing	C2		.929	
Contact Pad Width (X68)	X1			.026
Contact Pad Length (X68)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

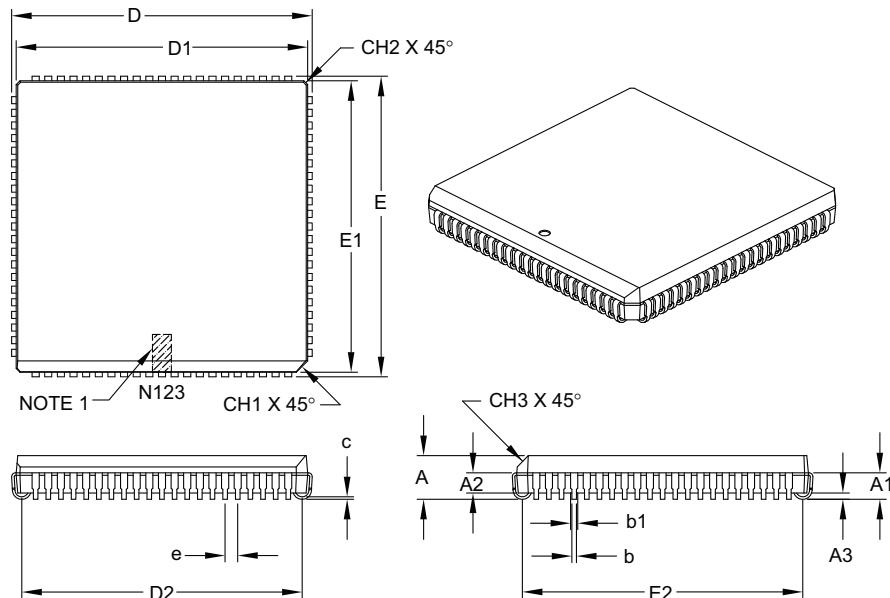
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2049A

Packaging Diagrams and Parameters

84-Lead Plastic Leaded Chip Carrier (L) – Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		84	
Pitch	e		.050	
Overall Height	A	.165	.172	.200
Contact Height	A1	.090	.105	.130
Molded Package to Contact	A2	.059	—	.080
Standoff §	A3	.020	—	—
Corner Chamfer	CH1	.042	—	.048
Chamfers	CH2	—	—	.020
Side Chamfer	CH3	.042	—	.056
Overall Width	E	1.185	1.190	1.195
Overall Length	D	1.185	1.190	1.195
Molded Package Width	E1	1.150	1.154	1.158
Molded Package Length	D1	1.150	1.154	1.158
Footprint Width	E2	1.082	1.110	1.138
Footprint Length	D2	1.082	1.110	1.138
Lead Thickness	c	.0075	—	.0125
Upper Lead Width	b1	.026	—	.032
Lower Lead Width	b	.013	—	.021

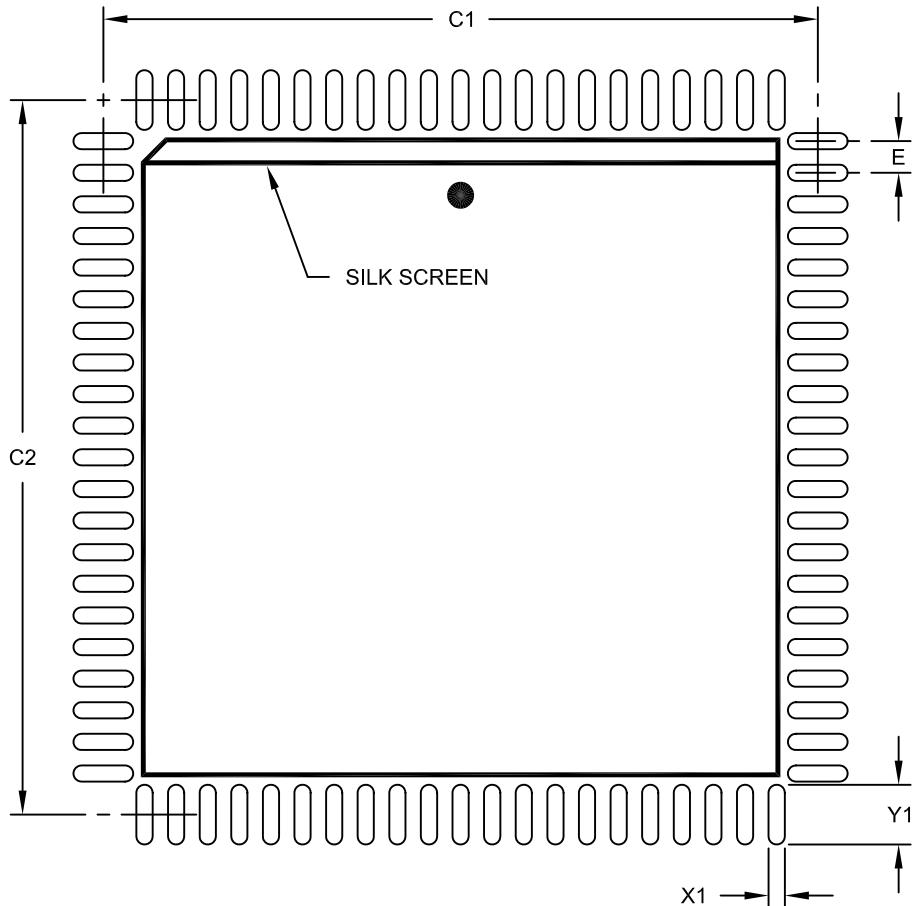
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

Land Pattern (Footprint)

84-Lead Plastic Leaded Chip Carrier (L) - Square [PLCC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		INCHES		
Dimension	Limits	MIN	NOM	MAX
Contact Pitch	E		.050 BSC	
Contact Pad Spacing	C1		1.130	
Contact Pad Spacing	C2		1.130	
Contact Pad Width (X84)	X1			.026
Contact Pad Length (X84)	Y1			.094

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2093A

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

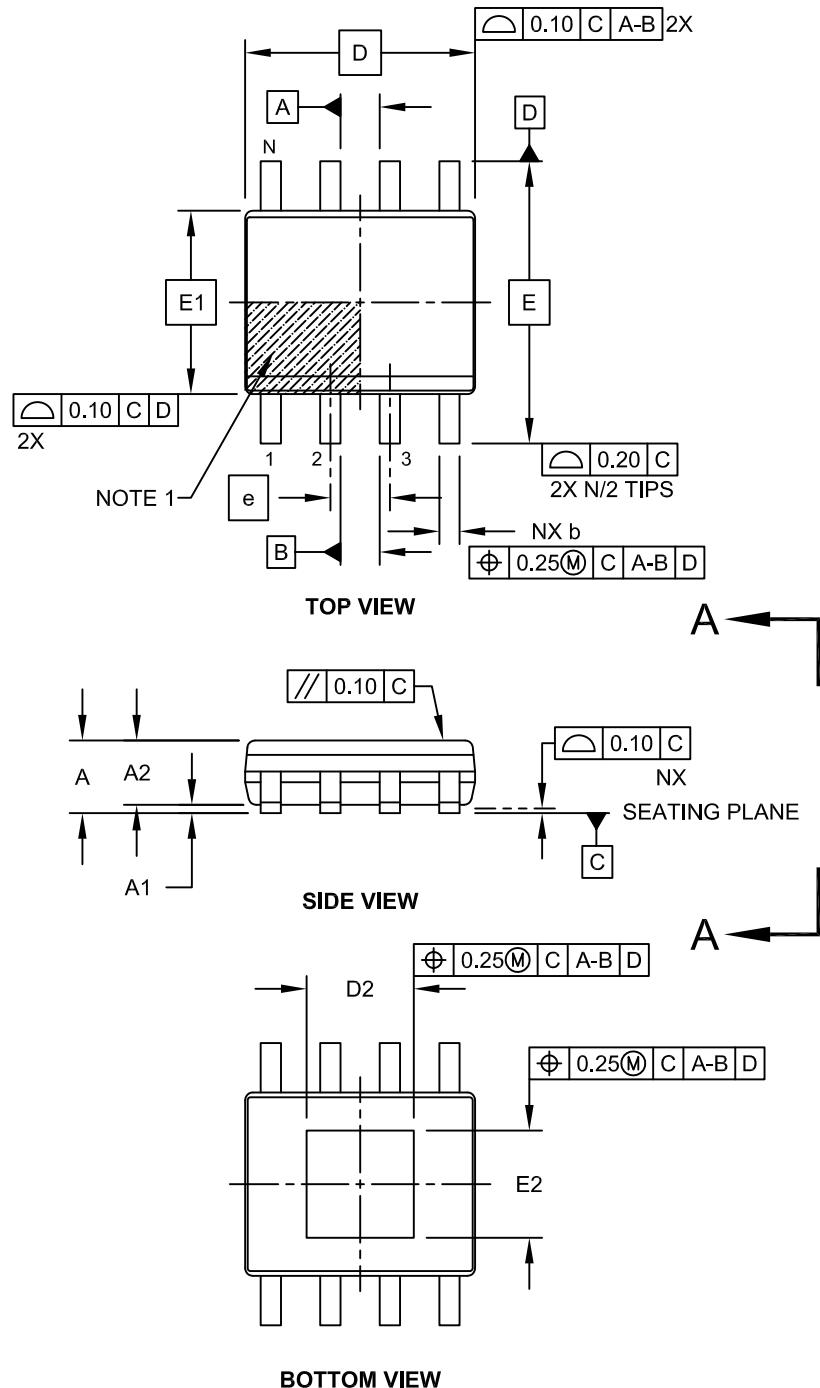
SOP Family

Small Outline Packages

Packaging Diagrams and Parameters

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOP]

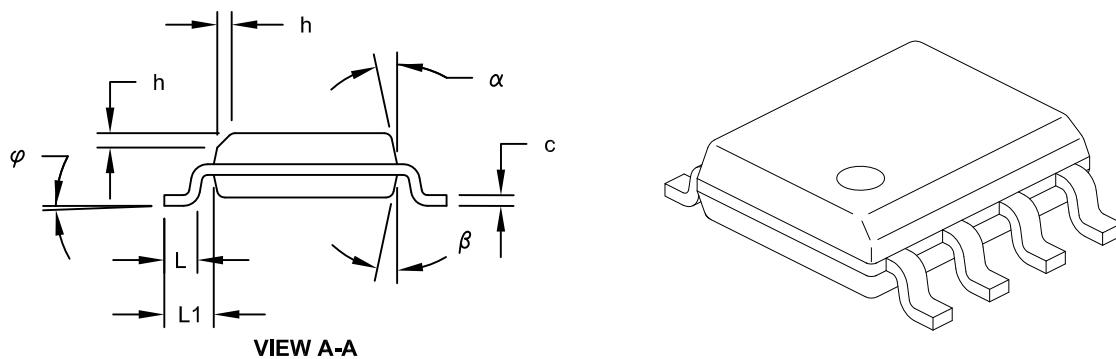
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		1.27	
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.00	-	0.15
Overall Width	E	5.80	6.00	6.20
Molded Package Width	E1	3.80	3.90	4.00
Overall Length	D	4.70	4.90	5.10
Exposed Pad Width	E2	2.19	2.29	2.39
Exposed Pad Length	D2	2.19	2.29	2.39
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1	1.04	1.04	1.04
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.17	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
- Dimensioning and tolerancing per ASME Y14.5M

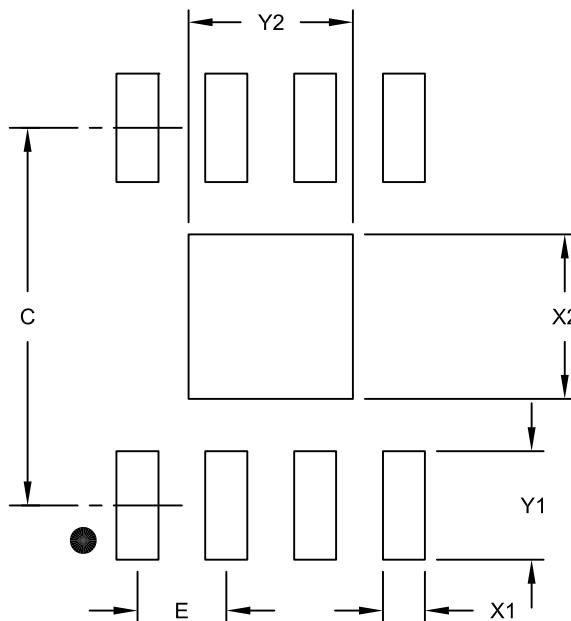
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Contact Pad Spacing	C		5.40	
Contact Pad Width (X8)	X1		0.60	
Contact Pad Length (X8)	Y1		1.55	
Exposed Pad Width	X2		2.35	
Exposed Pad Length	Y2		2.35	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2121A

Packaging Diagrams and Parameters

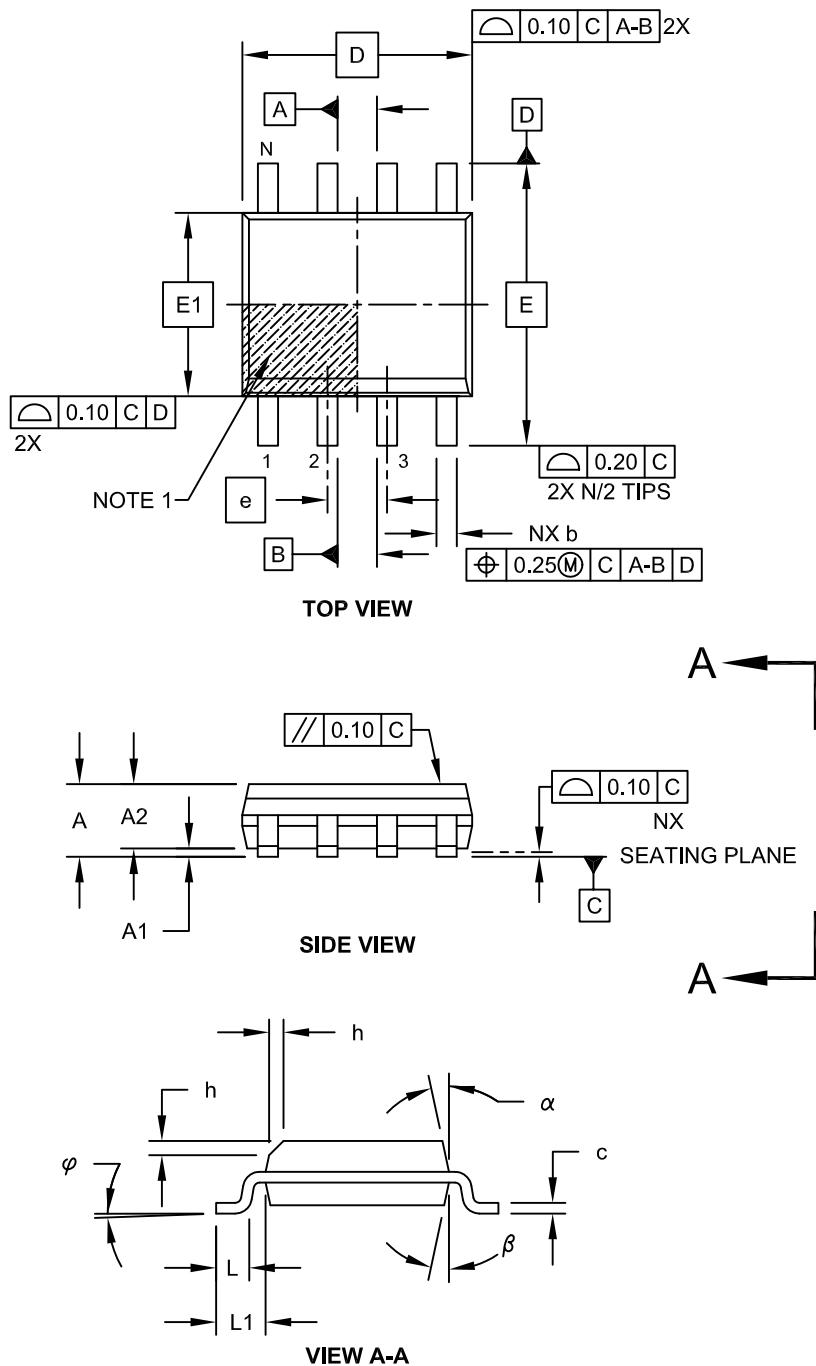
SOIC Family

Small Outline Plastic Packages

Packaging Diagrams and Parameters

8-Lead Plastic Small Outline (SN) - Narrow, 3.90 mm Body [SOIC]

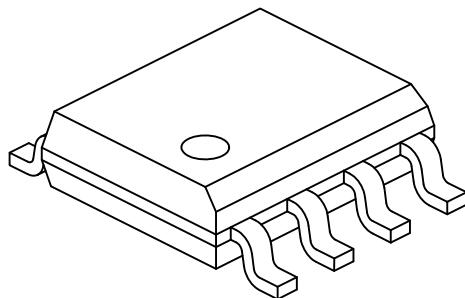
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Small Outline (SN) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		1.27 BSC	
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff	§	A1	0.10	-
Overall Width	E		6.00 BSC	
Molded Package Width	E1		3.90 BSC	
Overall Length	D		4.90 BSC	
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1		1.04 REF	
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.17	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

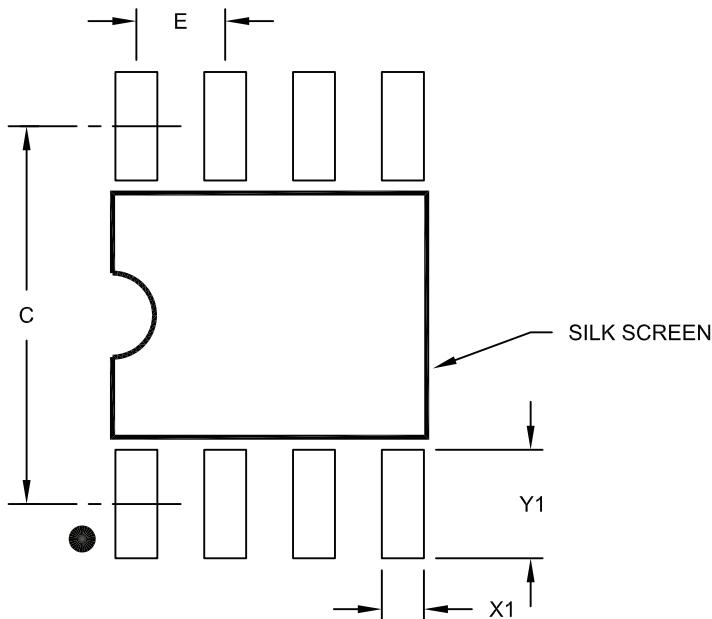
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Small Outline (SN) – Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch		E			1.27 BSC		
Contact Pad Spacing		C			5.40		
Contact Pad Width (X8)		X1			0.60		
Contact Pad Length (X8)		Y1			1.55		

Notes:

- Dimensioning and tolerancing per ASME Y14.5M

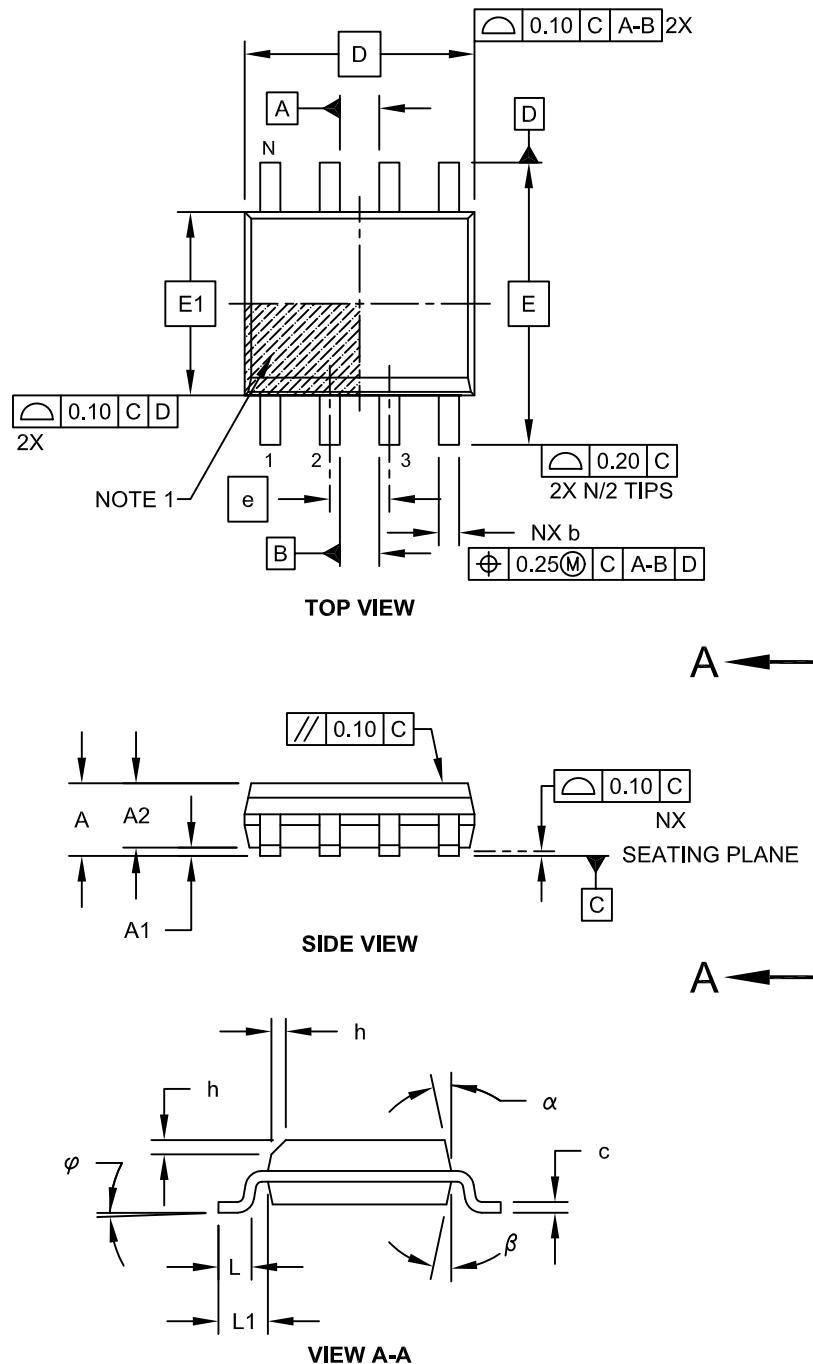
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2057A

Packaging Diagrams and Parameters

8-Lead Plastic Small Outline (OA) - Narrow, 3.90 mm Body [SOIC]

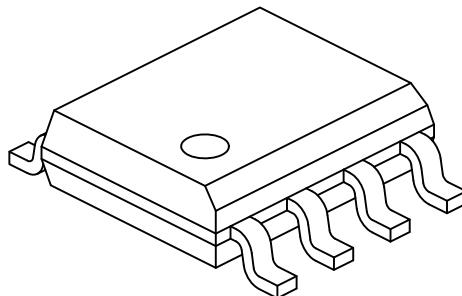
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Small Outline (OA) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Number of Pins	N				8		
Pitch	e				1.27	BSC	
Overall Height	A	-	-		1.75		
Molded Package Thickness	A2	1.25	-		-		
Standoff	§	A1	0.10	-	0.25		
Overall Width	E	6.00 BSC					
Molded Package Width	E1	3.90 BSC					
Overall Length	D	4.90 BSC					
Chamfer (Optional)	h	0.25	-		0.50		
Foot Length	L	0.40	-		1.27		
Footprint	L1	1.04 REF					
Foot Angle	φ	0°	-		8°		
Lead Thickness	c	0.17	-		0.25		
Lead Width	b	0.31	-		0.51		
Mold Draft Angle Top	α	5°	-		15°		
Mold Draft Angle Bottom	β	5°	-		15°		

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

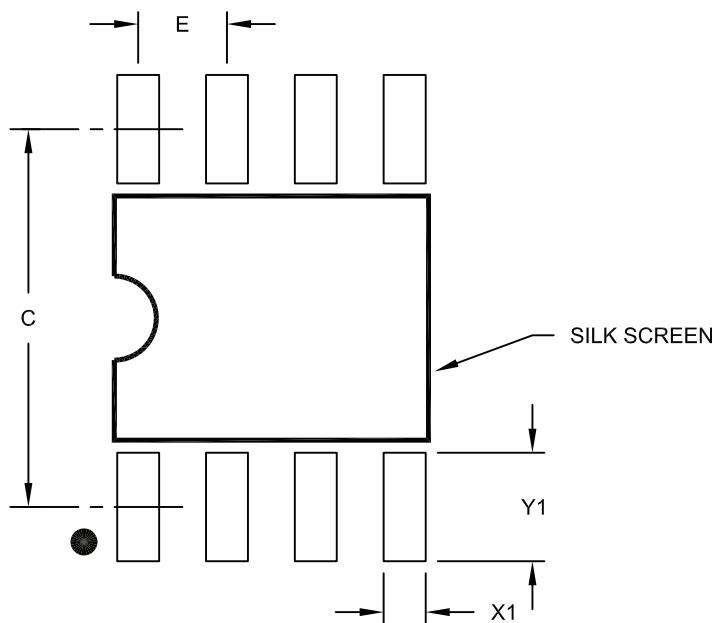
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Small Outline (OA) – Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch		E			1.27 BSC		
Contact Pad Spacing		C			5.40		
Contact Pad Width (X8)		X1			0.60		
Contact Pad Length (X8)		Y1			1.55		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

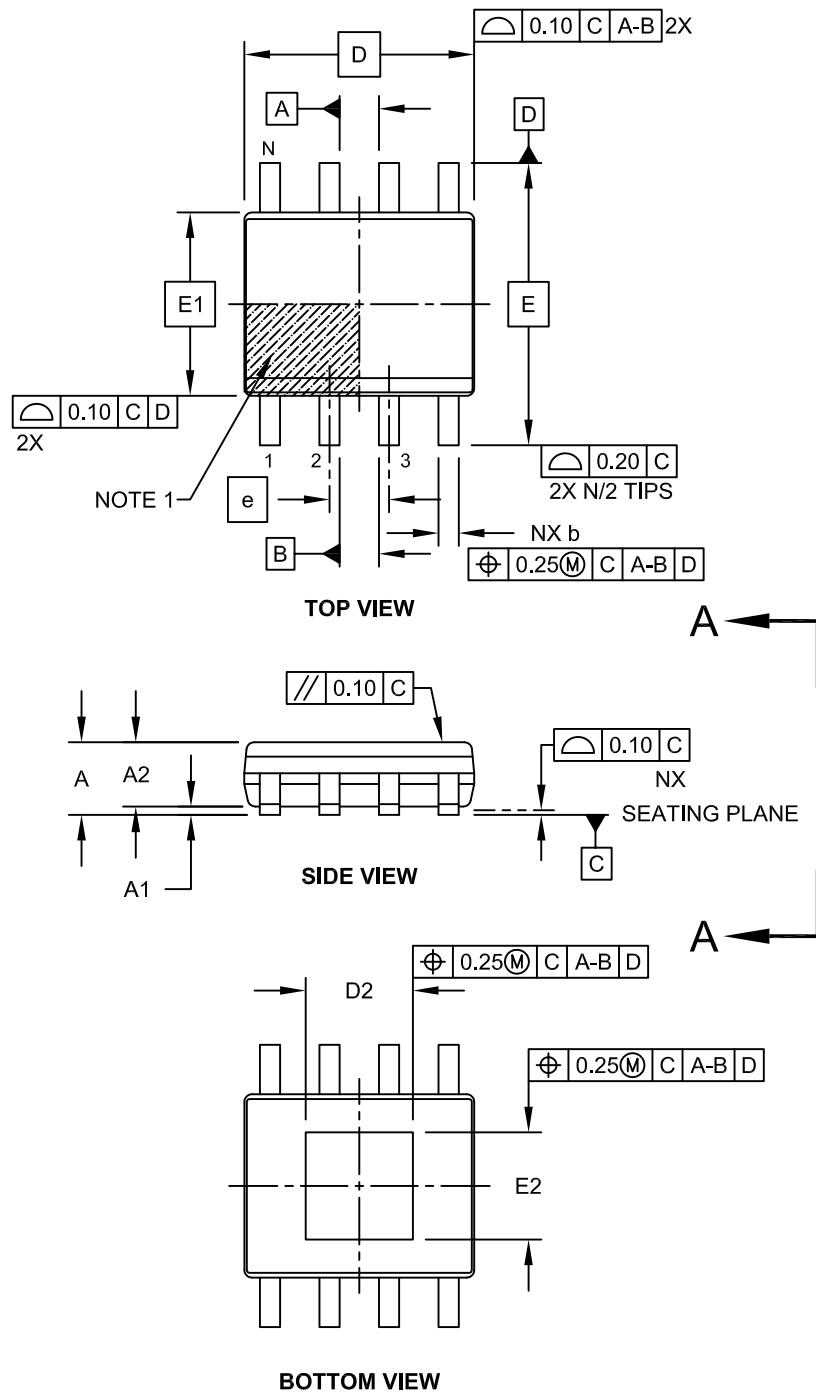
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2057A

Packaging Diagrams and Parameters

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

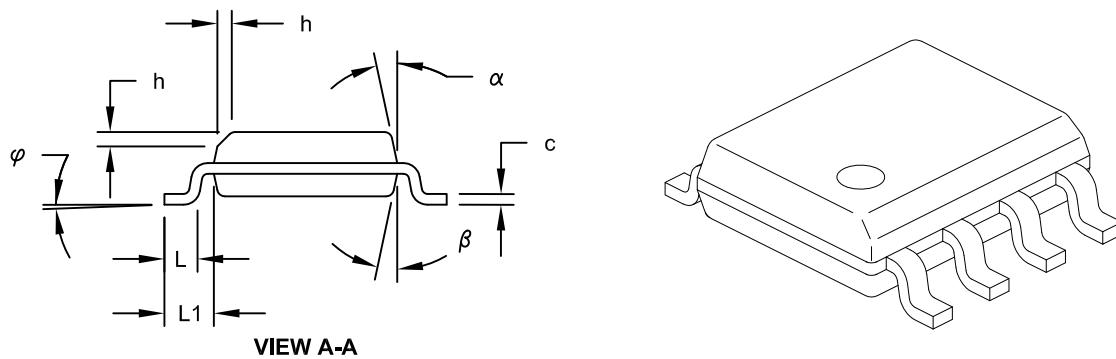


Microchip Technology Drawing No. C04-162B Sheet 1 of 2

Packaging Diagrams and Parameters

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Limits	Units			MILLIMETERS		
		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	N				8		
Pitch	e				1.27	BSC	
Overall Height	A	-	-		1.75		
Molded Package Thickness	A2	1.25	-		-		
Standoff §	A1	0.10	-		0.15		
Overall Width	E		6.00	BSC			
Molded Package Width	E1		3.90	BSC			
Overall Length	D		4.90	BSC			
Exposed Pad Width	E2	2.19	2.29		2.39		
Exposed Pad Length	D2	2.19	2.29		2.39		
Chamfer (Optional)	h	0.25	-		0.50		
Foot Length	L	0.40	-		1.27		
Footprint	L1		1.04	REF			
Foot Angle	φ	0°	-		8°		
Lead Thickness	c	0.17	-		0.25		
Lead Width	b	0.31	-		0.51		
Mold Draft Angle Top	α	5°	-		15°		
Mold Draft Angle Bottom	β	5°	-		15°		

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.

2. § Significant Characteristic

3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.

4. Dimensioning and tolerancing per ASME Y14.5M

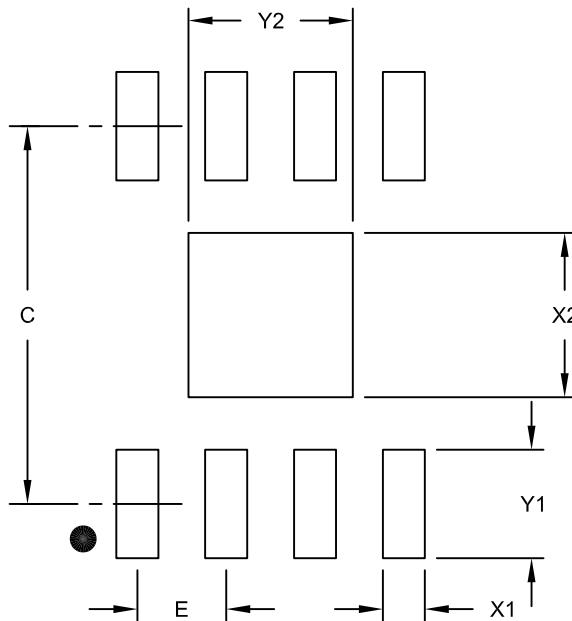
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Thermally Enhanced Plastic Small Outline (SE) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Contact Pad Spacing	C		5.40	
Contact Pad Width (X8)	X1			0.60
Contact Pad Length (X8)	Y1			1.55
Exposed Pad Width	X2			2.35
Exposed Pad Length	Y2			2.35

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

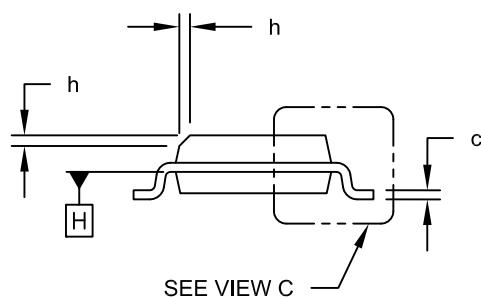
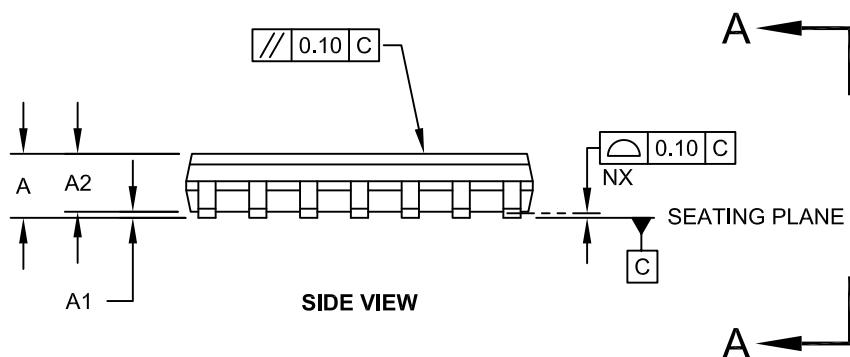
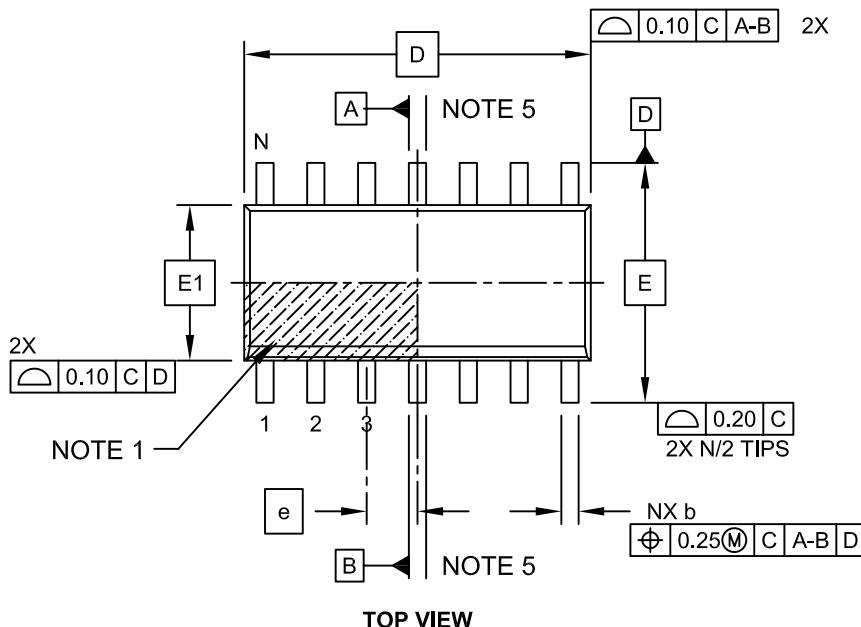
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2162A

Packaging Diagrams and Parameters

14-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



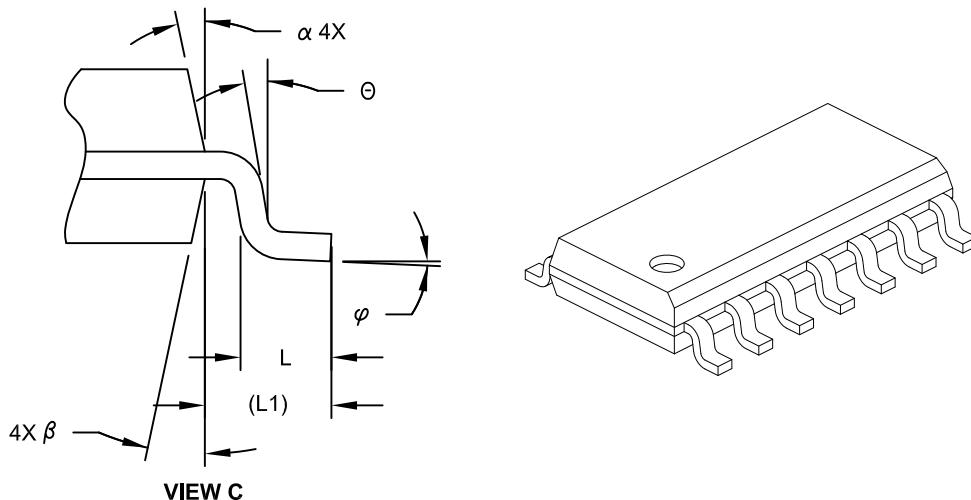
VIEW A-A

Microchip Technology Drawing No. C04-065C Sheet 1 of 2

Packaging Diagrams and Parameters

14-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		14		
Pitch	e		1.27	BSC	
Overall Height	A	-	-	1.75	
Molded Package Thickness	A2	1.25	-	-	
Standoff	§	A1	0.10	-	0.25
Overall Width	E	6.00 BSC			
Molded Package Width	E1	3.90 BSC			
Overall Length	D	8.65 BSC			
Chamfer (Optional)	h	0.25	-	0.50	
Foot Length	L	0.40	-	1.27	
Footprint	L1	1.04 REF			
Lead Angle	Θ	0°	-	-	
Foot Angle	φ	0°	-	8°	
Lead Thickness	c	0.10	-	0.25	
Lead Width	b	0.31	-	0.51	
Mold Draft Angle Top	α	5°	-	15°	
Mold Draft Angle Bottom	β	5°	-	15°	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

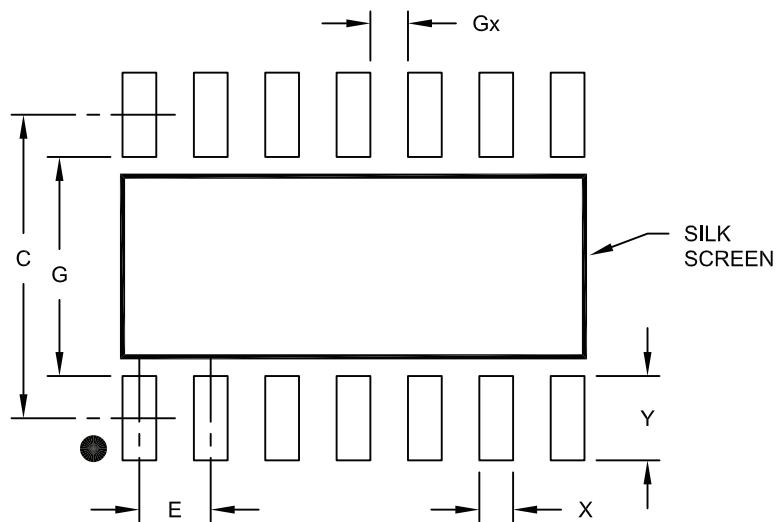
REF: Reference Dimension, usually without tolerance, for information purposes only.

5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

14-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27	BSC
Contact Pad Spacing	C		5.40	
Contact Pad Width	X			0.60
Contact Pad Length	Y			1.50
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	3.90		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

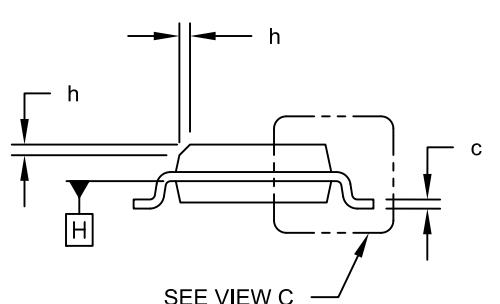
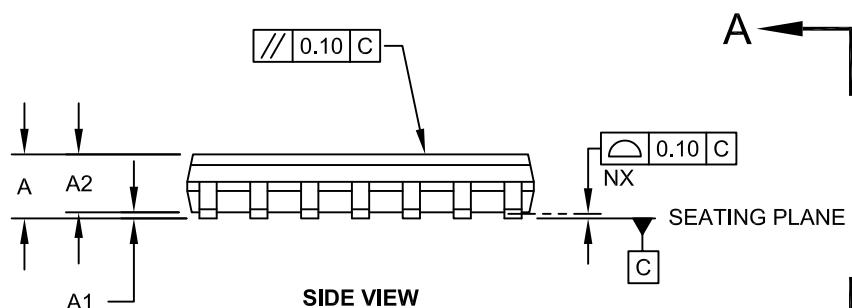
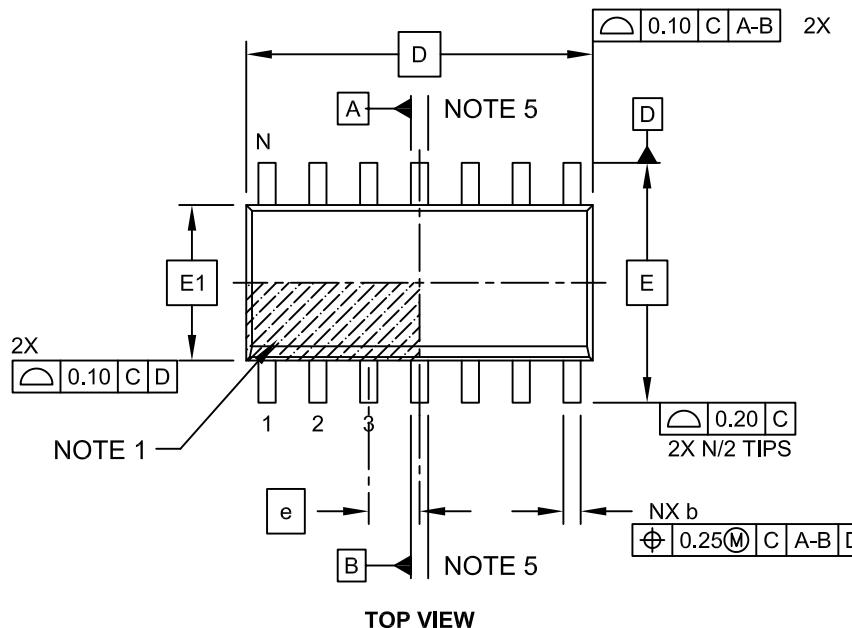
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2065A

Packaging Diagrams and Parameters

14-Lead Plastic Small Outline (OD) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



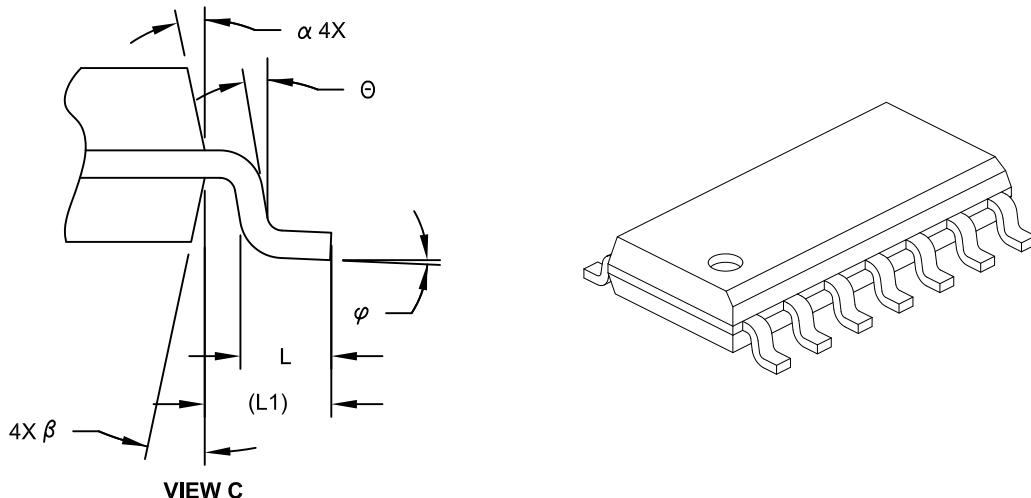
VIEW A-A

Microchip Technology Drawing No. C04-065C Sheet 1 of 2

Packaging Diagrams and Parameters

14-Lead Plastic Small Outline (OD) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Number of Pins	N			14	
Pitch	e		1.27	BSC	
Overall Height	A		-	-	1.75
Molded Package Thickness	A2		1.25	-	-
Standoff	§	A1	0.10	-	0.25
Overall Width	E		6.00	BSC	
Molded Package Width	E1		3.90	BSC	
Overall Length	D		8.65	BSC	
Chamfer (Optional)	h		0.25	-	0.50
Foot Length	L		0.40	-	1.27
Footprint	L1		1.04	REF	
Lead Angle	θ		0°	-	-
Foot Angle	φ		0°	-	8°
Lead Thickness	c		0.10	-	0.25
Lead Width	b		0.31	-	0.51
Mold Draft Angle Top	α		5°	-	15°
Mold Draft Angle Bottom	β		5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

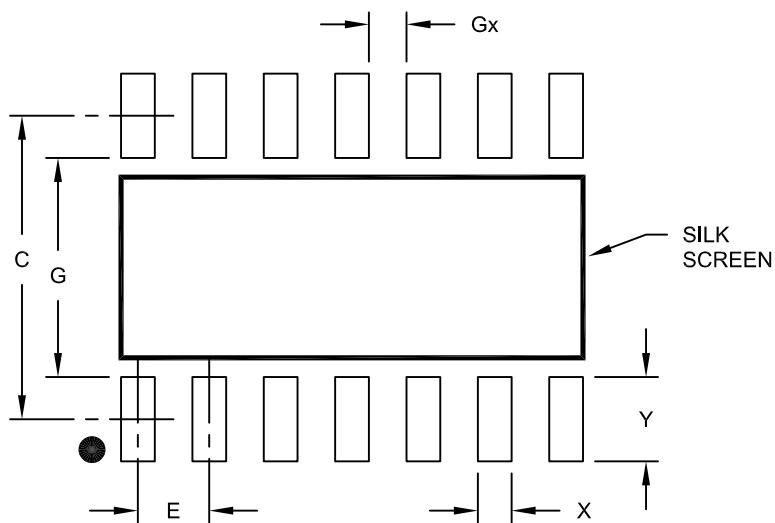
REF: Reference Dimension, usually without tolerance, for information purposes only.

5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

14-Lead Plastic Small Outline (OD) – Narrow, 3.90 mm Body [SOIC] Land Pattern

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		1.27	BSC	
Contact Pad Spacing	C		5.40		
Contact Pad Width	X			0.60	
Contact Pad Length	Y			1.50	
Distance Between Pads	Gx	0.67			
Distance Between Pads	G	3.90			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

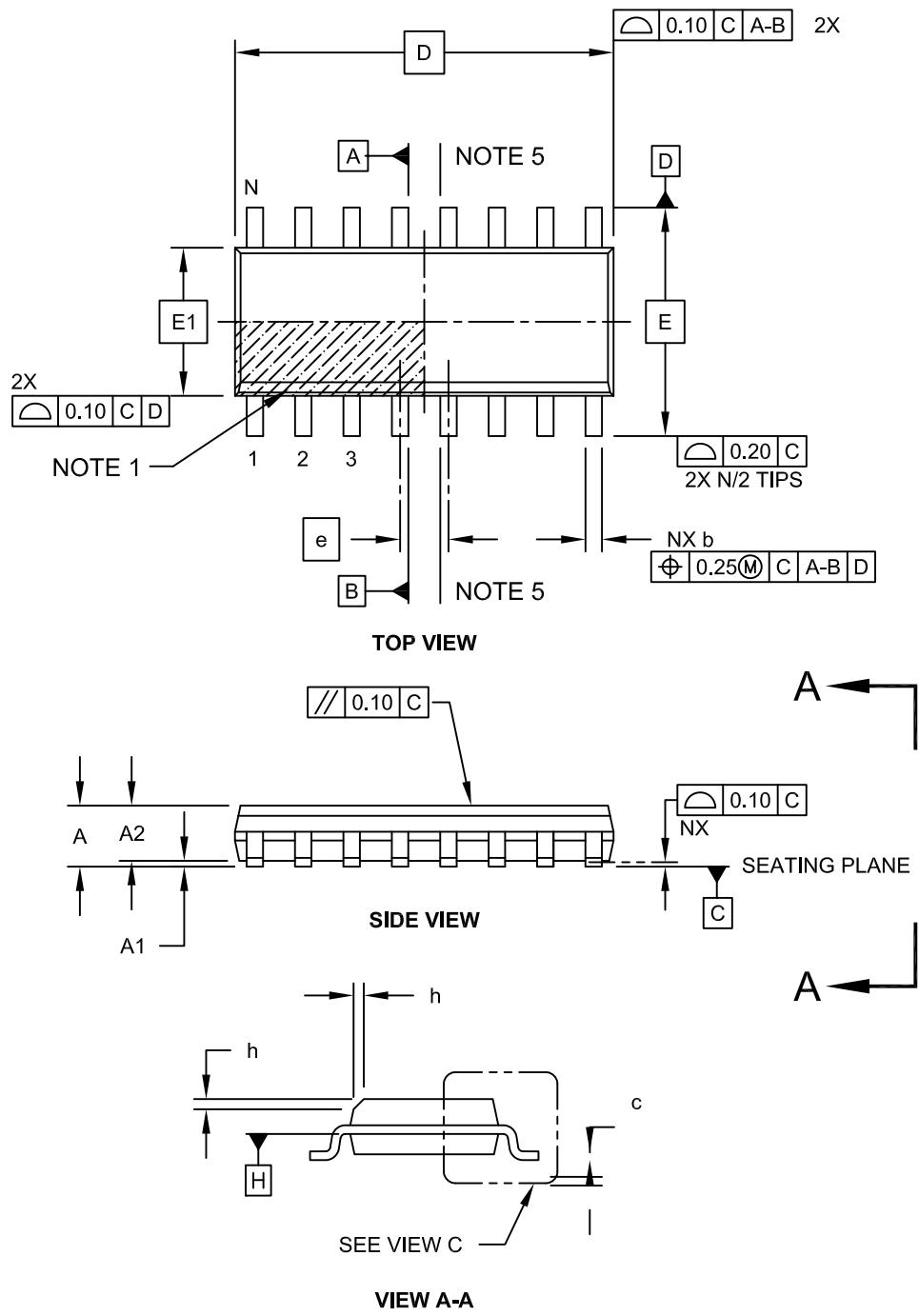
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2065A

Packaging Diagrams and Parameters

16-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

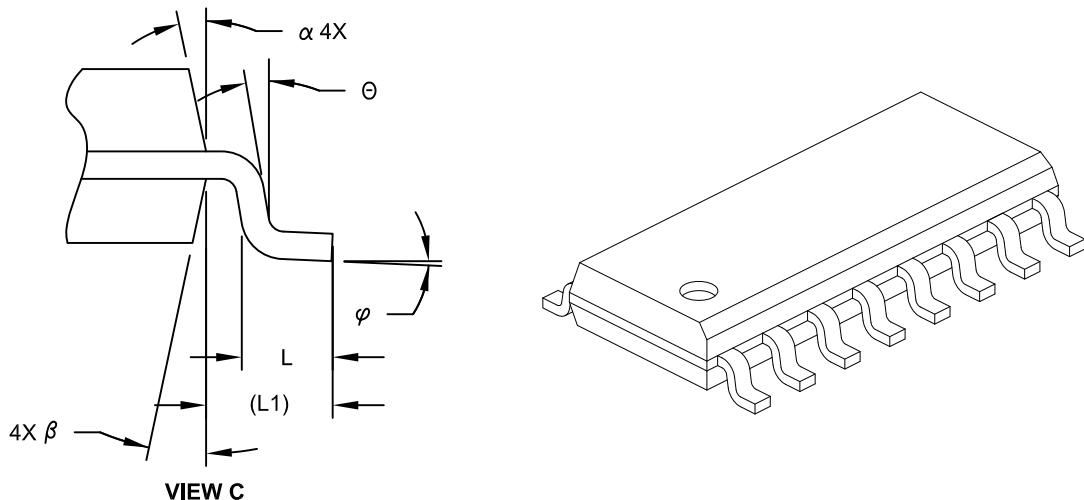


Microchip Technology Drawing No. C04-108C Sheet 1 of 2

Packaging Diagrams and Parameters

16-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		1.27 BSC	
Overall Height	A	-	-	1.75
Molded Package Thickness	A2	1.25	-	-
Standoff §	A1	0.10	-	0.25
Overall Width	E	6.00 BSC		
Molded Package Width	E1	3.90 BSC		
Overall Length	D	9.90 BSC		
Chamfer (Optional)	h	0.25	-	0.50
Foot Length	L	0.40	-	1.27
Footprint	L1	1.04 REF		
Lead Angle	θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.10	-	0.25
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

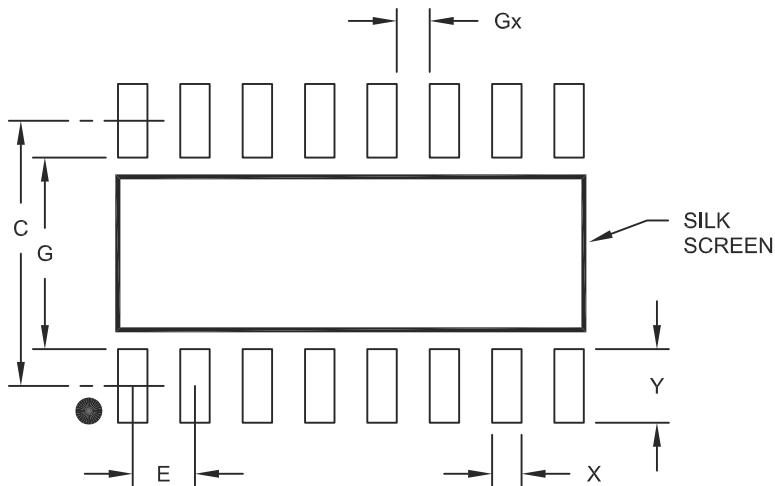
5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-108C Sheet 2 of 2

Land Pattern (Footprint)

16-Lead Plastic Small Outline (SL) - Narrow, 3.90 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E				1.27	BSC	
Contact Pad Spacing	C				5.40		
Contact Pad Width	X				0.60		
Contact Pad Length	Y				1.50		
Distance Between Pads	Gx	0.67					
Distance Between Pads	G	3.90					

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

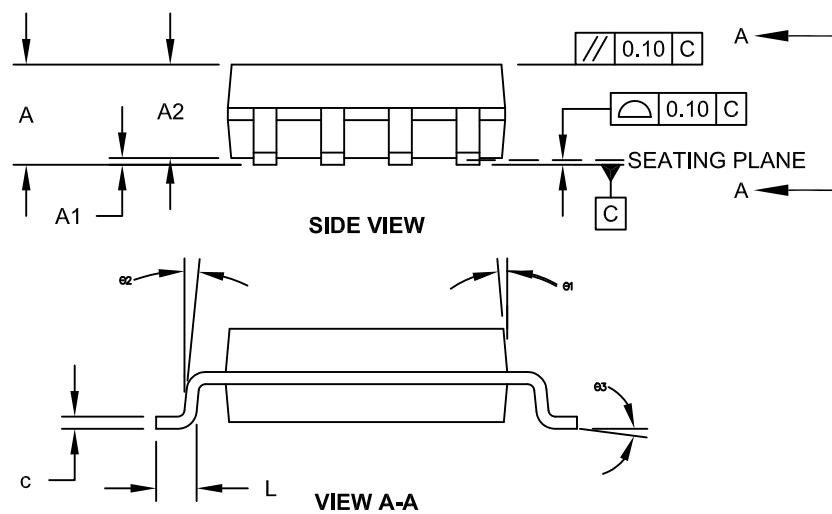
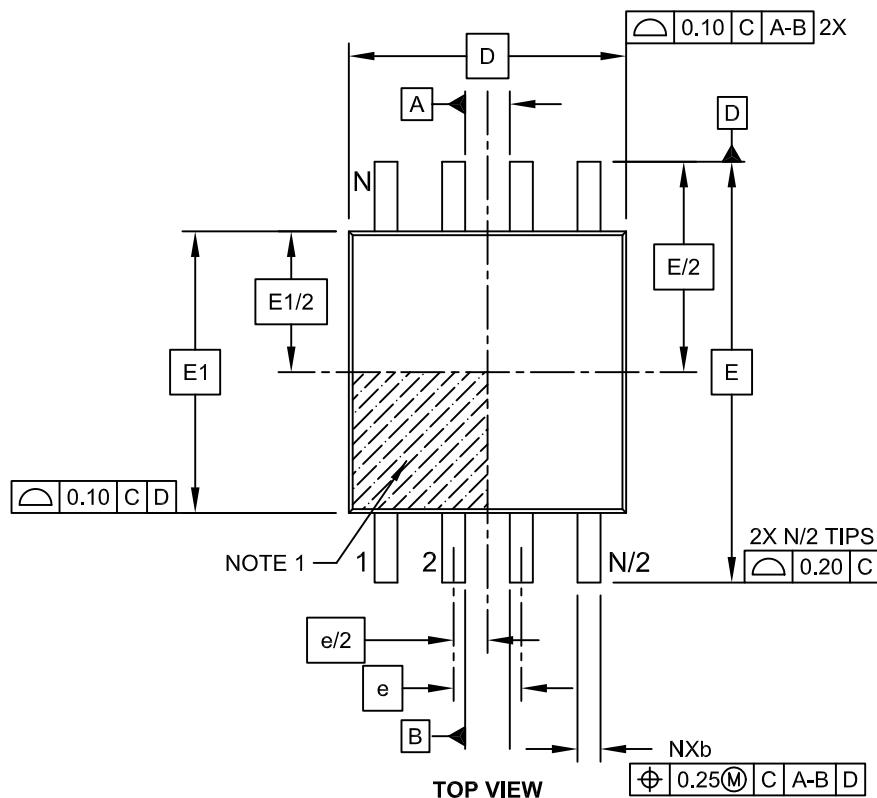
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2108A

Packaging Diagrams and Parameters

8-Lead Plastic Small Outline (SM) - Medium, 5.28 mm Body [SOIJ]

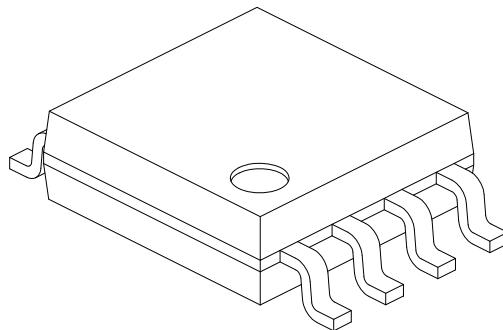
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Small Outline (SM) - Medium, 5.28 mm Body [SOIJ]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		8		
Pitch	e		1.27	BSC	
Overall Height	A	1.77	-	2.03	
Standoff §	A1	0.05		0.25	
Molded Package Thickness	A2	1.75	-	1.98	
Overall Width	E		7.94	BSC	
Molded Package Width	E1		5.25	BSC	
Overall Length	D		5.26	BSC	
Foot Length	L	0.51	-	0.76	
Lead Thickness	c	0.15	-	0.25	
Lead Width	b	0.36	-	0.51	
Mold Draft Angle	Θ1	-	-	15°	
Lead Angle	Θ2	0°	-	8°	
Foot Angle	Θ3	0°	-	8°	

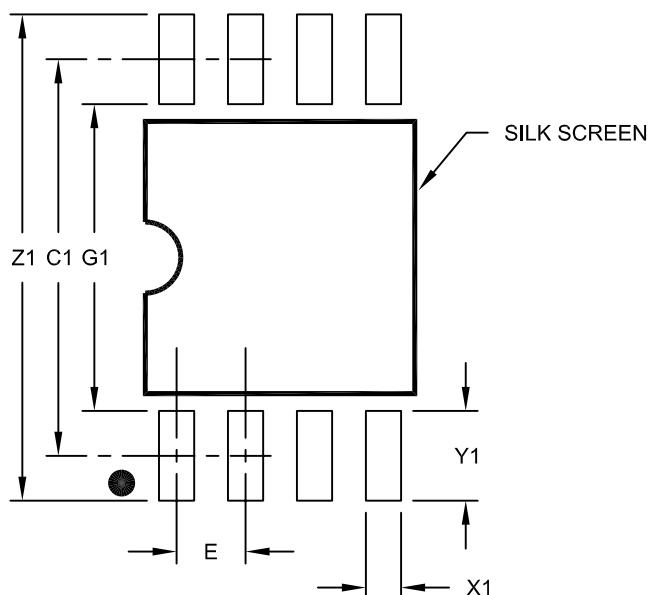
Notes:

1. SOIJ, JEITA/EIAJ Standard, Formerly called SOIC
2. § Significant Characteristic
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25mm per side.

Land Pattern (Footprint)

8-Lead Plastic Small Outline (SM) - Medium, 5.28 mm Body [SOIJ]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Overall Width	Z1			9.00
Contact Pad Spacing	C1		7.30	
Contact Pad Width (X8)	X1			0.65
Contact Pad Length (X8)	Y1			1.70
Distance Between Pads	G1	5.60		
Distance Between Pads	G	0.62		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

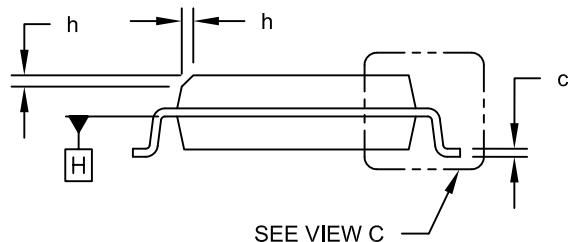
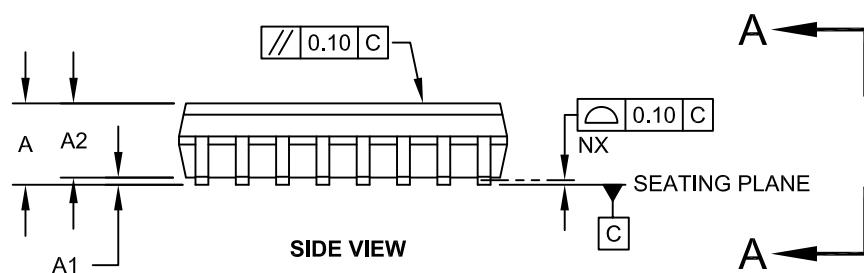
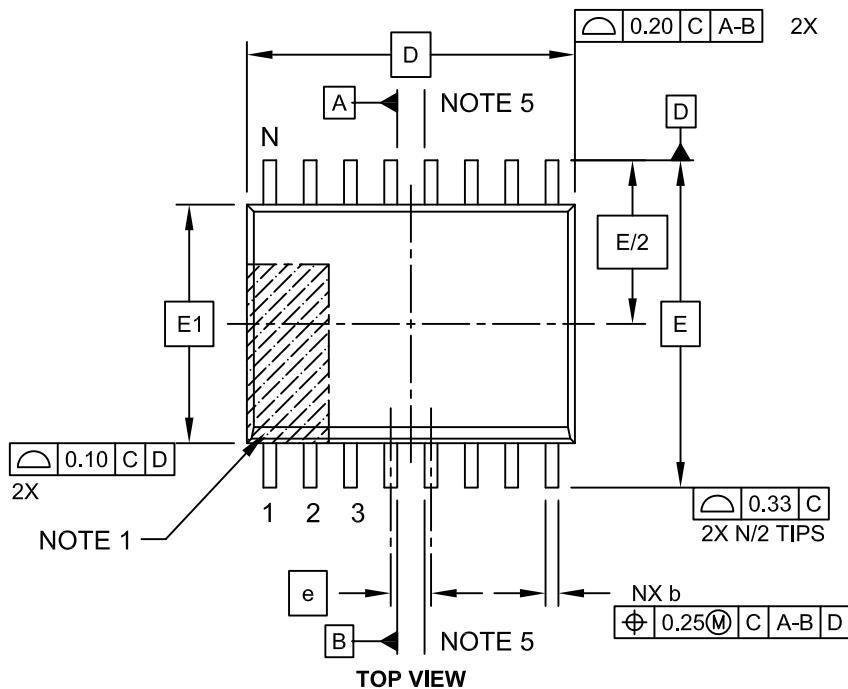
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2056C

Packaging Diagrams and Parameters

16-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

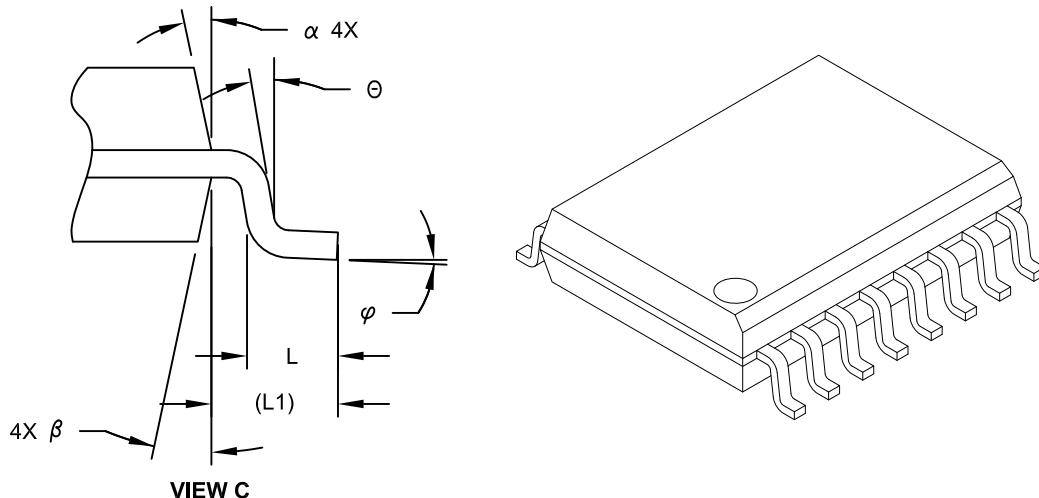


VIEW A-A

Packaging Diagrams and Parameters

16-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		16		
Pitch	e		1.27 BSC		
Overall Height	A		-	-	2.65
Molded Package Thickness	A2	2.05	-	-	-
Standoff	§	A1	0.10	-	0.30
Overall Width	E		10.30 BSC		
Molded Package Width	E1		7.50 BSC		
Overall Length	D		10.30 BSC		
Chamfer (Optional)	h	0.25	-	0.75	
Foot Length	L	0.40	-	1.27	
Footprint	L1		1.40 REF		
Lead Angle	θ	0°	-	-	-
Foot Angle	φ	0°	-	8°	
Lead Thickness	c	0.20	-	0.33	
Lead Width	b	0.31	-	0.51	
Mold Draft Angle Top	α	5°	-	15°	
Mold Draft Angle Bottom	β	5°	-	15°	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

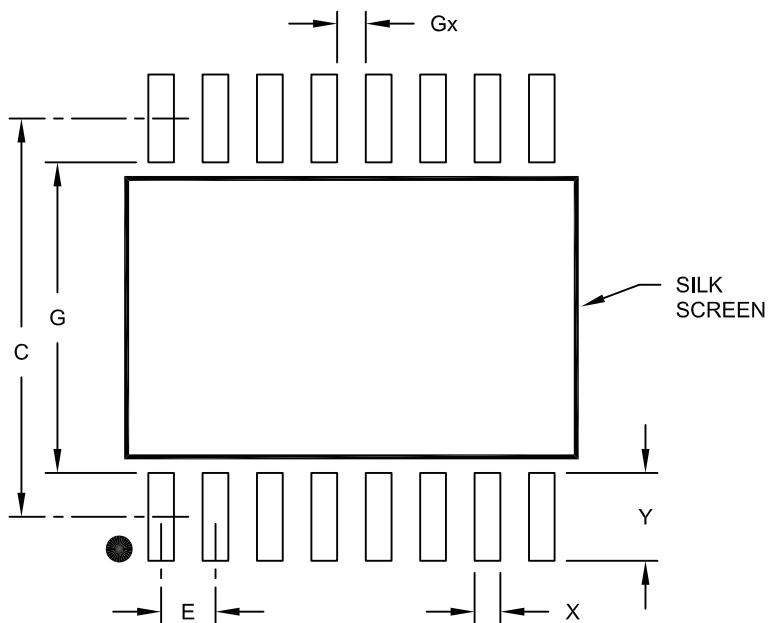
REF: Reference Dimension, usually without tolerance, for information purposes only.

5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

16-Lead Plastic Small Outline (SO) – Wide, 7.50 mm Body [SOIC] Land Pattern

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Contact Pad Spacing	C		9.30	
Contact Pad Width	X			0.60
Contact Pad Length	Y			2.05
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

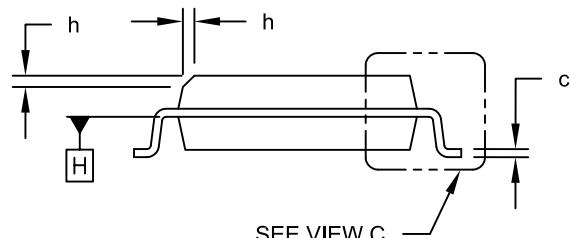
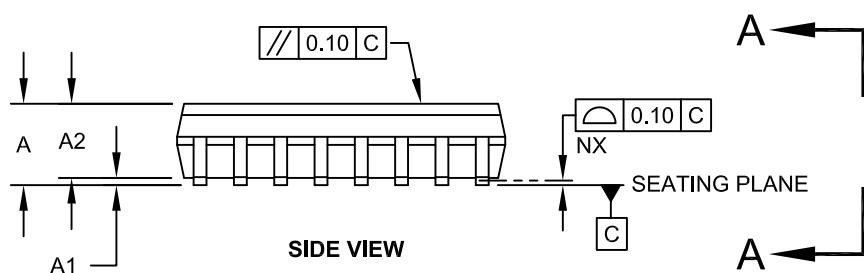
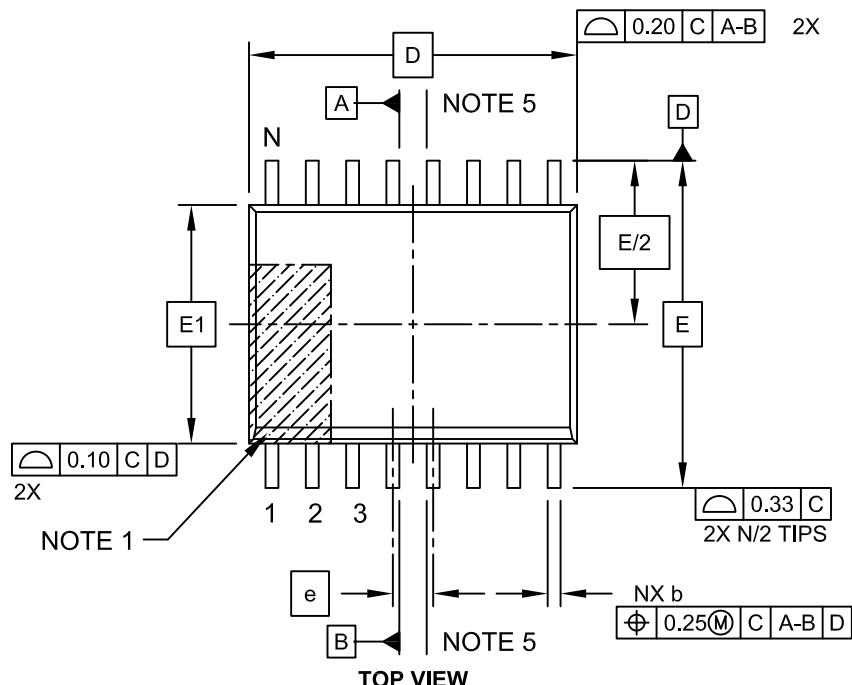
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2102A

Packaging Diagrams and Parameters

16-Lead Plastic Small Outline (OE) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

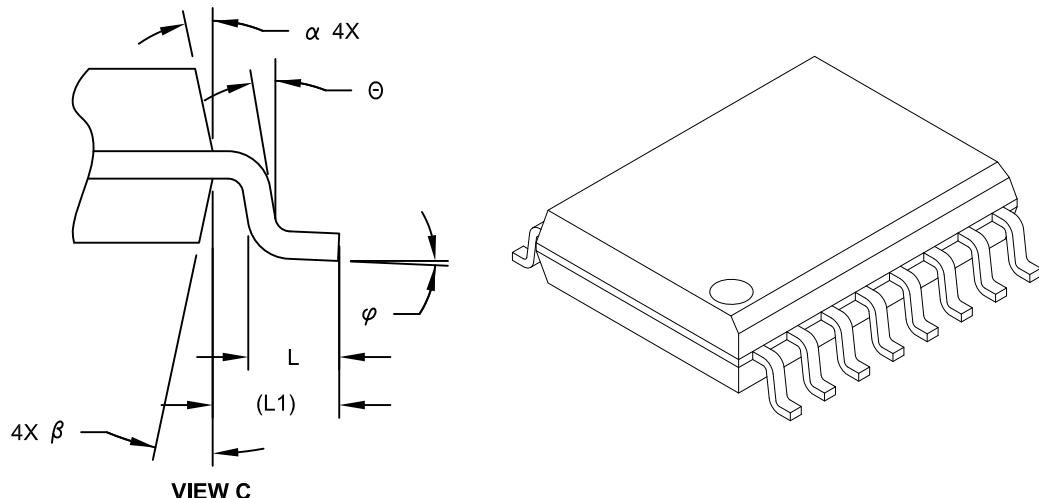


VIEW A-A

Packaging Diagrams and Parameters

16-Lead Plastic Small Outline (OE) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		1.27 BSC	
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff	§	A1	0.10	-
Overall Width	E		10.30 BSC	
Molded Package Width	E1		7.50 BSC	
Overall Length	D		10.30 BSC	
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1		1.40 REF	
Lead Angle	Θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

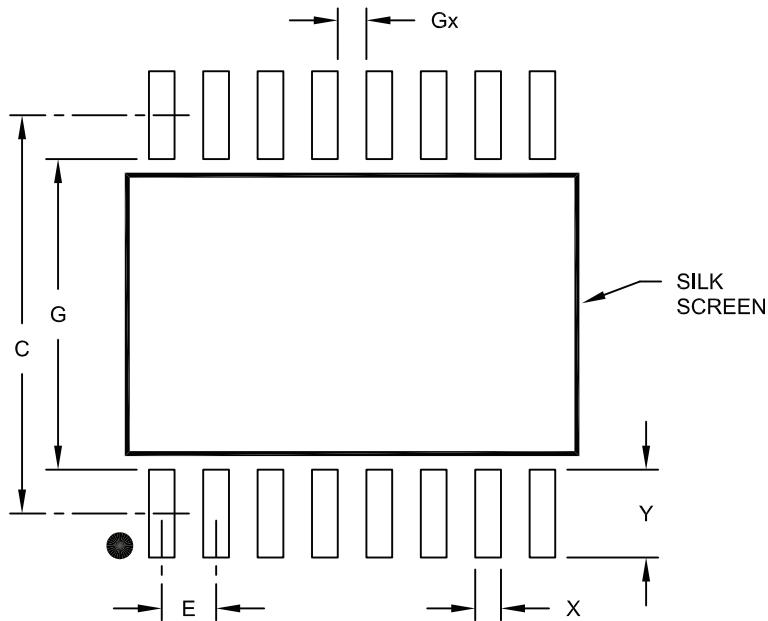
REF: Reference Dimension, usually without tolerance, for information purposes only.

5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

16-Lead Plastic Small Outline (OE) – Wide, 7.50 mm Body [SOIC] Land Pattern

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27	BSC
Contact Pad Spacing	C		9.30	
Contact Pad Width	X			0.60
Contact Pad Length	Y			2.05
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

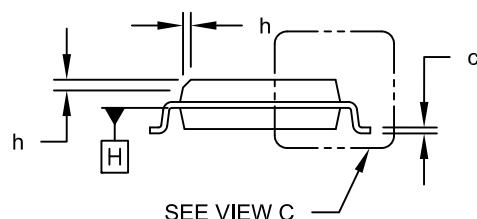
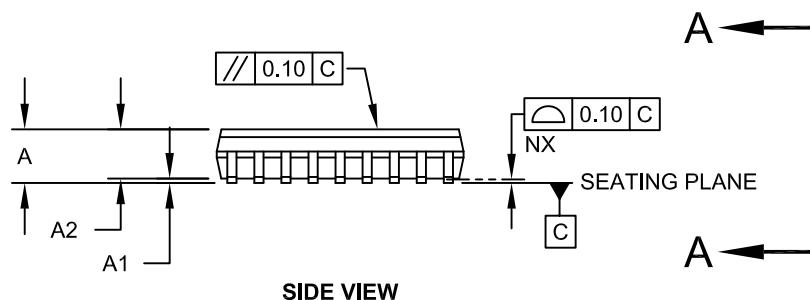
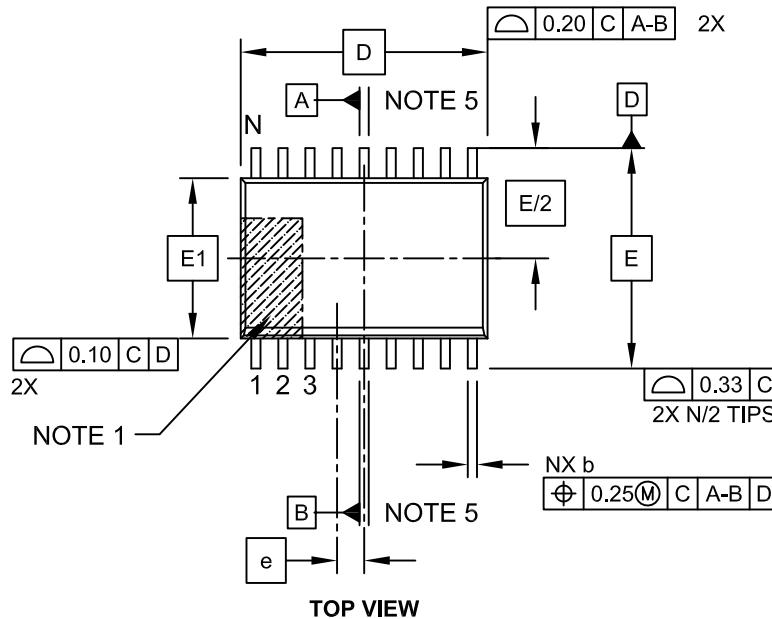
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2102A

Packaging Diagrams and Parameters

18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

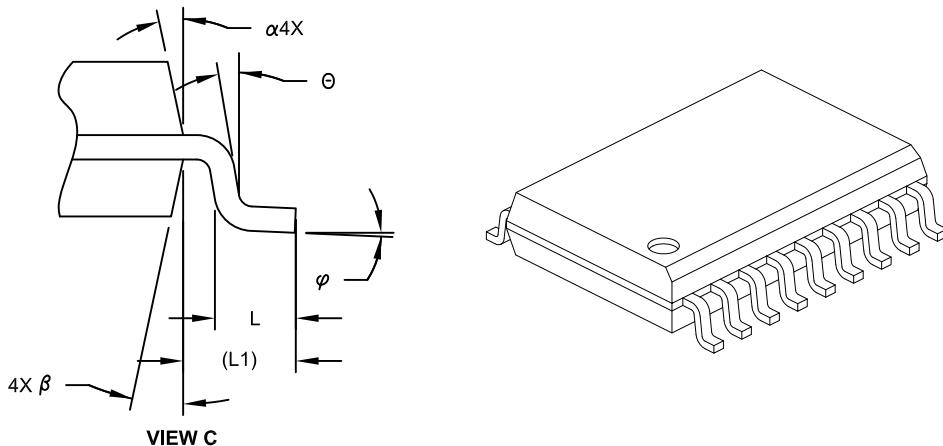


VIEW A-A

Packaging Diagrams and Parameters

18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	18		
Pitch	e	1.27	BSC	
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff	§	A1	0.10	-
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	11.55 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.

2. § Significant Characteristic

3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.

4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

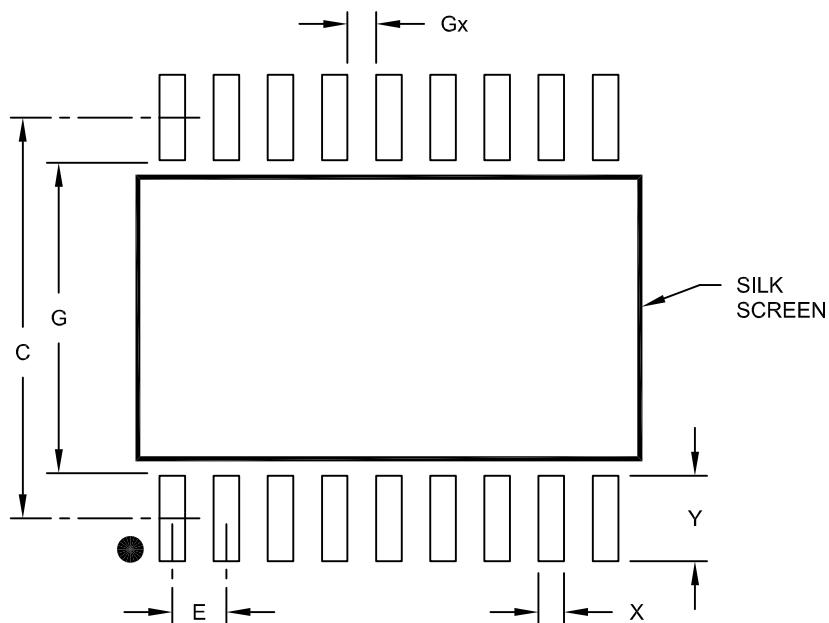
REF: Reference Dimension, usually without tolerance, for information purposes only.

5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

18-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension	Limits	UNITS MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E		1.27	BSC
Contact Pad Spacing	C		9.40	
Contact Pad Width	X			0.60
Contact Pad Length	Y			2.00
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.40		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

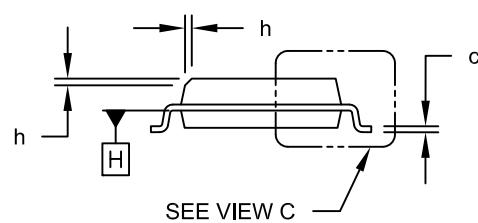
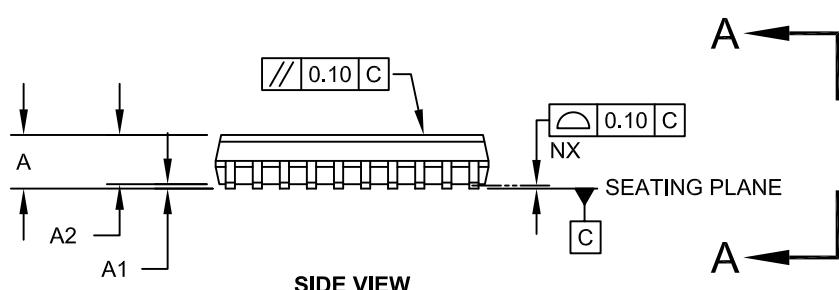
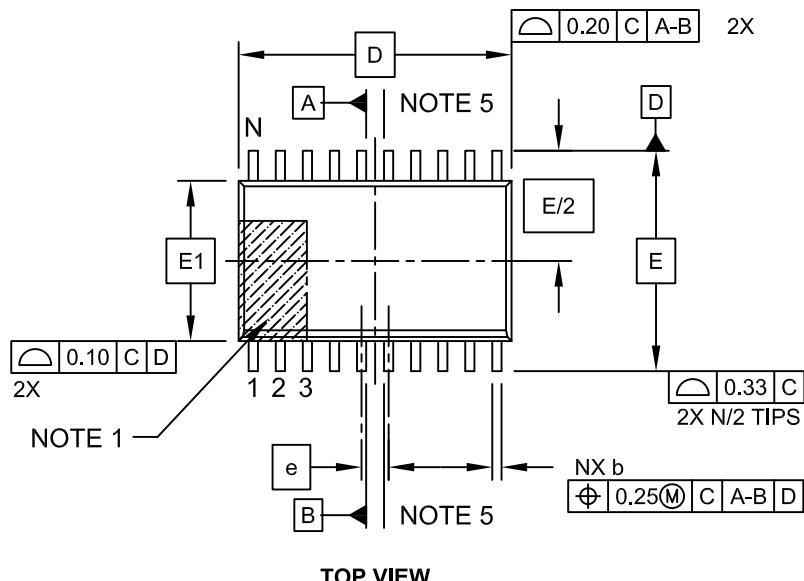
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2051A

Packaging Diagrams and Parameters

20-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

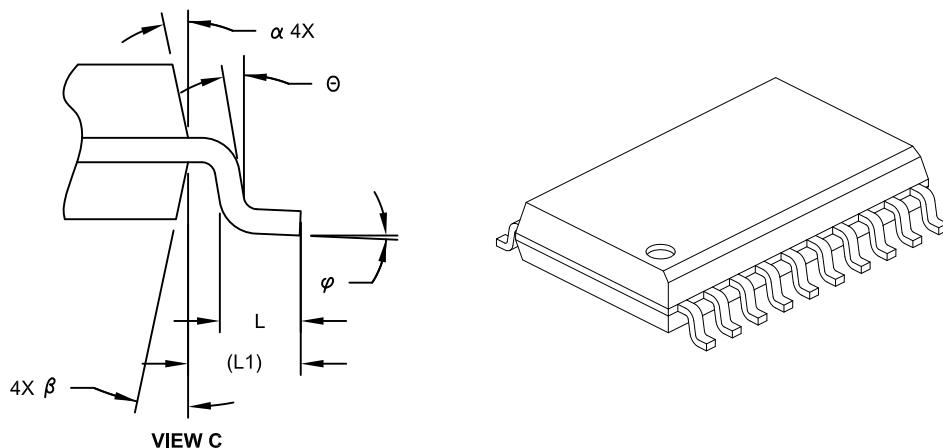


VIEW A-A

Packaging Diagrams and Parameters

20-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	20		
Pitch	e	1.27	BSC	
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff §	A1	0.10	-	0.30
Overall Width	E	10.30	BSC	
Molded Package Width	E1	7.50	BSC	
Overall Length	D	12.80	BSC	
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40	REF	
Lead Angle	theta	0°	-	-
Foot Angle	phi	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	alpha	5°	-	15°
Mold Draft Angle Bottom	beta	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

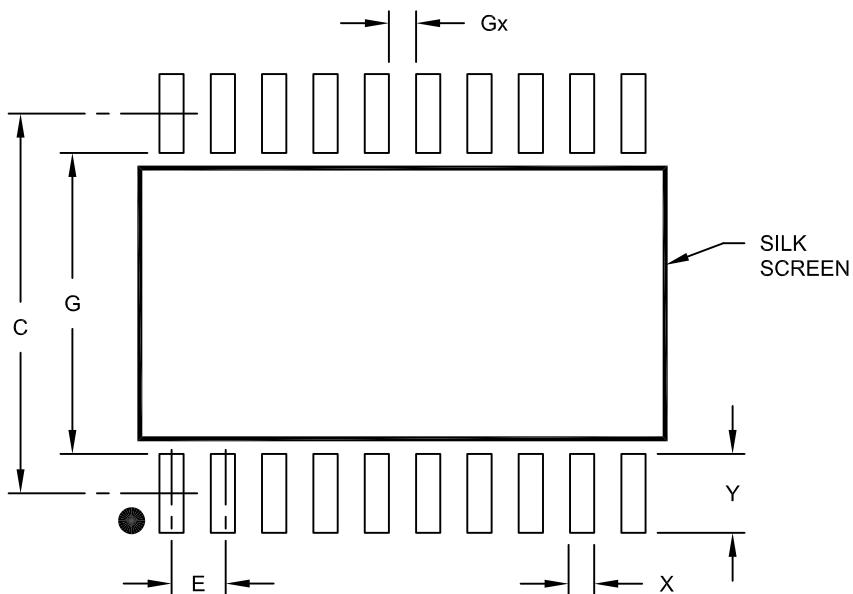
REF: Reference Dimension, usually without tolerance, for information purposes only.

5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

20-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch		1.27 BSC		
Contact Pad Spacing	C		9.40	
Contact Pad Width (X20)	X			0.60
Contact Pad Length (X20)	Y			1.95
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.45		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

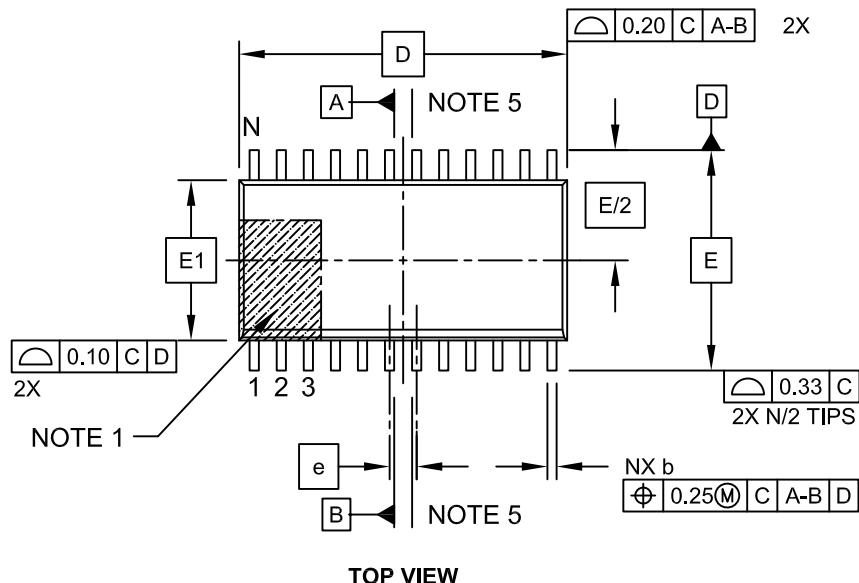
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2094A

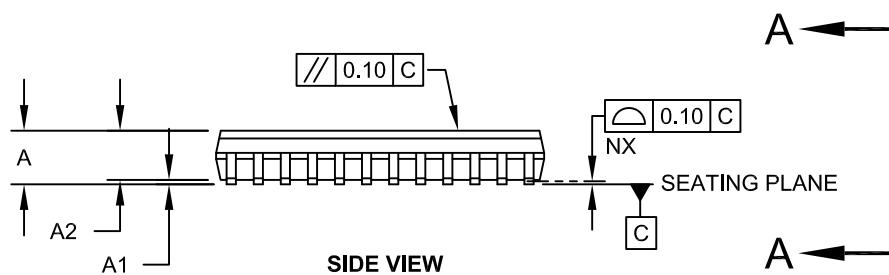
Packaging Diagrams and Parameters

24-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

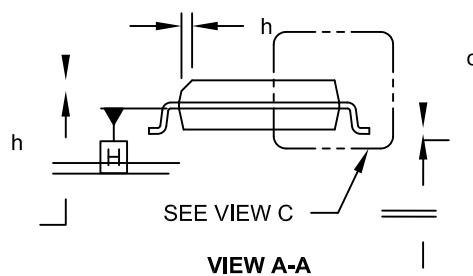
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



TOP VIEW



SIDE VIEW



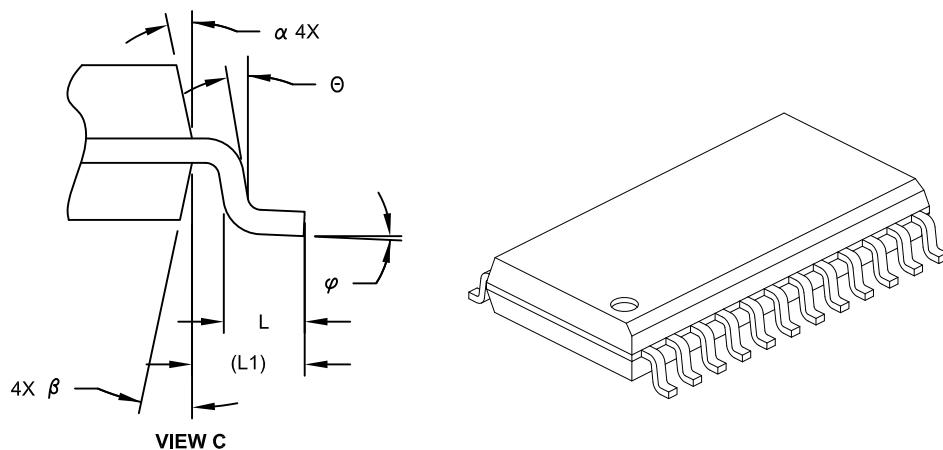
VIEW A-A

Microchip Technology Drawing C04-025C Sheet 1 of 2

Packaging Diagrams and Parameters

24-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits		MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N		24	
Pitch	e		1.27 BSC	
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff	§	A1	0.10	-
Overall Width	E	10.30 BSC		
Molded Package Width	E1	7.50 BSC		
Overall Length	D	15.40 BSC		
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.20	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

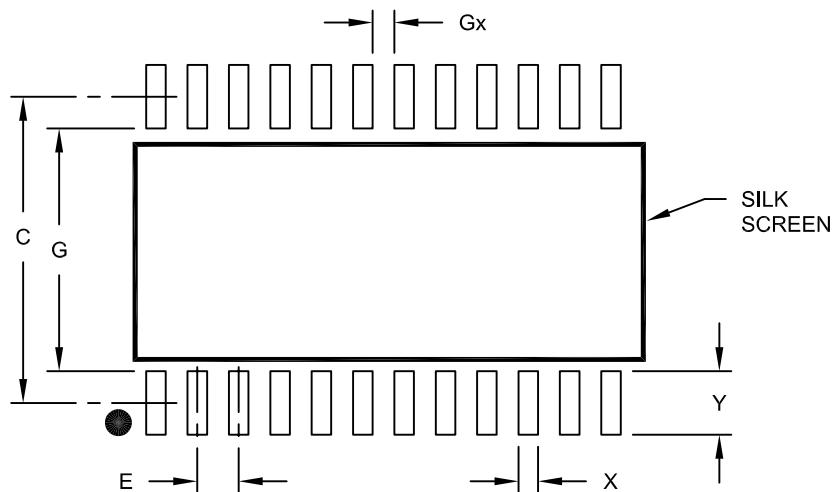
REF: Reference Dimension, usually without tolerance, for information purposes only.

5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

24-Lead Plastic Small Outline (SO) – Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Contact Pad Spacing	C		9.40	
Contact Pad Width (X24)	X			0.60
Contact Pad Length (X24)	Y			2.00
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.40		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

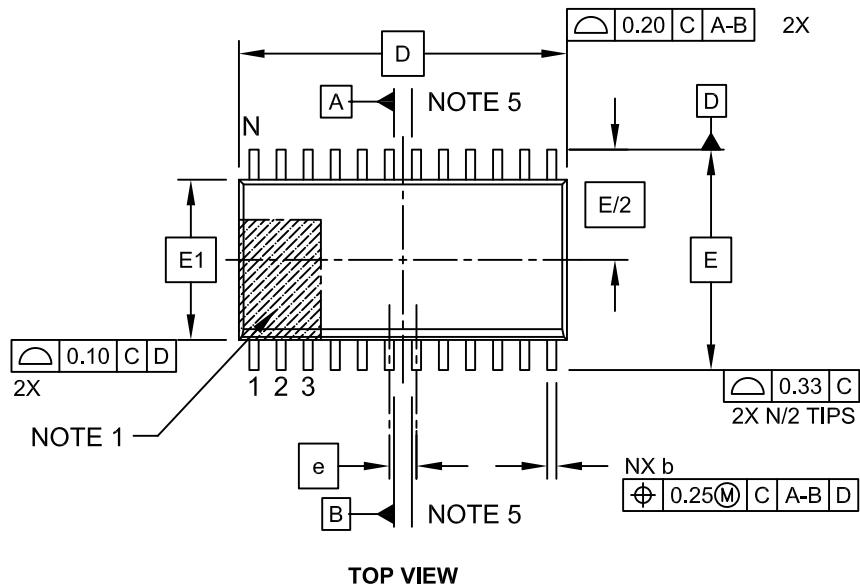
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2025A

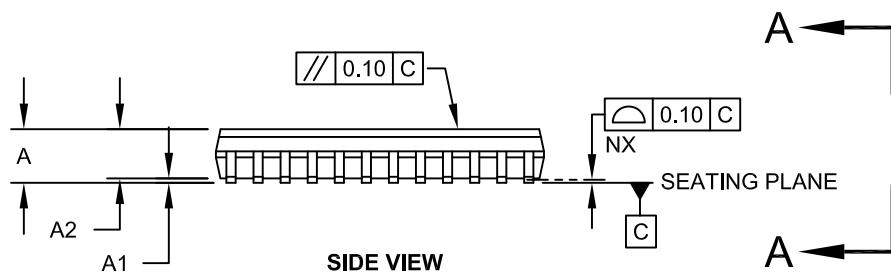
Packaging Diagrams and Parameters

24-Lead Plastic Small Outline (OG) - Wide, 7.50 mm Body [SOIC]

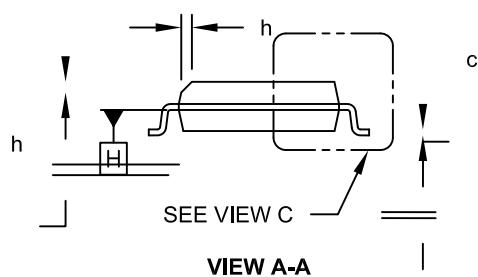
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



TOP VIEW



SIDE VIEW



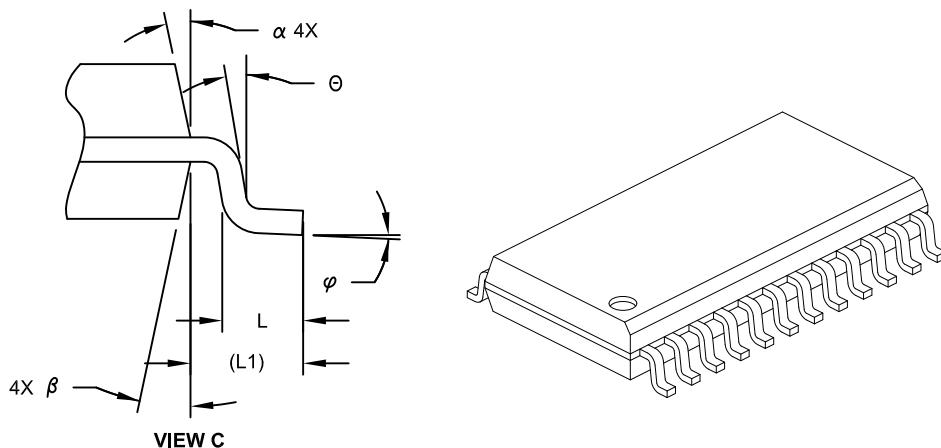
VIEW A-A

Microchip Technology Drawing C04-025C Sheet 1 of 2

Packaging Diagrams and Parameters

24-Lead Plastic Small Outline (OG) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		24		
Pitch	e		1.27 BSC		
Overall Height	A	-	-	2.65	
Molded Package Thickness	A2	2.05	-	-	
Standoff §	A1	0.10	-	0.30	
Overall Width	E	10.30 BSC			
Molded Package Width	E1	7.50 BSC			
Overall Length	D	15.40 BSC			
Chamfer (Optional)	h	0.25	-	0.75	
Foot Length	L	0.40	-	1.27	
Footprint	L1	1.40 REF			
Lead Angle	θ	0°	-	-	
Foot Angle	φ	0°	-	8°	
Lead Thickness	c	0.20	-	0.33	
Lead Width	b	0.31	-	0.51	
Mold Draft Angle Top	α	5°	-	15°	
Mold Draft Angle Bottom	β	5°	-	15°	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

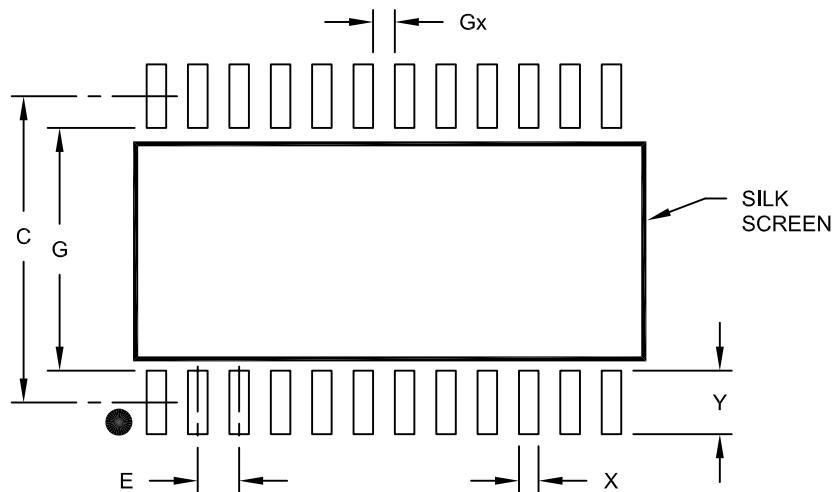
REF: Reference Dimension, usually without tolerance, for information purposes only.

5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

24-Lead Plastic Small Outline (OG) – Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27	BSC	
Contact Pad Spacing	C		9.40	
Contact Pad Width (X24)	X			0.60
Contact Pad Length (X24)	Y			2.00
Distance Between Pads	Gx	0.67		
Distance Between Pads	G	7.40		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

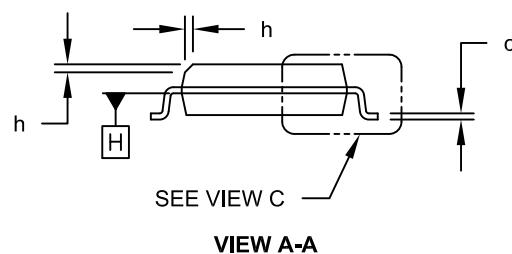
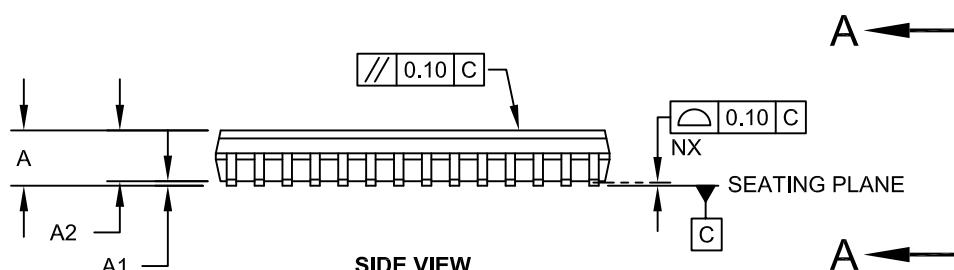
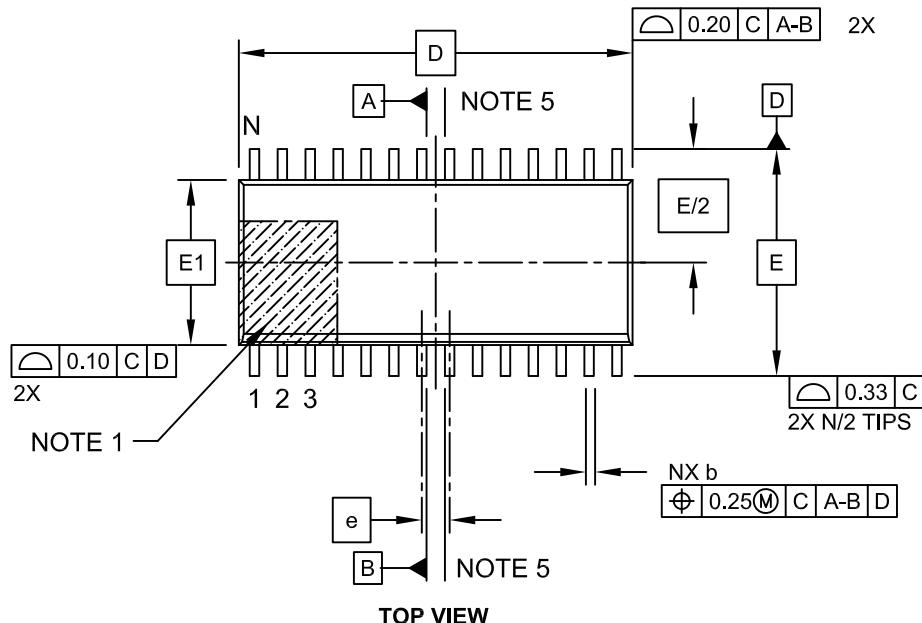
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2025A

Packaging Diagrams and Parameters

28-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

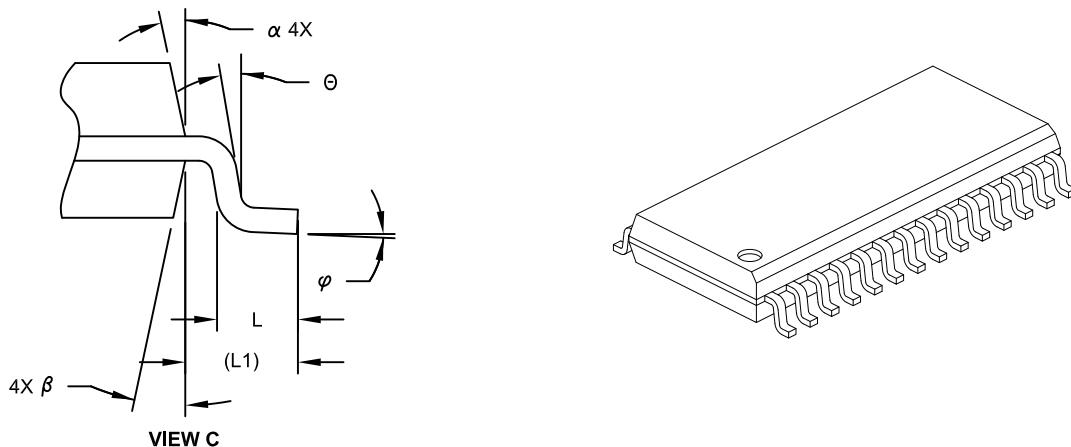
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

28-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	1.27	BSC	
Overall Height	A	-	-	2.65
Molded Package Thickness	A2	2.05	-	-
Standoff	§	0.10	-	0.30
Overall Width	E	10.30	BSC	
Molded Package Width	E1	7.50	BSC	
Overall Length	D	17.90	BSC	
Chamfer (Optional)	h	0.25	-	0.75
Foot Length	L	0.40	-	1.27
Footprint	L1	1.40 REF		
Lead Angle	θ	0°	-	-
Foot Angle	φ	0°	-	8°
Lead Thickness	c	0.18	-	0.33
Lead Width	b	0.31	-	0.51
Mold Draft Angle Top	α	5°	-	15°
Mold Draft Angle Bottom	β	5°	-	15°

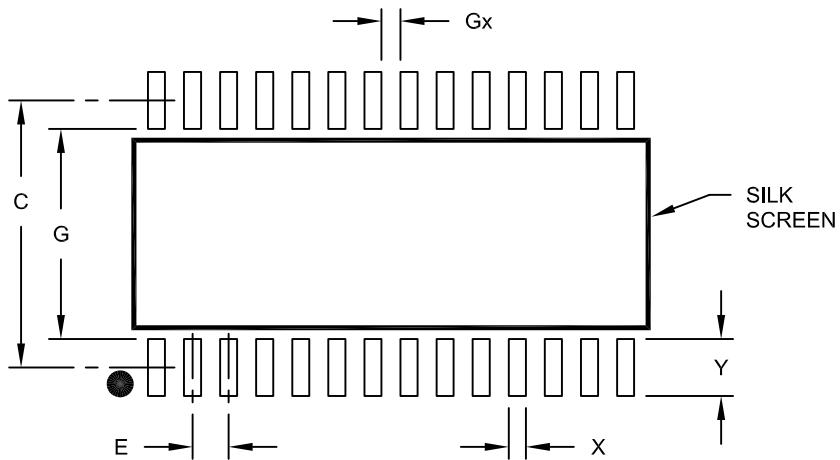
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
 2. § Significant Characteristic
 3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
 4. Dimensioning and tolerancing per ASME Y14.5M
- BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.
5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

28-Lead Plastic Small Outline (SO) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		1.27	BSC	
Contact Pad Spacing	C			9.40	
Contact Pad Width (X28)	X				0.60
Contact Pad Length (X28)	Y				2.00
Distance Between Pads	Gx	0.67			
Distance Between Pads	G	7.40			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

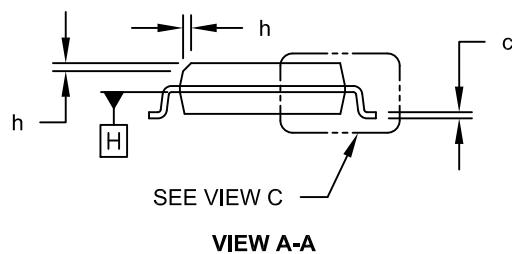
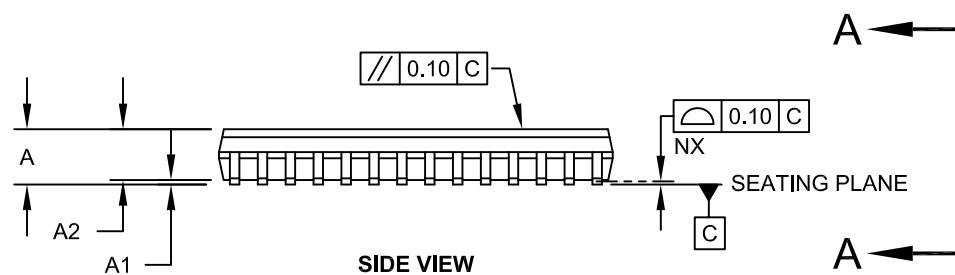
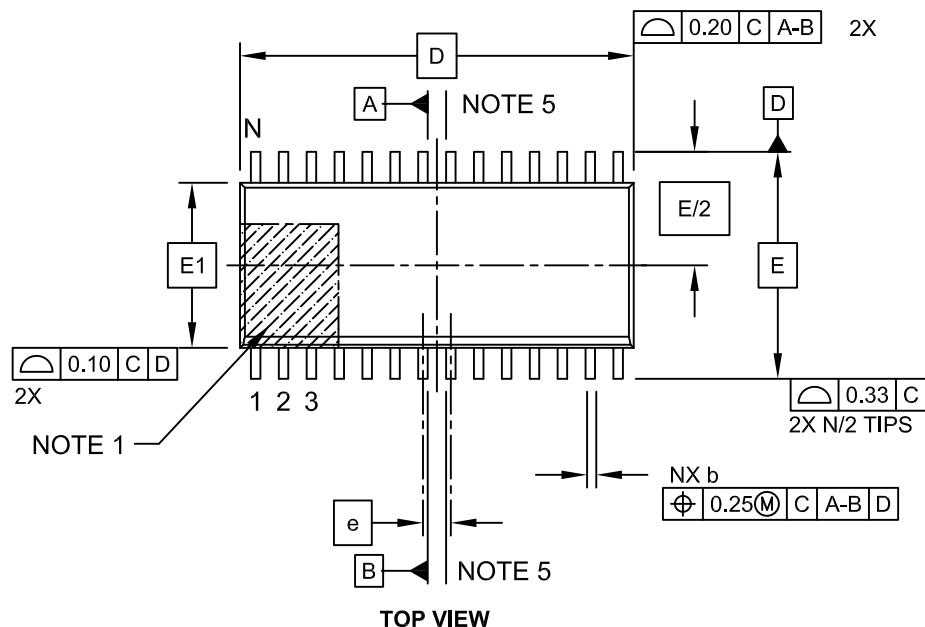
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2052A

Packaging Diagrams and Parameters

28-Lead Plastic Small Outline (OI) - Wide, 7.50 mm Body [SOIC]

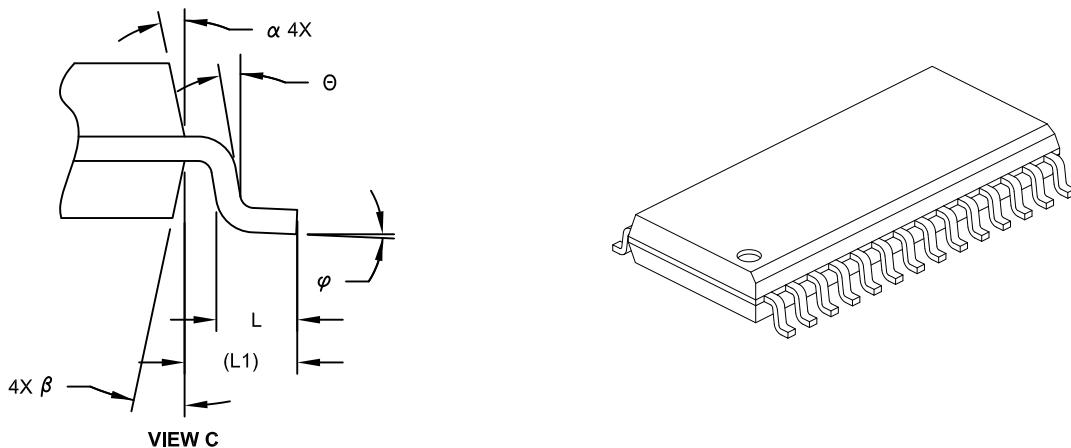
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

28-Lead Plastic Small Outline (O) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		28		
Pitch	e		1.27	BSC	
Overall Height	A		-	-	2.65
Molded Package Thickness	A2		2.05	-	-
Standoff	§	A1	0.10	-	0.30
Overall Width	E		10.30	BSC	
Molded Package Width	E1		7.50	BSC	
Overall Length	D		17.90	BSC	
Chamfer (Optional)	h	0.25	-	0.75	
Foot Length	L	0.40	-	1.27	
Footprint	L1		1.40	REF	
Lead Angle	θ	0°	-	-	
Foot Angle	φ	0°	-	8°	
Lead Thickness	c	0.18	-	0.33	
Lead Width	b	0.31	-	0.51	
Mold Draft Angle Top	α	5°	-	15°	
Mold Draft Angle Bottom	β	5°	-	15°	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic
3. Dimension D does not include mold flash, protrusions or gate burrs, which shall not exceed 0.15 mm per end. Dimension E1 does not include interlead flash or protrusion, which shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

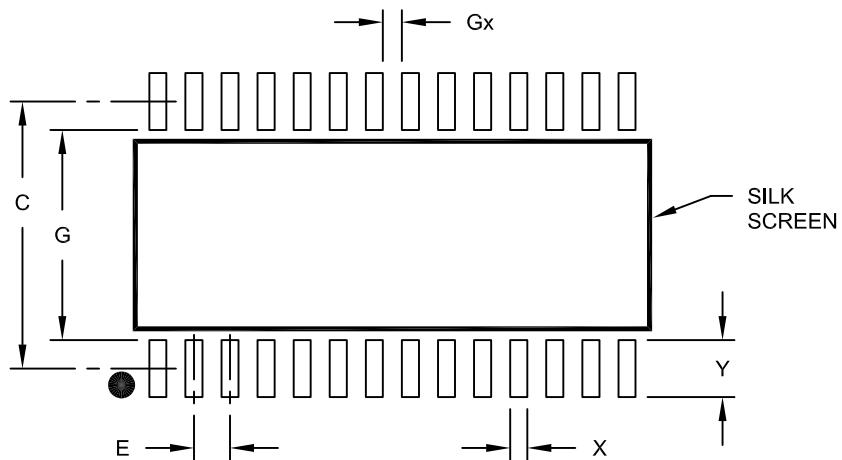
REF: Reference Dimension, usually without tolerance, for information purposes only.

5. Datums A & B to be determined at Datum H.

Land Pattern (Footprint)

28-Lead Plastic Small Outline (OI) - Wide, 7.50 mm Body [SOIC]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		1.27	BSC	
Contact Pad Spacing	C			9.40	
Contact Pad Width (X28)	X			0.60	
Contact Pad Length (X28)	Y			2.00	
Distance Between Pads	Gx	0.67			
Distance Between Pads	G	7.40			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2052A

Packaging Diagrams and Parameters

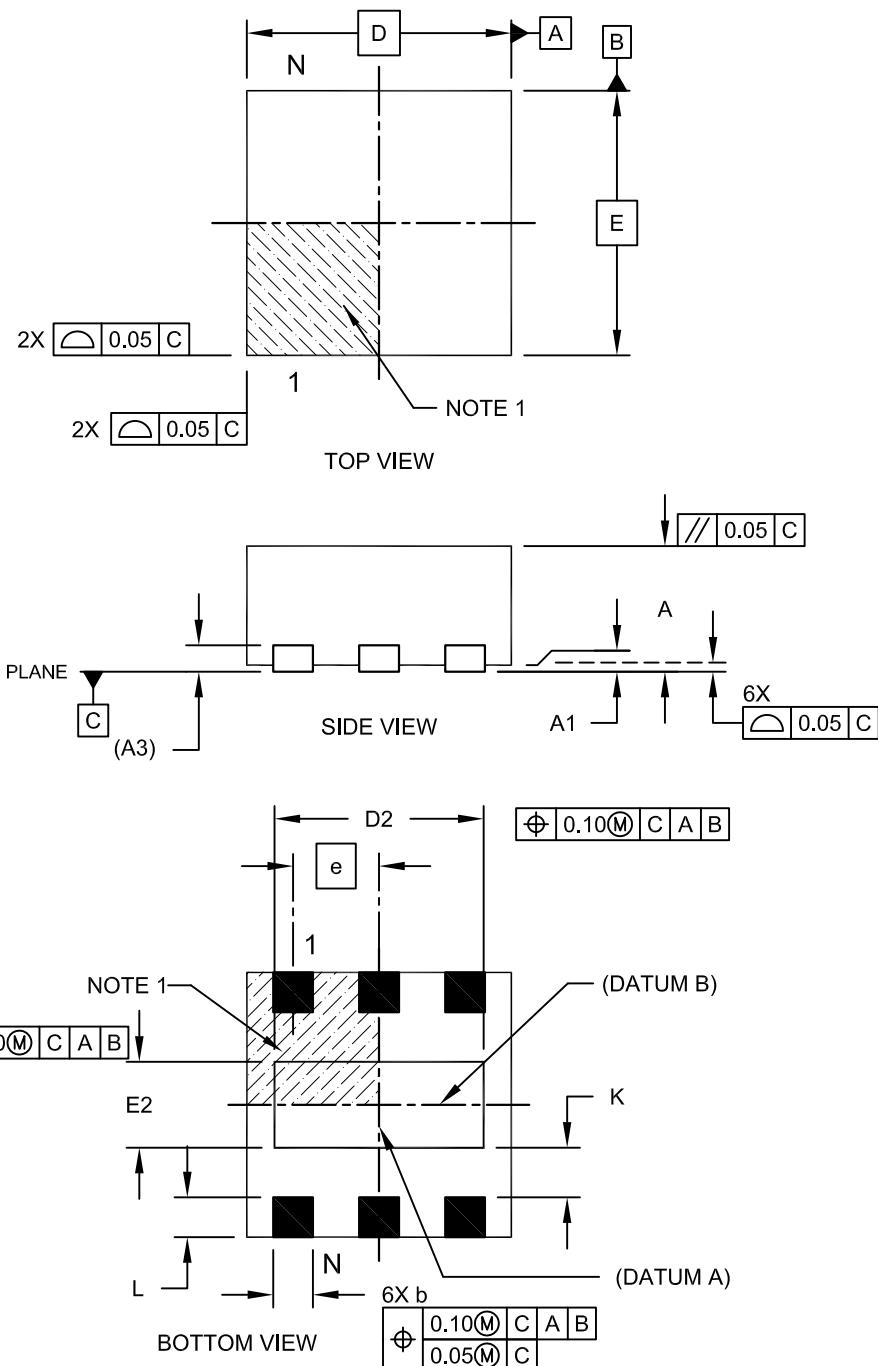
DFN Family

Dual Flat, No Lead Packages

Packaging Diagrams and Parameters

6-Lead Plastic Dual Flat, No Lead Package (MA[Y]) - 2x2x0.9mm Body [DFN]

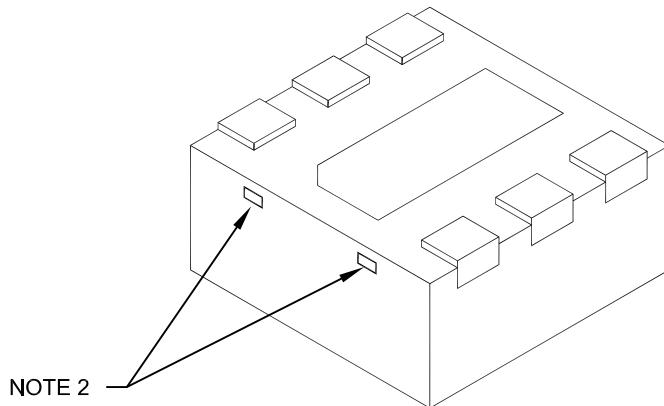
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

6-Lead Plastic Dual Flat, No Lead Package (MA[Y]) - 2x2x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Limits	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N		6	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Length	D	2.00 BSC		
Overall Width	E	2.00 BSC		
Exposed Pad Length	D2	1.50	1.60	1.70
Exposed Pad Width	E2	0.90	1.00	1.10
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

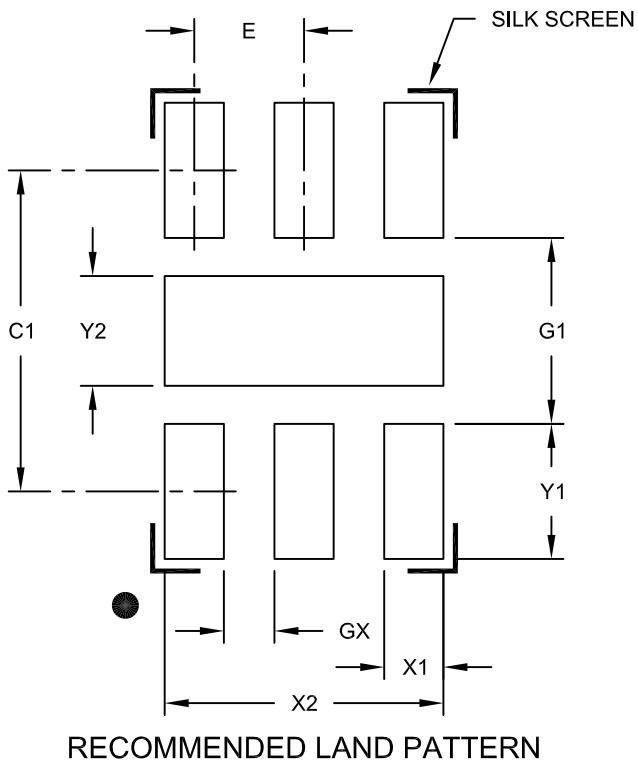
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

6-Lead Plastic Dual Flat, No Lead Package (MA) - 2x2x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch		0.65 BSC		
Optional Center Pad Width	Y2			1.00
Optional Center Pad Length	X2			1.70
Contact Pad Spacing	C1		2.10	
Contact Pad Width (X6)	X1			0.35
Contact Pad Length (X6)	Y1			0.65
Distance Between Pads	GX	0.20		
Distance Between Pads	G1	1.10		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

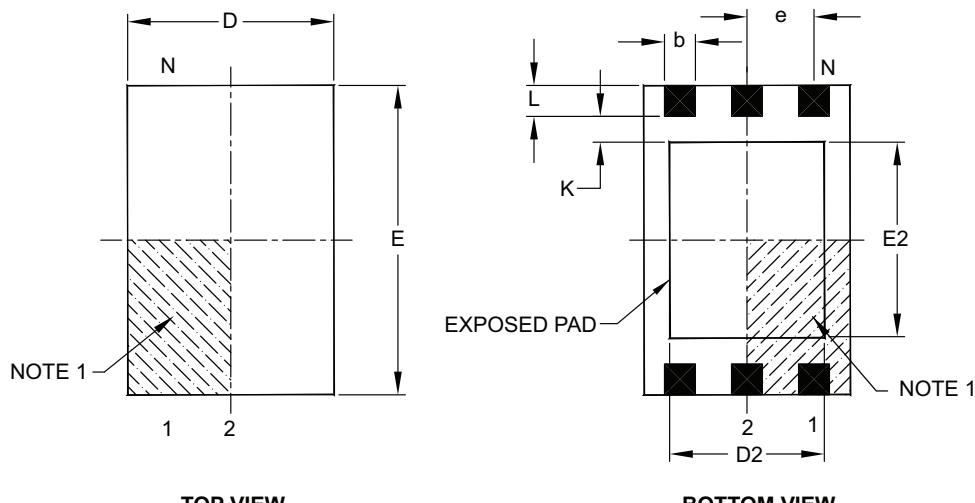
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2120A

Packaging Diagrams and Parameters

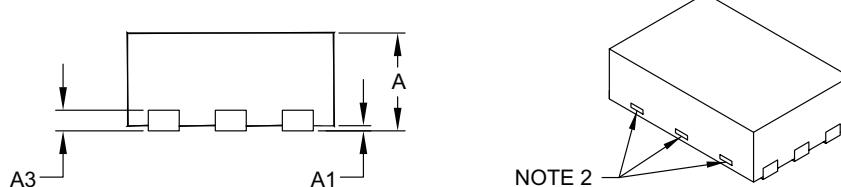
6-Lead Plastic Dual Flat, No Lead Package (ME) – 2x3x0.9 mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



TOP VIEW

BOTTOM VIEW



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		6		
Pitch	e		0.65	0.65	BSC
Overall Height	A	0.80	0.90	1.00	
Standoff	A1	0.00	0.02	0.05	
Contact Thickness	A3		0.20	REF	
Overall Length	D	2.00			BSC
Overall Width	E	3.00			BSC
Exposed Pad Length	D2	1.40	–	1.60	
Exposed Pad Width	E2	1.80	–	2.00	
Contact Width	b	0.25	0.30	0.35	
Contact Length	L	0.20	0.30	0.40	
Contact-to-Exposed Pad	K	0.20	–	–	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

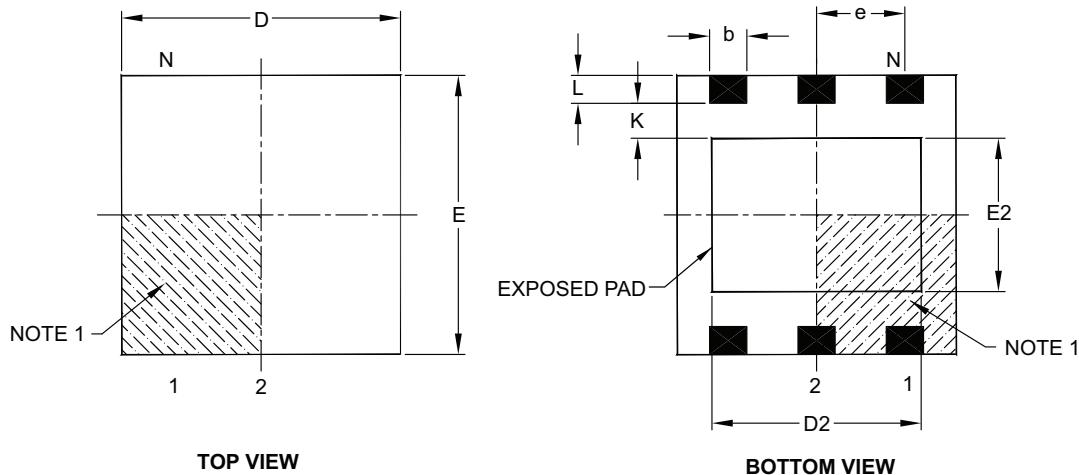
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-134A

Packaging Diagrams and Parameters

6-Lead Plastic Dual Flat, No Lead Package (MH) – 3x3x0.9 mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		6		
Pitch	e		0.95	BSC	
Overall Height	A	0.80	0.90	1.00	
Standoff	A1	0.00	0.02	0.05	
Contact Thickness	A3	0.20 REF			
Overall Length	D	3.00 BSC			
Overall Width	E	3.00 BSC			
Exposed Pad Length	D2	0.00	–	2.25	
Exposed Pad Width	E2	0.00	–	1.65	
Contact Width	b	0.30	0.40	0.45	
Contact Length	L	0.20	0.30	0.45	
Contact-to-Exposed Pad	K	0.20	–	–	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.

2. Package may have one or more exposed tie bars at ends.

3. Package is saw singulated.

4. Dimensioning and tolerancing per ASME Y14.5M.

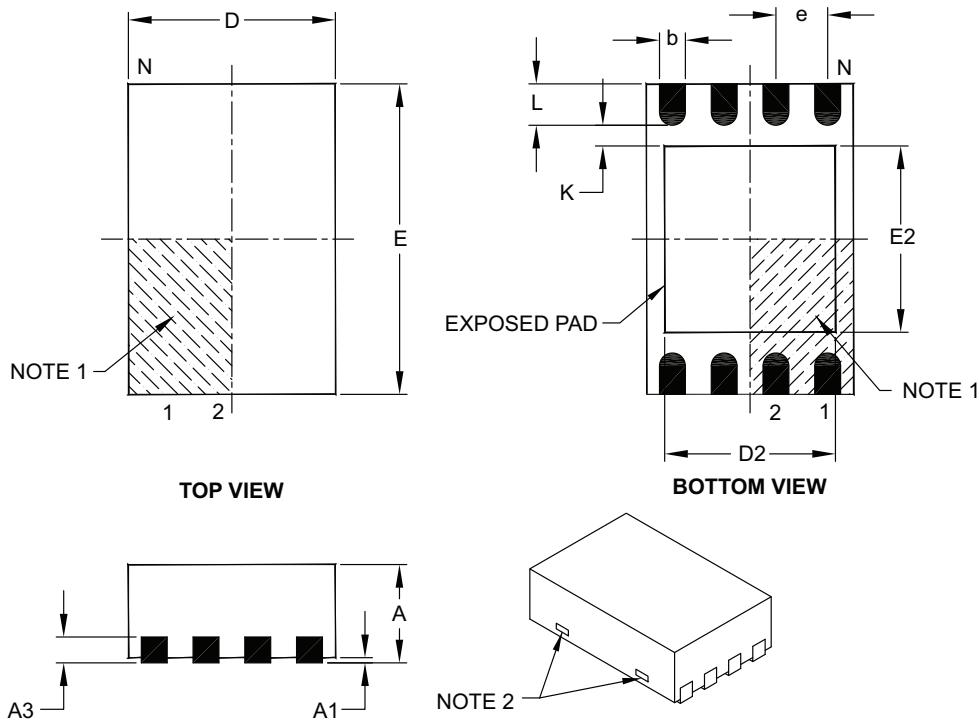
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MC) – 2x3x0.9 mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Length	D		2.00 BSC	
Overall Width	E		3.00 BSC	
Exposed Pad Length	D2	1.30	–	1.55
Exposed Pad Width	E2	1.50	–	1.75
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	–	–

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

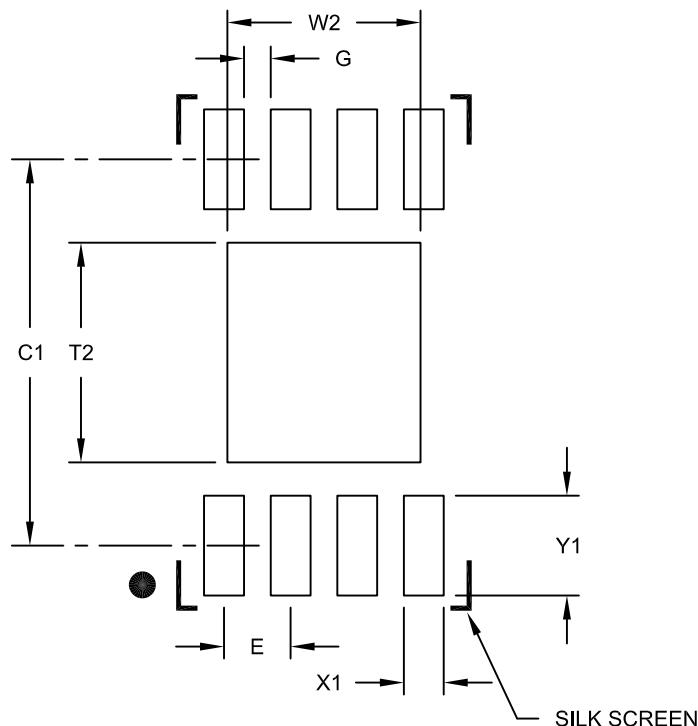
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Dual Flat, No Lead Package (MC) - 2x3x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			1.45
Optional Center Pad Length	T2			1.75
Contact Pad Spacing	C1		2.90	
Contact Pad Width (X8)	X1			0.30
Contact Pad Length (X8)	Y1			0.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

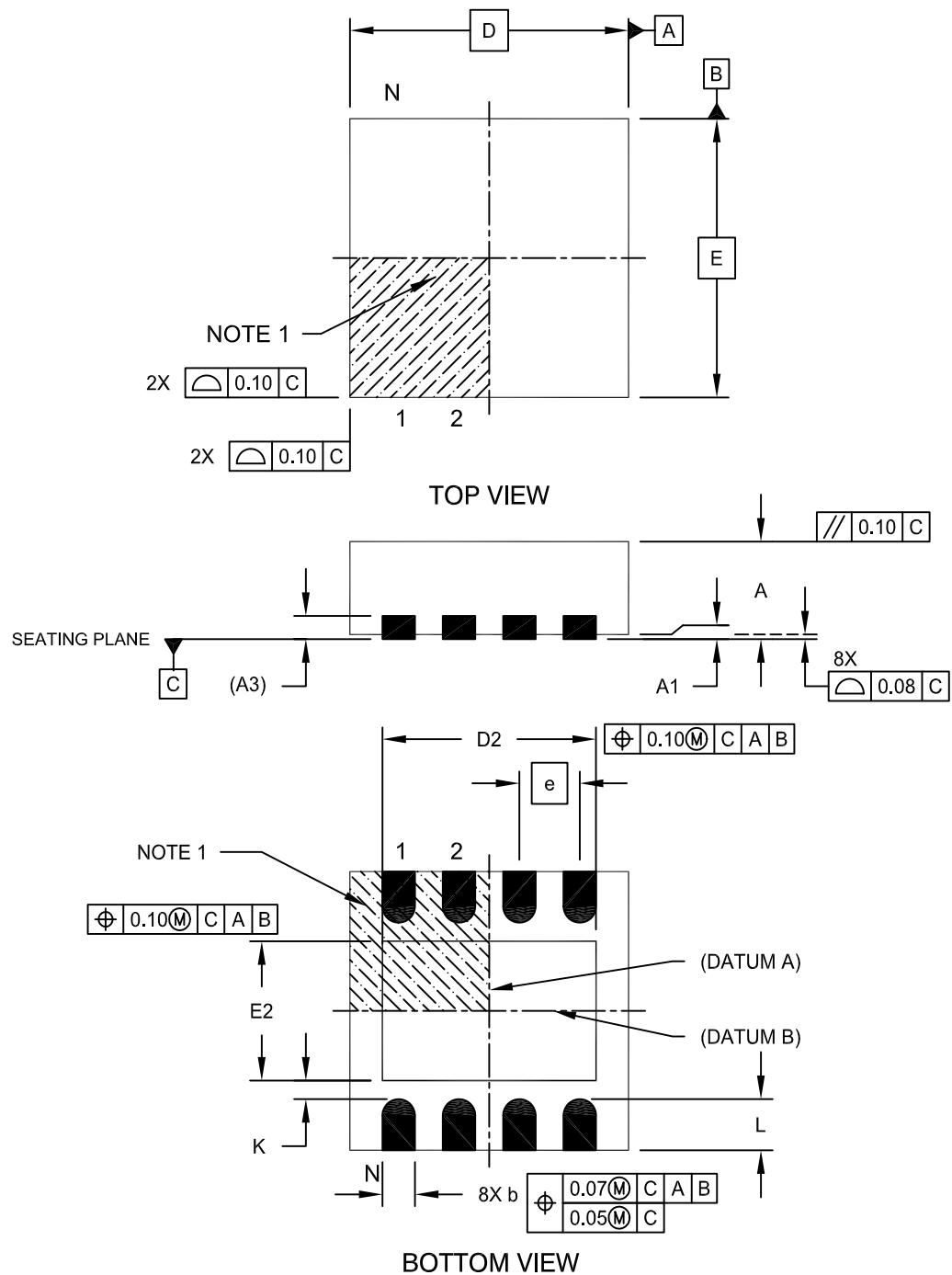
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2123B

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

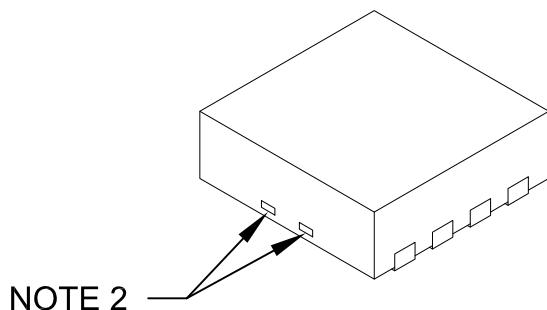
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Number of Pins	N		8		
Pitch	e		0.65	BSC	
Overall Height	A	0.80	0.90	1.00	
Standoff	A1	0.00	0.02	0.05	
Contact Thickness	A3		0.20	REF	
Overall Length	D		3.00	BSC	
Exposed Pad Width	E2	1.34	-	1.60	
Overall Width	E		3.00	BSC	
Exposed Pad Length	D2	1.60	-	2.40	
Contact Width	b	0.25	0.30	0.35	
Contact Length	L	0.20	0.30	0.55	
Contact-to-Exposed Pad	K	0.20	-	-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M

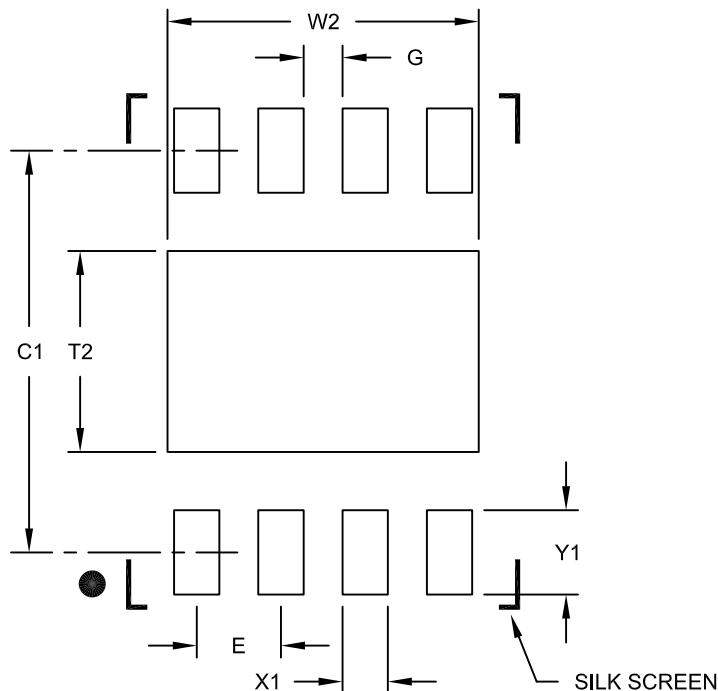
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	W2			2.40
Optional Center Pad Length	T2			1.55
Contact Pad Spacing	C1		3.10	
Contact Pad Width (X8)	X1			0.35
Contact Pad Length (X8)	Y1			0.65
Distance Between Pads	G	0.30		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

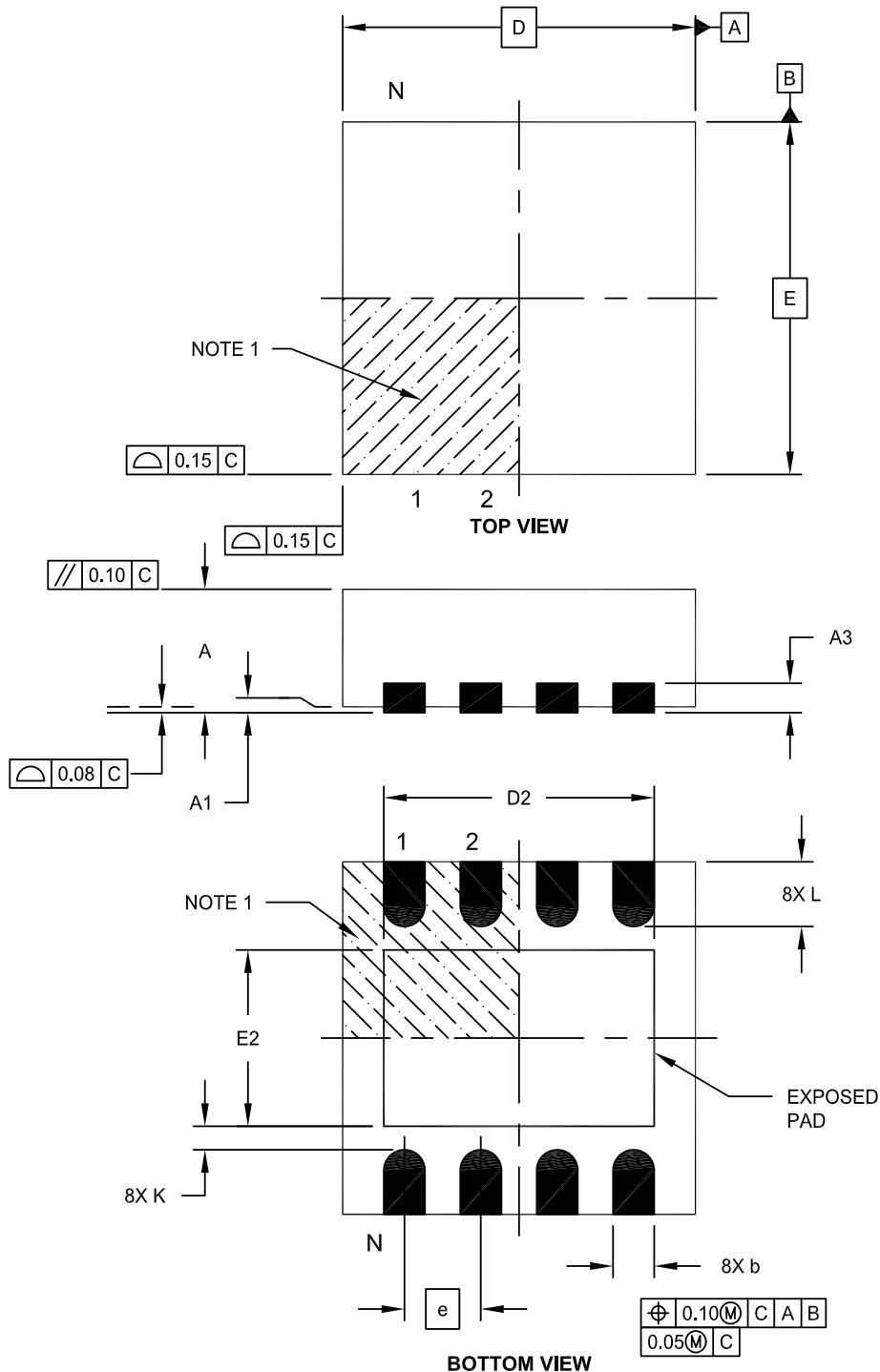
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2062B

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MD) – 4x4x0.9 mm Body [DFN]

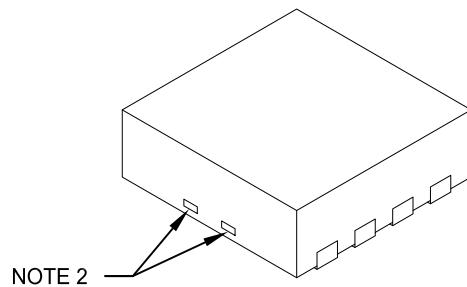
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MD) – 4x4x0.9 mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.80 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Length	D		4.00 BSC	
Exposed Pad Width	E2	2.60	2.70	2.80
Overall Width	E		4.00 BSC	
Exposed Pad Length	D2	3.40	3.50	3.60
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M

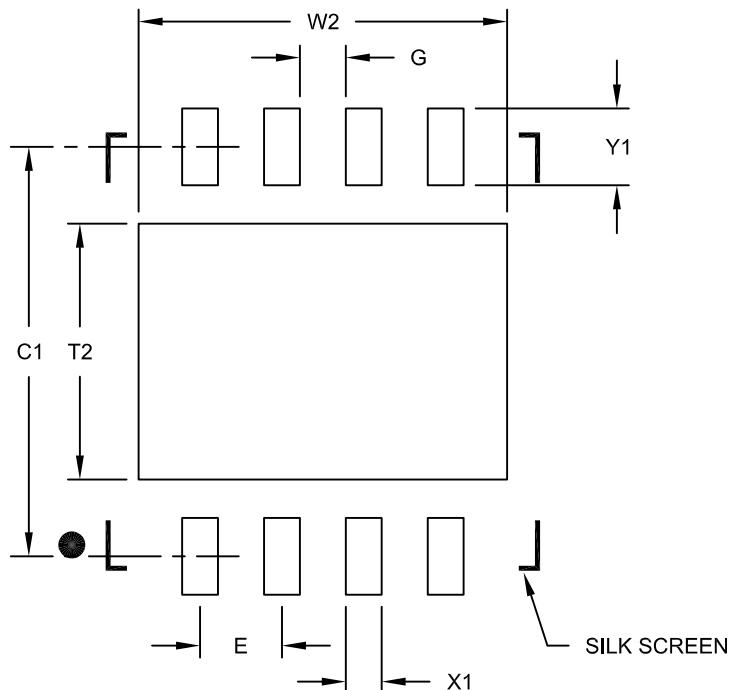
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Dual Flat, No Lead Package (MD) - 4x4x0.9 mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.80 BSC	
Optional Center Pad Width	W2			3.60
Optional Center Pad Length	T2			2.50
Contact Pad Spacing	C1		4.00	
Contact Pad Width (X8)	X1			0.35
Contact Pad Length (X8)	Y1			0.75
Distance Between Pads	G	0.45		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

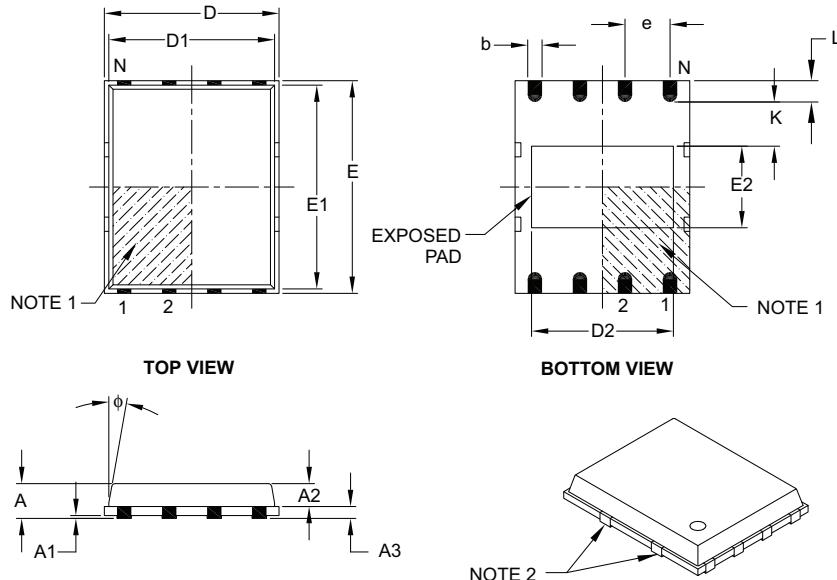
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2131C

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MF) – 6x5 mm Body [DFN-S] PUNCH SINGULATED

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		1.27 BSC	
Overall Height	A	—	0.85	1.00
Molded Package Thickness	A2	—	0.65	0.80
Standoff	A1	0.00	0.01	0.05
Base Thickness	A3		0.20 REF	
Overall Length	D		4.92 BSC	
Molded Package Length	D1		4.67 BSC	
Exposed Pad Length	D2	3.85	4.00	4.15
Overall Width	E		5.99 BSC	
Molded Package Width	E1		5.74 BSC	
Exposed Pad Width	E2	2.16	2.31	2.46
Contact Width	b	0.35	0.40	0.47
Contact Length	L	0.50	0.60	0.75
Contact-to-Exposed Pad	K	0.20	—	—
Model Draft Angle Top	ϕ	—	—	12°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Dimensioning and tolerancing per ASME Y14.5M.

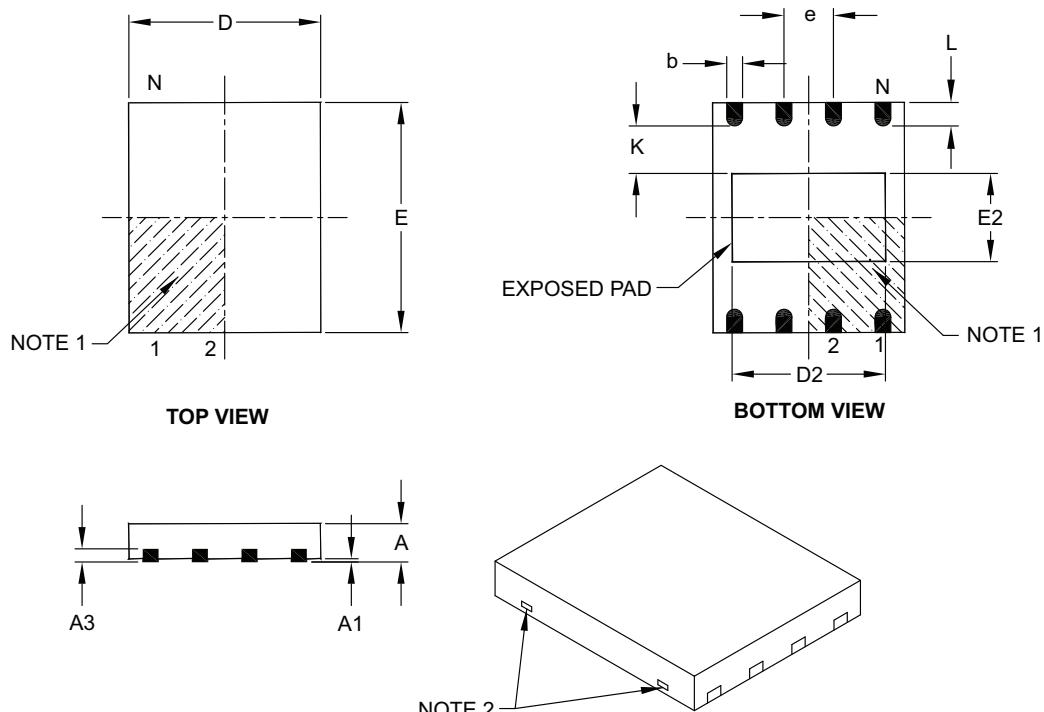
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MF) – 6x5 mm Body [DFN-S]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	1.27	BSC	
Overall Height	A	0.80	0.85	1.00
Standoff	A1	0.00	0.01	0.05
Contact Thickness	A3	0.20 REF		
Overall Length	D	5.00 BSC		
Overall Width	E	6.00 BSC		
Exposed Pad Length	D2	3.90	4.00	4.10
Exposed Pad Width	E2	2.20	2.30	2.40
Contact Width	b	0.35	0.40	0.48
Contact Length	L	0.50	0.60	0.75
Contact-to-Exposed Pad	K	0.20	–	–

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

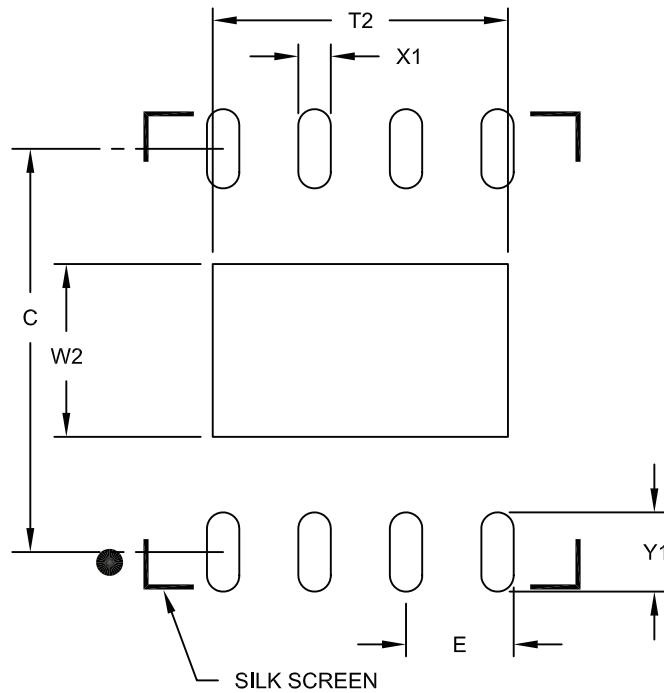
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-122B

Land Pattern (Footprint)

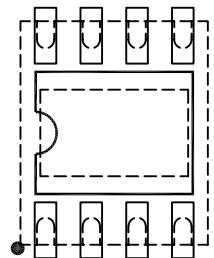
8-Lead Plastic Dual Flat, No Lead Package (MF) - 6x5 mm Body [DFN-S]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

NOTE: THIS PACKAGE MAY ALSO BE
USED WITH THE 8L SOIC (3.90 mm)
LAND PATTERN



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Optional Center Pad Width	W2			2.40
Optional Center Pad Length	T2			4.10
Contact Pad Spacing	C		5.60	
Contact Pad Width (X8)	X1			0.45
Contact Pad Length (X8)	Y1			1.10

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

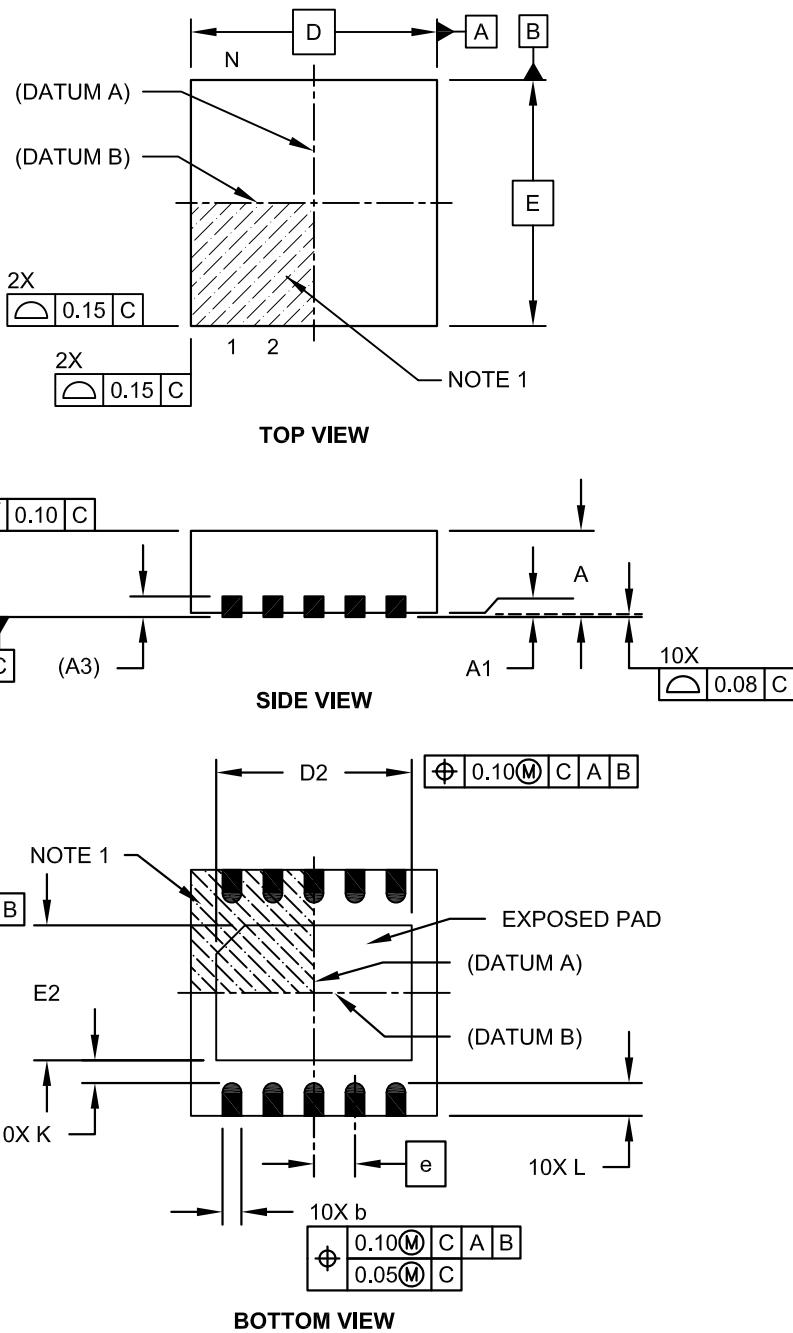
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2122A

Packaging Diagrams and Parameters

10-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

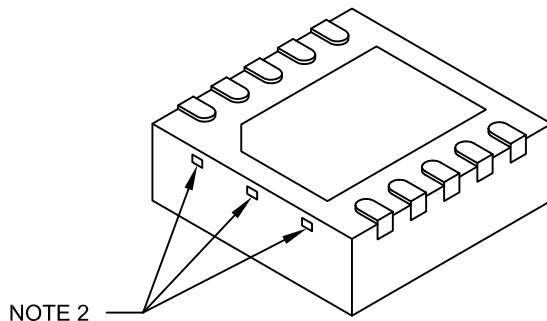
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

10-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Limits	Units MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	10		
Pitch	e	0.50	BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20	REF	
Overall Length	D	3.00	BSC	
Exposed Pad Length	D2	2.15	2.35	2.45
Overall Width	E	3.00	BSC	
Exposed Pad Width	E2	1.40	1.50	1.75
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

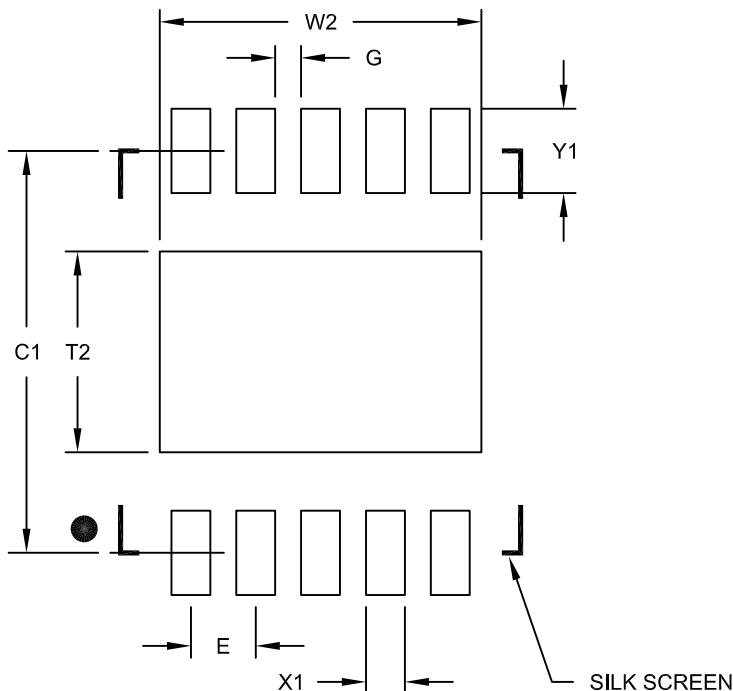
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

10-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9mm Body [DFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			2.48
Optional Center Pad Length	T2			1.55
Contact Pad Spacing	C1		3.10	
Contact Pad Width (X10)	X1			0.30
Contact Pad Length (X10)	Y1			0.65
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2063B

Packaging Diagrams and Parameters

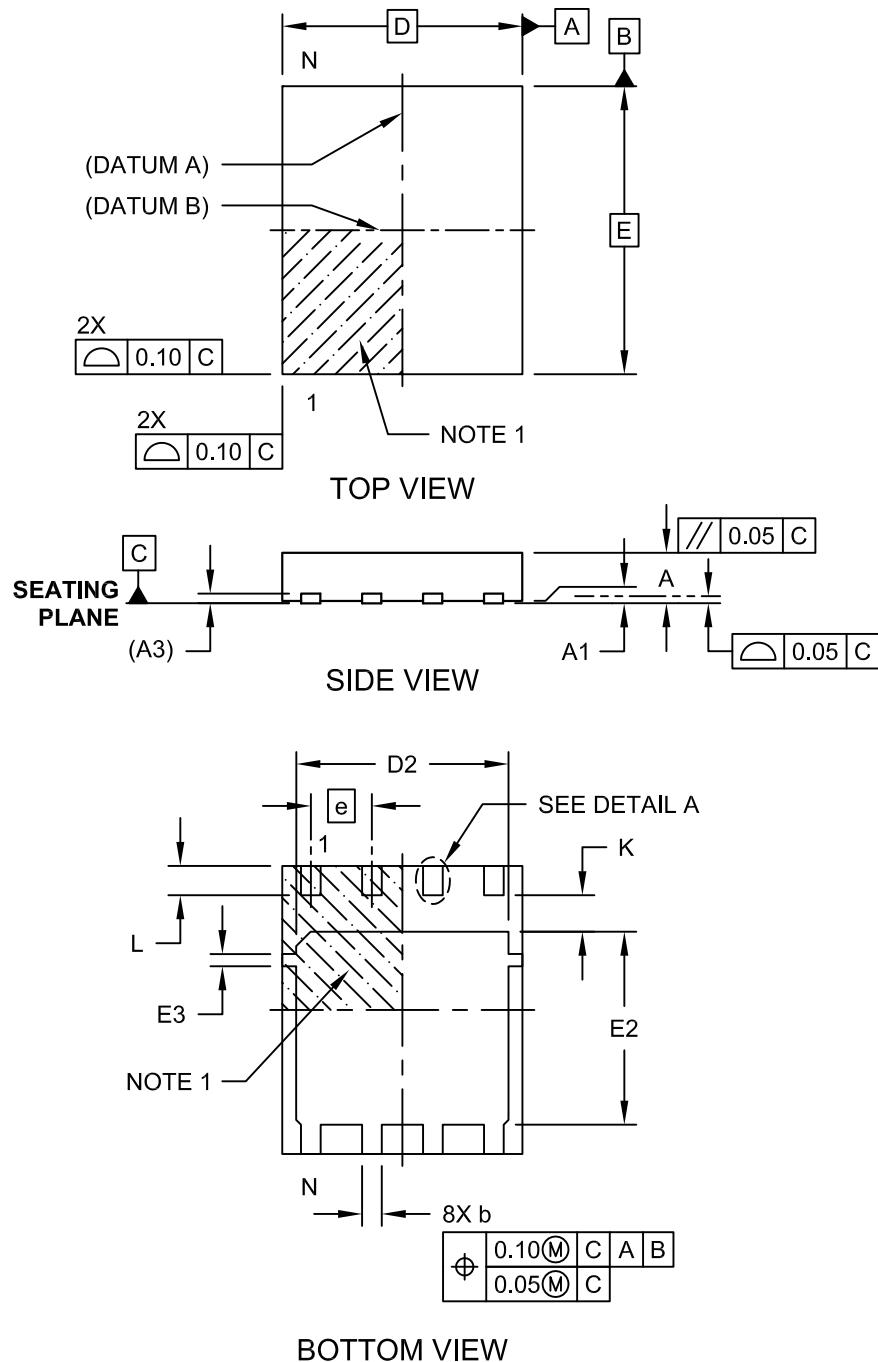
PDFN Family

High Power Dual Flat, No Lead Packages

Packaging Diagrams and Parameters

8-Lead Power Dual Flatpack No Lead Package (MF) – 5x6x1.0 mm Body [PDFN]

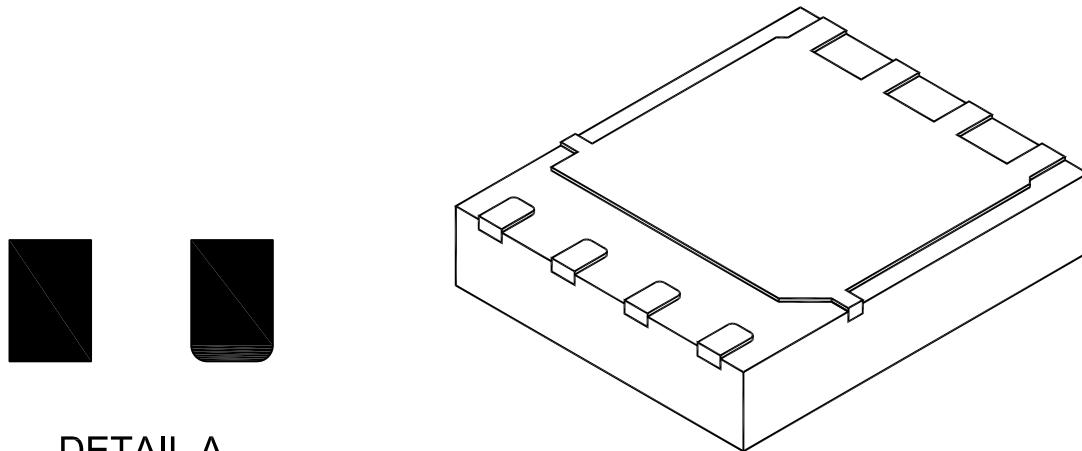
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Power Dual Flatpack No Lead Package (MF) – 5x6x1.0 mm Body [PDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



DETAIL A

ALTERNATE
CONTACT
SHAPES

Dimension	Limits	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		1.27 BSC	
Overall Height	A	0.80	1.00	1.03
Standoff	A1	0.00	-	0.05
Terminal Thickness	(A3)		0.20 REF	
Overall Length	D		5.00 BSC	
Overall Width	E		6.00 BSC	
Exposed Pad length	D2	4.27	4.42	4.52
Exposed Pad Width	E2	3.87	4.02	4.12
Tab Width	E3	0.20	0.25	0.30
Terminal Width	b	0.36	0.41	0.46
Terminal Length	L	0.51	0.61	0.71
Terminal to Exposed Pad	K	0.71	0.76	0.81

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Package dimension does not include mold flash, protrusions, burrs or metal smearing.
4. Dimensioning and tolerancing per ASME Y14.5M.

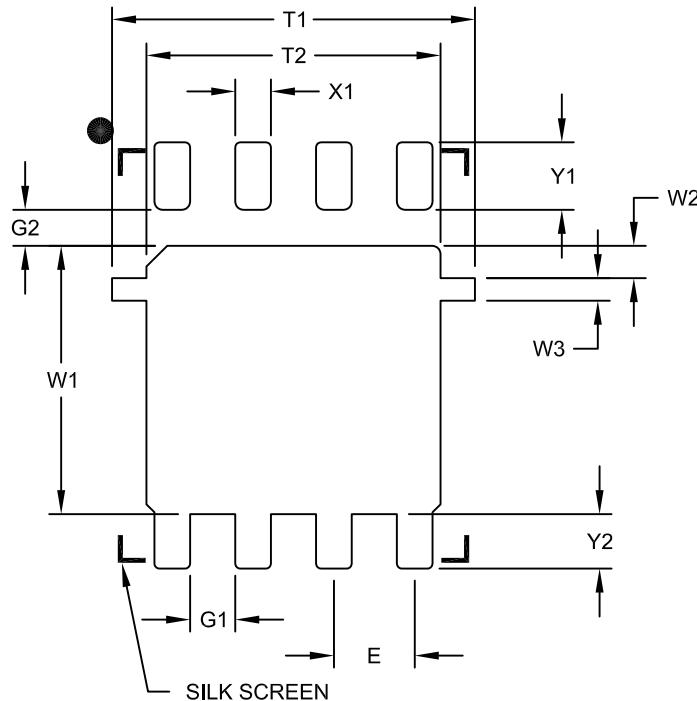
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Power Dual Flatpack No Lead Package (MF) – 5x6x1.0 mm Body [PDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		1.27 BSC	
Center Pad Width	W1			4.22
Pad Edge to Tab	W2		0.51	
Tab Width	W3		0.35	
Center Pad Length With Tabs	T1			5.70
Center Pad Length	T2			4.62
Distance Between Terminals	G1	0.71		
Terminal To Center Pad (X4)	G2	0.57		
Terminal Pad Width (X8)	X1			0.56
Terminal Pad Length (X4)	Y1			1.06
Terminal Pad Length (X8)	Y2			0.86

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

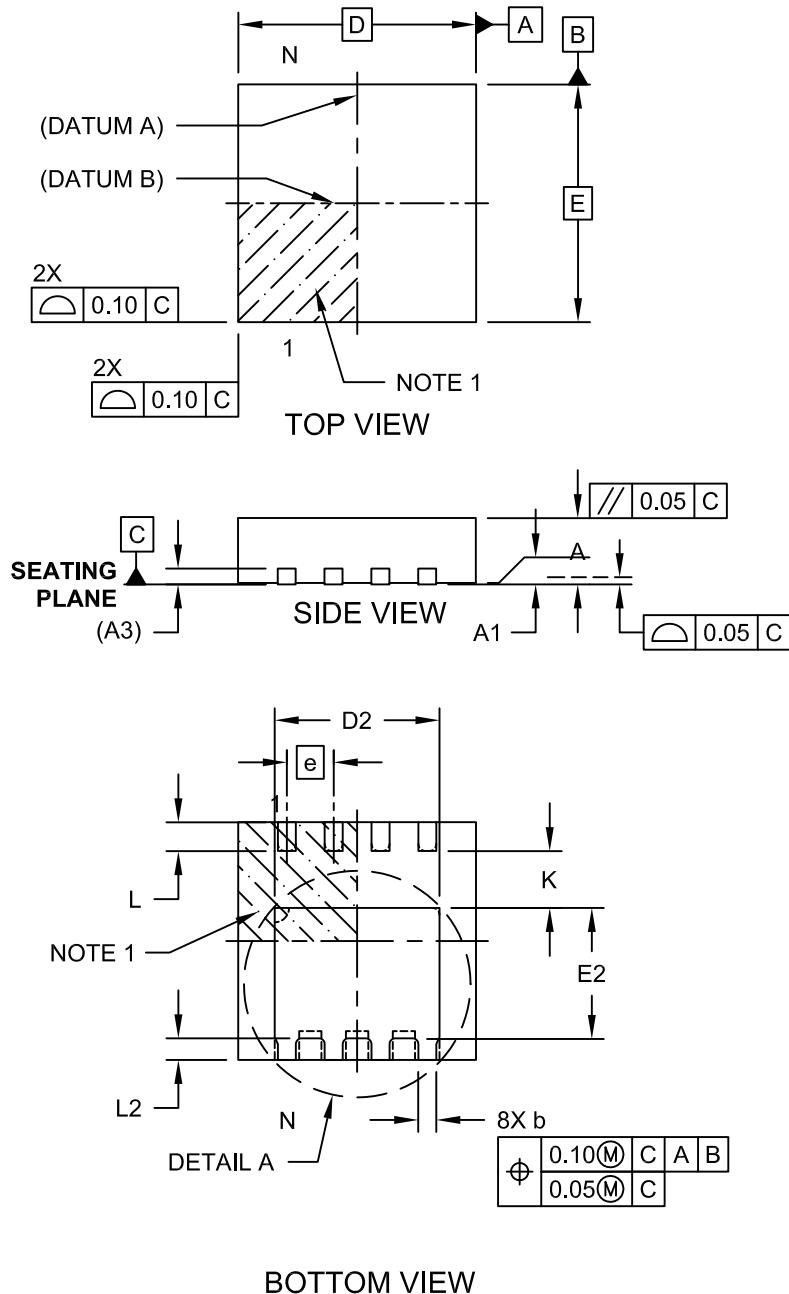
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2188A

Packaging Diagrams and Parameters

8-Lead Power Dual Flatpack No Lead Package (LC) – 3.3x3.3x1.0 mm Body [PDFN]

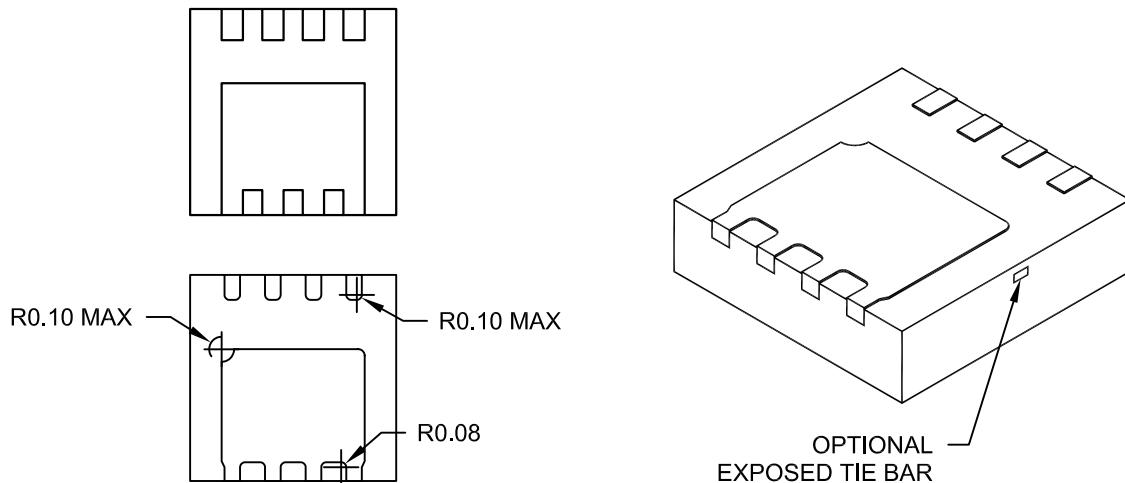
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Power Dual Flatpack No Lead Package (LC) – 3.3x3.3x1.0 mm Body [PDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



DETAIL A
ALTERNATE EXPOSED PAD CONFIGURATIONS

Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	0.65	BSC	
Overall Height	A	0.80	1.00	1.03
Standoff	A1	0.00	-	0.05
Terminal Thickness	(A3)	0.20	REF	
Overall Length	D	3.30	BSC	
Overall Width	E	3.30	BSC	
Exposed Pad length	D2	2.14	2.29	2.39
Exposed Pad Width	E2	1.66	1.81	1.91
Terminal Width	b	0.25	0.30	0.35
Terminal Length	L	0.30	0.40	0.50
Terminal Length	L2	0.30	-	0.40
Terminal to Exposed Pad	K	0.60	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars.
3. Package is saw singulated.
4. Package dimension does not include mold flash, protrusions, burrs or metal smearing.
5. Dimensioning and tolerancing per ASME Y14.5M.

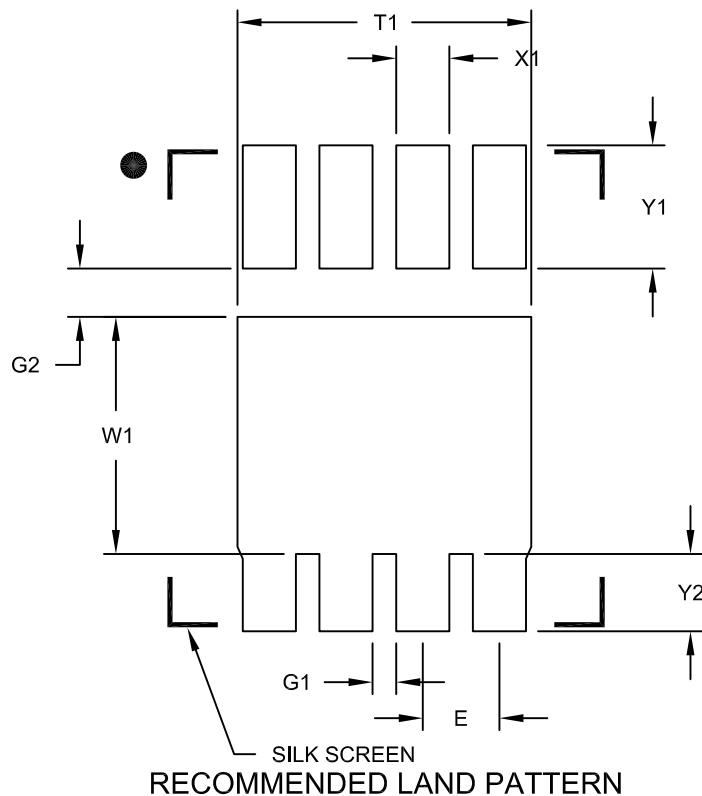
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Power Dual Flatpack No Lead Package (LC) – 3.3x3.3x1.0 mm Body [PDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch		0.65 BSC		
Center Pad Width	W1			2.01
Center Pad Length	T1			2.49
Distance Between Terminals	G1	0.20		
Terminal Edge to Center Pad	G2	0.41		
Terminal Pad Width (X8)	X1			0.45
Terminal Pad Length (X4)	Y1			1.05
Terminal Pad Length (X8)	Y2			0.66

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2195A

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

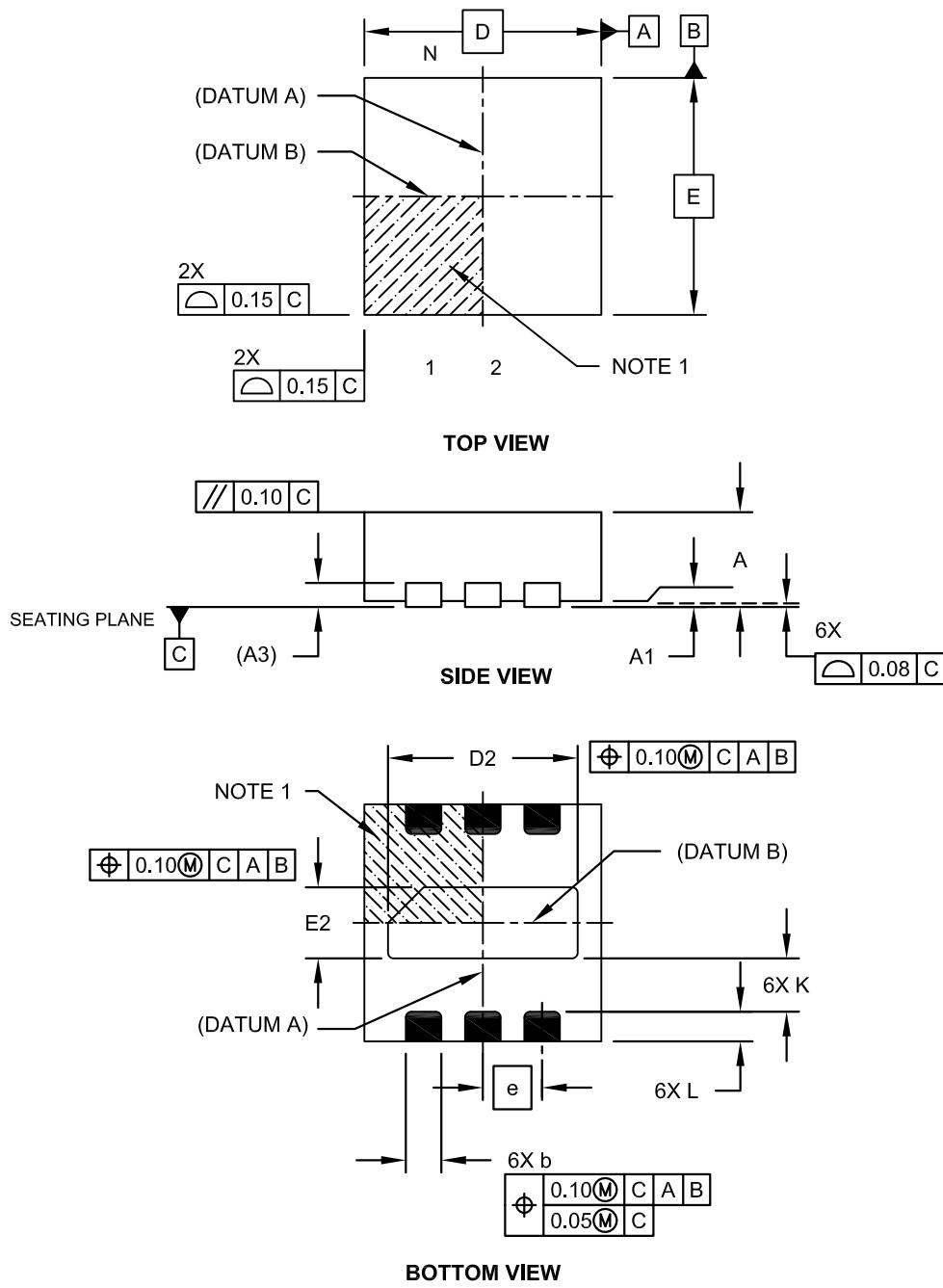
TDFN Family

Thin Dual Flat, No Lead Packages

Packaging Diagrams and Parameters

6-Lead Plastic Thin Dual Flat, No Lead Package (MY) – 2x2x0.8 mm Body [TDFN]

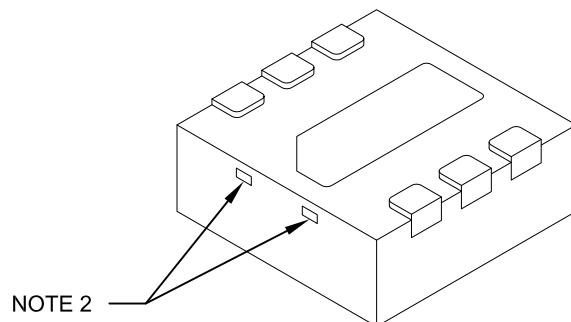
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

6-Lead Plastic Thin Dual Flat, No Lead Package (MY) – 2x2x0.8 mm Body [TDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		6		
Pitch	e		0.50	BSC	
Overall Height	A	0.70	0.75	0.80	
Standoff	A1	0.00	0.02	0.05	
Contact Thickness	A3		0.20	REF	
Overall Width	E		2.00	BSC	
Exposed Pad Width	E2	0.55	0.60	0.65	
Overall Length	D		2.00	BSC	
Exposed Pad Length	D2	1.55	1.60	1.65	
Contact Width	b	0.25	0.30	0.35	
Contact Length	L	0.20	0.25	0.30	
Contact-to-Exposed Pad	K	0.20	-	-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

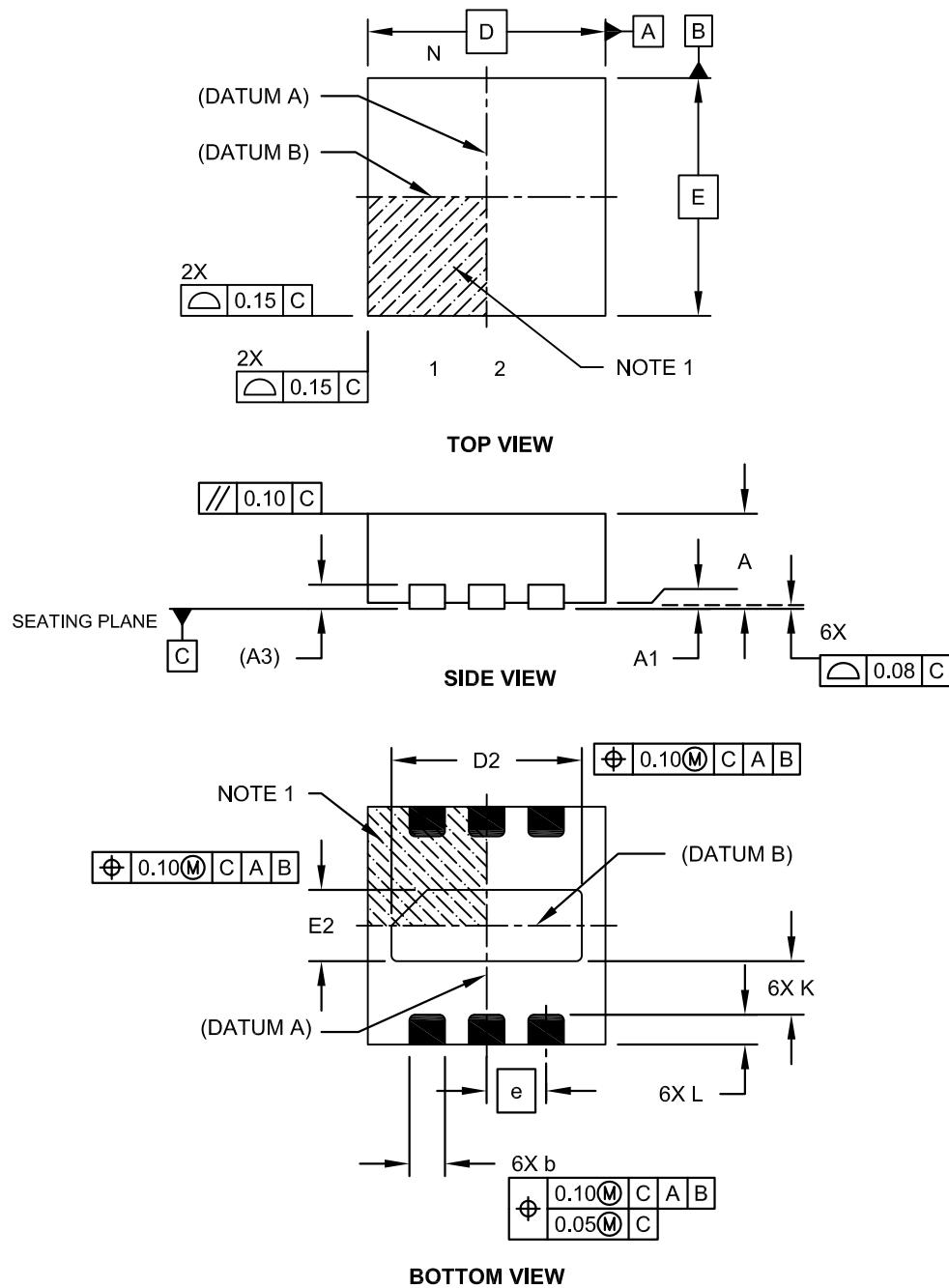
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

6-Lead Plastic Thin Dual Flat, No Lead Package (MYY) – 2x2x0.8 mm Body [TDFN]

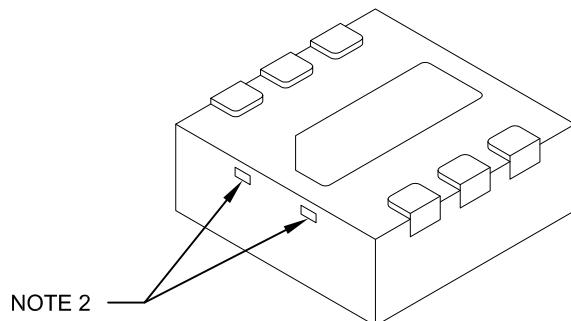
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

6-Lead Plastic Thin Dual Flat, No Lead Package (MYY) – 2x2x0.8 mm Body [TDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		6		
Pitch	e		0.50	BSC	
Overall Height	A	0.70	0.75	0.80	
Standoff	A1	0.00	0.02	0.05	
Contact Thickness	A3		0.20	REF	
Overall Width	E		2.00	BSC	
Exposed Pad Width	E2	0.55	0.60	0.65	
Overall Length	D		2.00	BSC	
Exposed Pad Length	D2	1.55	1.60	1.65	
Contact Width	b	0.25	0.30	0.35	
Contact Length	L	0.20	0.25	0.30	
Contact-to-Exposed Pad	K	0.20	-	-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated.
4. Dimensioning and tolerancing per ASME Y14.5M.

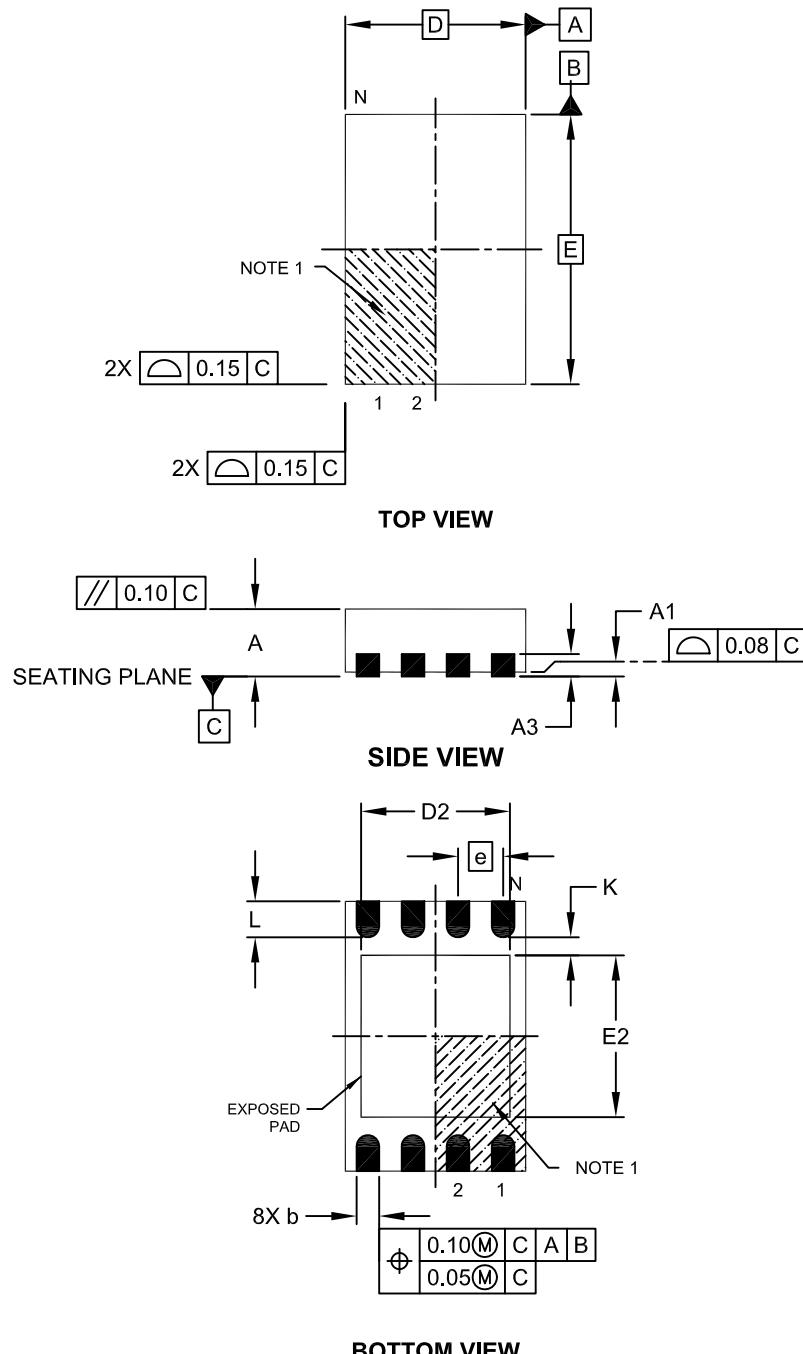
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MN) – 2x3x0.75mm Body [TDFN]

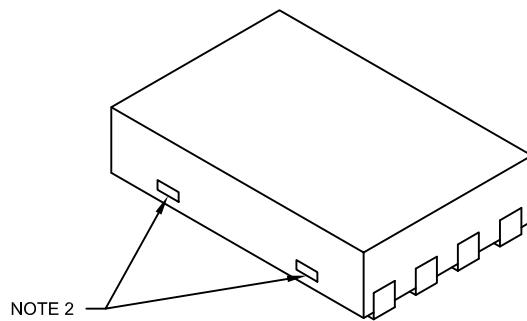
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MN) – 2x3x0.75mm Body [TDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins		N		8
Pitch		e		0.50 BSC
Overall Height		A		0.70 0.75 0.80
Standoff		A1		0.00 0.02 0.05
Contact Thickness		A3		0.20 REF
Overall Length		D		2.00 BSC
Overall Width		E		3.00 BSC
Exposed Pad Length		D2		1.20 - 1.60
Exposed Pad Width		E2		1.20 - 1.60
Contact Width		b		0.20 0.25 0.30
Contact Length		L		0.25 0.30 0.45
Contact-to-Exposed Pad		K		- -

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M

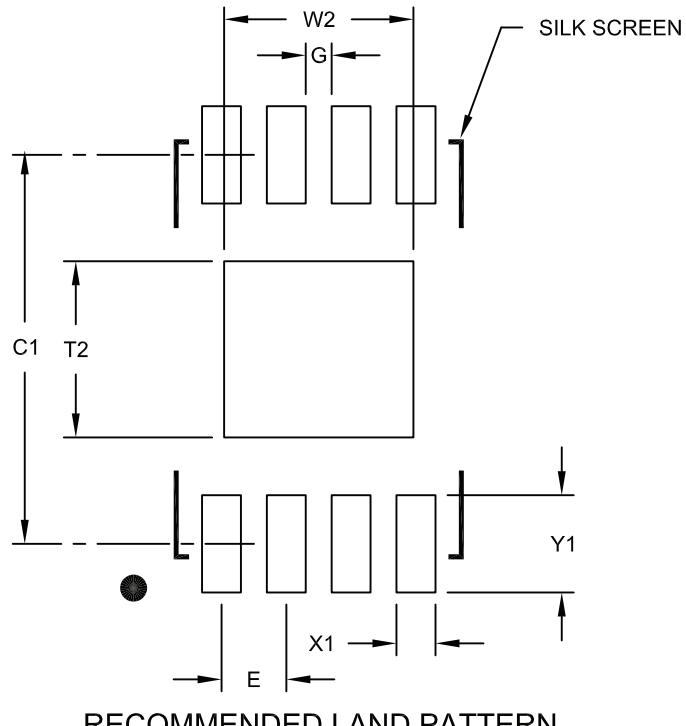
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Dual Flat, No Lead Package (MN) – 2x3x0.75 mm Body [TDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.50	BSC	
Optional Center Pad Width	W2			1.46	
Optional Center Pad Length	T2			1.36	
Contact Pad Spacing	C1		3.00		
Contact Pad Width (X8)	X1			0.30	
Contact Pad Length (X8)	Y1			0.75	
Distance Between Pads	G	0.20			

Notes:

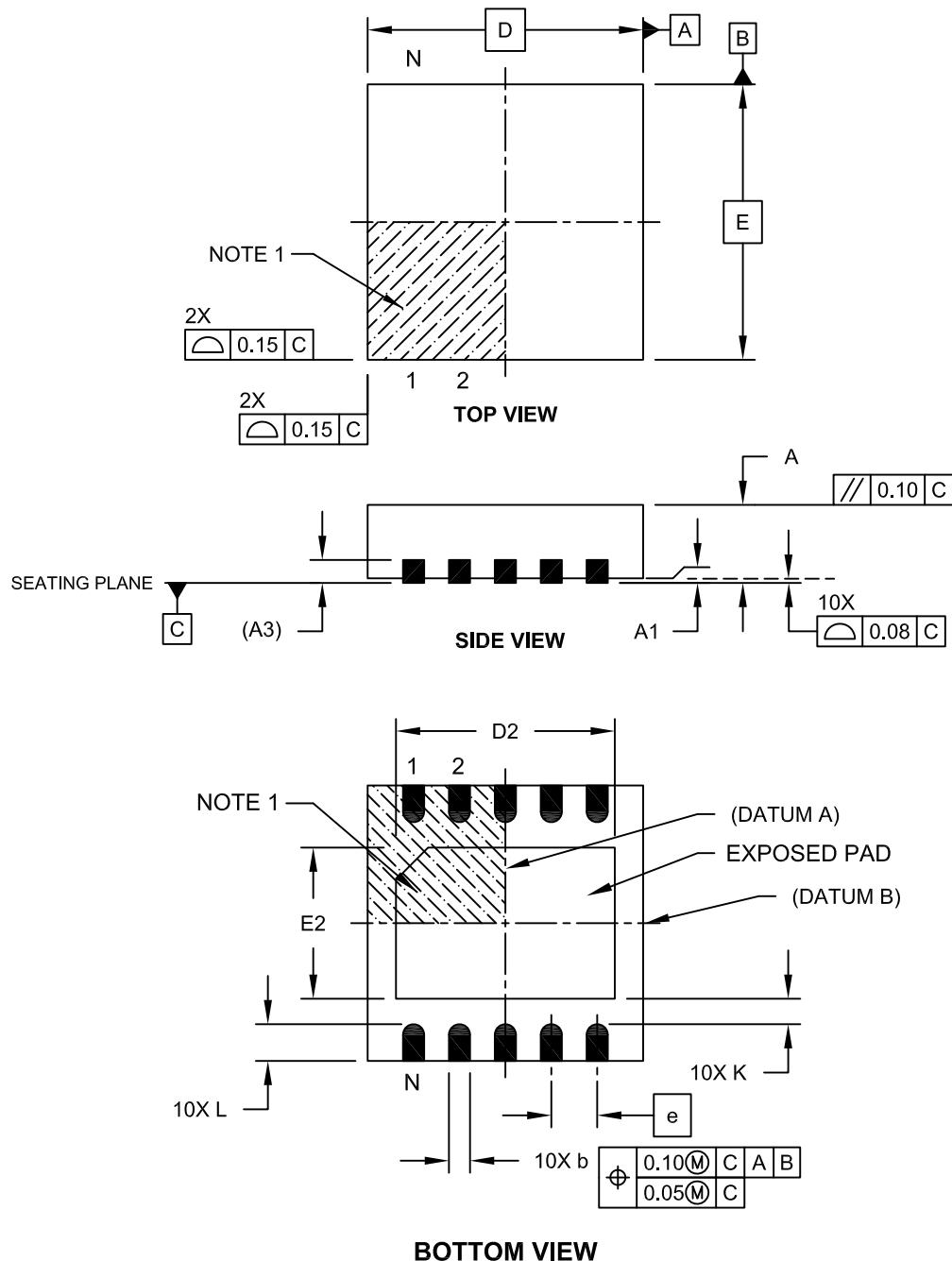
1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

10-Lead Thin Plastic Dual Flat, No Lead Package (MN) - 3x3x0.8mm Body [TDFN]

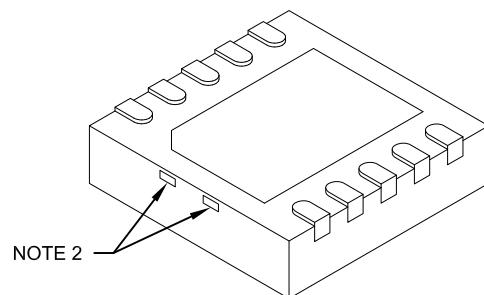
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

10-Lead Thin Plastic Dual Flat, No Lead Package (MN) - 3x3x0.8mm Body [TDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Number of Pins	N				10		
Pitch	e				0.50	BSC	
Overall Height	A	0.70	0.75	0.80			
Standoff	A1	0.00	0.02	0.05			
Contact Thickness	A3				0.20	REF	
Overall Length	D				3.00	BSC	
Exposed Pad Length	D2	2.20	2.30	2.35			
Overall Width	E				3.00	BSC	
Exposed Pad Width	E2	1.55	1.65	1.70			
Contact Width	b	0.18	0.25	0.30			
Contact Length	L	0.30	0.40	0.50			
Contact-to-Exposed Pad	K	0.20	-	-			

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
3. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

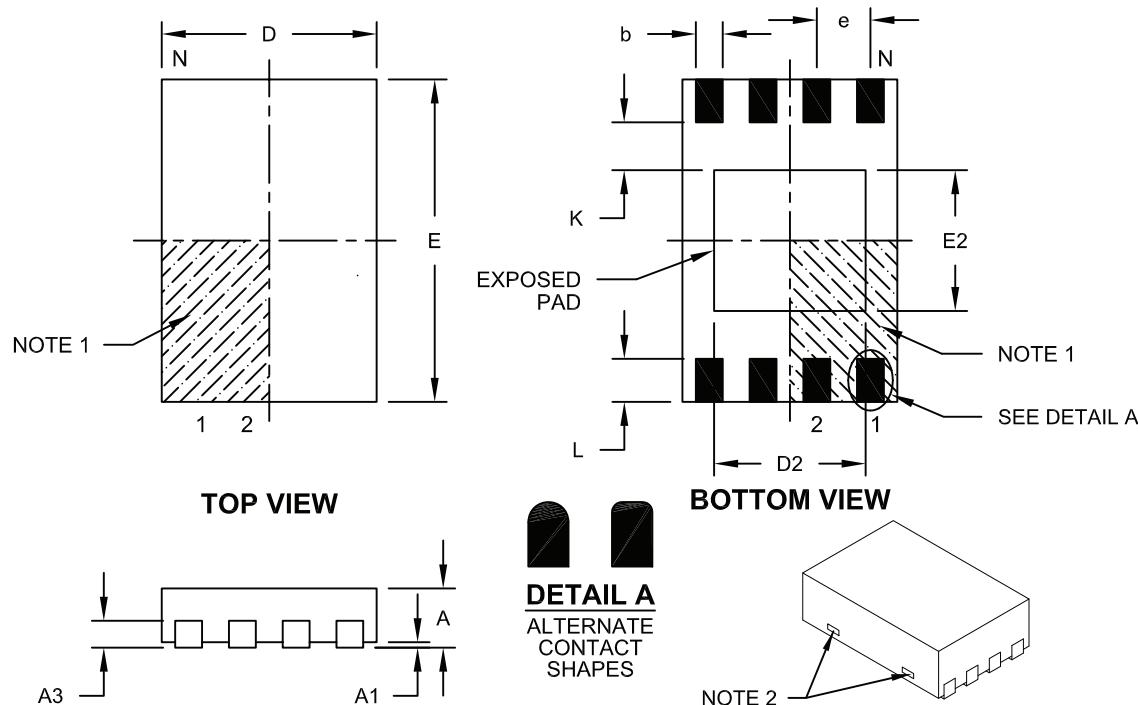
UDFN Family

Ultra Thin Dual Flat, No Lead Packages

Packaging Diagrams and Parameters

8-Lead Plastic Dual Flat, No Lead Package (MU) – 2x3x0.5 mm Body [UDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.45	0.50	0.55
Standoff	A1			0.07
Contact Thickness	A3	0.127 REF		
Overall Length	D	1.95	2.00	2.05
Overall Width	E	2.95	3.00	3.05
Exposed Pad Length	D2	1.30	1.40	1.50
Exposed Pad Width	E2	1.20	1.30	1.40
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.25	0.30	0.35
Contact-to-Exposed Pad	K	0.55 REF		

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package may have one or more exposed tie bars at ends.
- Package is saw singulated
- Dimensioning and tolerancing per ASME Y14.5M

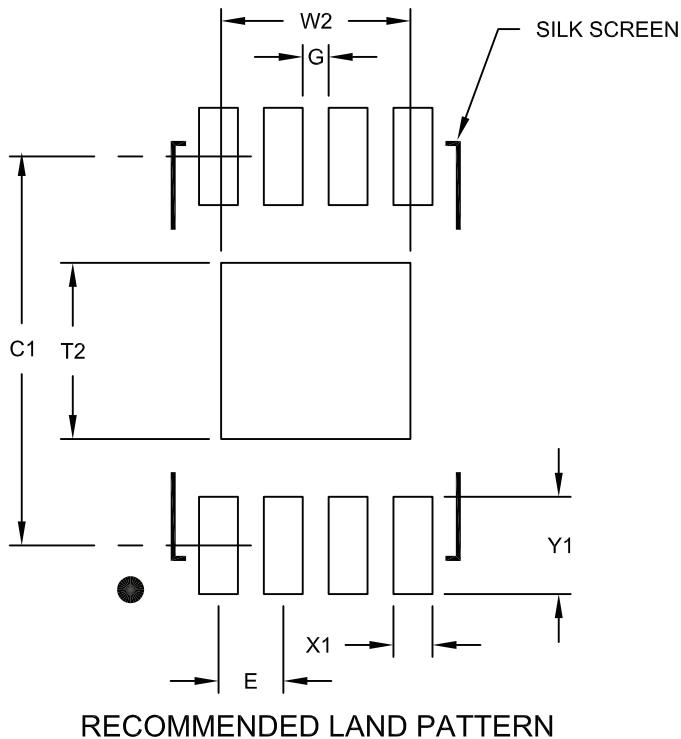
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Dual Flat, No Lead Package (MU) – 2x3x0.5 mm Body [UDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50	BSC	
Optional Center Pad Width	W2			1.46
Optional Center Pad Length	T2			1.36
Contact Pad Spacing	C1	3.00		
Contact Pad Width (X8)	X1			0.30
Contact Pad Length (X8)	Y1			0.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

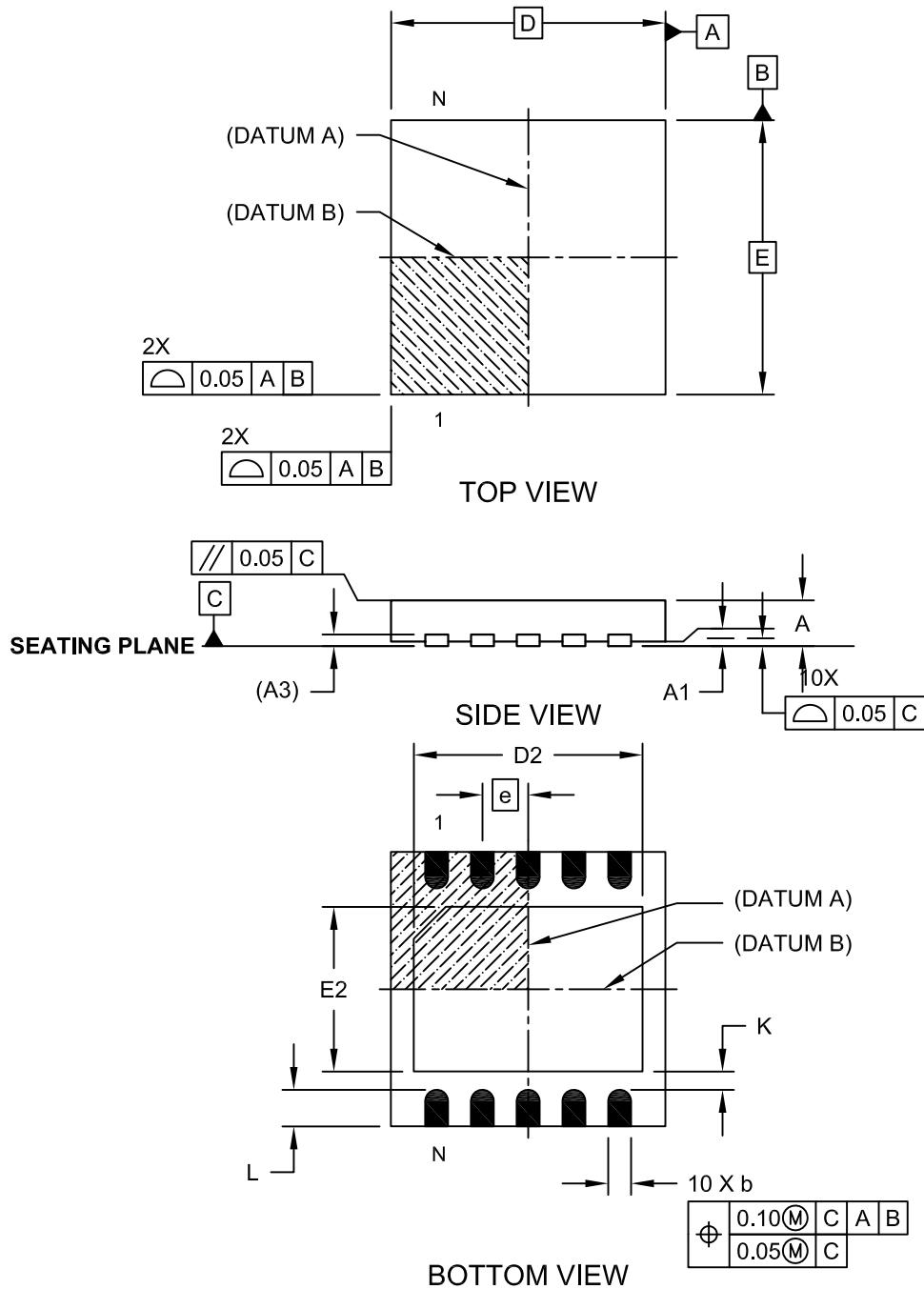
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2136A

Packaging Diagrams and Parameters

10-Lead Ultra-thin Dual Flatpack No-Lead (NA[Y]) – 3x3x0.5 mm Body [UDFN]

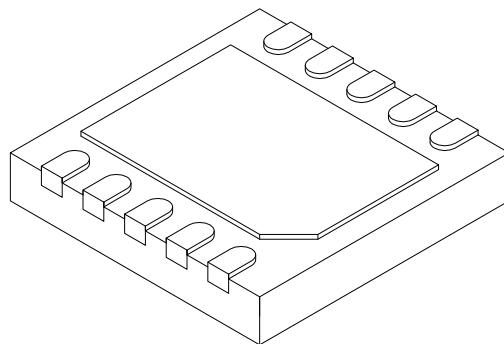
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

10-Lead Ultra-thin Dual Flatpack No-Lead (NA[Y]) – 3x3x0.5 mm Body [UDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Limits	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	10		
Pitch	e	0.50	BSC	
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	-	0.05
Overall Length	D	3.00	BSC	
Overall Width	E	3.00	BSC	
Exposed Pad Length	D2	2.40	2.50	2.60
Exposed Pad Width	E2	1.70	1.80	1.90
Terminal Thickness	(A3)	0.127 REF		
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package may have one or more exposed tie bars at ends.
2. Package is saw singulated
4. Dimensioning and tolerancing per ASME Y14.5M.

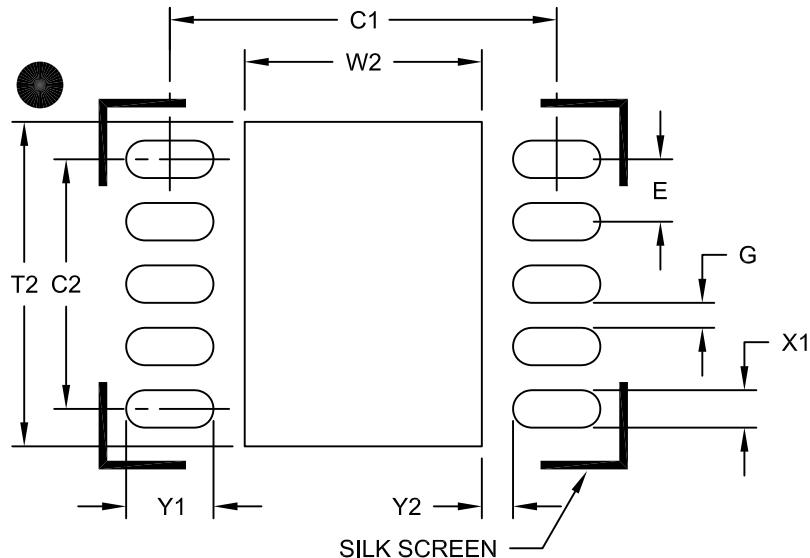
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

10-Lead Ultra-thin Dual Flatpack, No Lead Package (NA[Y]) - 3x3 mm Body (UDFN)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Terminal Pitch		0.50 BSC		
Optional Center Pad Width	W2			1.90
Optional Center Pad Length	T2			2.60
Terminal Pad Spacing	C1		3.10	
Terminal Pad Spacing	C2		2.00	
Terminal Pad Width (X10)	X1			0.30
Terminal Pad Length (X10)	Y1			0.70
Terminal Pad to Center (X10)	Y2	0.25		
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2194A

Packaging Diagrams and Parameters

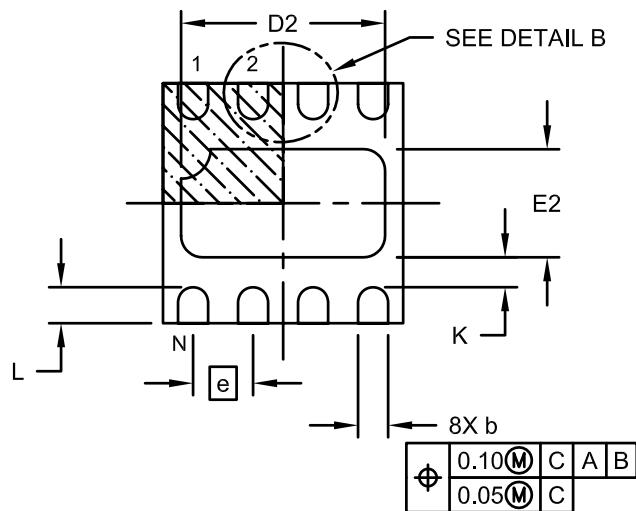
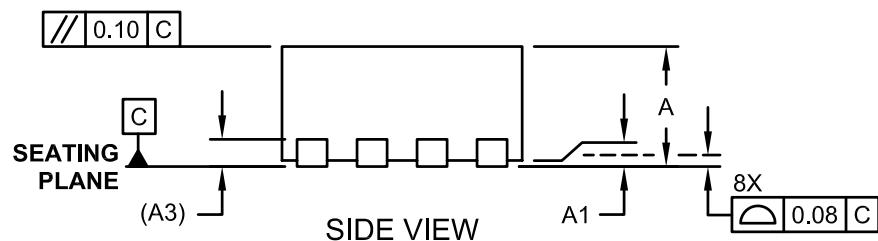
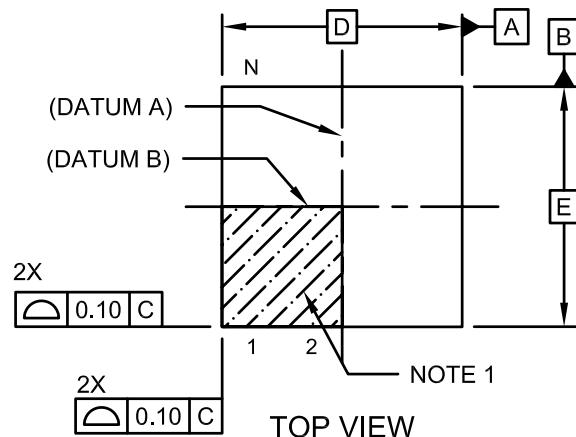
VDFN Family

Very Thin Dual Flat, No Lead Packages

Packaging Diagrams and Parameters

8-Lead Very Thin Dual Flatpack No-Lead (LZ) – 2x2x0.9 mm Body [VDFN]

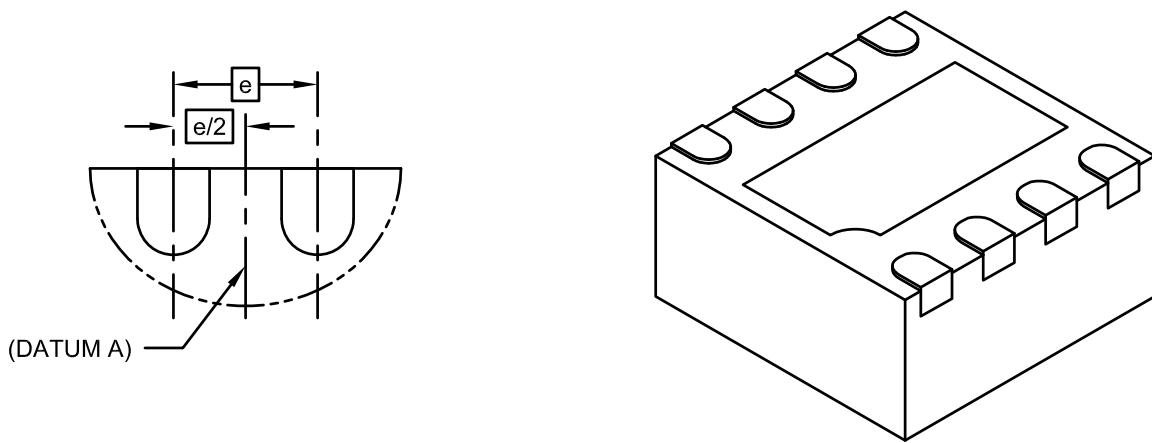
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Very Thin Dual Flatpack No-Lead (LZ) – 2x2x0.9 mm Body [VDFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



DETAIL B

Dimension	Limits	Units MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	0.50	BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness (REF)	(A3)	0.20	(REF)	
Overall Width	D	2.00	BSC	
Exposed Pad Width	D2	1.55	1.70	1.80
Overall Length	E	2.00	BSC	
Exposed Pad Length	E2	0.75	0.90	1.00
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.20	0.30	0.40
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package may have one or more exposed tie bars at ends.
- Package is saw singulated
- Dimensioning and tolerancing per ASME Y14.5M.

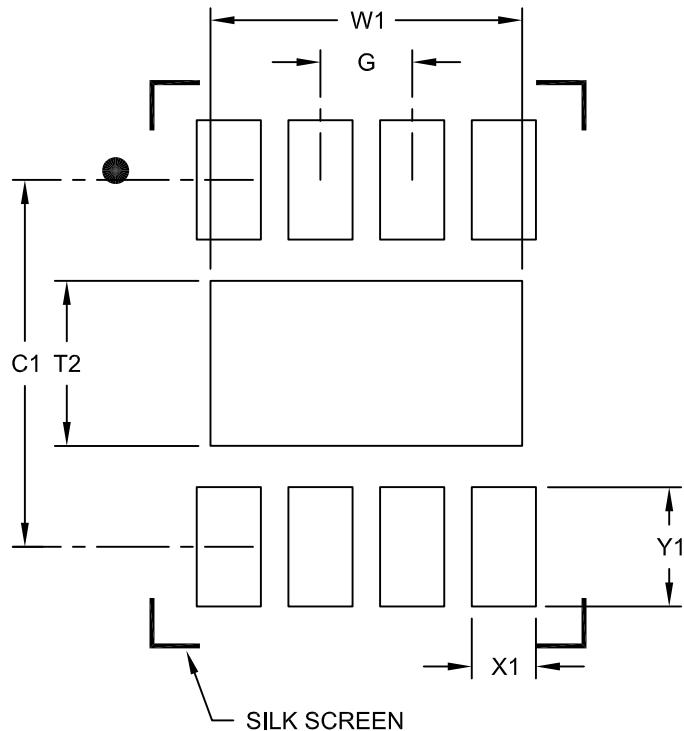
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

**8-Lead Plastic Very Thin Flat, No Lead Package (LZ) - 2x2 mm Body [VDFN]
With 0.55mm Contact Length**

Note: For the most current package drawings, please see the Microchip Packaging Specification located at
<http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W1			1.70
Optional Center Pad Length	T2			0.90
Contact Pad Spacing	C1		2.00	
Contact Pad Width (X28)	X1			0.35
Contact Pad Length (X28)	Y1			0.65
Distance Between Pads	G	0.15		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2198A

Packaging Diagrams and Parameters

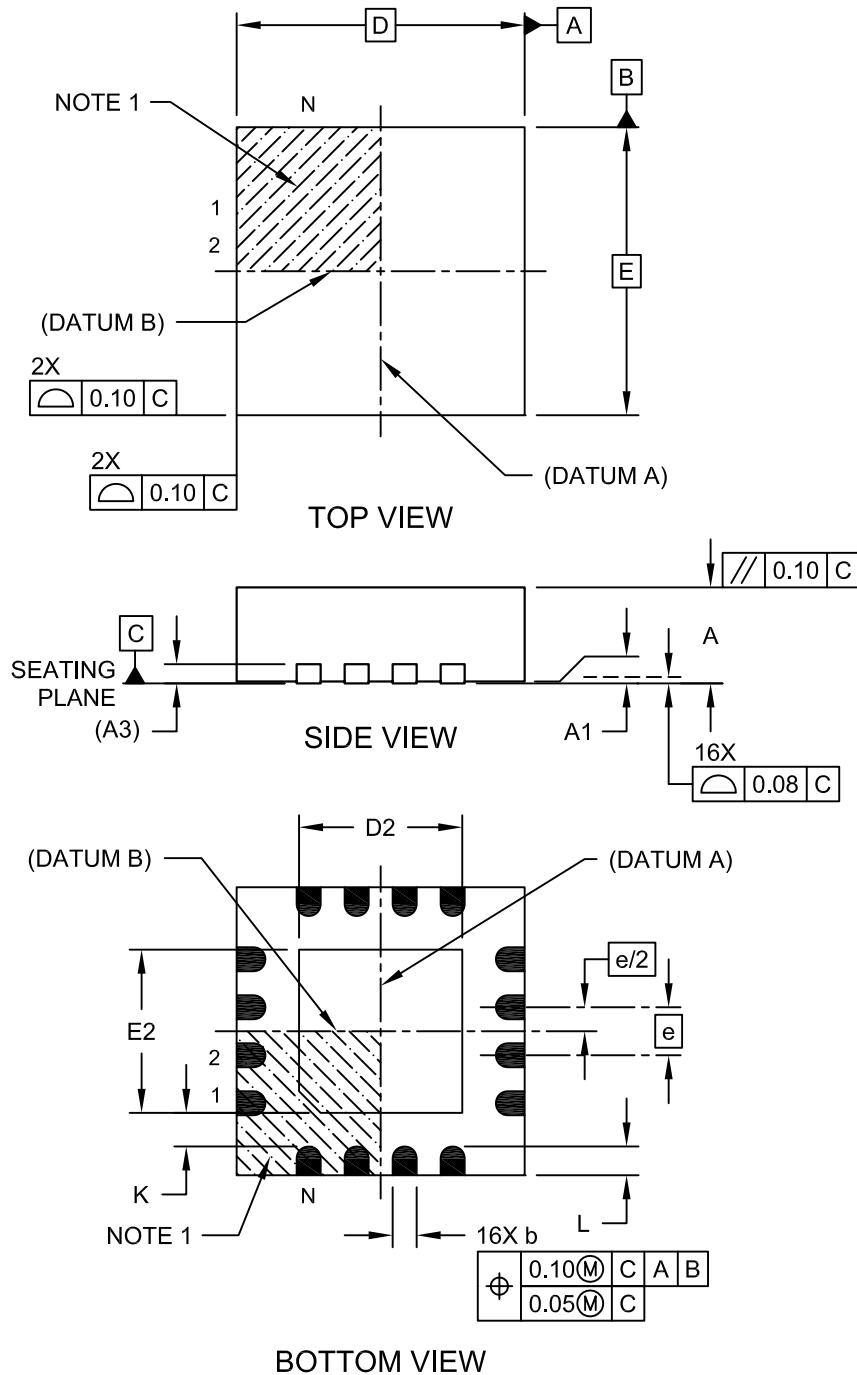
QFN Family

Quad Flat, No Lead Package

Packaging Diagrams and Parameters

16-Lead Plastic Quad Flat, No Lead Package (NG) - 3x3x0.9 mm Body [QFN]

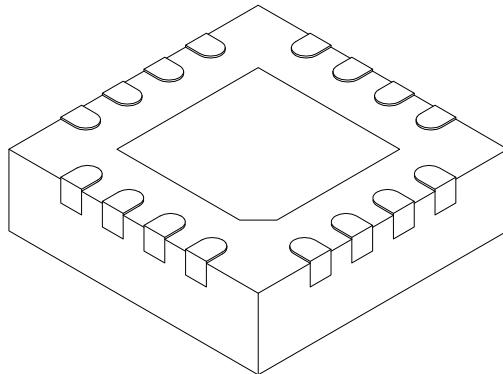
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

16-Lead Plastic Quad Flat, No Lead Package (NG) - 3x3x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Limits	Units MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.20 REF	
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.55	1.70	1.80
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	1.55	1.70	1.80
Terminal Width	b	0.18	0.25	0.30
Terminal Length	L	0.20	0.30	0.40
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

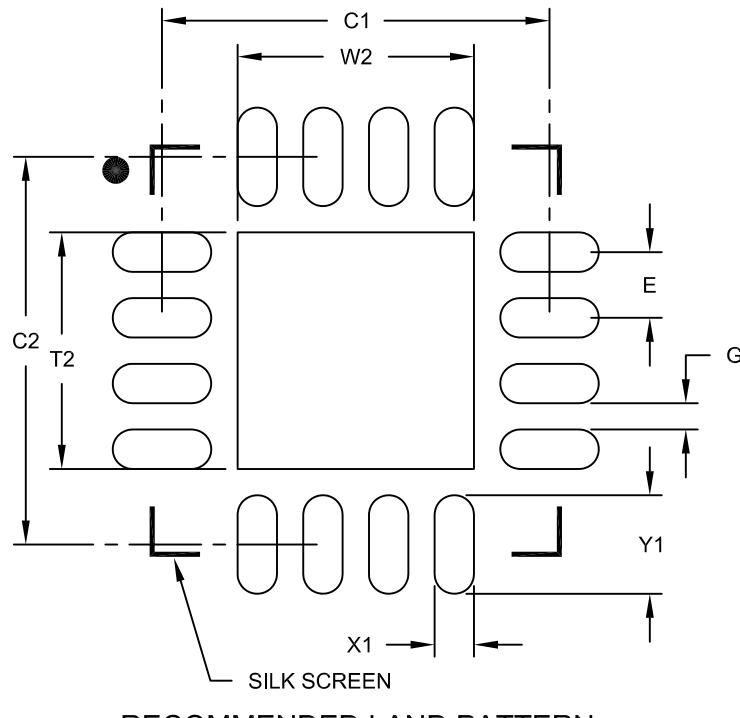
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

16-Lead Plastic Quad Flat, No Lead Package (NG) – 3x3x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50 BSC	
Optional Center Pad Width	W2			1.80
Optional Center Pad Length	T2			1.80
Contact Pad Spacing	C1		2.95	
Contact Pad Spacing	C2		2.95	
Contact Pad Width (X16)	X1			0.30
Contact Pad Length (X16)	Y1			0.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

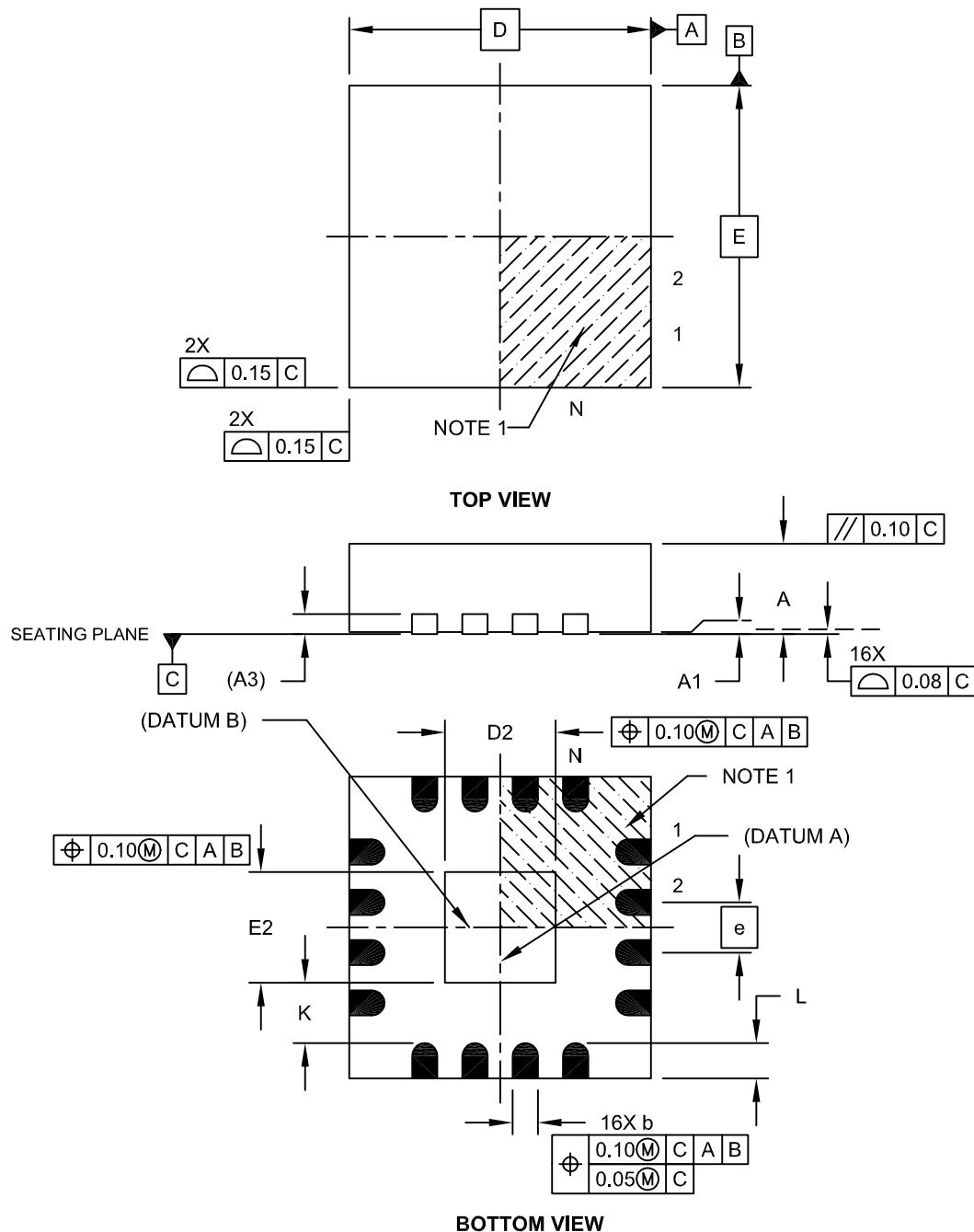
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2197A

Packaging Diagrams and Parameters

16-Lead Plastic Quad Flat, No Lead Package (MG) - 3x3x0.9 mm Body [QFN]

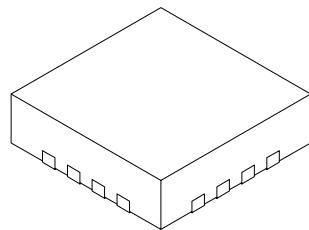
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

16-Lead Plastic Quad Flat, No Lead Package (MG) - 3x3x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Number of Pins	N				16		
Pitch	e				0.50	BSC	
Overall Height	A	0.80		0.85		0.90	
Standoff	A1	0.00		0.02		0.05	
Contact Thickness	A3			0.20	REF		
Overall Width	E			3.00	BSC		
Exposed Pad Width	E2	1.00		1.10		1.50	
Overall Length	D			3.00	BSC		
Exposed Pad Length	D2	1.00		1.10		1.50	
Contact Width	b	0.18		0.25		0.30	
Contact Length	L	0.25		0.35		0.45	
Contact-to-Exposed Pad	K	0.20		-		-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

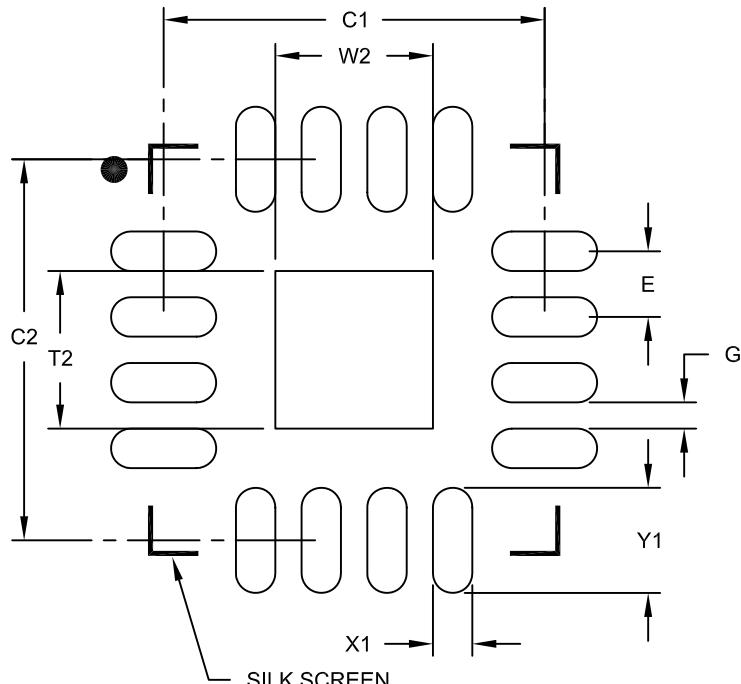
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

16-Lead Plastic Quad Flat, No Lead Package (MG) – 3x3x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch		E			0.50 BSC		
Optional Center Pad Width		W2			1.20		
Optional Center Pad Length		T2			1.20		
Contact Pad Spacing		C1			2.90		
Contact Pad Spacing		C2			2.90		
Contact Pad Width (X16)		X1			0.30		
Contact Pad Length (X16)		Y1			0.80		
Distance Between Pads		G			0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

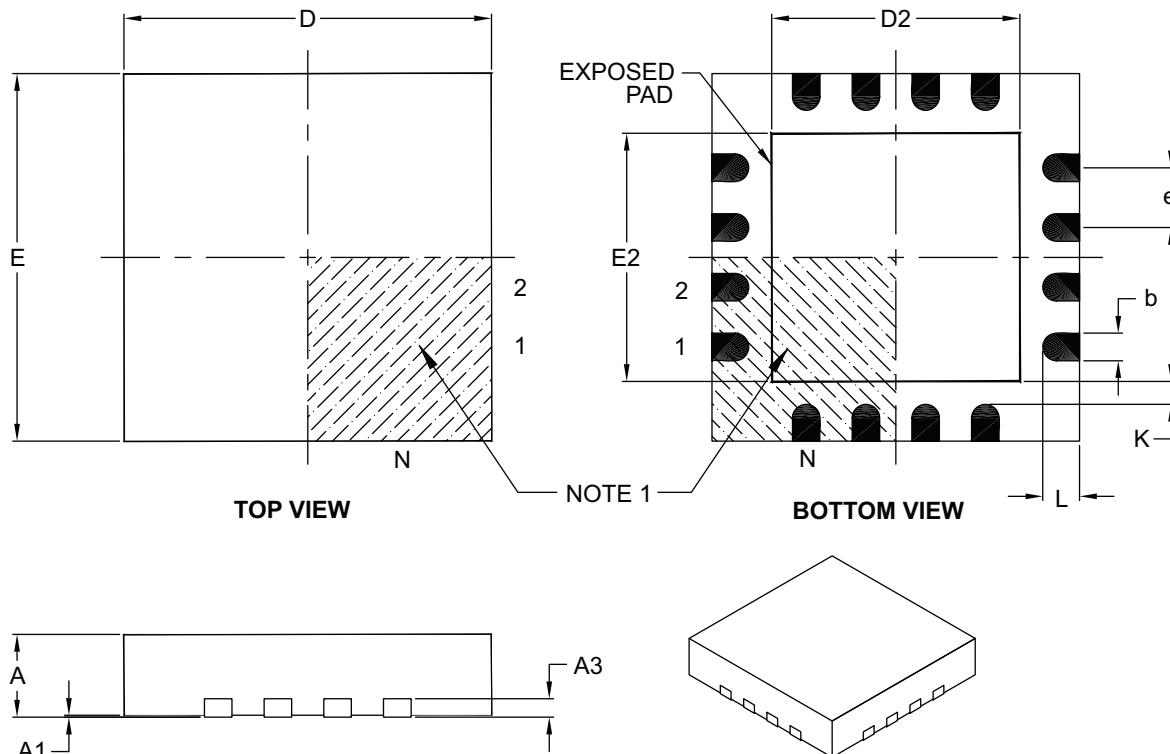
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2142A

Packaging Diagrams and Parameters

16-Lead Plastic Quad Flat, No Lead Package (ML) – 4x4x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		16		
Pitch	e		0.65	BSC	
Overall Height	A	0.80	0.90	1.00	
Standoff	A1	0.00	0.02	0.05	
Contact Thickness	A3	0.20	REF		
Overall Width	E	4.00	BSC		
Exposed Pad Width	E2	2.50	2.65	2.80	
Overall Length	D	4.00	BSC		
Exposed Pad Length	D2	2.50	2.65	2.80	
Contact Width	b	0.25	0.30	0.35	
Contact Length	L	0.30	0.40	0.50	
Contact-to-Exposed Pad	K	0.20	—	—	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.

2. Package is saw singulated.

3. Dimensioning and tolerancing per ASME Y14.5M.

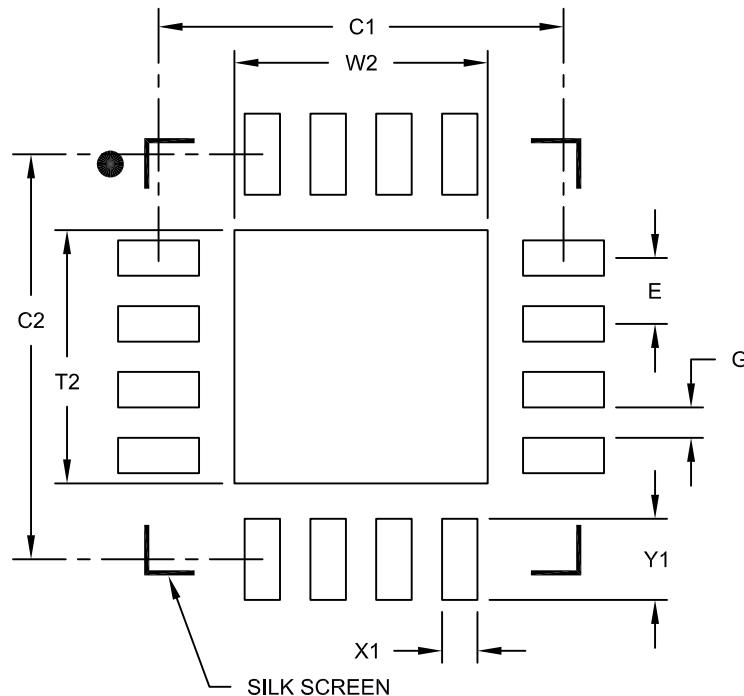
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

16-Lead Plastic Quad Flat, No Lead Package (ML) - 4x4x0.9mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Limits	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Width	W2			2.50
Optional Center Pad Length	T2			2.50
Contact Pad Spacing	C1	4.00		
Contact Pad Spacing	C2	4.00		
Contact Pad Width (X16)	X1			0.35
Contact Pad Length (X16)	Y1			0.80
Distance Between Pads	G	0.30		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

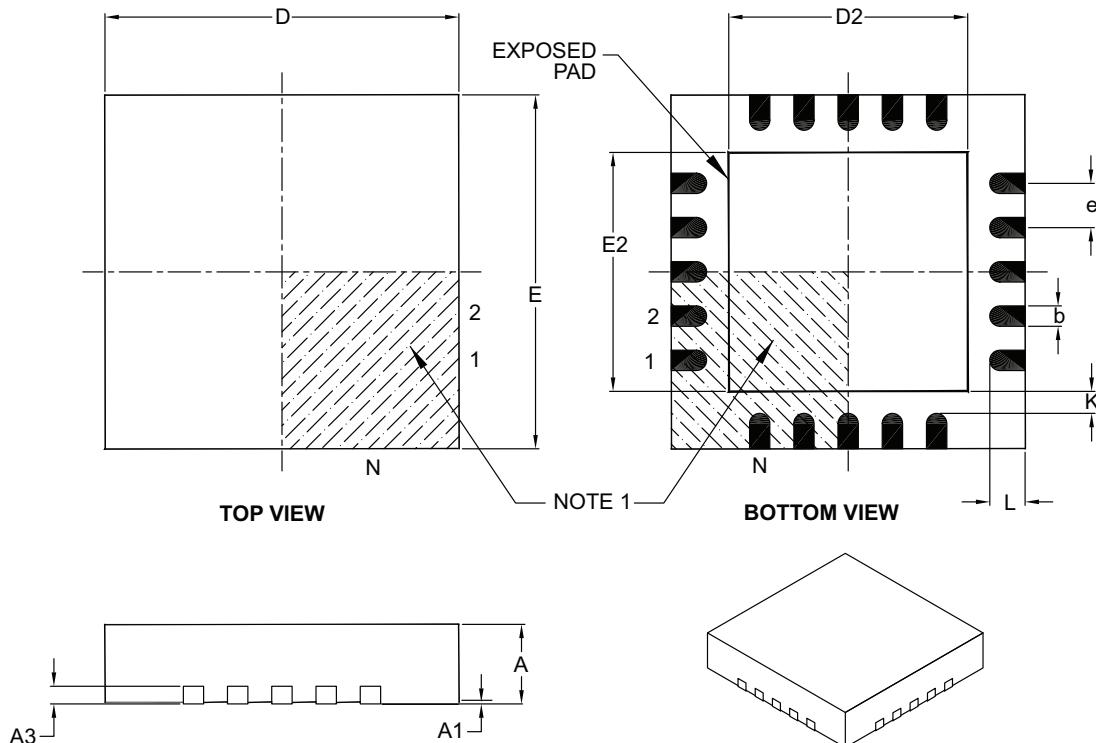
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2127A

Packaging Diagrams and Parameters

20-Lead Plastic Quad Flat, No Lead Package (ML) – 4x4x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		UNITS			MILLIMETERS		
		DIMENSION LIMITS			MIN	NOM	MAX
Number of Pins	N				20		
Pitch	e				0.50	BSC	
Overall Height	A	0.80	0.90	1.00			
Standoff	A1	0.00	0.02	0.05			
Contact Thickness	A3	0.20 REF					
Overall Width	E	4.00 BSC					
Exposed Pad Width	E2	2.60	2.70	2.80			
Overall Length	D	4.00 BSC					
Exposed Pad Length	D2	2.60	2.70	2.80			
Contact Width	b	0.18	0.25	0.30			
Contact Length	L	0.30	0.40	0.50			
Contact-to-Exposed Pad	K	0.20	-	-			

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.

2. Package is saw singulated.

3. Dimensioning and tolerancing per ASME Y14.5M.

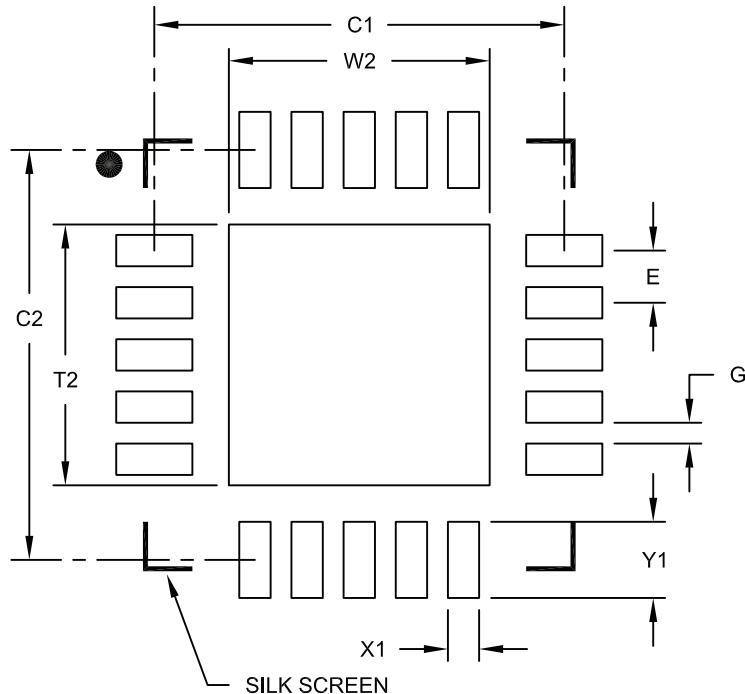
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

20-Lead Plastic Quad Flat, No Lead Package (ML) - 4x4 mm Body [QFN]
 With 0.40 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50	BSC
Optional Center Pad Width	W2			2.50
Optional Center Pad Length	T2			2.50
Contact Pad Spacing	C1		3.93	
Contact Pad Spacing	C2		3.93	
Contact Pad Width	X1			0.30
Contact Pad Length	Y1			0.73
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

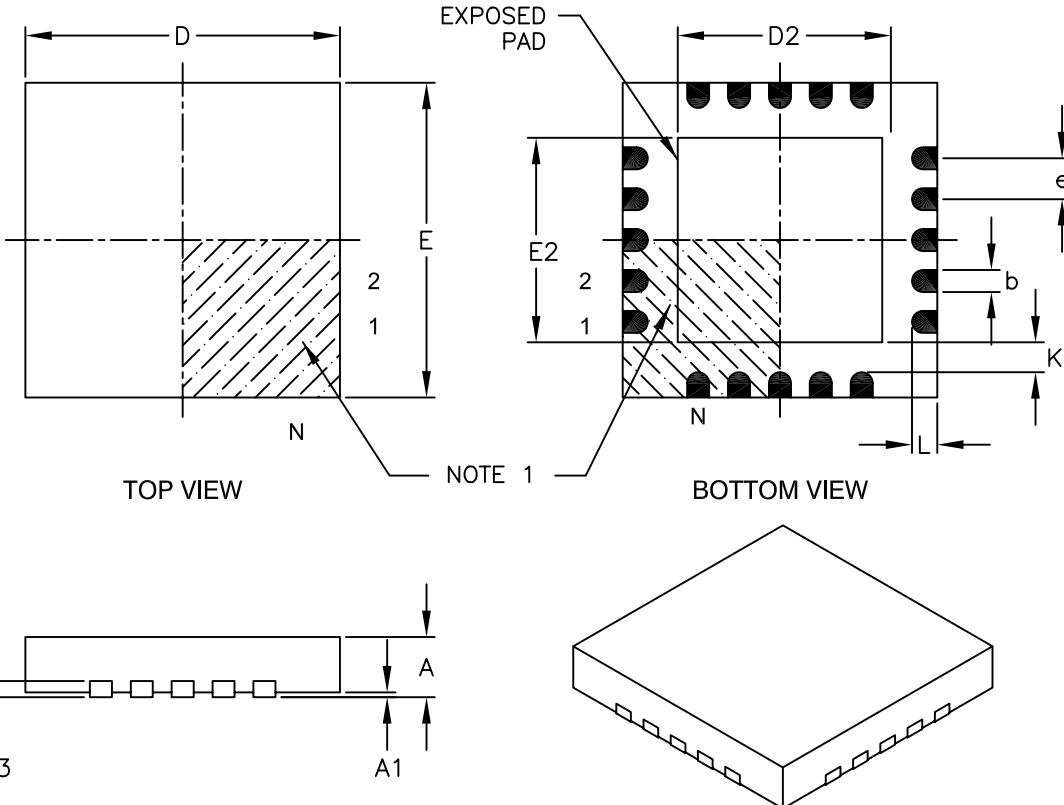
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2126A

Packaging Diagrams and Parameters

20-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		20	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.15	3.25	3.35
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.15	3.25	3.35
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.35	0.40	0.45
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

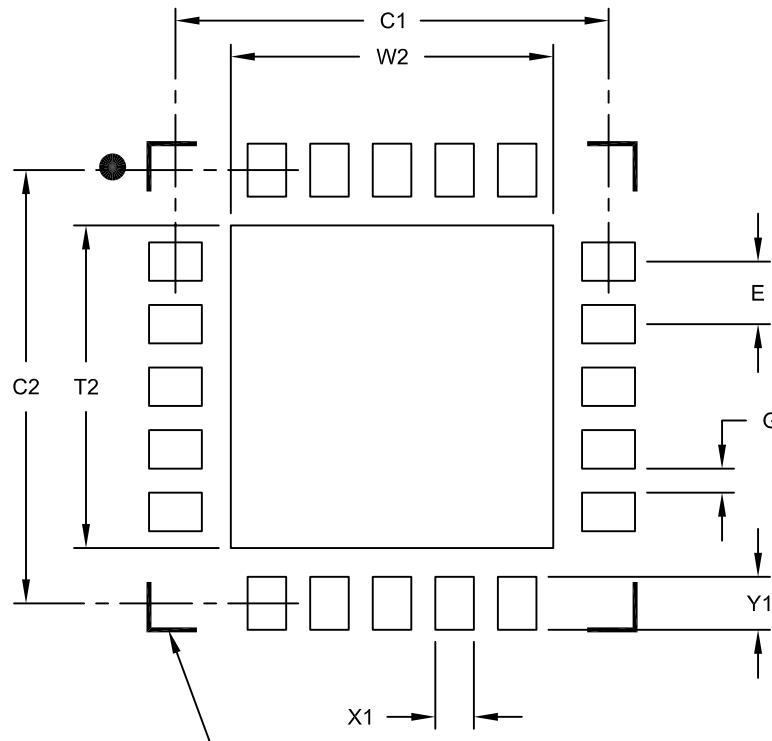
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

20-Lead Plastic Quad Flat, No Lead Package (MQ) - 5x5 mm Body [QFN]
With 0.40mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch		E	0.65 BSC		
Optional Center Pad Width	W2				3.35
Optional Center Pad Length	T2				3.35
Contact Pad Spacing	C1		4.50		
Contact Pad Spacing	C2		4.50		
Contact Pad Width (X20)	X1			0.40	
Contact Pad Length (X20)	Y1				0.55
Distance Between Pads	G	0.20			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

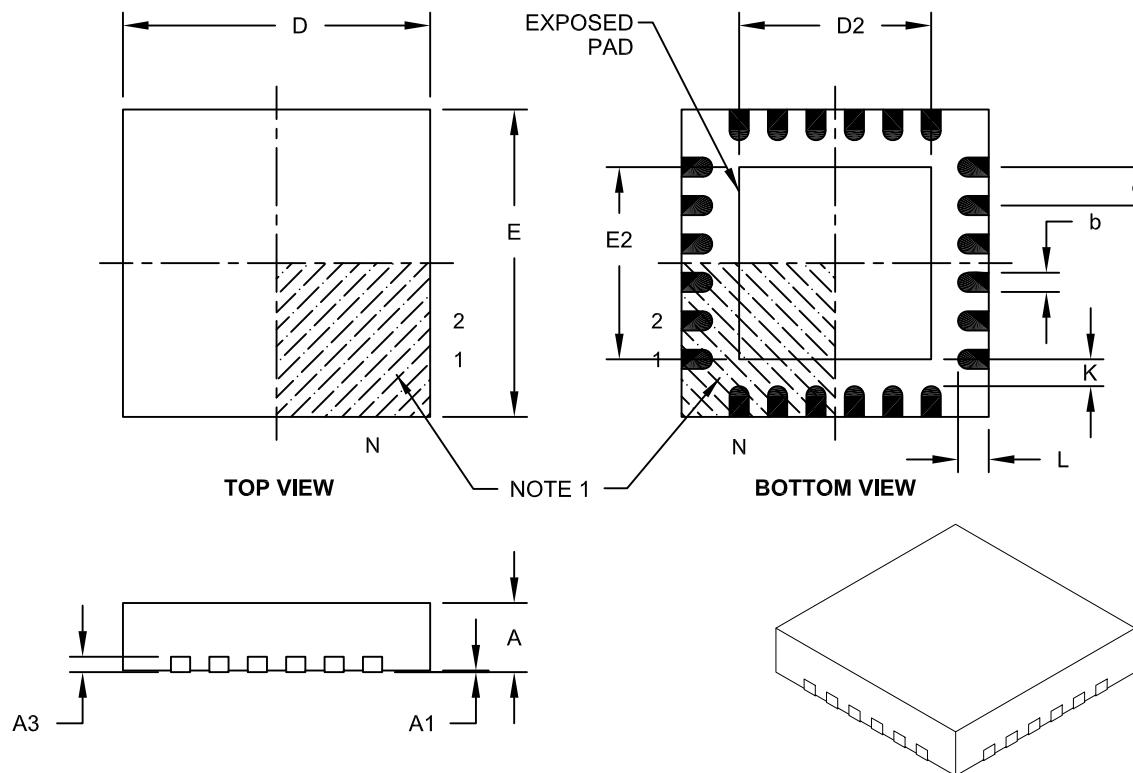
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2139A

Packaging Diagrams and Parameters

24-Lead Plastic Quad Flat, No Lead Package (MJ) – 4x4x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		24		
Pitch	e		0.50	BSC	
Overall Height	A	0.80	0.85	0.90	
Standoff	A1	0.00	0.02	0.05	
Contact Thickness	A3	0.20	REF		
Overall Width	E	4.00	BSC		
Exposed Pad Width	E2	2.40	2.50	2.60	
Overall Length	D	4.00	BSC		
Exposed Pad Length	D2	2.40	2.50	2.60	
Contact Width	b	0.20	0.25	0.30	
Contact Length	L	0.30	0.40	0.50	
Contact-to-Exposed Pad	K	0.20	-	-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.

2. Package is saw singulated.

3. Dimensioning and tolerancing per ASME Y14.5M.

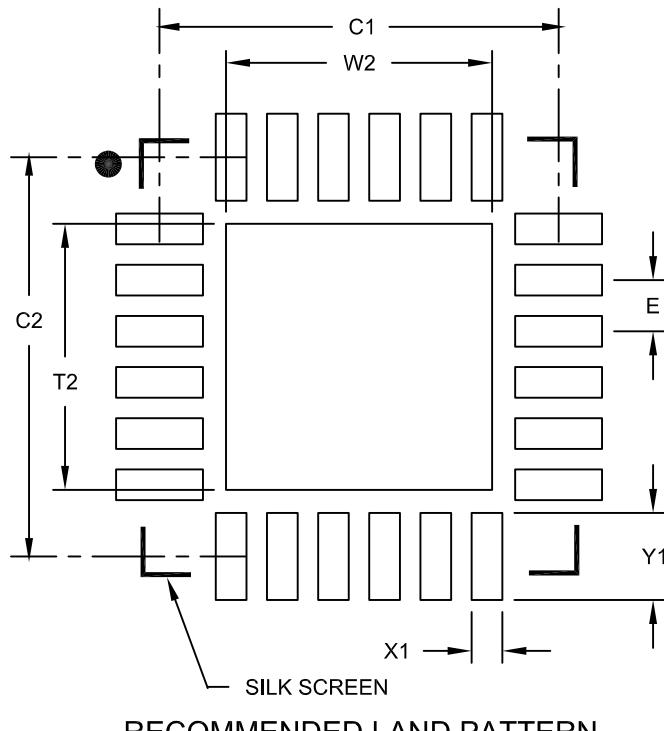
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

24-Lead Plastic Quad Flat, No Lead Package (MJ) - 4x4 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits		MIN	NOM	MAX	
Contact Pitch	E			0.50	BSC		
Optional Center Pad Width	W2					2.60	
Optional Center Pad Length	T2					2.60	
Contact Pad Spacing	C1			3.90			
Contact Pad Spacing	C2			3.90			
Contact Pad Width	X1					0.30	
Contact Pad Length	Y1					0.85	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

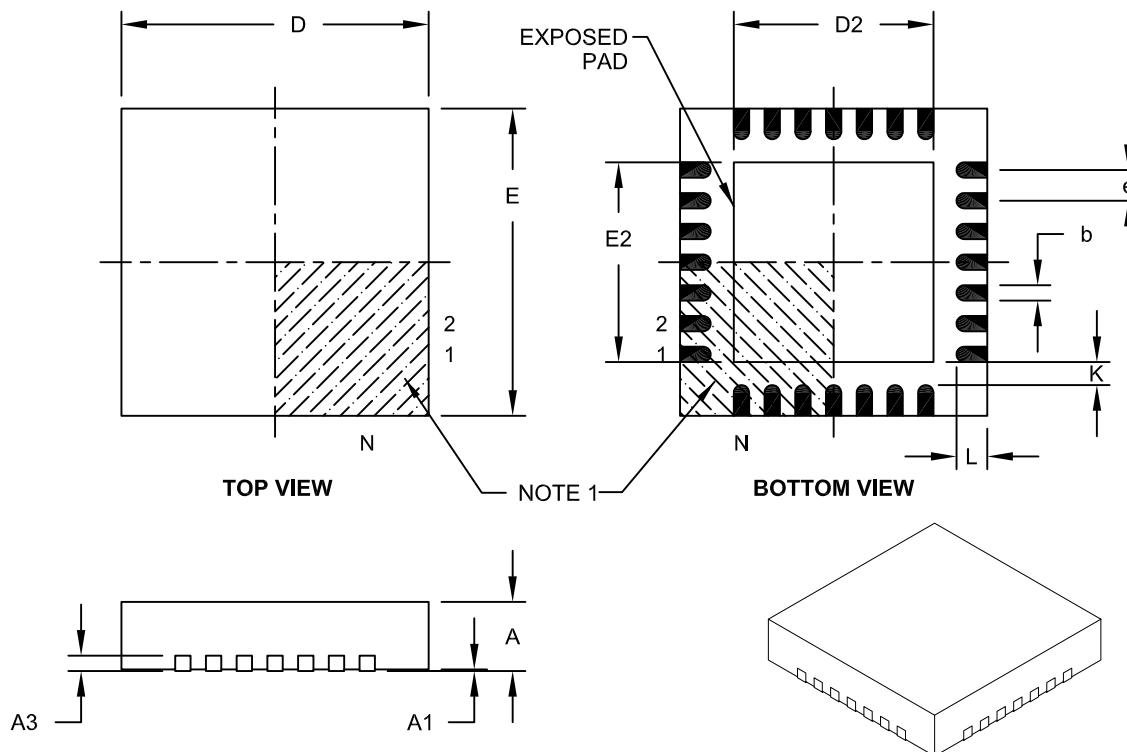
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2143B

Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (MK) – 4x4x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Number of Pins	N				28		
Pitch	e				0.40	BSC	
Overall Height	A	0.80	0.85	0.90			
Standoff	A1	0.00	0.02	0.05			
Contact Thickness	A3	0.20 REF					
Overall Width	E	4.00 BSC					
Exposed Pad Width	E2	2.50	2.60	2.70			
Overall Length	D	4.00 BSC					
Exposed Pad Length	D2	2.50	2.60	2.70			
Contact Width	b	0.17	0.20	0.25			
Contact Length	L	0.30	0.40	0.50			
Contact-to-Exposed Pad	K	0.20	-	-			

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

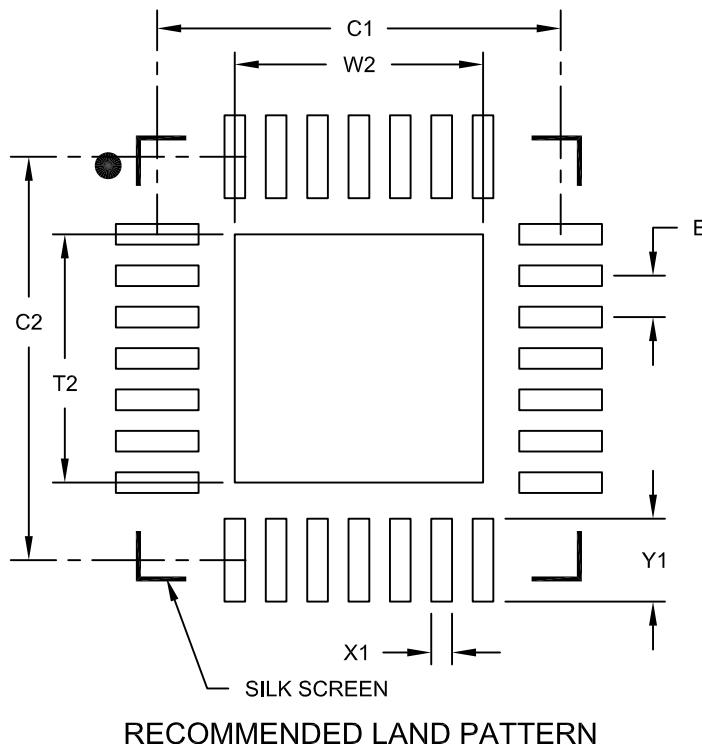
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

28-Lead Plastic Quad Flat, No Lead Package (MK) – 4x4x0.9 mm Body [QFN] Land Pattern

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.40	BSC
Optional Center Pad Width	W2			2.40
Optional Center Pad Length	T2			2.40
Contact Pad Spacing	C1		3.90	
Contact Pad Spacing	C2		3.90	
Contact Pad Width	X1			0.20
Contact Pad Length	Y1			0.80

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

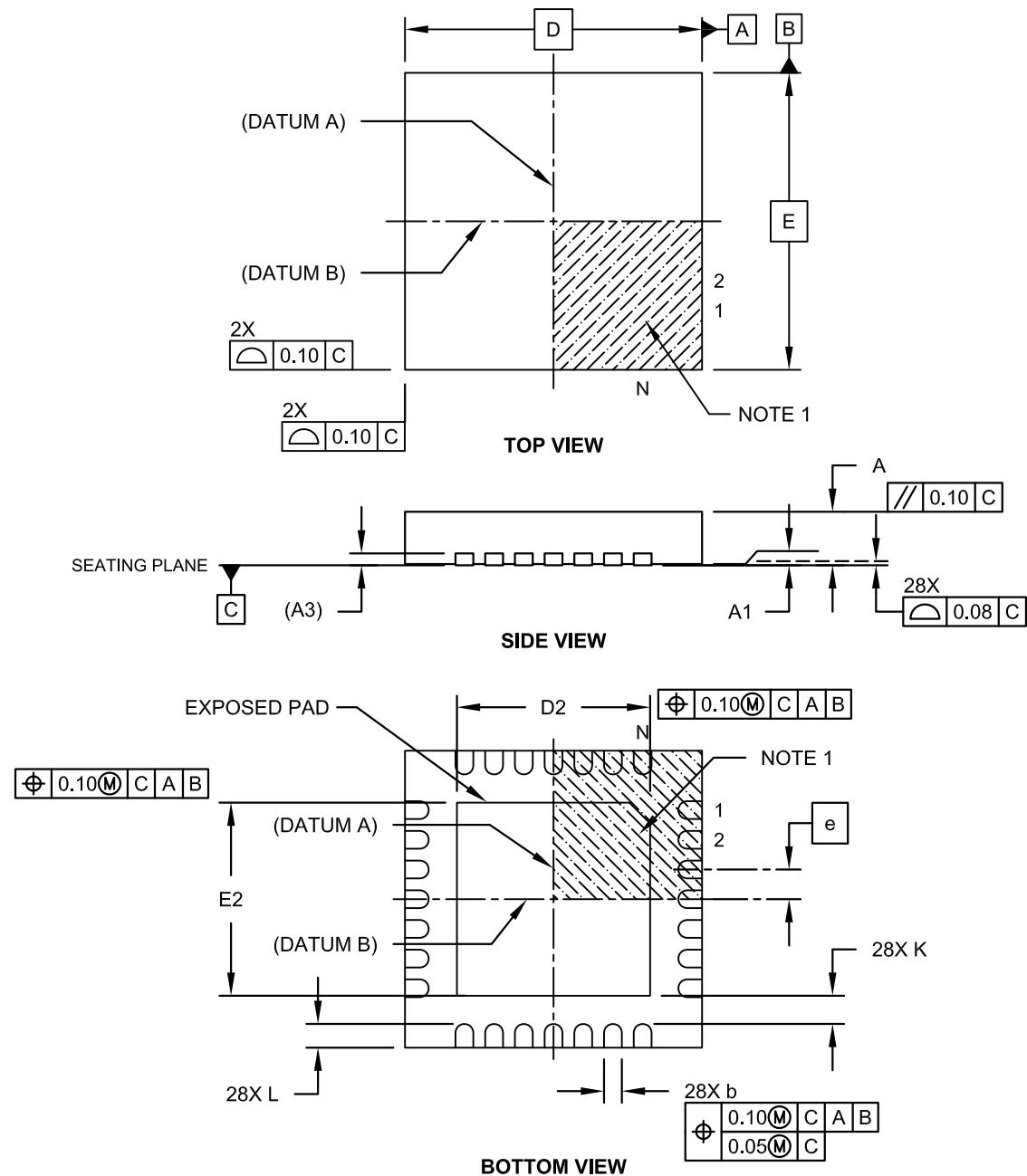
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2144A

Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x0.9 mm Body [QFN]

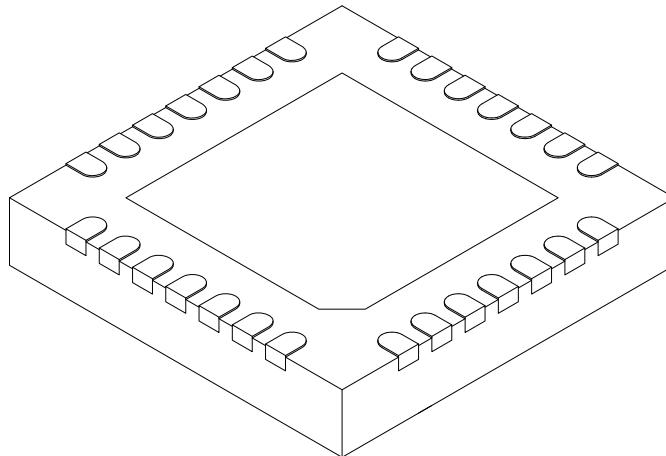
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5x0.9 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		28		
Pitch	e		0.50	BSC	
Overall Height	A	0.80	0.90	1.00	
Standoff	A1	0.00	0.02	0.05	
Contact Thickness	A3		0.20	REF	
Overall Width	E		5.00	BSC	
Exposed Pad Width	E2	3.15	3.25	3.35	
Overall Length	D		5.00	BSC	
Exposed Pad Length	D2	3.15	3.25	3.35	
Contact Width	b	0.18	0.25	0.30	
Contact Length	L	0.35	0.40	0.45	
Contact-to-Exposed Pad	K	0.20	-	-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

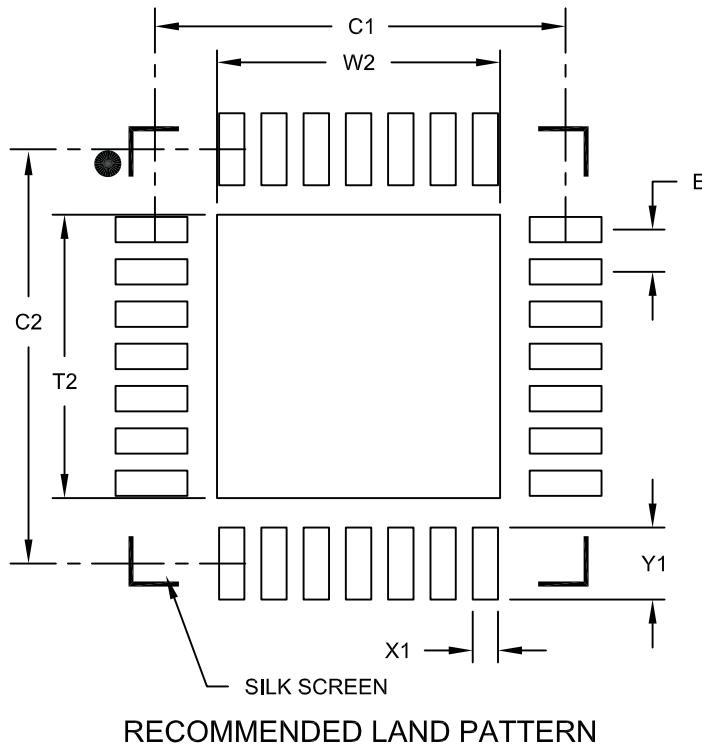
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

28-Lead Plastic Quad Flat, No Lead Package (MQ) – 5x5 mm Body [QFN] Land Pattern With 0.55 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits		MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	0.50 BSC		
Optional Center Pad Width	W2			3.35
Optional Center Pad Length	T2			3.35
Contact Pad Spacing	C1		4.90	
Contact Pad Spacing	C2		4.90	
Contact Pad Width (X28)	X1			0.30
Contact Pad Length (X28)	Y1			0.85

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

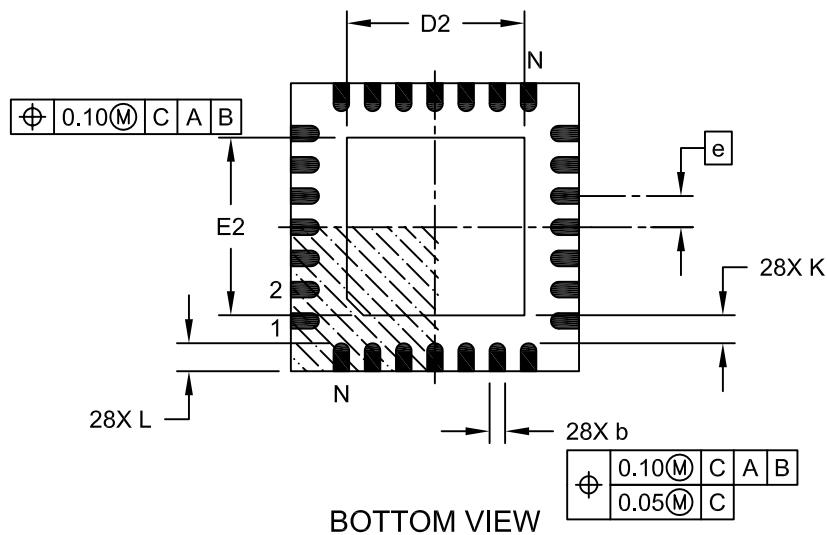
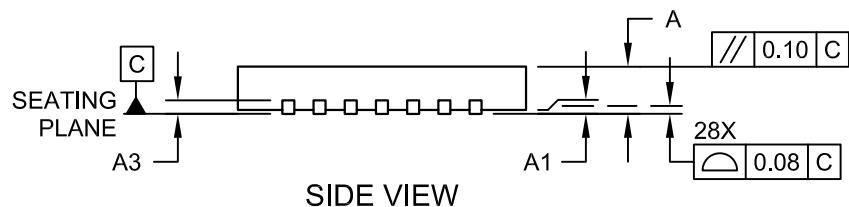
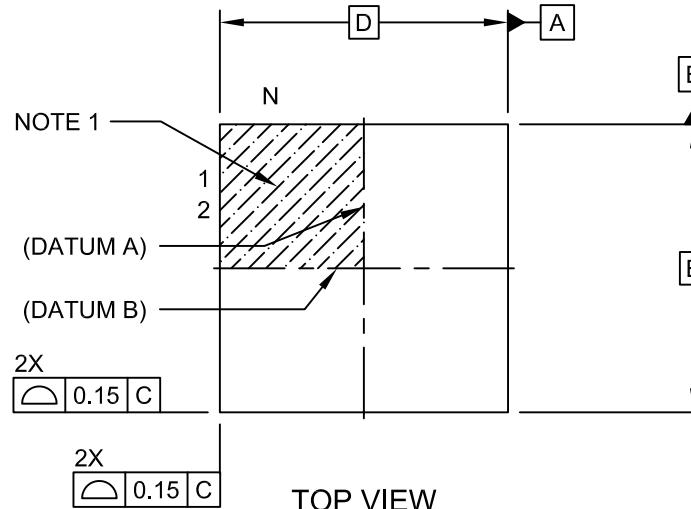
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2140A

Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6 mm Body [QFN] With 0.55 mm Terminal Length

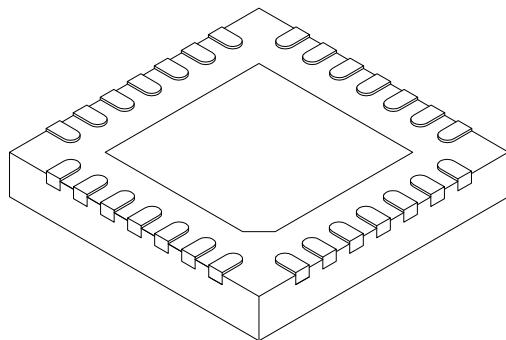
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6 mm Body [QFN] With 0.55 mm Terminal Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	28		
Pitch	e	0.65	BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3	0.20	REF	
Overall Width	E	6.00	BSC	
Exposed Pad Width	E2	3.65	3.70	4.20
Overall Length	D	6.00	BSC	
Exposed Pad Length	D2	3.65	3.70	4.20
Terminal Width	b	0.23	0.30	0.35
Terminal Length	L	0.50	0.55	0.70
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M.

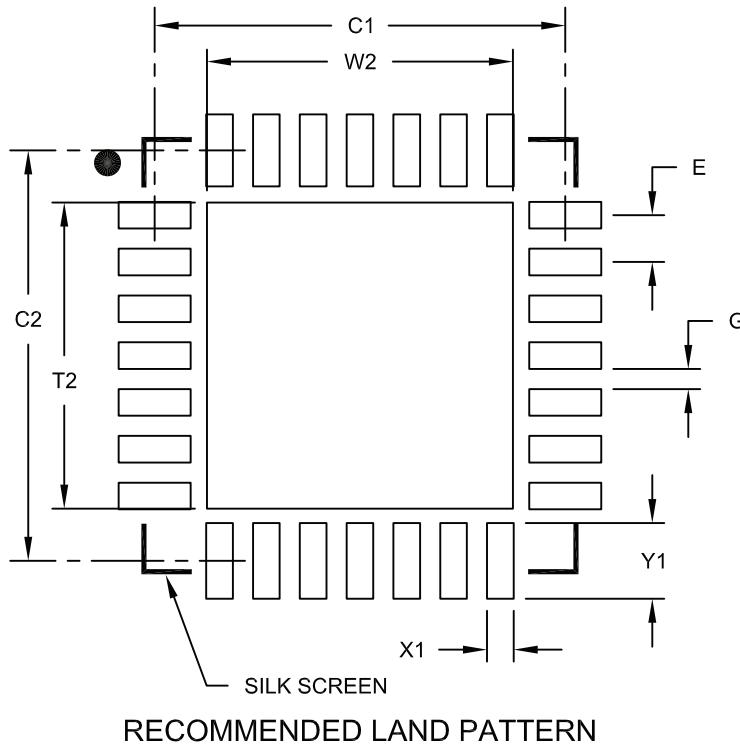
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (ML) – 6x6 mm Body [QFN] with 0.55 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E	0.65 BSC					
Optional Center Pad Width	W2				4.25		
Optional Center Pad Length	T2				4.25		
Contact Pad Spacing	C1				5.70		
Contact Pad Spacing	C2				5.70		
Contact Pad Width (X28)	X1				0.37		
Contact Pad Length (X28)	Y1				1.00		
Distance Between Pads	G	0.20					

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

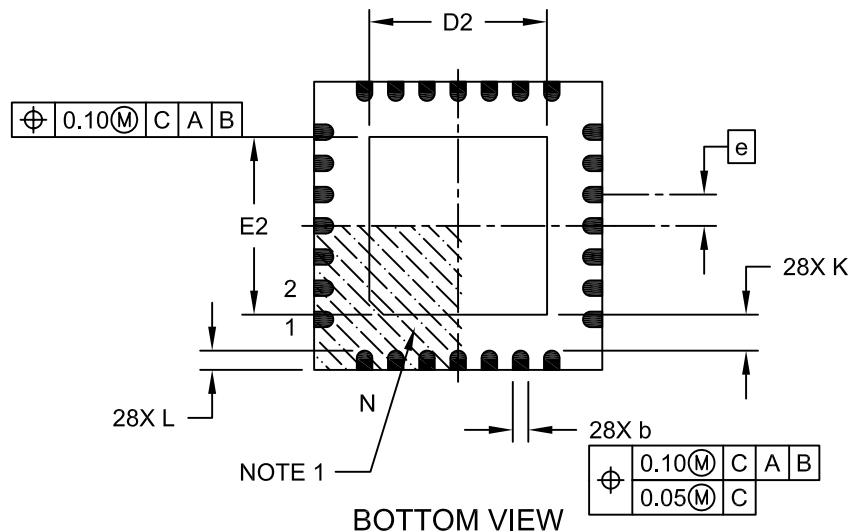
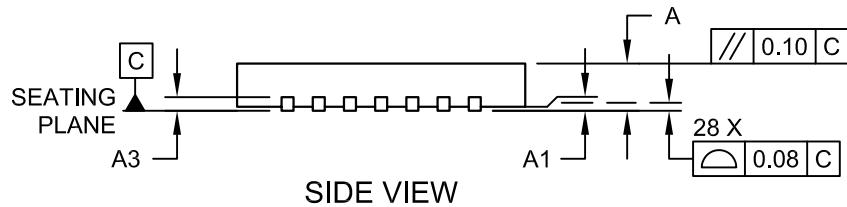
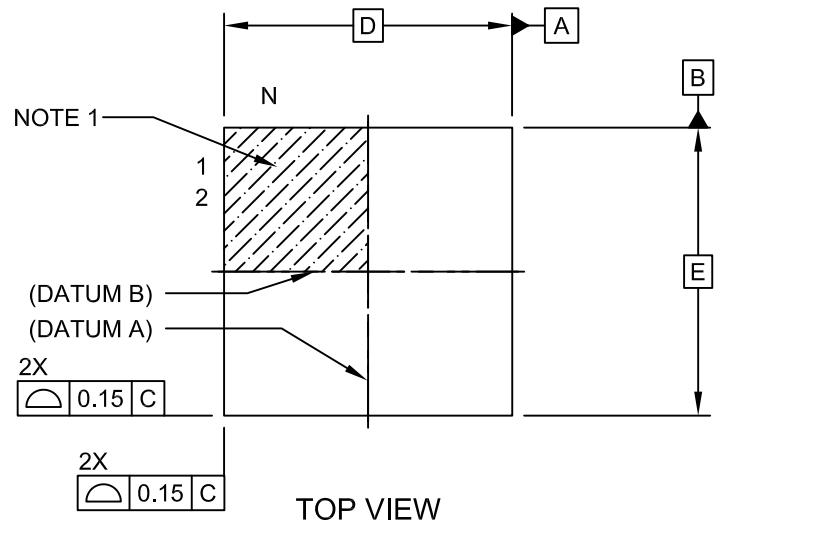
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2105A

Packaging Diagrams and Parameters

**28-Lead Plastic Quad Flat, No Lead Package (MM) - 6x6x0.9mm Body [QFN-S]
With 0.40 mm Terminal Length**

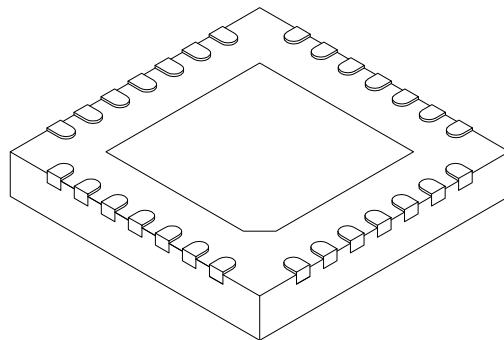
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (MM) - 6x6x0.9mm Body [QFN-S] With 0.40 mm Terminal Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		28		
Pitch	e		0.65	BSC	
Overall Height	A	0.80	0.90	1.00	
Standoff	A1	0.00	0.02	0.05	
Terminal Thickness	A3		0.20	REF	
Overall Width	E		6.00	BSC	
Exposed Pad Width	E2	3.65	3.70	4.70	
Overall Length	D		6.00	BSC	
Exposed Pad Length	D2	3.65	3.70	4.70	
Terminal Width	b	0.23	0.30	0.35	
Terminal Length	L	0.30	0.40	0.50	
Terminal-to-Exposed Pad	K	0.20	-	-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

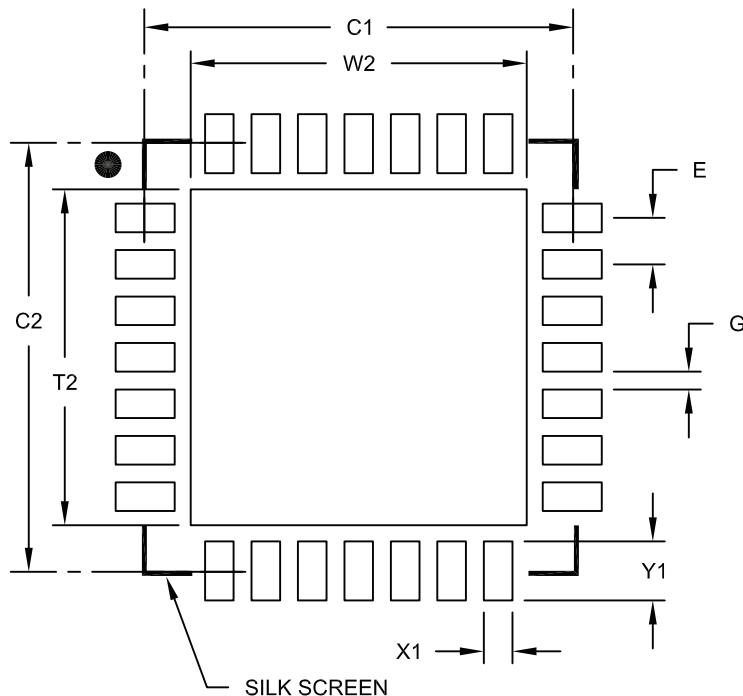
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

**28-Lead Plastic Quad Flat, No Lead Package (MM) – 6x6x0.9 mm Body [QFN-S]
with 0.40 mm Contact Length**

Note: For the most current package drawings, please see the Microchip Packaging Specification located at
<http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65	BSC
Optional Center Pad Width	W2			4.70
Optional Center Pad Length	T2			4.70
Contact Pad Spacing	C1		6.00	
Contact Pad Spacing	C2		6.00	
Contact Pad Width (X28)	X1			0.40
Contact Pad Length (X28)	Y1			0.85
Distance Between Pads	G	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

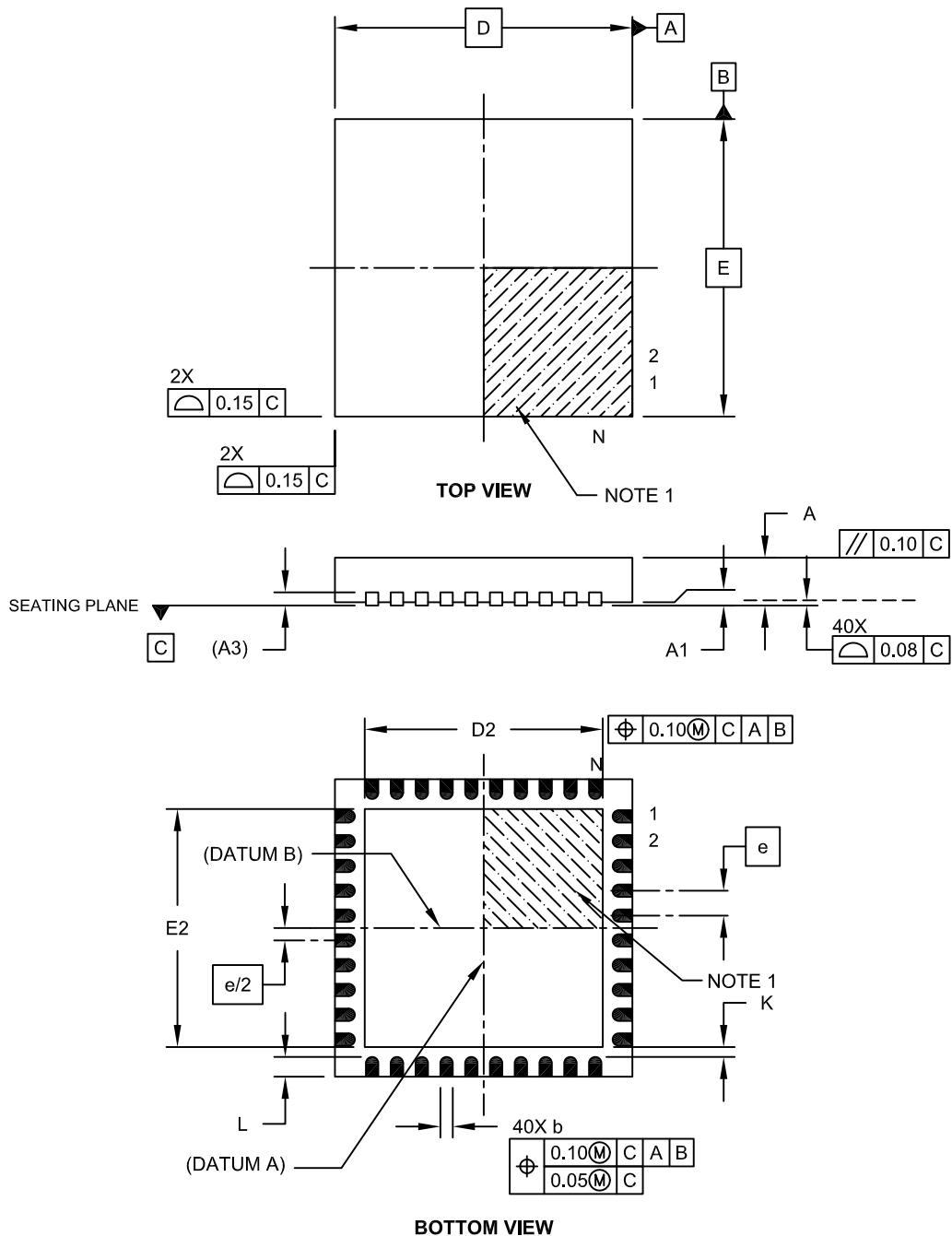
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2124A

Packaging Diagrams and Parameters

40-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6x0.9mm Body [QFN] With 0.40mm Contact Length

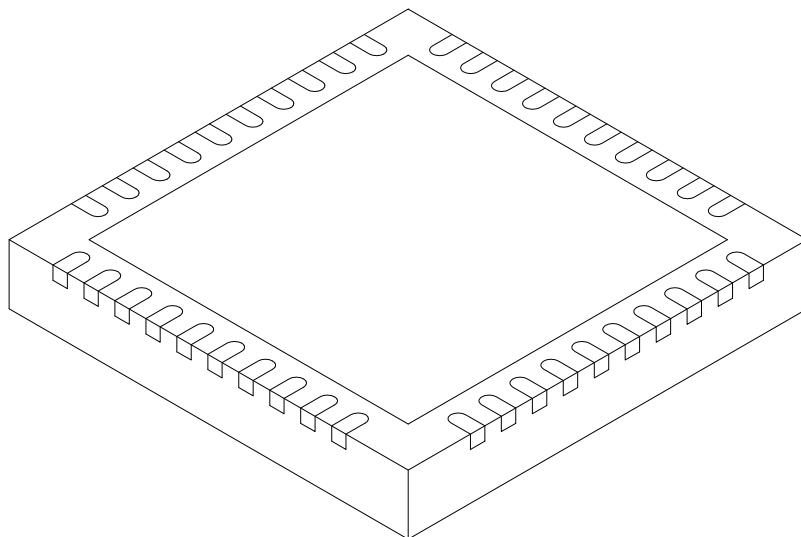
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

40-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6x0.9mm Body [QFN] With 0.40mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		40		
Pitch	e		0.50	BSC	
Overall Height	A	0.80	0.90	1.00	
Standoff	A1	0.00	0.02	0.05	
Contact Thickness	A3	0.20 REF			
Overall Width	E	6.00 BSC			
Exposed Pad Width	E2	4.50	4.65	4.80	
Overall Length	D	6.00 BSC			
Exposed Pad Length	D2	4.50	4.65	4.80	
Contact Width	b	0.18	0.25	0.30	
Contact Length	L	0.30	0.40	0.50	
Contact-to-Exposed Pad	K	0.20	-	-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

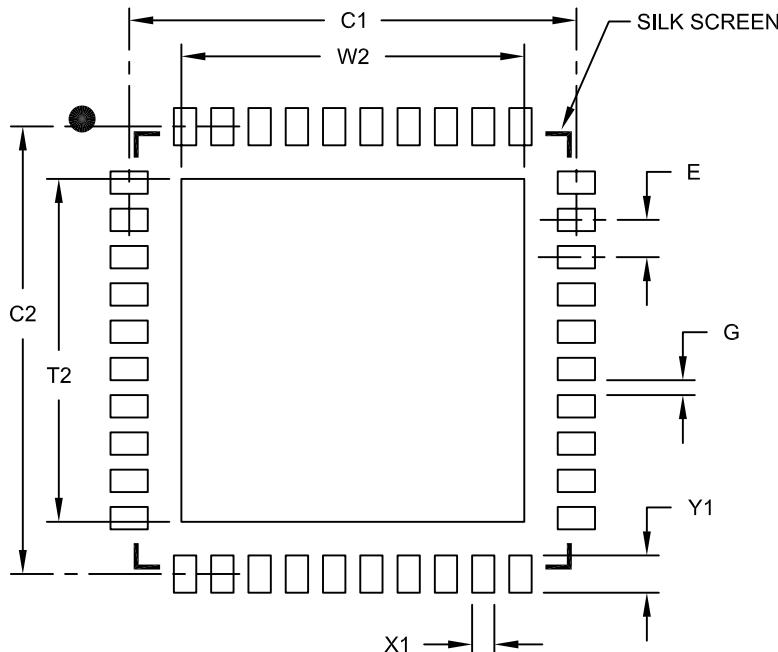
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

40-Lead Plastic Quad Flat, No Lead Package (ML) - 6x6x0.9mm Body [QFN]
 With 0.40mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at
<http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			MILLIMETERS		
		Dimension Limits		MIN	NOM	MAX	
Contact Pitch		E		0.50 BSC			
Optional Center Pad Width		W2		4.60			
Optional Center Pad Length		T2		4.60			
Contact Pad Spacing		C1		6.00			
Contact Pad Spacing		C2		6.00			
Contact Pad Width (X40)		X1		0.30			
Contact Pad Length (X40)		Y1		0.50			
Distance Between Pads		G		0.20			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

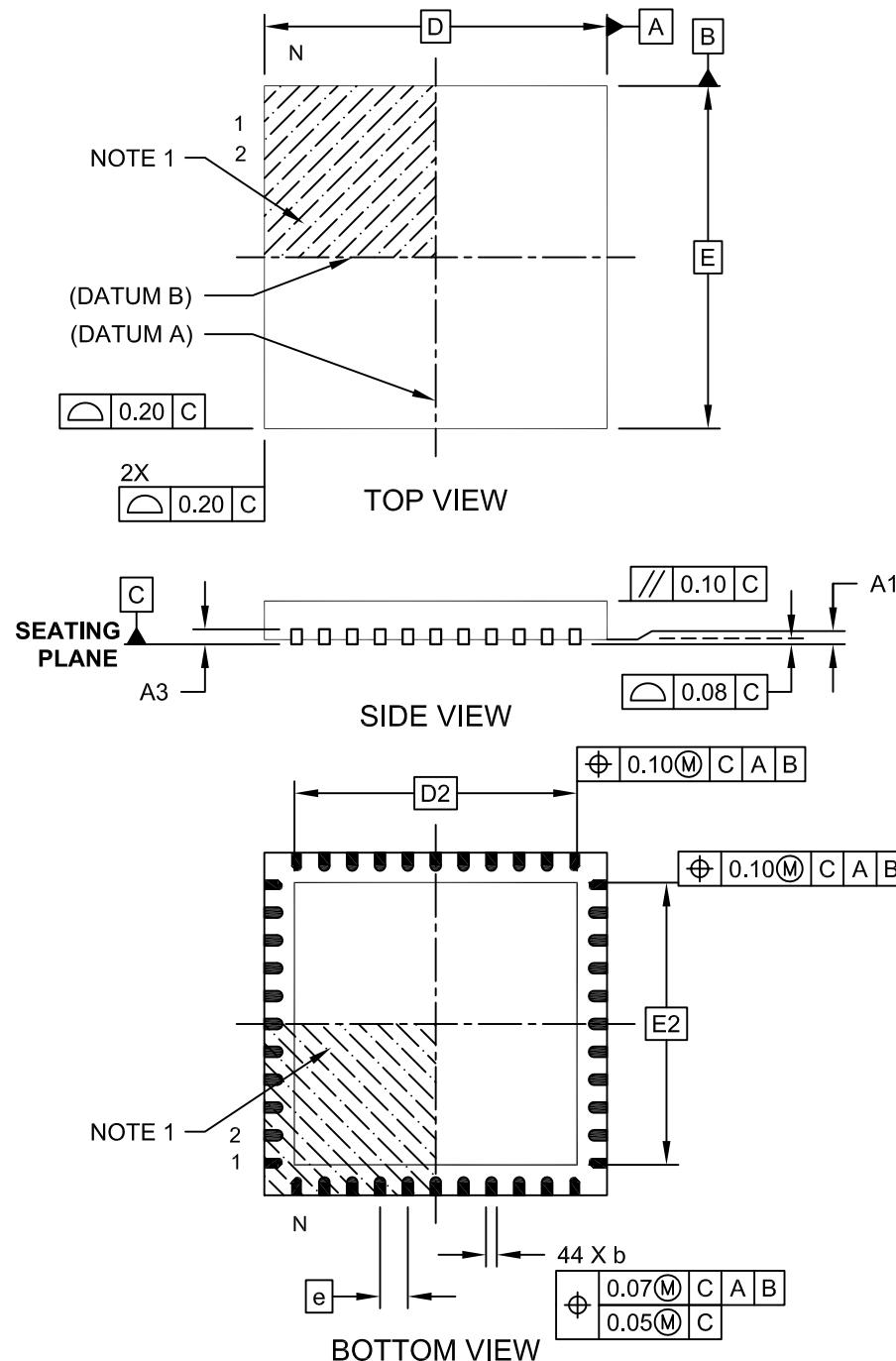
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2118A

Packaging Diagrams and Parameters

44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN]

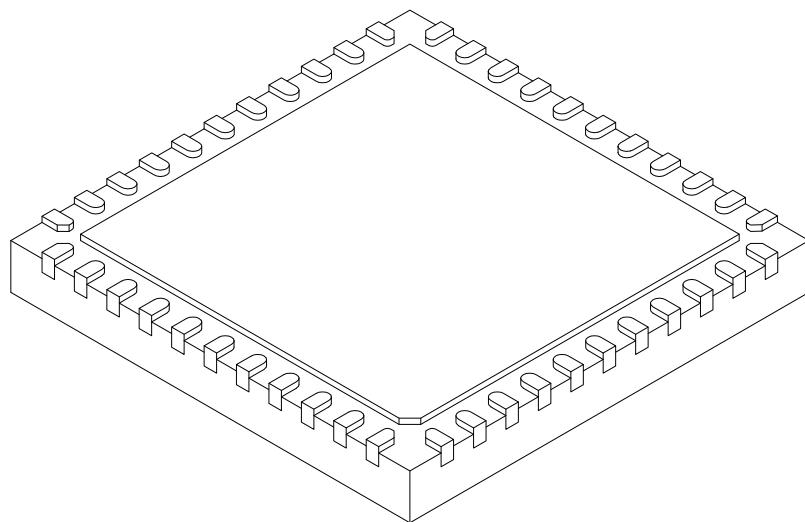
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		44		
Pitch	e		0.65	BSC	
Overall Height	A	0.80	0.90	1.00	
Standoff	A1	0.00	0.02	0.05	
Terminal Thickness	A3		0.20	REF	
Overall Width	E		8.00	BSC	
Exposed Pad Width	E2	6.25	6.45	6.60	
Overall Length	D		8.00	BSC	
Exposed Pad Length	D2	6.25	6.45	6.60	
Terminal Width	b	0.20	0.30	0.35	
Terminal Length	L	0.30	0.40	0.50	
Terminal-to-Exposed-Pad	K	0.20	-	-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

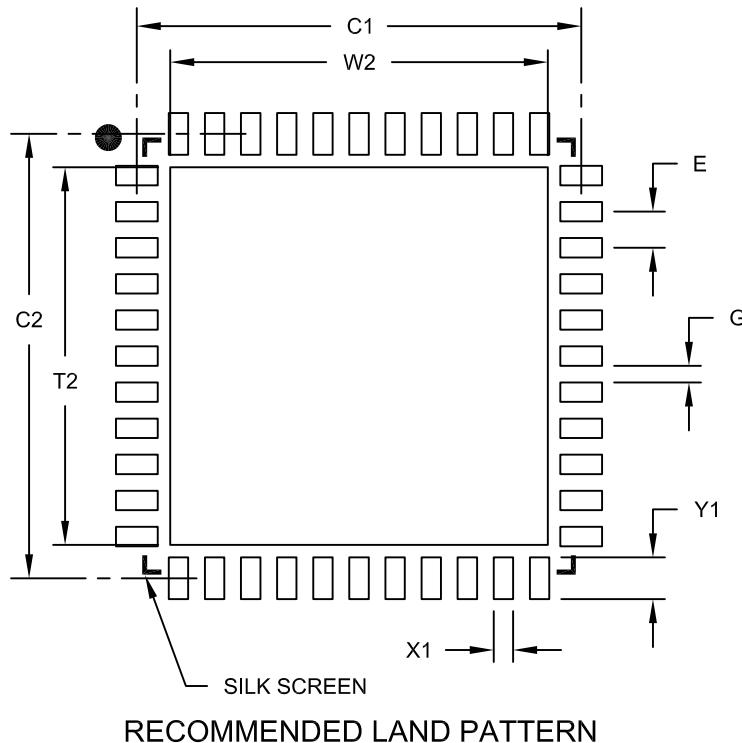
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension. usually without tolerance, for information purposes only.

Land Pattern (Footprint)

44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.65	BSC	
Optional Center Pad Width	W2			6.60	
Optional Center Pad Length	T2			6.60	
Contact Pad Spacing	C1		8.00		
Contact Pad Spacing	C2		8.00		
Contact Pad Width (X44)	X1			0.35	
Contact Pad Length (X44)	Y1			0.85	
Distance Between Pads	G	0.25			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

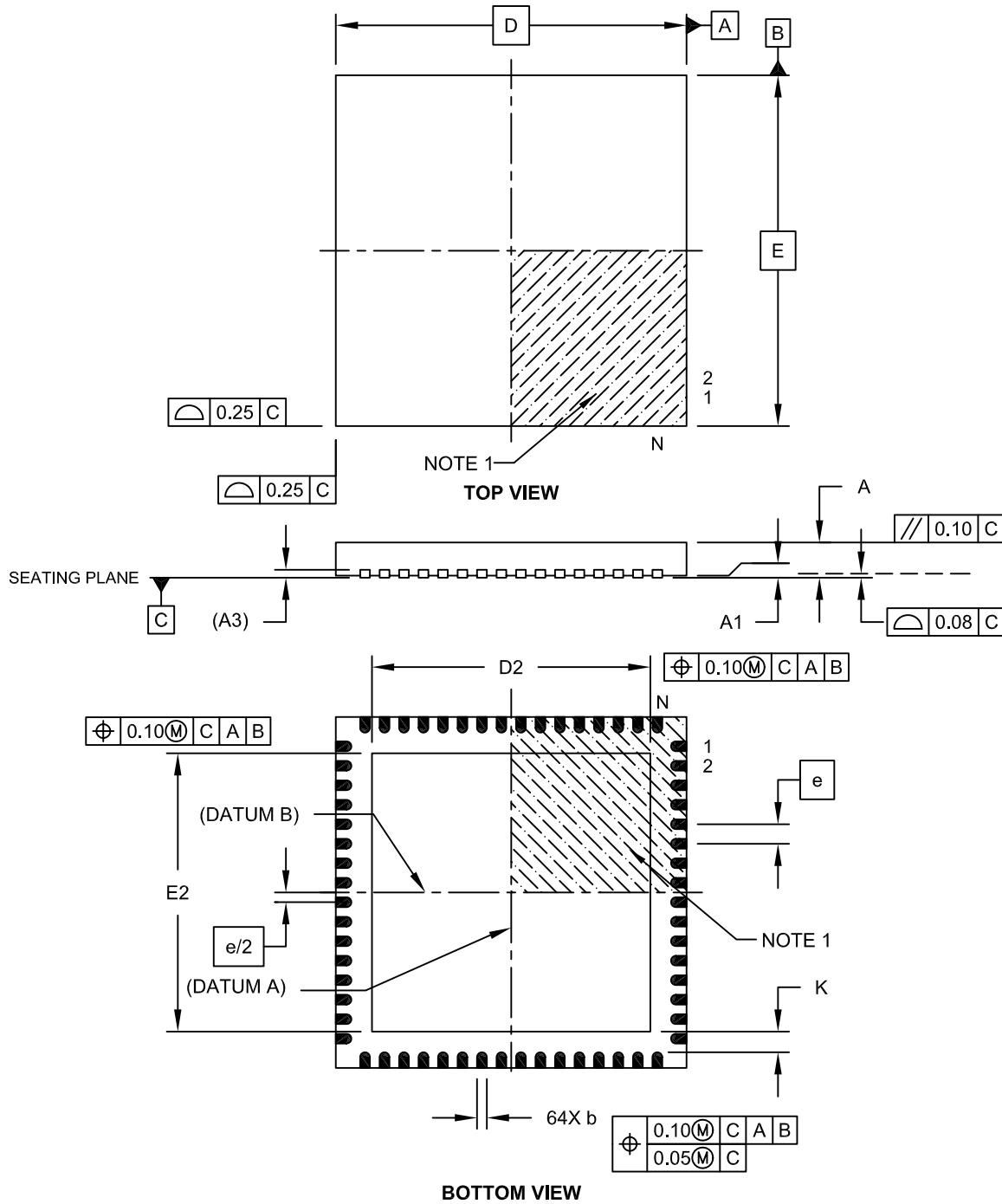
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2103B

Packaging Diagrams and Parameters

64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [QFN] With 7.15 x 7.15 Exposed Pad [QFN]

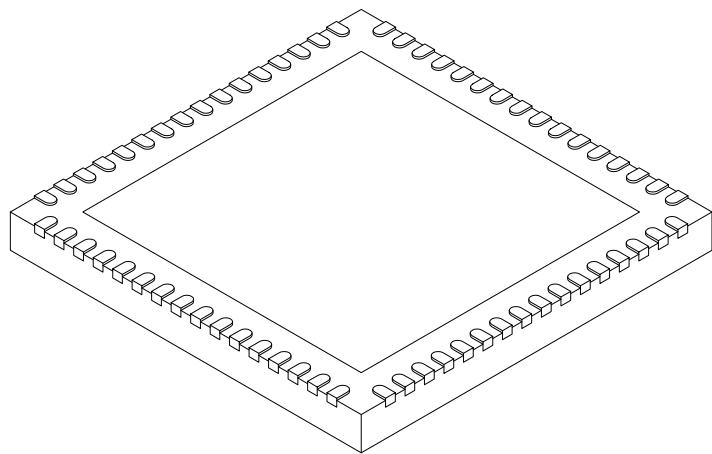
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [QFN] With 7.15 x 7.15 Exposed Pad [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins		N		64
Pitch		e		0.50 BSC
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20 REF		
Overall Width	E	9.00 BSC		
Exposed Pad Width	E2	7.05	7.15	7.50
Overall Length	D	9.00 BSC		
Exposed Pad Length	D2	7.05	7.15	7.50
Contact Width	b	0.18	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

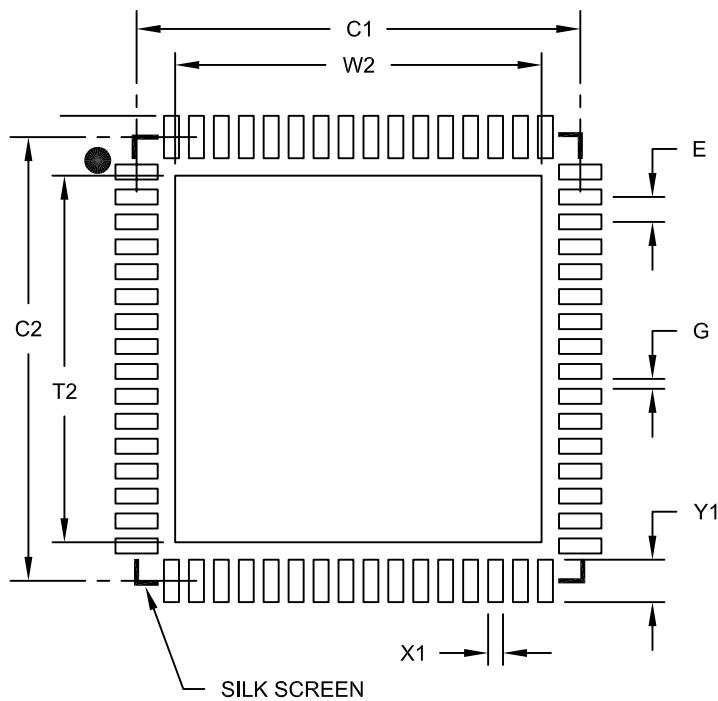
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [QFN]
With 0.40 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at
<http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			MILLIMETERS		
Dimension		Limits	MIN	NOM	MAX		
Contact Pitch	E		0.50 BSC				
Optional Center Pad Width	W2				7.35		
Optional Center Pad Length	T2				7.35		
Contact Pad Spacing	C1		8.90				
Contact Pad Spacing	C2		8.90				
Contact Pad Width (X64)	X1				0.30		
Contact Pad Length (X64)	Y1				0.85		
Distance Between Pads	G	0.20					

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

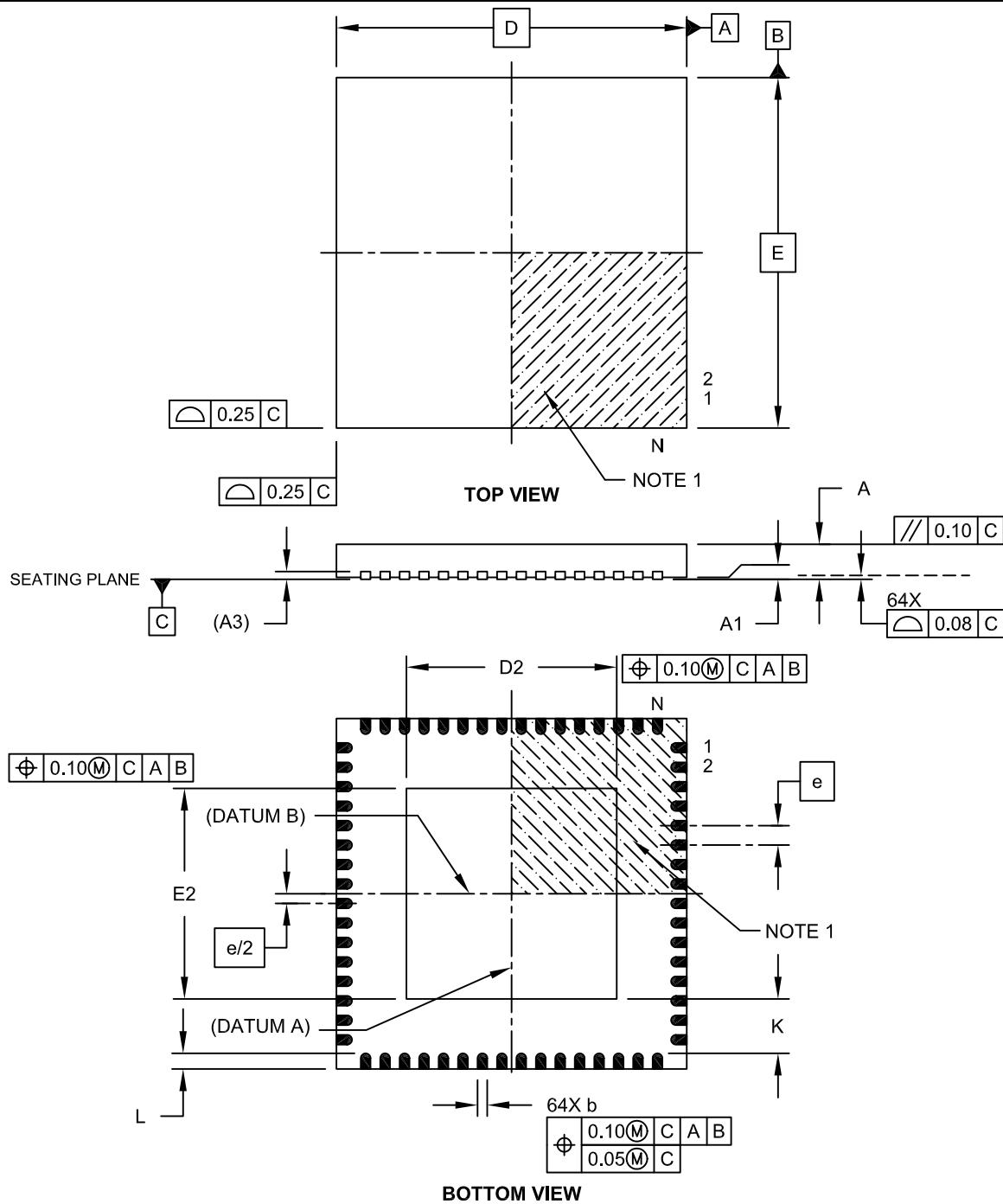
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2149A

Packaging Diagrams and Parameters

**64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body
with 5.40 x 5.40 Exposed Pad [QFN]**

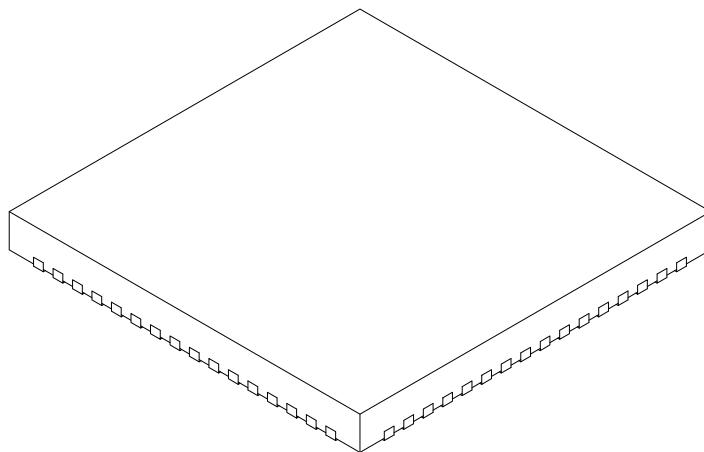
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body with 5.40 x 5.40 Exposed Pad [QFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		64		
Pitch	e		0.50	BSC	
Overall Height	A	0.80	0.90	1.00	
Standoff	A1	0.00	0.02	0.05	
Contact Thickness	A3		0.20	REF	
Overall Width	E		9.00	BSC	
Exposed Pad Width	E2	5.30	5.40	5.50	
Overall Length	D		9.00	BSC	
Exposed Pad Length	D2	5.30	5.40	5.50	
Contact Width	b	0.20	0.25	0.30	
Contact Length	L	0.30	0.40	0.50	
Contact-to-Exposed Pad	K	0.20	-	-	

Notes:

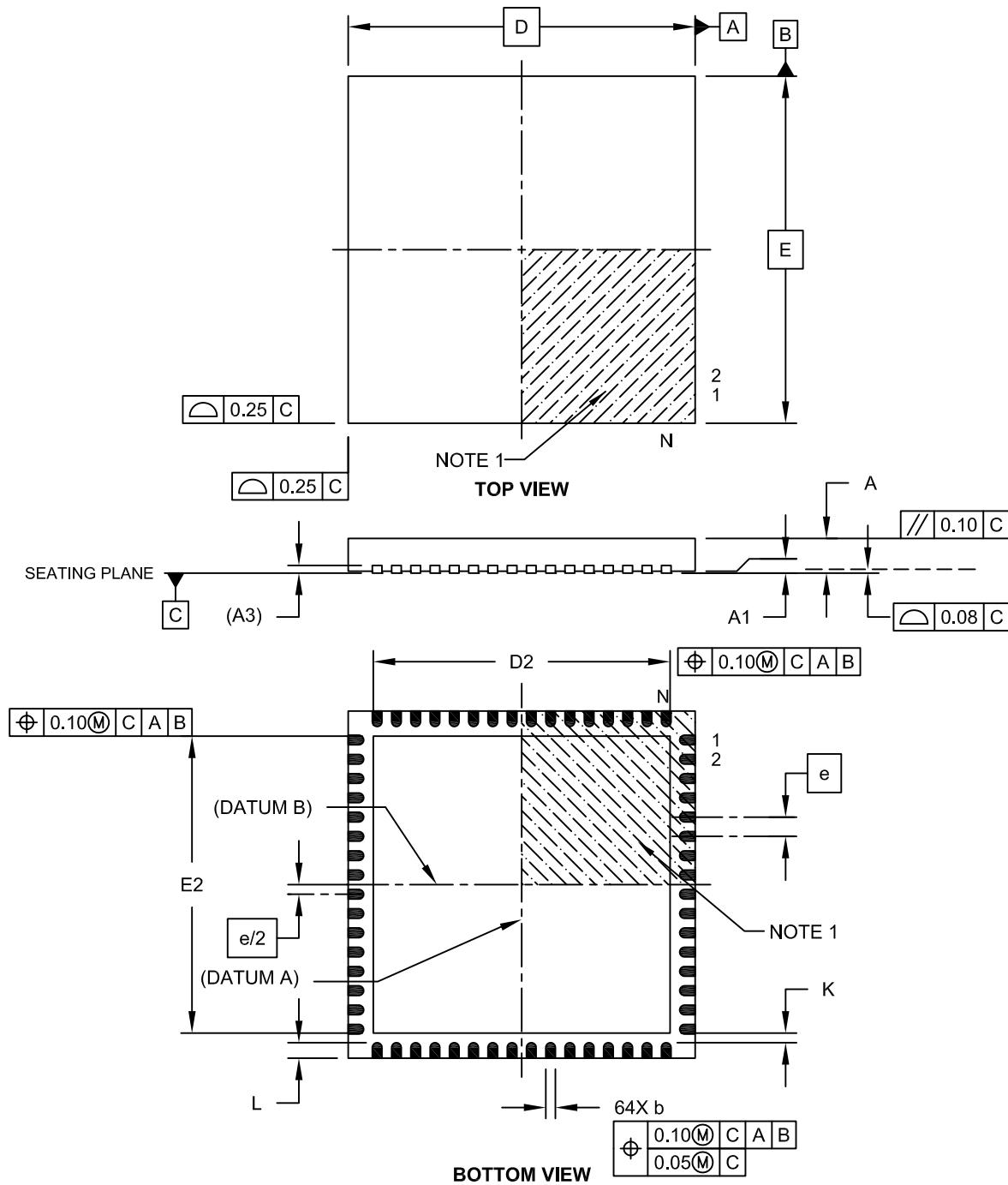
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

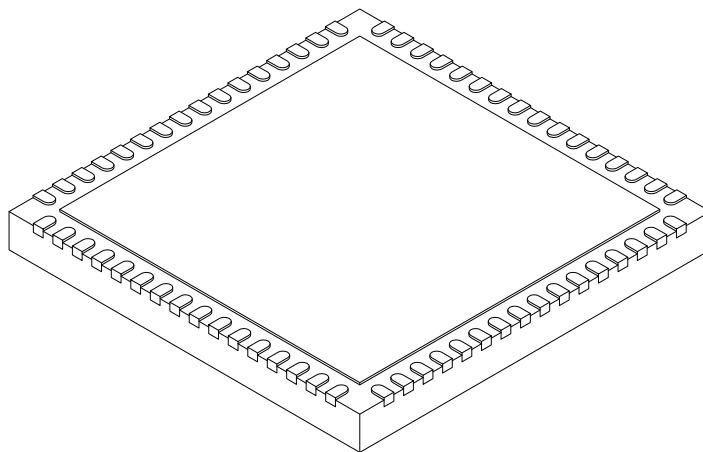
Packaging Diagrams and Parameters

**64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [QFN]
With 7.70 x 7.70 Exposed Pad [QFN]**



Packaging Diagrams and Parameters

**64-Lead Plastic Quad Flat, No Lead Package (MR) – 9x9x0.9 mm Body [QFN]
With 7.70 x 7.70 Exposed Pad [QFN]**



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	64		
Pitch	e	0.50	BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3	0.20	REF	
Overall Width	E	9.00	BSC	
Exposed Pad Width	E2	7.60	7.70	7.80
Overall Length	D	9.00	BSC	
Exposed Pad Length	D2	7.60	7.70	7.80
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

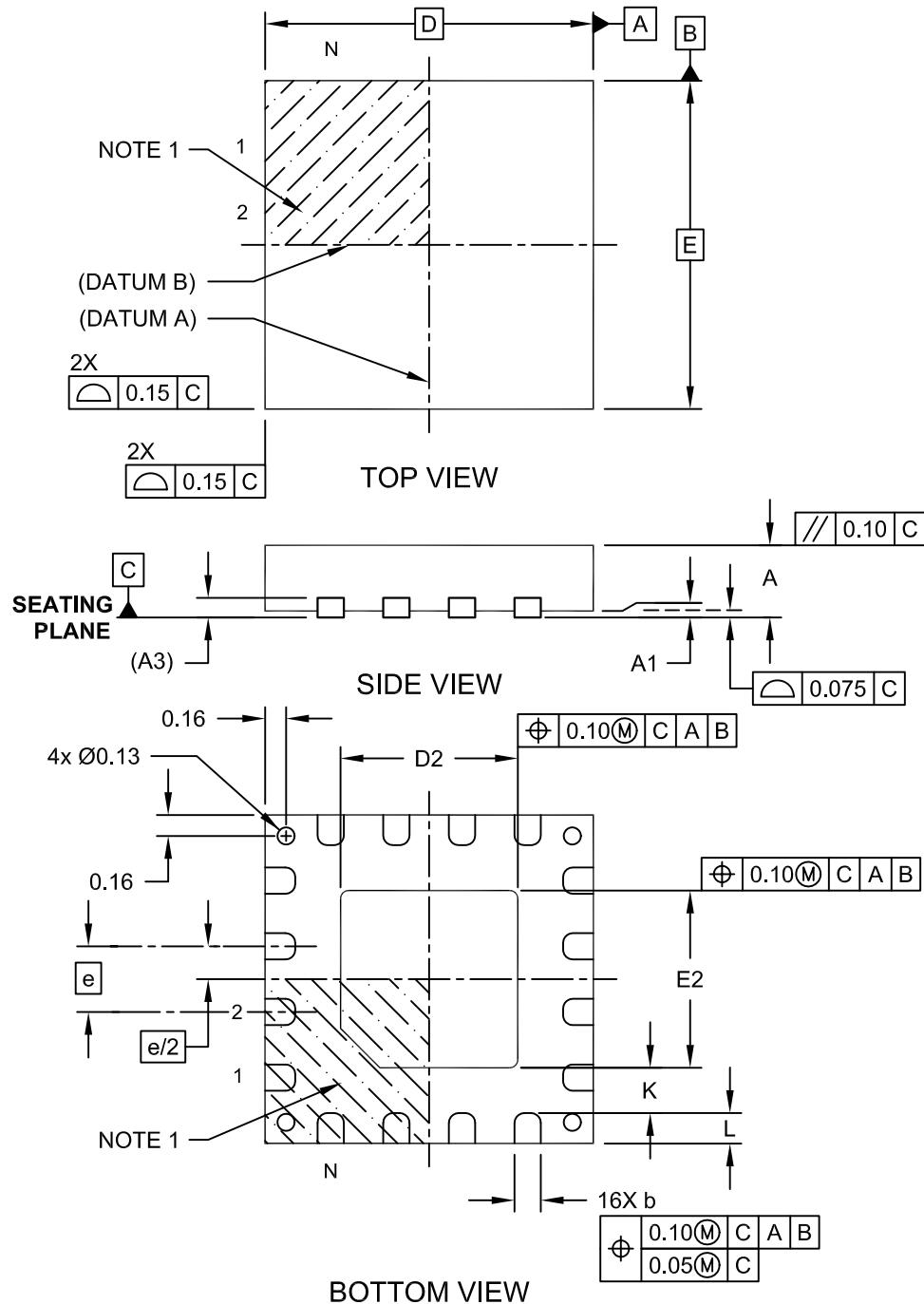
UQFN Family

Ultra Thin Quad Flat, No Lead Packages

Packaging Diagrams and Parameters

16-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) - 2.5x2.5x0.6mm Body [UQFN]

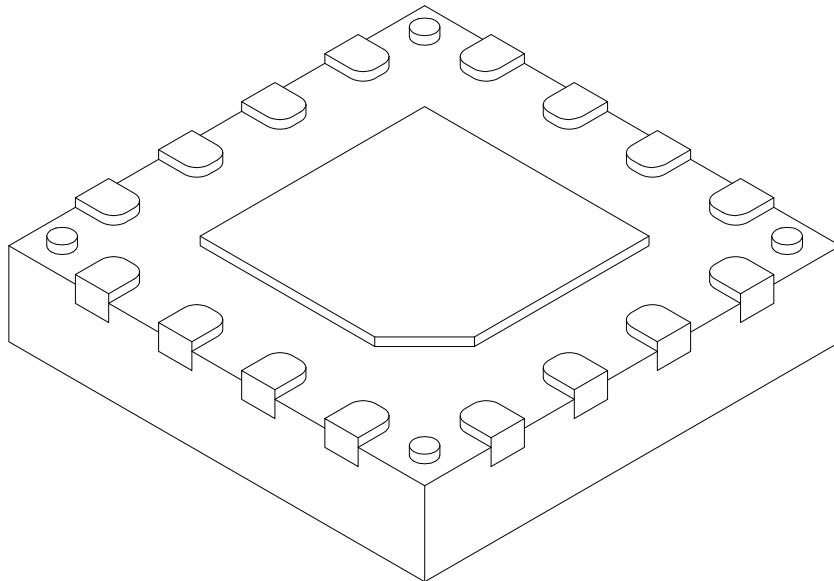
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

16-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) - 2.5x2.5x0.6mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Terminals	N	16		
Pitch	e	0.50	BSC	
Overall Height	A	0.50	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3	0.15	REF	
Overall Width	E	2.50	BSC	
Exposed Pad Width	E2	1.30	1.35	1.40
Overall Length	D	2.50	BSC	
Exposed Pad Length	D2	1.30	1.35	1.40
Terminal Width	b	0.15	0.20	0.25
Terminal Length	L	0.175	0.225	0.275
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

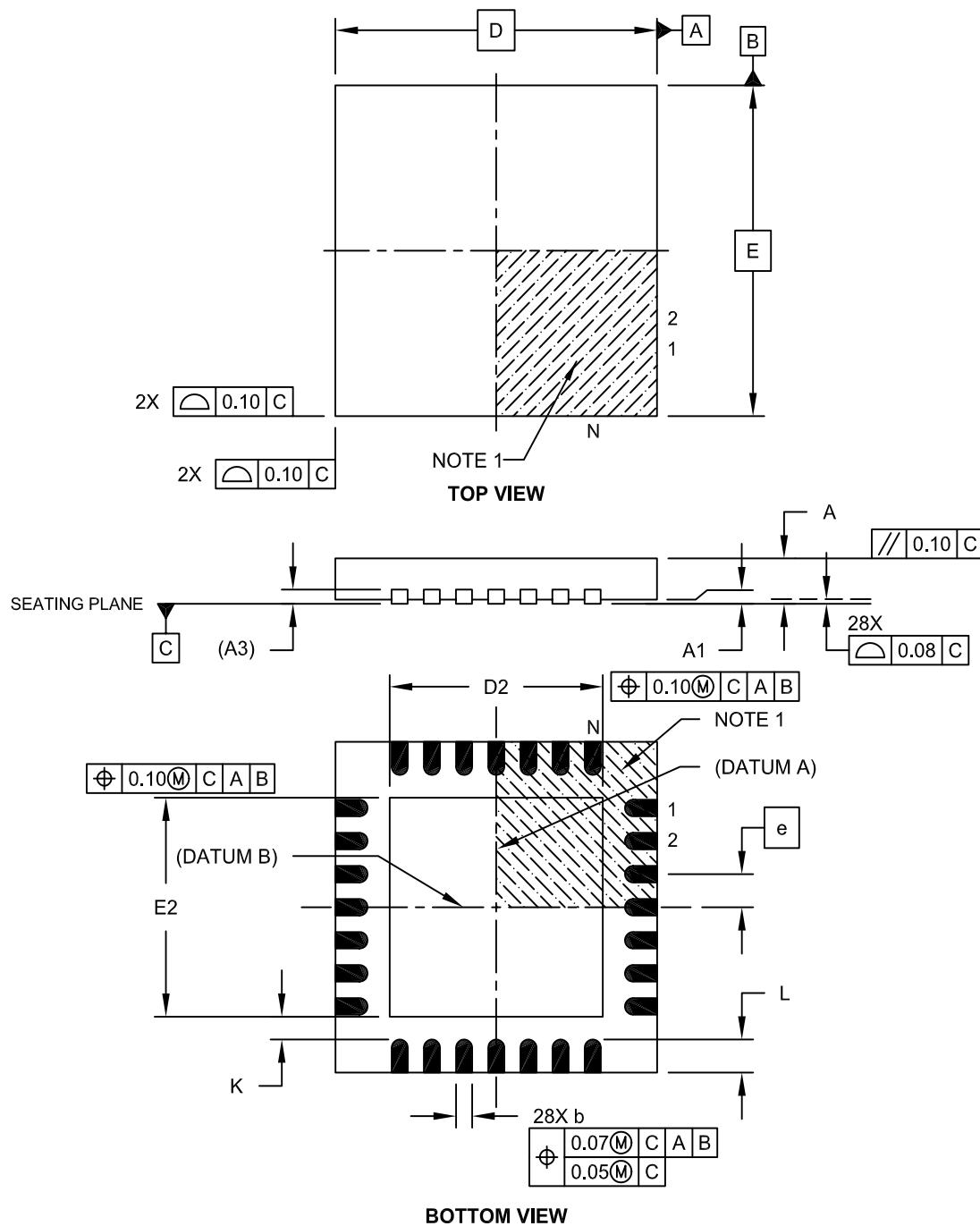
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

28-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) – 4x4x0.5 mm Body [UQFN]

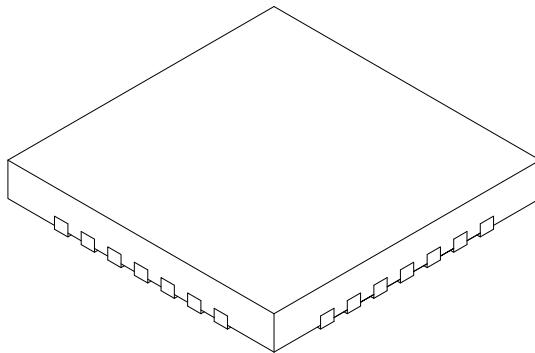
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

28-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) – 4x4x0.5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.40	BSC
Overall Height	A	0.45	0.50	0.55
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.127	REF
Overall Width	E		4.00	BSC
Exposed Pad Width	E2	2.55	2.65	2.75
Overall Length	D		4.00	BSC
Exposed Pad Length	D2	2.55	2.65	2.75
Contact Width	b	0.15	0.20	0.25
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

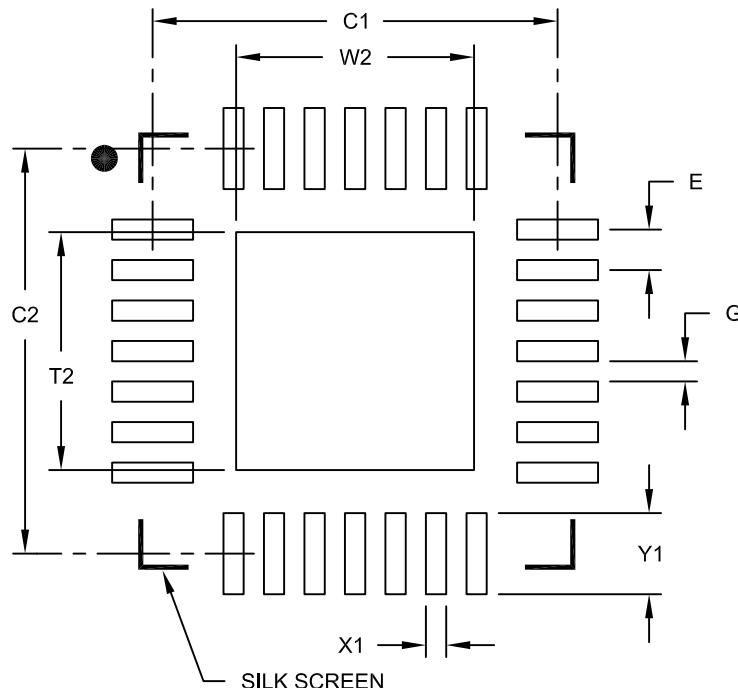
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

28-Lead Ultra Thin Plastic Quad Flat, No Lead Package (MV) - 4x4 mm Body [UQFN]
With 0.40 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at
<http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Optional Center Pad Width	W2			2.35
Optional Center Pad Length	T2			2.35
Contact Pad Spacing	C1		4.00	
Contact Pad Spacing	C2		4.00	
Contact Pad Width (X28)	X1			0.20
Contact Pad Length (X28)	Y1			0.80
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

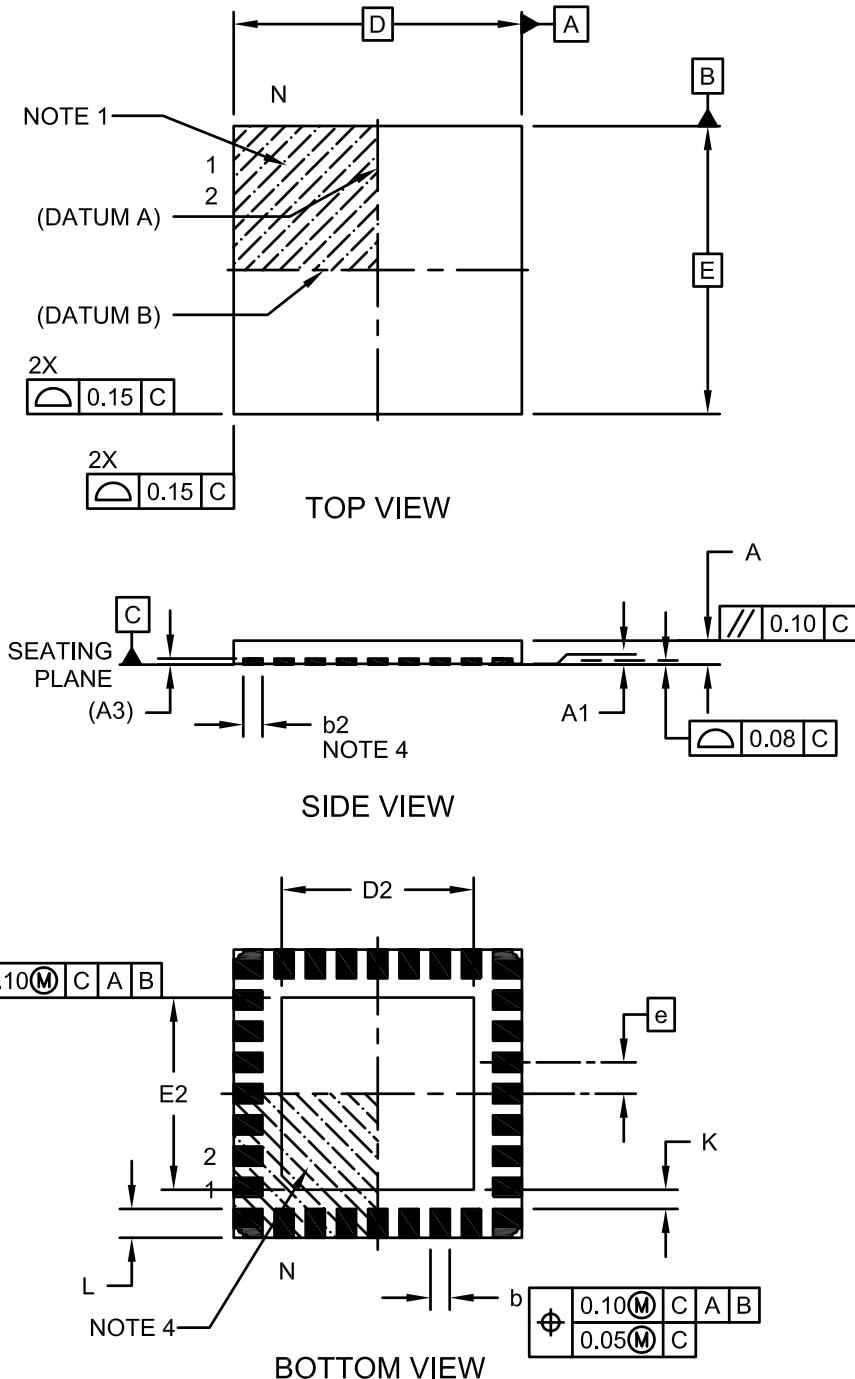
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2152A

Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (MV) - 6x6x0.5mm Body [UQFN] Ultra-Thin with 0.40 x 0.60 mm Terminal Width/Length + Corner Anchors

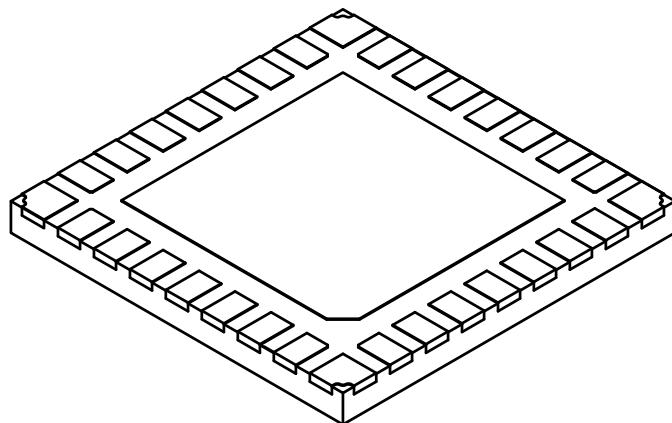
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

28-Lead Plastic Quad Flat, No Lead Package (MV) - 6x6x0.5mm Body [UQFN] Ultra-Thin with 0.40 x 0.60 mm Terminal Width/Length + Corner Anchors

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins		N		28
Pitch		e		0.65 BSC
Overall Height	A	0.40	0.50	0.60
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	(A3)	0.127 REF		
Overall Width	E	6.00 BSC		
Exposed Pad Width	E2	4.00		
Overall Length	D	6.00 BSC		
Exposed Pad Length	D2	4.00		
Terminal Width	b	0.35	0.40	0.45
Corner Pad	b2	0.25	0.40	0.45
Terminal Length	L	0.55	0.60	0.65
Terminal-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

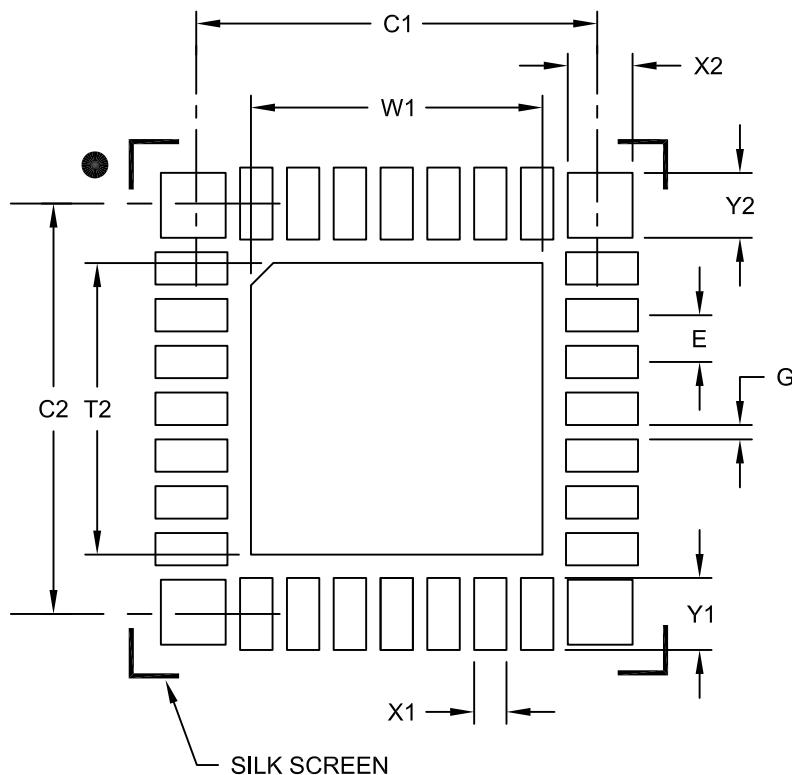
REF: Reference Dimension, usually without tolerance, for information purposes only.

4. Outermost portions of corner structures may vary slightly.

Land Pattern (Footprint)

**28-Lead Plastic Quad Flat, No Lead Package (MV) - 6x6 mm Body [UQFN]
With 0.60mm Contact Length And Corner Anchors**

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E	0.65 BSC					
Optional Center Pad Width	W1				4.05		
Optional Center Pad Length	T2				4.05		
Contact Pad Spacing	C1			5.70			
Contact Pad Spacing	C2			5.70			
Contact Pad Width (X28)	X1				0.45		
Contact Pad Length (X28)	Y1				1.00		
Corner Pad Width (X4)	X2				0.90		
Corner Pad Length (X4)	Y2				0.90		
Distance Between Pads	G	0.20					

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

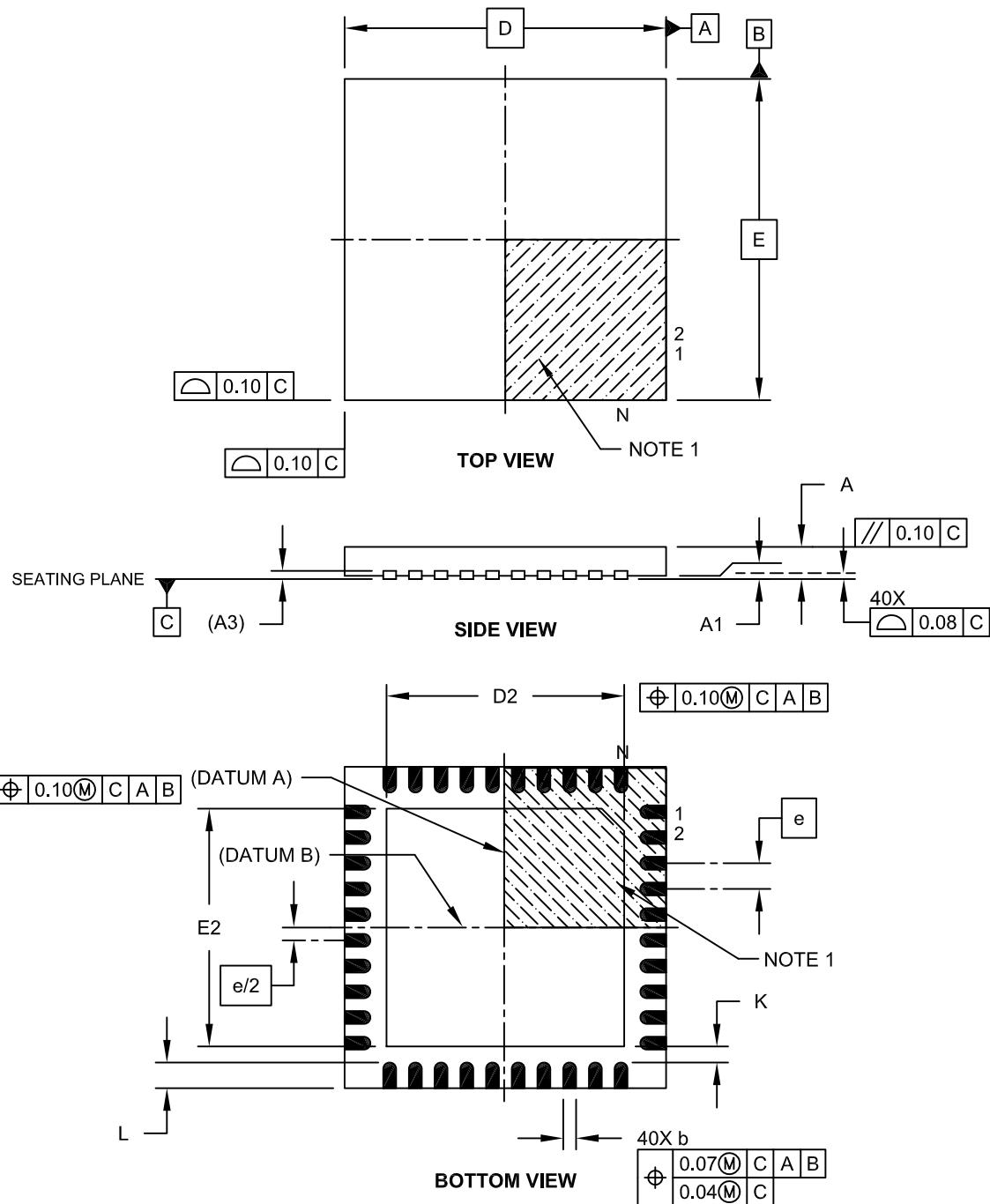
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2209A

Packaging Diagrams and Parameters

40-Lead Ultra Thin Plastic Quad Flat, No Lead Package (MV) – 5x5x0.5 mm Body [UQFN]

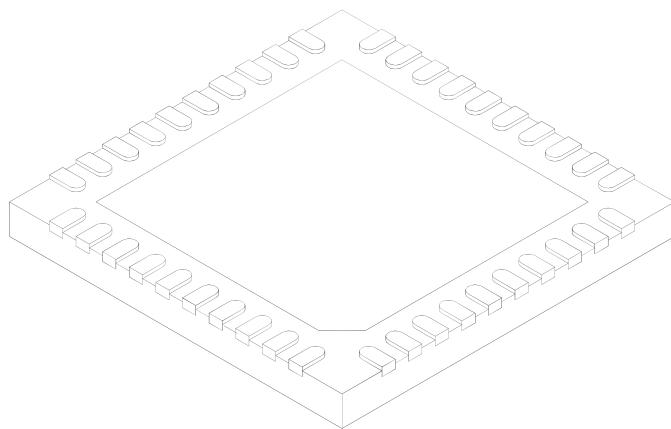
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

40-Lead Ultra Thin Plastic Quad Flat, No Lead Package (MV) – 5x5x0.5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		40		
Pitch	e		0.40	BSC	
Overall Height	A	0.45	0.50	0.55	
Standoff	A1	0.00	0.02	0.05	
Contact Thickness	A3	0.127 REF			
Overall Width	E	5.00 BSC			
Exposed Pad Width	E2	3.60	3.70	3.80	
Overall Length	D	5.00 BSC			
Exposed Pad Length	D2	3.60	3.70	3.80	
Contact Width	b	0.15	0.20	0.25	
Contact Length	L	0.30	0.40	0.50	
Contact-to-Exposed Pad	K	0.20	-	-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

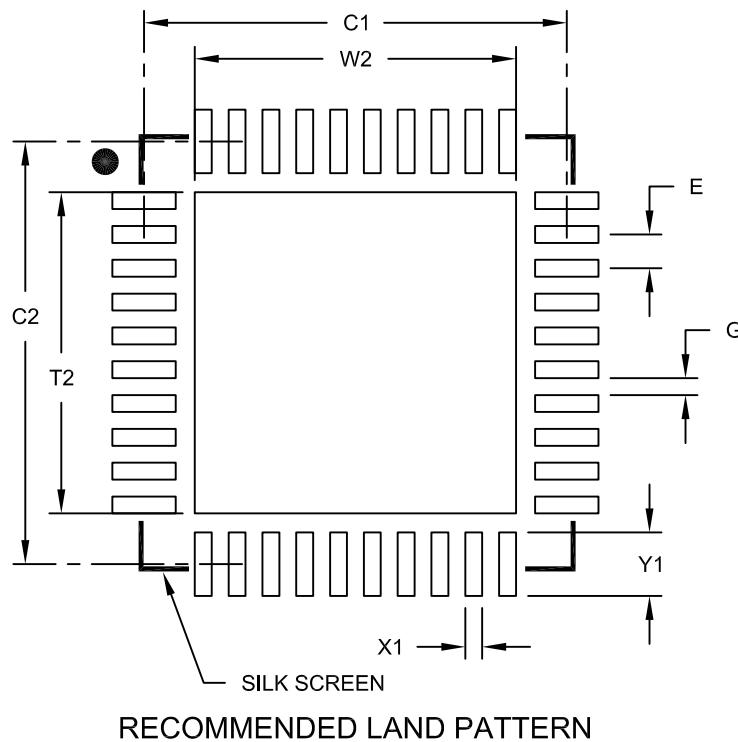
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

40-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) - 5x5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.40 BSC		
Optional Center Pad Width	W2			3.80
Optional Center Pad Length	T2			3.80
Contact Pad Spacing	C1		5.00	
Contact Pad Spacing	C2		5.00	
Contact Pad Width (X40)	X1			0.20
Contact Pad Length (X40)	Y1			0.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

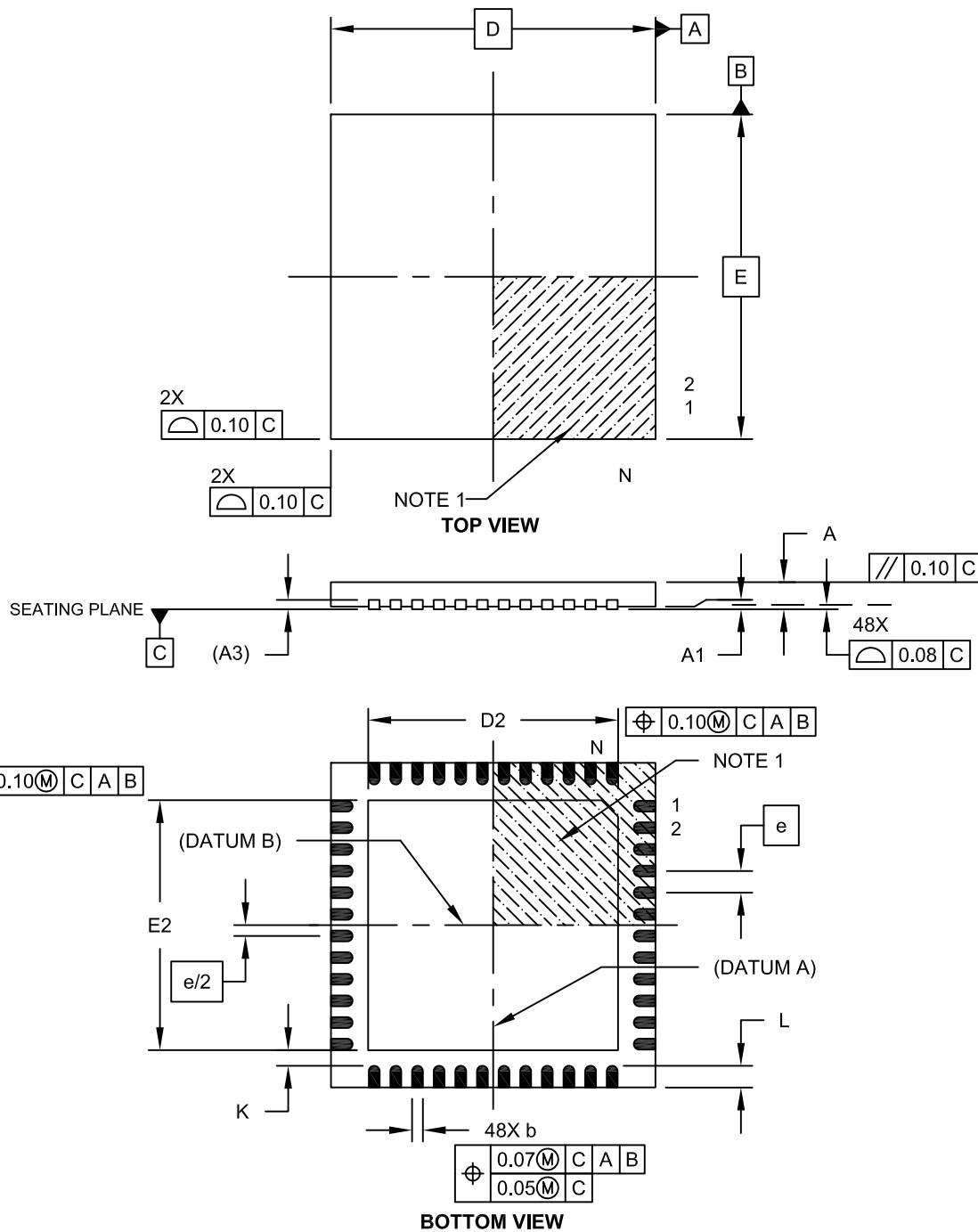
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2156B

Packaging Diagrams and Parameters

48-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) – 6x6x0.5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

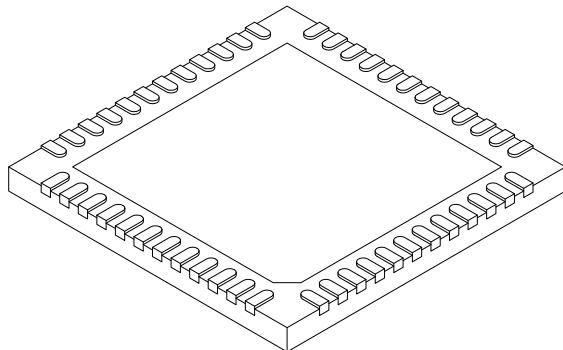


Microchip Technology Drawing C04-153A Sheet 1 of 2

Packaging Diagrams and Parameters

48-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) – 6x6x0.5 mm Body [UQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		48		
Pitch	e		0.40	BSC	
Overall Height	A	0.45	0.50	0.55	
Standoff	A1	0.00	0.02	0.05	
Contact Thickness	A3	0.127	REF		
Overall Width	E	6.00	BSC		
Exposed Pad Width	E2	4.45	4.60	4.75	
Overall Length	D	6.00	BSC		
Exposed Pad Length	D2	4.45	4.60	4.75	
Contact Width	b	0.15	0.20	0.25	
Contact Length	L	0.30	0.40	0.50	
Contact-to-Exposed Pad	K	0.20	-	-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

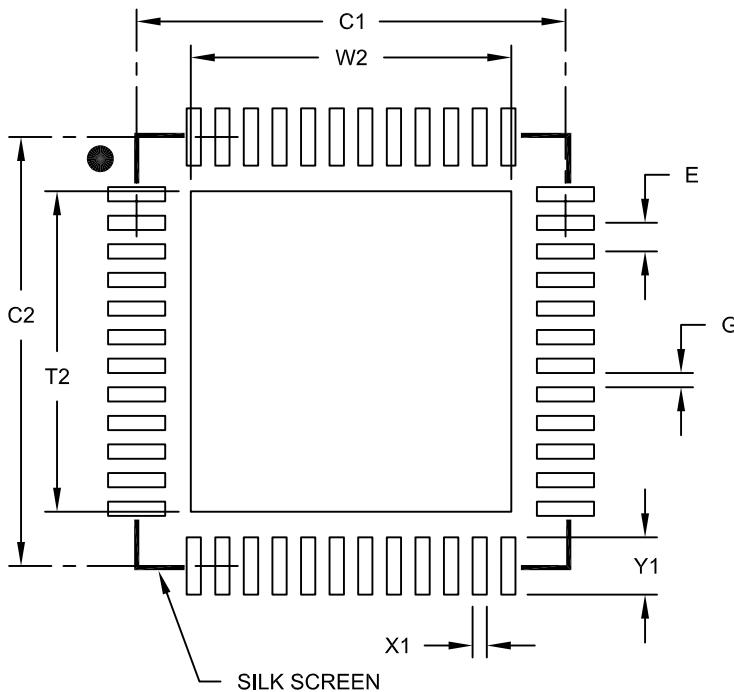
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

48-Lead Ultra Thin Plastic Quad Flat, No Lead Package (MV) - 6x6 mm Body [UQFN]
With 0.40 mm Contact Length

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E	0.40 BSC					
Optional Center Pad Width	W2				4.45		
Optional Center Pad Length	T2				4.45		
Contact Pad Spacing	C1				6.00		
Contact Pad Spacing	C2				6.00		
Contact Pad Width (X28)	X1				0.20		
Contact Pad Length (X28)	Y1				0.80		
Distance Between Pads	G	0.20					

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

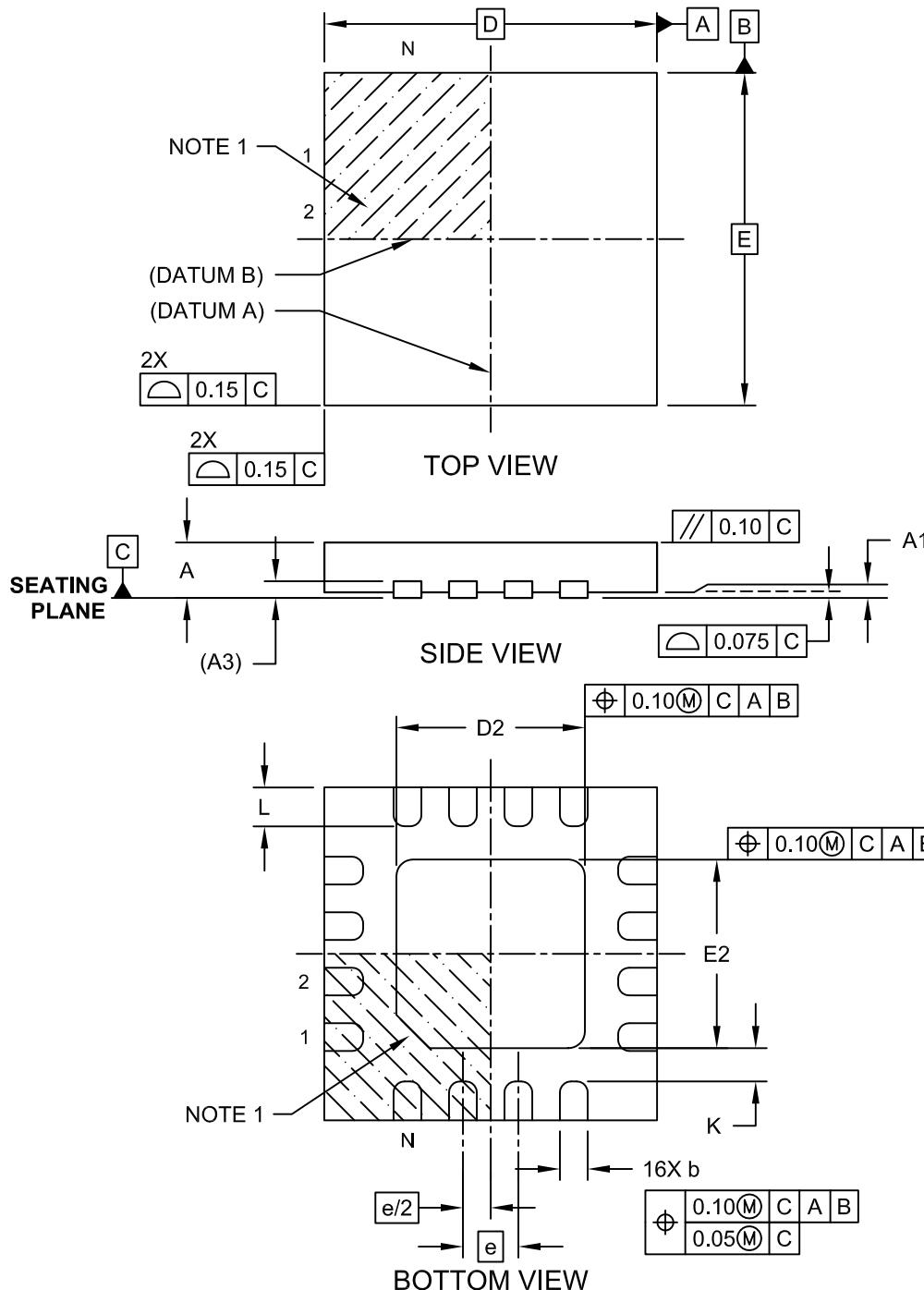
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2153A

Packaging Diagrams and Parameters

16-Lead Extremely Thin Quad Flat, No Lead Package (NL) - 3x3x0.5mm Body [XQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

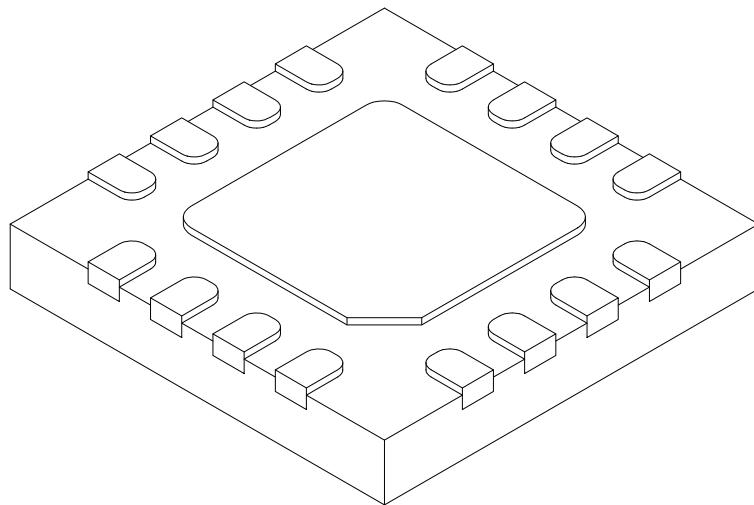


Microchip Technology Drawing C04-217A Sheet 1 of 2

Packaging Diagrams and Parameters

16-Lead Extremely Thin Quad Flat, No Lead Package (NL) - 3x3x0.5mm Body [XQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Limits	Units MILLIMETERS		
		MIN	NOM	MAX
Number of Terminals	N		16	
Pitch	e		0.50 BSC	
Overall Height	A	0.40	0.45	0.50
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3		0.15 REF	
Overall Width	E		3.00 BSC	
Exposed Pad Width	E2	1.65	1.70	1.75
Overall Length	D		3.00 BSC	
Exposed Pad Length	D2	1.65	1.70	1.75
Terminal Width	b	0.20	0.25	0.30
Terminal Length	L	0.30	0.35	0.40
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

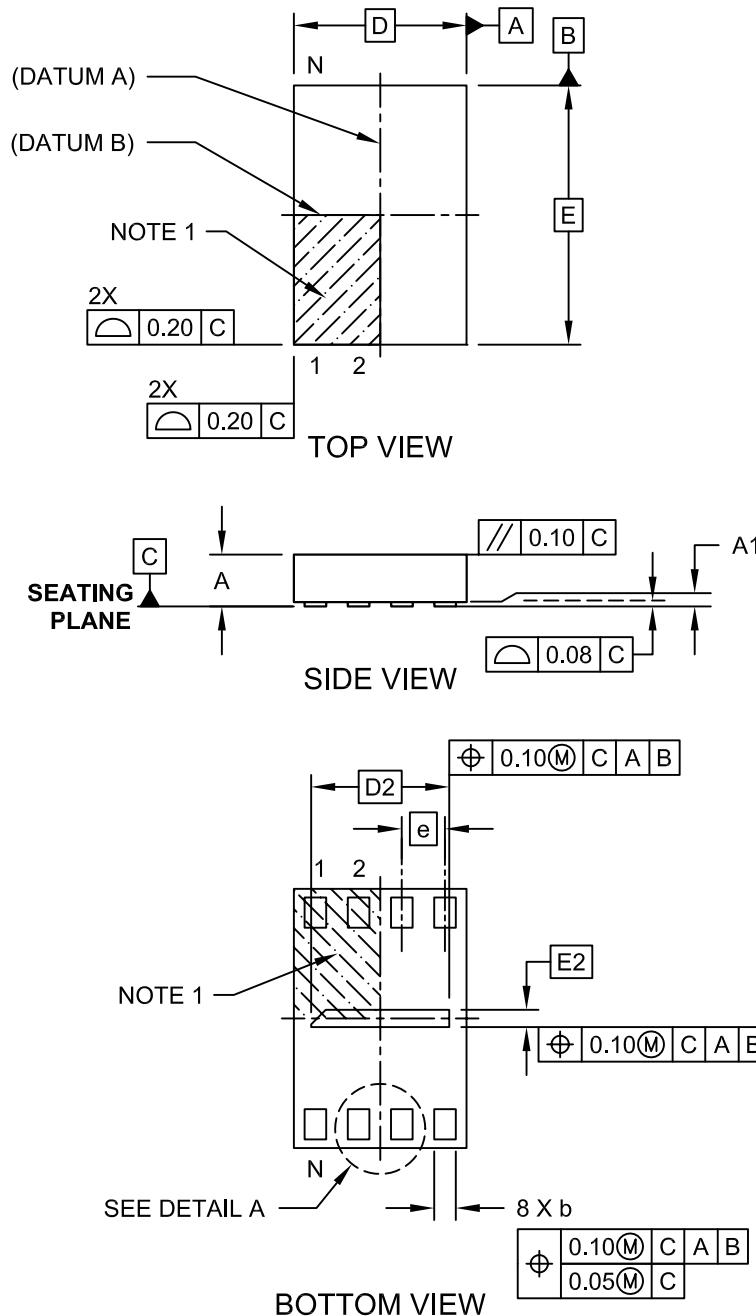
USON Family

Ultra Thin Small Outline Packages

Packaging Diagrams and Parameters

8-Lead Plastic Ultra Thin Small Outline No Lead Package (NP) - 2x3 mm Body [USON]

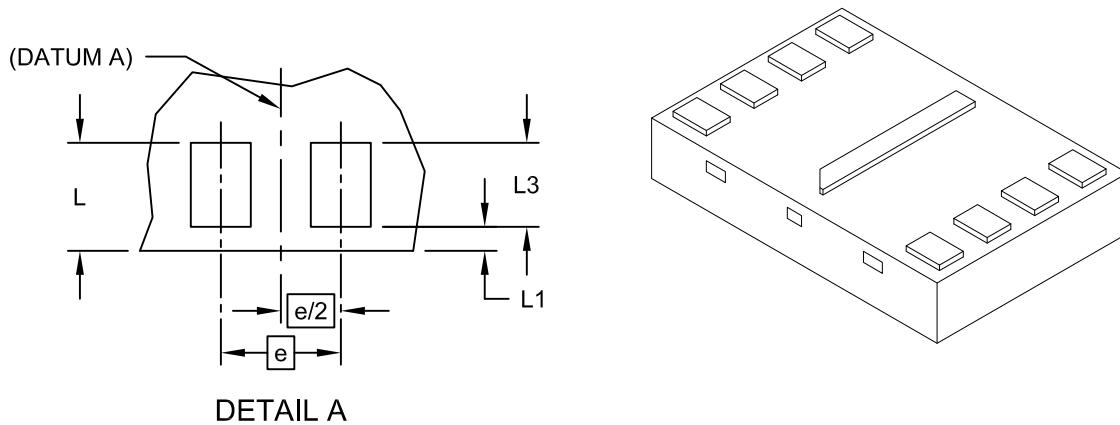
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Ultra Thin Small Outline No Lead Package (NP) - 2x3 mm Body [USON]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Limits	UNITS MILLIMETERS		
		MIN	NOM	MAX
Number of Terminals	N		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.50	0.55	0.60
Standoff	A1	0.00	0.02	0.05
Overall Width	D	2.00 BSC		
Exposed Pad Width	D2	1.55	1.60	1.65
Overall Length	E	3.00 BSC		
Exposed Pad Length	E2	0.15	0.20	0.25
Terminal Width	b	0.20	0.25	0.30
Package Edge to Terminal Edge	L	0.40	0.45	0.50
Package Edge to Terminal Edge	L1	—	0.10	—
Terminal Length	L3	0.30	0.35	0.40

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

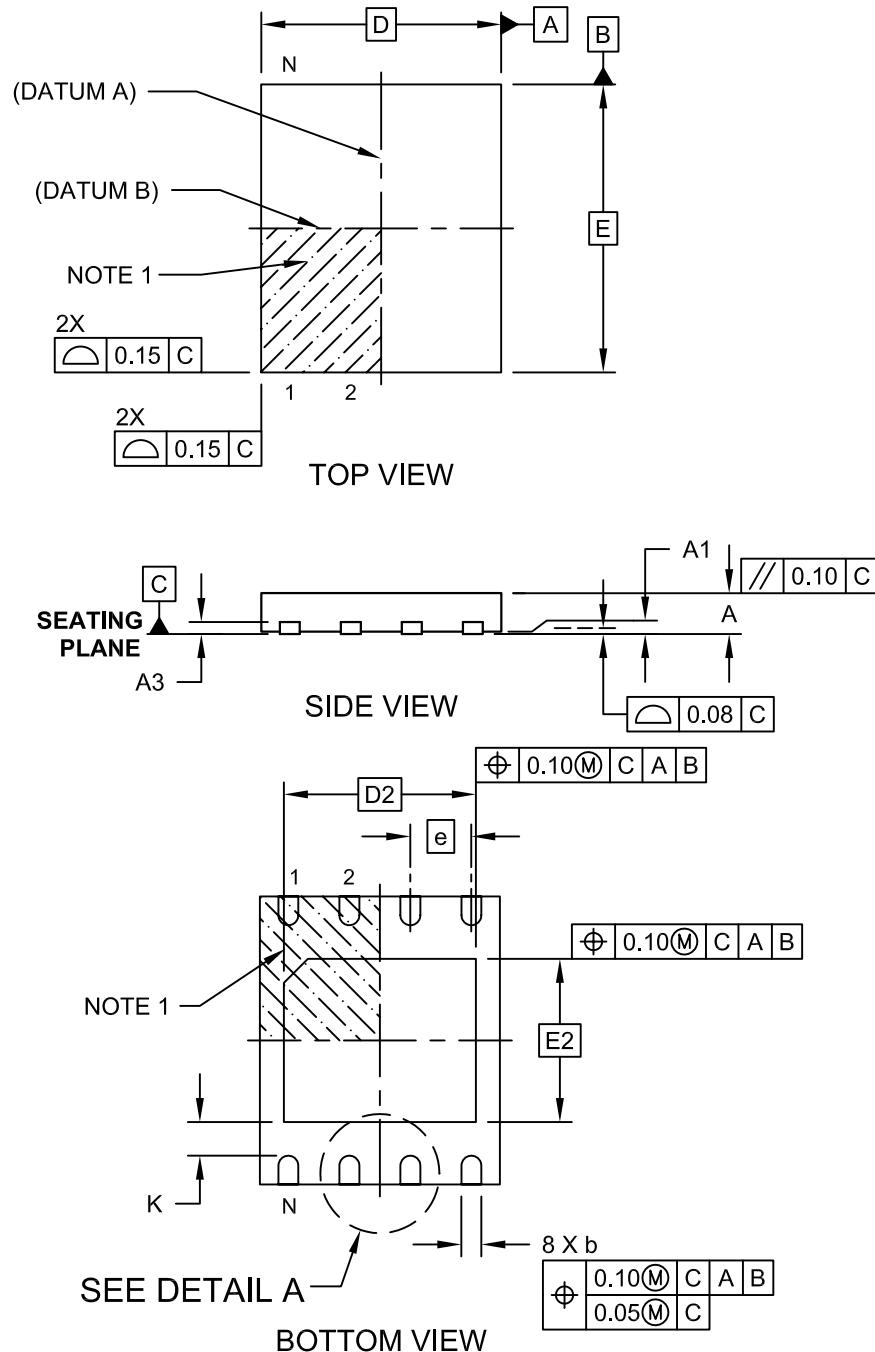
WSON Family

Very, Very Thin Small Outline Packages

Packaging Diagrams and Parameters

8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [WSON]

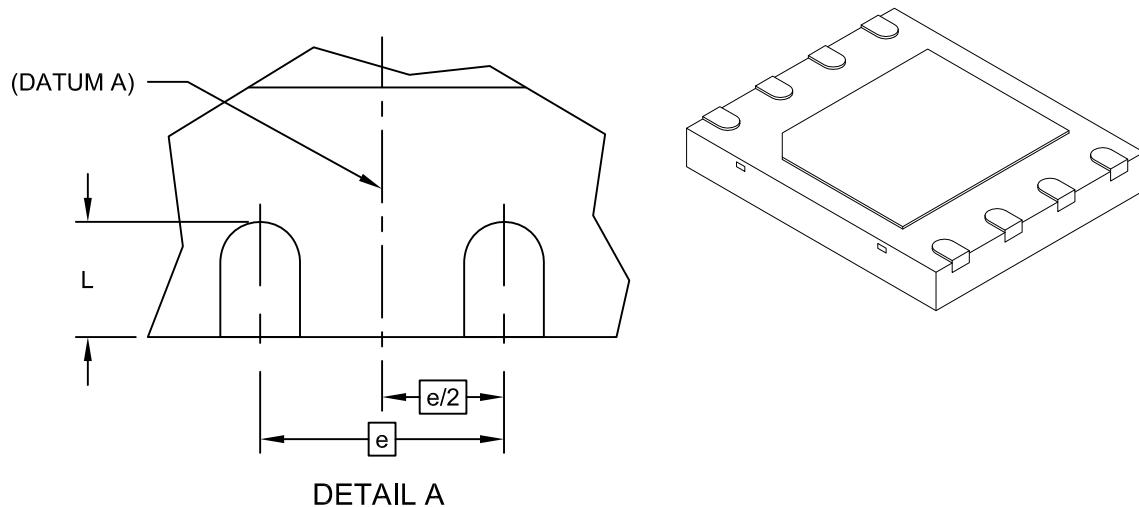
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Very, Very Thin Small Outline No-Lead (MF) - 5x6 mm Body [WSON]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Number of Terminals	N			8	
Pitch	e		1.27	BSC	
Overall Height	A	0.70	0.75	0.80	
Standoff	A1	0.00	0.02	0.05	
Terminal Thickness	A3		0.20	REF	
Overall Width	D		5.00	BSC	
Exposed Pad Width	D2		4.0	BSC	
Overall Length	E		6.00	BSC	
Exposed Pad Length	E2		3.4	BSC	
Terminal Width	b	0.35	0.42	0.48	
Terminal Length	L	0.50	0.60	0.70	
Terminal-to-Exposed-Pad	K	0.20	-	-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.

2. Package is saw singulated

3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

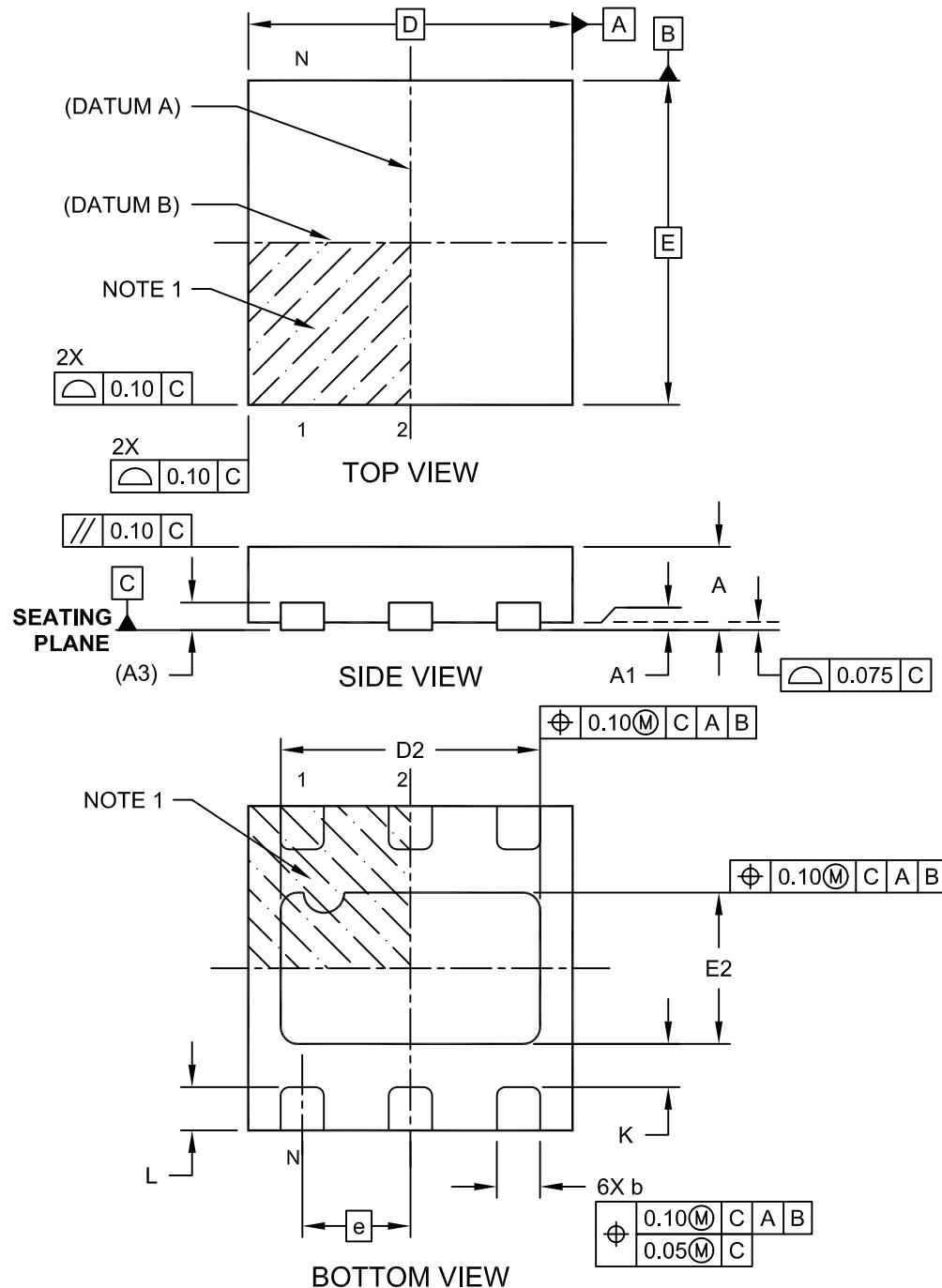
X2SON Family

Super Thin, Small Outline Packages

Packaging Diagrams and Parameters

6-Lead Plastic Super Thin Small Outline No Lead (NR) - 1.5x1.5x0.4 mm Body [X2SON]

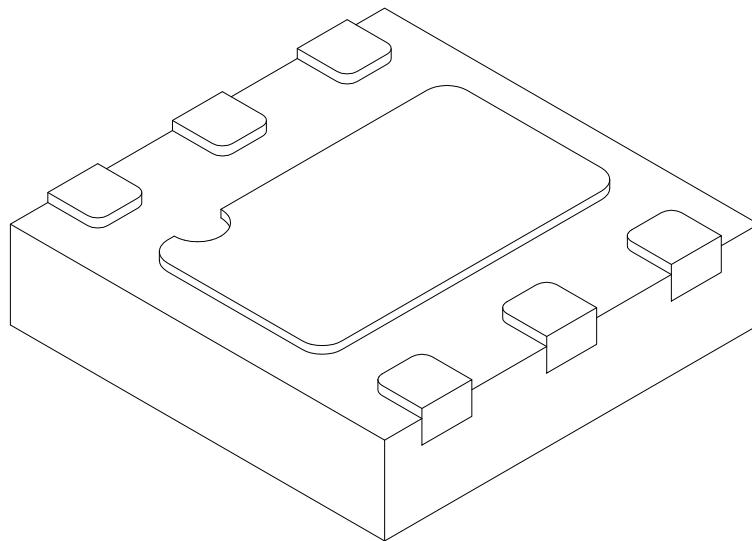
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

6-Lead Plastic Super Thin Small Outline No Lead (NR) - 1.5x1.5x0.4 mm Body [X2SON]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
		Dimension	MIN	NOM	MAX
Number of Terminals	N		6		
Pitch	e		0.50	0.50	BSC
Overall Height	A	0.30	0.35	0.40	
Standoff	A1	0.00	0.02	0.05	
Terminal Thickness	A3		0.127	REF	
Overall Width	E		1.50	1.50	BSC
Exposed Pad Width	E2	0.65	0.70	0.75	
Overall Length	D		1.50	1.50	BSC
Exposed Pad Length	D2	1.15	1.20	1.25	
Terminal Width	b	0.15	0.20	0.25	
Terminal Length	L	0.150	0.200	0.250	
Terminal-to-Exposed-Pad	K	0.20	-	-	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

MSOP and QSOP Family

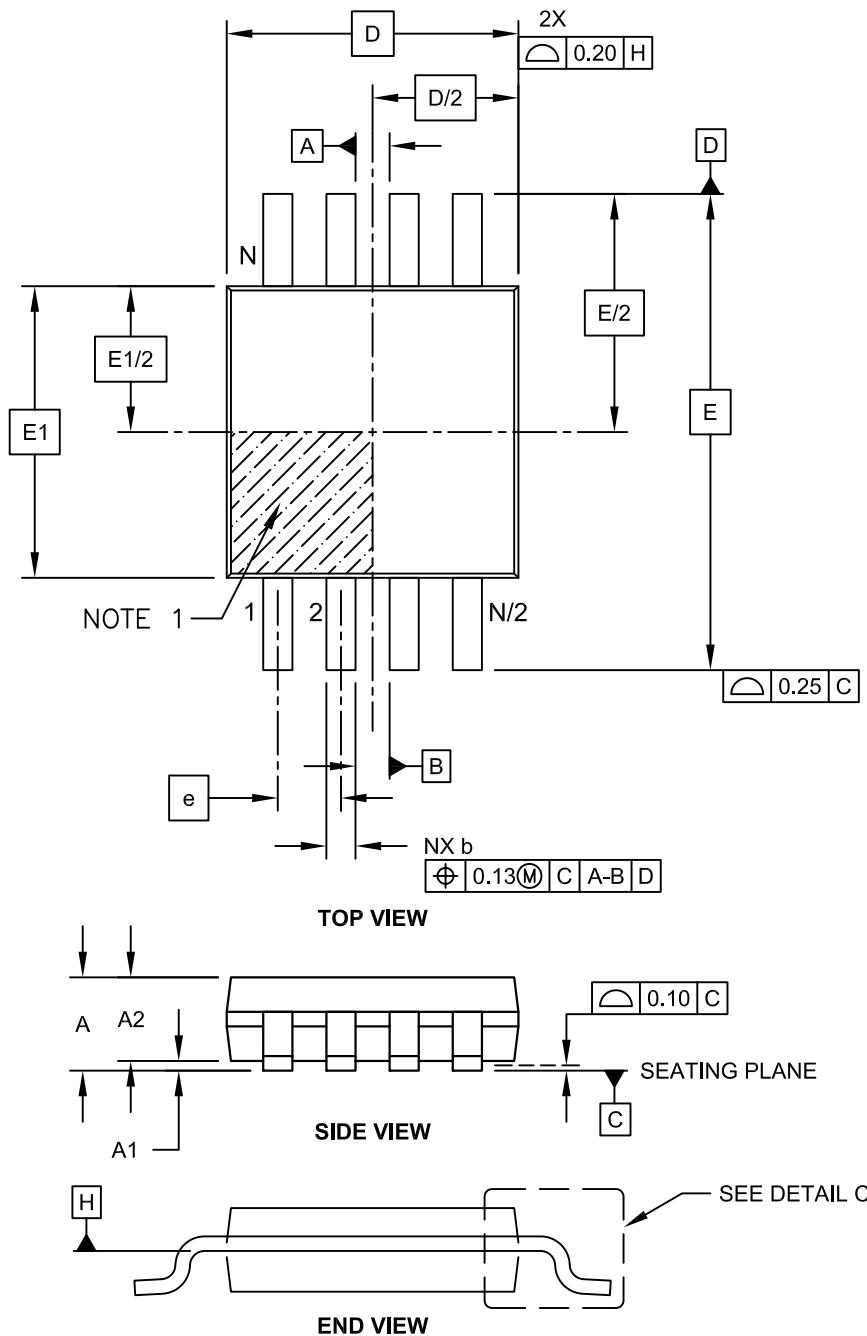
Micro Small Outline Packages

Shrink Small Outline Packages

Packaging Diagrams and Parameters

8-Lead Plastic Micro Small Outline Package (MS) [MSOP]

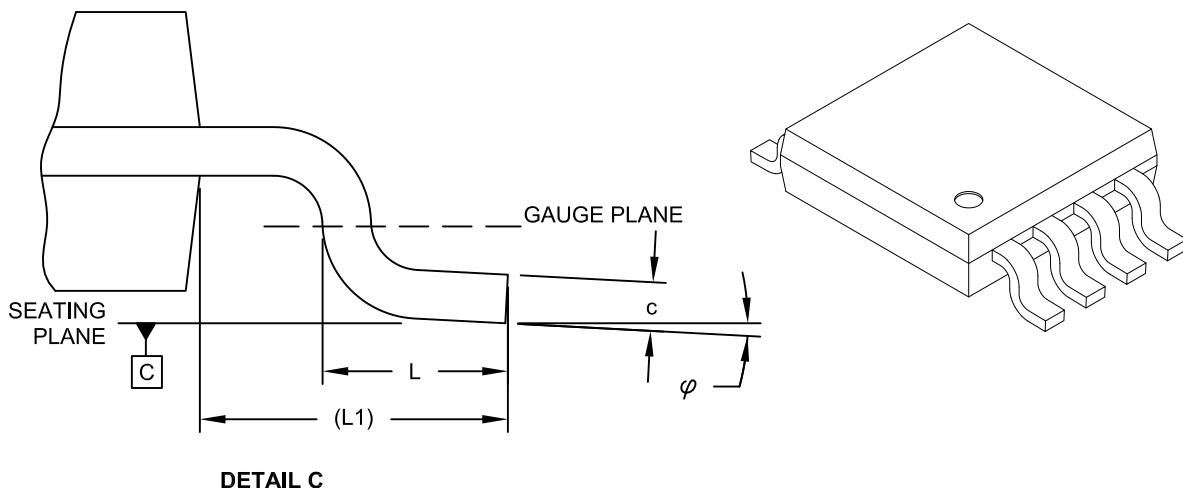
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



DETAIL C

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N			8	
Pitch	e		0.65 BSC		
Overall Height	A		-	-	1.10
Molded Package Thickness	A2		0.75	0.85	0.95
Standoff	A1		0.00	-	0.15
Overall Width	E		4.90 BSC		
Molded Package Width	E1		3.00 BSC		
Overall Length	D		3.00 BSC		
Foot Length	L		0.40	0.60	0.80
Footprint	L1		0.95 REF		
Foot Angle	φ		0°	-	8°
Lead Thickness	c		0.08	-	0.23
Lead Width	b		0.22	-	0.40

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

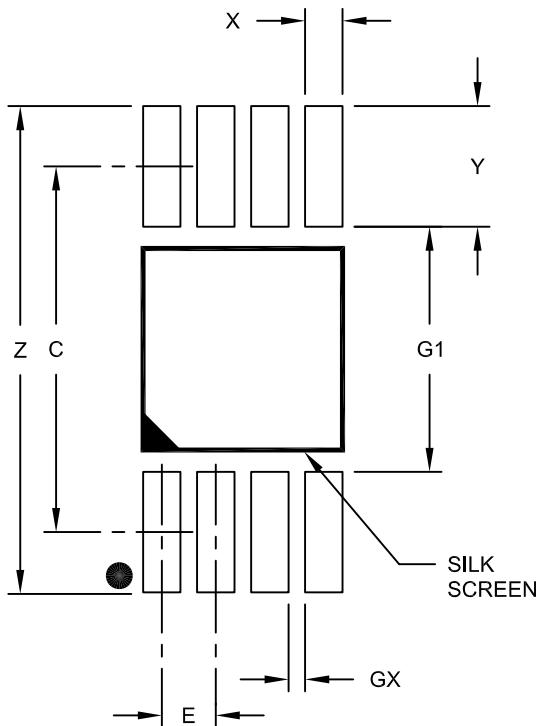
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.65	BSC	
Contact Pad Spacing	C		4.40		
Overall Width	Z			5.85	
Contact Pad Width (X8)	X1			0.45	
Contact Pad Length (X8)	Y1			1.45	
Distance Between Pads	G1	2.95			
Distance Between Pads	GX	0.20			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

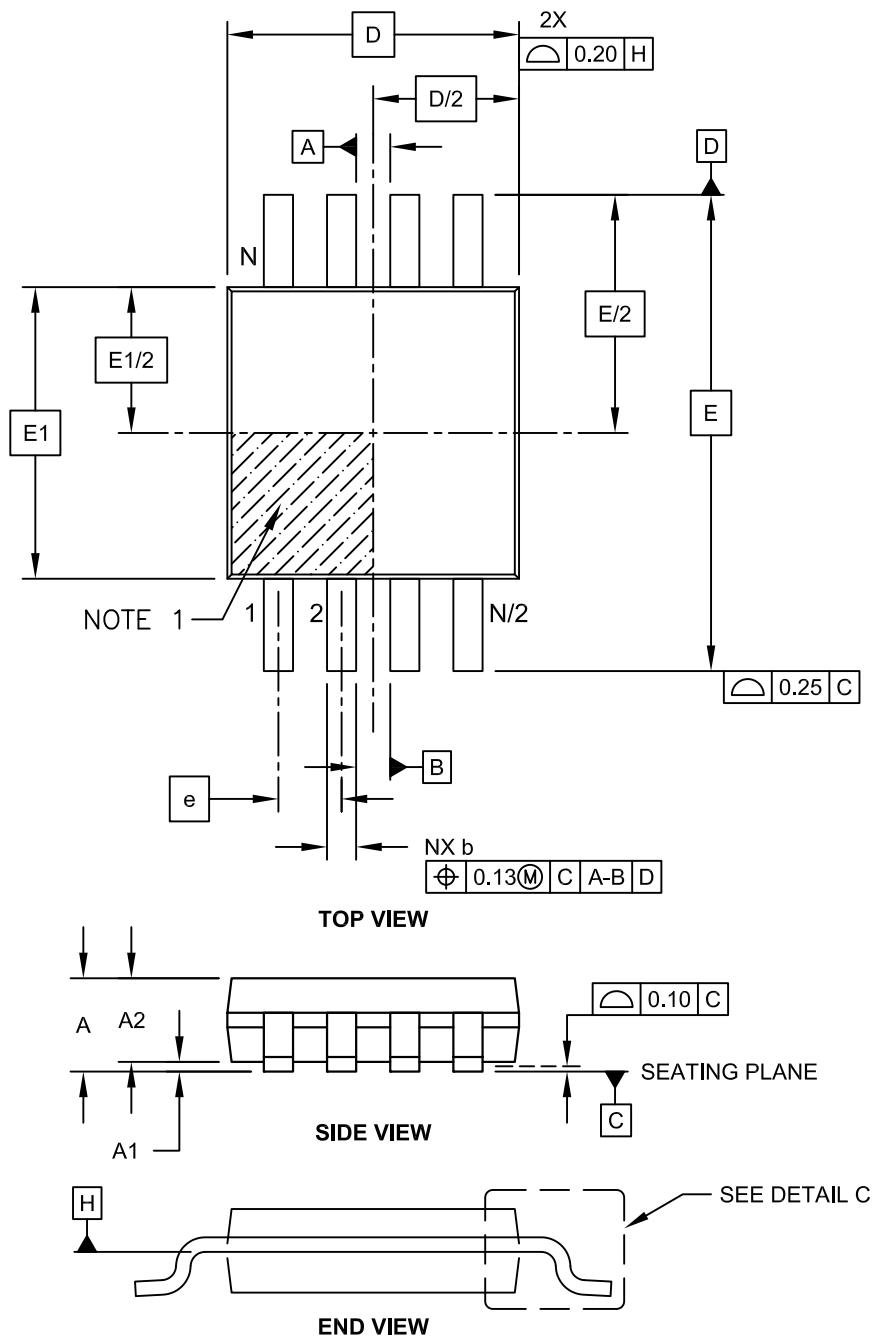
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2111A

Packaging Diagrams and Parameters

8-Lead Plastic Micro Small Outline Package (UA) [MSOP]

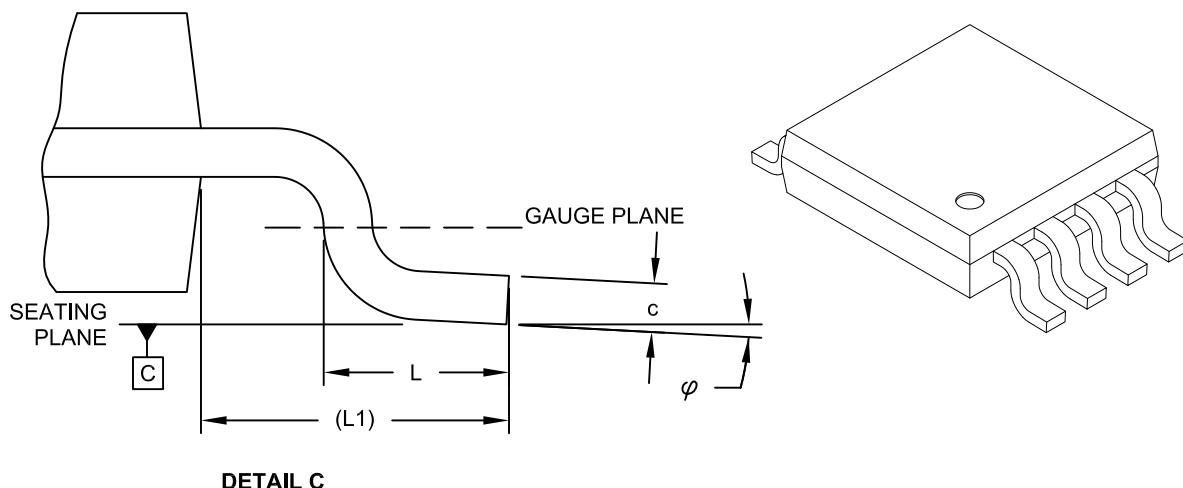
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

8-Lead Plastic Micro Small Outline Package (UA) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		8	
Pitch	e		0.65 BSC	
Overall Height	A	-	-	1.10
Molded Package Thickness	A2	0.75	0.85	0.95
Standoff	A1	0.00	-	0.15
Overall Width	E	4.90 BSC		
Molded Package Width	E1	3.00 BSC		
Overall Length	D	3.00 BSC		
Foot Length	L	0.40	0.60	0.80
Footprint	L1	0.95 REF		
Foot Angle	phi	0°	-	8°
Lead Thickness	c	0.08	-	0.23
Lead Width	b	0.22	-	0.40

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

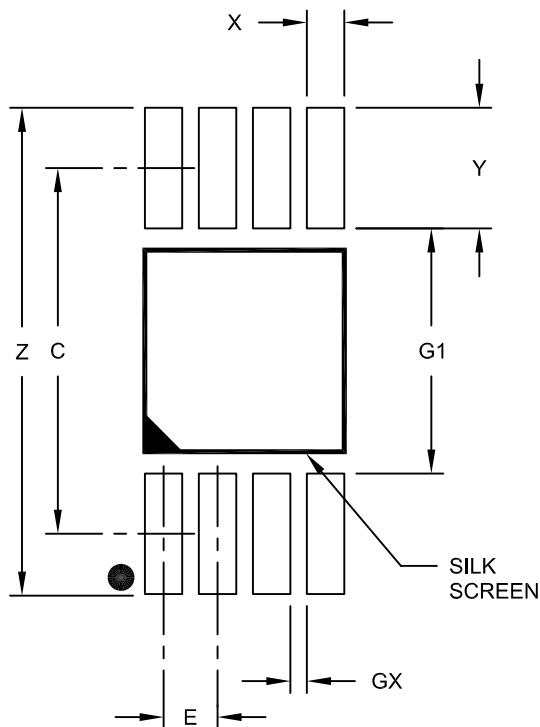
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Micro Small Outline Package (UA) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.65	BSC	
Contact Pad Spacing	C		4.40		
Overall Width	Z			5.85	
Contact Pad Width (X8)	X1			0.45	
Contact Pad Length (X8)	Y1			1.45	
Distance Between Pads	G1	2.95			
Distance Between Pads	GX	0.20			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

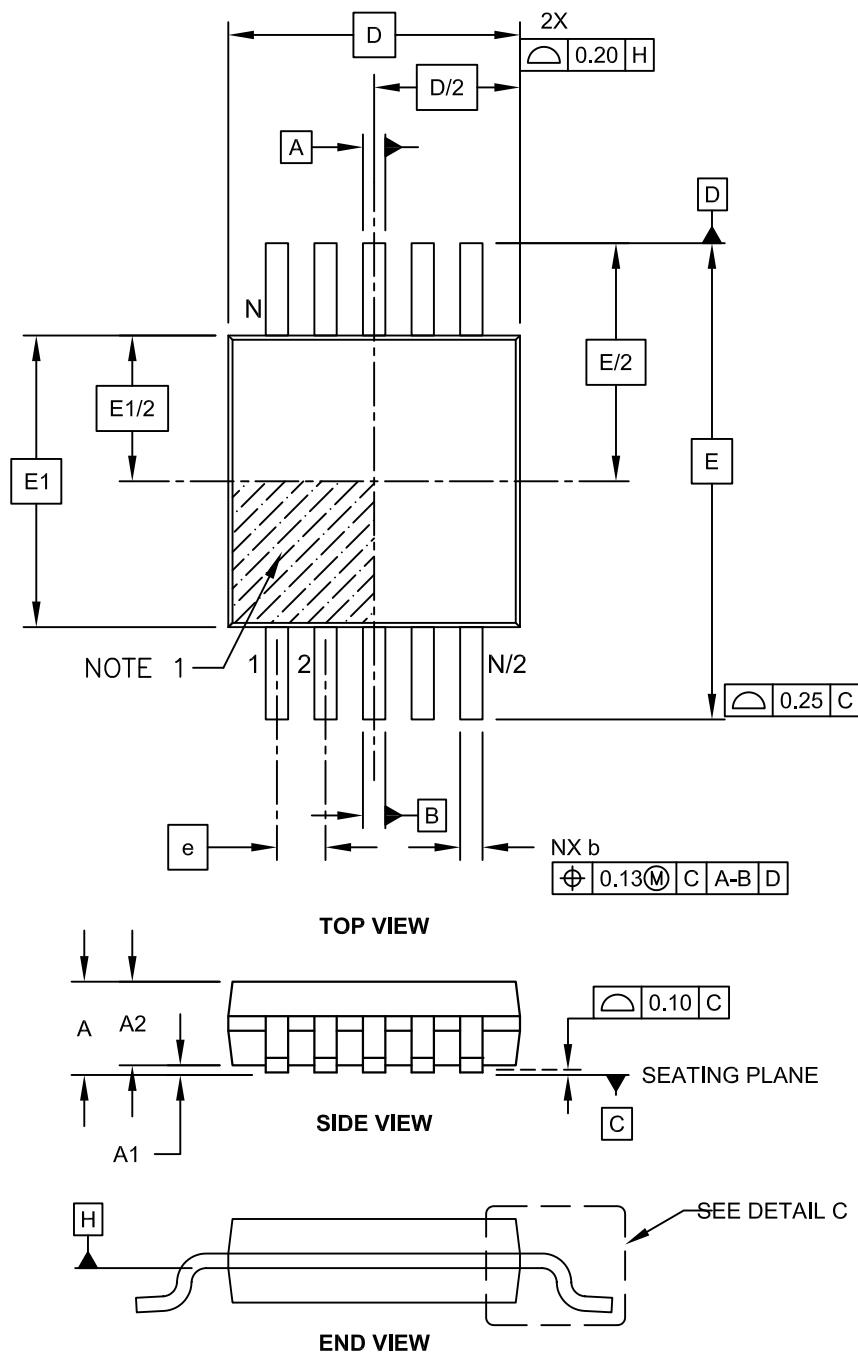
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2111A

Packaging Diagrams and Parameters

10-Lead Plastic Micro Small Outline Package (MS) [MSOP]

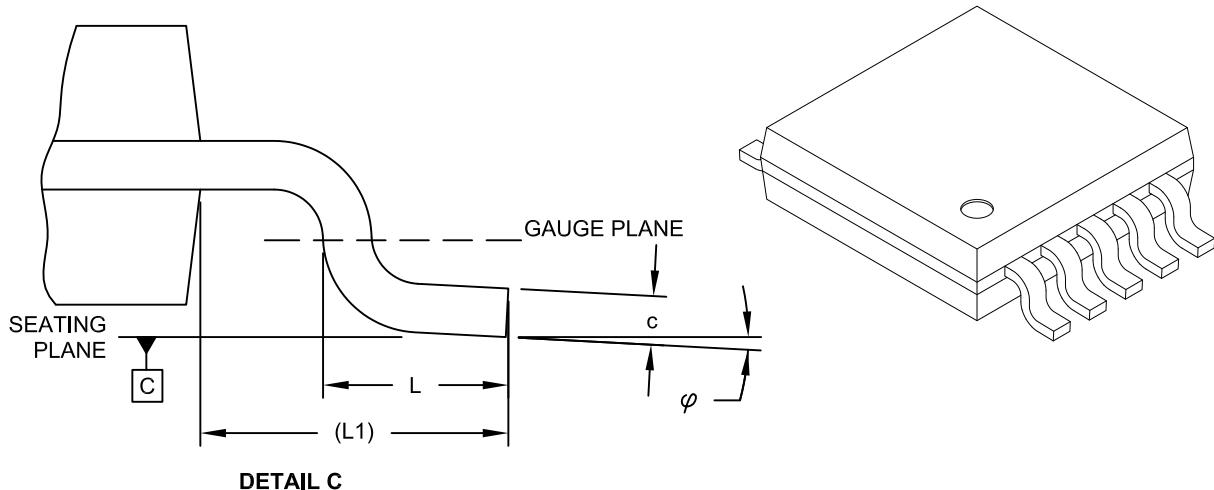
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

10-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		10		
Pitch	e		0.50	BSC	
Overall Height	A	-	-	1.10	
Molded Package Thickness	A2	0.75	0.85	0.95	
Standoff	A1	0.00	-	0.15	
Overall Width	E	4.90 BSC			
Molded Package Width	E1	3.00 BSC			
Overall Length	D	3.00 BSC			
Foot Length	L	0.40	0.60	0.80	
Footprint	L1	0.95 REF			
Foot Angle	φ	0°	-	8°	
Lead Thickness	c	0.08	-	0.23	
Lead Width	b	0.15	-	0.33	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

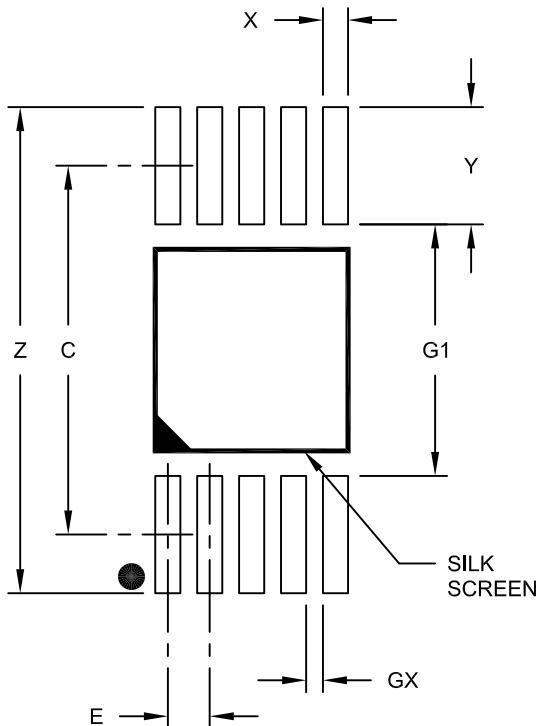
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

10-Lead Plastic Micro Small Outline Package (MS) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50	BSC	
Contact Pad Spacing	C	4.40		
Overall Width	Z		5.80	
Contact Pad Width (X10)	X1		0.30	
Contact Pad Length (X10)	Y1			1.40
Distance Between Pads	G1	3.00		
Distance Between Pads	GX	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

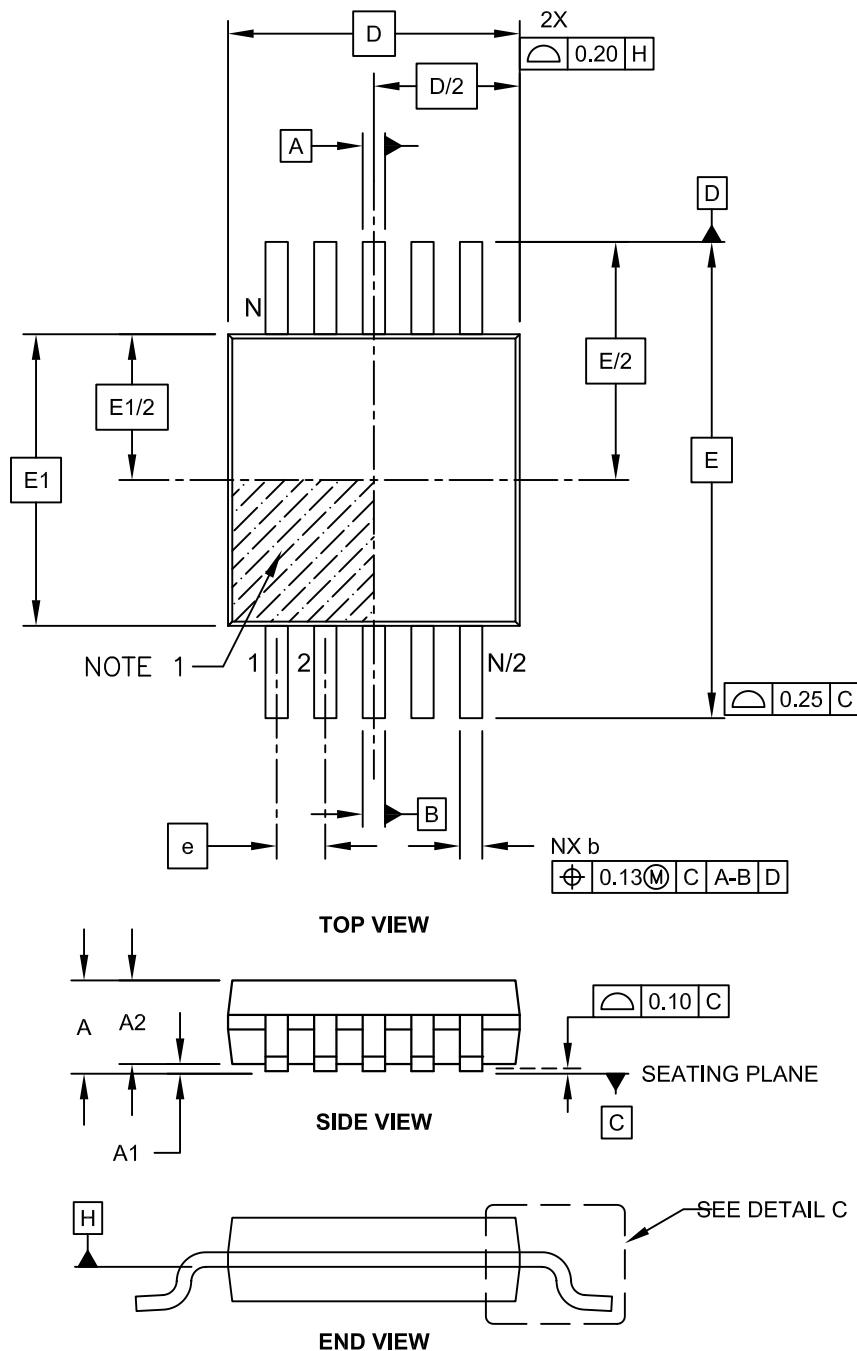
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2021A

Packaging Diagrams and Parameters

10-Lead Plastic Micro Small Outline Package (UN) [MSOP]

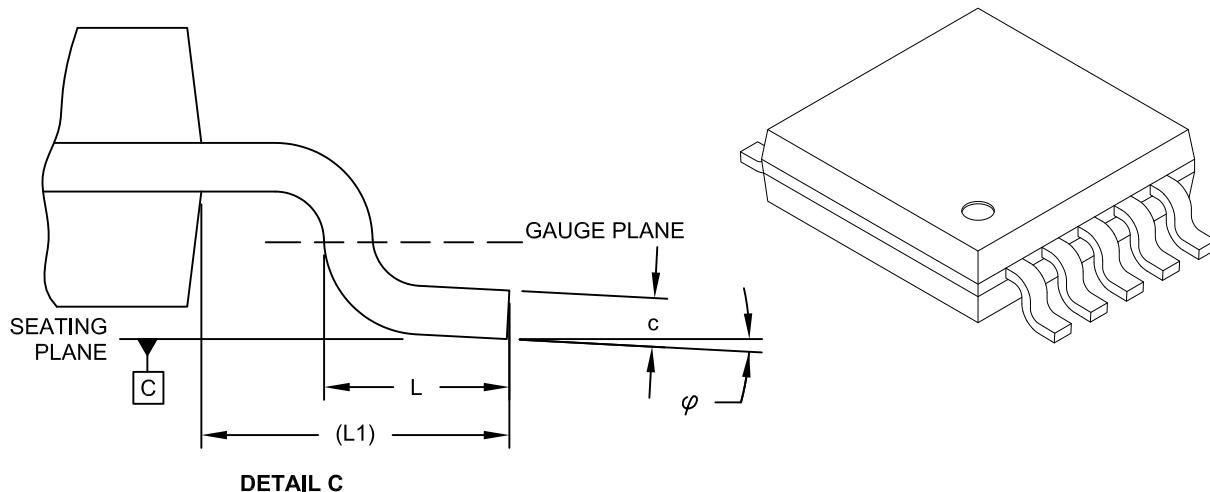
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

10-Lead Plastic Micro Small Outline Package (UN) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		10		
Pitch	e		0.50	BSC	
Overall Height	A	-	-	1.10	
Molded Package Thickness	A2	0.75	0.85	0.95	
Standoff	A1	0.00	-	0.15	
Overall Width	E	4.90 BSC			
Molded Package Width	E1	3.00 BSC			
Overall Length	D	3.00 BSC			
Foot Length	L	0.40	0.60	0.80	
Footprint	L1	0.95 REF			
Foot Angle	φ	0°	-	8°	
Lead Thickness	c	0.08	-	0.23	
Lead Width	b	0.15	-	0.33	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

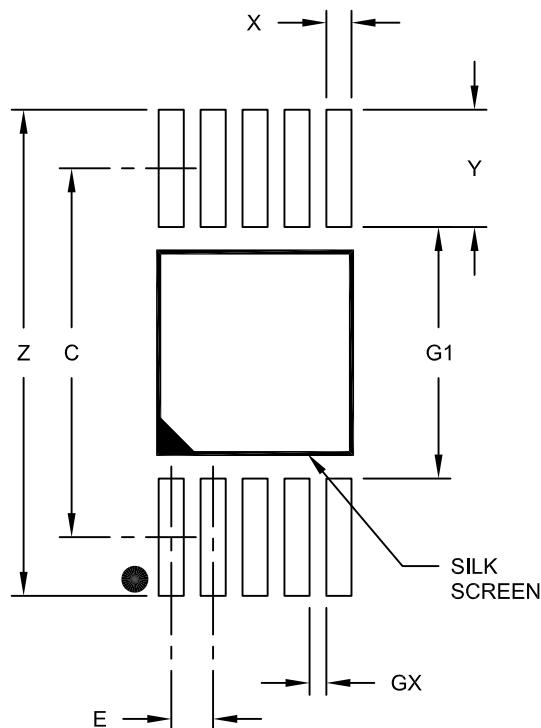
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

10-Lead Plastic Micro Small Outline Package (UN) [MSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.50	BSC	
Contact Pad Spacing	C		4.40	
Overall Width	Z			5.80
Contact Pad Width (X10)	X1			0.30
Contact Pad Length (X10)	Y1			1.40
Distance Between Pads	G1	3.00		
Distance Between Pads	GX	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

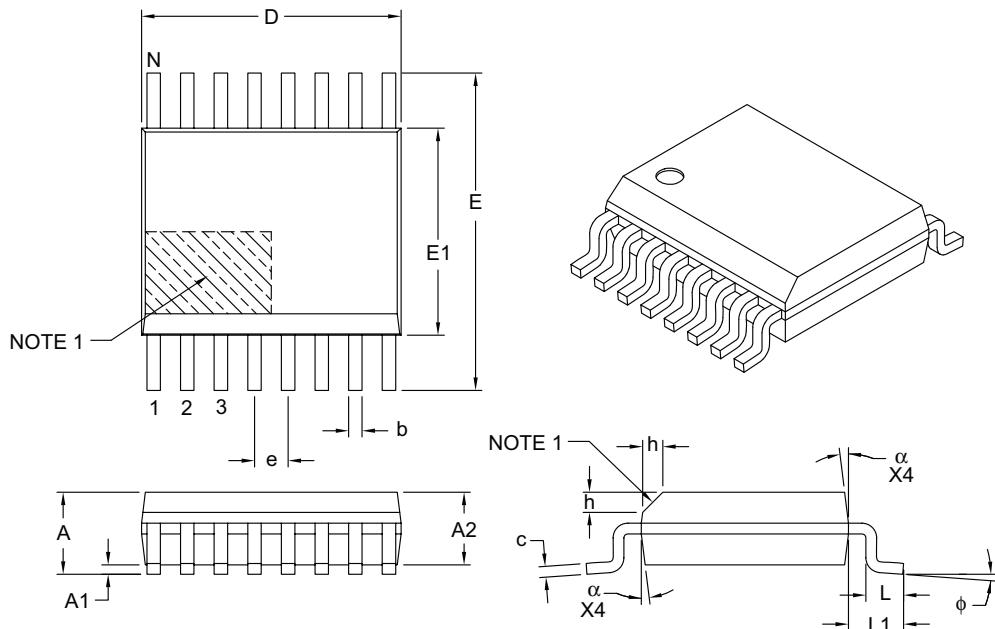
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2021A

Packaging Diagrams and Parameters

16-Lead Plastic Shrink Small Outline Narrow Body (QR) – .150" Body [QSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			INCHES		
		Dimension Limits			MIN	NOM	MAX
Number of Pins	N				16		
Pitch	e				.025	BSC	
Overall Height	A	—	—	—	.069		
Standoff §	A1	.004	—	—	.010		
Molded Package Height	A2	.049	—	—	—		
Overall Width	E	.236 BSC					
Molded Package Width	E1	.154 BSC					
Overall Length	D	.193 BSC					
Chamfer Distance	h	.010	—	—	.020		
Lead Thickness	c	.006	—	—	.010		
Lead Width	b	.008	—	—	.012		
Footprint	L1	.041 REF					
Foot Length	L	.016	—	—	.050		
Foot Angle	phi	0°	—	—	8°		
Molded Draft Angle	alpha	5°	—	—	15°		

Notes:

1. Chamfer feature is optional. If it is not present, then a Pin 1 visual index feature must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .006" per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

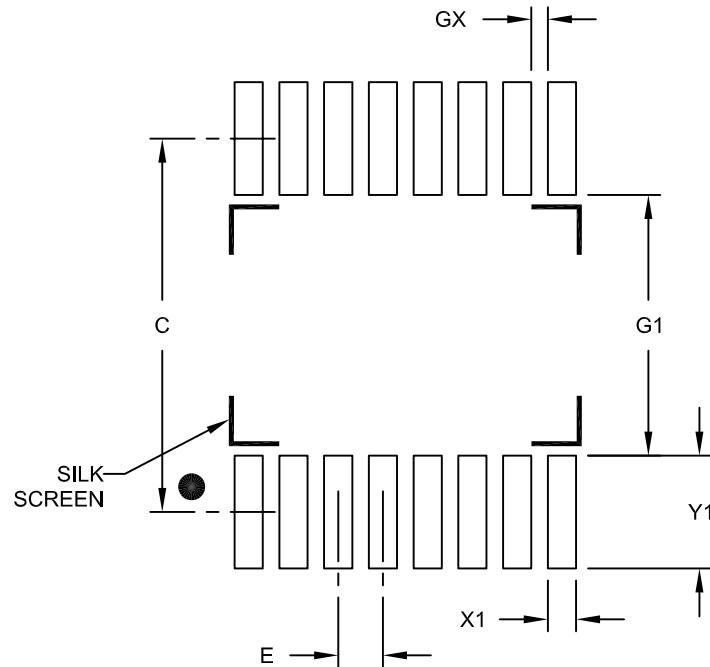
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

16-Lead Plastic Shrink Small Outline Narrow Body (QR) - .150" Body [QSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		INCHES		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		.025	BSC
Contact Pad Spacing	C		.209	
Contact Pad Width (X16)	X1			.016
Contact Pad Length (X16)	Y1			.063
Distance Between Pads	GX	.009		
Distance Between Pads	G1	.146		

Notes:

- ## 1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2024A

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

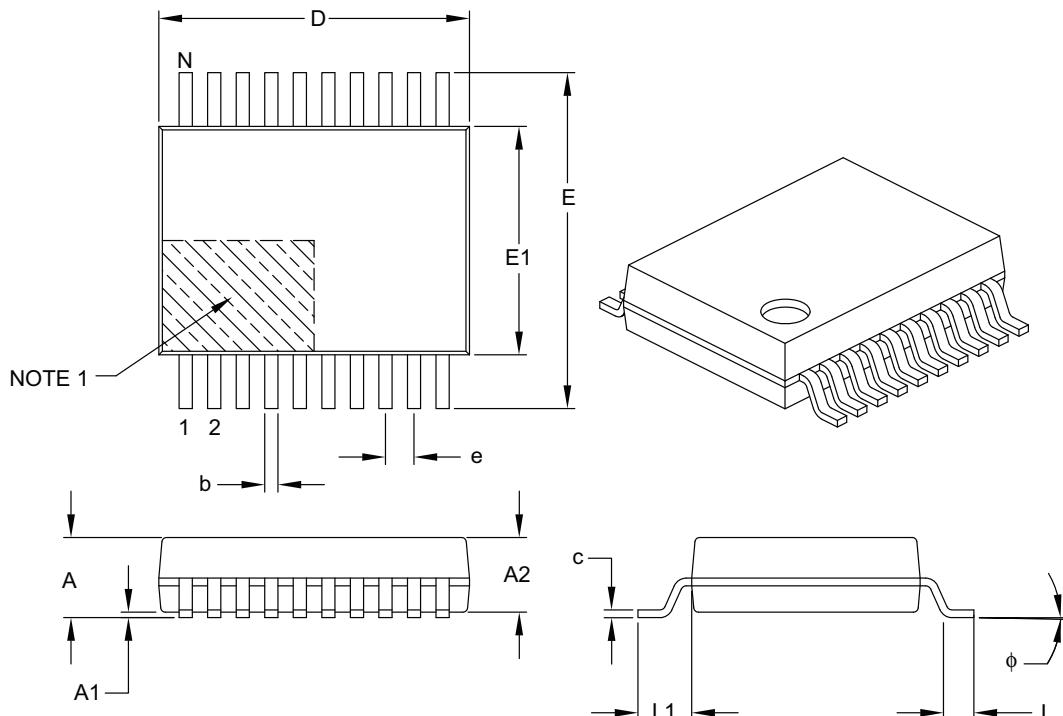
SSOP Family

Shrink Small Outline Packages

Packaging Diagrams and Parameters

20-Lead Plastic Shrink Small Outline (SS) – 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		20		
Pitch	e		0.65	BSC	
Overall Height	A	—	—	2.00	
Molded Package Thickness	A2	1.65	1.75	1.85	
Standoff	A1	0.05	—	—	
Overall Width	E	7.40	7.80	8.20	
Molded Package Width	E1	5.00	5.30	5.60	
Overall Length	D	6.90	7.20	7.50	
Foot Length	L	0.55	0.75	0.95	
Footprint	L1	1.25 REF			
Lead Thickness	c	0.09	—	0.25	
Foot Angle	ϕ	0°	4°	8°	
Lead Width	b	0.22	—	0.38	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.20 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

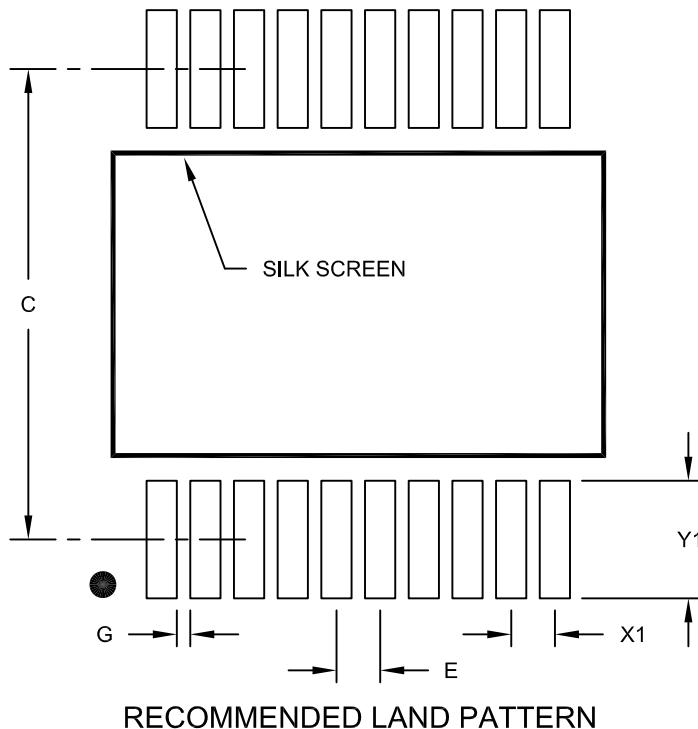
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-072B

Land Pattern (Footprint)

20-Lead Plastic Shrink Small Outline (SS) - 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Contact Pad Spacing	C		7.20	
Contact Pad Width (X20)	X1			0.45
Contact Pad Length (X20)	Y1			1.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

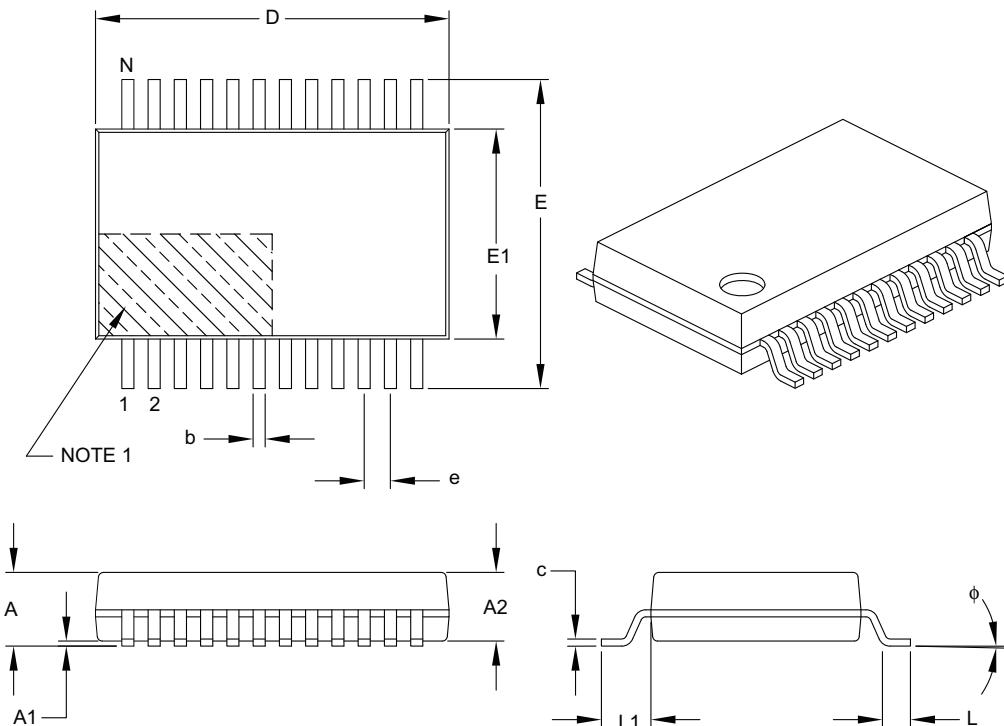
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2072A

Packaging Diagrams and Parameters

24-Lead Plastic Shrink Small Outline (SS) – 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		UNITS			MILLIMETERS		
		DIMENSION LIMITS			MIN	NOM	MAX
Number of Pins	N				24		
Pitch	e				0.65 BSC		
Overall Height	A		—	—	2.00		
Molded Package Thickness	A2	1.65	1.75	1.85			
Standoff	A1	0.05	—	—			
Overall Width	E	7.40	7.80	8.20			
Molded Package Width	E1	5.00	5.30	5.60			
Overall Length	D	7.90	8.20	8.50			
Foot Length	L	0.55	0.75	0.95			
Footprint	L1	1.25 REF					
Lead Thickness	c	0.09	—	0.25			
Foot Angle	ϕ	0°	4°	8°			
Lead Width	b	0.22	—	0.38			

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.20 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

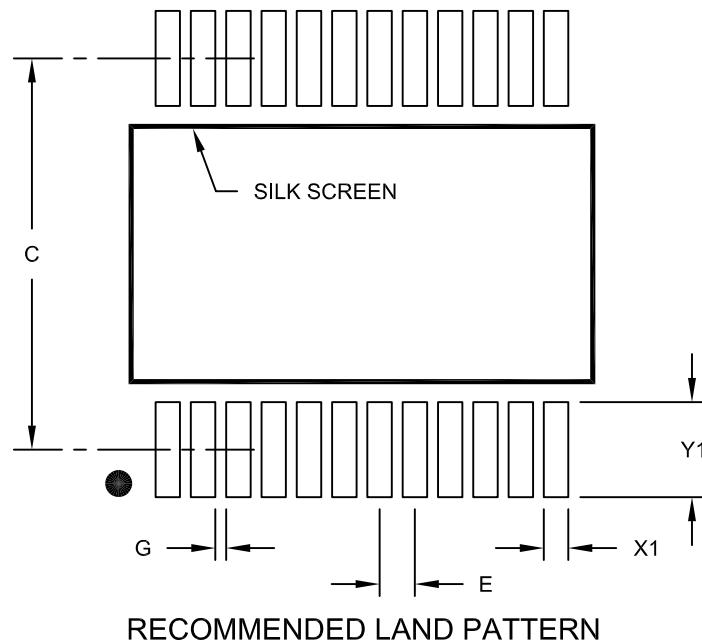
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

24 Lead Plastic Shrink Small Outline (SS) - 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Contact Pad Spacing	C		7.20	
Contact Pad Width (X24)	X1			0.45
Contact Pad Length (X24)	Y1			1.75
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

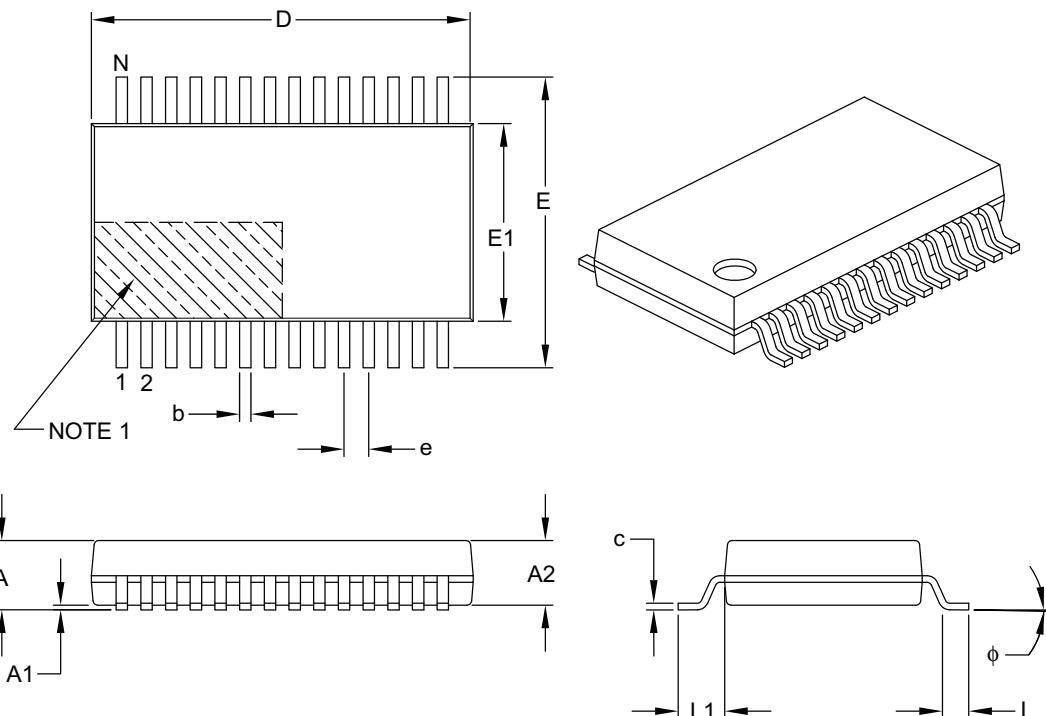
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2132A

Packaging Diagrams and Parameters

28-Lead Plastic Shrink Small Outline (SS) – 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins		28		
Pitch		e 0.65 BSC		
Overall Height		A	—	2.00
Molded Package Thickness		A2	1.65	1.75
Standoff		A1	0.05	—
Overall Width		E	7.40	7.80
Molded Package Width		E1	5.00	5.30
Overall Length		D	9.90	10.20
Foot Length		L	0.55	0.75
Footprint		L1	1.25 REF	
Lead Thickness		c	0.09	—
Foot Angle		phi	0°	4°
Lead Width		b	0.22	—
				0.38

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.20 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

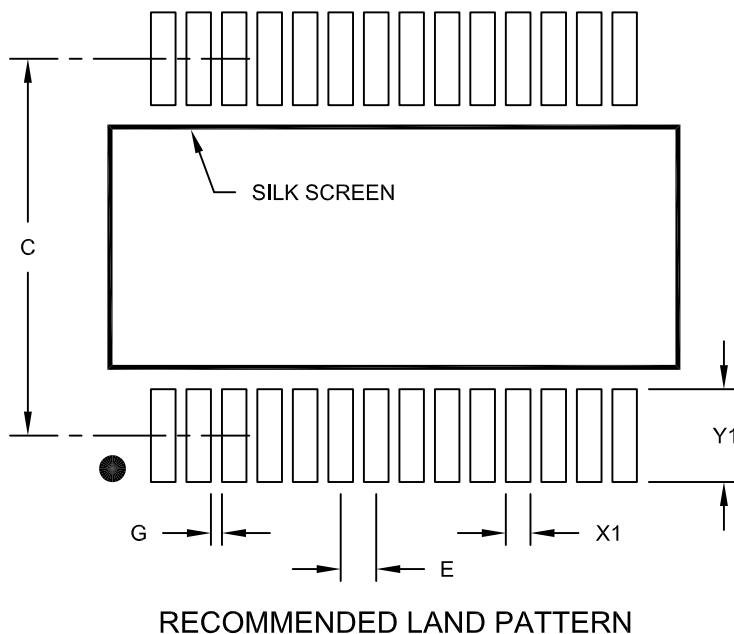
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

28-Lead Plastic Shrink Small Outline (SS) - 5.30 mm Body [SSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E	0.65 BSC					
Contact Pad Spacing	C			7.20			
Contact Pad Width (X28)	X1				0.45		
Contact Pad Length (X28)	Y1					1.75	
Distance Between Pads	G	0.20					

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2073A

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

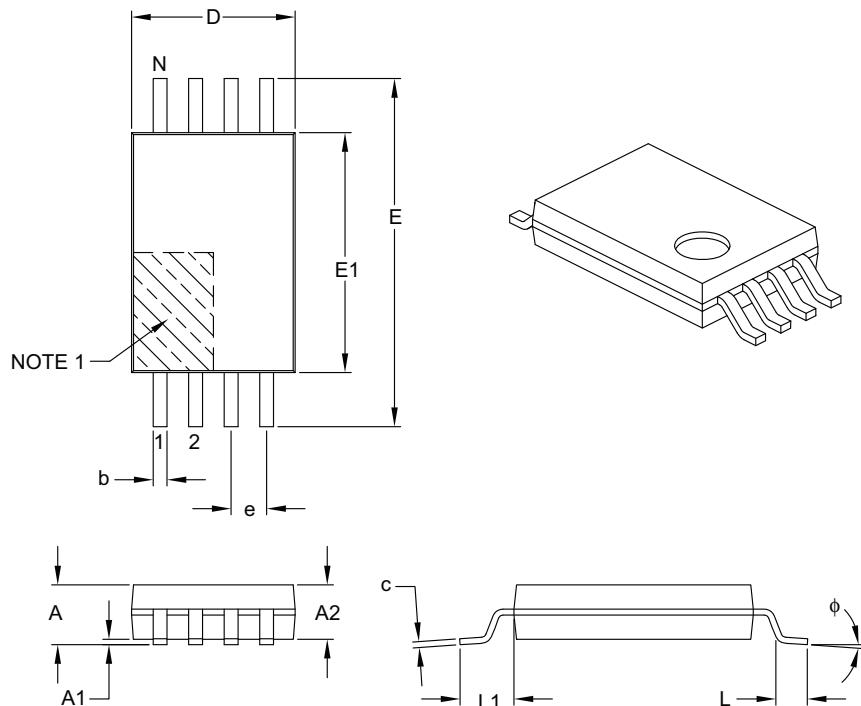
TSSOP Family

Thin Shrink, Small Outline Packages

Packaging Diagrams and Parameters

8-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins		N		
Pitch		e		
Overall Height		A		
Molded Package Thickness		A2		
Standoff		A1		
Overall Width		E		
Molded Package Width		E1		
Molded Package Length		D		
Foot Length		L		
Footprint		L1		
Foot Angle		ϕ		
Lead Thickness		c		
Lead Width		b		

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

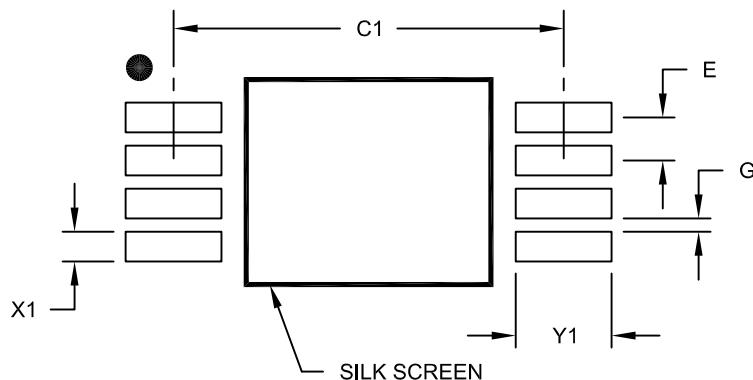
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

8-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E	0.65 BSC					
Contact Pad Spacing	C1			5.90			
Contact Pad Width (X8)	X1				0.45		
Contact Pad Length (X8)	Y1					1.45	
Distance Between Pads	G	0.20					

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

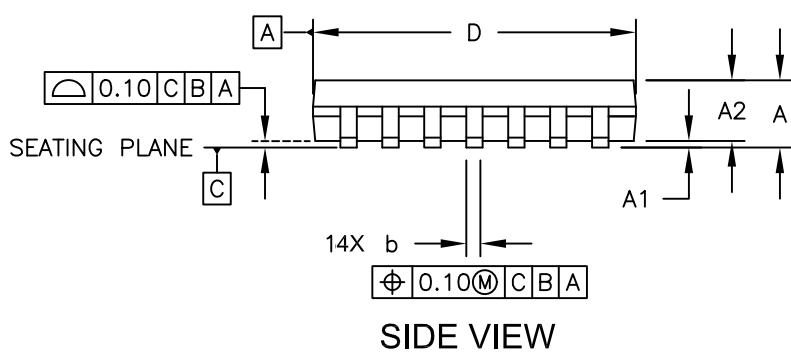
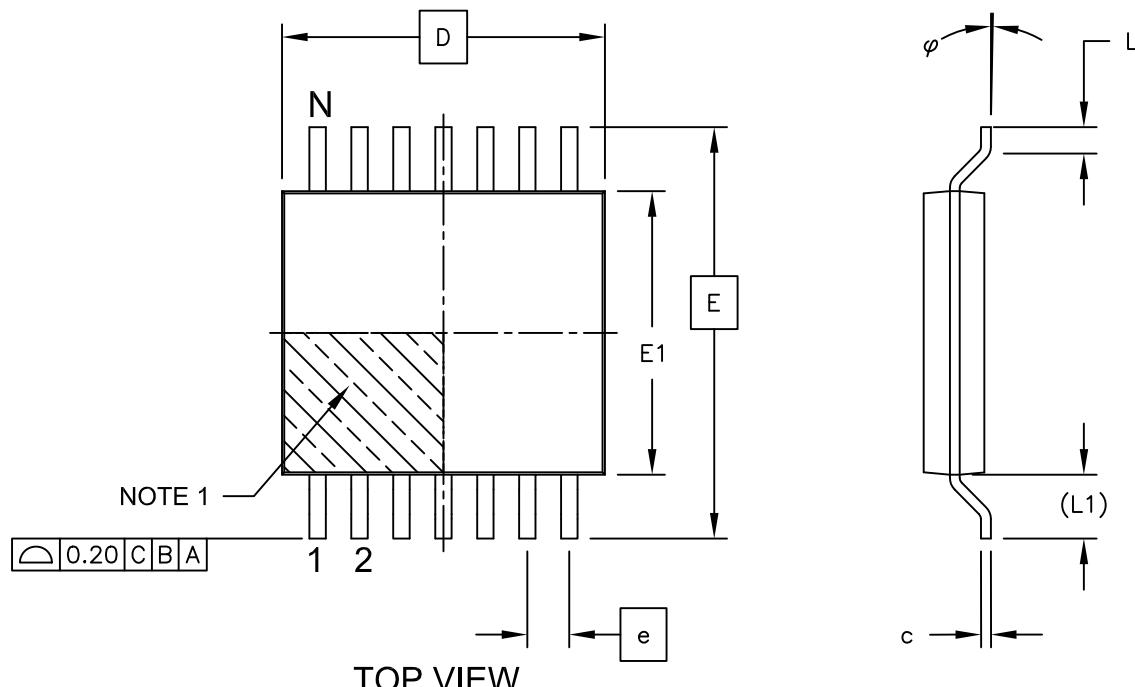
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2086A

Packaging Diagrams and Parameters

14-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

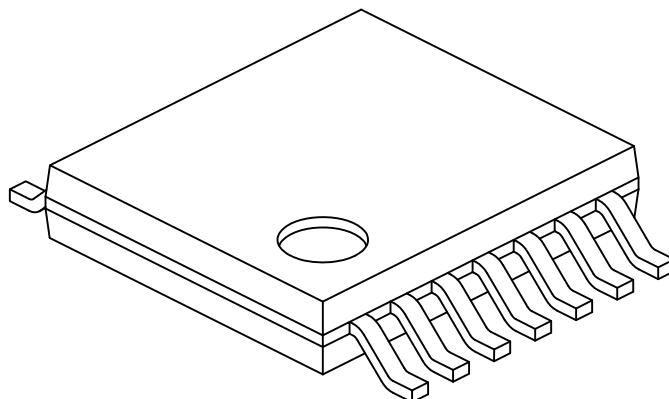
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

14-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		14		
Pitch	e		0.65	BSC	
Overall Height	A	-	-	1.20	
Molded Package Thickness	A2	0.80	1.00	1.05	
Standoff	A1	0.05	-	0.15	
Overall Width	E	6.40 BSC			
Molded Package Width	E1	4.30	4.40	4.50	
Molded Package Length	D	4.90	5.00	5.10	
Foot Length	L	0.45	0.60	0.75	
Footprint	(L1)	1.00 REF			
Foot Angle	φ	0°	-	8°	
Lead Thickness	c	0.09	-	0.20	
Lead Width	b	0.19	-	0.30	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M

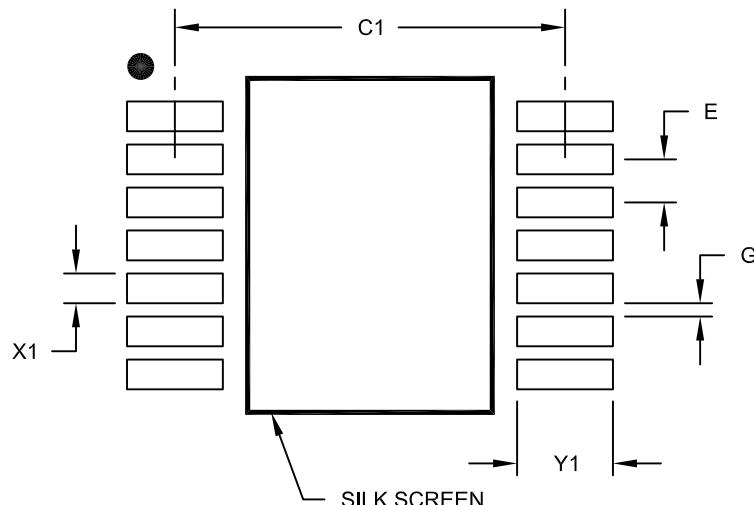
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

14-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch		E			0.65 BSC		
Contact Pad Spacing		C1			5.90		
Contact Pad Width (X14)		X1			0.45		
Contact Pad Length (X14)		Y1			1.45		
Distance Between Pads		G			0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

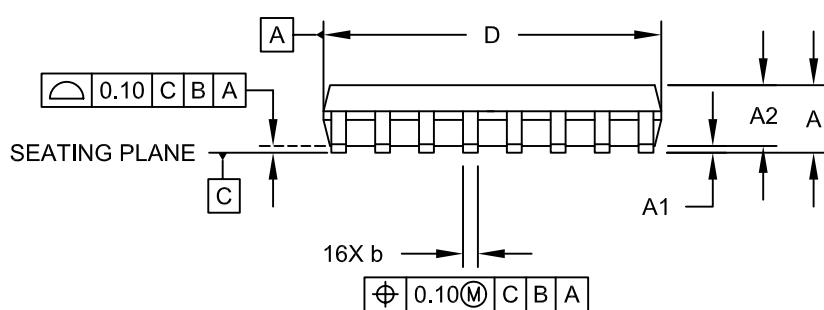
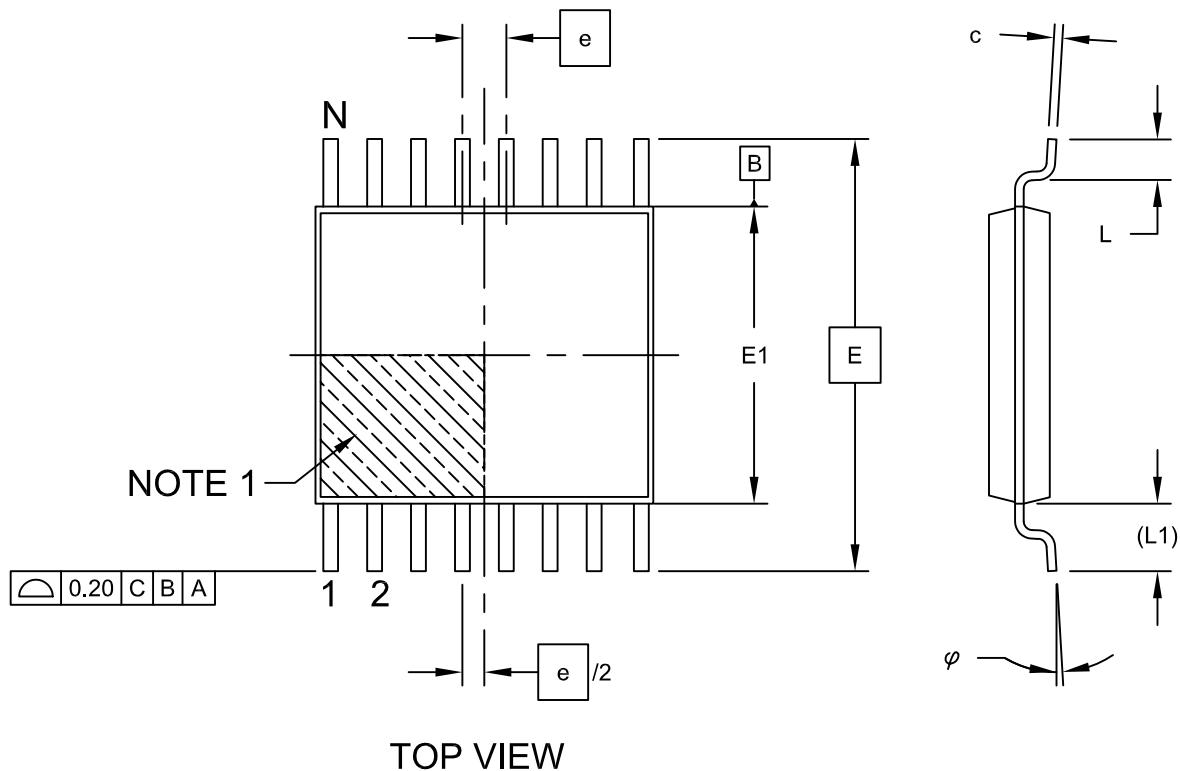
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2087A

Packaging Diagrams and Parameters

16-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

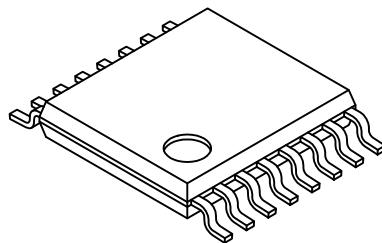
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

16-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Pins	N		16		
Pitch	e		0.65	BSC	
Overall Height	A	-	-	1.20	
Molded Package Thickness	A2	0.80	1.00	1.05	
Standoff	A1	0.05	-	0.15	
Overall Width	E		6.40	BSC	
Molded Package Width	E1	4.30	4.40	4.50	
Molded Package Length	D	4.90	5.00	5.10	
Foot Length	L	0.45	0.60	0.75	
Footprint	(L1)		1.00	REF	
Foot Angle	φ	0°	-	8°	
Lead Thickness	c	0.09	-	0.20	
Lead Width	b	0.19	-	0.30	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M

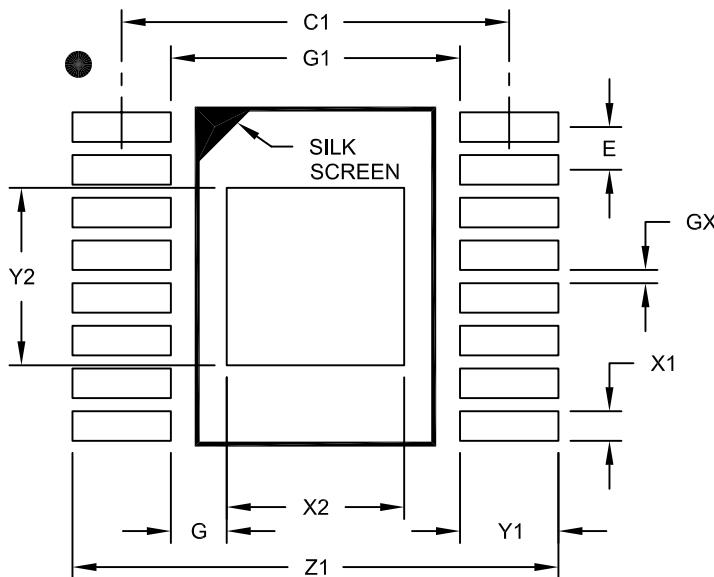
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

16-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.65	BSC	
Optional Center Pad Length	Y2				2.70
Optional Center Pad Width	X2				2.70
Clearance Between Contact Pads	G1	4.40			
Contact Pad To Center Pad	G	0.73			
Contact Pad Spacing	C1		5.90		
Contact Pad Width (X16)	X1			0.45	
Contact Pad Length (X16)	Y1			1.50	
Distance Between Pads	GX	0.20			
Overall Width	Z1			7.40	

Notes:

- Dimensioning and tolerancing per ASME Y14.5M

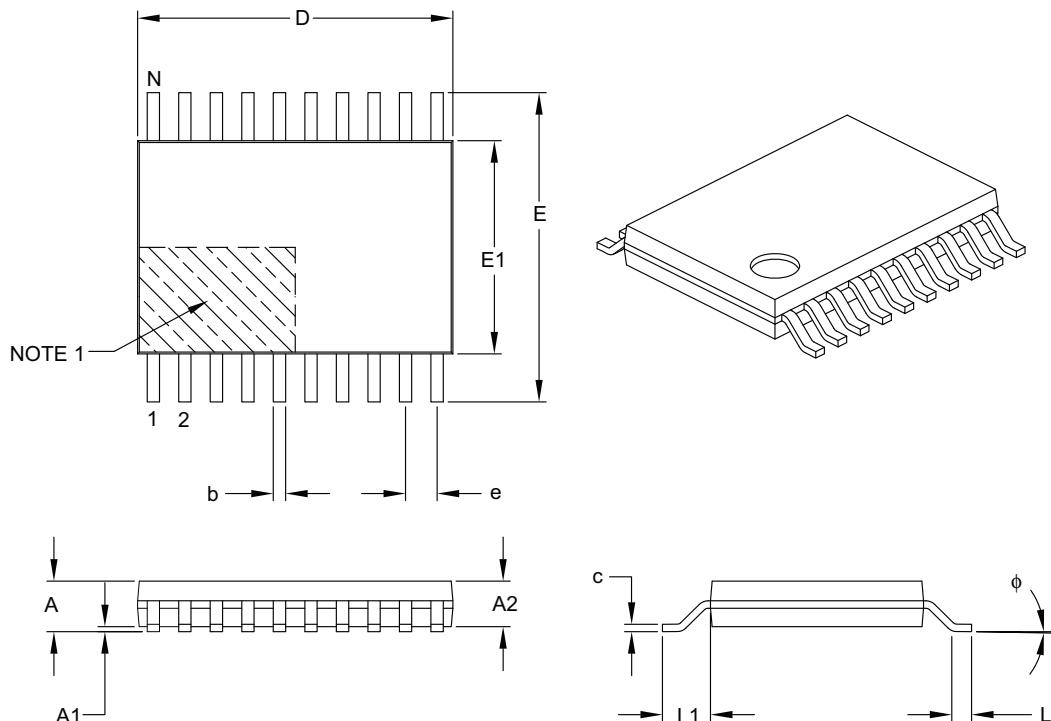
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2068A

Packaging Diagrams and Parameters

20-Lead Plastic Thin Shrink Small Outline (ST) – 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		20	
Pitch	e		0.65 BSC	
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.80	1.00	1.05
Standoff	A1	0.05	–	0.15
Overall Width	E	6.40 BSC		
Molded Package Width	E1	4.30	4.40	4.50
Molded Package Length	D	6.40	6.50	6.60
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	φ	0°	–	8°
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.19	–	0.30

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
3. Dimensioning and tolerancing per ASME Y14.5M.

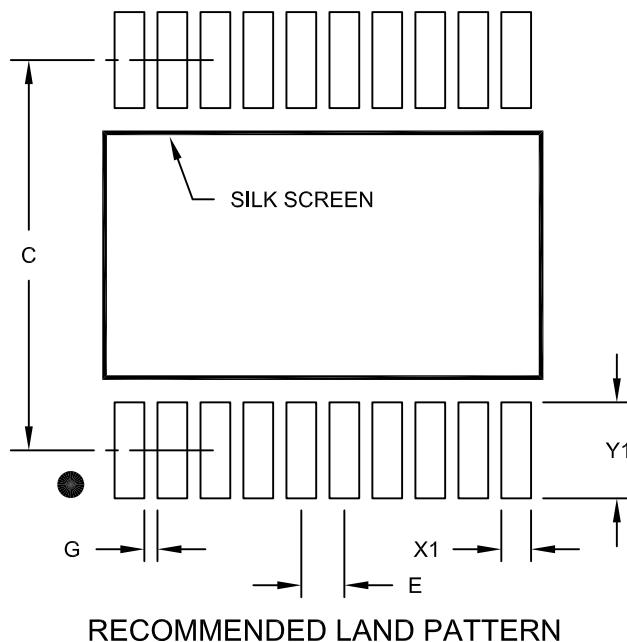
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

20-Lead Plastic Thin Shrink Small Outline (ST) - 4.4 mm Body [TSSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Contact Pitch	E		0.65	BSC	
Contact Pad Spacing	C		5.90		
Contact Pad Width (X20)	X1			0.45	
Contact Pad Length (X20)	Y1				1.45
Distance Between Pads	G	0.20			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2088A

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

TSOP Family

Thin Small Outline Package

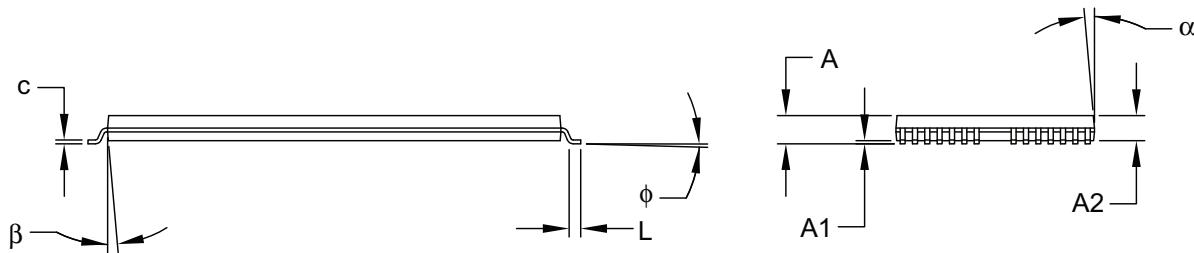
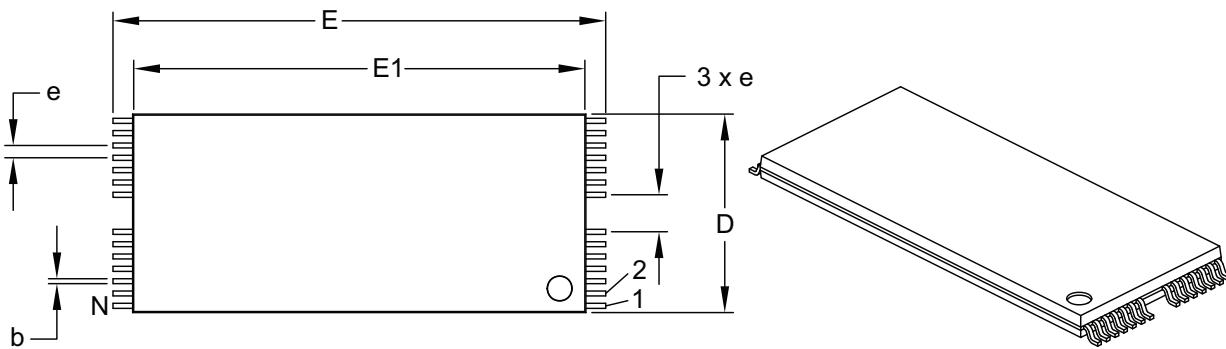
VSOP Family

Very Small Outline Package

Packaging Diagrams and Parameters

28-Lead Plastic Thin Small Outline (TS) – 8x20 mm [TSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N		28	
Pitch	e		0.50	
Overall Height	A	0.99	1.14	1.30
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff §	A1	0.05	0.15	0.25
Overall Width	E	19.80	20.00	20.20
Molded Package Width	E1	18.30	18.40	18.50
Molded Package Length	D	7.80	8.00	8.20
Foot Length	L	0.50	0.60	0.70
Foot Angle	ϕ	0°	4°	8°
Lead Thickness	c	0.10	0.15	0.20
Lead Width	b	0.15	0.20	0.25
Mold Draft Angle Top	α	0°	5°	10°
Mold Draft Angle Bottom	β	0°	5°	10°

Notes:

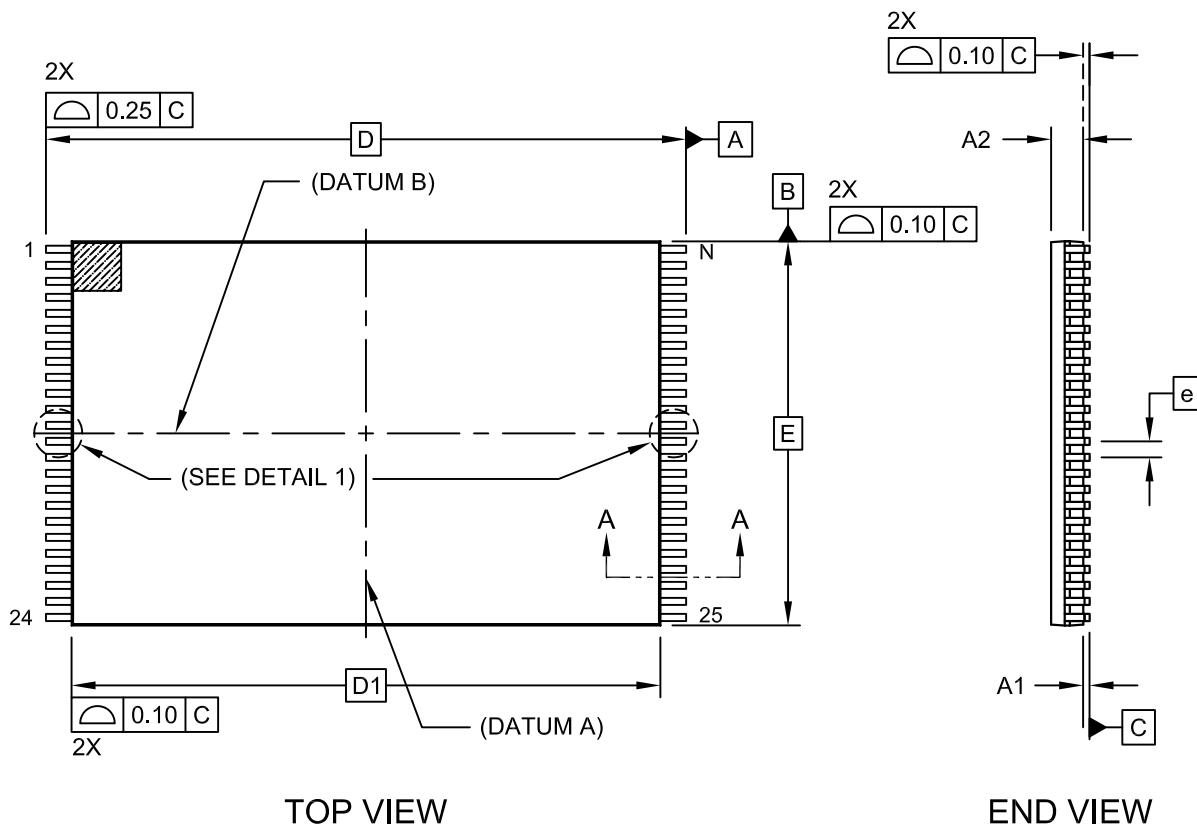
1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. § Significant Characteristic.

Microchip Technology Drawing C04-067B

Packaging Diagrams and Parameters

48-LEAD THIN SMALL OUTLINE PACKAGE (TV) - 12x20 mm Body [TSOP]

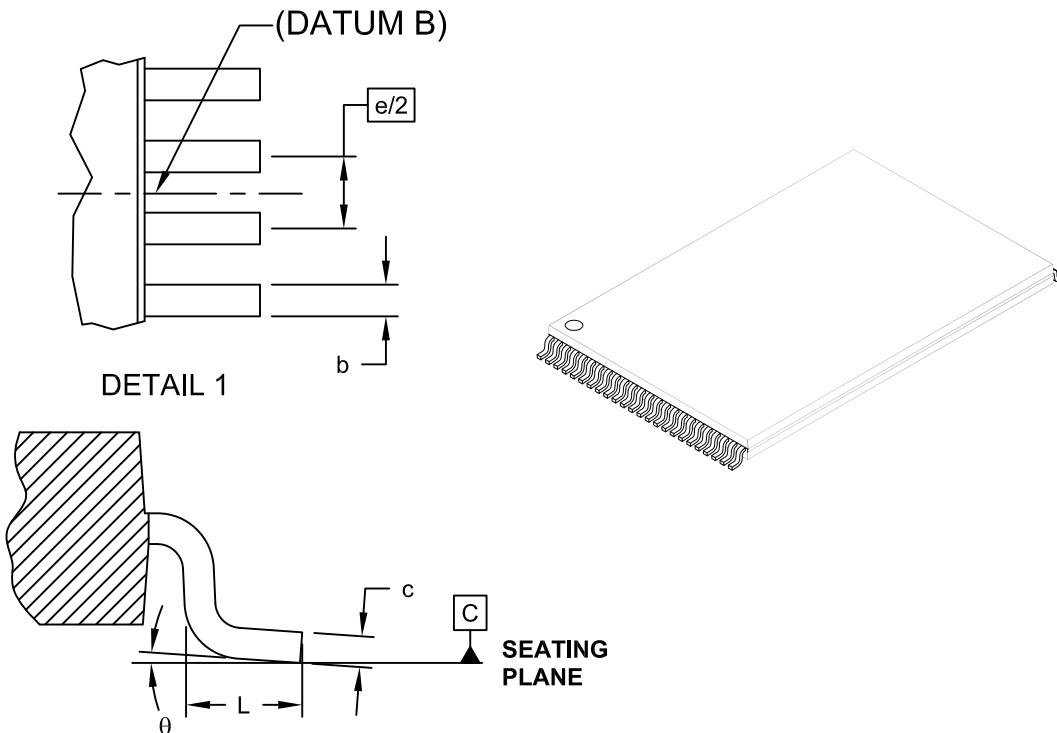
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

48-LEAD THIN SMALL OUTLINE PACKAGE (TV) - 12x20 mm Body [TSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



SECTION A-A

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	48		
Pitch	e	0.50	BSC	
Overall Height	A	-	-	1.20
Standoff	A1	0.05	-	0.15
Molded Package Height	A2	0.95	1.00	1.05
Overall Width	E	12.00	BSC	
Overall Length	D	20.00	BSC	
Molded Package Length	D1	18.40	BSC	
Lead Width	b	0.17	0.22	0.27
Lead Thickness	c	0.10	-	0.21
Lead Length	L	0.50	0.60	0.70
Lead Foot Angle	θ	0°	5°	8°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

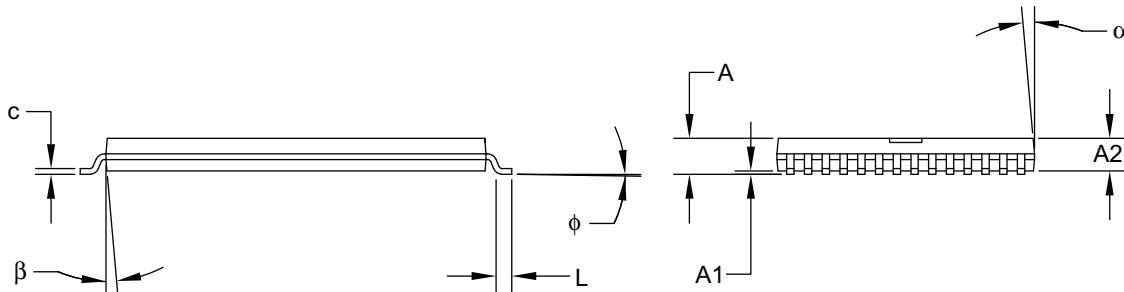
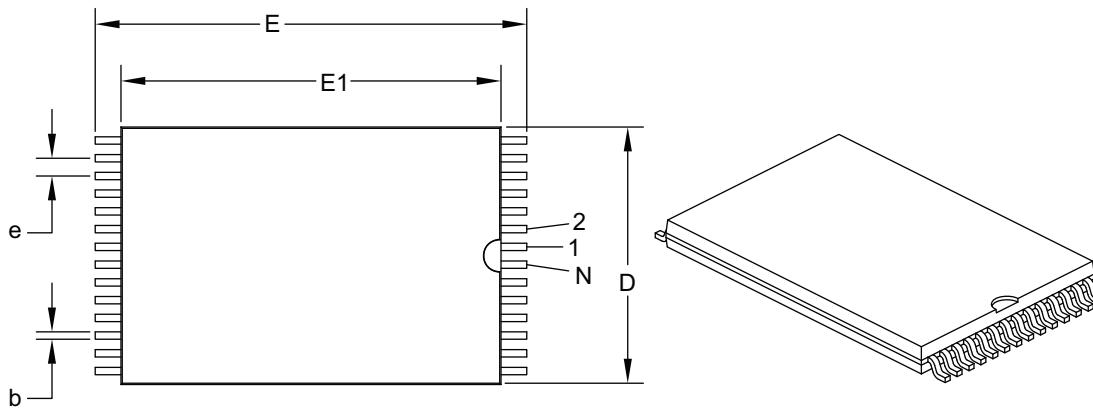
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

28-Lead Plastic Very Small Outline (VS) – 8x13.4 mm Body [VSOP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits		Units	MILLIMETERS		
	N		MIN	NOM	MAX
Number of Pins	N		28		
Pitch	e		0.55		
Overall Height	A	0.99	1.14	1.29	
Molded Package Thickness	A2	0.95	1.00	1.05	
Standoff §	A1	0.05	0.13	0.25	
Overall Width	E	13.20	13.40	13.60	
Molded Package Width	E1	11.70	11.80	11.90	
Molded Package Length	D	7.90	8.00	8.10	
Foot Length	L	0.30	0.50	0.70	
Foot Angle	ϕ	0°	3°	5°	
Lead Thickness	c	0.14	0.15	0.16	
Lead Width	b	0.17	0.20	0.23	
Mold Draft Angle Top	α	0°	5°	10°	
Mold Draft Angle Bottom	β	0°	5°	10°	

Notes:

- § Significant Characteristic.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

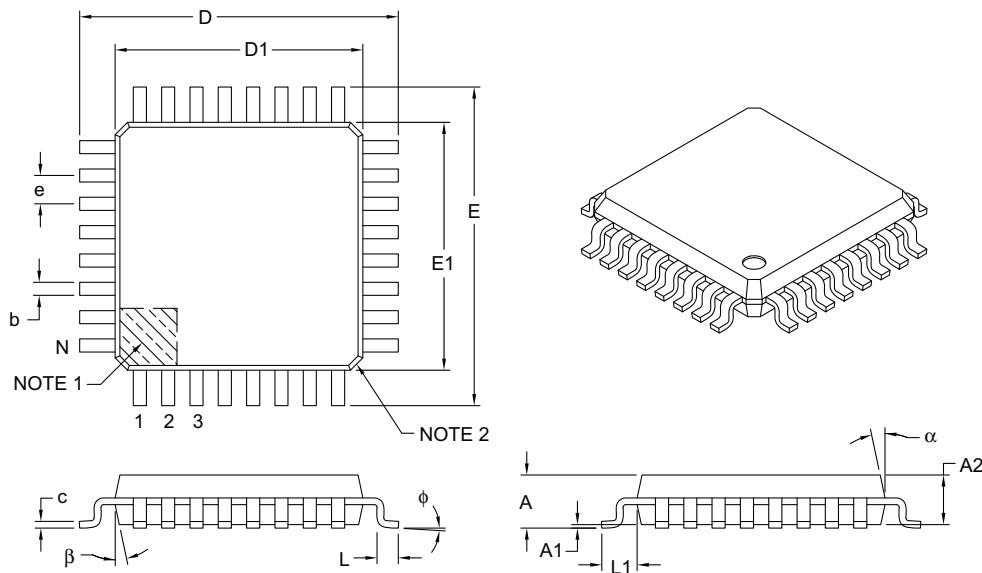
LQFP Family

Low Profile Quad Flat Packages

Packaging Diagrams and Parameters

32-Lead Plastic Low-Profile Quad Flatpack (PL) – 7x7x1.4 mm Body, 2.0 mm [LQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Leads	N		32		
Lead Pitch	e		0.80	BSC	
Overall Height	A	—	—	1.60	
Molded Package Thickness	A2	1.35	1.40	1.45	
Standoff	A1	0.05	—	0.15	
Foot Length	L	0.45	0.60	0.75	
Footprint	L1	1.00 REF			
Foot Angle	φ	0°	3.5°	7°	
Overall Width	E	9.00 BSC			
Overall Length	D	9.00 BSC			
Molded Package Width	E1	7.00 BSC			
Molded Package Length	D1	7.00 BSC			
Lead Thickness	c	0.09	—	0.20	
Lead Width	b	0.30	0.37	0.45	
Mold Draft Angle Top	α	11°	12°	13°	
Mold Draft Angle Bottom	β	11°	12°	13°	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

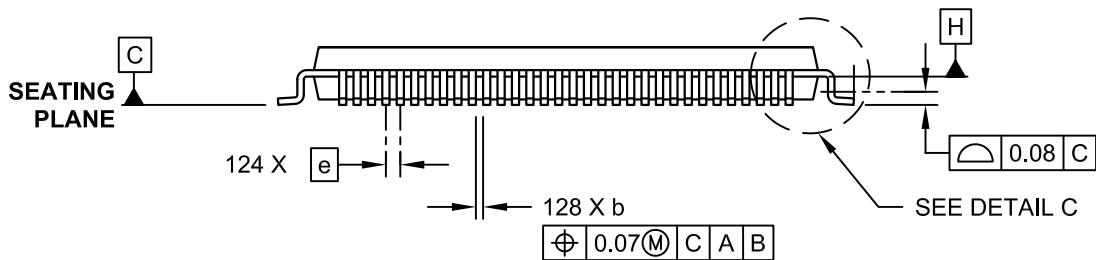
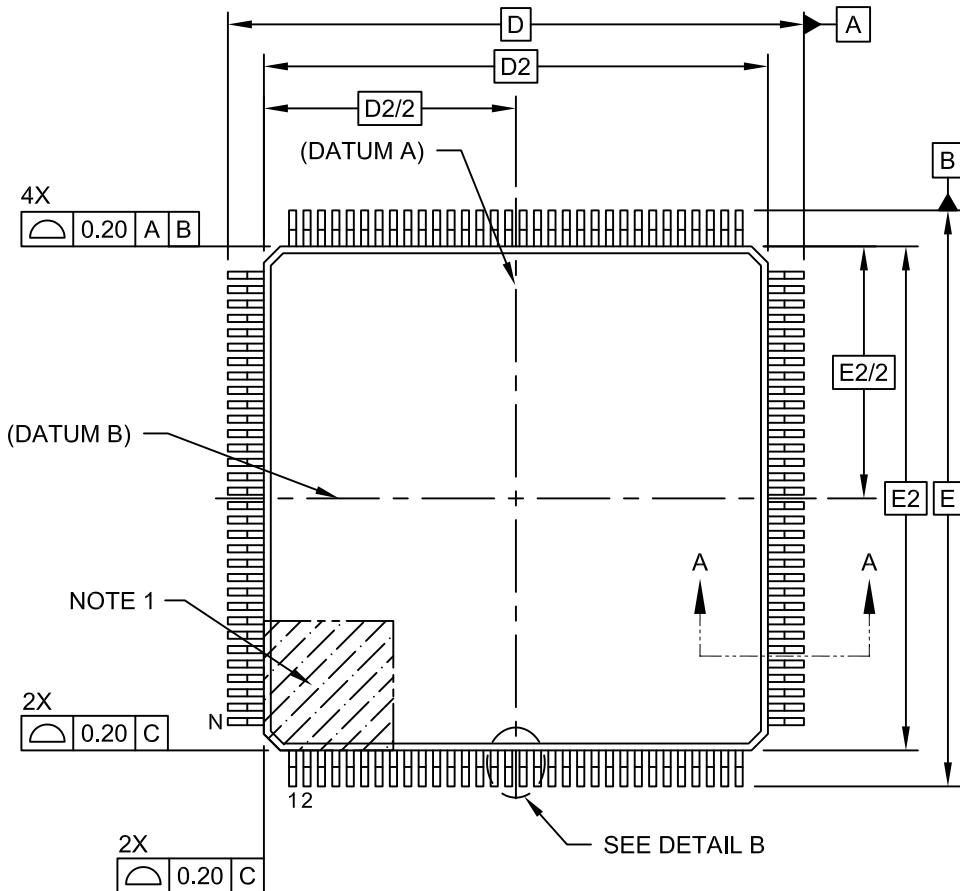
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

128-Lead Low Profile Plastic Quad Flat Pack (PT) – 14x14x1.4 mm Body [LQFP]

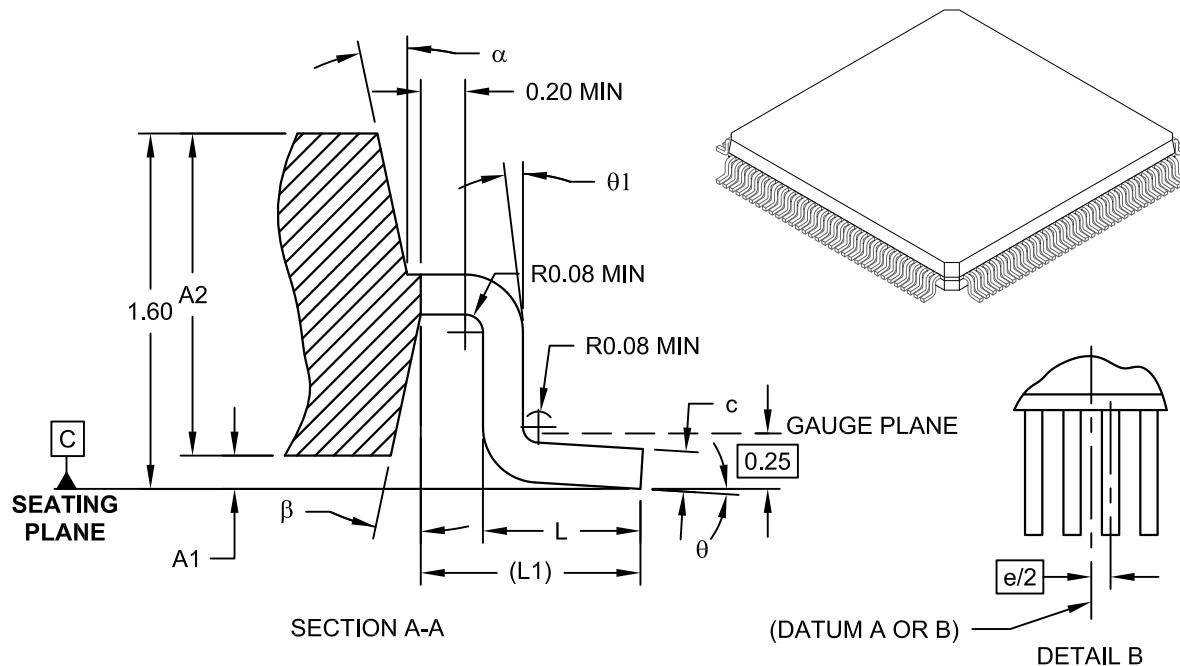
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

128-Lead Low Profile Plastic Quad Flat Pack (PT) – 14x14x1.4 mm Body [LQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	128		
Pitch	e	0.40 BSC		
Overall Height	A	-	-	1.60
Molded Package Thickness	A2	1.35	1.40	1.45
Standoff	A1	0.05	-	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Lead Angle	θ	0°	-	-
Foot Angle	θ_1	0°	3.5°	7°
Overall Width	D	16.00 BSC		
Overall Length	E	16.00 BSC		
Molded Body Width	D1	14.00 BSC		
Molded Body Length	E1	14.00 BSC		
Lead Thickness	c	0.09	-	0.20
Foot Angle	θ	0°	-	-
Mold Draft Angle Top	α	-	-	-
Mold Draft Angle Bottom	β	-	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Exact shape at each corner may vary.
3. Dimensioning and tolerancing per ASME Y14.5M.

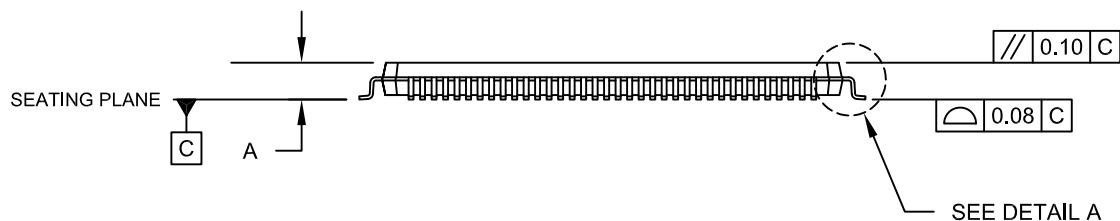
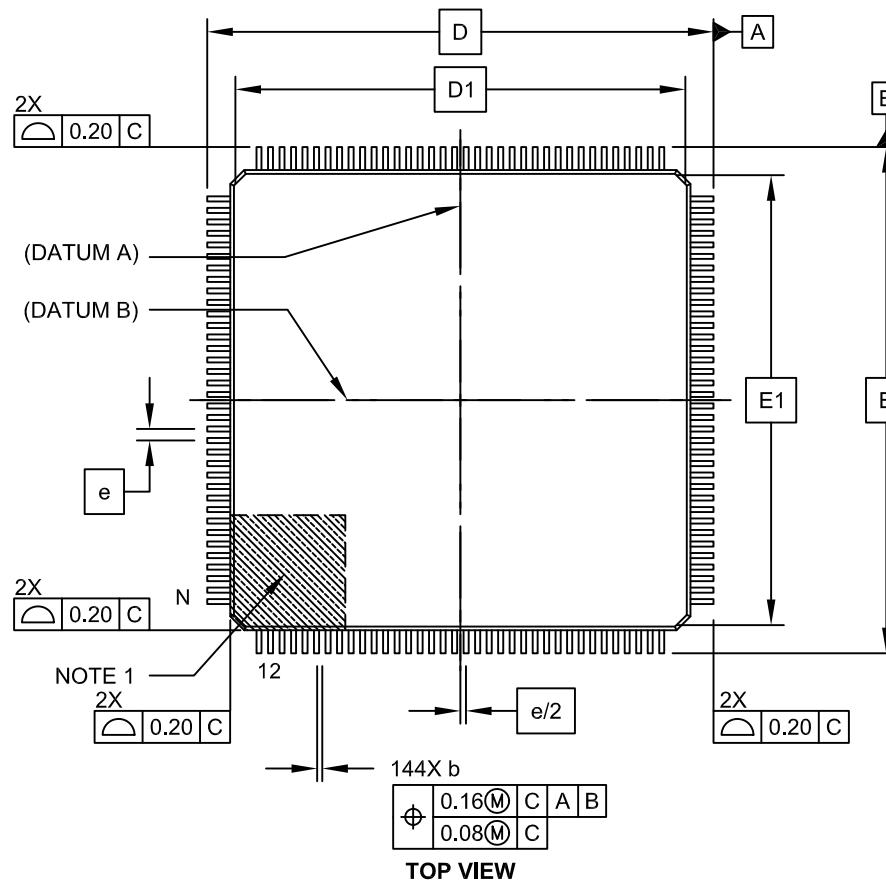
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

144-Lead Plastic Low Profile Quad Flatpack (PL) – 20x20x1.40 mm Body, with 2.00 mm Footprint [LQFP]

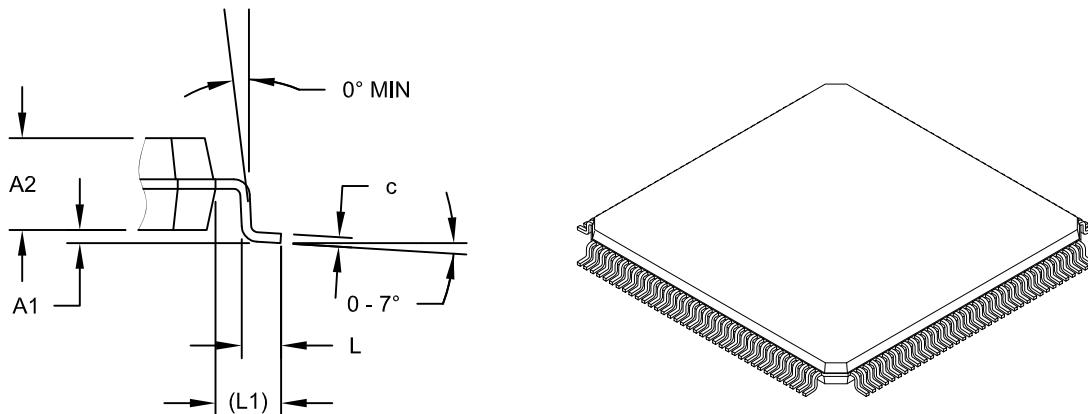
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

144-Lead Plastic Low Profile Quad Flatpack (PL) – 20x20x1.40 mm Body, with 2.00 mm Footprint [LQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



DETAIL A

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Leads	N		144	
Lead Pitch	e		0.50 BSC	
Overall Height	A	-	-	1.60
Molded Package Height	A2	1.35	1.40	1.45
Standoff	A1	0.05	-	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 (REF)		
Overall Width	E	22.00 BSC		
Overall Length	D	22.00 BSC		
Molded Body Width	E1	20.00 BSC		
Molded Body Length	D1	20.00 BSC		
Lead Thickness	c	0.09	-	0.20
Lead Width	b	0.17	0.22	0.27

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

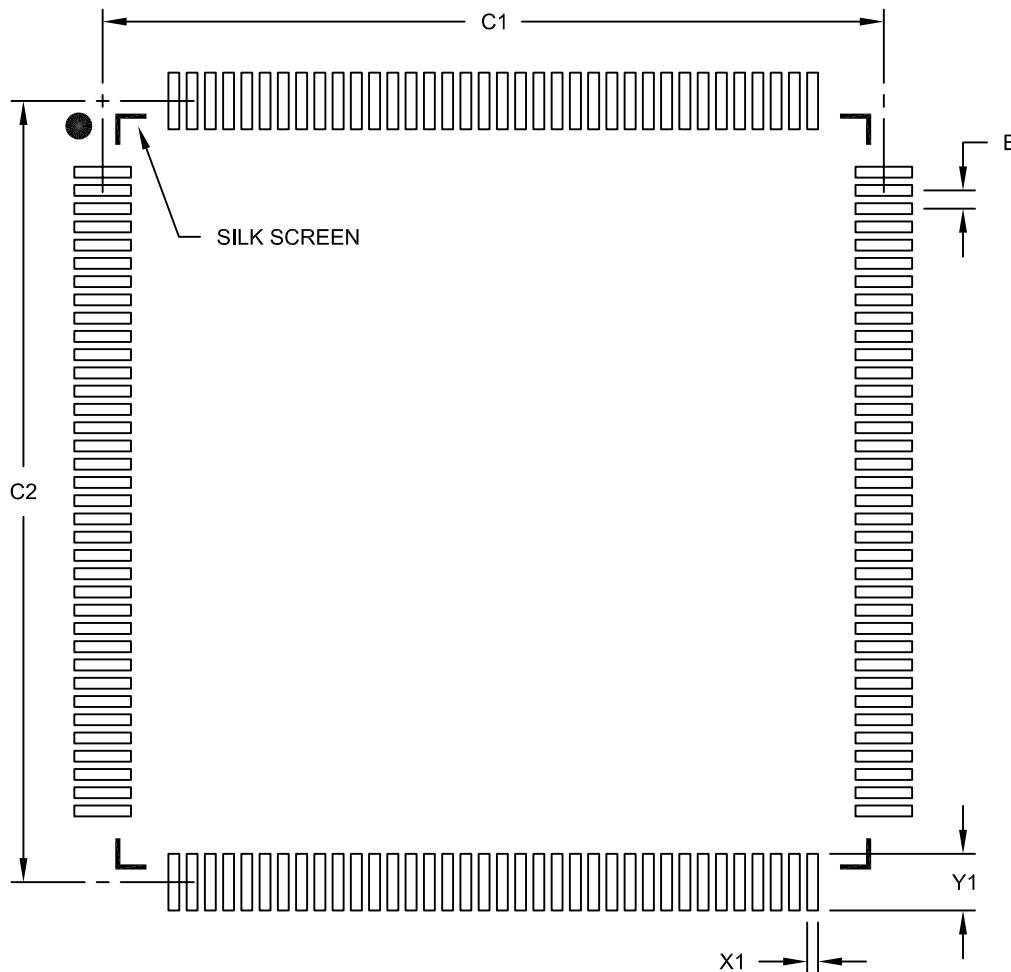
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

144-Lead Plastic Low Profile Quad Flatpack (PL) - 20x20x1.40 mm Body [LQFP]
 2.00 mm Footprint

Note: For the most current package drawings, please see the Microchip Packaging Specification located at
<http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.50	BSC	
Contact Pad Spacing	C1			21.40	
Contact Pad Spacing	C2			21.40	
Contact Pad Width (X144)	X1				0.30
Contact Pad Length (X144)	Y1				1.55

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2044B

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

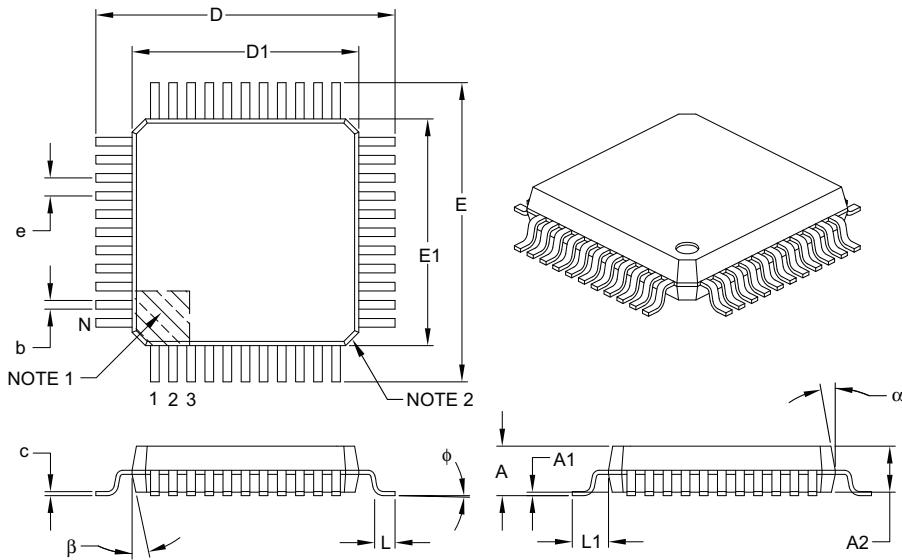
MQFP Family

Metric Quad Flat Packages

Packaging Diagrams and Parameters

44-Lead Plastic Metric Quad Flatpack (KW) – 10x10x2 mm Body, 3.20 mm [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Number of Leads		N	44		
Lead Pitch		e	0.80 BSC		
Overall Height		A	–	–	2.45
Molded Package Thickness		A2	1.80	2.00	2.20
Standoff §		A1	0.00	–	0.25
Foot Length		L	0.73	0.88	1.03
Footprint		L1	1.60 REF		
Foot Angle		ϕ	0°	–	7°
Overall Width		E	13.20 BSC		
Overall Length		D	13.20 BSC		
Molded Package Width		E1	10.00 BSC		
Molded Package Length		D1	10.00 BSC		
Lead Thickness		c	0.11	–	0.23
Lead Width		b	0.29	–	0.45
Mold Draft Angle Top		α	5°	–	16°
Mold Draft Angle Bottom		β	5°	–	16°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

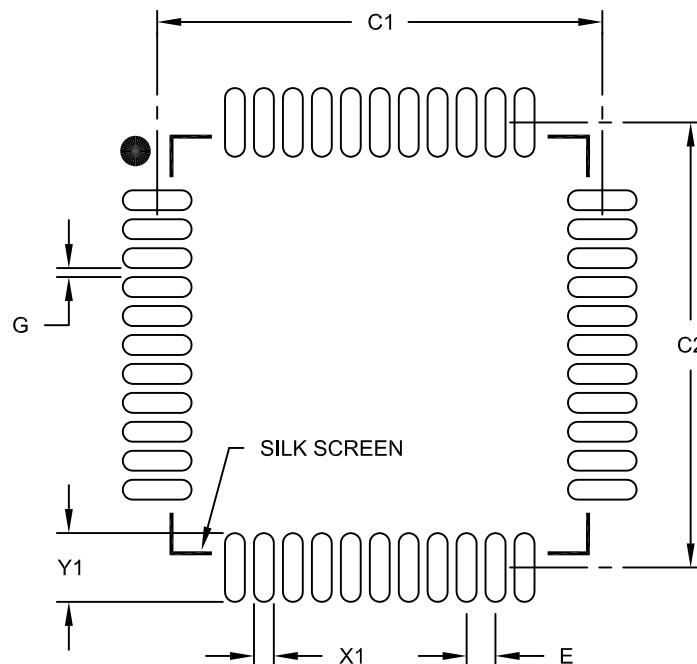
REF: Reference Dimension, usually without tolerance, for information purposes only.

5. § Significant Characteristic.

Land Pattern (Footprint)

44-Lead Plastic Metric Quad Flatpack (KW) - 10x10x2 mm Body, 3.20 mm Footprint [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.80	BSC	
Contact Pad Spacing	C1			12.30	
Contact Pad Spacing	C2			12.30	
Contact Pad Width (X44)	X1				0.55
Contact Pad Length (X44)	Y1				1.90
Distance Between Pads	G	0.25			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

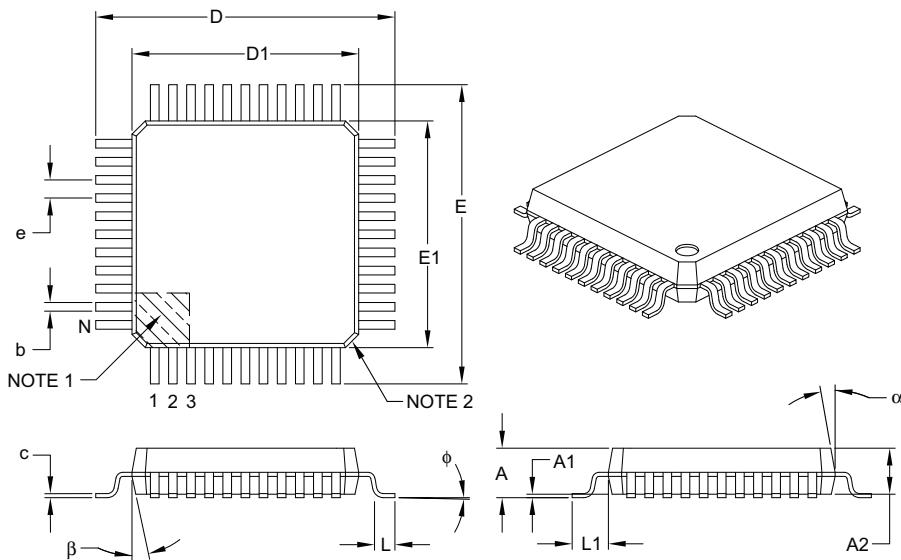
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2071B

Packaging Diagrams and Parameters

44-Lead Plastic Metric Quad Flatpack (PQ) – 10x10x2 mm Body, 3.20 mm [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads		N		
Lead Pitch		e		
Overall Height		A		
Molded Package Thickness		A2		
Standoff §		A1		
Foot Length		L		
Footprint		L1		
Foot Angle		φ		
Overall Width		E		
Overall Length		D		
Molded Package Width		E1		
Molded Package Length		D1		
Lead Thickness		c		
Lead Width		b		
Mold Draft Angle Top		α		
Mold Draft Angle Bottom		β		

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

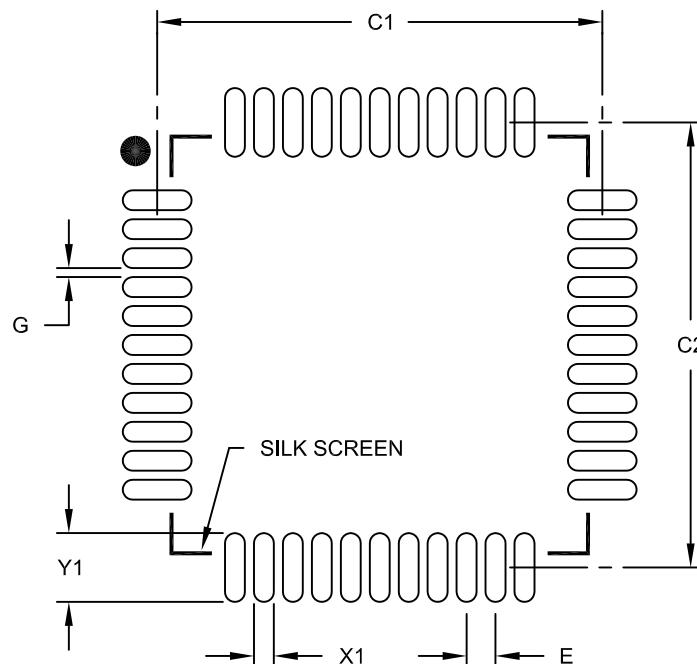
REF: Reference Dimension, usually without tolerance, for information purposes only.

5. § Significant Characteristic.

Land Pattern (Footprint)

44-Lead Plastic Metric Quad Flatpack (PQ) - 10x10x2 mm Body, 3.20 mm Footprint [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.80	BSC	
Contact Pad Spacing	C1			12.30	
Contact Pad Spacing	C2			12.30	
Contact Pad Width (X44)	X1				0.55
Contact Pad Length (X44)	Y1				1.90
Distance Between Pads	G	0.25			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

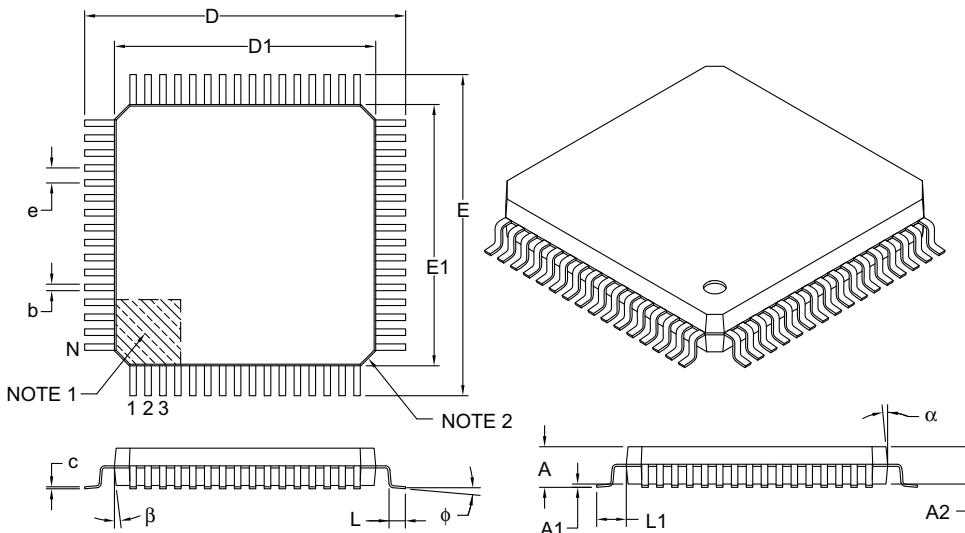
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2071B

Packaging Diagrams and Parameters

64-Lead Plastic Metric Quad Flatpack (BU) – 14x14x2.7 mm Body, 3.20 mm [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads		64		
Lead Pitch		0.80 BSC		
Overall Height		A	–	3.15
Molded Package Thickness		A2	2.50	2.70
Standoff §		A1	0.00	–
Overall Width		E	17.20 BSC	
Molded Package Width		E1	14.00 BSC	
Overall Length		D	17.20 BSC	
Molded Package Length		D1	14.00 BSC	
Foot Length		L	0.73	0.88
Footprint		L1	1.60 REF	
Foot Angle		phi	0°	–
Lead Thickness		c	0.11	–
Lead Width		b	0.29	–
Mold Draft Angle Top		alpha	5°	–
Mold Draft Angle Bottom		beta	5°	16°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

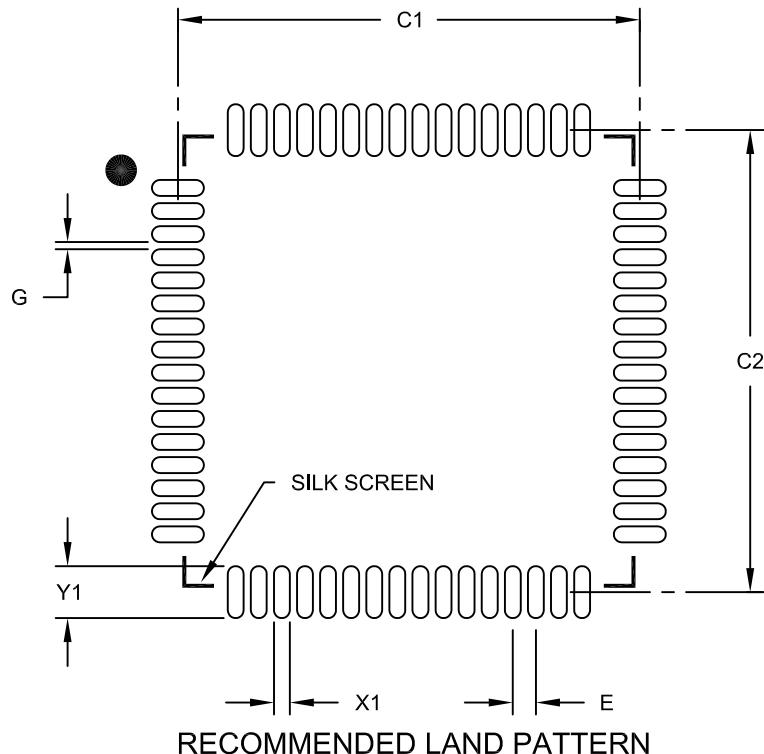
5. § Significant Characteristic.

6. Formerly TelCom PQFP package.

Land Pattern (Footprint)

64-Lead Plastic Metric Quad FlatPack (BU) - 14x14x2.7 mm Body 3.20 mm Footprint [MQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E				0.80	BSC	
Contact Pad Spacing	C1				16.10		
Contact Pad Spacing	C2				16.10		
Contact Pad Width (X64)	X1					0.55	
Contact Pad Length (X64)	Y1					1.80	
Distance Between Pads	G	0.25					

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

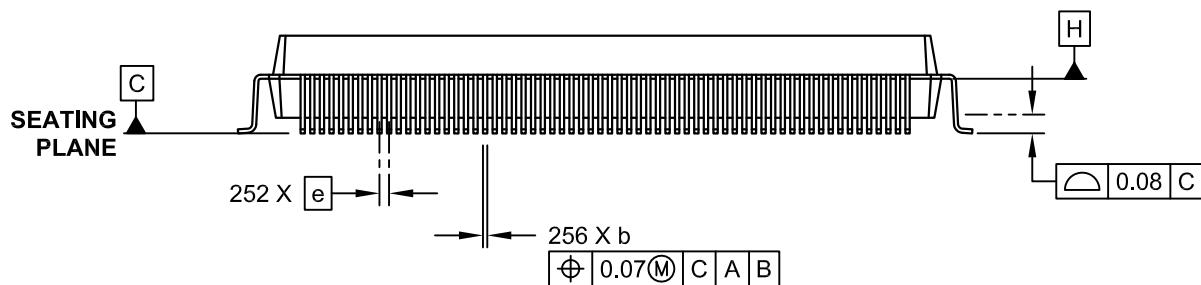
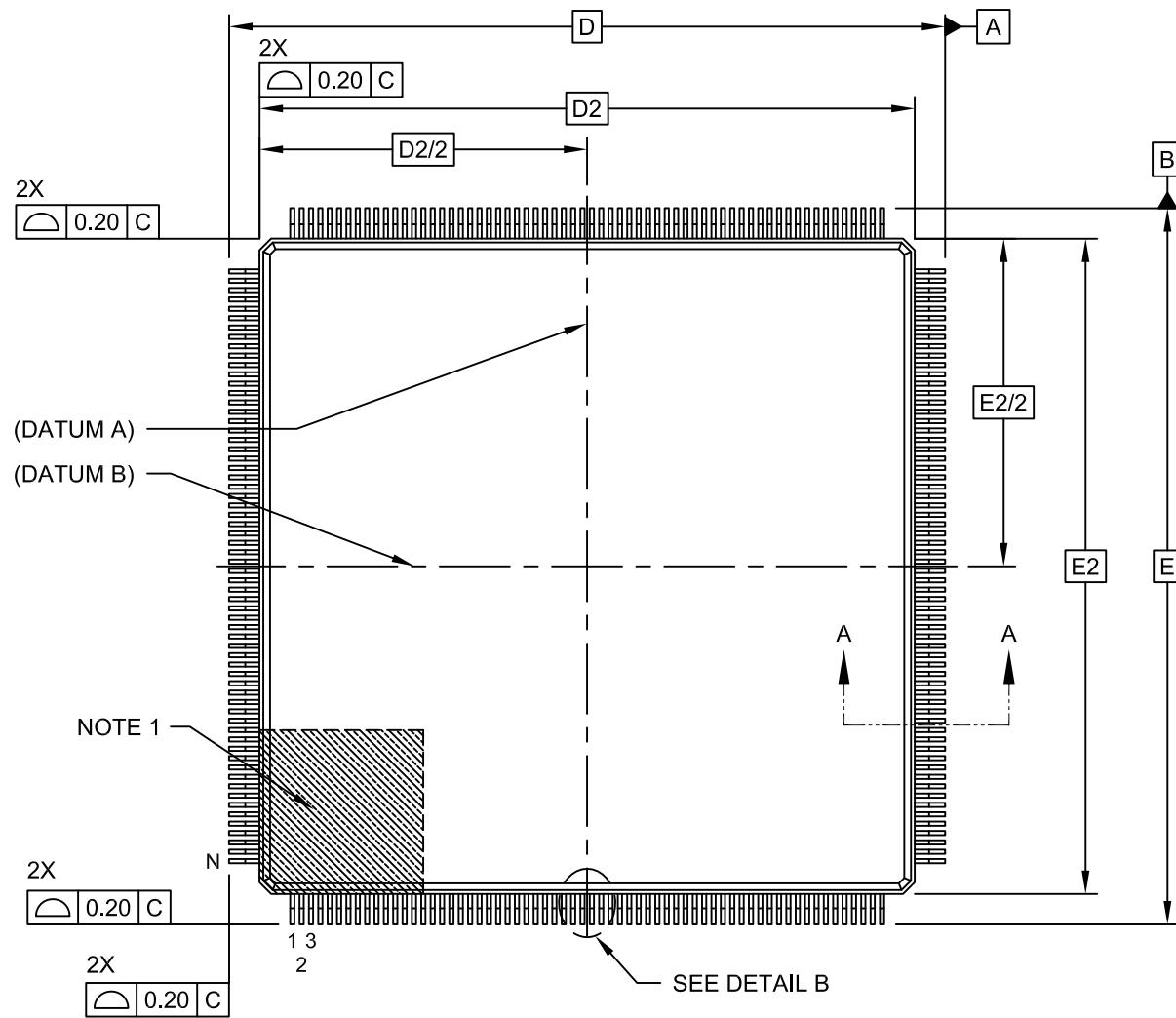
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2022B

Packaging Diagrams and Parameters

256-Lead Plastic Metric Quat Flatpack (PQ) - 28x28x3.40 mm Body [MQFP] 2.60 mm Footprint

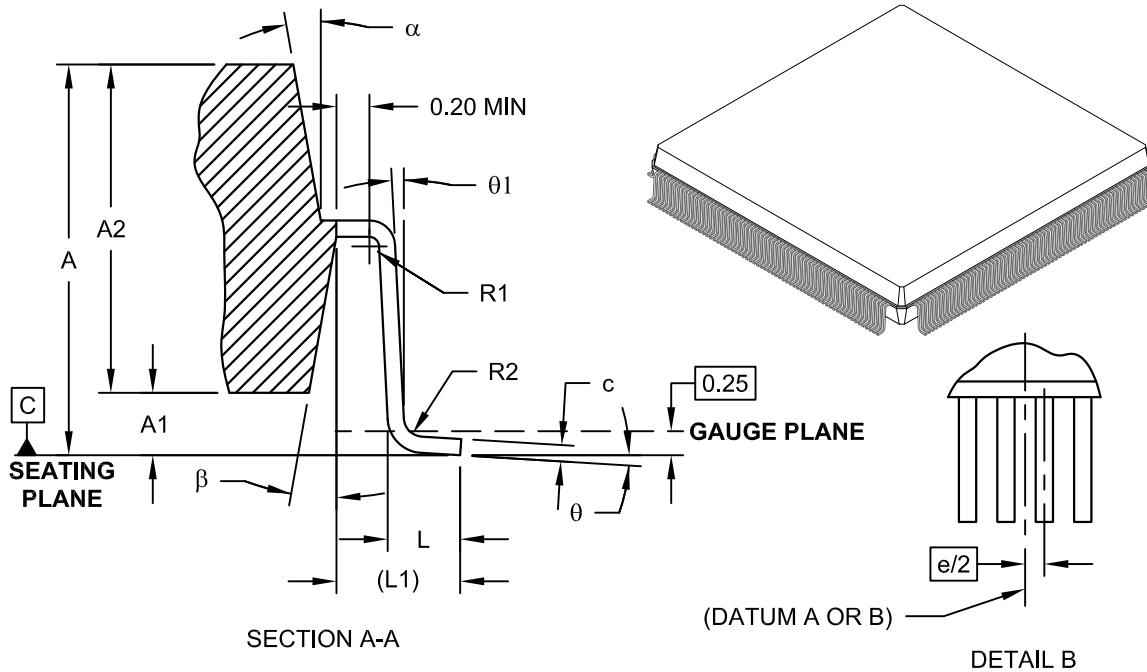
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

256-Lead Plastic Metric Quat Flatpack (PQ) - 28x28x3.40 mm Body [MQFP] 2.60 mm Footprint

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N	256		
Lead Pitch	e	0.40	BSC	
Overall Height	A	-	-	4.07
Molded Package Height	A2	3.20	3.40	3.60
Standoff	A1	0.15	0.25	0.35
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.30 (REF)		
Lead Angle	φ	0°	3.5°	7°
Foot Angle	φ1	0°	-	-
Overall Width	E	30.60 BSC		
Overall Length	D	30.60 BSC		
Molded Body Width	E1	28.00 BSC		
Molded Body Length	D1	28.00 BSC		
Lead Thickness	c	0.09	-	0.20
Lead Width	b	0.13	-	0.23
Bend Radius	R1	0.08	-	-
Bend Radius	R2	0.25 TYP		
Mold Draft Angle Top	α	9°	-	11°
Mold Draft Angle Bottom	β	9°	-	11°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

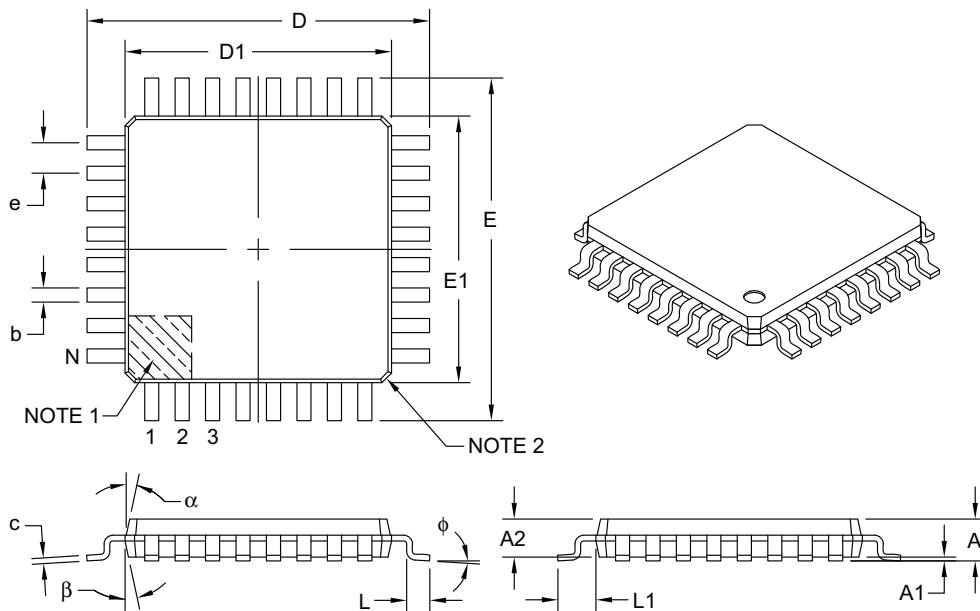
TQFP Family

Thin Quad Flat Packages

Packaging Diagrams and Parameters

32-Lead Plastic Thin Quad Flatpack (PT) – 7x7x1.0 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		UNITS			MILLIMETERS		
		DIMENSION LIMITS			MIN	NOM	MAX
Number of Leads	N				32		
Lead Pitch	e				0.80 BSC		
Overall Height	A		—	—	1.20		
Standoff	A1		0.05	—	0.15		
Molded Package Thickness	A2		0.95	1.00	1.05		
Foot Length	L		0.45	0.60	0.75		
Footprint	L1		1.00 REF				
Foot Angle	phi		0°	3.5°	7°		
Overall Width	E		9.00 BSC				
Overall Length	D		9.00 BSC				
Molded Package Width	E1		7.00 BSC				
Molded Package Length	D1		7.00 BSC				
Lead Thickness	c		0.09	—	0.20		
Lead Width	b		0.30	0.37	0.45		
Mold Draft Angle Top	alpha		11°	12°	13°		
Mold Draft Angle Bottom	beta		11°	12°	13°		

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

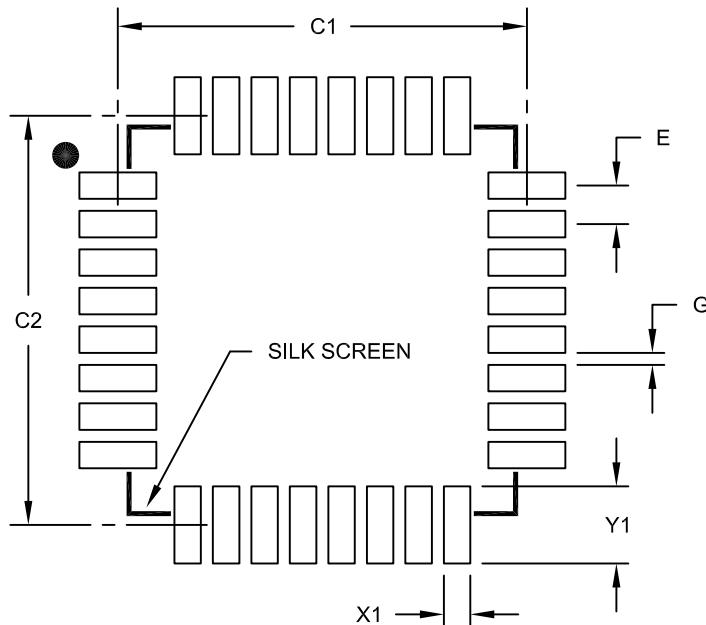
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-074B

Land Pattern (Footprint)

32-Lead Plastic Thin Quad Flatpack (PT) - 7x7x1.0 mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension	Limits	MIN	NOM	MAX
Contact Pitch	E		0.80	BSC
Contact Pad Spacing	C1		8.50	
Contact Pad Spacing	C2		8.50	
Contact Pad Width (X28)	X1			0.55
Contact Pad Length (X28)	Y1			1.60
Distance Between Pads	G	0.25		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

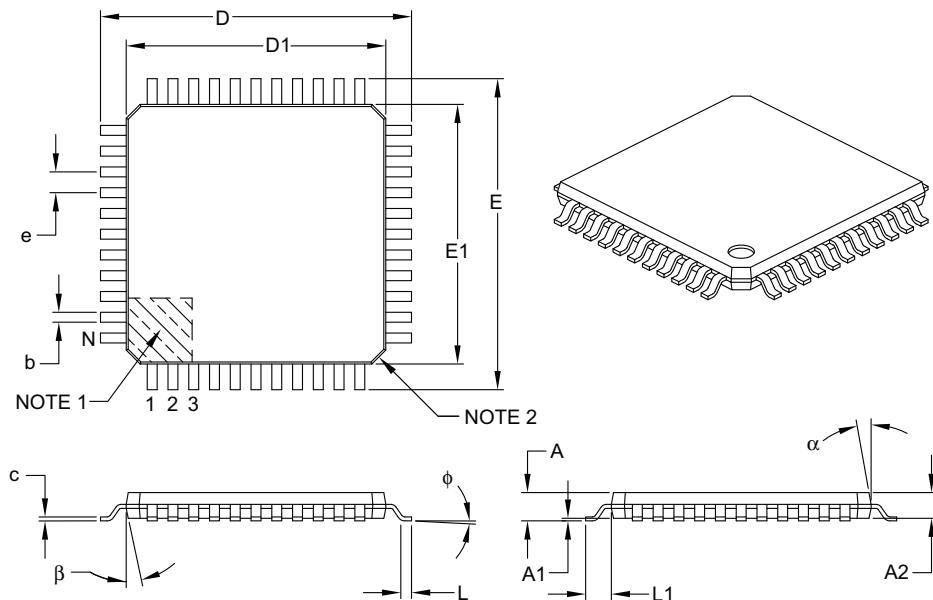
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2074B

Packaging Diagrams and Parameters

44-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads		N		
Lead Pitch		e		
Overall Height		A		
Molded Package Thickness		A2		
Standoff		A1		
Foot Length		L		
Footprint		L1		
Foot Angle		φ		
Overall Width		E		
Overall Length		D		
Molded Package Width		E1		
Molded Package Length		D1		
Lead Thickness		c		
Lead Width		b		
Mold Draft Angle Top		α		
Mold Draft Angle Bottom		β		

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

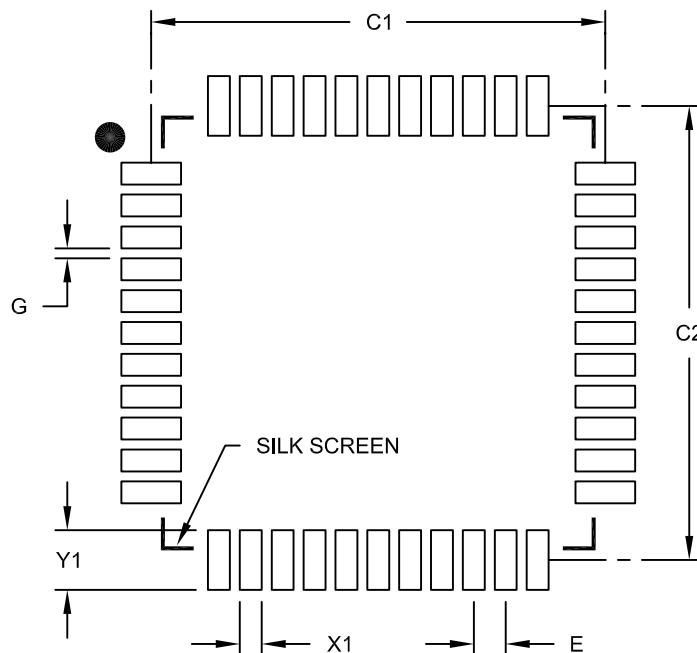
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-076B

Land Pattern (Footprint)

44-Lead Plastic Thin Quad Flatpack (PT) 10X10X1 mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		UNITS			MILLIMETERS		
Dimension		Limits	MIN	NOM	MAX		
Contact Pitch	E		0.80	BSC			
Contact Pad Spacing	C1		11.40				
Contact Pad Spacing	C2		11.40				
Contact Pad Width (X44)	X1				0.55		
Contact Pad Length (X44)	Y1				1.50		
Distance Between Pads	G	0.25					

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

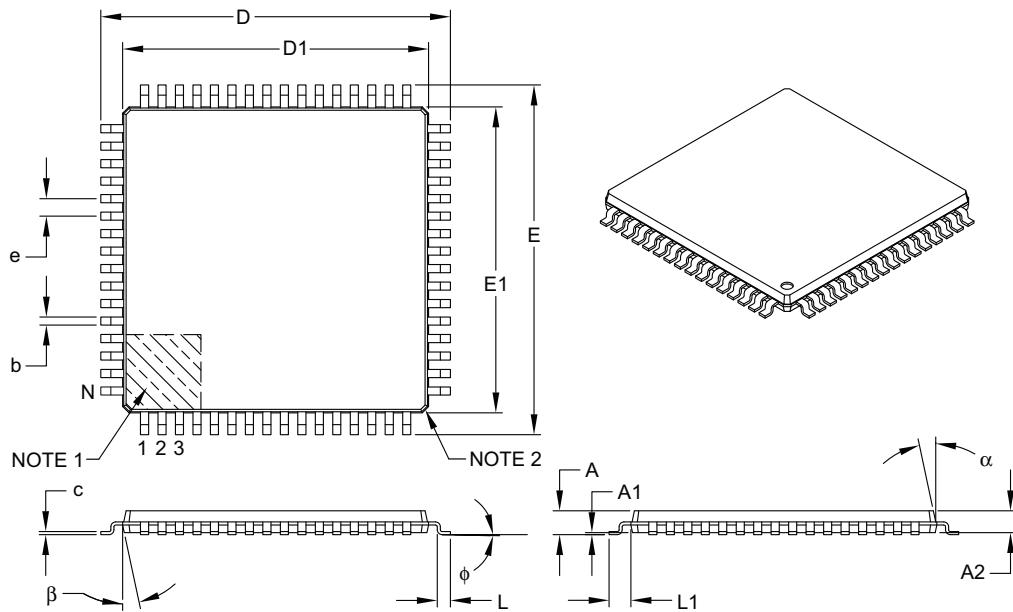
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2076B

Packaging Diagrams and Parameters

64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Leads	N		64		
Lead Pitch	e		0.80	BSC	
Overall Height	A	—	—	1.20	
Molded Package Thickness	A2	0.95	1.00	1.05	
Standoff	A1	0.05	—	0.15	
Foot Length	L	0.45	0.60	0.75	
Footprint	L1	1.00 REF			
Foot Angle	phi	0°	3.5°	7°	
Overall Width	E	16.00 BSC			
Overall Length	D	16.00 BSC			
Molded Package Width	E1	14.00 BSC			
Molded Package Length	D1	14.00 BSC			
Lead Thickness	c	0.09	—	0.20	
Lead Width	b	0.30	0.37	0.45	
Mold Draft Angle Top	alpha	11°	12°	13°	
Mold Draft Angle Bottom	beta	11°	12°	13°	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

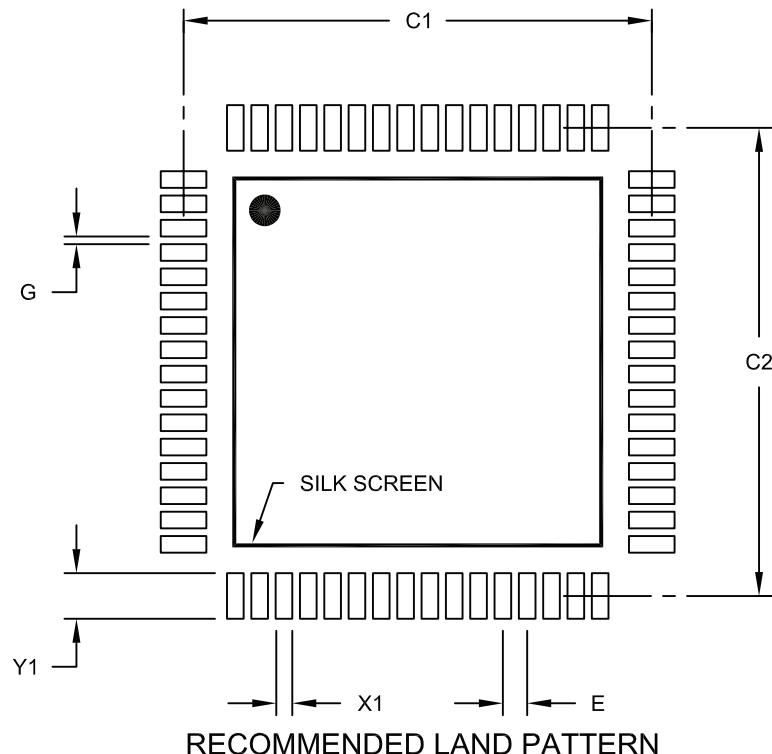
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-066B

Land Pattern (Footprint)

64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.80	BSC	
Contact Pad Spacing	C1			15.40	
Contact Pad Spacing	C2			15.40	
Contact Pad Width (X64)	X1				0.55
Contact Pad Length (X64)	Y1				1.50
Distance Between Pads	G	0.25			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

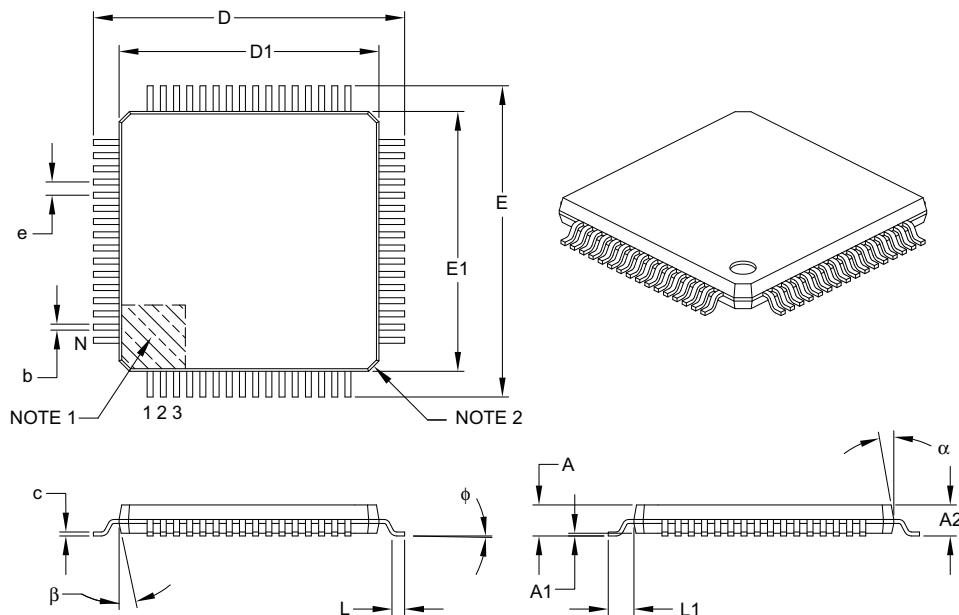
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2066A

Packaging Diagrams and Parameters

64-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
		Dimension Limits	MIN	NOM	MAX
Number of Leads	N		64		
Lead Pitch	e		0.50	BSC	
Overall Height	A	–	–	1.20	
Molded Package Thickness	A2	0.95	1.00	1.05	
Standoff	A1	0.05	–	0.15	
Foot Length	L	0.45	0.60	0.75	
Footprint	L1	1.00 REF			
Foot Angle	phi	0°	3.5°	7°	
Overall Width	E	12.00 BSC			
Overall Length	D	12.00 BSC			
Molded Package Width	E1	10.00 BSC			
Molded Package Length	D1	10.00 BSC			
Lead Thickness	c	0.09	–	0.20	
Lead Width	b	0.17	0.22	0.27	
Mold Draft Angle Top	alpha	11°	12°	13°	
Mold Draft Angle Bottom	beta	11°	12°	13°	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

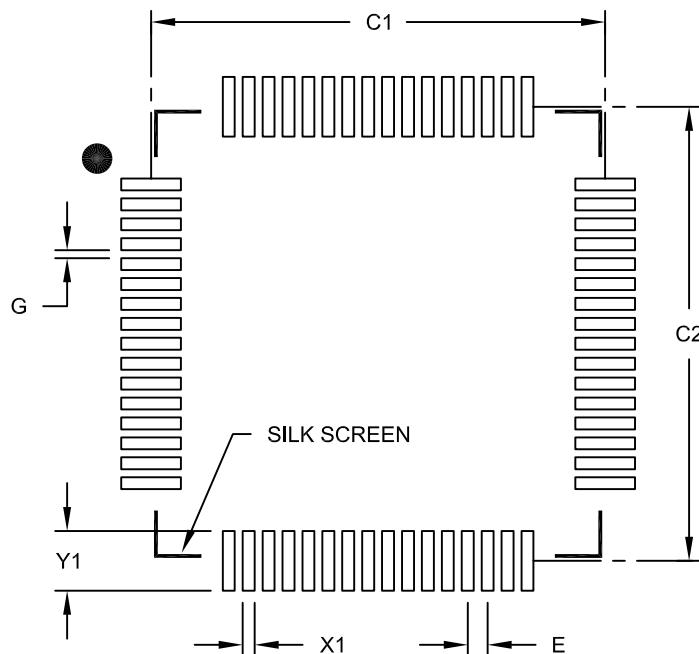
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-085B

Land Pattern (Footprint)

64-Lead Plastic Thin Quad Flatpack (PT) 10x10x1 mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units			MILLIMETERS		
Dimension Limits		MIN	NOM	MAX			
Contact Pitch	E		0.50	BSC			
Contact Pad Spacing	C1		11.40				
Contact Pad Spacing	C2		11.40				
Contact Pad Width (X64)	X1			0.30			
Contact Pad Length (X64)	Y1			1.50			
Distance Between Pads	G	0.20					

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

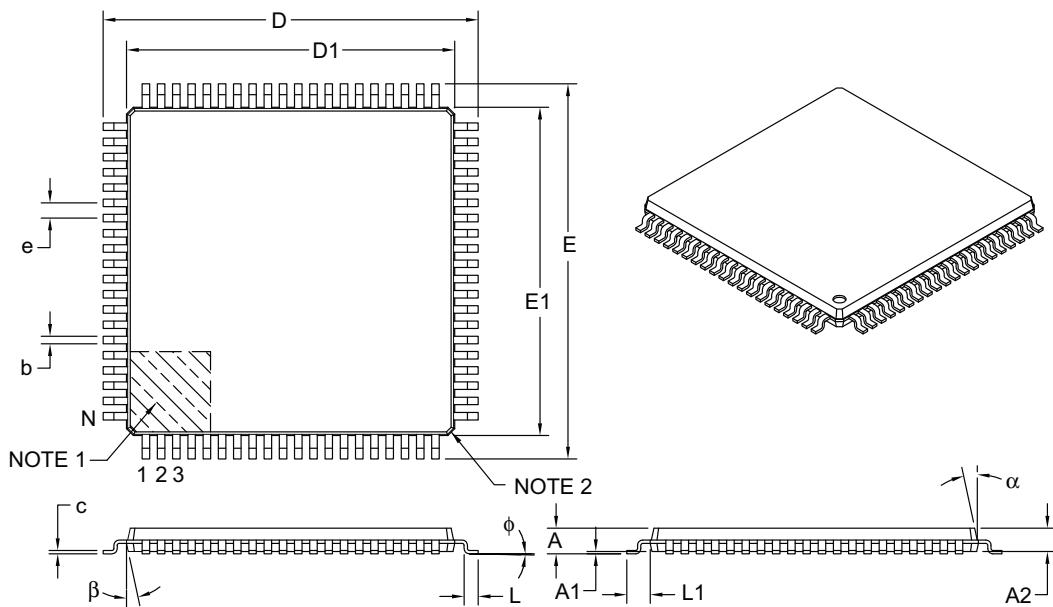
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2085B

Packaging Diagrams and Parameters

80-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads	N	80		
Lead Pitch	e	0.65 BSC		
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	–	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	φ	0°	3.5°	7°
Overall Width	E	16.00 BSC		
Overall Length	D	16.00 BSC		
Molded Package Width	E1	14.00 BSC		
Molded Package Length	D1	14.00 BSC		
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.22	0.32	0.38
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

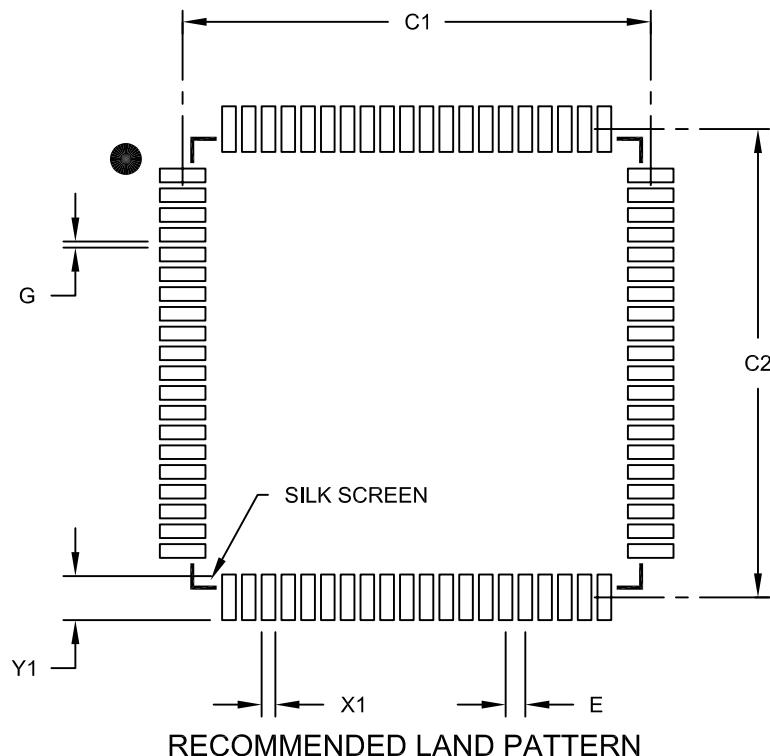
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-116B

Land Pattern (Footprint)

80-Lead Plastic Thin Quad Flatpack (PF) 14x14x1mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Contact Pitch	E		0.65	BSC	
Contact Pad Spacing	C1		15.40		
Contact Pad Spacing	C2		15.40		
Contact Pad Width (X80)	X1			0.45	
Contact Pad Length (X80)	Y1				1.50
Distance Between Pads	G	0.20			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

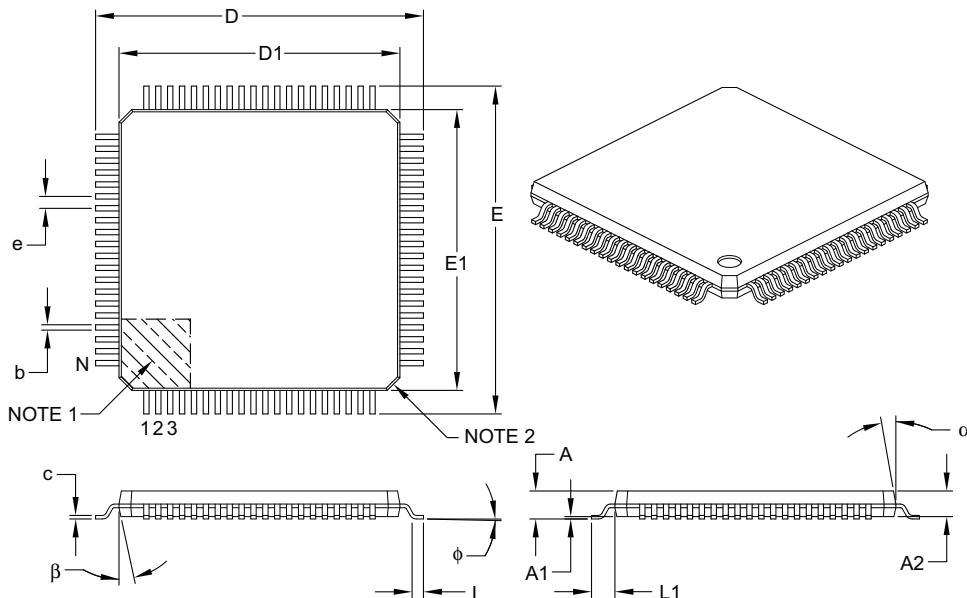
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2116C

Packaging Diagrams and Parameters

80-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits		MILLIMETERS		
		MIN	NOM	MAX
Number of Leads	N	80		
Lead Pitch	e	0.50 BSC		
Overall Height	A	–	–	1.20
Molded Package Thickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	–	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1	1.00 REF		
Foot Angle	ϕ	0°	3.5°	7°
Overall Width	E	14.00 BSC		
Overall Length	D	14.00 BSC		
Molded Package Width	E1	12.00 BSC		
Molded Package Length	D1	12.00 BSC		
Lead Thickness	c	0.09	–	0.20
Lead Width	b	0.17	0.22	0.27
Mold Draft Angle Top	α	11°	12°	13°
Mold Draft Angle Bottom	β	11°	12°	13°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

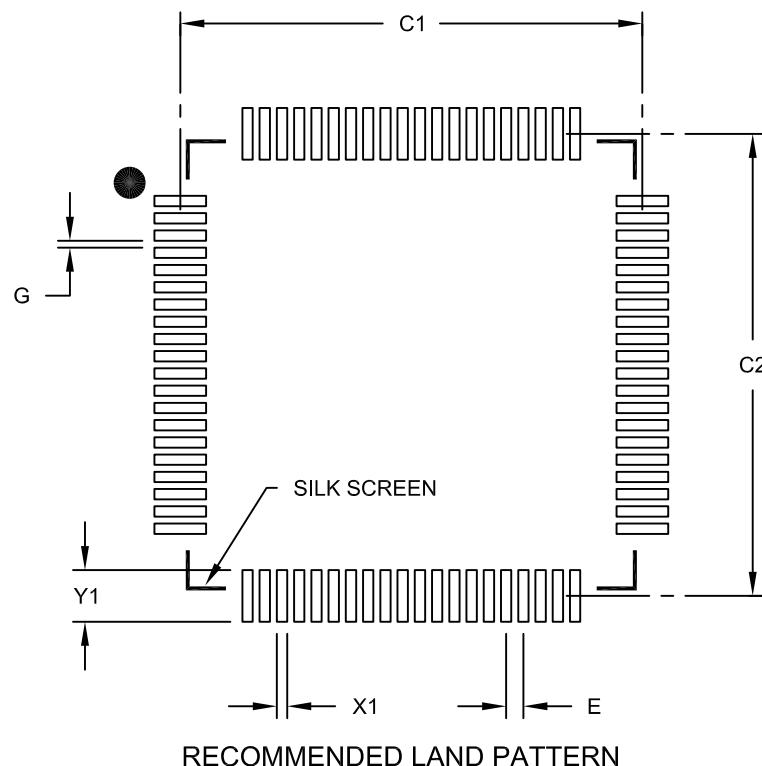
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

80-Lead Plastic Thin Quad Flatpack (PT) - 12x12x1mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50	BSC
Contact Pad Spacing	C1		13.40	
Contact Pad Spacing	C2		13.40	
Contact Pad Width (X80)	X1			0.30
Contact Pad Length (X80)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

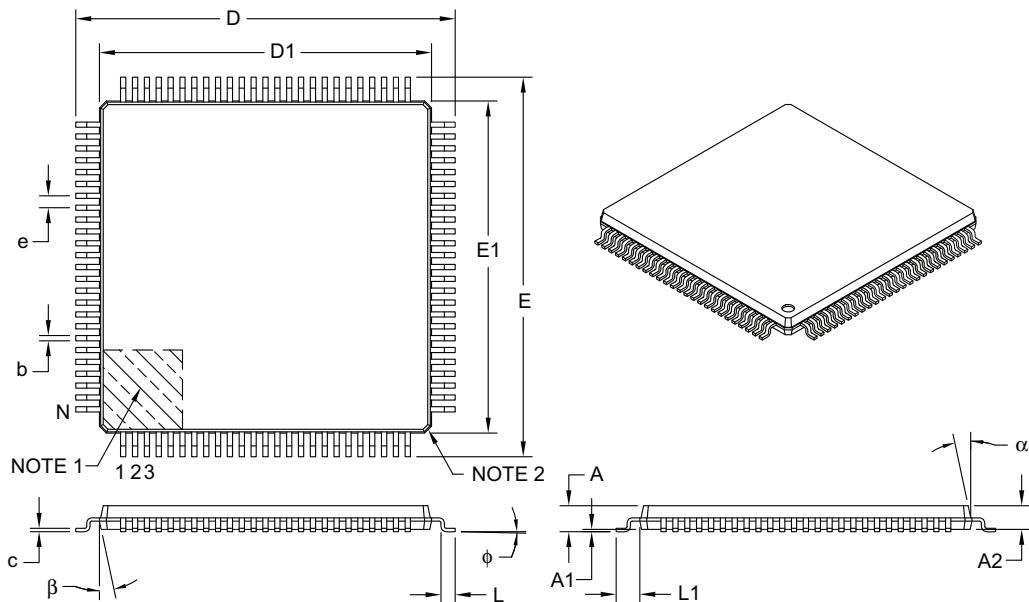
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2092B

Packaging Diagrams and Parameters

100-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Leads	N		100		
Lead Pitch	e		0.50	BSC	
Overall Height	A	—	—	1.20	
Molded Package Thickness	A2	0.95	1.00	1.05	
Standoff	A1	0.05	—	0.15	
Foot Length	L	0.45	0.60	0.75	
Footprint	L1	1.00 REF			
Foot Angle	φ	0°	3.5°	7°	
Overall Width	E	16.00 BSC			
Overall Length	D	16.00 BSC			
Molded Package Width	E1	14.00 BSC			
Molded Package Length	D1	14.00 BSC			
Lead Thickness	c	0.09	—	0.20	
Lead Width	b	0.17	0.22	0.27	
Mold Draft Angle Top	α	11°	12°	13°	
Mold Draft Angle Bottom	β	11°	12°	13°	

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

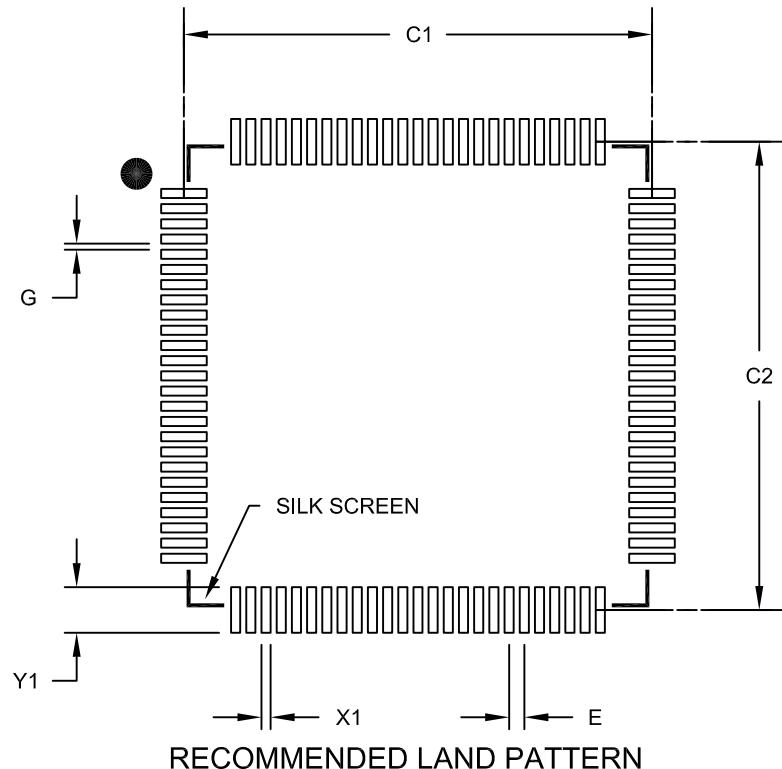
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-110B

Land Pattern (Footprint)

100-Lead Plastic Thin Quad Flatpack (PF) - 14x14x1 mm Body 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.50	BSC
Contact Pad Spacing	C1		15.40	
Contact Pad Spacing	C2		15.40	
Contact Pad Width (X100)	X1			0.30
Contact Pad Length (Y100)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

- Dimensioning and tolerancing per ASME Y14.5M

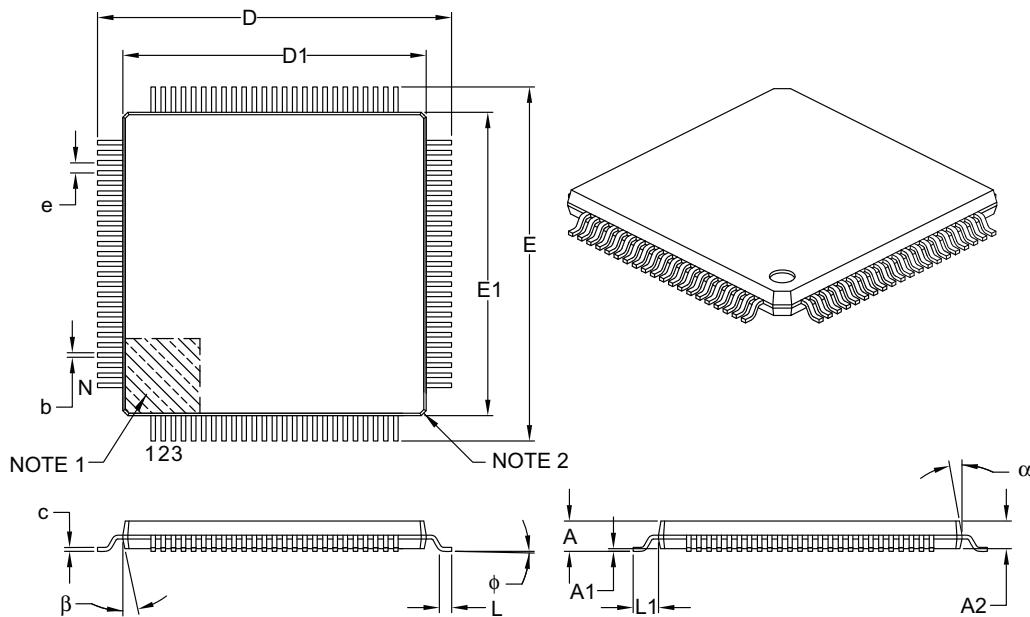
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2110B

Packaging Diagrams and Parameters

100-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Leads		100		
Lead Pitch		e 0.40 BSC		
Overall Height		A –		
Molded Package Thickness		A2 0.95		
Standoff		A1 0.05		
Foot Length		L 0.45		
Footprint		L1 1.00 REF		
Foot Angle		phi 0°		
Overall Width		E 14.00 BSC		
Overall Length		D 14.00 BSC		
Molded Package Width		E1 12.00 BSC		
Molded Package Length		D1 12.00 BSC		
Lead Thickness		c 0.09		
Lead Width		b 0.13		
Mold Draft Angle Top		alpha 11°		
Mold Draft Angle Bottom		beta 11°		

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Chamfers at corners are optional; size may vary.
3. Dimensions D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.25 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

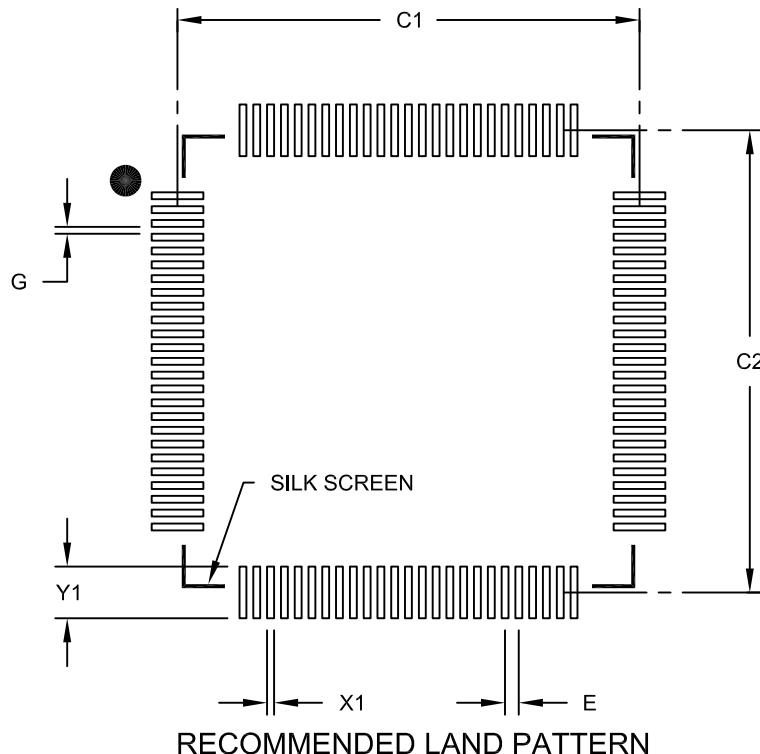
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-100B

Land Pattern (Footprint)

100-Lead Plastic Thin Quad Flatpack (PT)-12x12x1mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.40	BSC	
Contact Pad Spacing	C1		13.40	
Contact Pad Spacing	C2		13.40	
Contact Pad Width (X100)	X1			0.20
Contact Pad Length (Y100)	Y1			1.50
Distance Between Pads	G	0.20		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

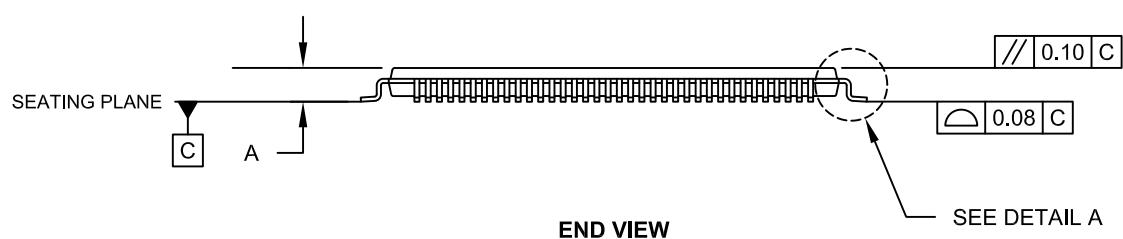
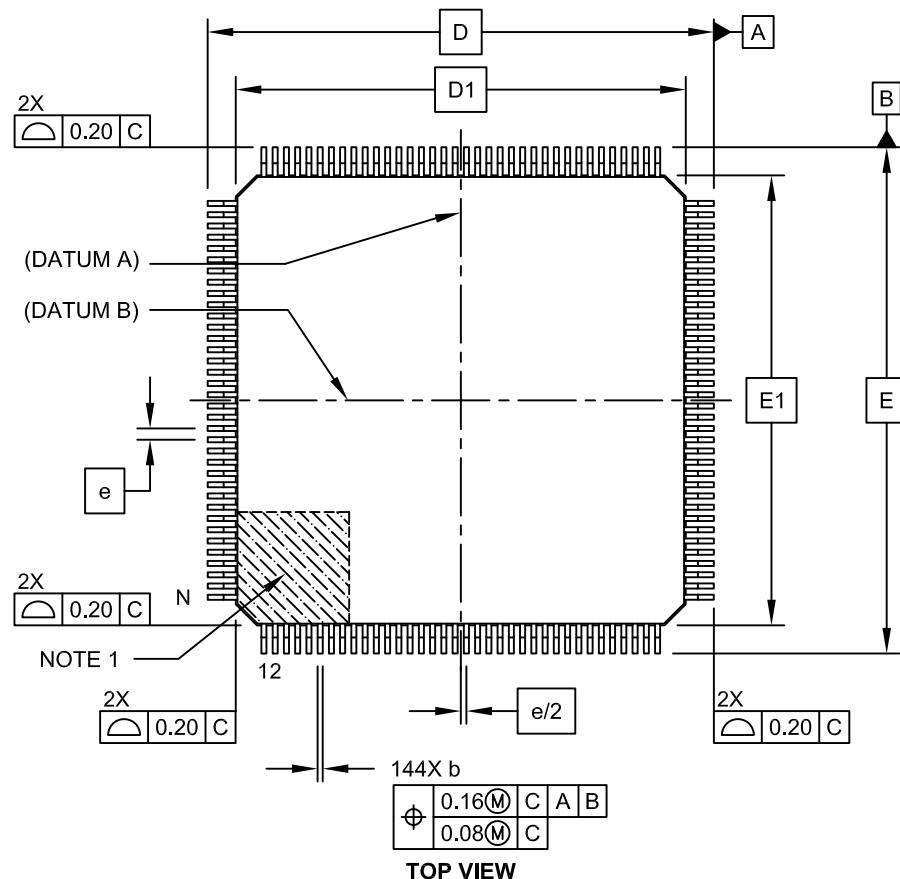
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2100B

Packaging Diagrams and Parameters

144-Lead Plastic Thin Quad Flatpack (PH)-16x16x1mm Body, 2.00 mm Footprint [TQFP]

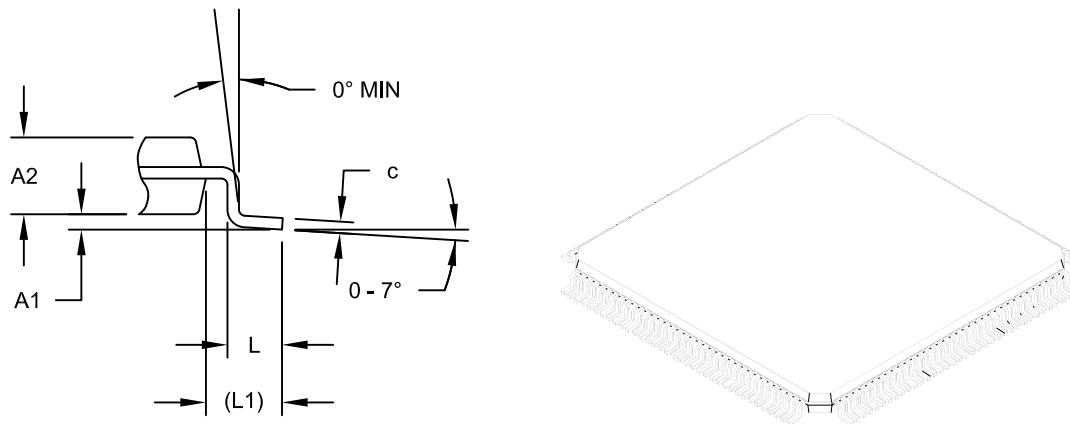
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

144-Lead Plastic Thin Quad Flatpack (PH)-16x16x1mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



DETAIL A

	Units	MILLIMETERS		
	Dimension Limits	MIN	NOM	MAX
Number of Pins	N		144	
Lead Pitch	e		0.40 BSC	
Overall Height	A	-	-	1.20
Molded PackageThickness	A2	0.95	1.00	1.05
Standoff	A1	0.05	-	0.15
Foot Length	L	0.45	0.60	0.75
Footprint	L1		1.00 REF	
Overall Width	D		18.00 BSC	
Overall Length	E		18.00 BSC	
Molded Body Width	D1		16.00 BSC	
Molded Body Length	E1		16.00 BSC	
Lead Thickness	c	0.09	-	0.20
Lead Width	b	0.13	-	0.23

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

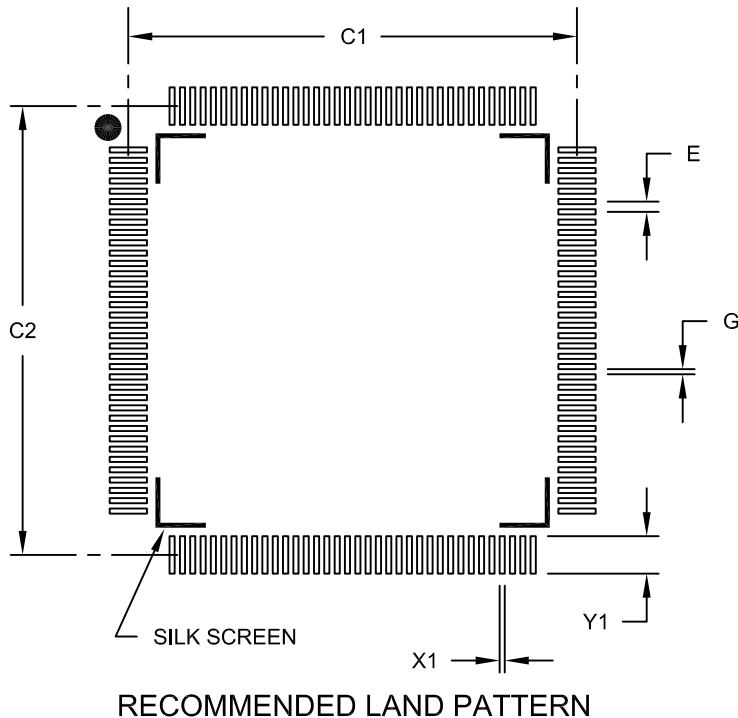
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

144-Lead Plastic Thin Quad Flat Pack (PH) - 16x16 mm Body, 2.00 mm Footprint [TQFP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch	E				0.40	BSC	
Contact Pad Spacing	C1				17.40		
Contact Pad Spacing	C2				17.40		
Contact Pad Width (X144)	X1					0.20	
Contact Pad Length (X144)	Y1						1.45
Distance Between Pads	G	0.20					

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2155B

Packaging Diagrams and Parameters

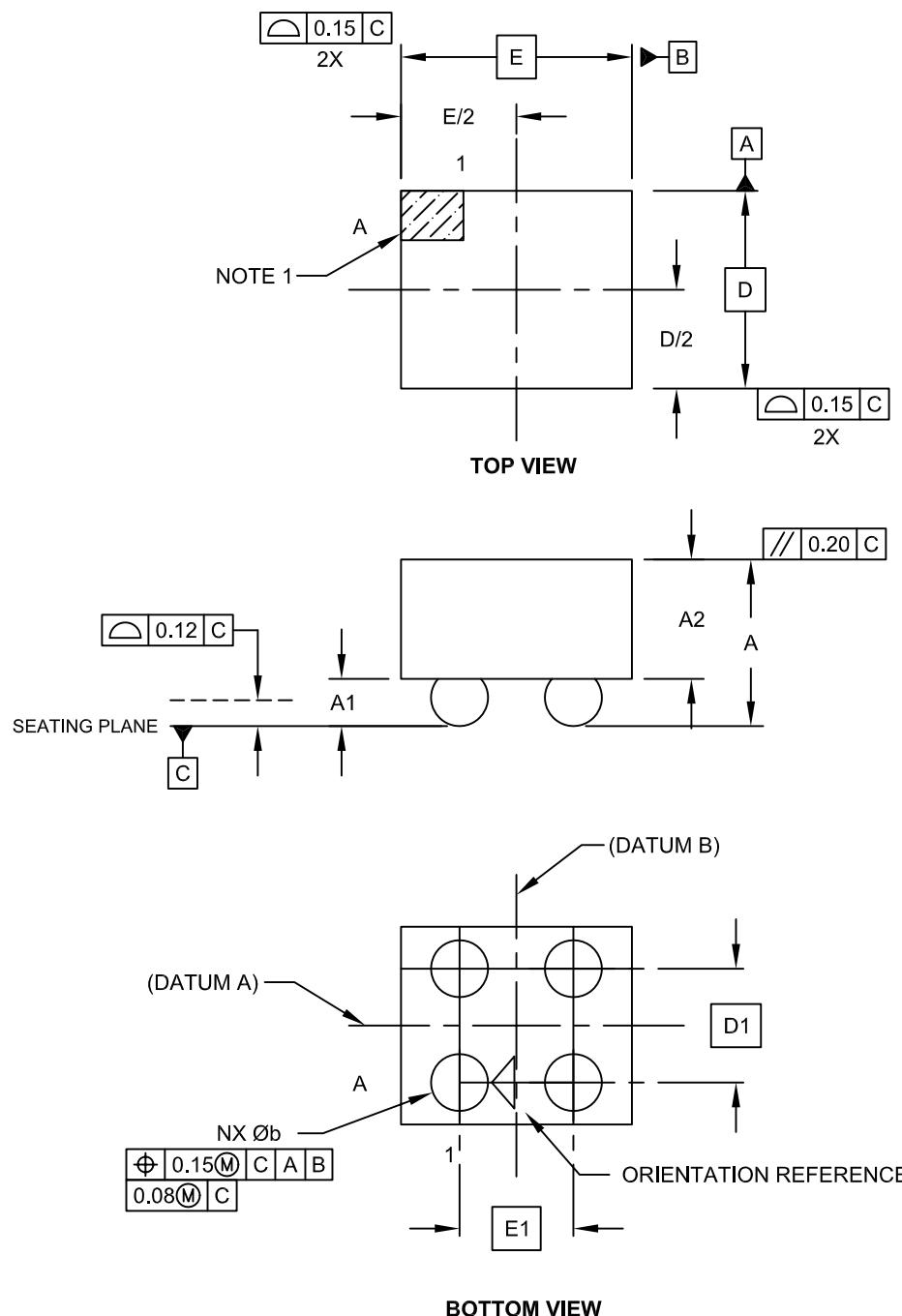
CSP Family

Chip Scale Packages

Packaging Diagrams and Parameters

4-Lead Chip Scale Package (CS) - [CSP]

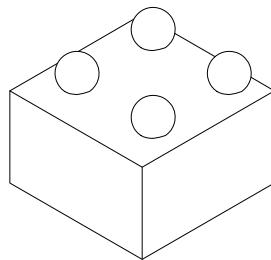
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

4-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Contacts	N			4	
Adjacent Column X-Pitch	E1		0.400	BSC	
Adjacent Row Y-Pitch	D1		0.400	BSC	
Overall Height	A	0.47	0.51	0.55	
Die Height	A2	0.33	0.35	0.37	
Bump Height	A1	0.14	0.16	0.18	
Overall Length	E	NOTE 4			
Overall Width	D	NOTE 4			
Ball Diameter	b	0.18	0.200	0.22	

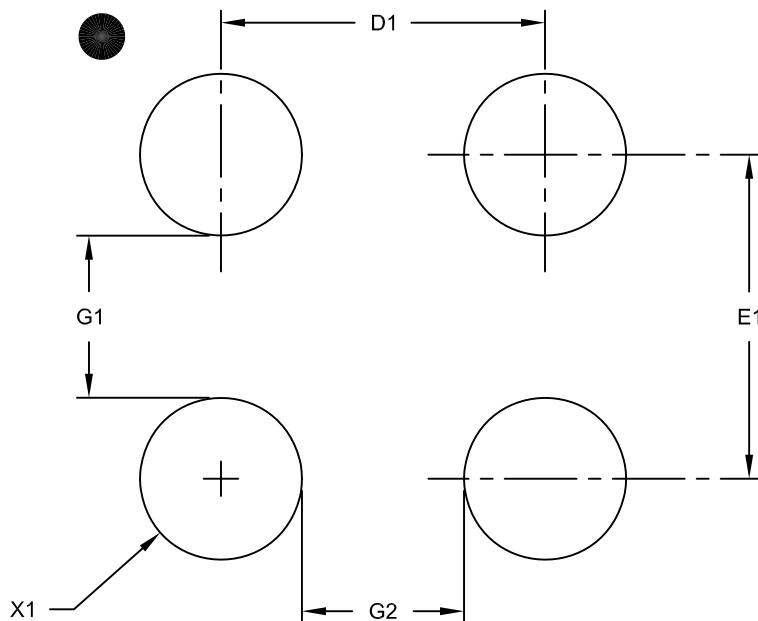
Notes:

1. Orientation reference feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
 BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Package size varies with specific devices. Please contact our local Microchip representative for specific details.

Land Pattern (Footprint)

4-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Contacts	N		4	
Contact Pad Spacing	E1		0.40	
Contact Pad Spacing	D1		0.40	
Contact Pad Diameter (X4)	X1			0.20
Distance Between Pads	G1	0.24		
Distance Between Pads	G2	0.24		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

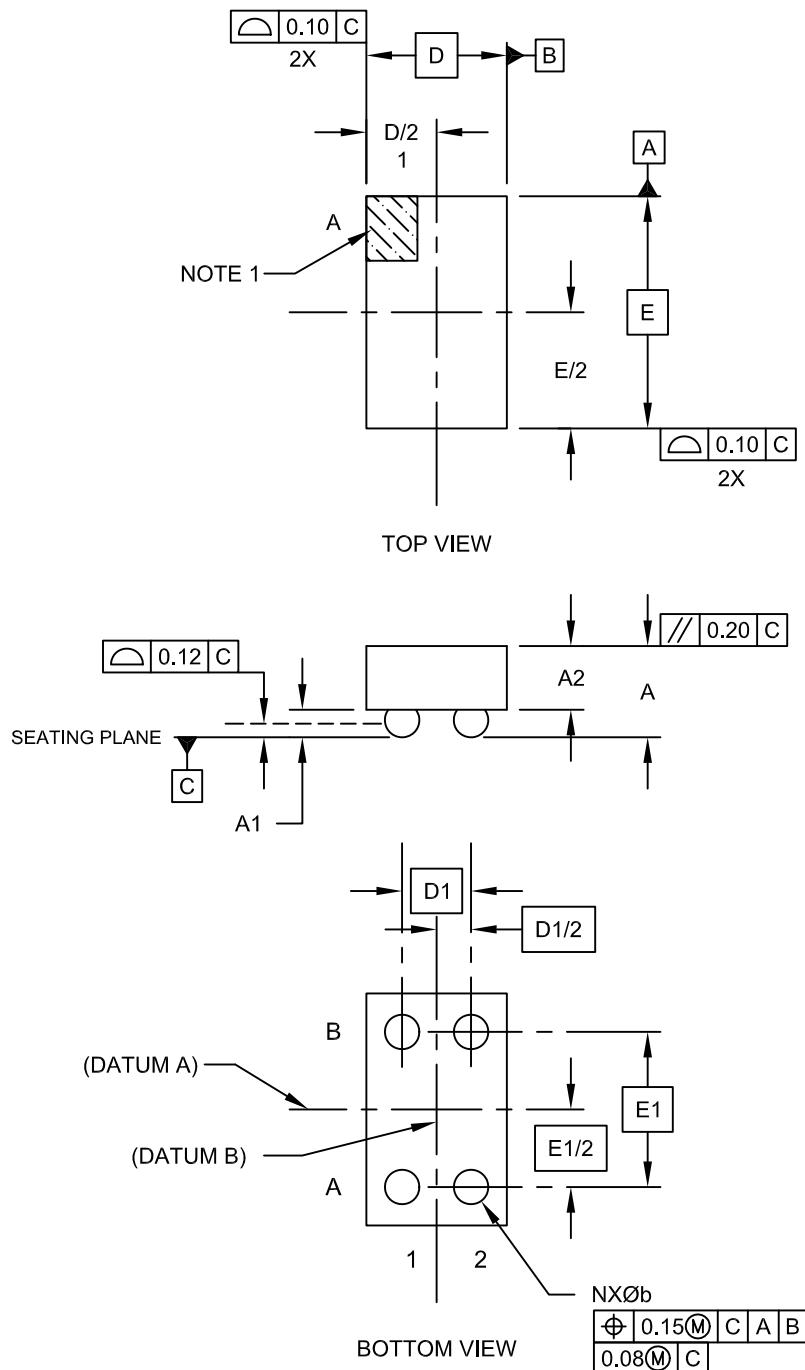
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-8005A

Packaging Diagrams and Parameters

4-Lead Chip Scale Package (CS) - [CSP]

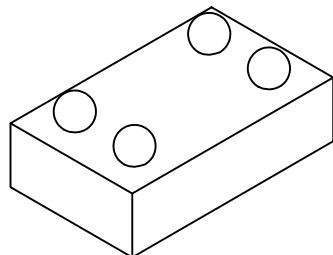
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

4-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Contacts	N		4	
Adjacent Column X-Pitch	D1	0.400 BSC		
Adjacent Row Y-Pitch	E1	0.900 BSC		
Overall Height	A	0.47	0.51	0.55
Die Height	A2	0.33	0.35	0.37
Bump Height	A1	0.14	0.16	0.18
Overall Width	D	NOTE 4		
Overall Length	E	NOTE 4		
Ball Diameter	b	0.18	0.20	0.22

Notes:

1. Orientation reference feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

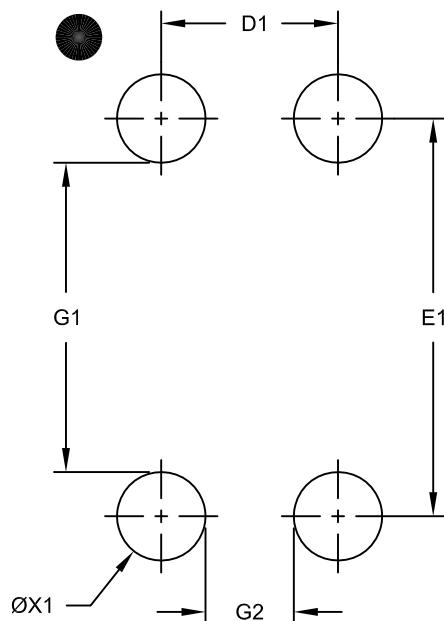
REF: Reference Dimension, usually without tolerance, for information purposes only.

4. Package size varies with specific devices. Please see the specific Product Data Sheet.

Land Pattern (Footprint)

4-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Contacts	N		4	
Contact Pad Spacing	D1		0.40	
Contact Pad Spacing	E1		0.90	
Contact Pad Diameter (X4)	ØX1		0.20	
Distance Between Pads	G1		0.70	
Distance Between Pads	G2		0.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

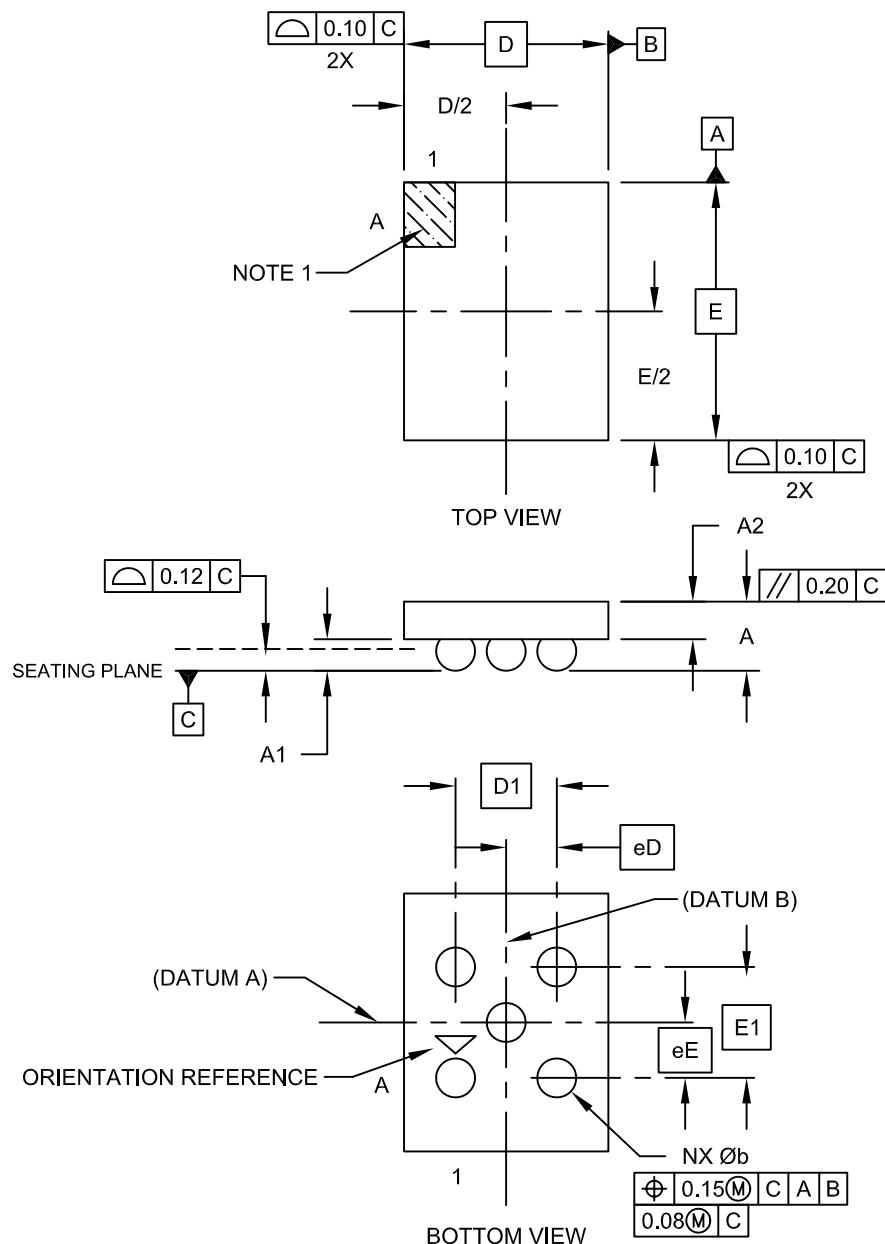
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-8008A

Packaging Diagrams and Parameters

5-Lead Chip Scale Package (CS) - [CSP]

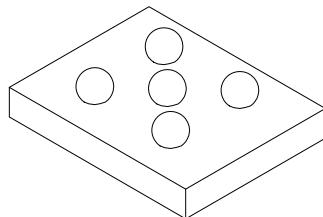
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

5-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Limits	Units MILLIMETERS		
		MIN	NOM	MAX
Number of Contacts	N		5	
Adjacent Column X-Pitch	E1	0.570	BSC	
Adjacent Row Y-Pitch	D1	0.520	BSC	
Adjacent Column X-Pitch	eE	0.285	BSC	
Adjacent Row Y-Pitch	eD	0.260	BSC	
Overall Height	A	0.47	0.51	0.55
Die Height	A2	0.33	0.35	0.37
Bump Height	A1	0.14	0.16	0.18
Overall Length	E	NOTE 4		
Overall Width	D	NOTE 4		
Ball Diameter	b	0.18	0.20	0.22

Notes:

1. Orientation reference feature may vary, but must be located within the hatched area.

2. Package is saw singulated.

3. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

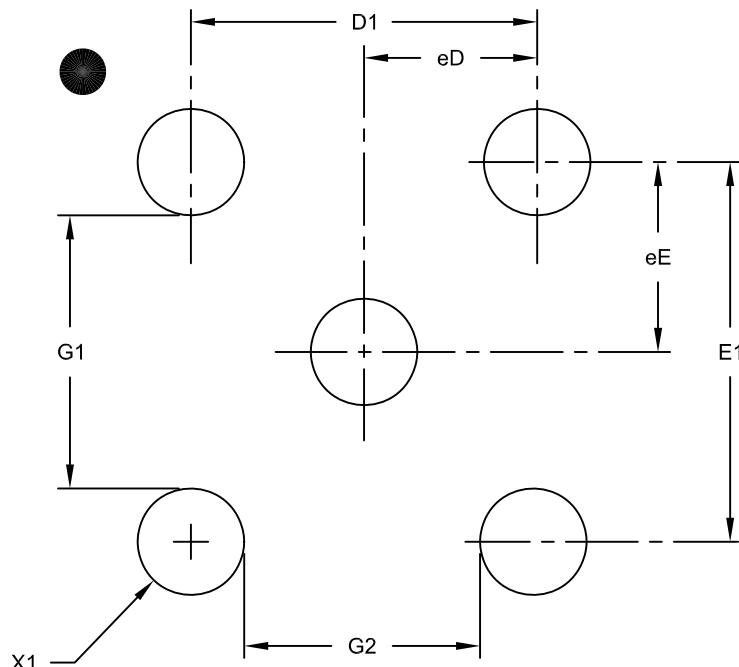
REF: Reference Dimension, usually without tolerance, for information purposes only.

4. Package size varies with specific devices. Please see the specific Product Data Sheet.

Land Pattern (Footprint)

5-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Contacts	N		5		
Contact Pitch Y	eE		0.285		
Contact Pitch X	eD		0.260		
Contact Pad Spacing	E1		0.570		
Contact Pad Spacing	D1		0.520		
Contact Pad Diameter (X5)	X1			0.20	
Distance Between Pads	G1	0.41			
Distance Between Pads	G2	0.36			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

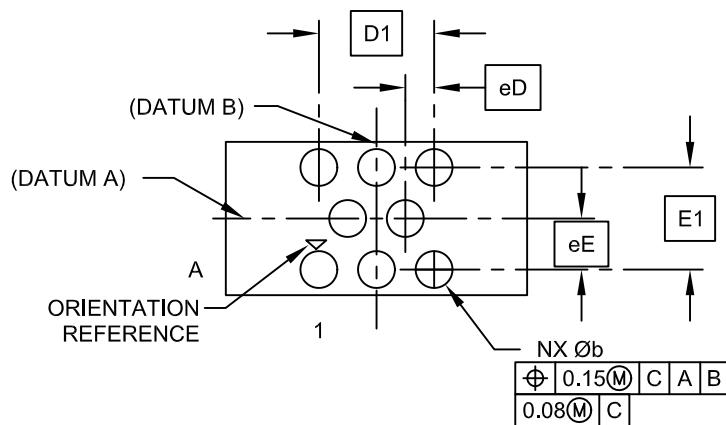
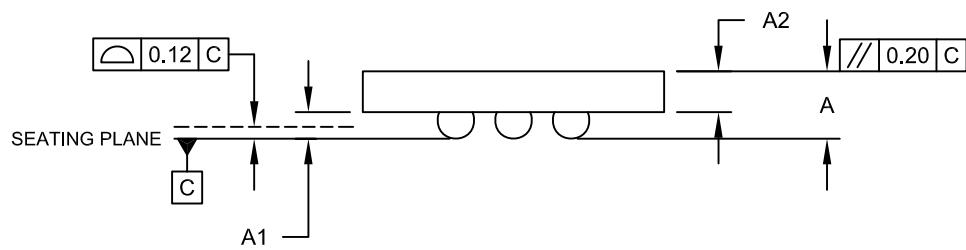
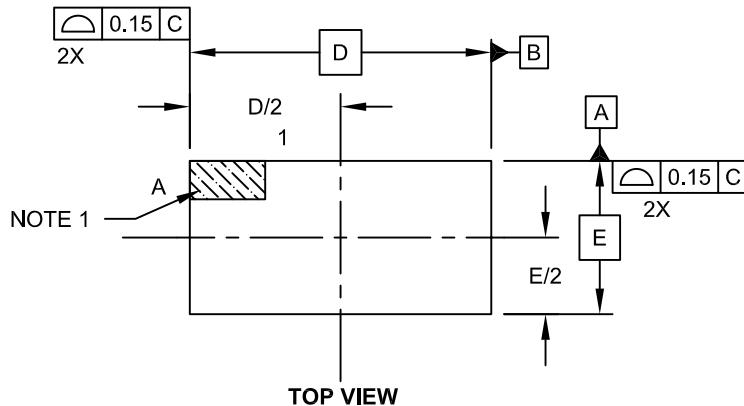
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-8004A

Packaging Diagrams and Parameters

8-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

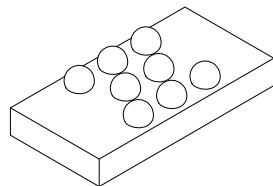


BOTTOM VIEW

Packaging Diagrams and Parameters

8-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Contacts	N		8	
Overall Grid X-Pitch	E1		0.886 BSC	
Overall Grid Y-Pitch	D1		1.00 BSC	
Adjacent Column X-Pitch	eE		0.443 BSC	
Adjacent Row Y-Pitch	eD		0.25 BSC	
Overall Height	A	0.53	0.59	0.64
Die Height	A2	0.33	0.36	0.38
Bump Height	A1	0.20	0.23	0.26
Overall Width	E	NOTE 4		
Overall Length	D	NOTE 4		
Ball Diameter	b	0.30	0.32	0.34

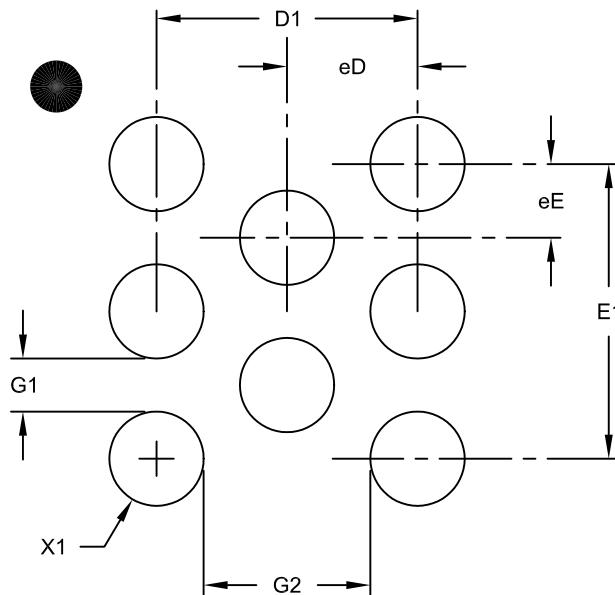
Notes:

1. Orientation reference feature may vary, but must be located within the hatched area.
 2. Package is saw singulated.
 3. Dimensioning and tolerancing per ASME Y14.5M.
- BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Package size varies with specific devices. Please contact your local Microchip representative for specific details

Land Pattern (Footprint)

8-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

		Units	MILLIMETERS		
Dimension		Limits	MIN	NOM	MAX
Number of Contacts	N		8		
Contact Pitch Y	eE			0.25	
Contact Pitch X	eD			0.443	
Contact Pad Spacing	E1		1.00		
Contact Pad Spacing	D1		0.886		
Contact Pad Diameter (X8)	X1			0.32	
Distance Between Pads	G1	0.18			
Distance Between Pads	G2	0.56			

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

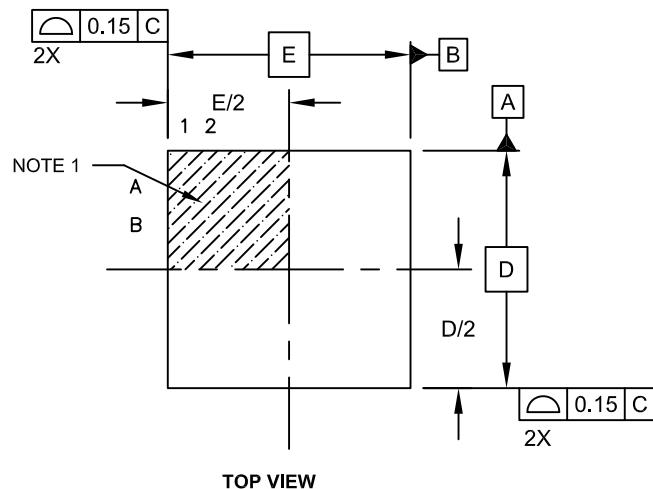
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-8001A

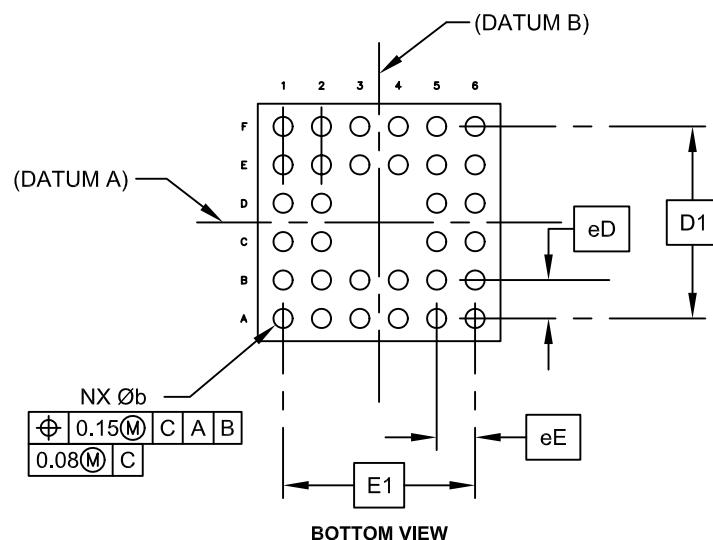
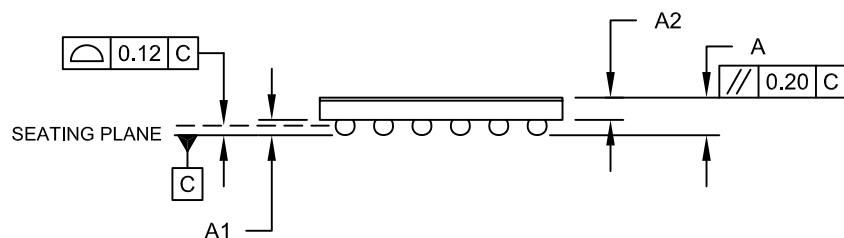
Packaging Diagrams and Parameters

32-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



TOP VIEW

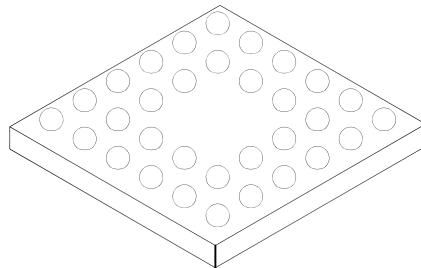


BOTTOM VIEW

Packaging Diagrams and Parameters

32-Lead Chip Scale Package (CS) - [CSP]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Balls	N		32	
Overall Grid X-Pitch	E1	2.50	BSC	
Overall Grid Y-Pitch	D1	2.50	BSC	
Adjacent Column X-Pitch	eE	0.50	BSC	
Adjacent Row Y-Pitch	eD	0.50	BSC	
Overall Height	A	0.45	0.49	0.53
Bump Height	A1	0.18	0.20	0.22
Die Height	A2	0.27	0.29	0.31
Overall Width	E	NOTE 4		
Overall Length	D	NOTE 4		
Contact Diameter	b	0.23	0.25	0.27

Notes:

1. Orientation reference feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.
4. Package size varies with specific devices. Please see the specific Product Data Sheet.

Packaging Diagrams and Parameters

NOTES:

Packaging Diagrams and Parameters

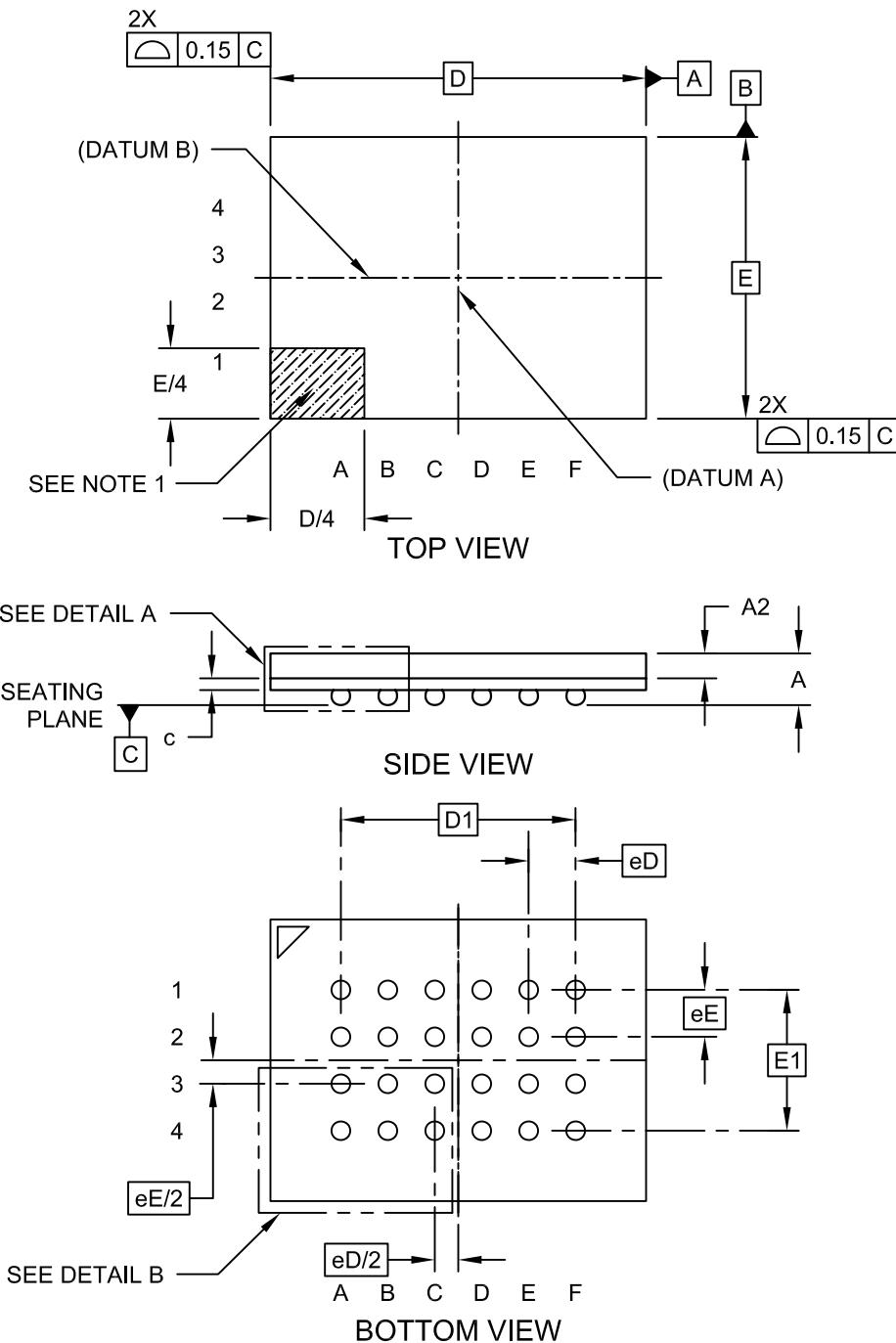
TFBGA Family

Plastic Thin Profile, Ball Grid Array Package

Packaging Diagrams and Parameters

24-Ball Thin Fine Pitch Ball Grid Array (TD) - 6x8 mm Body [TFBGA]

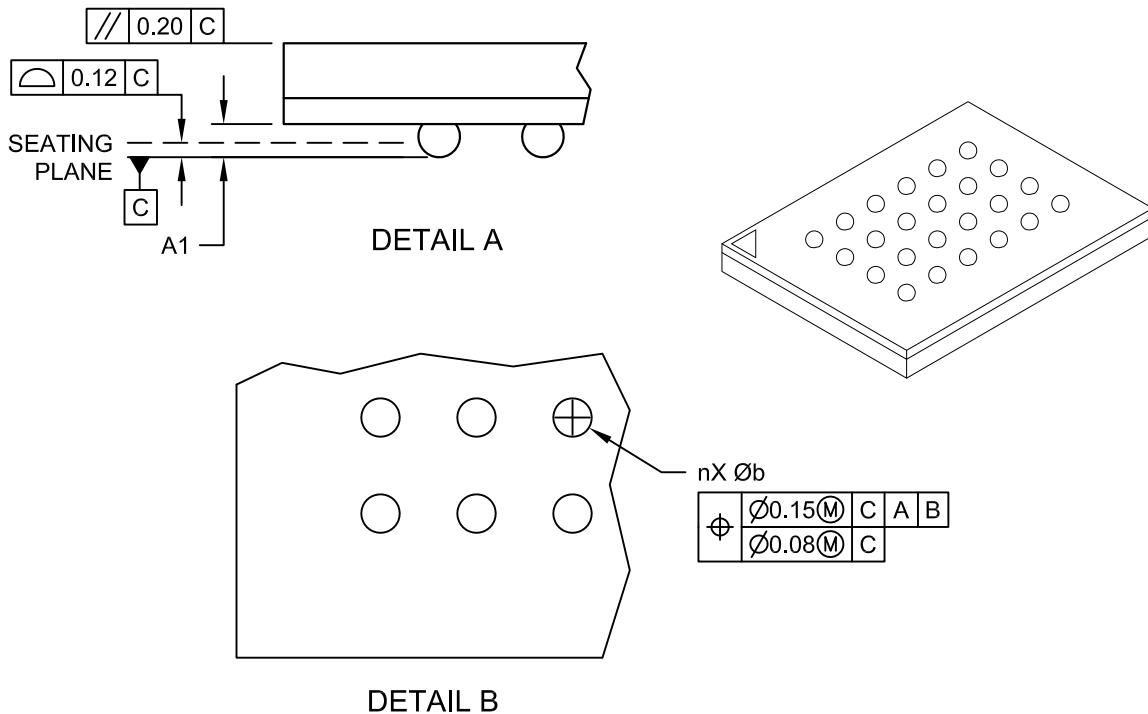
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

24-Ball Thin Fine Pitch Ball Grid Array (TD) - 6x8 mm Body [TFBGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		UNITS			MILLIMETERS		
Dimension		Limits	MIN	NOM	MAX		
Number of Solder Balls	n		24				
Solder Ball X-Pitch	eD		1.00	BSC			
Solder Ball Y-Pitch	eE		1.00	BSC			
Overall Height	A		1.00	1.10	1.20		
Standoff	A1		0.25	—	0.35		
Molded Package Thickness	A2		—	0.53	—		
Overall Length	D		8.00	BSC			
Overall Y-Pitch	D1		5.00	BSC			
Overall Width	E		6.00	BSC			
Overall Solder Ball Y-Pitch	E1		3.00	BSC			
Solder Ball Width	b		0.35	0.40	0.45		
Substrate Thickness	c		-	0.21	-		

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

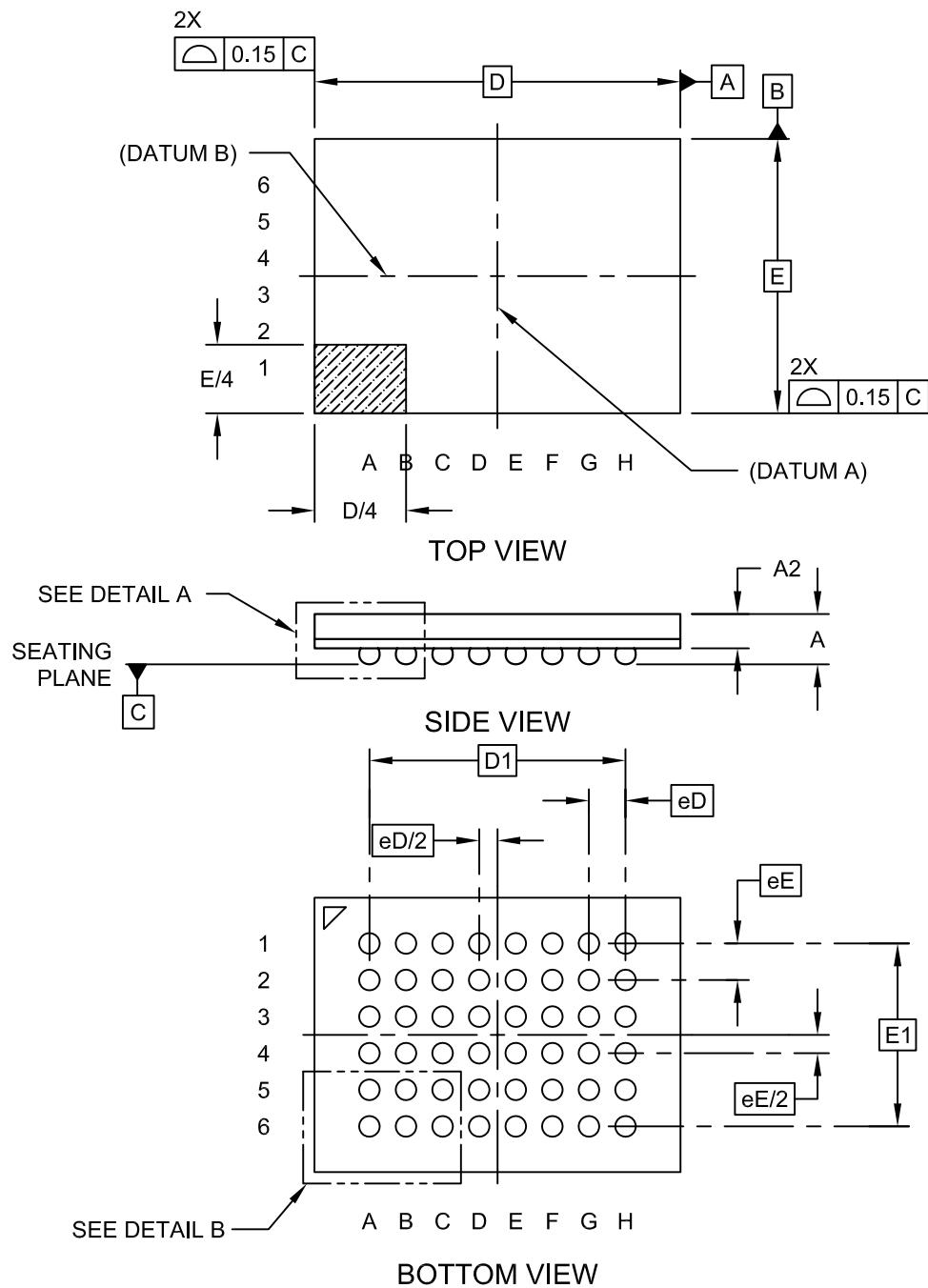
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

48-Ball Thin Fine Pitch Ball Grid Array (CD) - 6x8 mm Body [TFBGA]

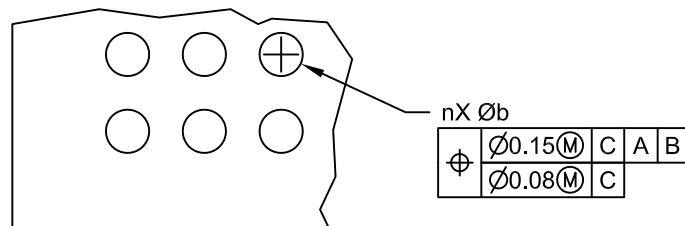
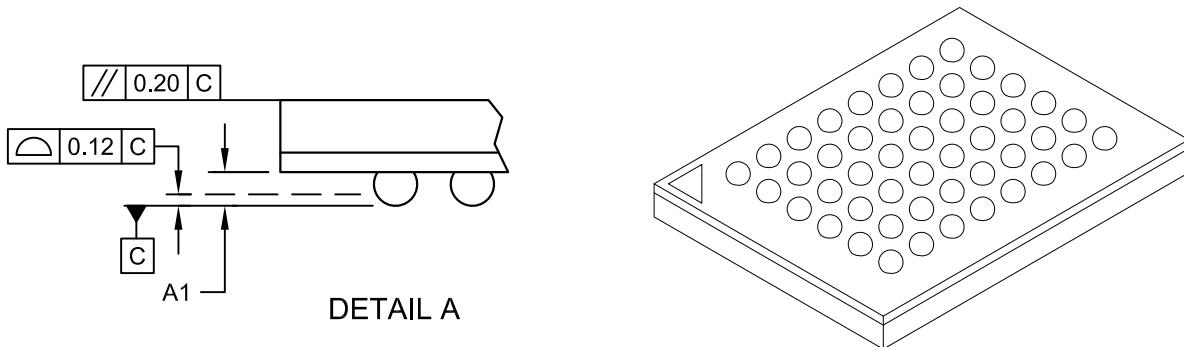
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

48-Ball Thin Fine Pitch Ball Grid Array (CD) - 6x8 mm Body [TFBGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



DETAIL B

Dimension	Limits	UNITS MILLIMETERS		
		MIN	NOM	MAX
Number of Solder Balls	n	48		
Solder Ball X-Pitch	eD	0.80	BSC	
Solder Ball Y-Pitch	eE	0.80	BSC	
Overall Height	A	-	-	1.20
Standoff	A1	0.30	-	-
Molded Package Thickness	A2	-	-	0.95
Overall Length	D	8.00	BSC	
Overall Solder Ball X-Pitch	D1	5.60	BSC	
Overall Width	E	6.00	BSC	
Overall Solder Ball Y-Pitch	E1	4.00	BSC	
Solder Ball Diameter	b	0.40	0.45	0.50

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M

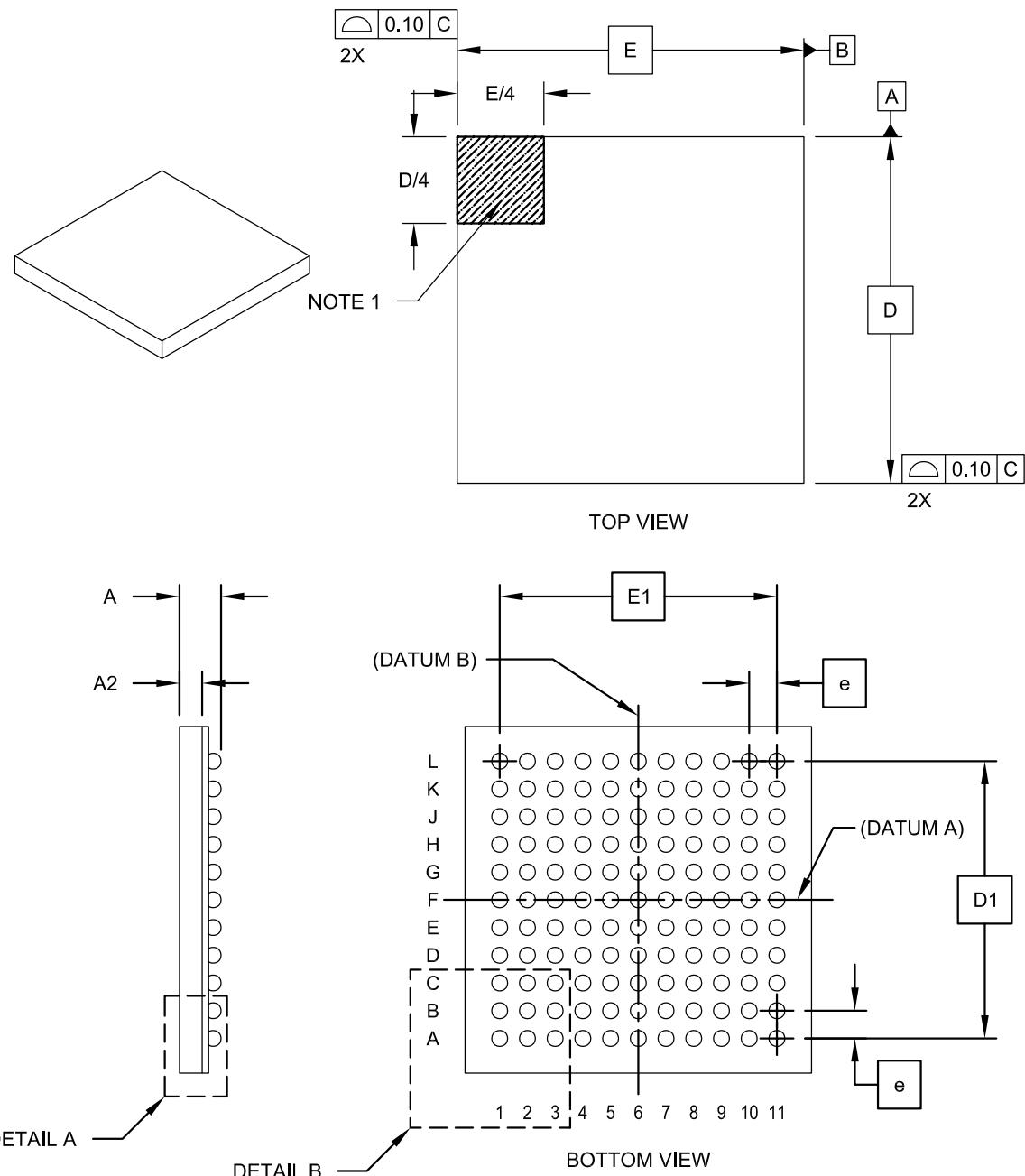
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

121-Lead Plastic Thin Profile Ball Grid Array (BG) - 10x10x1.10 mm Body [TFBGA]

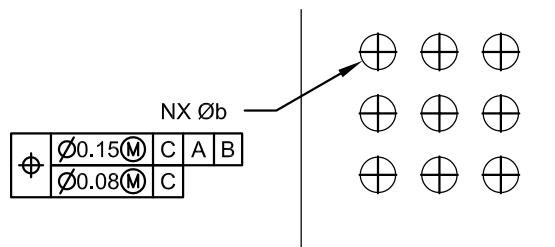
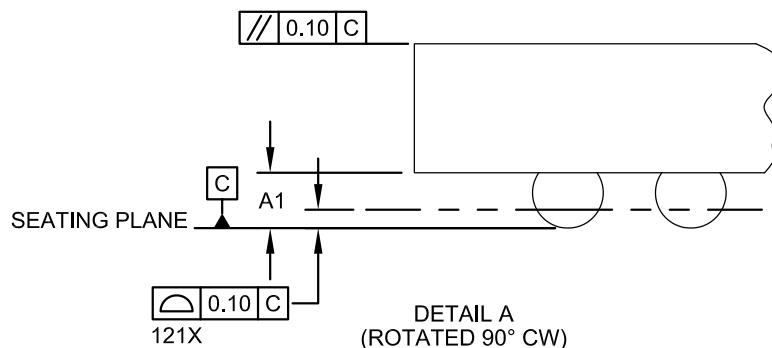
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

121-Lead Plastic Thin Profile Ball Grid Array (BG) - 10x10x1.10 mm Body [TFBGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units	MILLIMETERS		
Dimension Limits			MIN	NOM	MAX
Number of Contacts	N			121	
Contact Pitch	e			0.80 BSC	
Overall Height	A		1.00	1.10	1.20
Standoff	A1		0.25	0.30	0.35
Molded Package Thickness	A2		0.75	0.80	0.85
Overall Width	E		10.00 BSC		
Array Width	E1		8.00 BSC		
Overall Length	D		10.00 BSC		
Array Length	D1		8.00 BSC		
Contact Diameter	b		0.40 TYP		

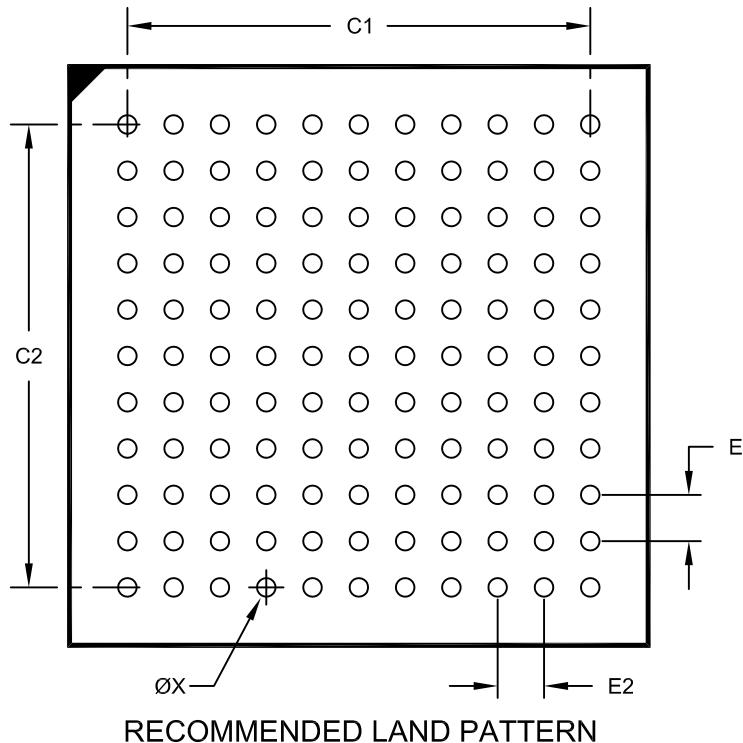
Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Dimensioning and tolerancing per ASME Y14.5M.
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.
3. The outer rows and columns of balls are located with respect to datums A and B.

Land Pattern (Footprint)

**121-Lead Plastic Thin Profile Ball Grid Array (BG) - 10x10x1.10 mm Body
[TFBGA--Formerly XBGA]**

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E1	0.80	BSC	
Contact Pitch	E2	0.80	BSC	
Contact Pad Spacing	C1		8.00	
Contact Pad Spacing	C2		8.00	
Contact Pad Diameter (X121)	X			0.32

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-2148 Rev D

Packaging Diagrams and Parameters

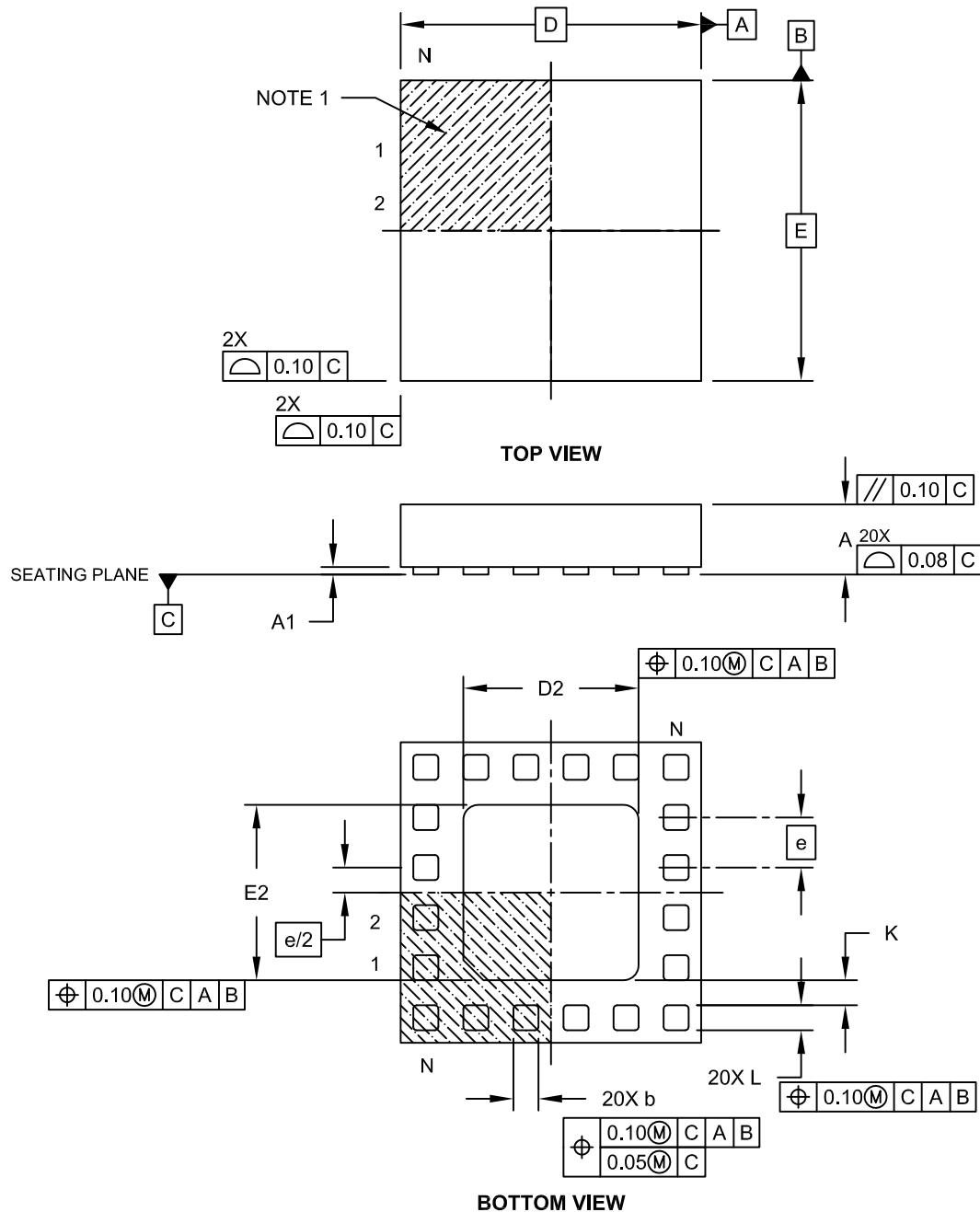
TLA Family

Thermal Leadless Array Packages

Packaging Diagrams and Parameters

20-Terminal Very, Very Thin Leadless Array Package (TW) – 3x3x0.7 mm Body With Exposed Pad [WTLA]

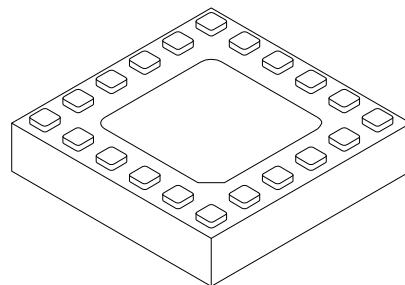
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

20-Terminal Very, Very Thin Leadless Array Package (TW) – 3x3x0.7 mm Body With Exposed Pad [WTLA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	20		
Pitch	e	0.50	BSC	
Overall Height	A	0.60	-	0.70
Standoff	A1	0.025	-	0.075
Overall Width	E	3.00	BSC	
Exposed Pad Width	E2	1.60	1.75	1.90
Overall Length	D	3.00	BSC	
Exposed Pad Length	D2	1.60	1.75	1.90
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

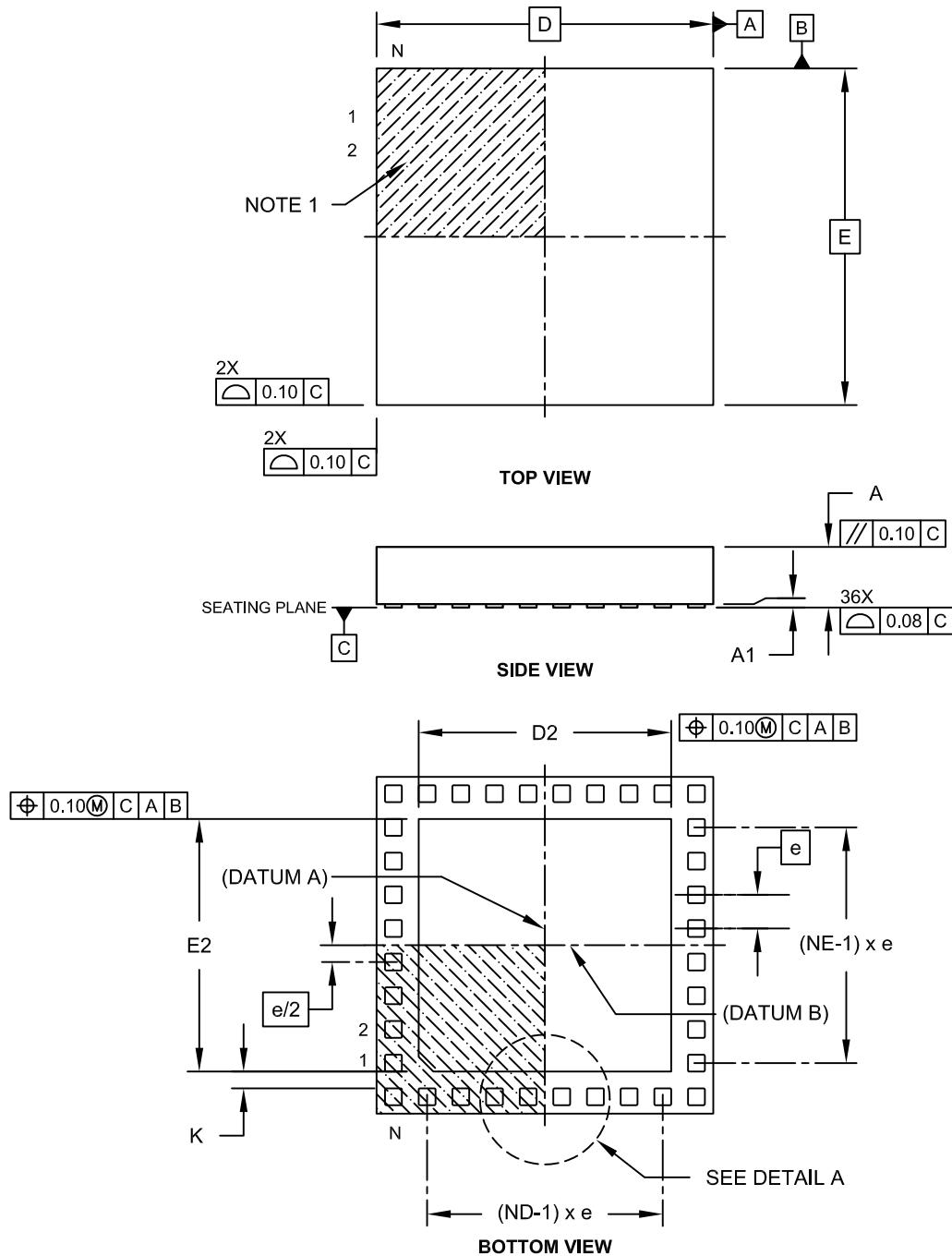
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

36-Terminal Very Thin Thermal Leadless Array Package (TL) – 5x5x0.9 mm Body with Exposed Pad [VTLA]

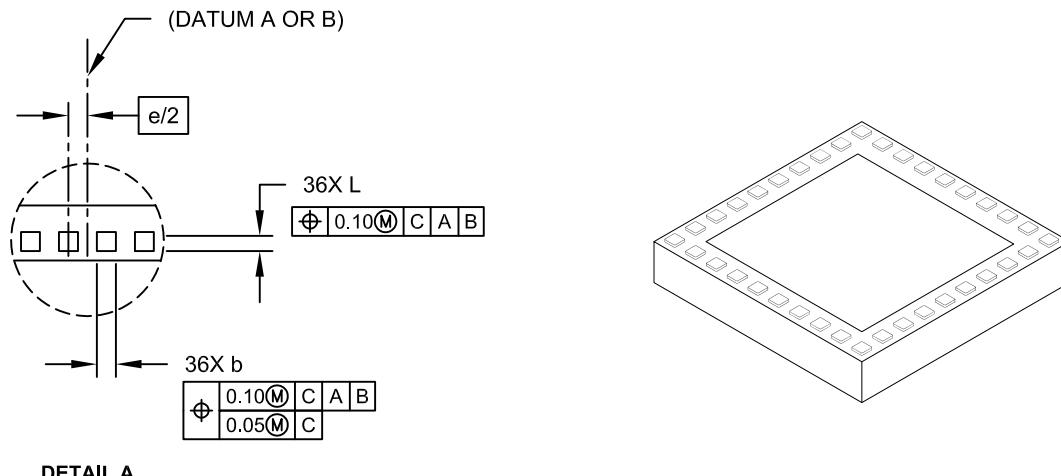
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

36-Terminal Very Thin Thermal Leadless Array Package (TL) – 5x5x0.9 mm Body with Exposed Pad [VTLA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N		36	
Number of Pins per Side	ND		10	
Number of Pins per Side	NE		8	
Pitch	e		0.50 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.025	-	0.075
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	3.60	3.75	3.90
Overall Length	D		5.00 BSC	
Exposed Pad Length	D2	3.60	3.75	3.90
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

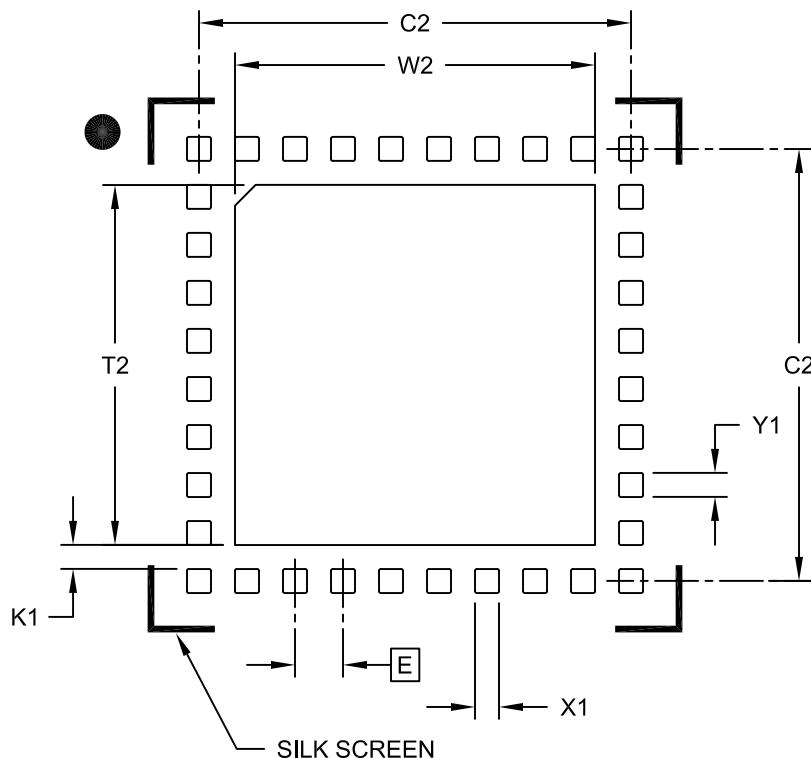
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Land Pattern (Footprint)

**36-Lead Thermal Leadless Array Package (TL) – 5x5x0.9 mm Body
with Exposed Pad [VTLA]**

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



		Units			MILLIMETERS		
		Dimension Limits			MIN	NOM	MAX
Contact Pitch		E			0.50 BSC		
Optional Center Pad Width		W2			3.75		
Optional Center Pad Length		T2			3.75		
Contact Pad Spacing		C1			4.50		
Contact Pad Spacing		C2			4.50		
Contact Pad Width (X36)		X1			0.25		
Contact Pad Length (X36)		Y1			0.25		
Distance Between Pads		K1	0.15	0.25			

Notes:

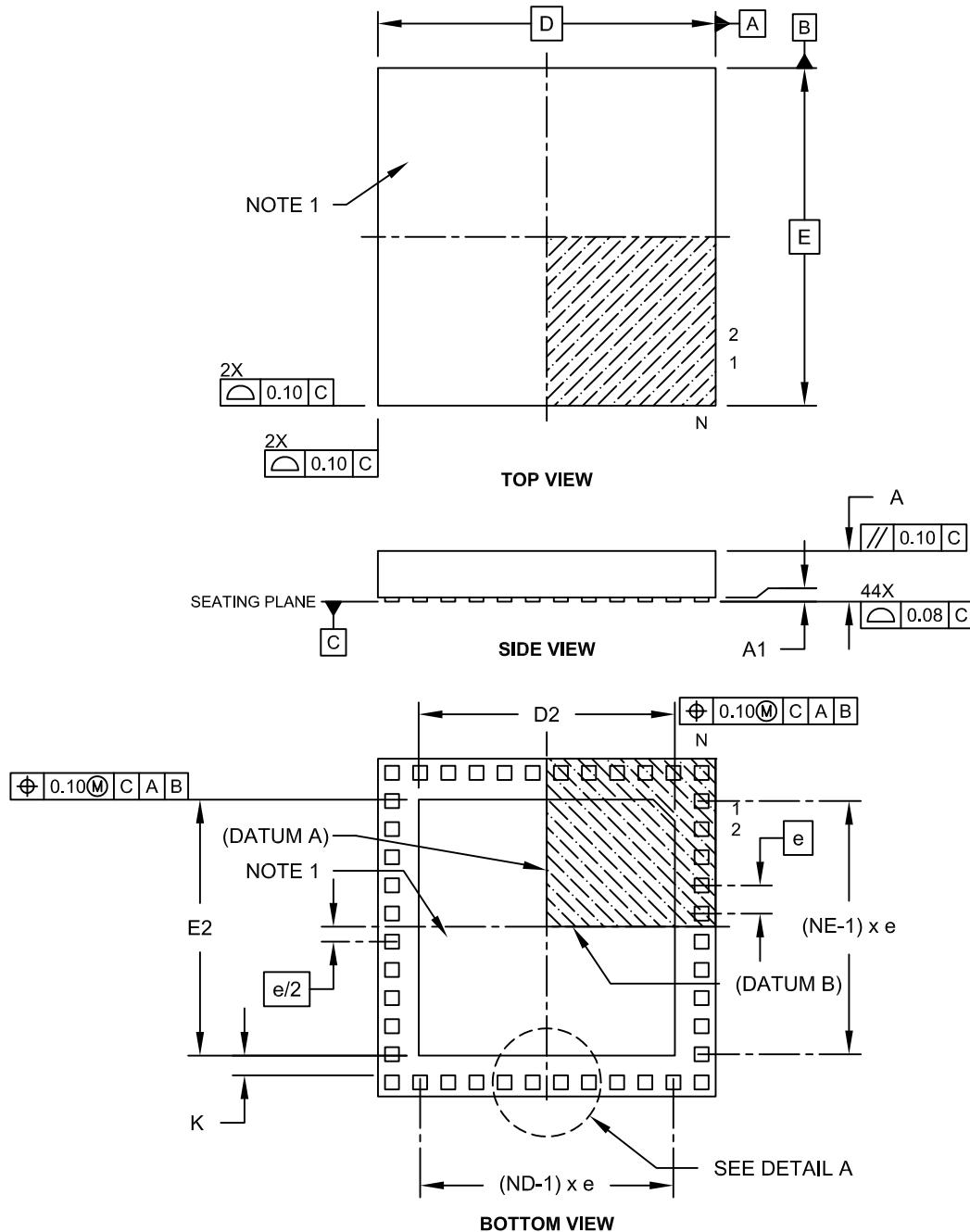
1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Packaging Diagrams and Parameters

44-Terminal Very Thin Leadless Array Package (TL) – 6x6x0.9 mm Body With Exposed Pad [VTLA]

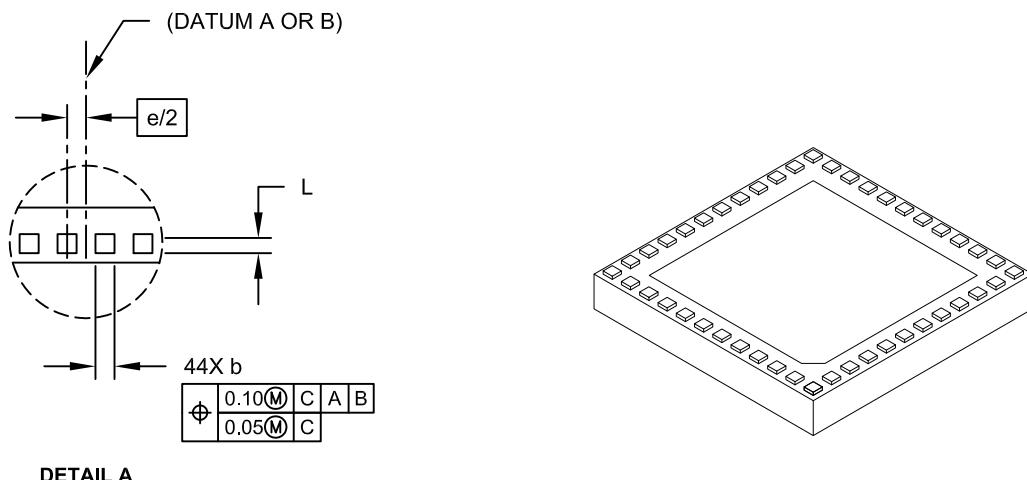
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

44-Terminal Very Thin Leadless Array Package (TL) – 6x6x0.9 mm Body With Exposed Pad [VTLA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	44		
Number of Pins per Side	ND	12		
Number of Pins per Side	NE	10		
Pitch	e	0.50	BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.025	-	0.075
Overall Width	E	6.00	BSC	
Exposed Pad Width	E2	4.40	4.55	4.70
Overall Length	D	6.00	BSC	
Exposed Pad Length	D2	4.40	4.55	4.70
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

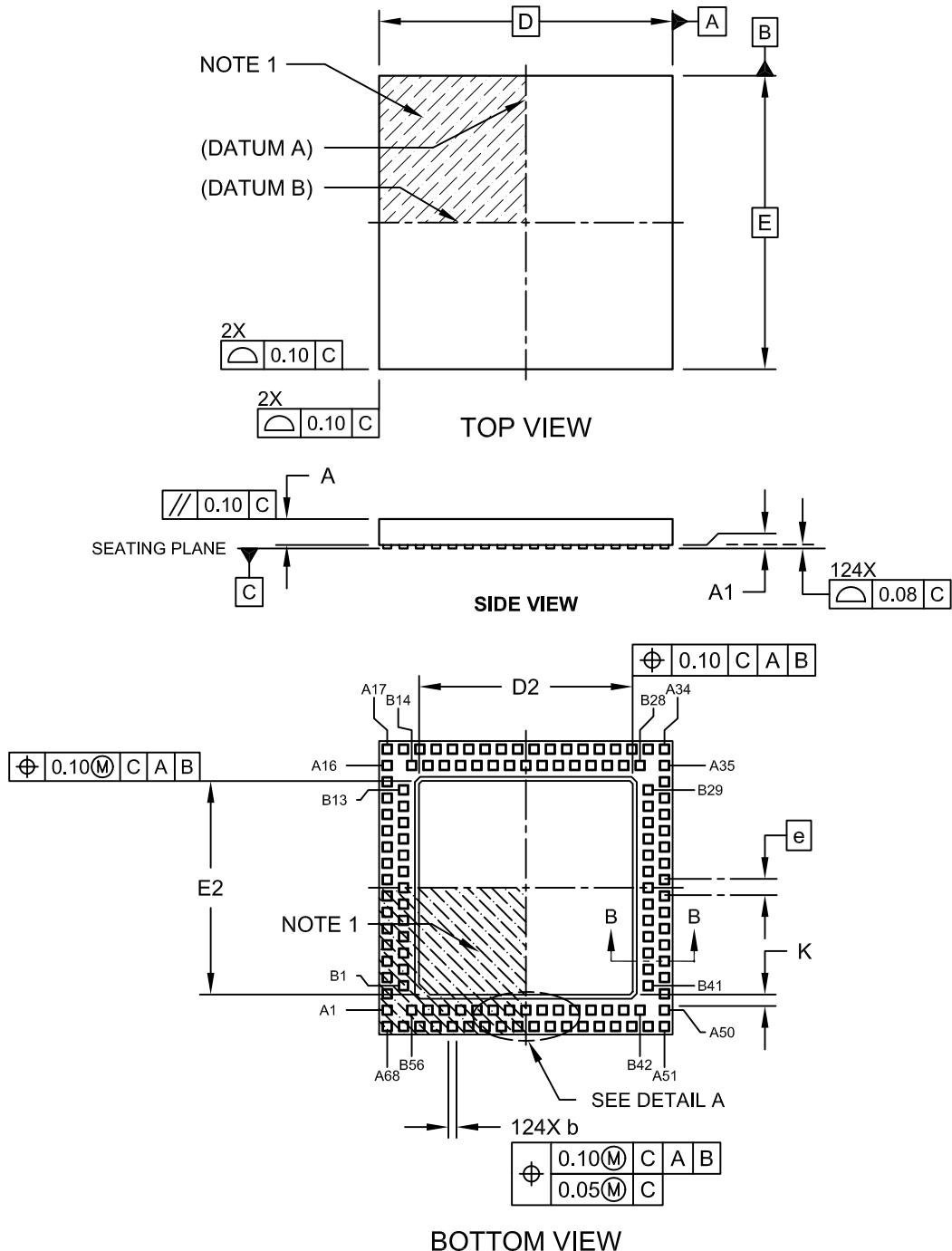
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

Packaging Diagrams and Parameters

124-Terminal Very Thin Leadless Array Package (TL) – 9x9x0.9 mm Body [VTLA]

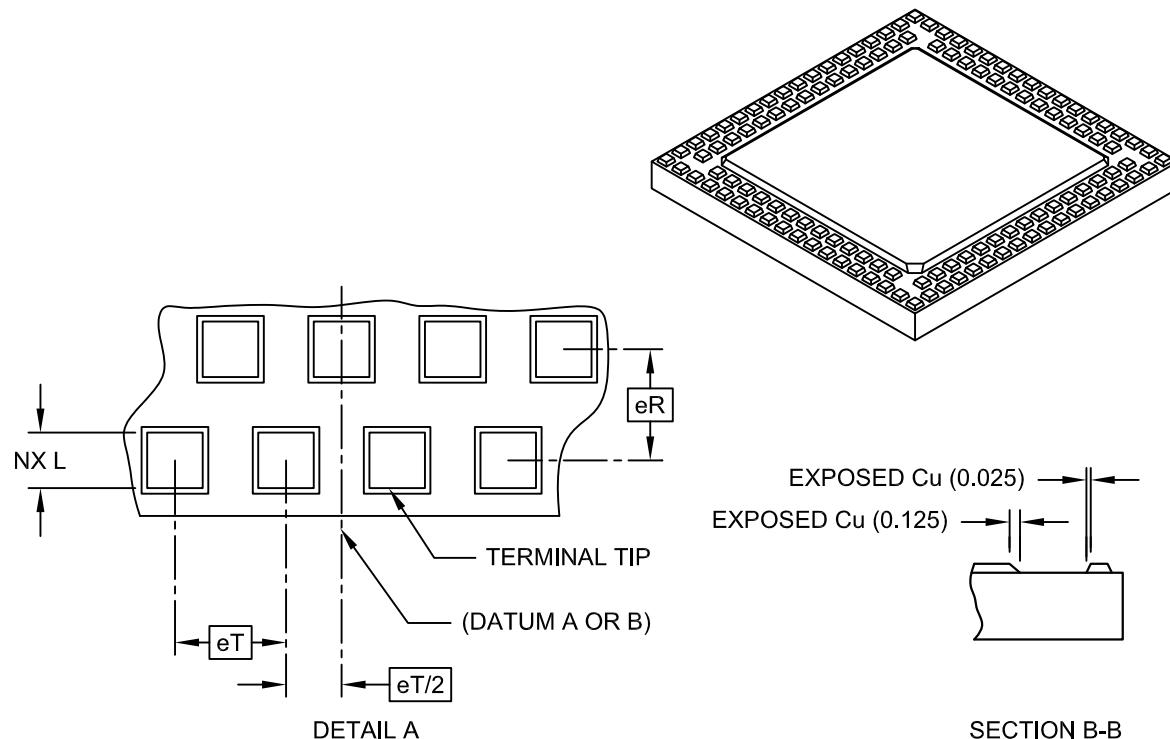
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Packaging Diagrams and Parameters

124-Terminal Very Thin Leadless Array Package (TL) – 9x9x0.9 mm Body [VTLA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	124		
Pitch	eT	0.50	BSC	
Pitch (Inner to outer terminal ring)	eR	0.50	BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	-	0.05
Overall Width	E	9.00 BSC		
Exposed Pad Width	E2	6.40	6.55	6.70
Overall Length	D	9.00 BSC		
Exposed Pad Length	D2	6.40	6.55	6.70
Contact Width	b	0.20	0.25	0.30
Contact Length	L	0.20	0.25	0.30
Contact-to-Exposed Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated.
3. Dimensioning and tolerancing per ASME Y14.5M.

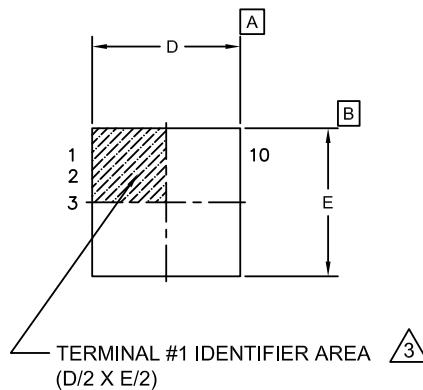
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.

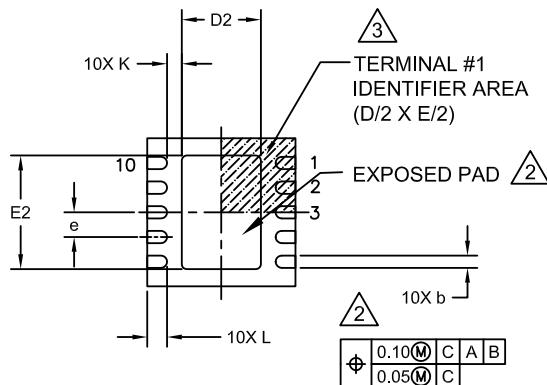
LEGACY SMSC PACKAGE DRAWINGS AND SPECIFICATIONS

10-DFN-162304-3x3B-05P-rB--1 of 2	421
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124-DQFN-10x10B-54eP--rA	423
124-DQFN-10x10B-69eP--rC	424
132-DQFN-5004-11x11mm--rB--1 of 2	425
132-DQFN-5004-11x11mm--rB--2 of 2	426
156-DQFN51-12x12B-05P--rE--1 of 2	427
156-DQFN51-12x12B-05P--rE--2 of 2	428
30-DSA-04P-rB	429
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156-LFBGA-11x11B-08P--rC	436
169-LFBGA-11x11B-08P--rB	437
176-LFBGA-10x10B-065P--rD	438
196-LFBGA-10x10B-065P--rB	439
208-LFBGA-15x15B-08P--rA	440
225-LFBGA-13x13B-08P--rB	441
292LFBGA-17x17B-08P--rA	442
324-LFBGA-15x15B-08P--rB	443
45-LGA-KLR3012-SiP-rD	445
64-LQFP-7x7B-04P-rC	447
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36-QFN3704-6x6B-05P-rA	461
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40-QFN-4304-6x6B-05P-rE--1 of 2	467
40-QFN-4304-6x6B-05P-rE--2 of 2	468
48-QFN4104-7x7B-rG--1 of 2	469
48-QFN4104-7x7B-rG--2 of 2	470
48-QFN5304-7x7B-rB--1 of 2	471
48-QFN5304-7x7B-rB--2 of 2	472
56-QFN4304-8x8B-rE--1 of 2	473
56-QFN4304-8x8B-rE--2 of 2	474
56-QFN5904-8x8B-rF--1 of 2	475
56-QFN5904-8x8B-rF--2 of 2	476
64-QFN4704-9x9B-rC--1 of 2	477
64-QFN4704-9x9B-rC--2 of 2	478
64-QFN6004-9x9B-rB--1 of 2	479
64-QFN6004-9x9B-rB--2 of 2	480
64-QFN7304-9x9B-rC--1 of 2	481
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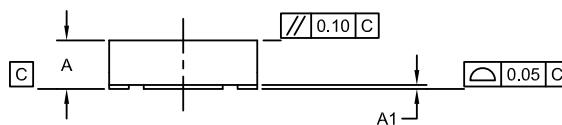
72-QFN6004-10x10B-rC--2 of 2	484
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10-S18QLeX-1800x1300x550B-400P--rB	491
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20-SIP-R-rB	494
8-SOIC-150 mils-wide-body-rB	495
14-SOIC-150 mils-wide-rB	496
SOT23-FAMILY-rD	497
12-SQFN-4x4B-08P-rC	499
16-SQFN3-3x3B-05P-rB	500
16-SQFN5-5x5B-08P-rB	501
16-SQFN-4x4B-065P-rC	502
20-SQFN-4x4B-05P-rF	503
24-S4QFN-4x4B-05P-rA	504
24-SQFN-5x5B-065P-rB	506
28-SQFN-3104--5x5B-05P-rA	507
28-SQFN-3106--5x5B-05P-rA	508
32-SQFN-5x5B-05P-rB	509
36-SQFN-3706-6x6B-05P-rB	510
48-SQFN-4104-7x7B-05P--rB	511
48-SQFN-5304-7x7B-05P--rA	512
SSOP-150mils-WIDE-FAMILY-rC	513
8-TDFN-151704-type 1-2x3B-05P-rA	515
129-TFBGA-7x7B-05P--rC	517
134-TFBGA-7x7B-05P--rB	518
144-TFBGA-7x7B-05P--rD	519
TQFP-1p4 Thick-Square-rC	521
100-TQFP-14x14B-05P--rC	522
176-TQFP-20x20x1p4B-04P--rA	523
TSSOP-3x3B-Family-rB	525
25-UFBGA-3x3B-05P-rA	527
25-VFBGA-3x3B-05P--rB	529
40-VFBGA-4x4B-05P-rA	530
100-VTQFP-14x14B-05P--rC	531
128-VTQFP-14x14B-04P--rC	532
144-VTQFP-20x20x1B-05P--rA	533
49-WFBGA-3500x3500umB-400umP--rA	535
128-XVTQFP-14x14B-05P-5x5ePAD--rA	537



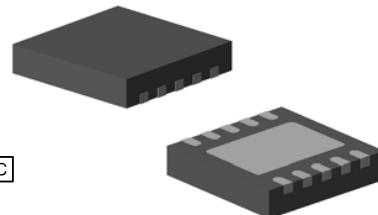
TOP VIEW



BOTTOM VIEW



SIDE VIEW



3-D VIEWS

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	2/28/08	S.K.ILIEV
B	ADDED PAGE 2of2. APPLICATION NOTES UPDATED	4/8/09	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	0.90	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
D/E	2.90	3.00	3.10	-	X/Y BODY SIZE
D2	1.50	1.60	1.70	2	X EXPOSED PAD SIZE
E2	2.20	2.30	2.40	2	Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.25	0.30	-	-	TERMINAL TO PAD DISTANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. UNILATERAL COPLANARITY ZONE APPLIES TO THE EXPOSED PAD, AS WELL AS THE TERMINALS. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL
XX ± 0.1
XXX ± 0.05
XXXX ± 0.025

ANGULAR
 $\pm 1^\circ$
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

MATERIAL

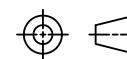
-

FINISH

-

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION



NAME

-

DRAWN

-

2/28/08

CHECKED

S.K.ILIEV

2/28/08

APPROVED

S.K.ILIEV

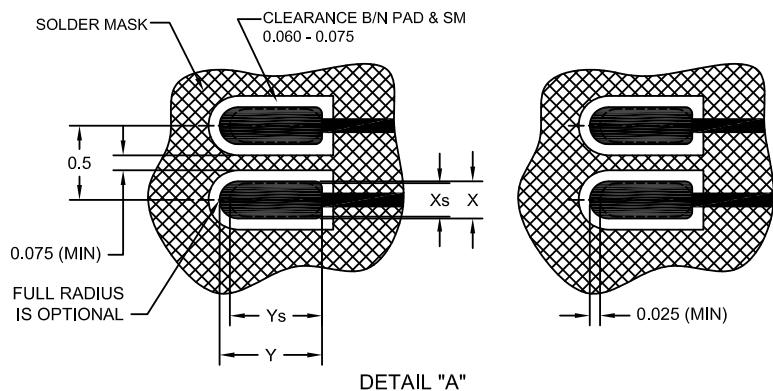
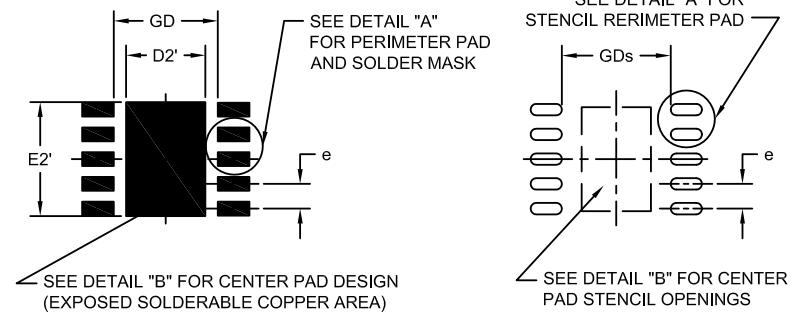
2/28/08

Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

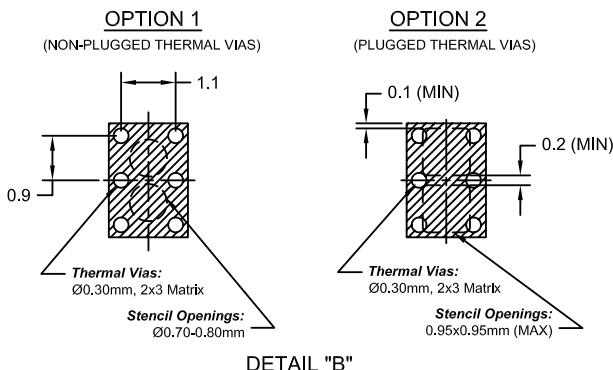
PACKAGE DATA

10 PINS DFN-162304, 3x3mm BODY, 0.50mm PITCH
1.6x2.3mm ePAD, FULL LEAD DESIGN (SAWN)
Package Outline Drawing

REV
B
DWG NUMBER
10DFN-162304-3x3B
STD COMPLIANCE
MO-229
SHEET
1 OF 2



STENCIL OPENING - PERIMETER LANDS



THERMAL VIAS and STENCIL OPENING - CENTER PAD

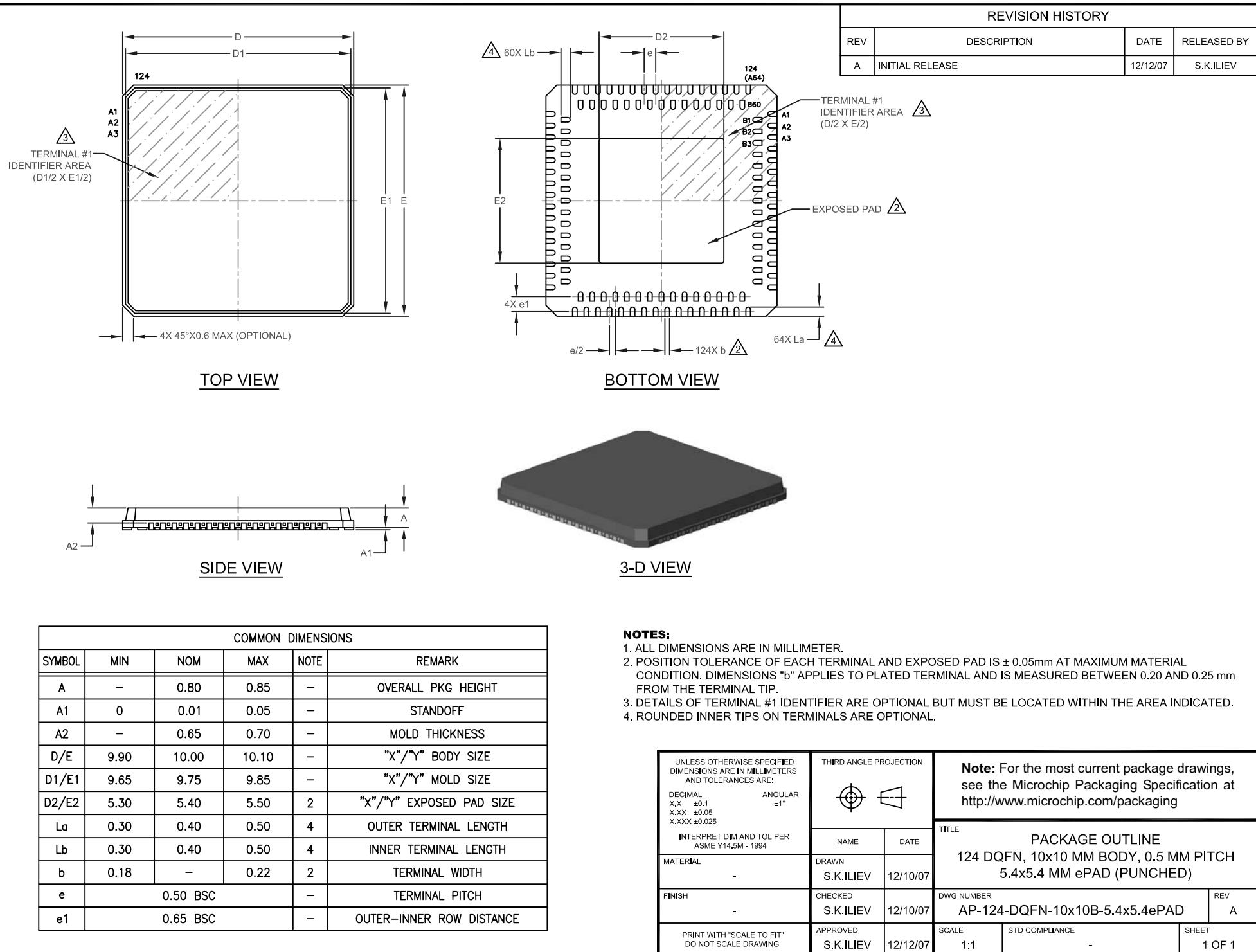
REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
B	ADDED PAGE 2of2. APPLICATION NOTES UPDATED	4/8/09	S.K.ILIEV

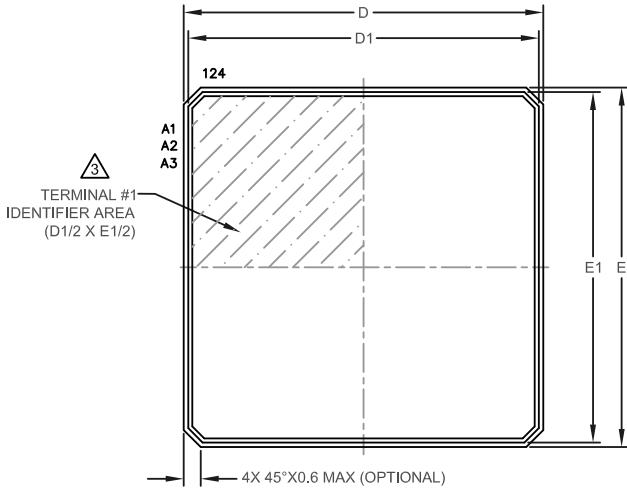
LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD	2.10	-	2.20
GDs	2.20	-	-
D2'	-	1.60	1.60
E2'	-	2.30	-
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e	0.50		

SMT APPLICATION NOTES

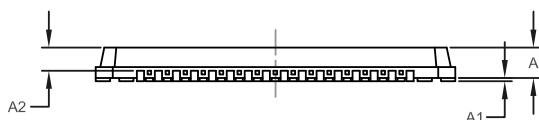
1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN (See Options 1 & 2).
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ± 0.1 X.XX ± 0.05 XXX.X ± 0.025	THIRD ANGLE PROJECTION 	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	TITLE PACKAGE DATA 10 PINS DFN-162304, 3x3mm BODY, 0.50mm PITCH 1.6x2.3mm ePAD, FULL LEAD DESIGN (SAWN) Application Notes			
MATERIAL -	NAME -	DATE 4/8/09	DRAWN -	REV B
FINISH -	CHECKED S.K.ILIEV	4/8/09	DWG NUMBER 10DFN-162304-3x3B	STD COMPLIANCE JEDEC: MO-229
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	4/9/09	SCALE 1:1	SHEET 2 OF 2

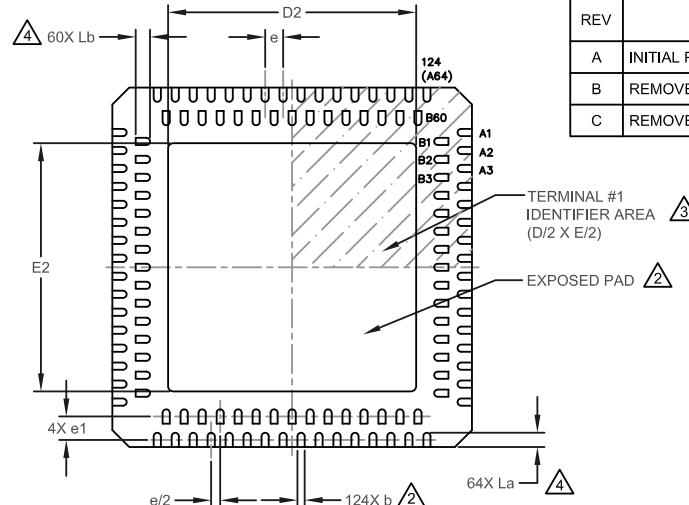




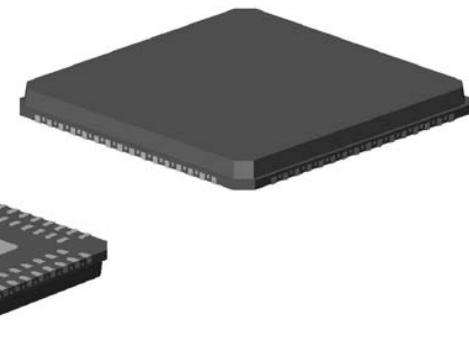
TOP VIEW



SIDE VIEW



BOTTOM VIEW



3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	0.80	0.85	-	OVERALL PKG HEIGHT
A1	0	0.01	0.05	-	STANDOFF
A2	-	0.65	0.70	-	MOLD THICKNESS
D/E	9.90	10.00	10.10	-	"X"/"Y" BODY SIZE
D1/E1	9.65	9.75	9.85	-	"X"/"Y" MOLD SIZE
D2/E2	6.75	6.90	7.05	2	"X"/"Y" EXPOSED PAD SIZE
La	0.30	0.40	0.50	4	OUTER TERMINAL LENGTH
Lb	0.30	0.40	0.50	4	INNER TERMINAL LENGTH
b	0.18	-	0.22	2	TERMINAL WIDTH
e	0.50 BSC		-	TERMINAL PITCH	
e1	0.65 BSC		-	OUTER-INNER ROW DISTANCE	

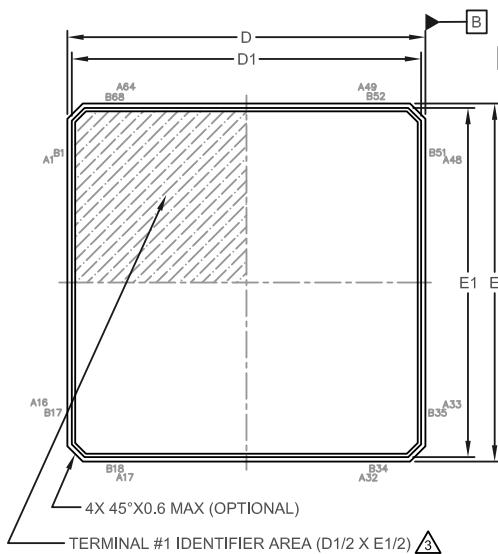
REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	4/5/05	S.K.ILIEV
B	REMOVE THE "PRELIMINARY" NOTE	7/2/05	S.K.ILIEV
C	REMOVED THE LOGO FROM THE TITLE BLOCK	9/26/07	S.K.ILIEV

NOTES:

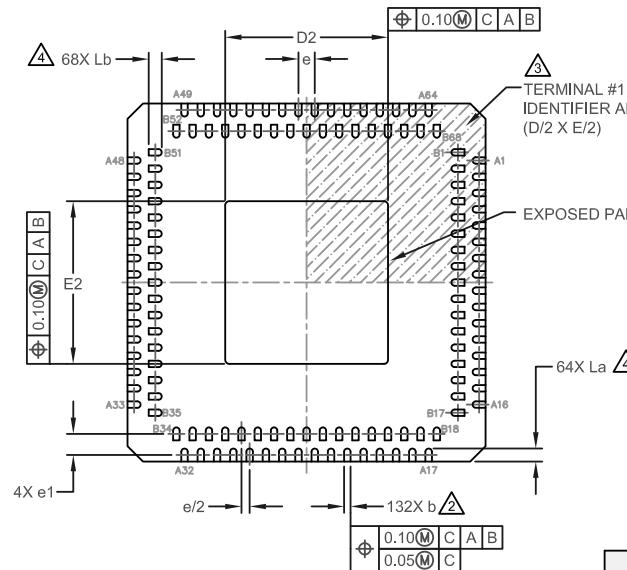
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. POSITION TOLERANCE OF EACH TERMINAL AND EXPOSED PAD IS $\pm 0.05\text{mm}$ AT MAXIMUM MATERIAL CONDITION. DIMENSIONS "b" APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.20 AND 0.25 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. ROUNDED INNER TIPS ON TERMINALS ARE OPTIONAL.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ± 0.1 XXX ± 0.05 XXXX ± 0.025 ANGULAR $\pm 1^\circ$ INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
TITLE		PACKAGE OUTLINE 124 DQFN, 10x10 MM BODY, 0.5 MM PITCH (P)		
MATERIAL	DRAWN S.K.ILIEV	DATE 2/1/05		
FINISH	CHECKED S.K.ILIEV	3/31/05	DWG NUMBER AP-124-DQFN-10x10B	REV C
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	4/5/05	SCALE 1:1	STD COMPLIANCE -
				SHEET 1 OF 1

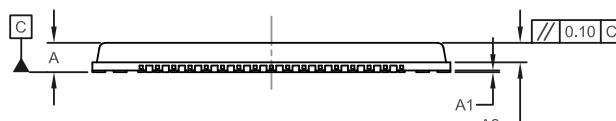
REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	7/30/08	S.K.ILIEV
B	NEW LAYOUT OF PAGE 2of2 - TO UPDATE STENCIL	1/30/09	S.K.ILIEV



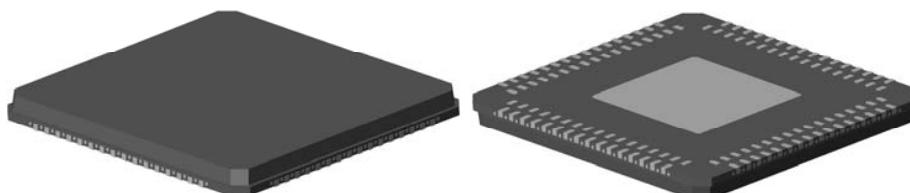
TOP VIEW



BOTTOM VIEW



SIDE VIEW



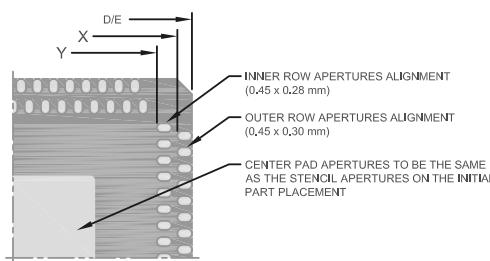
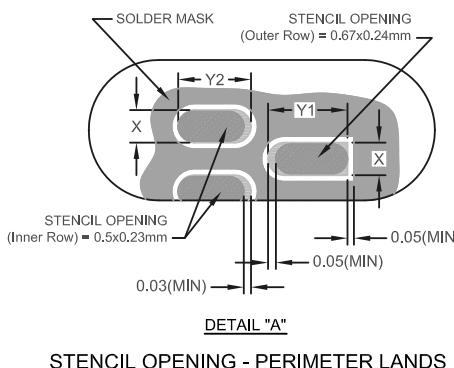
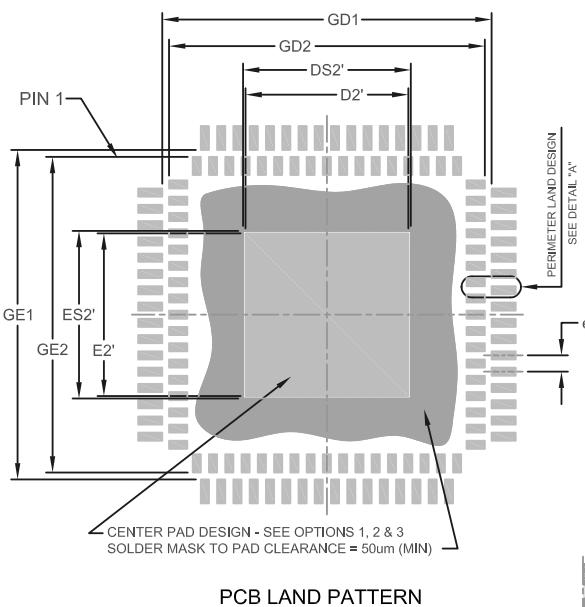
3-D VIEWS

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	0.90	-	OVERALL PACKAGE HEIGHT
A1	0	0.01	0.05	-	STANOFF
A2	-	0.60	0.65	-	MOLD CAVITY HEIGHT
D/E	10.90	11.00	11.10	-	X/Y BODY SIZE
D1/E1	10.63	10.73	10.83	-	X/Y MOLD CAVITY SIZE
D2/E2	4.90	5.00	5.10	2	X/Y EXPOSED PAD SIZE
La/Lb	0.30	0.40	0.50	4	TERMINAL LENGTH
b	0.17	0.22	0.27	2	TERMINAL WIDTH
e	0.50 BSC			-	TERMINAL PITCH
e1	0.65 BSC			-	OUTER-INNER ROW PITCH

NOTES:

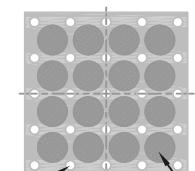
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. ROUNDED INNER ENDS OF THE TERMINALS ARE OPTIONAL.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025 INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION 	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging
TITLE	PACKAGE DATA	
	132 PINS DQFN, 11x11mm BODY, 0.50/0.65mm LEAD PITCH (PUNCHED)	
DRAWN	7/30/08	REV B
CHECKED	7/30/08	
APPROVED	7/30/08	SCALE 1:1
S.K.ILIEV		STD COMPLIANCE MO-267
		SHEET 1 OF 2

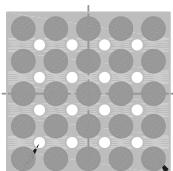


OPTION 1

(UN-PLUGGED THERMAL VIAS)



Thermal Vias: Ø0.30mm,
5x5 Matrix @ 1.1mm Pitch



Thermal Vias: Ø0.40mm,
4x4 Matrix @ 1.0mm Pitch

OPTION 3

(PLUGGED THERMAL VIAS)

0.1mm (MIN) 0.2mm (MIN)

Thermal Vias: Ø0.30mm,
5x5 Matrix @ 1.1mm Pitch

Stencil Openings: Ø0.70mm
5x5 Matrix @ 1.0mm Pitch

THERMAL VIAS & STENCIL OPENING - CENTER PAD

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
B	NEW LAYOUT OF PAGE 2of2 - TO UPDATE STENCIL	1/30/09	S.K.Iliev

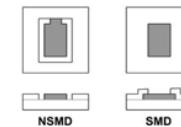
LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD1/GE1	10.12	-	10.2
GD2/GE2	-	9.70	9.72
D2'/E2'	(Copper center pad - NSMD)	5.00	5.00
DS2'/ES2'	(Solder mask opening)	5.10	-
X	-	-	0.28
Y1	-	-	0.74
Y2	-	-	0.56
e		0.50	

NSMD = Non Solder Mask Defined

SMT APPLICATION NOTES

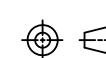
1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. NON SOLDER MASK DEFINED (NSMD) CENTER LAND PATTERN (CORRESPONDING TO THE PACKAGE EXPOSED PAD) IS RECOMMENDED.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1, 2 & 3)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.



6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCH = 0.5 mm.
7. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
8. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
9. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL: XX: ±0.1
XXX: ±0.05
XXXX: ±0.025
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

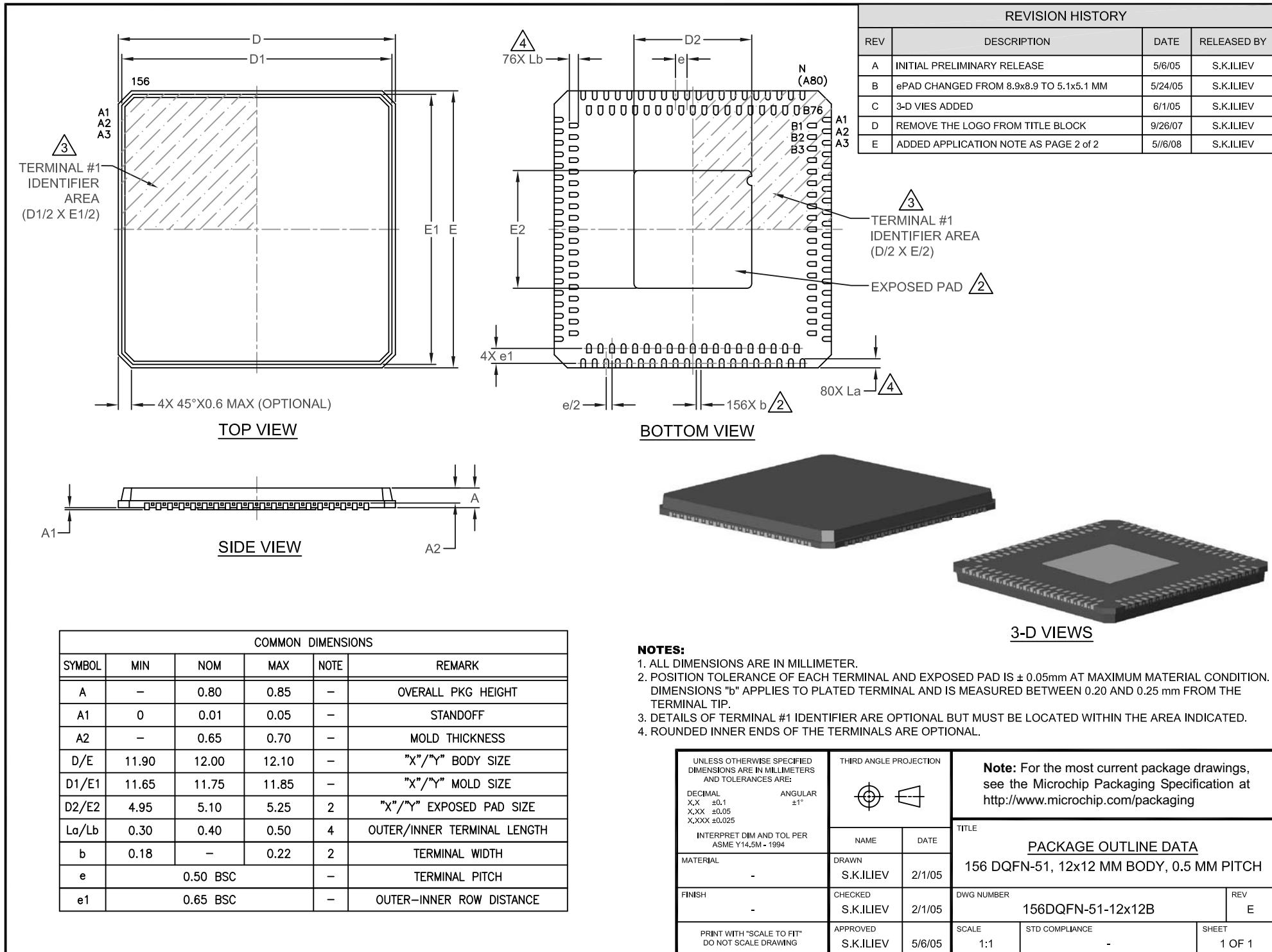
THIRD ANGLE PROJECTION

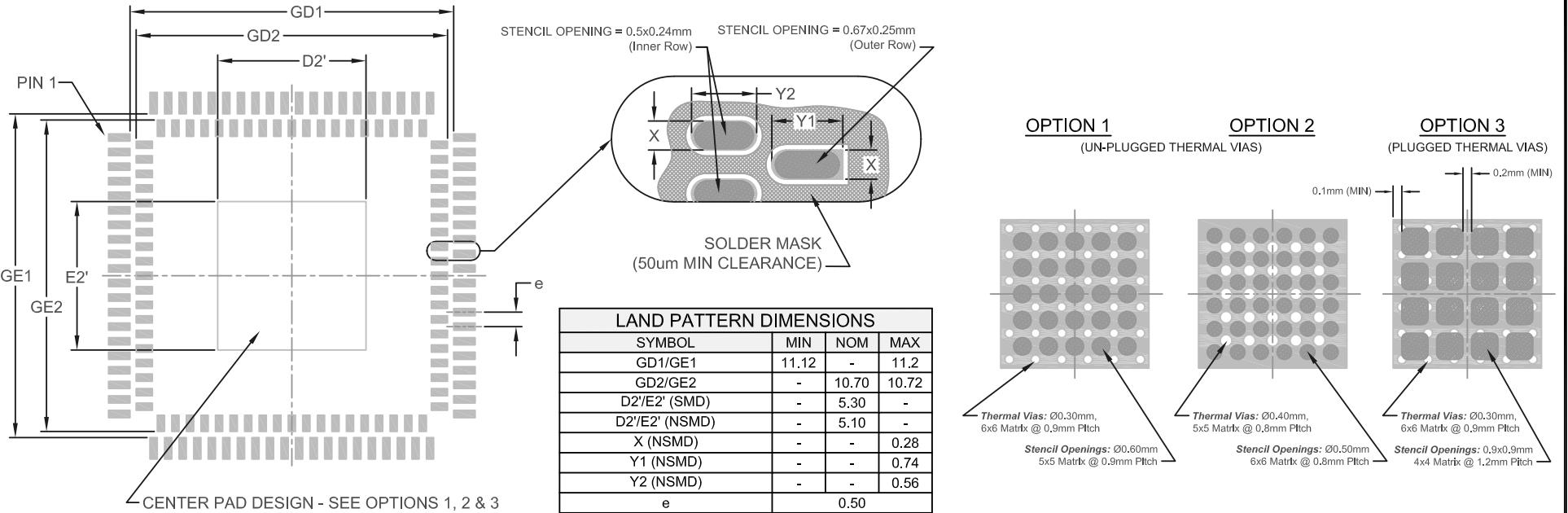


Note: For the most current package drawings, see the Microchip Packaging Specification at <http://www.microchip.com/packaging>

APPLICATION NOTES
132 PINS DQFN, 11x11mm BODY,
0.50/0.65mm LEAD PITCH (PUNCHED)

MATERIAL	NAME	DATE	DWG NUMBER	REV
FINISH	CHECKED	7/30/08	132-DQFN5004-11x11B-05P	B
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	7/30/08	SCALE: 1:1	STD COMPLIANCE: -
	S.K.Iliev		SHEET: 2 OF 2	



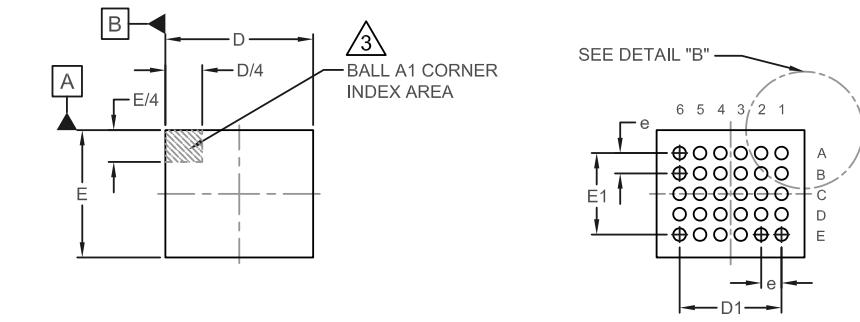


RECOMMENDED PCB LAND PATTERN

SMT APPLICATION NOTES

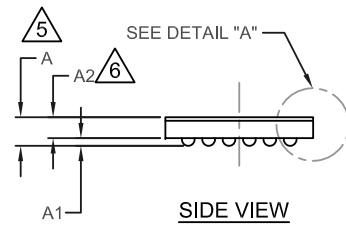
1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK, SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE:
NSMD: 5.1x5.1mm
SMD: 5.3x5.3mm
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1, 2 & 3)
4. THE VIAS SHOULD BE AT 0.8 to 1.0MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025 ANGULAR $\pm 1^\circ$ INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION 	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
MATERIAL	NAME S.K.Iliev	DATE 2/1/05	TITLE	
FINISH	CHECKED S.K.Iliev	2/1/05	APPLICATION NOTES	
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.Iliev	5/6/05	DWG NUMBER 156DQFN-51-12x12B	REV E
	SCALE 1:1	STD COMPLIANCE -	SHEET 2 OF 2	

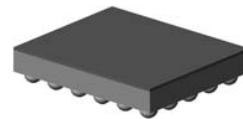


TOP VIEW

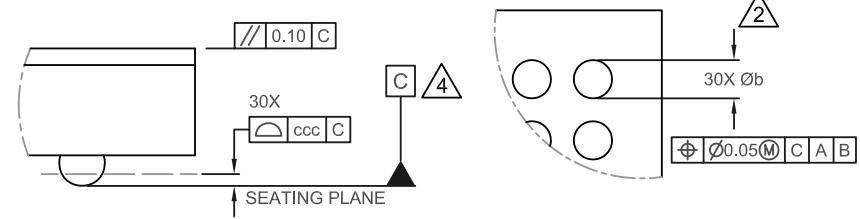
BOTTOM VIEW



SIDE VIEW

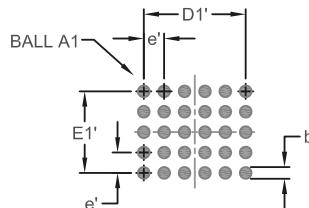


3-D VIEW



DETAIL A

DETAIL B



PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'	-	2.00	-
E1'	-	1.60	-
b'	0.23	0.23	-
e'	-	0.40	-

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	9/10/2012	S.K.ILIEV
A1	UPDATED A1 CORNER ON TOP VIEW TO MATCH THE ONE IN BOTTOM VIEW	3/19/2012	SKI
A2	ADDED 3-D VIEW	3/23/2012	SKI
A3	ROTATE PKG 90° CLOCKWISE	3/28/2012	SKI
B	INITIAL RELEASE	1/25/2013	SKI

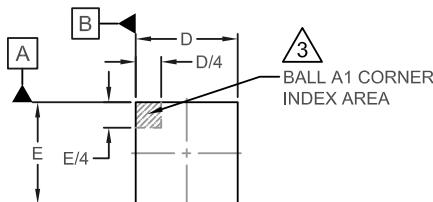
COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	0.56	0.62	5	OVERALL PACKAGE HEIGHT
A1	0.16	0.20	0.24	-	STANDOFF
A2	-	-	0.38	6	PACKAGE THICKNESS
D	2.87	2.90	2.93	-	X DIE SIZE
E	2.47	2.50	2.53	-	Y DIE SIZE
D1	2.00 BSC			-	X END BALLS DISTANCE
E1	1.60 BSC			-	Y END BALLS DISTANCE
b	0.20	0.25	0.30	2	BALL DIAMETER
e	0.40 BSC			-	BALL PITCH
ccc	0	-	0.05	4	COPLANARITY

NOTES:

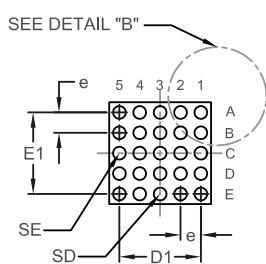
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. DIMENSION "A(MAX)" IS GIVEN FOR THE EXTREMELY THIN VARIATION OF THE PACKAGE PROFILE HEIGHT.
7. DIMENSION "A2" INCLUDES A DIE COATING THICKNESS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ±0.1 XXX ±0.05 XXXX ±0.025 INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	ANGULAR ±1°	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging
		NAME	DATE	
MATERIAL	DRAWN	-	2/9/12	TITLE PACKAGE OUTLINE
FINISH	CHECKED	S.K.ILIEV	2/9/12	30 BALL DSA, 2.5x2.9mm BODY, 0.40mm PITCH (DSA = Die Size Package, or WLCSP)
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.ILIEV	2/10/12	DWG NUMBER 30DSA-0.4P REV B SCALE 1:1 STD COMPLIANCE MO-211 SHEET 1 OF 1

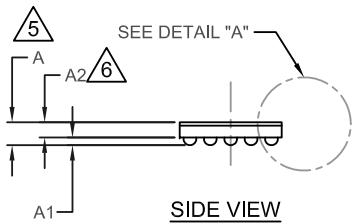
NOTES



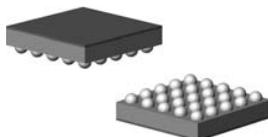
TOP VIEW



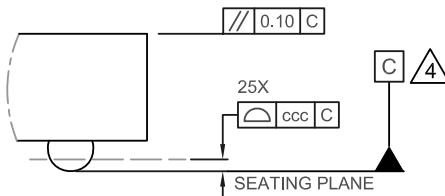
BOTTOM VIEW



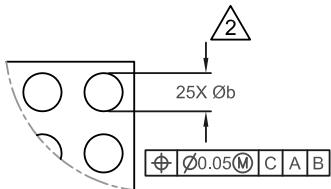
SIDE VIEW



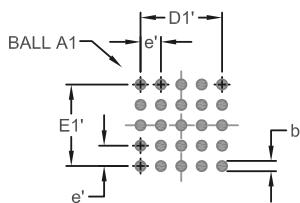
3-D VIEWS



DETAIL A



DETAIL B



PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'/E1'	-	1.60	-
b'	0.20	0.23	-
e'	-	0.40	-

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

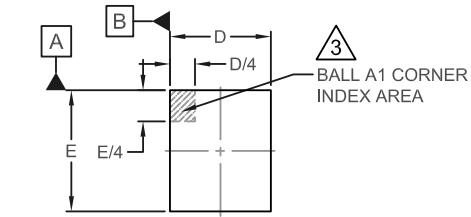
REVISION HISTORY				
REV	DESCRIPTION			DATE
A	INITIAL RELEASE			10/24/07
B	PCB LAND PATTERN UPDATED			4/20/09
C	D/E from 1.94 - 1.97 to 1.97±0.03mm			11/16/09
D	A from NOM & MAX to range MIN - MAX. ADDED SD and SE			MAR2010
E	UPDATED b' to be 0.20 MIN & 0.23 NOM			SEP 2010
				SKI

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.52	0.56	0.62	5	OVERALL PACKAGE HEIGHT
A1	0.16	0.20	0.24	-	STANOFF
A2	-	-	0.38	6	PACKAGE THICKNESS
D/E	1.94	1.97	2.00	-	X/Y DIE SIZE
D1/E1	1.60 BSC			-	X/Y END BALLS DISTANCE
b	0.20	0.25	0.30	2	BALL DIAMETER
e	0.40 BSC			-	BALL PITCH
SD/SE	0.00			-	CENTER BALL POSITION (OUTER ROW)
ccc	0	-	0.05	4	COPLANARITY

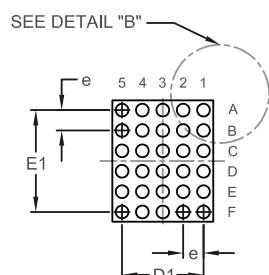
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
DIMENSION "A(MAX)" IS GIVEN FOR THE EXTREMELY THIN VARIATION OF THE PACKAGE PROFILE HEIGHT.
6. DIMENSION "A2" INCLUDES A DIE COATING THICKNESS.

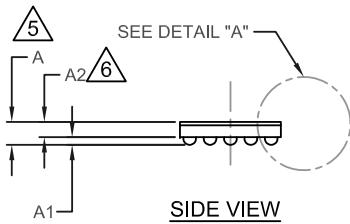
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ±0.1 XXX ±0.05 XXXX ±0.025 ANGULAR ±1°	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging	
	INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	NAME	DATE	
MATERIAL	DRAWN	-	7/14/07	TITLE PACKAGE OUTLINE
FINISH	CHECKED	S.K.Iliev	10/23/07	25 Ball DSe1, 0.40mm Pitch, e1=SAC Ball Material DSe1 = Die Size Package, or WLCSP
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.Iliev	10/24/07	REV E DWG NUMBER 25DSe1-2x2B-0.4P SCALE 1:1 STD COMPLIANCE MO-211 SHEET 1 OF 1



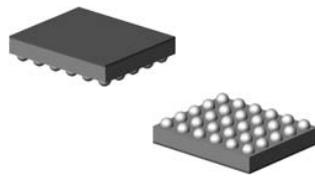
TOP VIEW



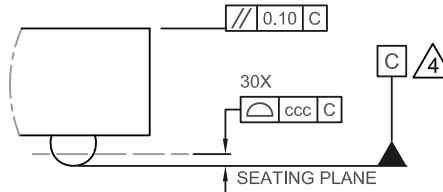
BOTTOM VIEW



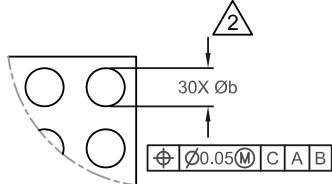
SIDE VIEW



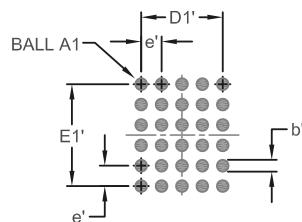
3-D VIEWS



DETAIL A



DETAIL B



LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'	-	1.60	-
E1'	-	2.00	-
b'	0.23	0.23	-
e'	-	0.40	-

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

REVISION HISTORY

REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	8/26/09	S.K.ILIEV
A1	b' (min) and (nom) from 0.20 to 0.23	11/9/09	S.K.ILIEV
B	INITIAL RELEASE	1/22/10	S.K.ILIEV

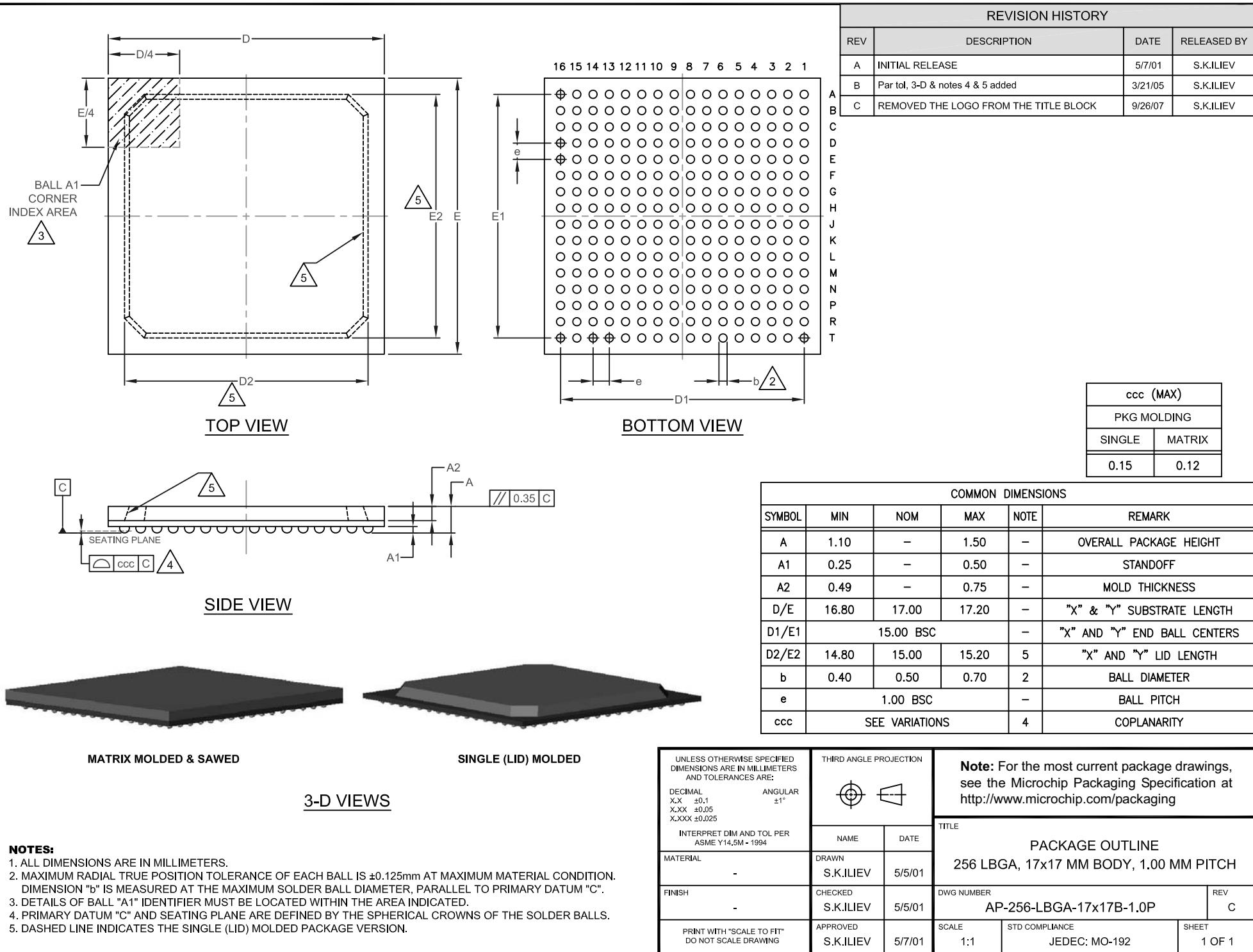
COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	0.53	0.62	5	OVERALL PACKAGE HEIGHT
A1	0.16	0.20	0.24	-	STANDOFF
A2	-	-	0.38	6	PACKAGE THICKNESS
D	1.94	1.97	2.00	-	X DIE SIZE
E	2.34	2.37	2.40	-	Y DIE SIZE
D1/E1	1.60 BSC			-	X END BALLS DISTANCE
E1	2.00 BSC			-	Y END BALLS DISTANCE
b	0.20	0.25	0.30	2	BALL DIAMETER
e	0.40 BSC			-	BALL PITCH
ccc	0	-	0.05	4	COPLANARITY

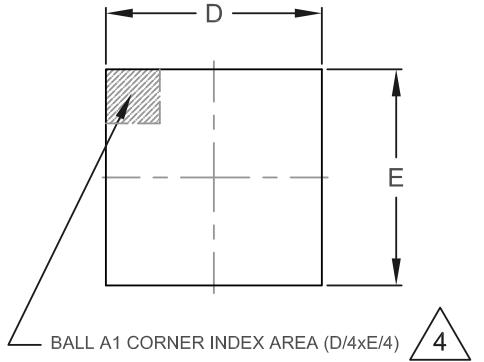
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
DIMENSION "A(M)" IS GIVEN FOR THE EXTREMELY THIN VARIATION OF THE PACKAGE PROFILE HEIGHT.
6. DIMENSION "A2" INCLUDES A DIE COATING THICKNESS.

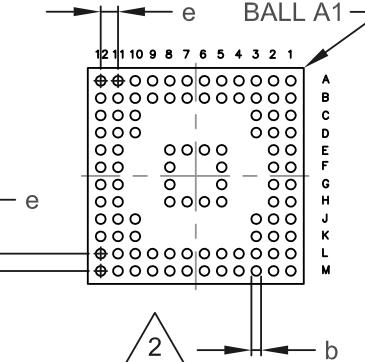
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X-X ±0.1 X-XX ±0.05 X-XXX ±0.025 INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging
	NAME	DATE	
MATERIAL	DRAWN	8/15/09	
FINISH	CHECKED	8/26/09	DWG NUMBER
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	8/26/09	30DSe1-0.4P
	SCALE	1:1	STD COMPLIANCE
			MO-211
			1 OF 1



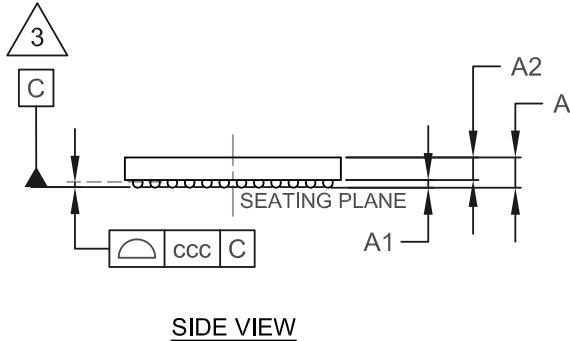
NOTES



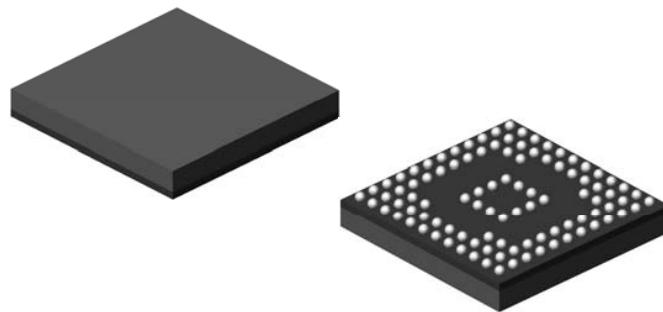
TOP VIEW



BOTTOM VIEW



SIDE VIEW



REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	8/22/07	S.K.Iliev
B	INITIAL PRODUCTION RELEASE	3/20/08	S.K.Iliev
C	ADDED PAGE 2 of 2, UPDATED APP NOTES.	2/7/09	S.K.Iliev

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	1.60	1.70	-	OVERALL PACKAGE HEIGHT
A1	0.25	0.34	-	-	STANDOFF
A2	1.16	1.26	1.36	-	PACKAGE BODY THICKNESS
D/E	9.90	10.00	10.10	-	OVERALL PACKAGE SIZE
b	0.40	0.45	0.50	2	BALL DIAMETER
e	0.80 BSC			-	BALL PITCH
CCC	-	-	0.20	3	COPLANARITY

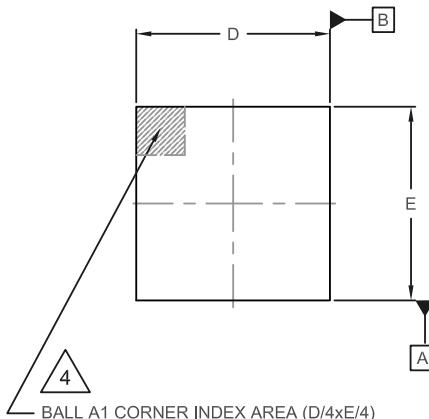
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAXIMUM RADIAL TRUE POSITION TOLERANCE OF EACH BALL IS $\pm 0.075\text{mm}$ AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. PRIMARY DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT BALLS.
4. A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, IDENTIFICATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE UNIQUE.

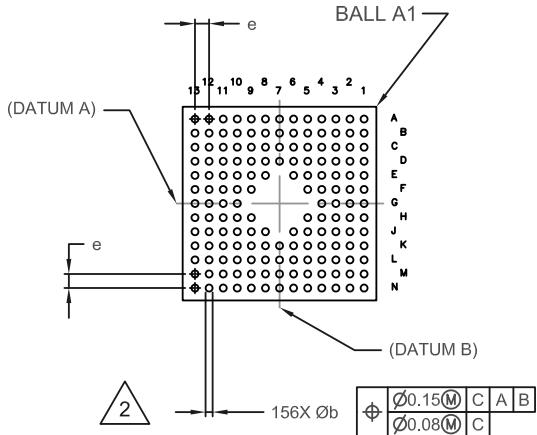
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL ANGULAR XX ± 0.1 $\pm 1^\circ$ XXX ± 0.05 XXXX ± 0.025 INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
	NAME	DATE	TITLE PACKAGE DATA 100 BALL LFBGA, 10x10mm BODY, 0.8mm PITCH Package Outline Drawing (POD)		
MATERIAL	DRAWN	8/20/07	DWG NUMBER	100LFBGA-10x10B-0.8P	REV C
FINISH	CHECKED	8/20/07	STD COMPLIANCE	JEDEC: MO-275	SHEET 1 OF 2
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.Iliev	SCALE 1:1	1		

REVISION HISTORY

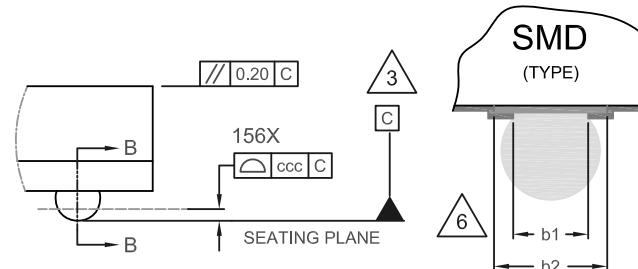
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	12/21/10	SKI
B	A1(max) from 0.35 to 0.40. Added DIM b1(max) & b2	3/2/11	SKI
C	PRODUCTION RELEASE. Vie pad from 0.46 to 0.45	4/15/11	SKI



TOP VIEW



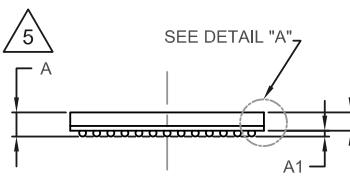
BOTTOM VIEW



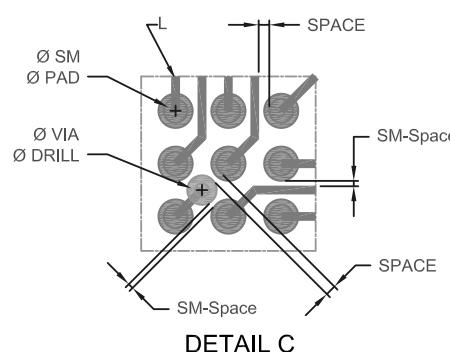
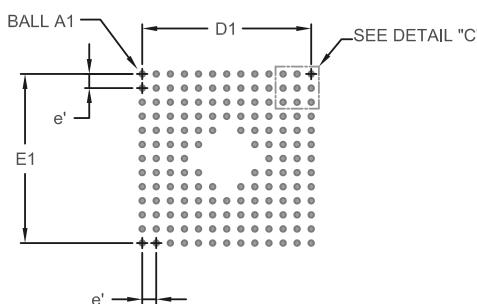
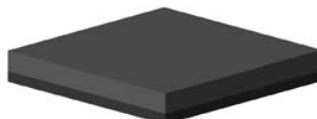
DETAIL A

SMD
(TYPE)

SECTION B-B



SIDE VIEW



DETAIL C

PCB LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1/E1	-	9.60	-
e'		0.80 BSC	

THE USER MAY MODIFY THE PCB LAND PATTERN & ROUTING DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN & ROUTING

ROUTING DIMENSIONS	
SYMBOL	NOM
Ø PAD	0.40
Ø SM	0.50
L (Trace)	0.125
SPACE	0.135
SM-Space	0.09
Ø VIA PAD	0.45
Ø DRILL	0.25

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL X.X ±0.1
XXX ±0.05
XXXX ±0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

MATERIAL

FINISH

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

NAME DATE

DRAWN 12/17/10

CHECKED S.K.Iliev 12/20/10

APPROVED S.K.Iliev 12/21/10

DWG NUMBER

156-LFBGA-11x11B-0.8P

REV C

SCALE 1:1

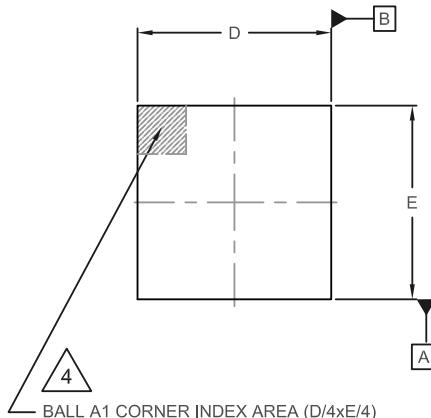
STD COMPLIANCE JEDEC: MO-275

SHEET 1 OF 1

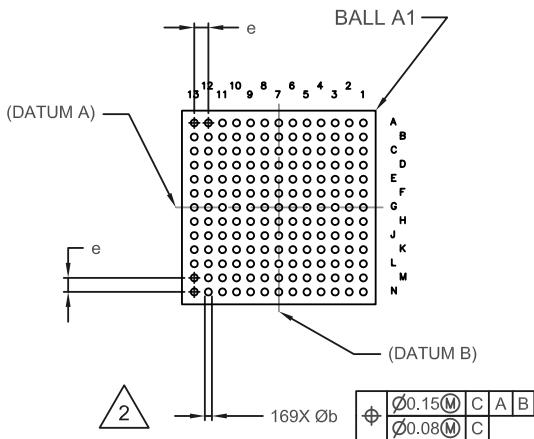
Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE
PACKAGE OUTLINE
156 BALL LFBGA, 11x11mm BODY, 0.8mm PITCH

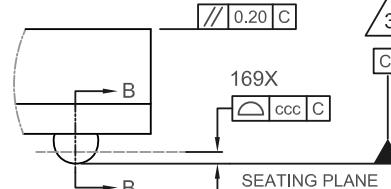
REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	11/7/11	SKI
B	INITIAL RELEASE	2/15/12	SKI



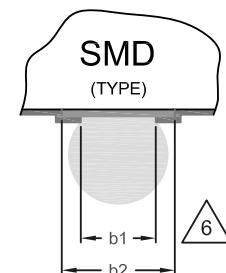
TOP VIEW



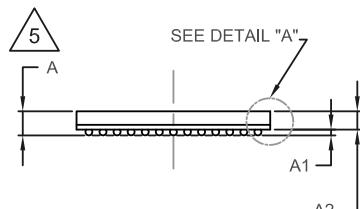
BOTTOM VIEW



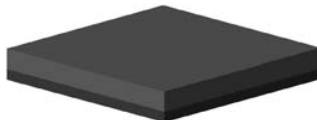
DETAIL A



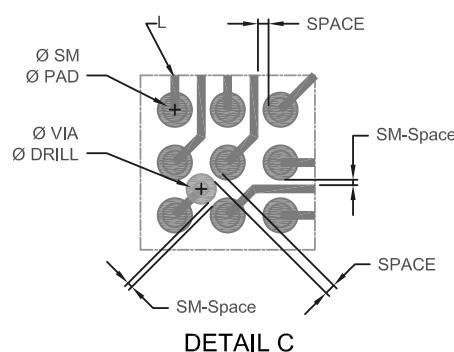
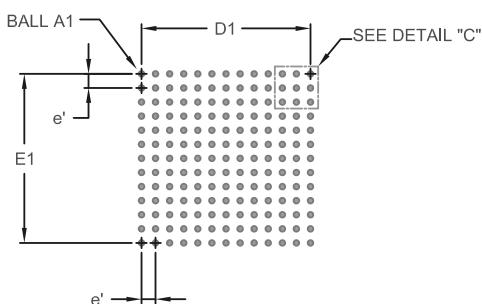
SECTION B-B



SIDE VIEW



3D VIEW



DETAIL C

PCB LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1/E1	-	9.60	-
e'		0.80 BSC	

THE USER MAY MODIFY THE PCB LAND PATTERN & ROUTING DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN & ROUTING

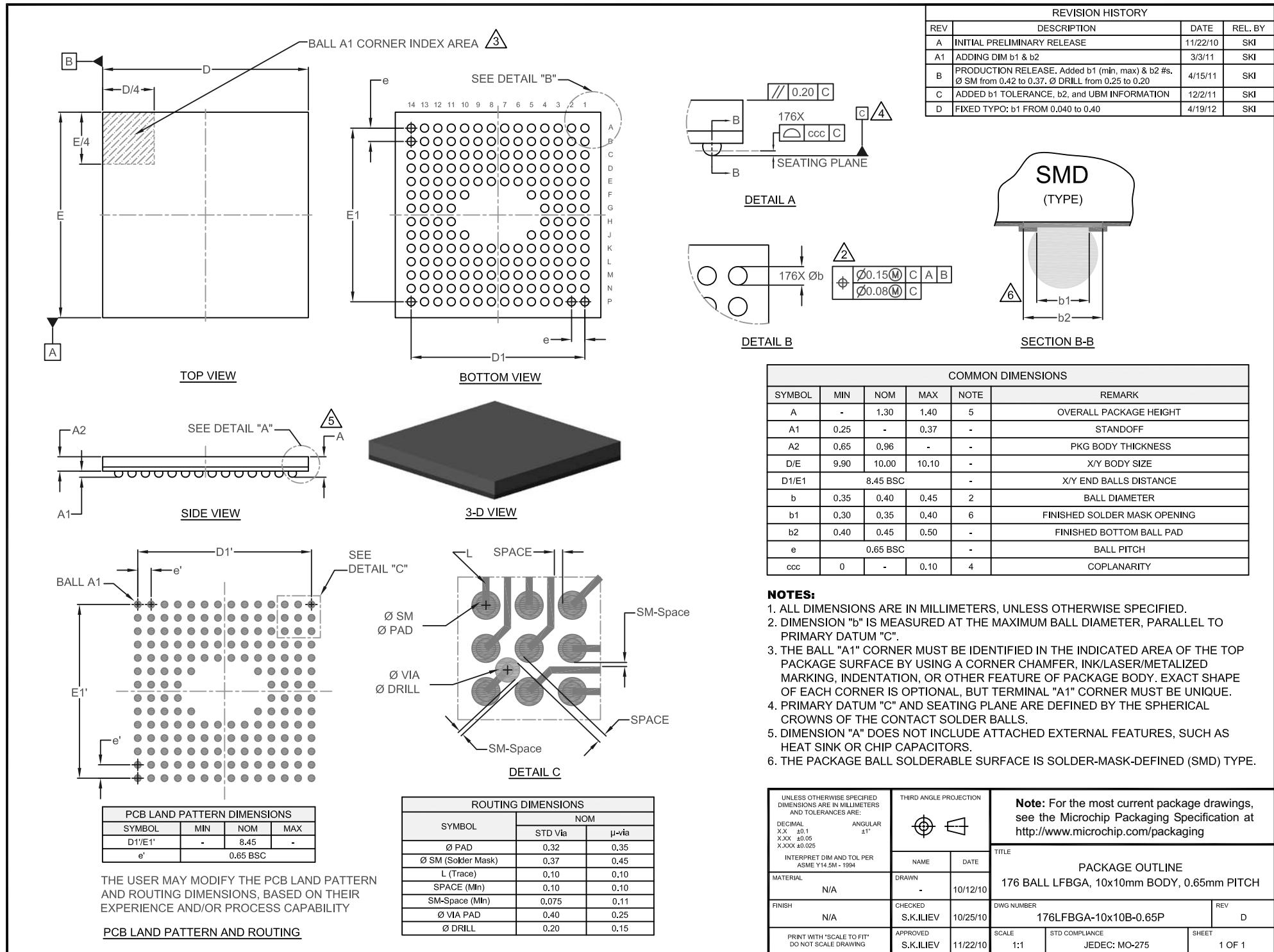
ROUTING DIMENSIONS	
SYMBOL	NOM
Ø PAD	0.40
Ø SM	0.50
L (Trace)	0.125
SPACE (Min)	0.135
SM-Space (Min)	0.09
Ø VIA PAD	0.45
Ø DRILL	0.25

COMMON DIMENSIONS				
SYMBOL	MIN	NOM	MAX	NOTE
A	-	1.30	1.40	5 OVERALL PACKAGE HEIGHT
A1	0.25	-	0.40	- STANDOFF
A2	0.65	0.96	-	- PACKAGE BODY THICKNESS
D/E	10.90	11.00	11.10	- OVERALL PACKAGE SIZE
b	0.40	0.45	0.50	2 BALL DIAMETER
b1	0.35	0.40	0.45	6 FINISHED SOLDER MASK OPENING
b2	0.47	0.52	0.57	- FINISHED BOTTOM BALL PAD
e	0.80 BSC		-	BALL PITCH
ccc	-	-	0.20	3 COPLANARITY

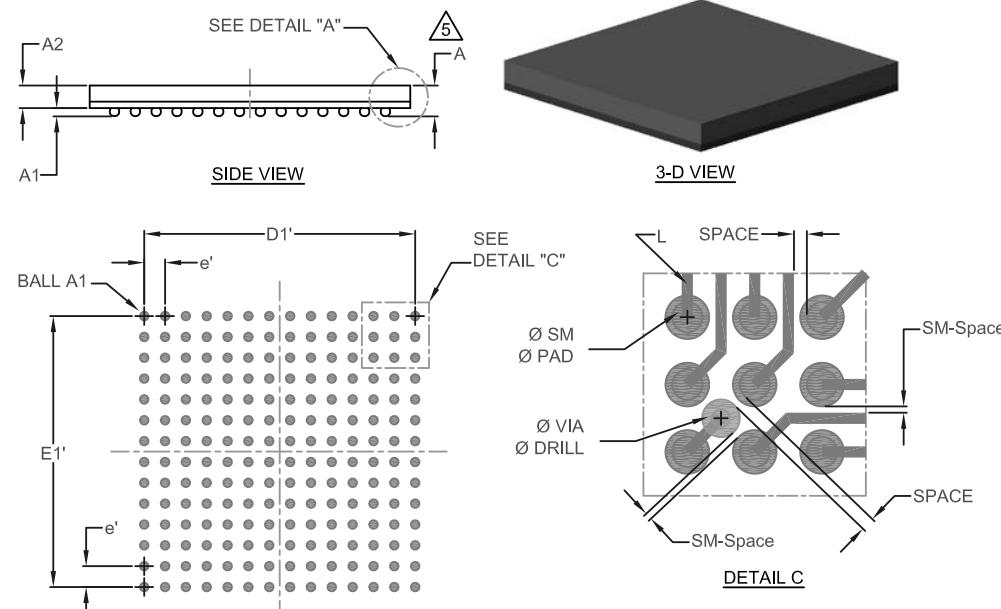
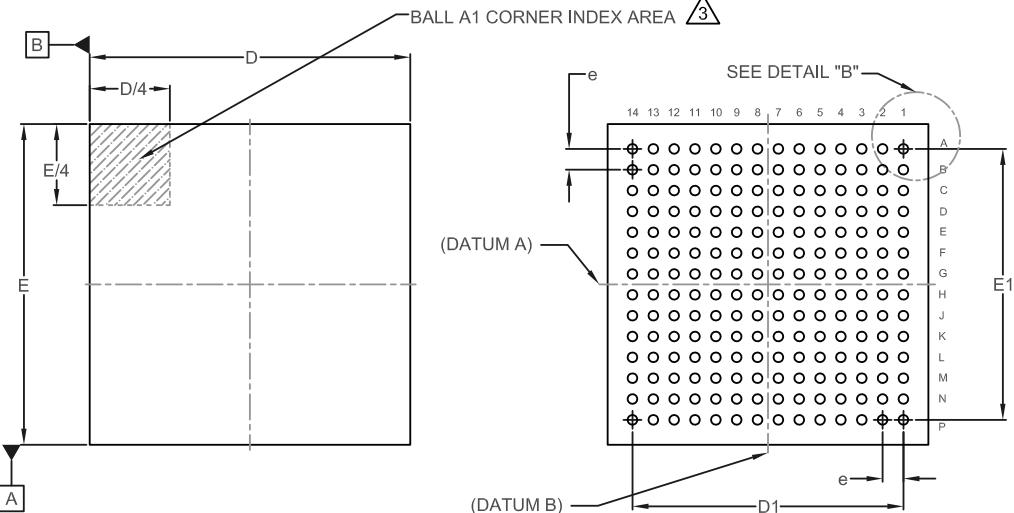
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. PRIMARY DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT BALLS.
4. A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, IDENTATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE UNIQUE.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. THE PACKAGE BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD) TYPE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1 XXX ±0.05 XXXX ±0.025	ANGULAR ±1°	THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994		NAME	DATE	TITLE	
MATERIAL		DRAWN	11/4/11	PACKAGE OUTLINE	
FINISH	CHECKED S.K.ILIEV	11/4/11	DWG NUMBER 169-LFBGA-11x11B-0.8P	REV B	
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	11/7/11	SCALE 1:1	STD COMPLIANCE JEDEC: MO-275	SHEET 1 OF 1



REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	11/02/11	H. CABALLERO
B	INITIAL RELEASE. b2 (NOM) from 0.40 to 0.365	2/23/12	SKI

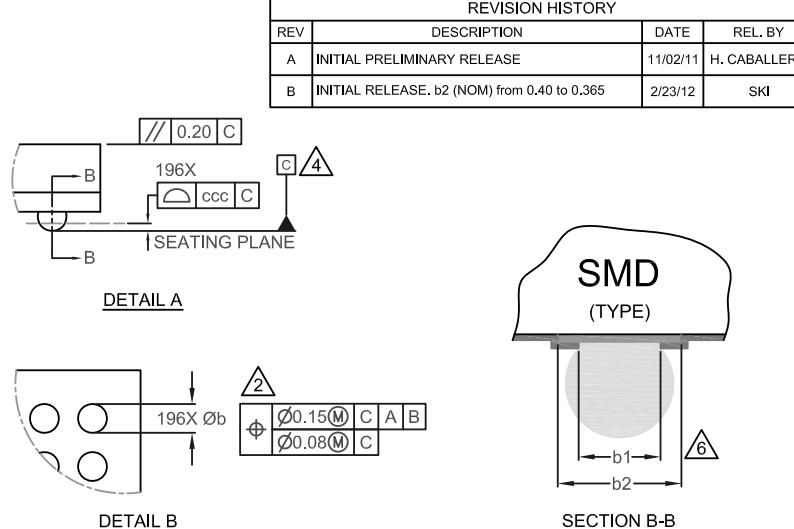


PCB LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'E1'	-	8.45	-
e'	0.65 BSC		

THE USER MAY MODIFY THE PCB LAND PATTERN AND ROUTING DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN AND ROUTING

ROUTING DIMENSIONS		
SYMBOL	NOM	
	STD Via	μ -via
\varnothing PAD	0.275	0.300
\varnothing SM	0.375	0.400
L (Trace)	0.125	0.110
SPACE (Min)	0.122	0.110
SM-Space (Min)	0.072	0.070
\varnothing VIA PAD	0.400	0.250
\varnothing DRILL	0.200	0.150



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	1.30	1.40	5	OVERALL PACKAGE HEIGHT
A1	0.15	0.21	-	-	STANDOFF
A2	0.65	0.96	-	-	PKG BODY THICKNESS
D/E	9.90	10.00	10.10	-	X/Y BODY SIZE
D1/E1	8.45 BSC		-	-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
b1	0.237	0.275	0.312	6	FINISHED SOLDER MASK OPENING
b2	0.315	0.365	0.415	-	FINISHED BOTTOM BALL PAD
e	0.65 BSC		-	-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

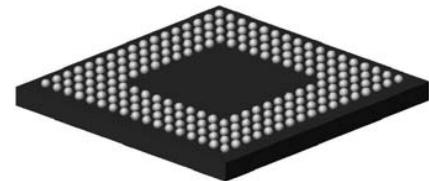
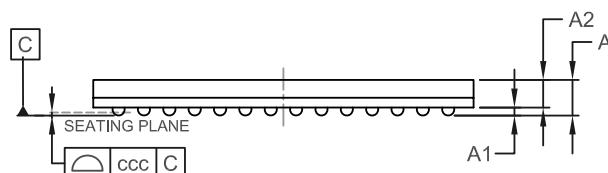
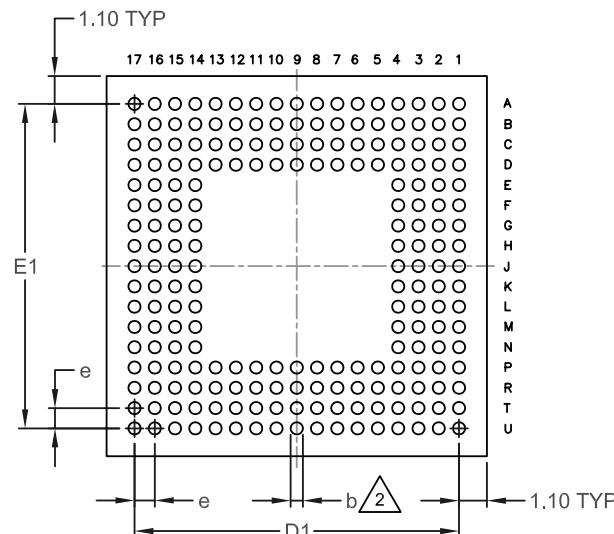
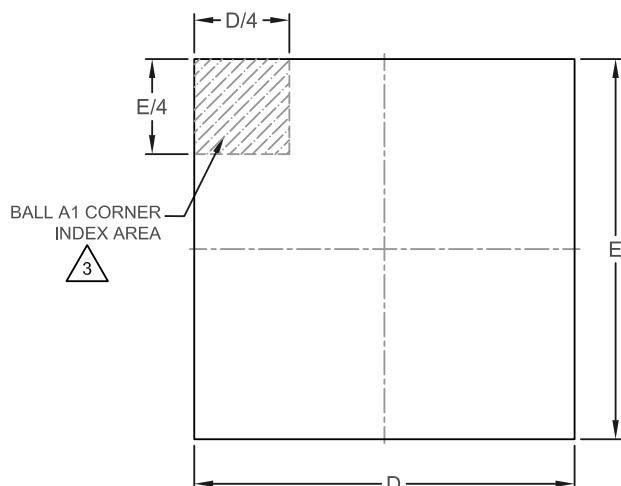
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. THE PACKAGE BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD) TYPE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025	ANGULAR $\pm 1^\circ$	THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994			TITLE PACKAGE OUTLINE 196 BALL LFBGA, 10x10mm BODY, 0.65mm PITCH		
MATERIAL	DRAWN	H. CABALLERO	11/02/11		
FINISH	CHECKED	H. CABALLERO	11/02/11		
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.Iliev	11/04/11	1:1	STD COMPLIANCE JEDEC: MO-275
					SHEET 1 OF 1

REVISION HISTORY

REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/3/05	S.K.ILIEV



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.70	-	OVERALL PACKAGE HEIGHT
A1	0.25	-	-	-	STANOFF
A2	0.65	-	-	-	PACKAGE BODY THICKNESS
D/E	14.90	15.00	15.10	-	"X" & "Y" PKG/SUBSTRATE LENGTH
D1/E1	12.80 BSC			-	"X" AND "Y" END BALL CENTERS
b	0.41	-	0.55	2	BALL DIAMETER
e	0.80 BSC			-	BALL PITCH
ccc	-	-	0.12	-	COPLANARITY

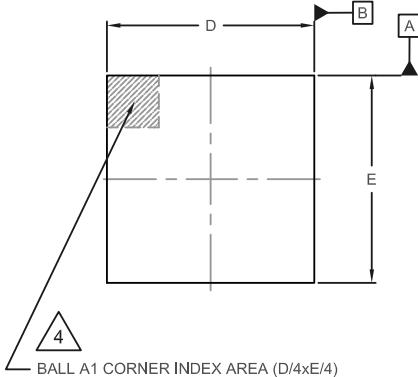
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. RADIAL TRUE POSITION TOLERANCE OF EACH BALL IS $\pm 0.075\text{mm}$ AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE "A1" CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE, AND MUST BE LOCATED WITHIN THE AREA INDICATED.

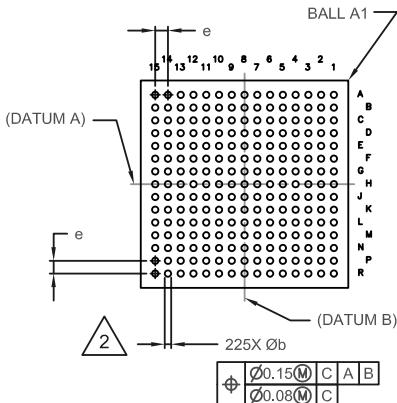
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ± 0.1 X.XX ± 0.05 X.XXX ± 0.025		THIRD ANGLE PROJECTION	
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994			
MATERIAL	-	DRAWN S.K.ILIEV	2/2/05
FINISH	-	CHECKED S.K.ILIEV	2/3/05

Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging			
TITLE PACKAGE OUTLINE 208 LFBGA, 15x15 MM BODY, 0.80 MM PITCH			
DWG NUMBER MO-208-LFBGA-15x15B-0.8P		REV A	SHEET 1 OF 1
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	SCALE 1:1	STD COMPLIANCE JEDEC: MO-205 / F

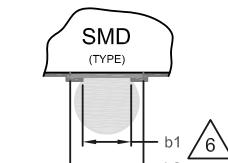
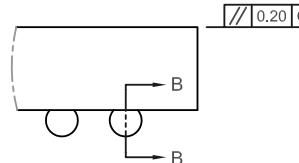
REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
B	INITIAL PRODUCTION RELEASE. ADDED DIM "b2" & PCB ROUTING	2/15/2011	S.K.Iliev



TOP VIEW

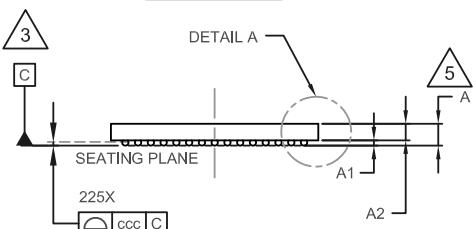


BOTTOM VIEW

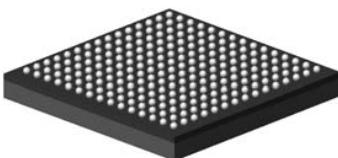


DETAIL A

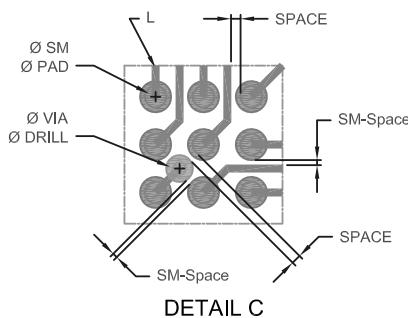
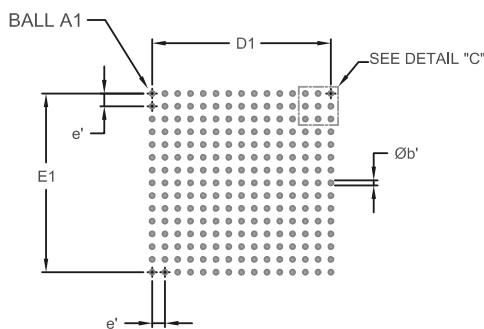
SECTION B-B



SIDE VIEW



3-D VIEW



DETAIL C

PCB LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1/E1	-	11.20	-
e'		0.80 BSC	

THE USER MAY MODIFY THE PCB LAND PATTERN & ROUTING DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

ROUTING DIMENSIONS	
SYMBOL	NOM
Ø PAD	0.40
Ø SM	0.50
L (Trace)	0.125
SPACE (Min)	0.135
SM-Space (Min)	0.09
Ø VIA PAD	0.45
Ø DRILL	0.25

COMMON DIMENSIONS				
SYMBOL	MIN	NOM	MAX	NOTE
A	-	1.30	1.40	5 OVERALL PACKAGE HEIGHT
A1	0.25	-	0.40	- STANDOFF
A2	0.65	0.96	-	- PACKAGE BODY THICKNESS
D/E	12.90	13.00	13.10	- OVERALL PACKAGE SIZE
b	0.40	0.45	0.50	2 BALL DIAMETER
b1	0.35	0.40	0.45	6 FINISHED SOLDER MASK OPENING
b2	0.45	0.50	0.55	- FINISHED BALL PAD DIAMETER
e	0.80 BSC		-	BALL PITCH
ccc	-	-	0.20	3 COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. PRIMARY DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT BALLS.
4. THE BALL "A1" CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, INDENTATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE UNIQUE.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. THE PACKAGE BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD) TYPE.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL X.X ±0.1
X.XX ±0.05
X.XXX ±0.025

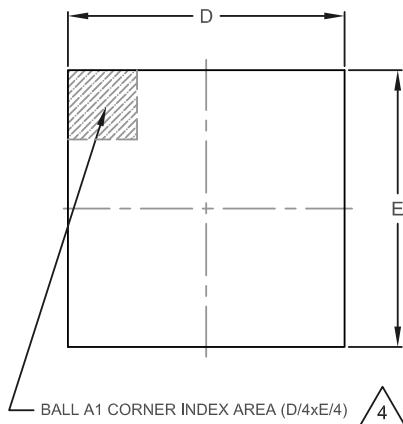


NAME DATE

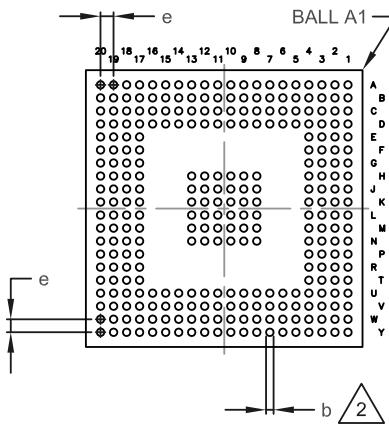
Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE		PACKAGE OUTLINE	
225 BALL LFBGA, 13x13mm BODY, 0.8mm PITCH		DWG NUMBER	
225-LFBGA-13x13B-0.8P		REV	B
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.Iliev	SCALE 1:1	STD COMPLIANCE JEDEC: MO-275
		SHEET 1 OF 1	

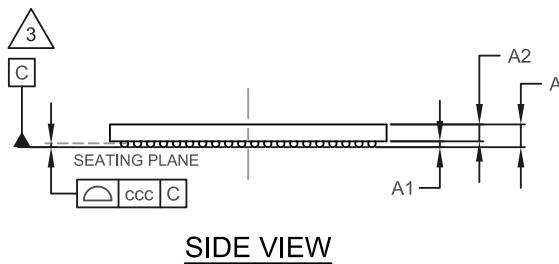
REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	1/1/07	S.K.Iliev



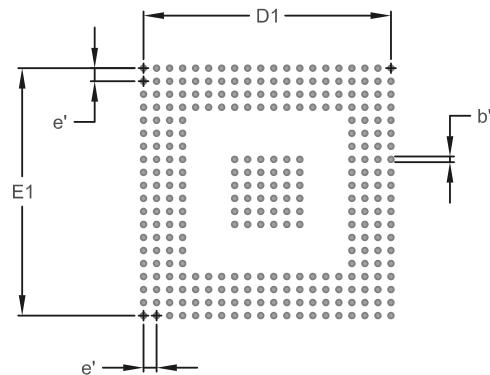
TOP VIEW



BOTTOM VIEW



SIDE VIEW



PCB LAND PATTERN

PCB LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1/E1	-	15.20	-
b'	0.35	-	0.40
e'		0.80	

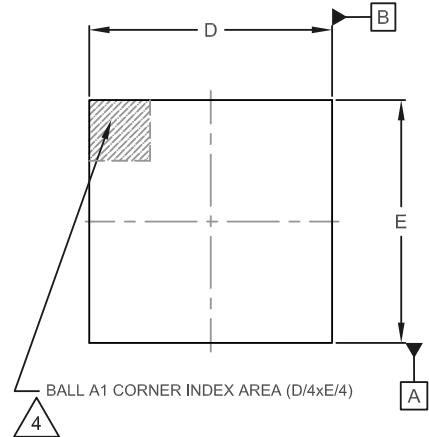
THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.70	-	OVERALL PACKAGE HEIGHT
A1	0.25	-	-	-	STANDOFF
A2	0.65	-	-	-	PACKAGE BODY THICKNESS
D/E	16.85	17.00	17.15	-	OVERALL PACKAGE SIZE
b	0.41	-	0.55	2	BALL DIAMETER
e		0.80 BSC		-	BALL PITCH
ccc	-	-	0.20	3	COPLANARITY

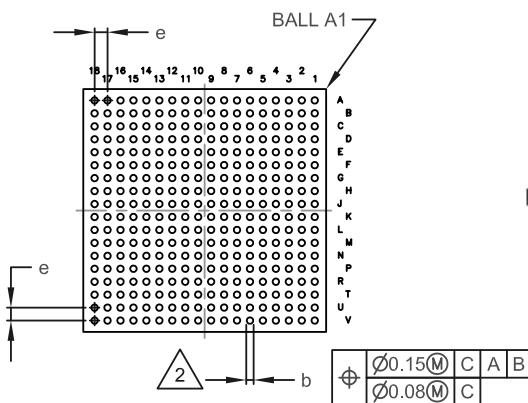
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAXIMUM RADIAL TRUE POSITION TOLERANCE OF EACH BALL IS $\pm 0.075\text{mm}$ AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. PRIMARY DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT BALLS.
4. A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, IDENTIFICATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE UNIQUE.

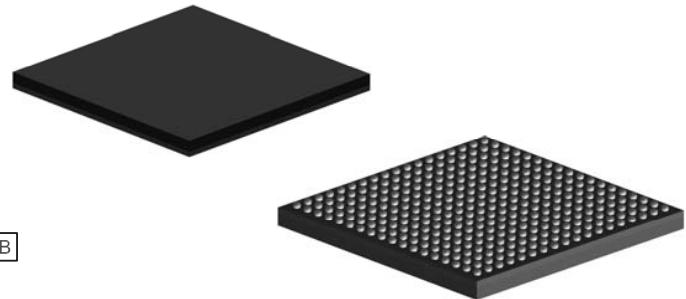
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025		THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging	
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994				TITLE	
MATERIAL		DRAWN	NAME	DATE	PACKAGE OUTLINE
-		S.K.Iliev		12/31/06	292 BALL LFBGA, 17x17mm BODY, 0.8mm PITCH
FINISH		CHECKED	S.K.Iliev	12/31/06	DWG NUMBER
-		APPROVED	S.K.Iliev	1/1/07	MO-292LFBGA-17x17B-0.8P
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		SCALE	STD COMPLIANCE	SHEET	REV A 1 OF 1
		1:1	JEDEC: MO-205		



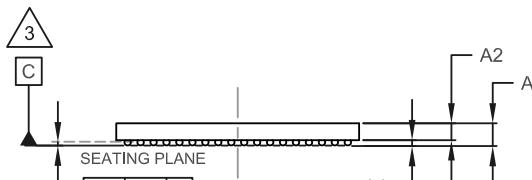
TOP VIEW



BOTTOM VIEW

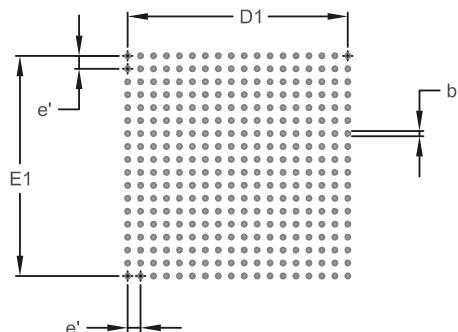


3-D VIEWS



SIDE VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	1.56	1.70	-	OVERALL PACKAGE HEIGHT
A1	0.25	-	-	-	STANOFF
A2	1.00	-	-	-	PACKAGE BODY THICKNESS
D/E	14.85	15.00	15.15	-	OVERALL PACKAGE SIZE
b	0.35	-	0.50	2	BALL DIAMETER
e	0.80 BSC		-	-	BALL PITCH
ccc	-	-	0.20	3	COPLANARITY



PCB LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1/E1	-	13.60	-
b'	0.30	-	0.35
e'	0.80		

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

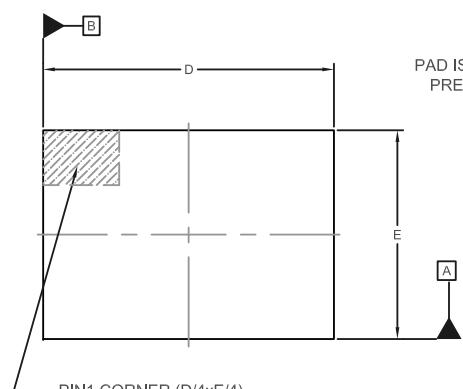
RECOMMENDED PCB LAND PATTERN

NOTES:

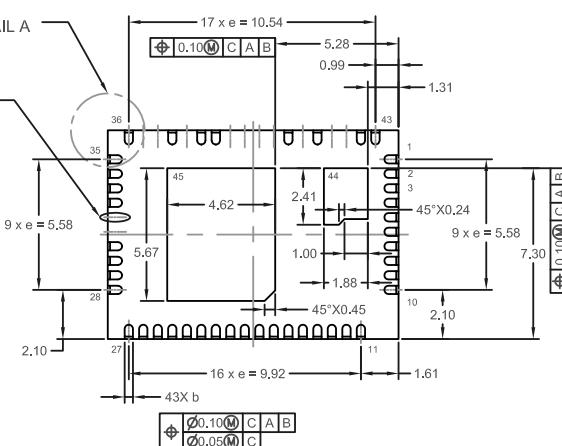
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. PRIMARY DATUM C (SEATING PLANE) IS DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT BALLS.
4. A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, IDENTIFICATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE UNIQUE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ±0.1 XXX ±0.05 XXXX ±0.025 INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	ANGULAR ±1°	THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging			
TITLE		PACKAGE OUTLINE				
324 BALL LFBGA, 15x15mm BODY, 0.8mm PITCH		4L DESIGN				
DWG NUMBER		REV		B		
MO-324LFBGA-15x15B-0.8P-4L		STD COMPLIANCE		JEDEC: MO-275		
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		APPROVED		SHEET		
S.K.Iliev		1/26/07		1 OF 1		

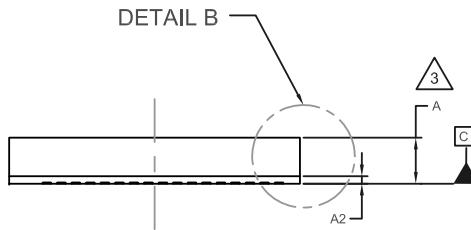
NOTES



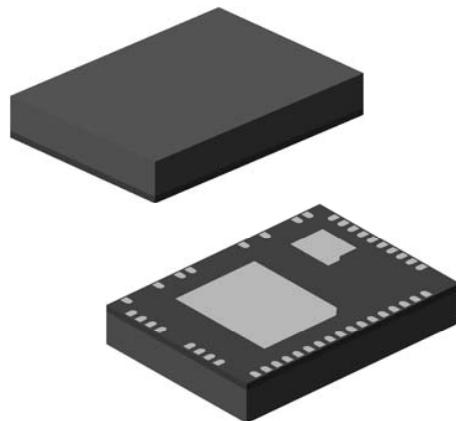
TOP VIEW



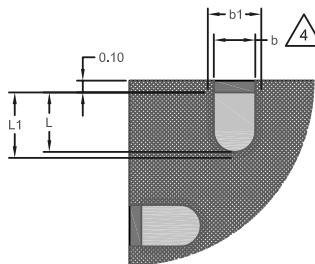
BOTTOM VIEW



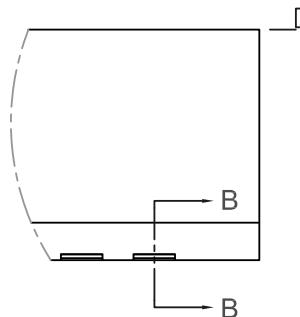
SIDE VIEW



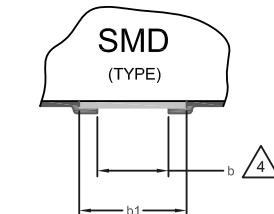
3-D VIEW



DETAIL A



DETAIL B



SECTION B-B

REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL RELEASE	AUG 2008	Kleer
B	D and E TOLERANCE FROM ± 0.05 TO ± 0.10	JUN 2010	S.K.ILIEV
C	"A" tolerance from ± 0.05 to ± 0.15 . Added note for not present perimeter pads	FEB 2011	S.K.ILIEV
D	ADDED DIMs ON PAD 44 & 45 CORNER CUTS	MAR 2011	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	1.82	1.97	2.12	3	OVERALL PACKAGE HEIGHT
A2	-	0.32	-	-	SUBSTRATE THICKNESS
D	12.33	12.43	12.53	-	OVERALL PACKAGE SIZE, X
E	8.82	8.92	9.02	-	OVERALL PACKAGE SIZE, Y
b	0.31	0.36	0.41	4	PIN SOLDERABLE WIDTH
b1	-	0.46	-	-	PIN OVERALL WIDTH
L	0.46	0.51	0.56	-	PIN SOLDERABLE LENGTH
L1	-	0.56	-	-	PIN OVERALL LENGTH
e	0.62 BSC		-	-	PINS PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. A1 CORNER MUST BE IDENTIFIED ON THE TOP SURFACE OF THE PACKAGE BY USING A CORNER CHAMFER, INK OR METALIZED MARKINGS, INDENTATION OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT PIN 1 CORNER MUST BE UNIQUE.
3. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
4. THE PACKAGE PERIMETER PIN SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD) TYPE.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL
XX ±0.1
XXX ±0.05
XXXX ±0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

MATERIAL -

FINISH -

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

ANGULAR
±1°

DRAWN -

5/12/10

CHECKED -

5/17/10

APPROVED S.K.ILIEV

5/20/10

SCALE 1:1

STD COMPLIANCE N/A

REV D

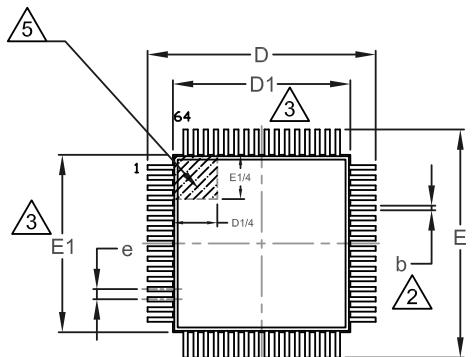
SHEET 1 OF 1

Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

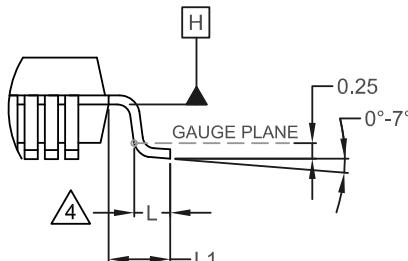
TITLE
PACKAGE OUTLINE
45 LGA, 12x9 mm BODY, SiP MODULE
(KLR3012/A)

NOTES

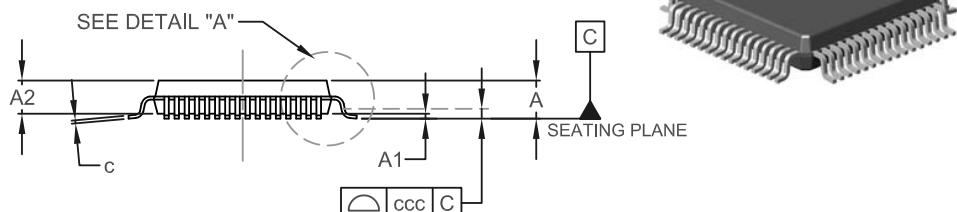
REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
SEE SPEC FRONT PAGE FOR REVISION HISTORY			



TOP VIEW

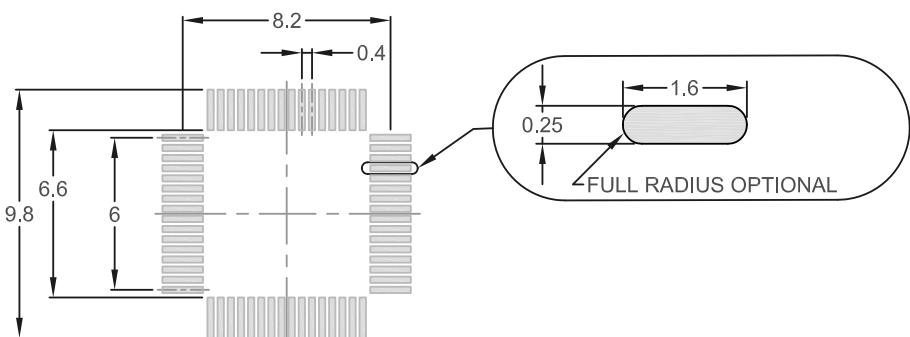


DETAIL "A"



SIDE VIEW

3-D VIEW



PCB LAND PATTERN AND APPLICATION NOTES

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	—	—	1.60	—	OVERALL PACKAGE HEIGHT
A1	0.05	—	0.15	—	STANDOFF
A2	1.35	1.40	1.45	—	BODY THICKNESS
D/E	8.80	9.00	9.20	—	"X"/"Y" SPAN
D1/E1	6.80	7.00	7.20	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			—	LEAD LENGTH
b	0.13	0.18	0.23	2	LEAD WIDTH
c	0.09	—	0.20	—	LEAD FOOT THICKNESS
e	0.40 BSC			—	LEAD PITCH
ccc	—	—	0.08	—	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS $\pm 0.035\text{mm}$ MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE. "D1" AND "E1" TO BE DETERMINED AT DATUM "H".
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL
XX ± 0.1
XXX ± 0.05
XXXX ± 0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

MATERIAL
- DRAWN
FINISH
- CHECKED

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

ANGULAR
 $\pm 1^\circ$

NAME DATE
S.K.ILIEV 12/17/04

APPROVED
S.K.ILIEV 12/17/04

SCALE STD COMPLIANCE
1:1 JEDEC: MS-026 (D)

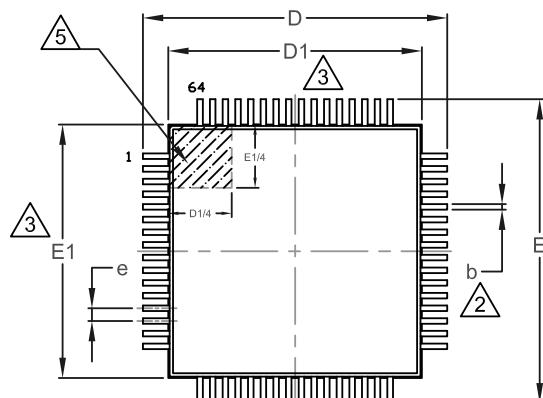
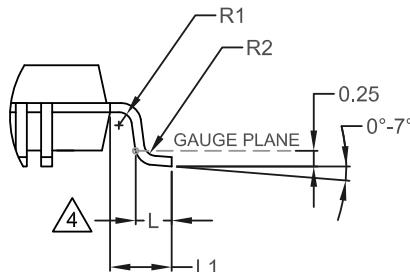
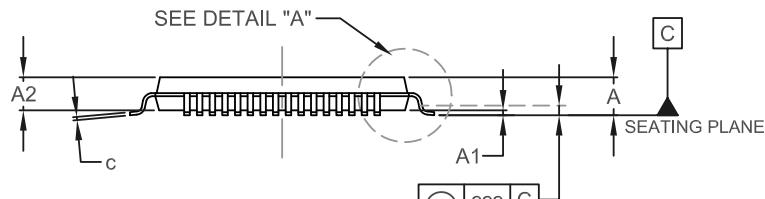
THIRD ANGLE PROJECTION

TITLE
PACKAGE OUTLINE

Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

DWG NUMBER		REV
MO-64-STQFP-7x7x1.4		C
SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MS-026 (D)	1 OF 1

REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-

TOP VIEWDETAIL "A" (SCALE: 2/1)SIDE VIEW3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.60	-	OVERALL PACKAGE HEIGHT
A1	0.05	-	0.15	-	STANDOFF
A2	1.35	1.40	1.45	-	BODY THICKNESS
D/E	11.80	-	12.20	-	"X"/"Y" SPAN
D1/E1	9.80	10.00	10.20	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			-	LEAD LENGTH
b	0.17	0.22	0.27	2	LEAD WIDTH
c	0.09	-	0.20	-	LEAD FOOT THICKNESS
e	0.50 BSC			-	LEAD PITCH
R1	0.08	-	-	-	LEAD SHOULDER RADIUS
R2	0.08	-	0.20	-	LEAD FOOT RADIUS
ccc	-	-	0.08	-	COPLANARITY

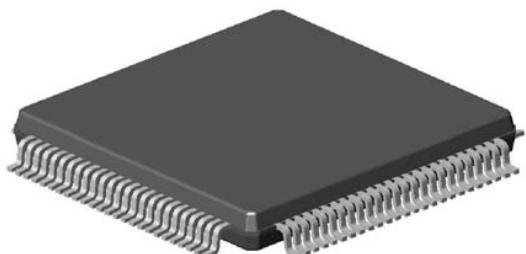
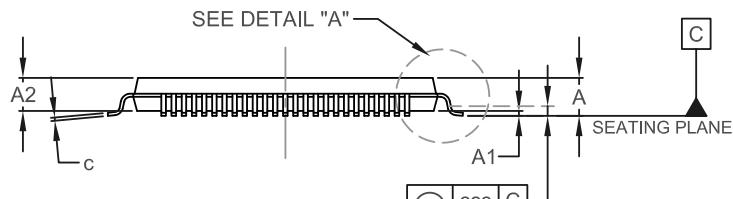
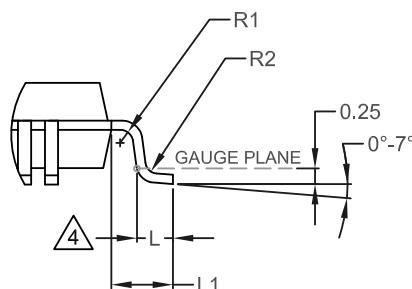
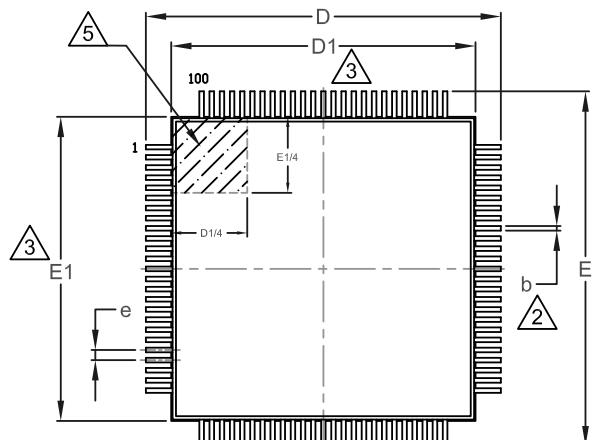
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS $\pm 0.04\text{mm}$ MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ± 0.1 X.XX ± 0.05 X.XXX ± 0.025		THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging			
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994		NAME	DATE	TITLE			
MATERIAL	DRAWN S.K.Iliev	12/17/04	PACKAGE OUTLINE				
FINISH	CHECKED S.K.Iliev	12/17/04	64 PIN TQFP-10x10x1.4mm BODY-0.5mm PITCH				
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.Iliev	12/17/04	DWG NUMBER	MO-64-TQFP-10x10x1.4	REV D		
			SCALE	1:1	STD COMPLIANCE		
				JEDEC: MS-026 (D)	SHEET 1 OF 1		

REVISION HISTORY

REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-



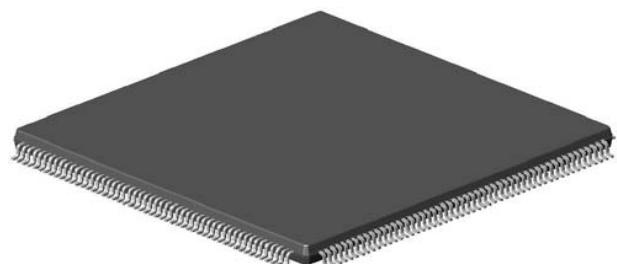
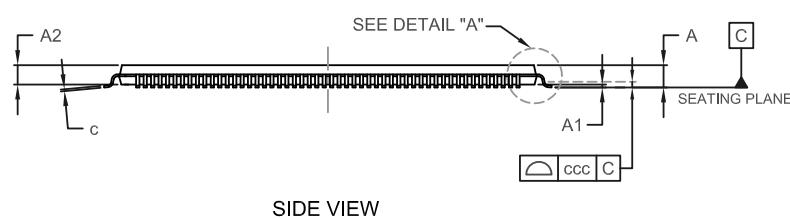
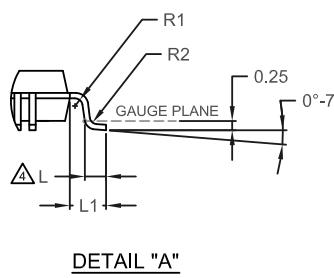
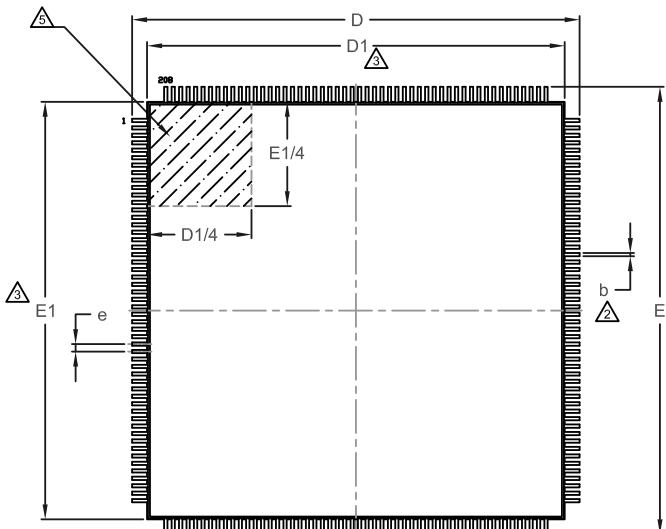
COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.60	-	OVERALL PACKAGE HEIGHT
A1	0.05	-	0.15	-	STANOFF
A2	1.35	1.40	1.45	-	BODY THICKNESS
D/E	13.80	-	14.20	-	"X"/"Y" SPAN
D1/E1	11.80	12.00	12.20	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			-	LEAD LENGTH
b	0.13	0.16	0.23	2	LEAD WIDTH
c	0.09	-	0.20	-	LEAD FOOT THICKNESS
e	0.40 BSC			-	LEAD PITCH
R1	0.08	-	-	-	LEAD SHOULDER RADIUS
R2	0.08	-	0.20	-	LEAD FOOT RADIUS
ccc	-	-	0.08	-	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS $\pm 0.035\text{mm}$ MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ± 0.1 XXX ± 0.05 XXXX ± 0.025		THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging	
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994				TITLE	PACKAGE OUTLINE
MATERIAL	-	DRAWN	S.K.Iliev	12/17/04	100 STQFP-12x12x1.4mm BODY-0.4mm PITCH
FINISH	-	CHECKED	S.K.Iliev	12/17/04	DWG NUMBER
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		APPROVED	S.K.Iliev	12/17/04	REV C MO-100-STQFP-12x12x1.4 JEDEC: MS-026 (D)
		SCALE	1:1	STD COMPLIANCE	SHEET 1 OF 1

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	—	—	1.60	—	OVERALL PACKAGE HEIGHT
A1	0.05	—	0.15	—	STANOFF
A2	1.35	1.40	1.45	—	BODY THICKNESS
D/E	29.80	—	30.20	—	"X"/"Y" SPAN
D1/E1	27.90	28.00	28.10	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			—	LEAD LENGTH
b	0.17	0.22	0.27	2	LEAD WIDTH
c	0.09	—	0.23	—	LEAD FOOT THICKNESS
e	0.50 BSC			—	LEAD PITCH
R1	0.08	—	—	—	LEAD SHOULDER RADIUS
R2	0.08	—	0.20	—	LEAD FOOT RADIUS
ccc	—	—	0.08	—	COPLANARITY

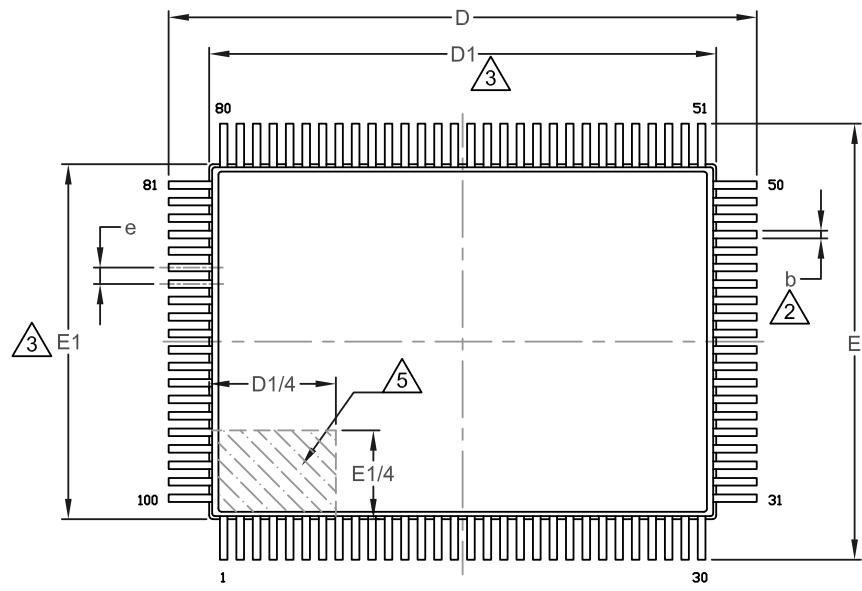
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.04 mm MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

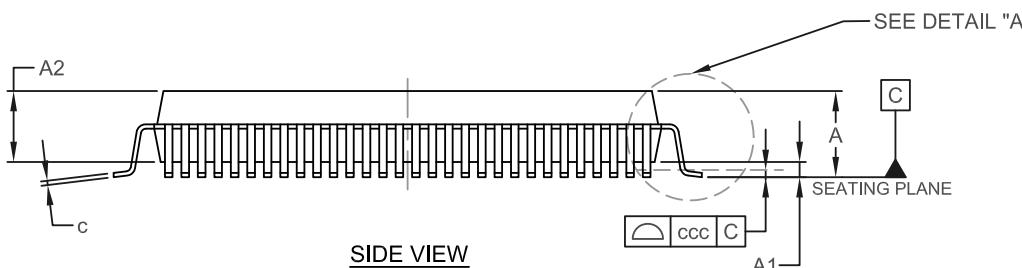
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ± 0.1 X.XX ± 0.05 X.XXX ± 0.025		THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging	
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994					
MATERIAL	DRAWN S.K.Iliev	NAME 12/20/04	DATE	TITLE PACKAGE OUTLINE 208 TQFP, 28x28x1.4 MM BODY, 0.50 MM PITCH	
FINISH	CHECKED S.K.Iliev	NAME 12/20/04	DATE	DWG NUMBER MO-208-TQFP-28x28x1.4	REV C
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.Iliev	NAME 12/20/04	DATE	SCALE 1:1	STD COMPLIANCE JEDEC: MS-026 / D
					SHEET 1 OF 1

REVISION HISTORY

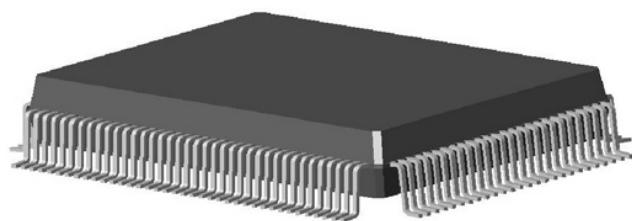
REVISION	DESCRIPTION	DATE	RELEASED BY
SEE SPEC FRONT PAGE FOR REVISION HISTORY			



TOP VIEW



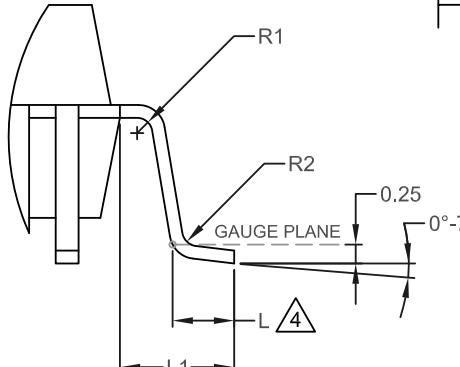
SIDE VIEW



3-D VIEW

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TOLERANCE OF THE TRUE POSITION OF THE LEADS IS $\pm 0.065\text{mm}$ MAXIMUM.
3. PACKAGE BODY DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM MOLD PROTRUSION IS 0.25 mm.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.



DETAIL "A" (SCALE: 3/1)

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	3.40	-	OVERALL PACKAGE HEIGHT
A1	0.05	-	0.50	-	STANOFF
A2	2.55	-	3.05	-	BODY THICKNESS
D	23.00	23.20	23.40	-	"X" SPAN
D1	19.90	20.00	20.10	3	"X" BODY SIZE
E	17.00	17.20	17.40	-	"Y" SPAN
E1	13.90	14.00	14.10	3	"Y" BODY SIZE
L	0.73	0.88	1.03	4	LEAD FOOT LENGTH
L1	1.60 REF			-	LEAD LENGTH
b	0.20	-	0.40	2	LEAD WIDTH
c	0.11	-	0.23	-	LEAD FOOT THICKNESS
e	0.65 BSC			-	LEAD PITCH
R1	0.10	-	0.25	-	LEAD SHOULDER RADIUS
R2	0.15	-	0.40	-	LEAD FOOT RADIUS
ccc	-	-	0.10	-	COPLANARITY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:DECIMAL
X,X ±0.1
XXX ±0.05
XXXX ±0.025
ANGULAR
±1°INTERPRET DIM AND TOL PER
ASME Y14.5M-1994

NAME DATE

MATERIAL DRAWN

S.K.JILIEV

11/30/04

FINISH CHECKED

S.K.JILIEV

11/30/04

THIRD ANGLE PROJECTION



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE

PACKAGE OUTLINE

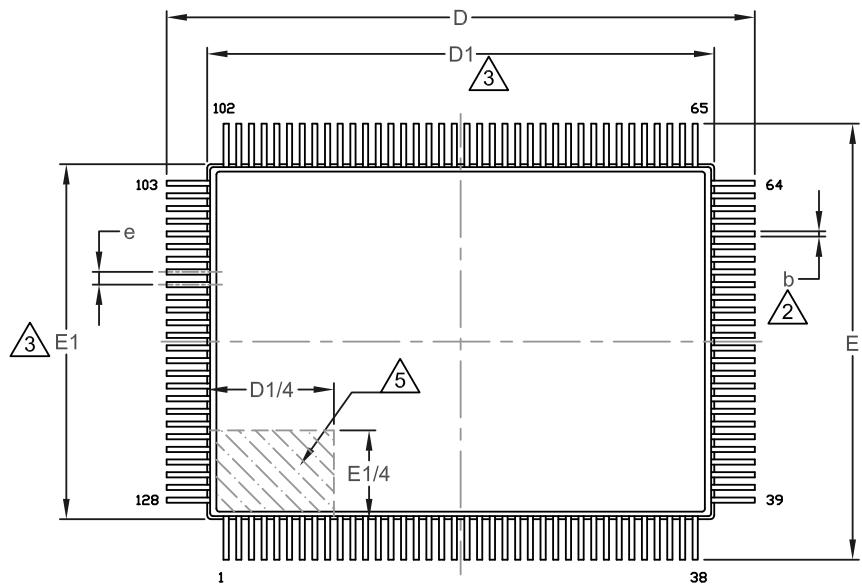
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DWG NUMBER MO-100 QFP-14x20-3.2FP REV C

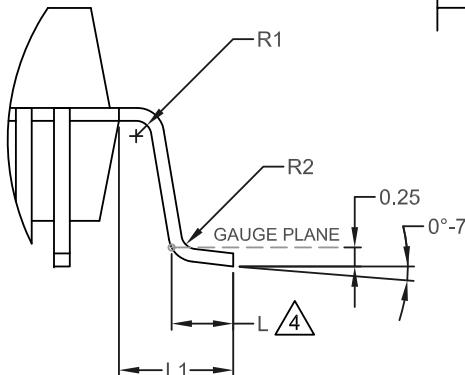
PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING APPROVED S.K.JILIEV 11/30/04

SCALE 1:1 STD COMPLIANCE JEDEC: MS-022 (B) SHEET -

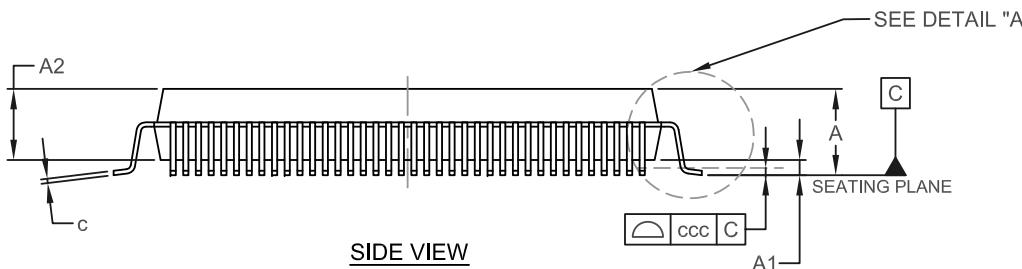
REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
SEE SPEC FRONT PAGE FOR REVISION HISTORY			



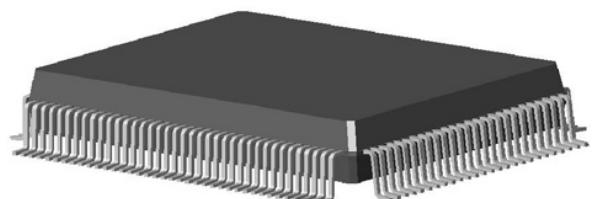
TOP VIEW



DETAIL "A" (SCALE: 3/1)



SIDE VIEW



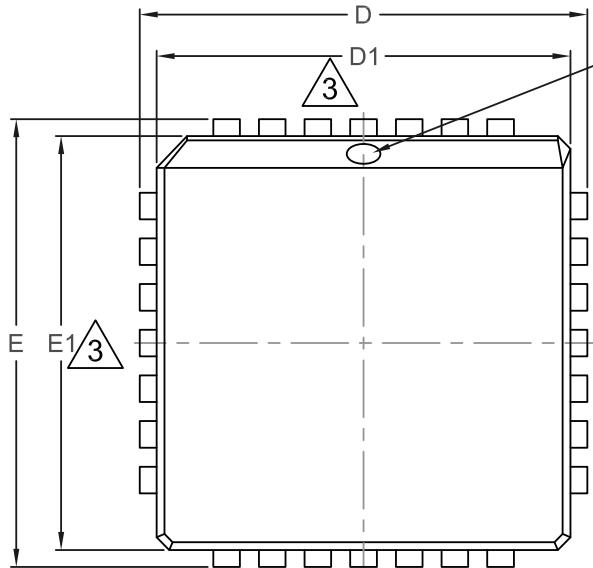
3-D VIEW

NOTES:

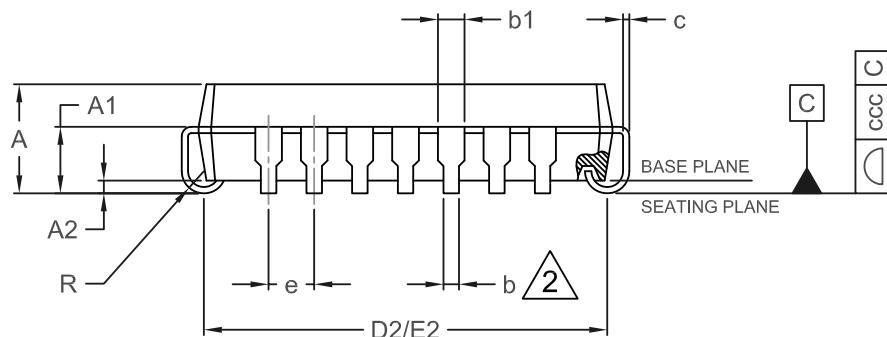
- ALL DIMENSIONS ARE IN MILLIMETER.
- TOLERANCE OF THE TRUE POSITION OF THE LEADS IS $\pm 0.04\text{mm}$ MAXIMUM.
- PACKAGE BODY DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM MOLD PROTRUSION IS 0.25 mm.
- DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
- DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	—	—	3.40	—	OVERALL PACKAGE HEIGHT
A1	0.05	—	0.50	—	STANOFF
A2	2.55	—	3.05	—	BODY THICKNESS
D	23.00	23.20	23.40	—	"X" SPAN
D1	19.90	20.00	20.10	3	"X" BODY SIZE
E	17.00	17.20	17.40	—	"Y" SPAN
E1	13.90	14.00	14.10	3	"Y" BODY SIZE
L	0.73	0.88	1.03	4	LEAD FOOT LENGTH
L1	1.60 REF			—	LEAD LENGTH
b	0.10	—	0.30	2	LEAD WIDTH
c	0.09	—	0.20	—	LEAD FOOT THICKNESS
e	0.50 BSC			—	LEAD PITCH
R1	0.08	—	—	—	LEAD SHOULDER RADIUS
R2	0.08	—	0.30	—	LEAD FOOT RADIUS
ccc	—	—	0.08	—	COPLANARITY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025		THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging	
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994		NAME	DATE	TITLE	
MATERIAL	-	DRAWN S.K.ILIEV	11/30/04	PACKAGE OUTLINE	
FINISH	-	CHECKED S.K.ILIEV	11/30/04	128 QFP-14x20x2.7mm BODY-3.2mm FOOTPRINT	
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	11/30/04	SCALE 1:1	STD COMPLIANCE JEDEC: MS-022 (B) & MS-029 (A)	REV E



TOP VIEW

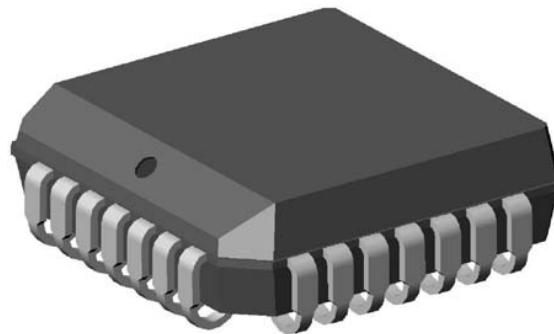


SIDE VIEW

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.0035 inches AT MAXIMUM MATERIAL CONDITION.
3. DIMENSIONS "D1" & "E1" DO NOT INCLUDE MOLD PROTRUSION. MAXIMUM ALLOWABLE MOLD PROTRUSION IS 0.010 inches PER SIDE.

PIN 1 IDENTIFIER



3-D VIEW

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/26/01	S.K.ILIEV
B	NEW DWG LAYOUT. 3-D VIEW ADDED	3/09/05	S.K.ILIEV
C	REMOVED THE LOGO FROM THE TITLE BLOCK	9/25/07	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.165	—	0.180	—	OVERALL PKG HEIGHT
A1	0.090	—	0.120	—	LEAD HEIGHT
A2	0.020	—	—	—	STANOFF
D/E	0.485	—	0.495	3	"X"/"Y" SPAN
D1/E1	0.450	0.453	0.456	3	"X"/"Y" BODY SIZE
D2/E2	0.390	—	0.430	—	LEAD CONTACT SPAN AT PLANE "C"
R	0.025	—	0.045	—	LEAD RADIUS AT PLANE "C"
e	0.050 BSC			—	LEAD PITCH
b	0.013	—	0.021	2	LEAD WIDTH AT PLANE "C"
b1	0.026	—	0.032	—	LEAD WIDTH AT PKG BODY/MOLD
c	0.010 TYP			—	LEAD THICKNESS
ccc	—	—	0.004	—	COPLANARITY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL
XX ± 0.1
XXX ± 0.05
XXXX ± 0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

ANGULAR
 $\pm 1^\circ$



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE

PACKAGE OUTLINE
28 PIN PLCC, 0.050 inch PITCH

NAME DATE

DRAWN
S.K.ILIEV
4/26/01

FINISH
CHECKED
S.K.ILIEV
4/26/01

DWG NUMBER

AP-28-PLCC

REV
C

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

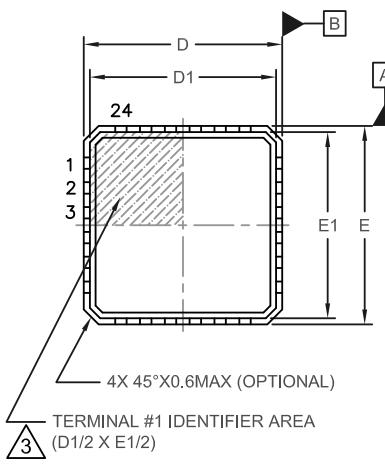
APPROVED
S.K.ILIEV
4/26/01

SCALE
1:1

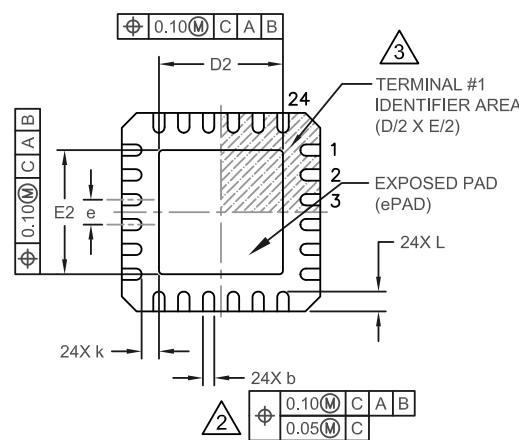
STD COMPLIANCE
JEDEC: MO-047

SHEET
1 OF 1

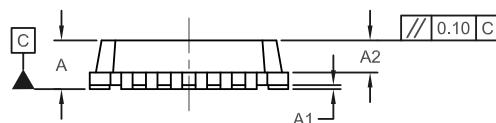
NOTES



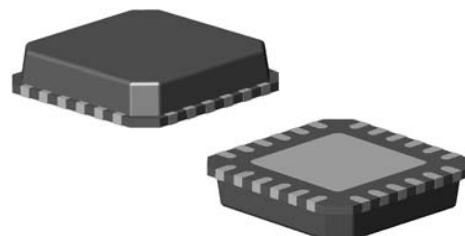
TOP VIEW



BOTTOM VIEW



SIDE VIEW



REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/6/06	S.K.ILIEV
B	ADDED PAGE 2of2, AND APP NOTES UPDATED. D/E TOLERANCE FROM ± 0.15 TO ± 0.10 mm. ADDED DIM K. POSITION TOLERANCES SHOWN AT BOTTOM VIEW.	2/18/09	S.K.ILIEV
C	ADD K(NOM), AND RE-LAYOUT PAGE 2 of 2	6/10/09	S.K.ILIEV

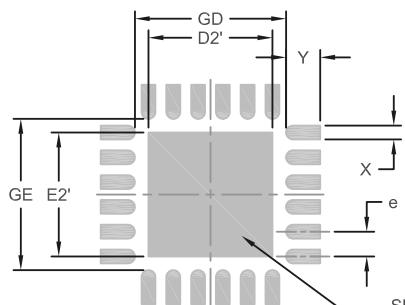
COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D1/E1	3.55	3.75	3.95	-	X/Y MOLD CAP SIZE
D2/E2	2.40	2.50	2.60	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
k	0.25	0.35	-	-	PIN TO ePAD CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025 INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION 	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
MATERIAL -	NAME DRAWN - DATE 4/5/06	TITLE PACKAGE DATA 24 PINS QFN-2504, 4x4mm BODY, 0.5mm PITCH, 2.5x2.5mm EXPOSED PAD, 0.4mm LEAD LENGTH Package Outline Drawing (POD)	REV C	
FINISH -	CHECKED S.K.ILIEV 4/5/06	DWG NUMBER 24QFN-2504-4x4B		
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV 4/6/06	SCALE 1:1	STD COMPLIANCE JEDEC: MO-220	SHEET 1 OF 2

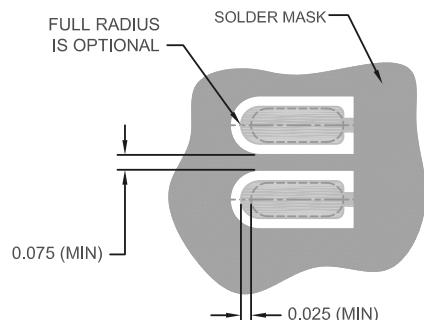


LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	3.05	-	3.10
D2/E2'	-	2.50	2.50
Pad; X	-	0.28	0.28
Pad; Y	-	0.69	-
e		0.50	

SEE NOTE 2

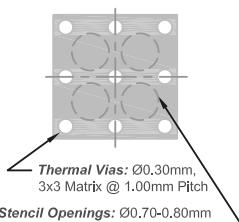
- NOTES:**
1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
 2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED.
 3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN.

PCB LAND PATTERN

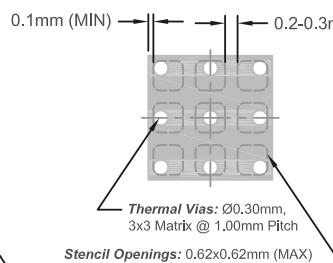


DETAIL "A" - STENCIL OPENING for PERIMETER LANDS

OPTION 1
(NON-PLUGGED THERMAL VIAS)

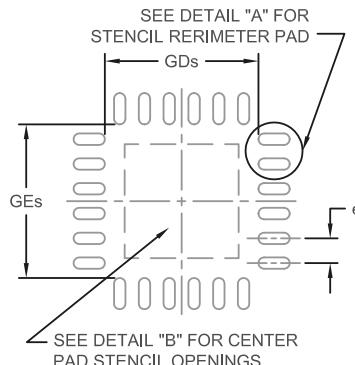


OPTION 2
(PLUGGED THERMAL VIAS)



DETAIL "B" - THERMAL VIAS and STENCIL OPENING for CENTER PAD

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
C	ADD K(NOM), AND RE-LAYOUT PAGE 2 of 2	6/10/09	S.K.ILIEV



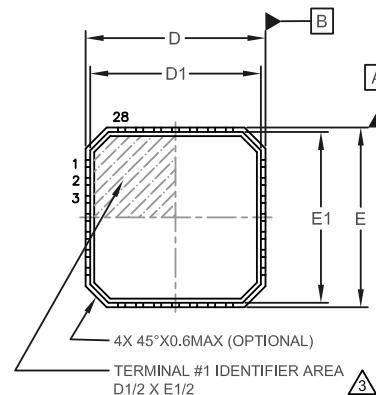
STENCIL DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GDs/GEs	3.10	-	-
Xs	-	0.23	0.25
Ys	-	0.62	-
e	0.50		

STENCIL

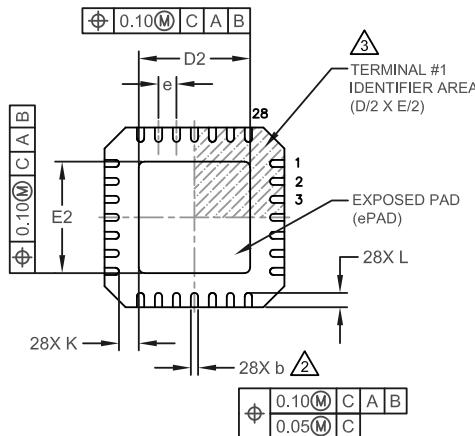
SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN (See Options 1 & 2).
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

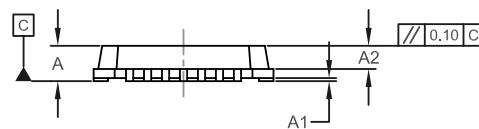
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ± 0.1 , XXX ± 0.05 , XXXX ± 0.025		THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging	
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994			TITLE	
MATERIAL	NAME	DATE	PACKAGE DATA	
-	DRAWN	2/18/09	24 PINS QFN-2504, 4x4mm BODY, 0.5mm PITCH, 2.5x2.5mm EXPOSED PAD, 0.4mm LEAD LENGTH	
-	CHECKED	2/18/09	Application Notes	
-	S.K.ILIEV	2/18/09	DWG NUMBER	REV
			24QFN-2504-4x4B	C
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	2/18/09	SCALE	STD COMPLIANCE
	S.K.ILIEV		1:1	JEDEC: MO-220
				2 OF 2



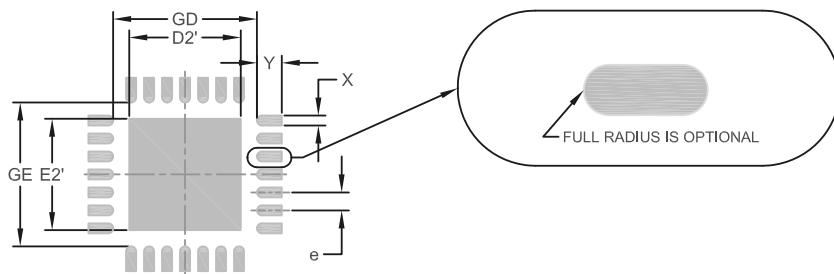
TOP VIEW



BOTTOM VIEW



SIDE VIEW



LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	4.00	-	4.10
D2'/E2'	-	3.10	-
X	-	0.28	0.28
Y	-	0.69	-
e		0.50	

PCB LAND NOTES:

- THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
- EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
- MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

PCB LAND PATTERN

REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL RELEASE	8/20/09	S.K.ILIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	0.60	-	0.80	-	MOLD CAP THICKNESS
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D1/E1	4.55	4.75	4.95	-	X/Y MOLD CAP SIZE
D2/E2	3.00	3.10	3.20	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.45	0.55	-	-	TERMINAL TO ePAD CLEARANCE
e	0.50 BSC		-		TERMINAL PITCH

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETER.
- DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
- DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
X.X ±0.1
X.XX ±0.05
XXXX ±0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

NAME	DATE
------	------

MATERIAL	DRAWN	8/14/09
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FINISH	CHECKED	S.K.ILIEV	8/17/09
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PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.ILIEV	8/20/09
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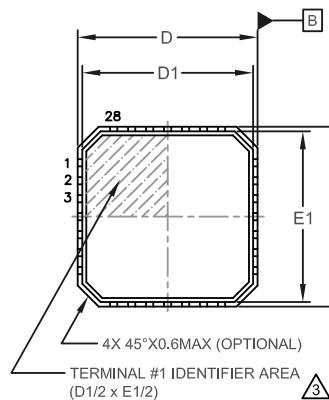
Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE
PACKAGE OUTLINE
28 PINS QFN-3104, 5x5mm BODY, 0.5mm PITCH
3.1x3.1mm ePAD, 0.4mm Lead Length

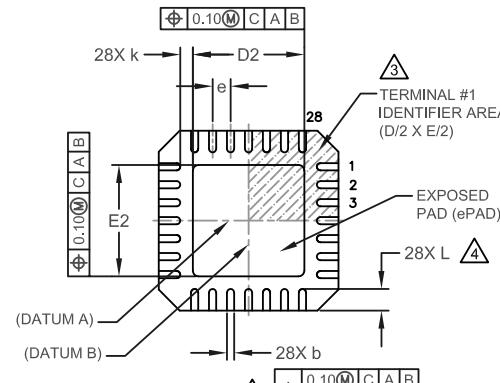
DWG NUMBER	REV
28QFN-3104-5x5	A

SCALE	STD COMPLIANCE	SHEET
1:1	JEDEC: MO-220	1 OF 1

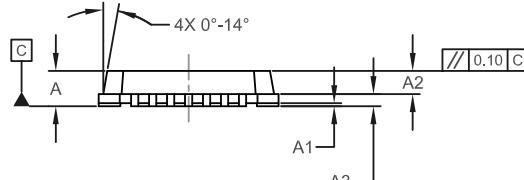
REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL RELEASE	10/7/03	S.K.ILIEV
B	ADDING "PRELIMINARY" NOTE	12/1/03	S.K.ILIEV
C	REMOVE THE "PRELIMINARY" NOTE	12/14/04	S.K.ILIEV
D	NEW DRAWING FORMAT AND 3-D VIEW ADDED	12/20/04	S.K.ILIEV
E	D2/E2(MIN) FROM 1.25 TO 2.95 & (NOM) ADDED	6/21/05	S.K.ILIEV
F	RECOMMENDED PCB LAND PATTERN ADDED	4/20/06	S.K.ILIEV
G	ADDED PARALLELISM TOL, D2'/E2' MAX, Y(nom) and X(nom). POSITION TOL MOVED TO TOP VIEW. SIDE ANGLE (max) FROM 12 TO 14°, D/E and D2/E2 TOL FROM ± 0.15 TO ± 0.10 . GD/ED FROM 3.53 TO 3.65. Y(max) NOT SPECIFIED NOW	4/12/2011	SKI



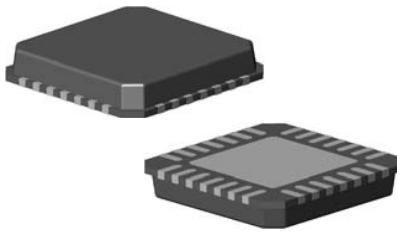
TOP VIEW



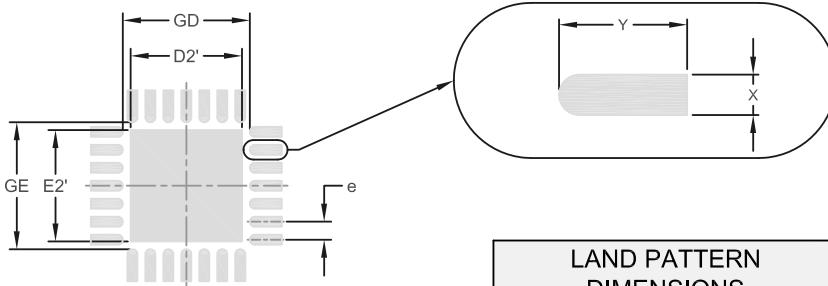
BOTTOM VIEW



SIDE VIEW



3-D VIEWS



THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	3.65	-	3.70
D2'/E2'	-	3.10	3.10
X	-	0.24	0.28
Y	-	0.89	-
e		0.50	

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	0.60	0.65	0.80	-	MOLD CAP THICKNESS
A3	0.20 (REF)		-	-	LEADFRAME THICKNESS
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D1/E1	4.55	4.75	4.95	-	X/Y MOLD CAP SIZE
D2/E2	3.00	3.10	3.20	2	X/Y EXPOSED PAD SIZE
L	0.50	0.60	0.75	4	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
e	0.50 BSC		-	-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. ROUNDED INNER TIPS ON TERMINALS ARE OPTIONAL.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
XX ± 0.1
XXX ± 0.05
XXXX ± 0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

ANGULAR
 $\pm 1^\circ$

NAME DATE

MATERIAL DRAWN
S.K.ILIEV 10/7/03

FINISH CHECKED
S.K.ILIEV 10/7/03

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

APPROVED
S.K.ILIEV 10/7/03

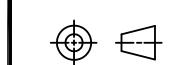
SCALE
1:1

STD COMPLIANCE
JEDEC: MO-220

REV
G

SHEET
1 OF 1

THIRD ANGLE PROJECTION

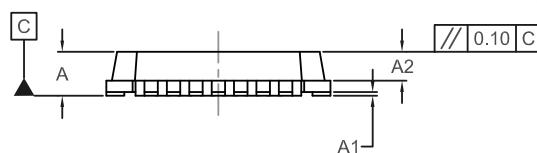
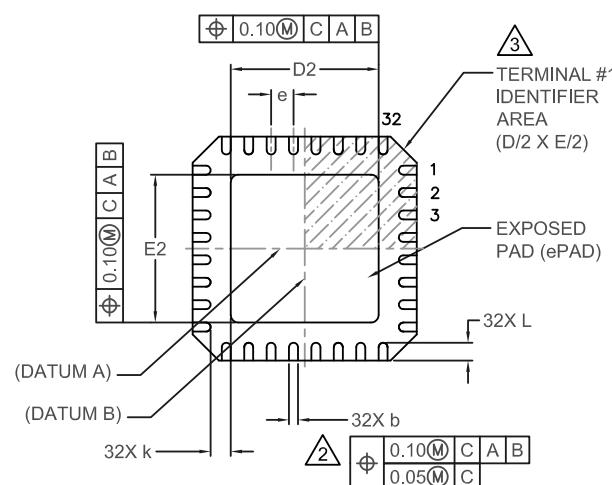
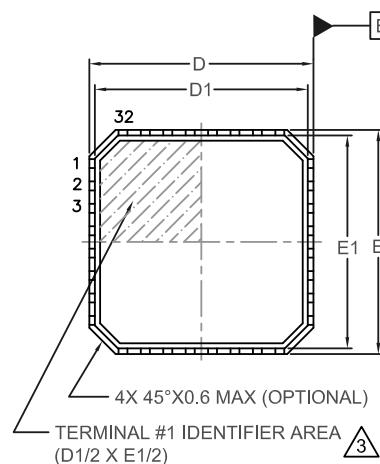


Note: For the most current package drawings, see the Microchip Packaging Specification at <http://www.microchip.com/packaging>

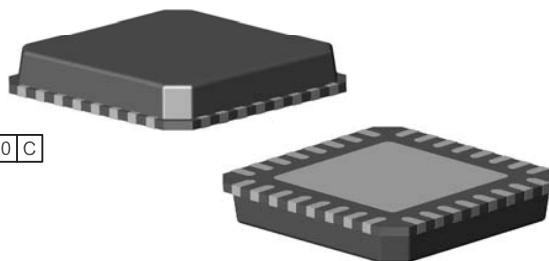
TITLE

PACKAGE DATA

28 TERMINAL QFN, 5x5mm BODY, 0.5mm PITCH
3106 PCB FEATURES



3-D VIEWS



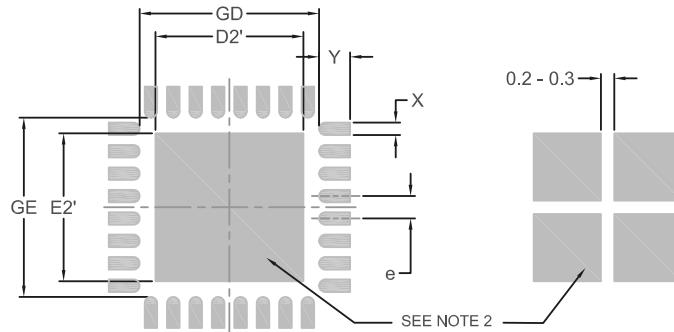
COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A2	-	0.65	0.90	-	MOLD CAP THICKNESS
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D1/E1	4.55	4.75	4.95	-	X/Y MOLD CAP SIZE
D2/E2	3.20	3.30	3.40	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
k	0.35	0.45	-	-	TERMINAL TO ePAD CLEARANCE
e	0.50 BSC		-	TERMINAL PITCH	

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	10/30/08	S.K.ILIEV
B	L(MAX) FROM 0.55 TO 0.50mm. ADDED D2/E2 TABLE	7/8/05	S.K.ILIEV
C	D2/E2 FROM 2.95 - 3.10 - 3.25 TO 3.15 - 3.30 - 3.45	10/19/05	S.K.ILIEV
D	ADDED PCB LAND PATTERN. ADDED DIM "K"	11/18/08	S.K.ILIEV
E	ADDED PAGE 2of2, AND APP NOTES UPDATED. D/E and D2/E2 TOLERANCES FROM ± 0.15 TO ± 0.10 mm. MINIMUM "K" FROM 0.20 TO 0.35mm	2/17/09	S.K.ILIEV
F	FIXED 3-D VIEWS from 28 to 32 PINS. ADDED K(nom). RE-LAYOUT PAGE 2of2.	4/23/09	S.K.ILIEV
G	D2/E2 (MIN) from 3.10 to 3.20.	9/1/09	S.K.ILIEV
H	ADDED A2 (NOM). ADDED D2'/E2'(MIN). X from 0.28 to 0.24. Y from 0.69 to 0.75. Ys from 0.64 to 0.68.	10/7/10	S.K.ILIEV

NOTES:

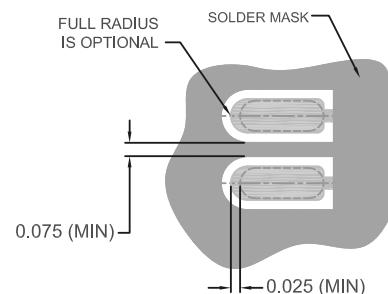
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER AREA ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025	ANGULAR $\pm 1^\circ$	THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994			TITLE PACKAGE DATA 32 PINS QFN-3304, 5x5mm BODY, 0.5mm PITCH 3.3x3.3mm ePAD, 0.4mm LEAD LENGTH Package Outline Drawing (POD)		
MATERIAL	DRAWN	NAME	DATE		
-	-	-	2/19/04		
FINISH	CHECKED	S.K.ILIEV	2/19/04	DWG NUMBER	REV
-	-	-	-	32QFN-3304-5x5B	H
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.ILIEV	7/12/04	SCALE	STD COMPLIANCE
-	-	-	-	1:1	JEDEC: MO-220
					SHEET 1 OF 2



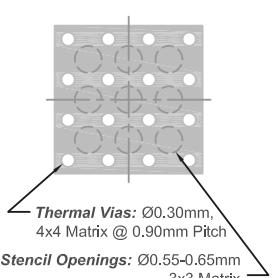
LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	4.00	-	4.10
D2'/E2'	3.10	-	3.30
X	-	0.24	0.28
Y	-	0.69	0.75
e		0.50	

PCB LAND PATTERN

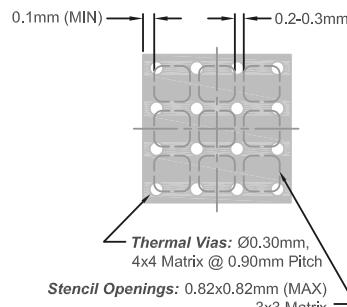


DETAIL "A" - STENCIL OPENING for PERIMETER LANDS

OPTION 1
(NON-PLUGGED THERMAL VIAS)

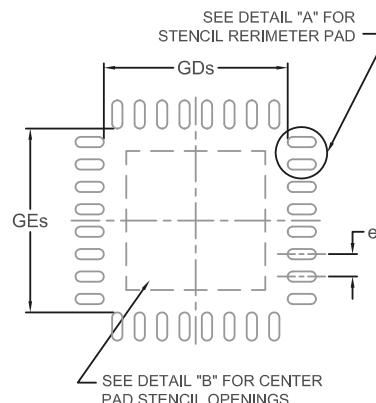


OPTION 2
(PLUGGED THERMAL VIAS)



DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD



STENCIL DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GDs/GEs	4.05	-	-
Xs	-	0.23	0.25
Ys	-	0.62	0.68
e		0.50	

STENCIL

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN (See Options 1 & 2).
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
X.X ± 0.1
X.XX ± 0.05
X.XXX ± 0.025

ANGULAR
 $\pm 1^\circ$

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

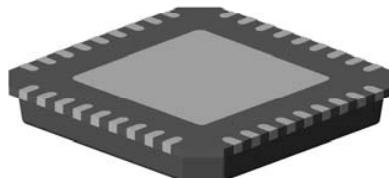
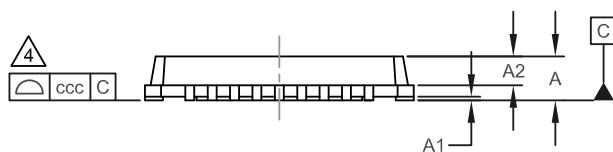
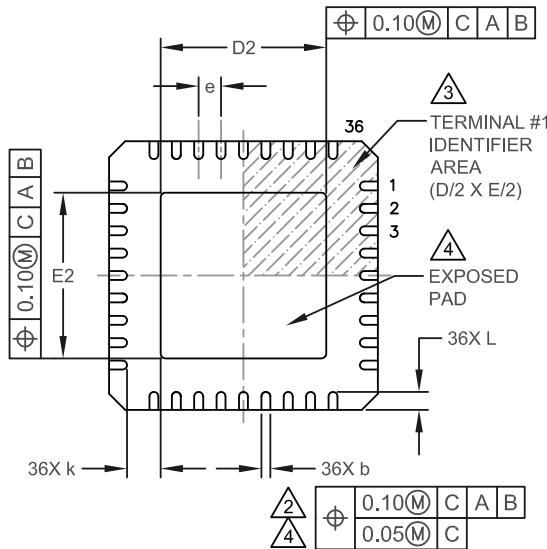
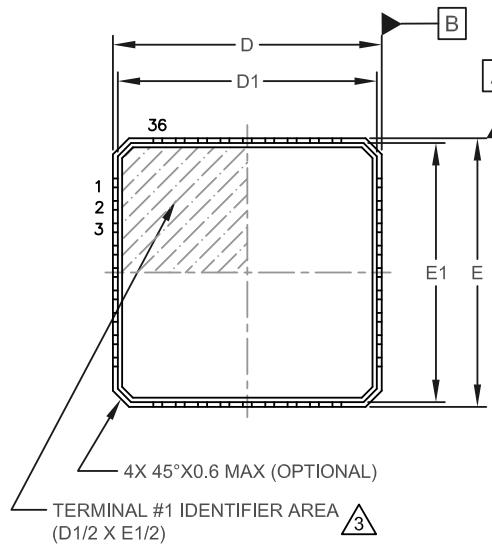
TITLE

PACKAGE DATA

32 PINS QFN-3304, 5x5mm BODY, 0.5mm PITCH,
3.3x3.3mm EXPOSED PAD, 0.4mm LEAD LENGTH

Application Notes

MATERIAL	DRAWN	2/17/09	DWG NUMBER		REV
FINISH	CHECKED	2/17/09	32QFN-3304-5x5B		H
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	2/17/09	SCALE	STD COMPLIANCE	SHEET
	S.K.ILIEV		1:1	JEDEC: MO-220	2 OF 2



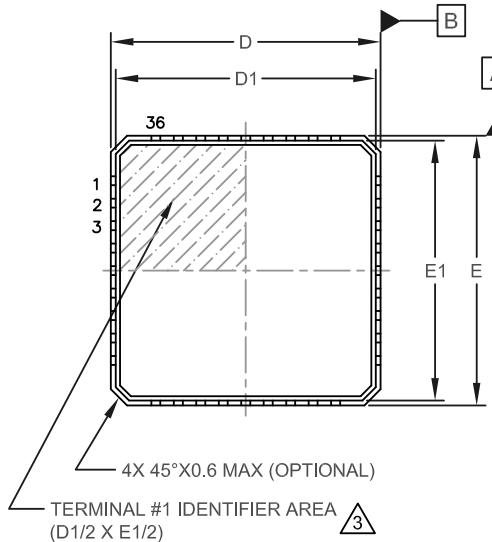
COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	-	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	5.85	6.00	6.15	-	X/Y BODY SIZE
D1/E1	5.55	-	5.95	-	X/Y MOLD CAP SIZE
D2/E2	3.60	3.70	3.80	4	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
k	0.52	-	-	-	TERMINAL TO ePAD CLEARANCE
ccc	-	-	0.08	4	COPLANARITY
e	0.50 BSC		-	TERMINAL PITCH	

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	10/30/08	S.K.ILIEV

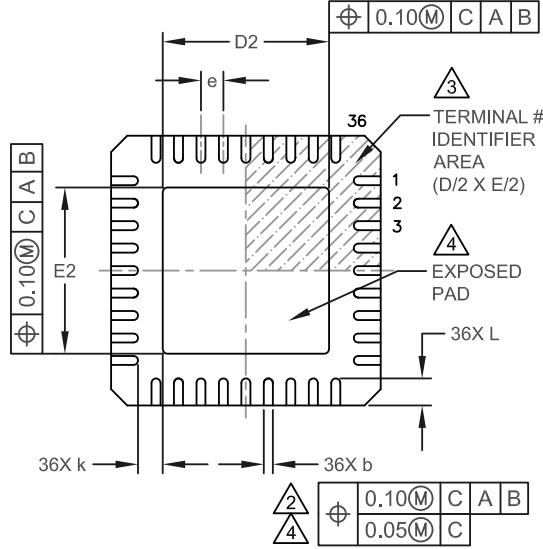
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. COPLANARITY ZONE APPLIES TO EXPOSED PAD AND TERMINALS.

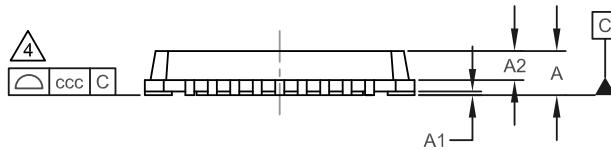
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025 INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	ANGULAR $\pm 1^\circ$	THIRD ANGLE PROJECTION	
		NAME	DATE
MATERIAL	DRAWN	S.K.ILIEV	10/28/08
FINISH	CHECKED	S.K.ILIEV	10/29/08
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.ILIEV	10/30/08
	SCALE	STD COMPLIANCE	SHEET
	1:1	JEDEC: MO-220	1 OF 1



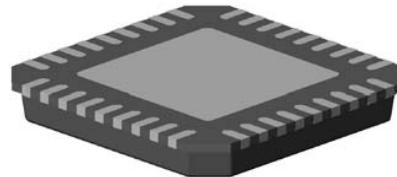
TOP VIEW



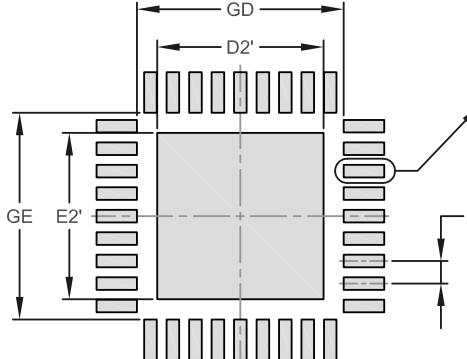
BOTTOM VIEW



SIDE VIEW

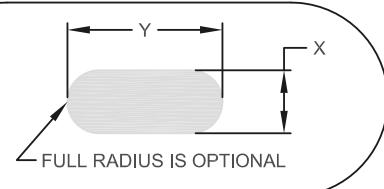


3-D VIEW



PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	4.60	-	4.70
D2'/E2'	-	3.70	-
X	-	0.28	0.28
Y	-	0.90	-
e		0.50	



REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	10/7/08	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	5.90	6.00	6.10	-	X/Y BODY SIZE
D1/E1	5.55	5.75	5.95	-	X/Y MOLD CAP SIZE
D2/E2	3.60	3.70	3.80	4	X/Y EXPOSED PAD SIZE
L	0.50	0.60	0.75	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
k	0.45	-	-	-	TERMINAL TO ePAD CLEARANCE
CCC	-	-	0.08	4	COPLANARITY
e	0.50 BSC		-		TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. COPLANARITY ZONE APPLIES TO EXPOSED PAD AND TERMINALS.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
XX ±0.1
XXX ±0.05
XXXX ±0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

ANGULAR
±1°



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

NAME DATE

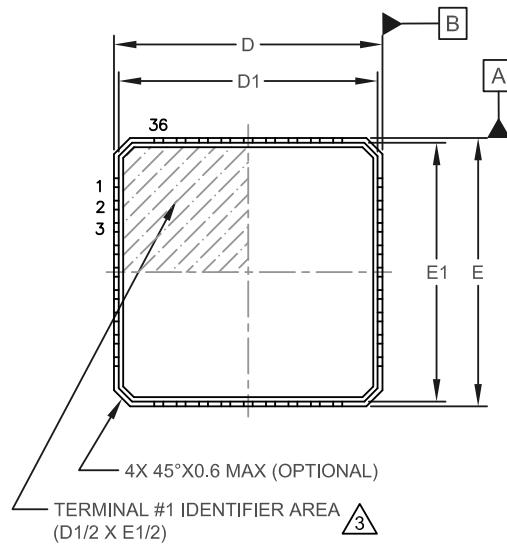
DRAWN S.K.ILIEV 10/3/08

FINISH CHECKED S.K.ILIEV 10/6/08

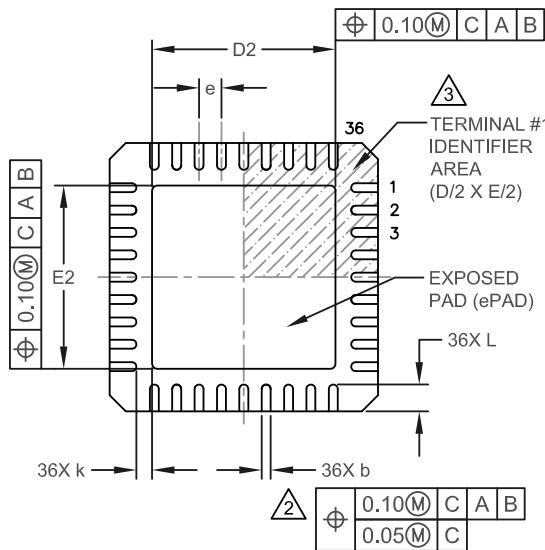
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DO NOT SCALE DRAWING APPROVED S.K.ILIEV 10/7/08

TITLE PACKAGE OUTLINE
36 PIN QFN, 6x6mm BODY, 0.5mm PITCH
3.7x3.7mm ePAD

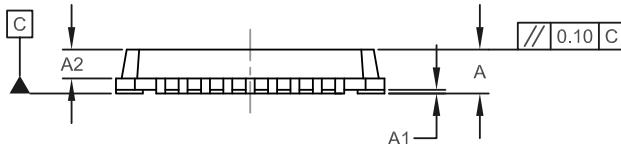
DWG NUMBER MO-36QFN-37-6x6B REV -
SCALE 1:1 STD COMPLIANCE JEDEC: MO-220 SHEET 1 OF 1



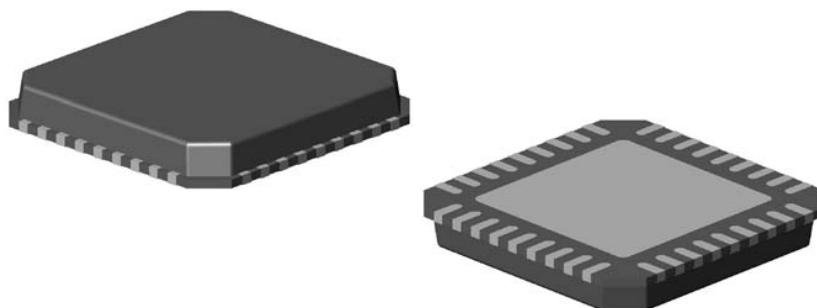
TOP VIEW



BOTTOM VIEW



SIDE VIEW



3-D VIEWS

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	7/24/07	S.K.ILIEV
B	"A" was 0.70-1.00, now 0.80-0.85-0.90. "A2" was -- 0.90, now - 0.65-0.75, D/E tolerance was ±0.15, now is ±0.10. ADDED PAGE 2of2. UPDATED APP NOTES	3/27/09	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	0.90	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A2	-	0.65	0.75	-	MOLD CAP THICKNESS
D/E	5.90	6.00	6.10	-	X/Y BODY SIZE
D1/E1	5.55	-	5.95	-	X/Y MOLD CAP SIZE
D2/E2	4.00	4.10	4.20	-	X/Y EXPOSED PAD SIZE
L	0.50	0.60	0.75	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
k	0.25	0.35	-	-	TERMINAL TO ePAD CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

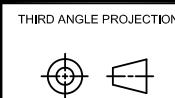
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL
XX ±0.1
XXX ±0.05
XXXX ±0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

ANGULAR
±1°

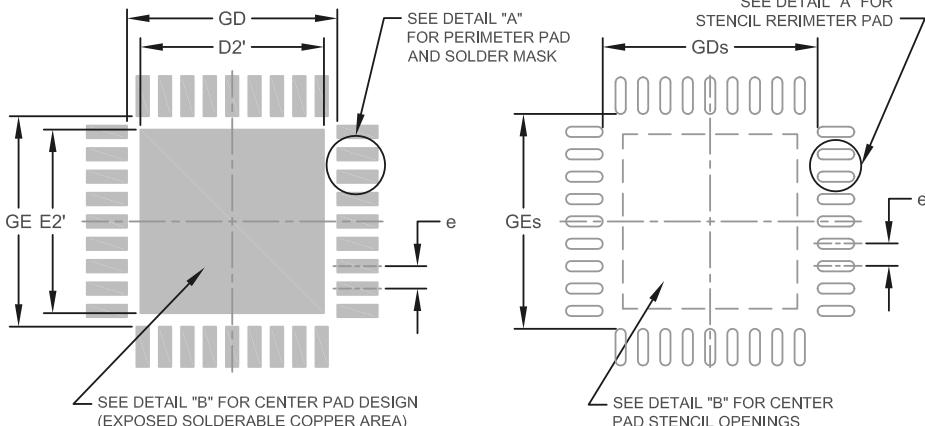


Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

PACKAGE DATA

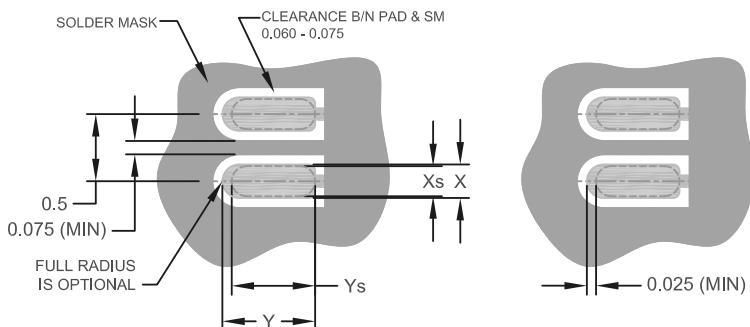
36 PINS QFN-4106, 6x6mm BODY, 0.5mm PITCH,
4.1x4.1mm EXPOSED PAD, 0.6mm LEAD LENGTH
Package Outline Drawing (POD)

NAME	DATE	DWG NUMBER			REV
		36QFN-4106-6x6B	1 OF 2	SHEET	
DRAWN	7/20/07				
CHECKED S.K.ILIEV	7/24/07	SCALE 1:1	STD COMPLIANCE JEDEC: MO-220		B
APPROVED S.K.ILIEV	7/24/07				
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING					



PCB LAND PATTERN

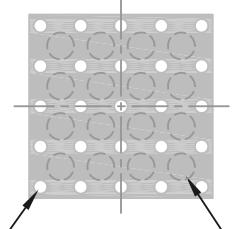
STENCIL



DETAIL "A"

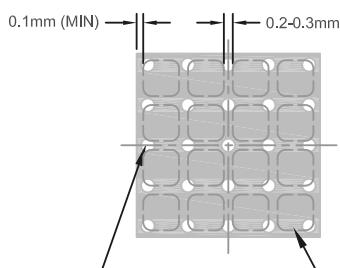
STENCIL OPENING - PERIMETER LANDS

OPTION 1
(NON-PLUGGED THERMAL VIAS)



Thermal Vias: Ø0.30mm,
5x5 Matrix @ 0.90mm Pitch
Stencil Openings: Ø0.55-0.65mm
4x4 Matrix

OPTION 2
(PLUGGED THERMAL VIAS)



Thermal Vias: Ø0.30mm,
5x5 Matrix @ 0.90mm Pitch
Stencil Openings: 0.82x0.82mm (MAX)
4x4 Matrix

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
B	"A" was 0.70-1.00, now 0.80-0.85-0.90. "A2" was --0.90, now -0.65-0.75. D/E tolerance was ±0.15, now is ±0.10. ADDED PAGE 2 of 2, UPDATED APP NOTES	3/27/09	S.K.ILIEV

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	4.70	-	4.75
GDs/GEs	4.80	-	-
D2'/E2'	-	4.10	4.10
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.90	0.90
Stencil: Ys	-	0.82	0.84
e		0.50	

SMT APPLICATION NOTES

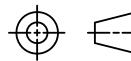
1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN (See Options 1 & 2).
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
X.X ± 0.1
X.XX ± 0.05
XXXX ± 0.025

ANGULAR
 $\pm 1^\circ$
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

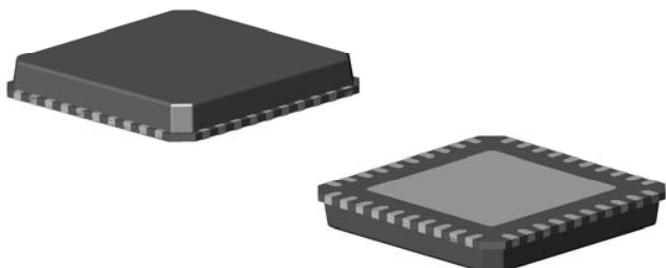
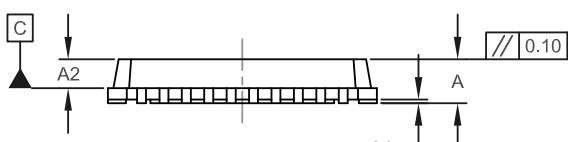
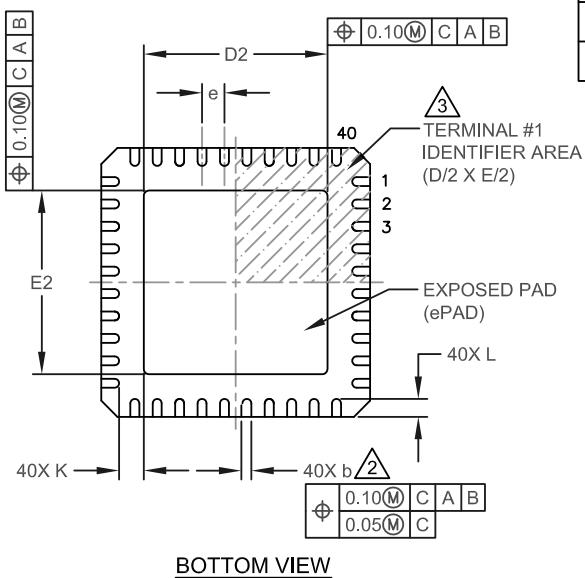
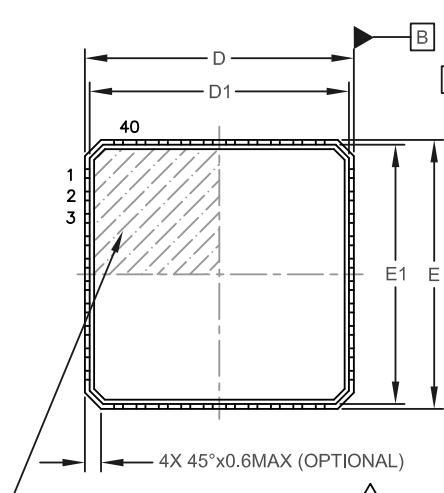
TITLE

PACKAGE DATA

36 PINS QFN-4106, 6x6mm BODY, 0.5mm PITCH,
4.1x4.1mm EXPOSED PAD, 0.6mm LEAD LENGTH

Application Notes

MATERIAL	DRAWN	DATE	REV
-	-	3/25/09	B
FINISH	CHECKED		
-	S.K.ILIEV	3/27/09	
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	SCALE	STD COMPLIANCE
S.K.ILIEV	3/27/09	1:1	JEDEC: MO-220
DWG NUMBER	DWG NUMBER		Sheet
	36QFN-4106-6x6B		2 OF 2



REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/7/04	S.K.ILIEV
B	ADDED PAGE 2of2. APP NOTES UPDATED	2/5/09	S.K.ILIEV

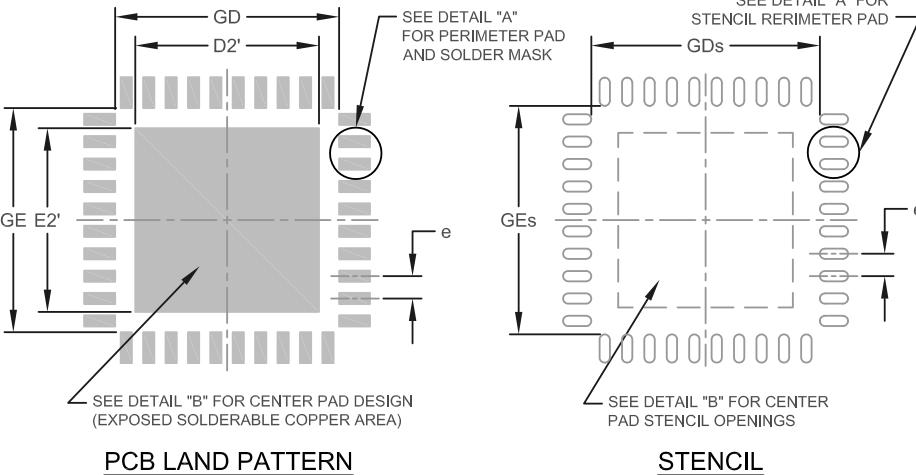
COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PKG HEIGHT
A1	0	0.02	0.05	-	STANOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	5.90	6.00	6.10	-	X/Y OVERALL PKG BODY SIZE
D1/E1	5.55	5.75	5.95	-	X/Y MOLD CAP SIZE
D2/E2	4.00	4.10	4.20	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.45	-	-	-	ePAD TO PINS CLEARANCE
e	050 BSC			-	TERMINAL PITCH

NOTES:

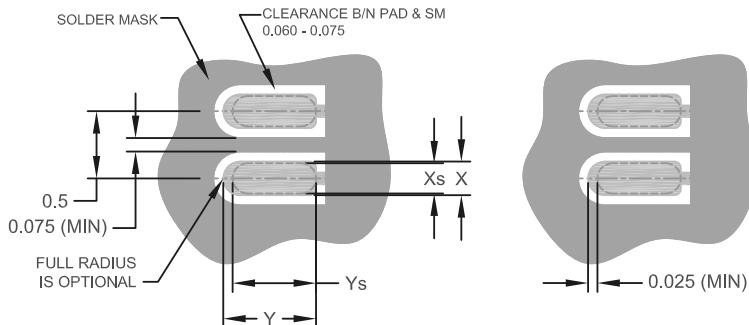
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ± 0.1 X.XX ± 0.05 X.XXX ± 0.025 ANGULAR $\pm 1^\circ$ INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging
	NAME	DATE	
MATERIAL	DRAWN	2/06/04	TITLE
FINISH	CHECKED	2/07/04	PACKAGE DATA
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	2/07/04	40 PINS QFN-4104, 6x6mm BODY, 0.5mm PITCH, 4.1x4.1mm EXPOSED PAD, 0.4mm LEAD LENGTH Package Outline Drawing (POD)
	SCALE 1:1	STD COMPLIANCE JEDEC: MO-220	REV B
		SHEET 1 OF 2	



PCB LAND PATTERN

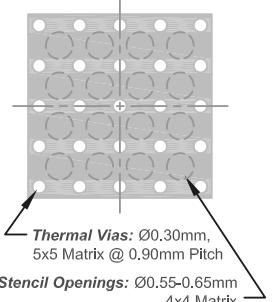
STENCIL



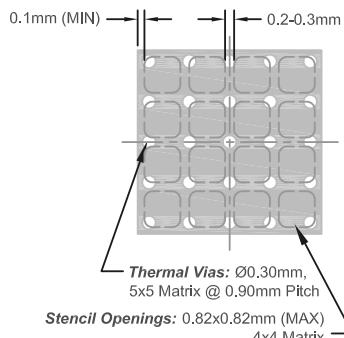
DETAIL "A"

STENCIL OPENING - PERIMETER LANDS

OPTION 1
(NON-PLUGGED THERMAL VIAS)



OPTION 2
(PLUGGED THERMAL VIAS)



DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
B	ADDED PAGE 2 of 2. APP NOTES UPDATED	2/5/09	S.K.ILIEV

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	5.00	-	5.10
GDs/GEs	5.05	-	-
D2'/E2'	-	4.10	-
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e		0.50	

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN (See Options 1 & 2).
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLUX PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

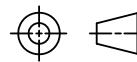
DECIMAL
X.X ± 0.1
X.XX ± 0.05
XXXX ± 0.025

ANGULAR
 $\pm 1^\circ$

INTERPRET DIM AND TOL PER

ASME Y14.5M - 1994

THIRD ANGLE PROJECTION



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE

PACKAGE DATA

40 PINS QFN-4104, 6x6mm BODY, 0.5mm PITCH,
4.1x4.1mm EXPOSED PAD, 0.4mm LEAD LENGTH

Application Notes

DWG NUMBER

40QFN-4104-6x6B

REV
B

MATERIAL DRAWN DATE

- - 2/06/04

FINISH CHECKED DATE

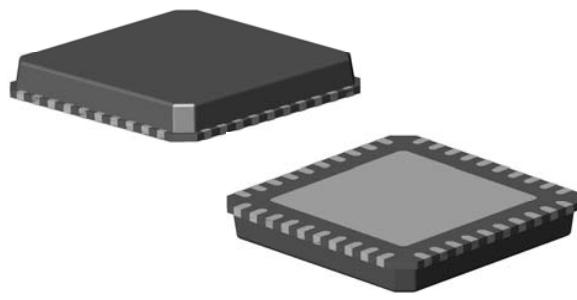
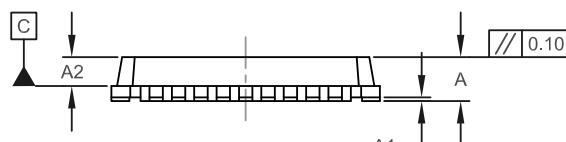
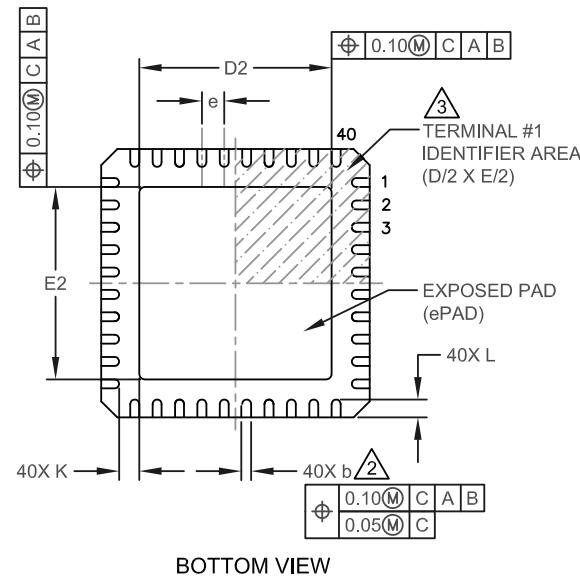
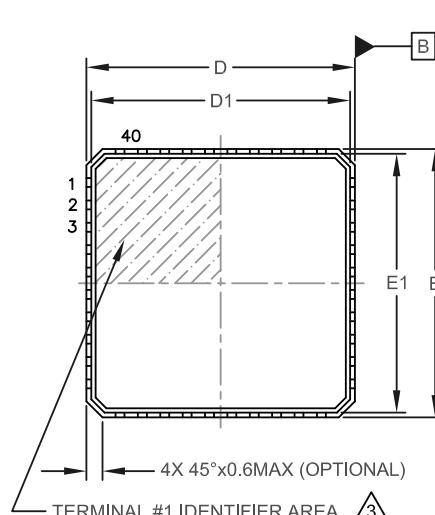
- - 2/07/04

SCALE

1:1

STD COMPLIANCE JEDEC: MO-220

SHEET 2 OF 2



REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	10/29/04	S.K.ILIEV
B	ADDED USB3450 & PARA 1 TO 6 IN MO SPEC	7/13/05	S.K.ILIEV
C	D2/E2 FROM 3.95-4.10-4.25 TO 4.15-4.30-4.45. PCB	1/11/06	S.K.ILIEV
D	POSITION TOL. MOVED TO VIEWS. D2/E2 TOL=±0.1	3/30/08	S.K.ILIEV
E	ADDED PAGE 2 of 2. UPDATED APP NOTES	2/5/09	S.K.ILIEV

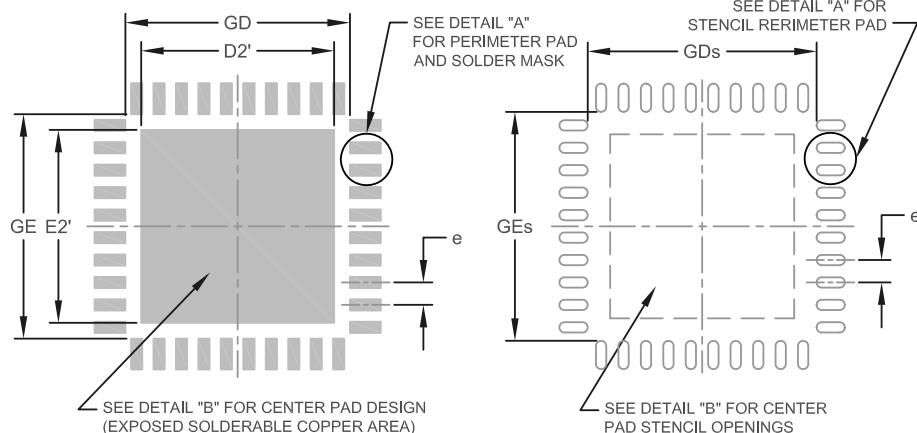
COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PKG HEIGHT
A1	0	0.02	0.05	-	STANOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	5.90	6.00	6.10	-	X/Y OVERALL PKG BODY SIZE
D1/E1	5.55	5.75	5.95	-	X/Y MOLD CAP SIZE
D2/E2	4.20	4.30	4.40	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.35	-	-	-	ePAD TO PINS CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

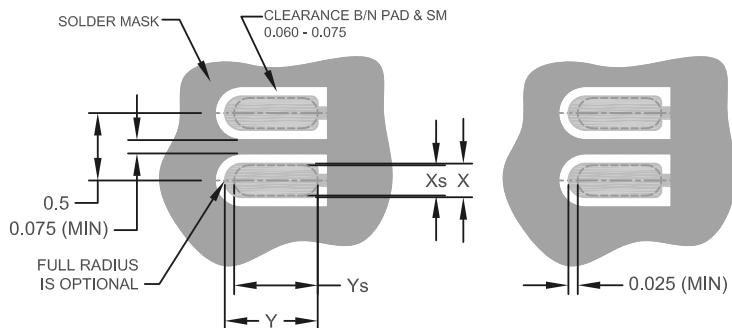
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025 ANGULAR $\pm 1^\circ$ INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
	NAME DRAWN - DATE 10/29/04		TITLE PACKAGE DATA 40 PINS QFN-4304, 6x6mm BODY, 0.5mm PITCH, 4.3x4.3mm EXPOSED PAD, 0.4mm LEAD LENGTH Package Outline Drawing (POD)		
MATERIAL -	FINISH -	CHECKED - 10/29/04	DWG NUMBER 40QFN-4304-6x6B	REV E	
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV 10/29/04	SCALE 1:1	STD COMPLIANCE JEDEC: MO-220	SHEET 1 OF 2	



PCB LAND PATTERN

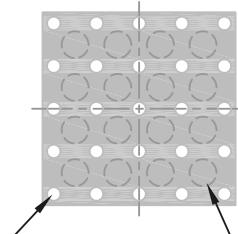
STENCIL



DETAIL "A"

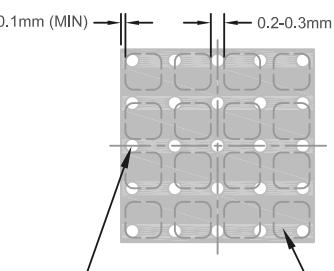
STENCIL OPENING - PERIMETER LANDS

OPTION 1
(NON-PLUGGED THERMAL VIAS)



Stencil Openings: Ø0.60-0.70mm
4x4 Matrix

OPTION 3
(PLUGGED THERMAL VIAS)



Stencil Openings: Ø0.30mm,
5x5 Matrix @ 0.95mm Pitch

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
E	ADDED PAGE 2 of 2. UPDATED APP NOTES	2/5/09	S.K.ILIEV

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	5.00	-	5.10
GDs/GEs	5.05	-	-
D2'/E2'	-	4.30	4.30
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e		0.50	

SMT APPLICATION NOTES

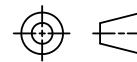
1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN (See Options 1 & 2).
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
X.X ± 0.1
X.XX ± 0.05
X.XXX ± 0.025

ANGULAR
 $\pm 1^\circ$
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE

PACKAGE DATA

40 PINS QFN-4304, 6x6mm BODY, 0.5mm PITCH,
4.3x4.3mm EXPOSED PAD, 0.4mm LEAD LENGTH

Application Notes

REV

40QFN-4304-6x6B

E

MATERIAL

DRAWN

2/5/09

FINISH

CHECKED

2/5/09

DWG NUMBER

40QFN-4304-6x6B

SHEET

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

APPROVED

S.K.ILIEV

2/5/09

SCALE

1:1

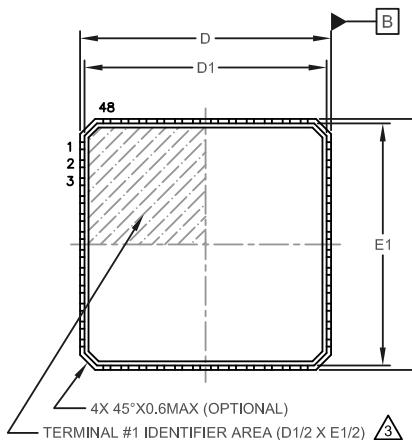
STD COMPLIANCE

JEDEC: MO-220

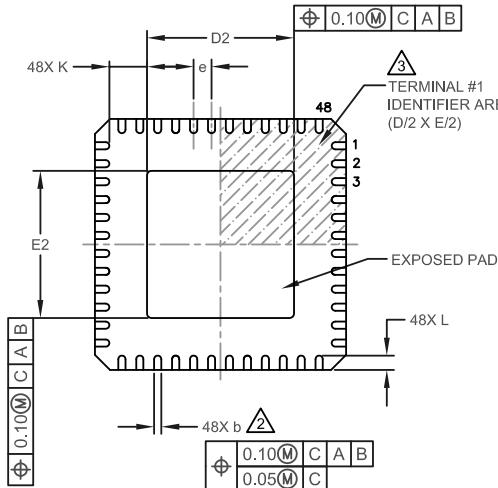
2 OF 2

REVISION HISTORY

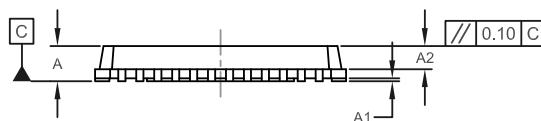
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	7/16/04	S.KILIEV
B	DELETE THE "PRELIMINARY" SIGN	11/30/04	S.KILIEV
C	3-D VIEW ADDED. D2/E2 WAS 1.25-5.80 NOW - SEE TABLE. L(MAX) WAS 0.75 NOW IS 0.50	7/14/05	S.KILIEV
D	PCB FOOTPRINT AND EMC4001 IN D2/E2 TABLE ADDED	2/23/06	S.KILIEV
E	NEW EXPOSED PAD ADDED FOR EMC4002 DEVICE	4/24/07	S.KILIEV
F	NEW EXPOSED PAD ADDED FOR OS81110 DEVICE	5/17/07	S.KILIEV
G	ADDED PAGE 2 of 2, UPDATED APP NOTES. D2/E2 TOLERANCE FROM ± 0.15 TO ± 0.10 mm	2/3/09	S.KILIEV



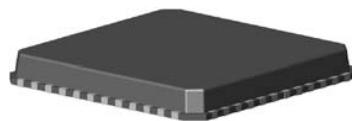
TOP VIEW



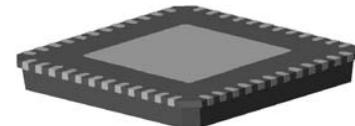
BOTTOM VIEW



SIDE VIEW



3-D VIEWS



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	6.85	7.00	7.15	-	X/Y BODY SIZE
D1/E1	6.55	6.75	6.95	-	X/Y MOLD CAP SIZE
D2/E2	4.00	4.10	4.20	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.95		-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

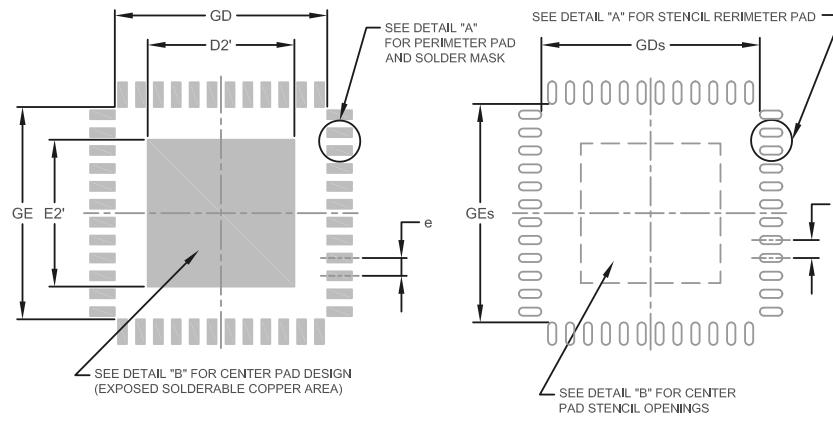
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL ANGULAR
XX ± 0.1 $\pm 1^\circ$
XXX ± 0.05
XXXX ± 0.025
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION
NAME DATE
DRAWN 6/15/04

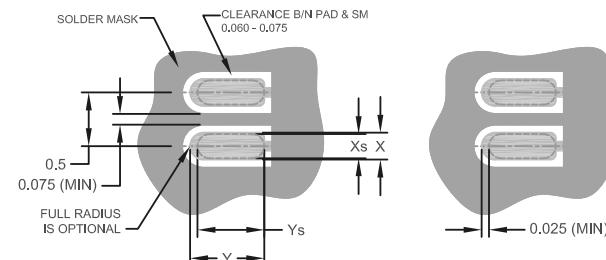
Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE		PACKAGE DATA	
		48 QFN-4104, 7x7mm BODY, 0.5mm PITCH, 4.1x4.1mm EXPOSED PAD, 0.4mm LEAD LENGTH Package Outline Drawing (POD)	
DWG NUMBER		REV G	
48QFN-4104-7x7B			
APPROVED	S.KILIEV	SCALE	1:1
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		STD COMPLIANCE	JEDEC: MO-220
		SHEET	1 OF 2



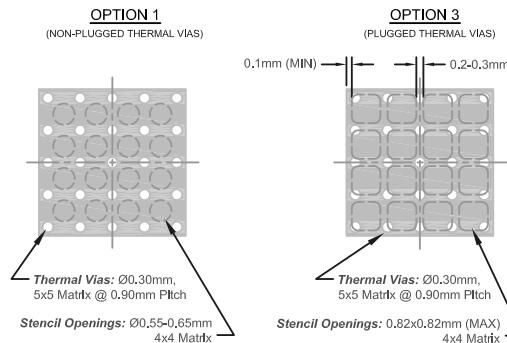
PCB LAND PATTERN

STENCIL



DETAIL "A"

STENCIL OPENING - PERIMETER LANDS



DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
G	ADDED PAGE 2 of 2, UPDATED APP NOTES AND D2/E2 TOLERANCE FROM ± 0.15 TO ± 0.10 mm	2/3/09	S.K.Iliev

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	6.00	-	6.10
GDs/GEs	6.05	-	-
D2'/E2'	-	4.10	-
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e		0.50	

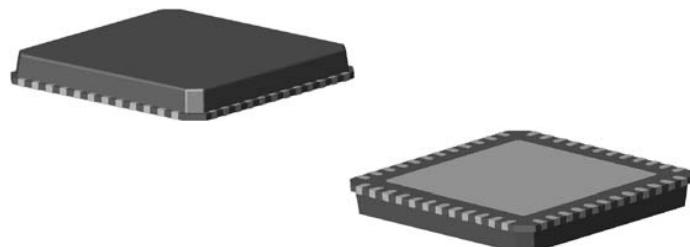
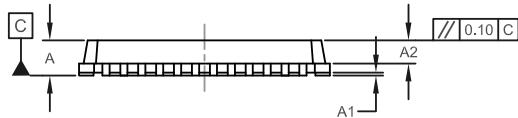
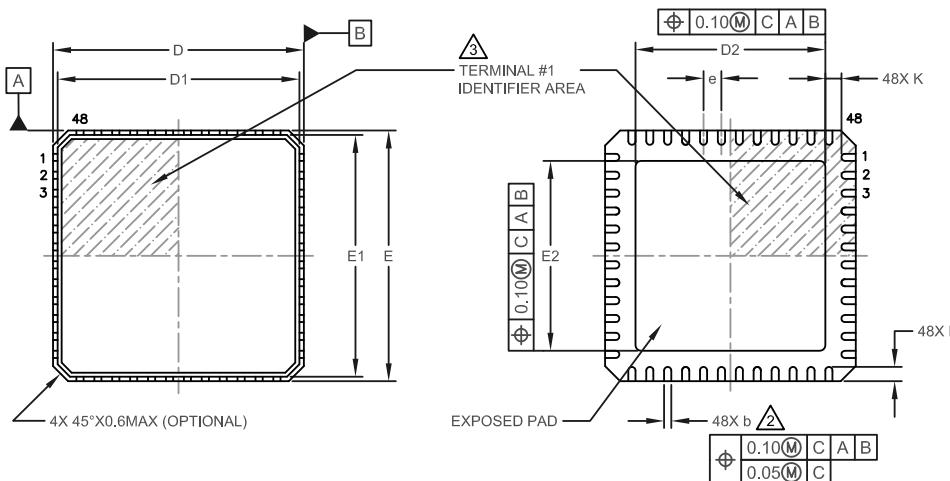
SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025 ANGULAR $\pm 1^\circ$	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
	NAME	DATE	TITLE PACKAGE DATA 48 QFN-4104, 7x7mm BODY, 0.5mm PITCH, 4.1x4.1mm EXPOSED PAD, 0.4mm LEAD LENGTH Application Notes		
MATERIAL	DRAWN	2/3/09	DWG #	48QFN-4104-7x7B	REV G
FINISH	CHECKED	2/3/09	SCALE	1:1	STD COMPLIANCE
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.Iliev	2/3/09		2 OF 2

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	7/26/07	S.K.ILIEV
B	ADDED PAGE 2of2. UPDATED APP NOTES	2/4/09	S.K.ILIEV



COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	6.85	7.00	7.15	-	X/Y BODY SIZE
D1/E1	6.55	6.75	6.95	-	X/Y MOLD CAP SIZE
D2/E2	5.20	5.30	5.40	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.35	-	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL
XX ±0.1
XXX ±0.05
XXXX ±0.025

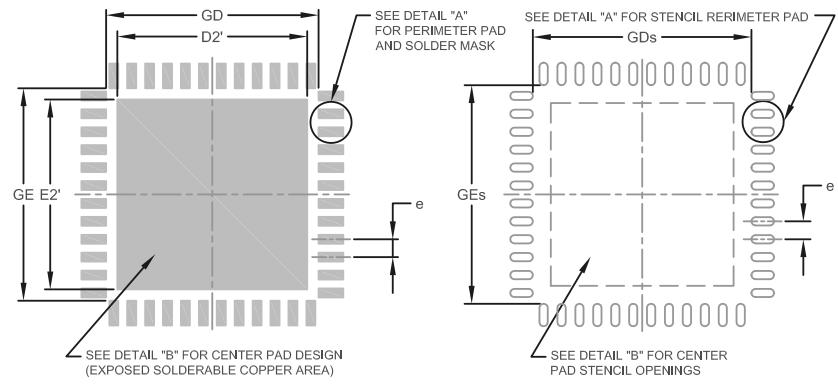
ANGULAR
±1°
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

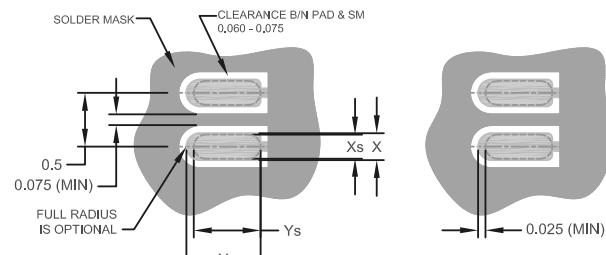
TITLE
PACKAGE DATA
48 PINS QFN-5304, 7x7mm BODY, 0.5mm PITCH,
5.3x5.3mm EXPOSED PAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

NAME	DATE
DRAWN	7/25/07
FINISH	CHECKED
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV
7/26/07	SCALE 1:1
	STD COMPLIANCE JEDEC: MO-220
	SHEET 1 OF 2



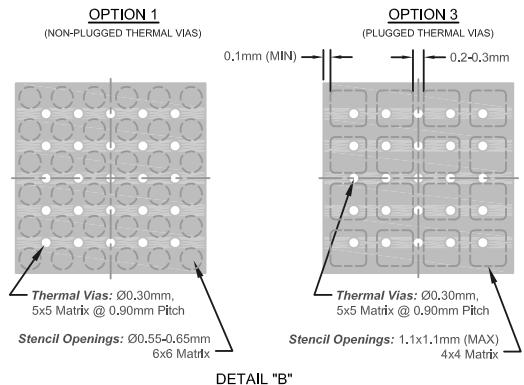
PCB LAND PATTERN

STENCIL



DETAIL "A"

STENCIL OPENING - PERIMETER LANDS



DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
B	ADDED PAGE 2 of 2. UPDATED APP NOTES	2/4/09	S.K.ILIEV

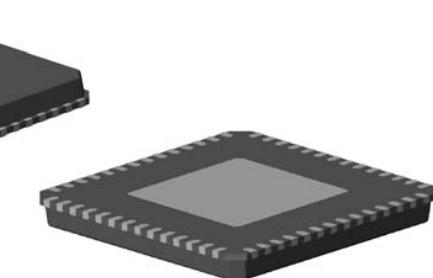
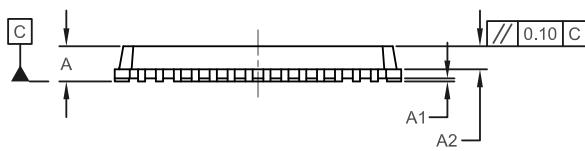
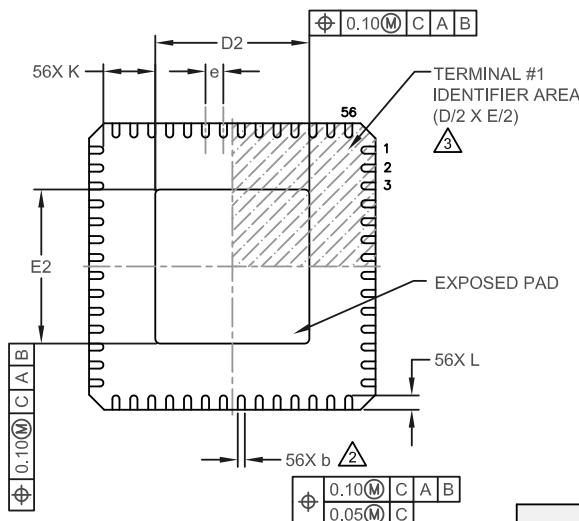
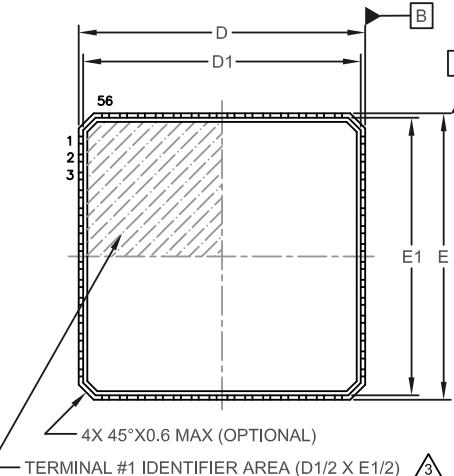
LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	6.00	-	6.10
GDs/GEs	6.05	-	-
D2'/E2'	-	5.30	5.30
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e	0.50		

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ± 0.1 X.XX ± 0.05 X.XXX ± 0.025	THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	TITLE	PACKAGE DATA 48 QFN-5304, 7x7mm BODY, 0.5mm PITCH, 5.3x5.3mm EXPOSED PAD, 0.4mm LEAD LENGTH Application Notes		
MATERIAL	NAME	DATE	DWG #	
-	DRAWN	2/3/09	48QFN-5304-7x7B	
FINISH	CHECKED	2/3/09	REV	B
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	2/4/09	SCALE	1:1
	S.K.ILIEV		STD COMPLIANCE	-
			2 OF 2	



REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/7/04	S.K.ILIEV
B	REMOVE "PRELIMINARY" NOTE	10/7/04	S.K.ILIEV
C	L(MAX) FROM 0.55 TO 0.50. ADD D2/E2 VAR TABLE	7/2/05	S.K.ILIEV
D	DELETE EMC2700, ADD USB2504A, USB2524 AND EMC2700P IN THE D2/E2 VARIATIONS TABLE	4/13/06	S.K.ILIEV
E	4304 GEOMETRY SHOWN ONLY. ADDED PAGE 2of2	6/11/08	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	7.85	8.00	8.15	-	X/Y BODY SIZE
D1/E1	7.55	-	7.95	-	X/Y MOLD CAP SIZE
D2/E2	4.20	4.30	4.40	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	1.35	-	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL ANGULAR
XX ± 0.1 $\pm 1^\circ$
XXX ± 0.05
XXXX ± 0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

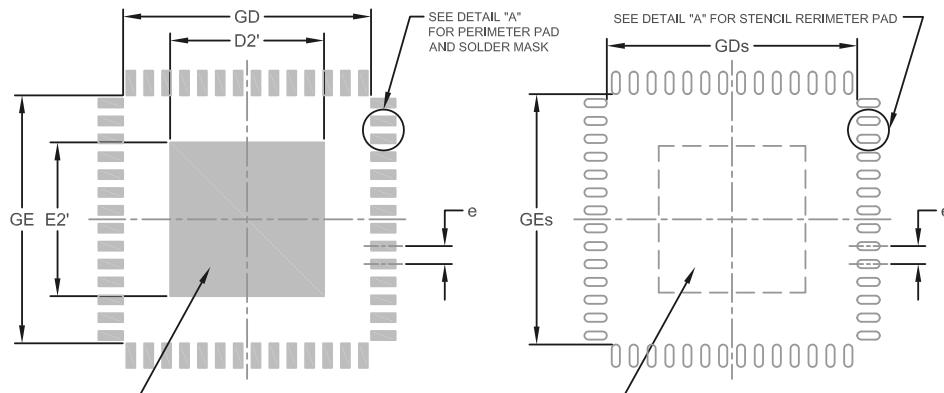


Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE		PACKAGE DATA	
56 QFN-4304, 8x8mm BODY, 0.5mm PITCH, 4.3x4.3mm ePAD, 0.4mm LEAD LENGTH Package Outline Drawing (POD)			
DWG #	56QFN-4304-8x8B	REV	E
NAME	DRAWN	DATE	2/06/04
MATERIAL	-	FINISH	-
CHECKED	-	APPROVED	S.K.ILIEV
2/07/04	2/07/04	SCALE	1:1
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	STD COMPLIANCE	JEDEC: MO-220	SHEET 1 OF 2

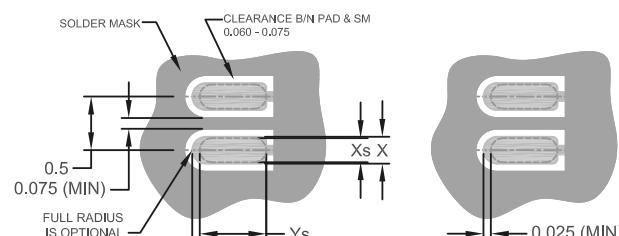
REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
E	4304 GEOMETRY SHOWN ONLY. ADDED PAGE 2of2	6/11/08	S.K.Iliev

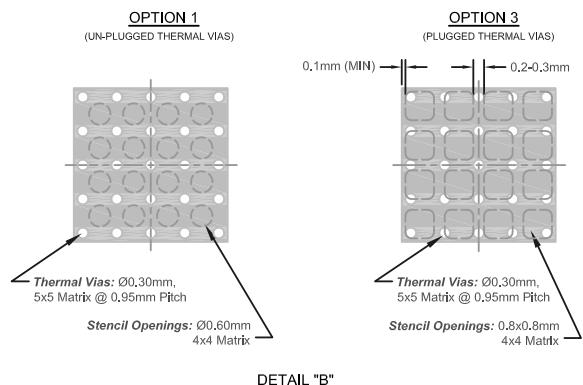


PCB LAND PATTERN

STENCIL



DETAIL "A"

STENCIL OPENING - PERIMETER LANDS

DETAIL "B"

THERMAL VIAS and STENCIL OPENING - CENTER PAD

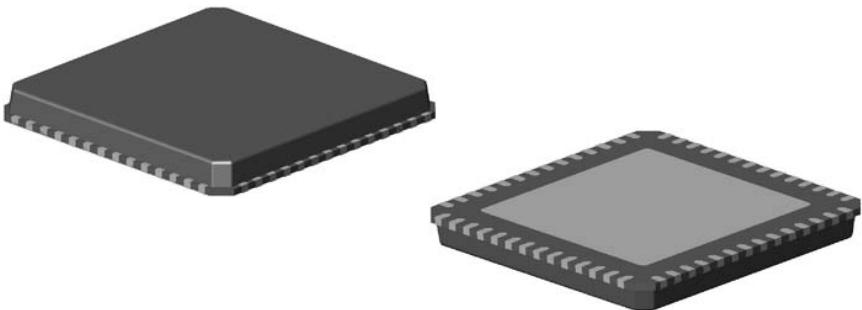
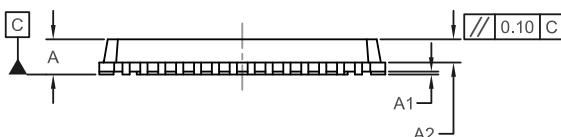
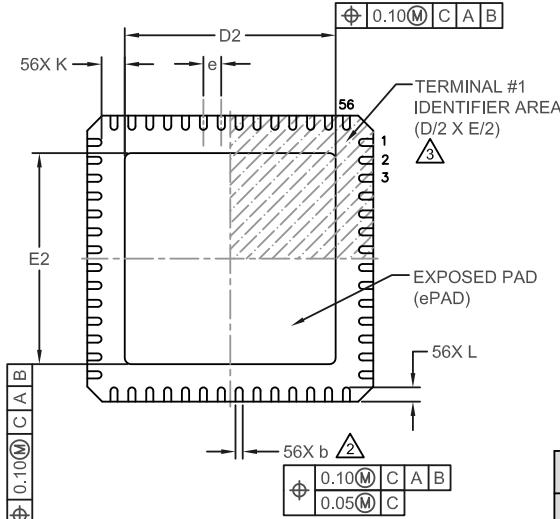
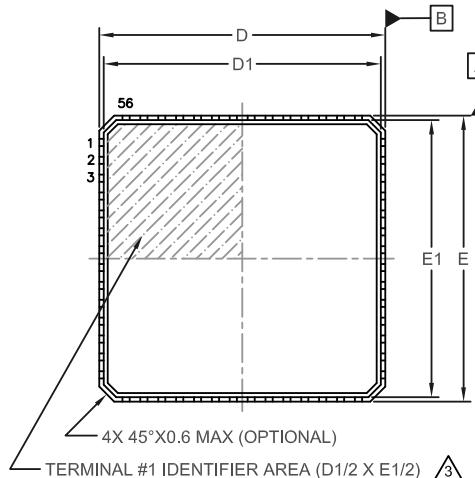
LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	6.93	-	7.05
GDs/GEs	7.00	-	-
D2'/E2'	-	4.30	-
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e	0.50		

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLow PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X,X ±0.1 X,XX ±0.05 X,XXX ±0.025 ANGULAR ±1° INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
	NAME	DATE			
MATERIAL	DRAWN	6/11/08	TITLE	PACKAGE DATA	
FINISH	CHECKED	6/11/08	56 QFN-4304, 8x8mm BODY, 0.5mm PITCH, 4.3x4.3mm ePAD, 0.4mm LEAD LENGTH	Application Notes	
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	6/11/08	DWG #	56QFN-4304-8x8B	REV E
	S.K.Iliev		SCALE	STD COMPLIANCE	SHEET 2 OF 2
			1:1	-	



REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/7/04	S.K.ILIEV
B	REMOVE "PRELIMINARY" NOTE	10/7/04	S.K.ILIEV
C	L(MAX) FROM 0.55 TO 0.50. ADD D2/E2 VAR TABLE	7/2/05	S.K.ILIEV
D	DELETE EMC2700, ADD USB2504A, USB2524 AND EMC2700P IN THE D2/E2 VARIATIONS TABLE	4/13/06	S.K.ILIEV
E	POSITION TOLERANCE IN BOTTOM VIEW, 5904 GEOMETRY SHOWN, AND PAGE 2of2 ADDED	12/15/08	S.K.ILIEV
F	RE-LAYOUT PAGE 2of2 TO SEPARATE LAND PATTERN FROM STENCIL INFORMATION	4/23/09	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.70	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A2	-	-	0.90	-	MOLD CAP THICKNESS
D/E	7.85	8.00	8.15	-	X/Y BODY SIZE
D1/E1	7.55	7.75	7.95	-	X/Y MOLD CAP SIZE
D2/E2	5.80	5.90	6.00	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.55	0.65	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

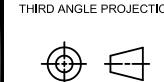
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
X.X ± 0.1
X.XX ± 0.05
XXXX ± 0.025

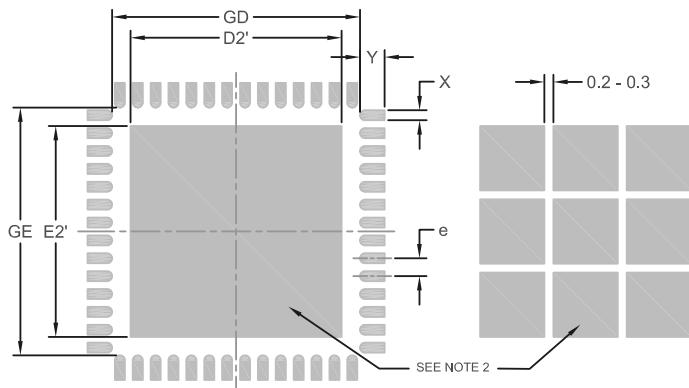
ANGULAR
 $\pm 1^\circ$

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE		PACKAGE DATA	
56 QFN-5904, 8x8mm BODY, 0.5mm PITCH, 5.9x5.9mm ePAD, 0.4mm LEAD LENGTH Package Outline Drawing (POD)			
NAME	DATE	DWG NUMBER	REV
DRAWN	2/06/04	56QFN-5904-8x8B	F
FINISH	CHECKED	SCALE	STD COMPLIANCE
-	2/07/04	1:1	JEDEC: MO-220
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	SHEET	1 OF 2
S.K.ILIEV	2/07/04		

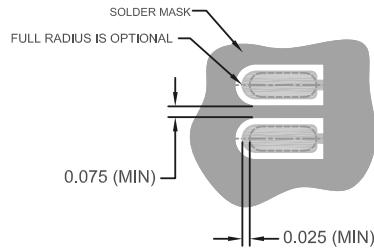


LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	6.93	-	7.05
D2'/E2'	-	5.90	5.90
X	-	0.28	0.28
Y	-	0.69	0.69
e	0.50		

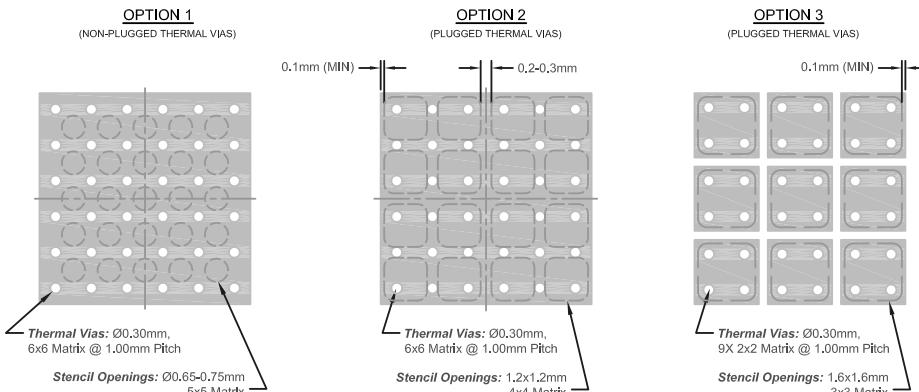
NOTES:

1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

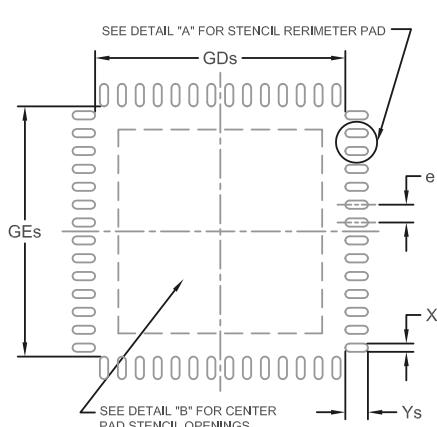
PCB LAND PATTERN



DETAIL "A" - STENCIL OPENING FOR PERIMETER LANDS



DETAIL "B" - THERMAL VIAS and STENCIL OPENING FOR CENTER PAD



REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
F	RE-LAYOUT PAGE 2of2 TO SEPARATE LAND PATTERN FROM STENCIL INFORMATION	4/23/09	S.K.ILIEV

STENCIL DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GDs/GEs	7.00	-	-
Xs	-	0.23	0.25
Ys	-	0.62	0.64
e	0.50		

STENCIL

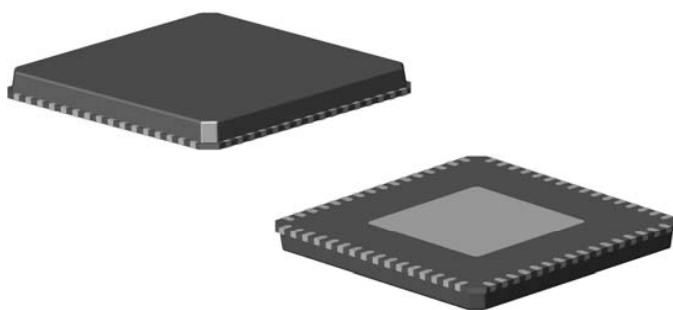
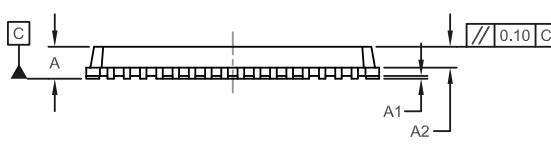
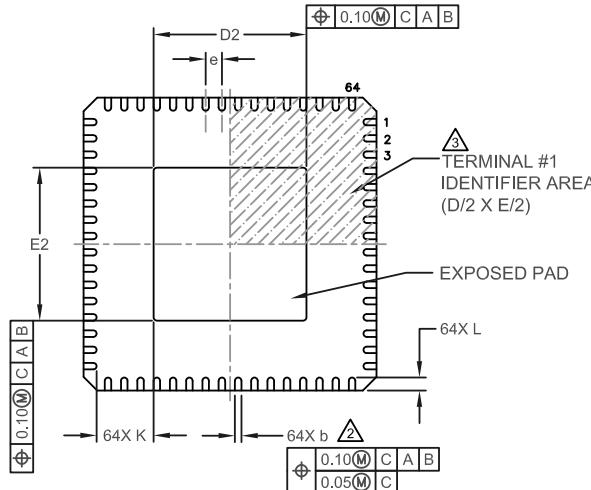
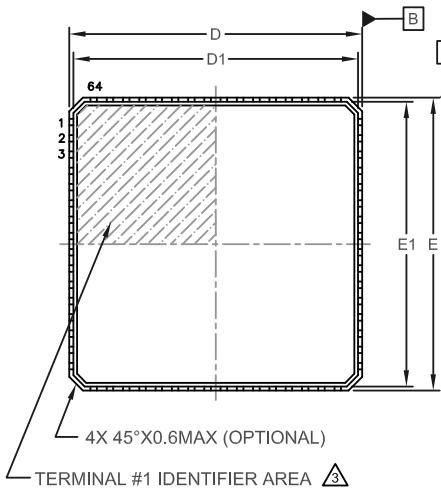
SMT APPLICATION RECOMMENDATIONS

1. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD) SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
2. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
3. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
4. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
5. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
6. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
7. IT IS RECOMMENDED TO USE "NO-CLEAN", "NO-VOIDS" TYPE 3 SOLDER PASTE.
8. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENT THERMAL MAS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ± 0.1 X.XX ± 0.05 XXXX ± 0.025	THIRD ANGLE PROJECTION
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	
MATERIAL	NAME DATE DRAWN 12/11/08
FINISH	CHECKED 12/11/08
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED DWG # S.K.ILIEV 56QFN-5904-8x8B REV F
STD COMPLIANCE	SCALE 1:1
	2 OF 2

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE (DWG IS PRELIMINARY)	3/7/08	S.K.ILIEV
A1	D2/E2 FROM 4.90 ± 0.10 TO 4.70 ± 0.10 (DWG IS PRELIMINARY)	3/31/08	S.K.ILIEV
B	INITIAL PRODUCTION RELEASE	11/5/08	S.K.ILIEV
C	ADDED PAGE 2 OF 2, UPDATED APP NOTES.	2/3/09	S.K.ILIEV



COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A2	-	0.65	0.80	-	MOLD CAP THICKNESS
D/E	8.90	9.00	9.10	-	X/Y BODY SIZE
D1/E1	8.65	8.75	8.85	-	X/Y MOLD CAP SIZE
D2/E2	4.60	4.70	4.80	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	1.55	-	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC		-	-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER AREA ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL ANGULAR
XX ± 0.1 $\pm 1^\circ$
XXX ± 0.05
XXXX ± 0.025
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

NAME DATE
DRAWN 3/7/08

MATERIAL DRAWN
FINISH CHECKED
PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

APPROVED
S.K.ILIEV

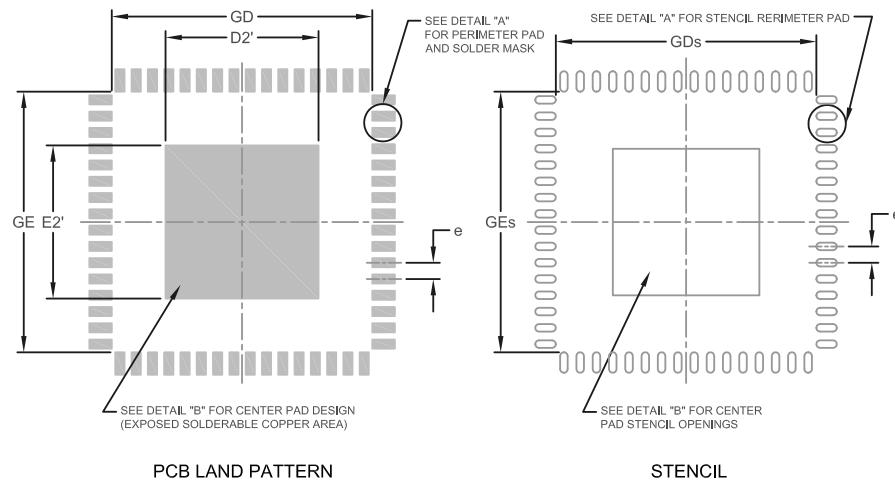
Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE PACKAGE DATA
64 PINS QFN-4704, 9x9mm BODY, 0.5mm PITCH,
4.7x4.7mm EXPOSED PAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

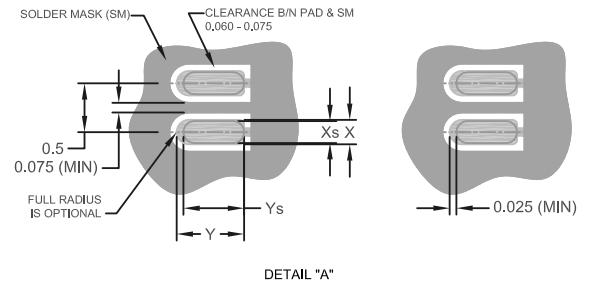
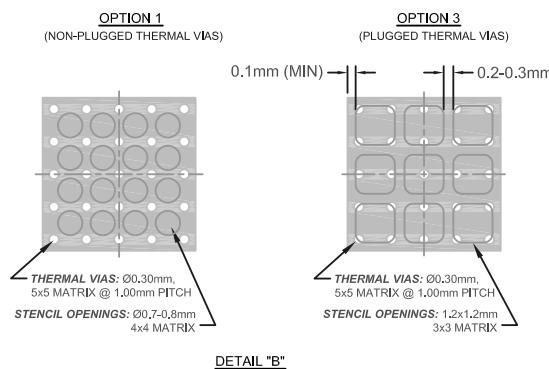
DWG NUMBER	64QFN-4704-9x9B	REV	C
STD COMPLIANCE	MO-220	SHEET	1 OF 2
SCALE	1:1		

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
C	ADDED PAGE 2 of 2, UPDATED APP NOTES.	2/3/09	S.K.Iliev



LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	8.00	-	8.10
GDs/GEs	8.05	-	-
D2'/E2'	-	4.70	-
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e	0.50		

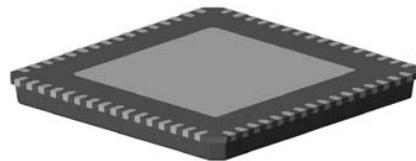
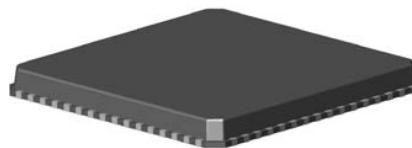
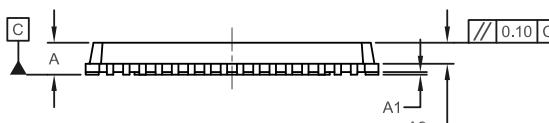
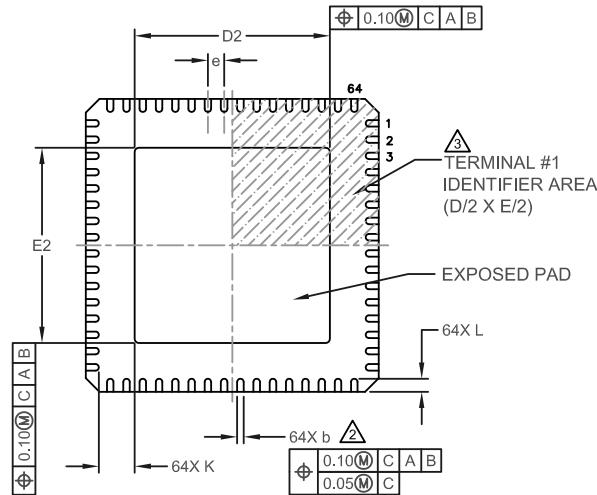
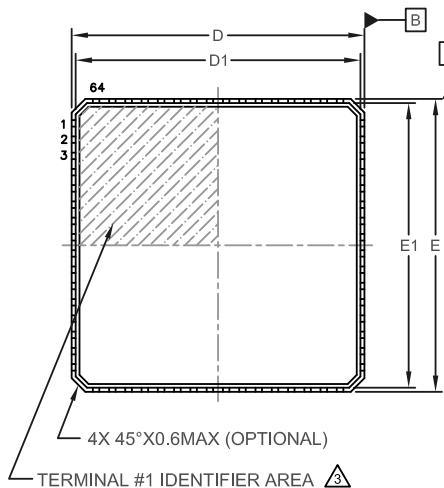
SMT APPLICATION NOTES (QFN)STENCIL OPENING - PERIMETER LANDSTHERMAL VIAS and STENCIL OPENING - CENTER PAD

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX: ±0.1 XXX: ±0.05 XXXX: ±0.025 INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
		TITLE		
		PACKAGE DATA		
		64 PINS QFN-4704, 9x9mm BODY, 0.5mm PITCH, 4.7x4.7mm EXPOSED PAD, 0.4mm LEAD LENGTH Application Notes		
MATERIAL	DRAWN	NAME	DATE	
FINISH	CHECKED	-	2/1/09	REV
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	2/3/09	1:1	SHEET
	S.K.Iliev		STD COMPLIANCE	2 OF 2
			MO-220	

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	1/21/09	S.K.IILIEV
B	ADDED PAGE 2-of-2. UPDATED APP NOTES.	2/3/09	S.K.IILIEV



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A2	-	0.65	0.80	-	MOLD CAP THICKNESS
D/E	8.90	9.00	9.10	-	X/Y BODY SIZE
D1/E1	8.65	8.75	8.85	-	X/Y MOLD CAP SIZE
D2/E2	5.90	6.00	6.10	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.90	-	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC		-	TERMINAL PITCH	

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER AREA ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL ANGULAR
XX ±0.1 ±1°
XXX ±0.05
XXXX ±0.025
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION
 NAME DATE
DRAWN - 12/19/08

FINISH
- CHECKED - 1/20/09
PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

APPROVED
S.K.IILIEV 1/21/09

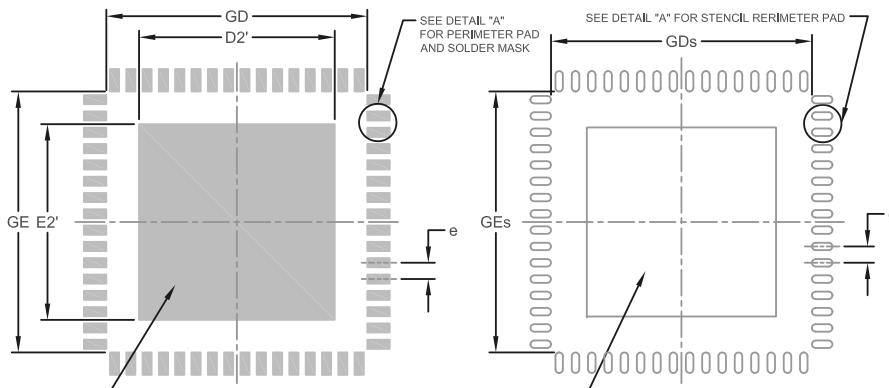
Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE PACKAGE DATA
64 PINS QFN-6004, 9x9mm BODY, 0.5mm PITCH,
6.0x6.0mm EXPOSED PAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

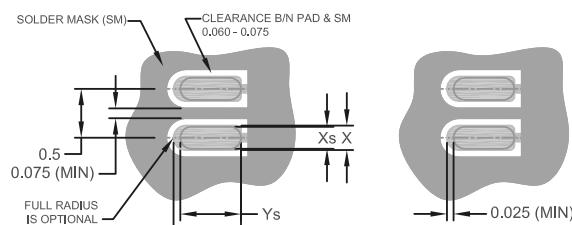
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SHEET 1 OF 2

SCALE 1:1 STD COMPLIANCE MO-220

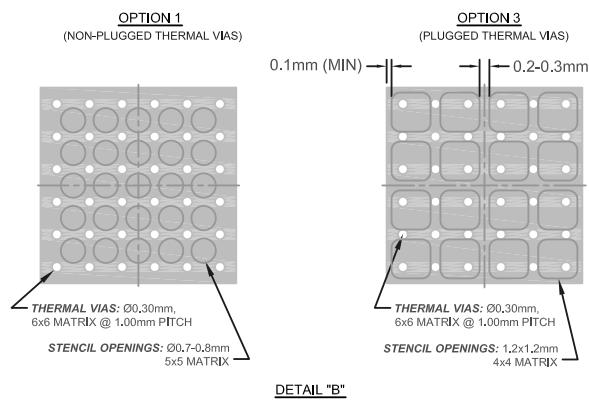
REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
B	ADDED PAGE 2-of-2. UPDATED APP NOTES.	2/3/09	S.K.ILIEV



LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	8.00	-	8.10
GDs/GEs	8.05	-	-
D2'/E2'	-	6.00	-
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e		0.50	



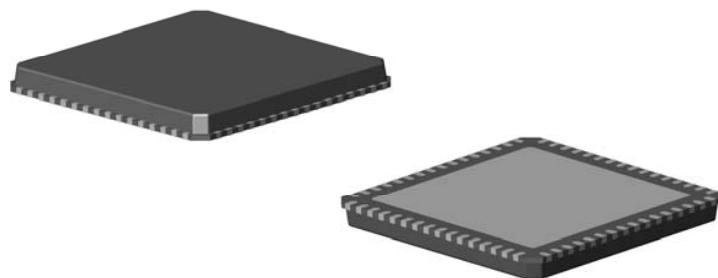
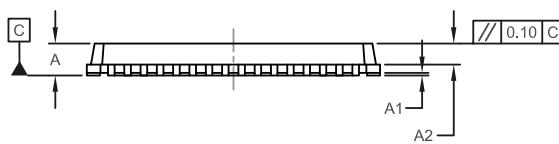
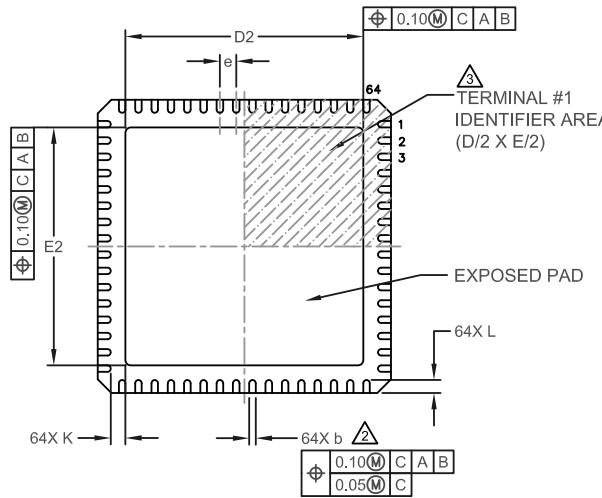
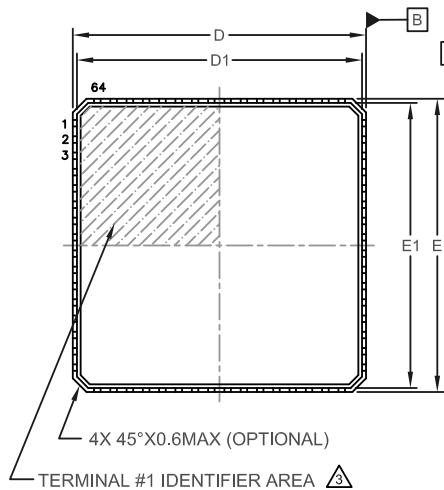
STENCIL OPENING - PERIMETER LANDS



1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ±0.1 XXX ±0.05 XXXX ±0.025	THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994		TITLE PACKAGE DATA 64 PINS QFN-6004, 9x9mm BODY, 0.5mm PITCH, 6.0x6.0mm EXPOSED PAD, 0.4mm LEAD LENGTH Application Notes		
MATERIAL	NAME	DATE		
-	-	2/1/09		
FINISH	CHECKED	2/1/09	DWG NUMBER	REV
-	-	2/1/09	64QFN-6004-9x9B	B
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	2/3/09	SCALE	STD COMPLIANCE
	S.K.ILIEV		1:1	MO-220
				2 OF 2

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	9/18/08	S.K.Iliev
B	INITIAL PRODUCTION RELEASE	11/19/08	S.K.Iliev
C	ADDED PAGE 2 of 2. UPDATED APP NOTES	2/3/09	S.K.Iliev



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A2	-	0.65	0.80	-	MOLD CAP THICKNESS
D/E	8.90	9.00	9.10	-	X/Y BODY SIZE
D1/E1	8.65	8.75	8.85	-	X/Y MOLD CAP SIZE
D2/E2	7.20	7.30	7.40	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.35	-	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC		-	TERMINAL PITCH	

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

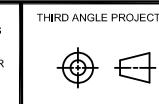
DECIMAL ANGULAR
X.X ± 0.1 $\pm 1^\circ$
X.XX ± 0.05
X.XXX ± 0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

MATERIAL -

FINISH -

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

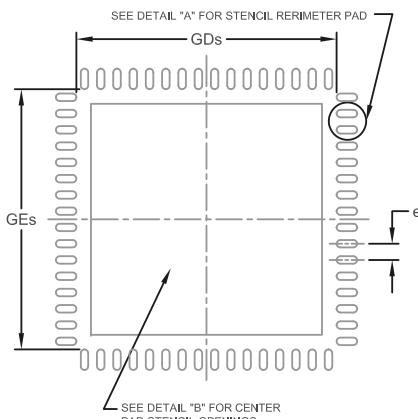
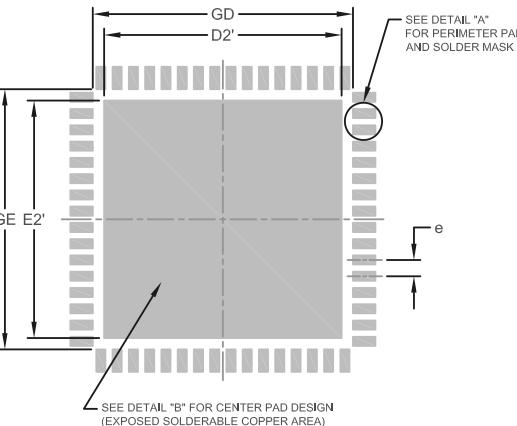


Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

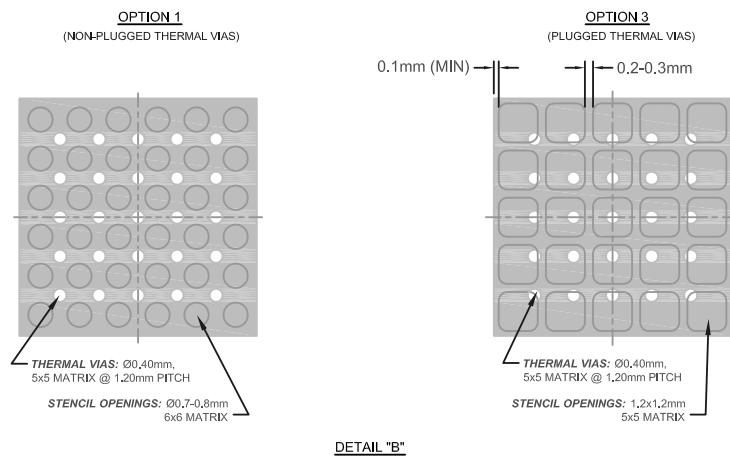
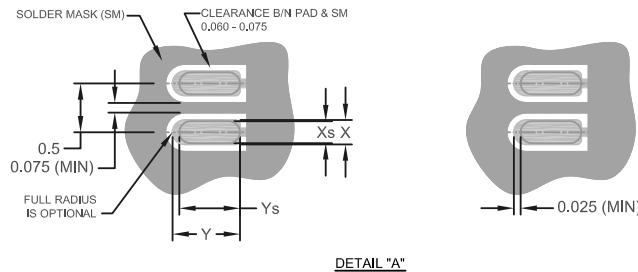
TITLE PACKAGE DATA
64 PINS QFN-7304, 9x9mm BODY, 0.5mm PITCH,
7.3x7.3mm EXPOSED PAD, 0.40mm LEAD LENGTH
Package Outline Drawing (POD)

DWG NUMBER 64QFN-7304-9x9B REV
C

SCALE 1:1 STD COMPLIANCE
MO-220 SHEET
1 OF 2



LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	8.00	-	8.10
GDs/GEs	8.05	-	-
D2'/E2'	-	7.30	7.30
Pad: X	-	0.28	0.28
Stencil: Xs	-	0.23	0.25
Pad: Y	-	0.69	0.69
Stencil: Ys	-	0.62	0.64
e	0.50		

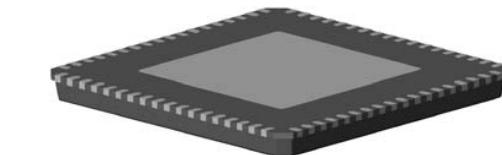
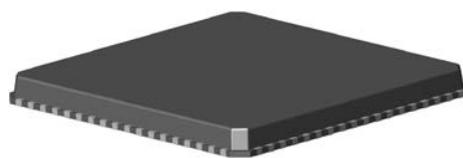
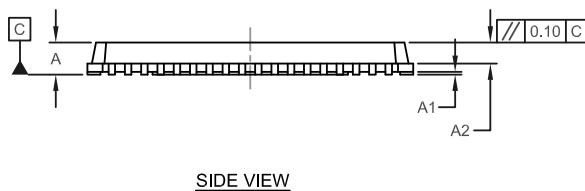
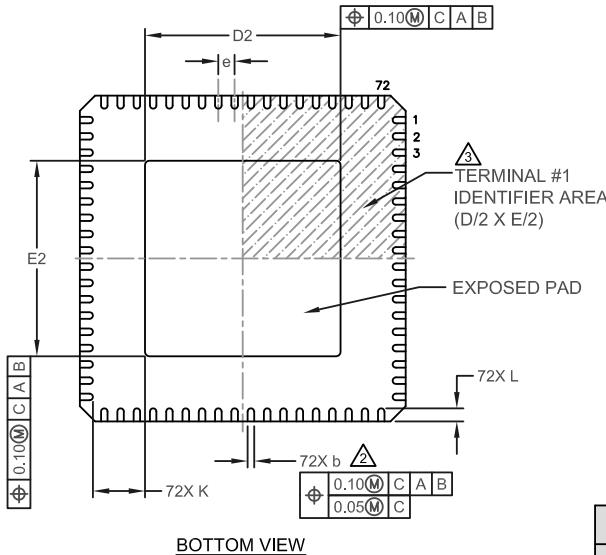
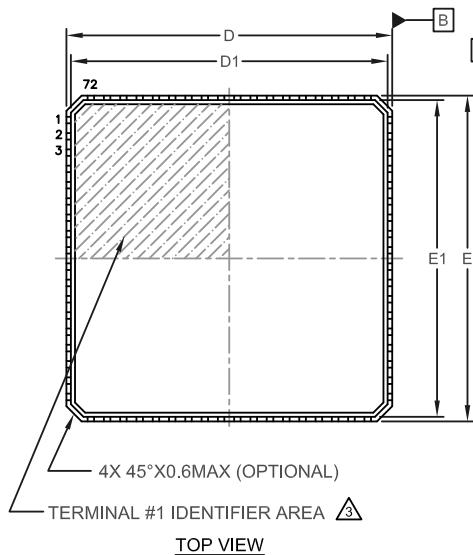


1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 (MIN) RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025 INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION 	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
		TITLE PACKAGE DATA 64 PINS QFN-7304, 9x9mm BODY, 0.5mm PITCH, 7.3x7.3mm EXPOSED PAD, 0.4mm LEAD LENGTH Application Notes		
MATERIAL	DRAWN	NAME	DATE	
FINISH	CHECKED	-	2/1/09	REV C
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.Iliev	SCALE 1:1	STD COMPLIANCE MO-220	SHEET 2 OF 2

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE (DWG IS PRELIMINARY)	4/14/08	S.K.ILIEV
B	INITIAL PRODUCTION RELEASE	2/2/09	S.K.ILIEV
C	RE-LAYOUT PAGE 2 of 2 TO SEPARATE LAND PATTERN FROM STENCIL INFORMATION	6/10/09	S.K.ILIEV



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A2	-	0.65	0.80	-	MOLD CAP THICKNESS
D/E	9.90	10.00	10.10	-	X/Y BODY SIZE
D1/E1	9.65	9.75	9.85	-	X/Y MOLD CAP SIZE
D2/E2	5.90	6.00	6.10	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	1.50	1.60	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC		-	-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL X.X	±0.1	ANGULAR ±1°
X.XX	±0.05	
X.XXX	±0.025	

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE
72 PINS QFN-6004, 10x10mm BODY, 0.5mm PITCH,
6.0x6.0mm EXPOSED PAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

NAME	DATE	REV
DRAWN	3/7/08	
CHECKED	3/7/08	
APPROVED S.K.ILIEV	4/14/08	C

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

SCALE 1:1	STD COMPLIANCE MO-220	SHEET 1 OF 2
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REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
C	RE-LAYOUT PAGE 2 of 2 TO SEPARATE LAND PATTERN FROM STENCIL INFORMATION	6/10/09	S.K.Iliev

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	9.00	-	9.10
D2'/E2'	-	6.00	-
X	-	0.28	0.28
Y	-	0.69	-
e		0.50	

NOTES:

1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

PCB LAND PATTERN

DETAIL "A" - STENCIL OPENING for PERIMETER LANDS

OPTION 1 (NON-PLUGGED THERMAL VIAS)

OPTION 2 (PLUGGED THERMAL VIAS)

OPTION 3 (PLUGGED THERMAL VIAS)

DETAIL "B" - THERMAL VIAS and STENCIL OPENING for CENTER PAD

SEE DETAIL "A" FOR STENCIL RERIMETER PAD

STENCIL

SYMBOL	MIN	NOM	MAX
GDs/GEs	9.05	-	-
Xs	-	0.23	0.25
Ys	-	0.62	0.64
e		0.50	

SMT APPLICATION NOTES

1. THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.
2. THE LAND PATTERN CORRESPONDING TO THE PACKAGE EXPOSED PAD (IN THE CENTER) CAN BE LARGER, AND WITH DIFFERENT SHAPE THAN THE EXPOSED PAD ON THE PACKAGE. HOWEVER, THE SOLDERABLE AREA, AS DEFINED BY THE SOLDER MASK (SMD), OR NON-SOLDER MASK DEFINED (NSMD), SHOULD BE AS SHOWN FOR THE BEST THERMAL & ELECTRICAL PERFORMANCE.
3. MAXIMUM THERMAL AND ELECTRICAL PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN. (See Options 1 & 2)
4. THE VIAS SHOULD BE AT 0.8 to 1.2MM PITCH WITH 0.30 TO 0.40MM DIAMETER, AND 1 OZ COPPER VIA BARREL PLATING.
5. NON SOLDER MASK DEFINED (NSMD) PAD DESIGN IS RECOMMENDED FOR PERIMETER LANDS.
6. A LASER-CUT STAINLESS STEEL STENCIL IS RECOMMENDED WITH ELECTRO POLISHED TRAPEZOIDAL WALLS. THE RECOMMENDED STENCIL THICKNESS IS 0.125 mm FOR PITCHES 0.4 and 0.5 mm.
7. RECOMMENDED STENCIL AREA & ASPECT RATIOS ARE 0.66 & 1.5 RESPECTIVELY.
8. RECOMMENDED STENCIL APERTURES ARE AS SHOWN.
9. IT IS RECOMMENDED TO USE "NO-CLEAN", TYPE 3 SOLDER PASTE.
10. THE REFLOW PROFILE DEPENDS ON THE EXACT SOLDER PASTE USED AND THE GIVEN BOARD DETAILS, SUCH AS GEOMETRY, COMPONENTS ETC.

**UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL
X-X ±0.1
X-XX ±0.05
X-XXX ±0.025**

**INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994**

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at <http://www.microchip.com/packaging>

TITLE PACKAGE DATA
72 PINS QFN-6004, 10x10mm BODY, 0.5mm PITCH,
6.0x6.0mm EXPOSED PAD, 0.4mm LEAD LENGTH
Application Notes

MATERIAL - DRAWN - 3/7/08

FINISH - CHECKED - 3/7/08

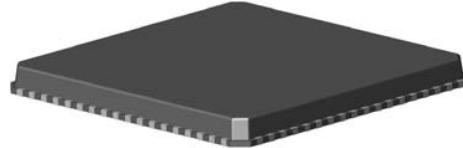
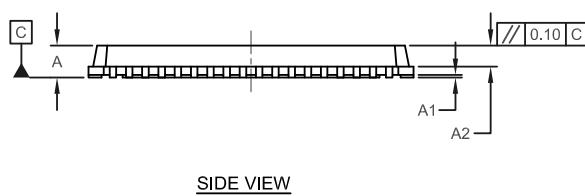
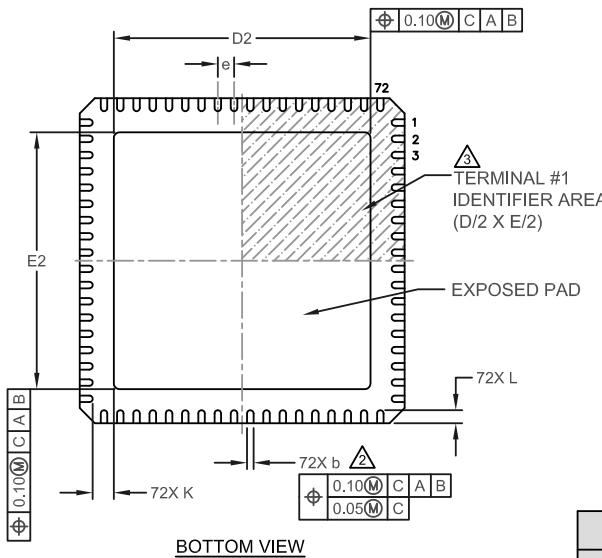
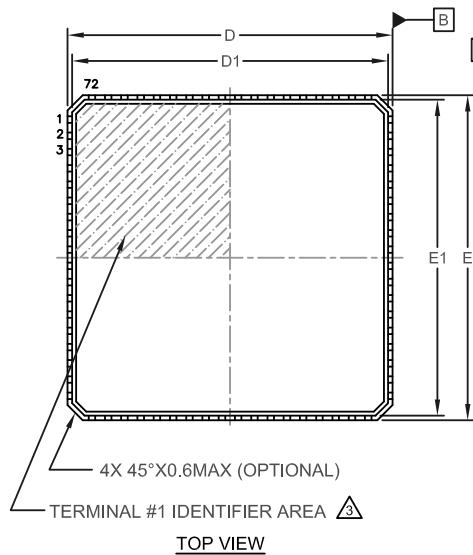
**PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING** APPROVED S.K.Iliev 4/14/08

SCALE 1:1 **STD COMPLIANCE** MO-220 **REV** C

SHEET 2 OF 2

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	5/29/12	SKI



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A2	-	0.65	0.80	-	MOLD CAP THICKNESS
D/E	9.90	10.00	10.10	-	X/Y BODY SIZE
D1/E1	9.65	9.75	9.85	-	X/Y MOLD CAP SIZE
D2/E2	7.80	7.90	8.00	-	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.55	0.65	-	-	CENTER PAD TO PIN CLEARANCE
e	0.50 BSC		-	TERMINAL PITCH	

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL ANGULAR
XX ± 0.1 $\pm 1^\circ$
XXX ± 0.05
XXXX ± 0.025
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

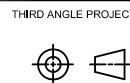
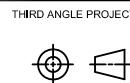
MATERIAL - DRAWN - 4/7/12

FINISH - CHECKED - 5/7/12

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

APPROVED
S.K.Iliev

5/29/12



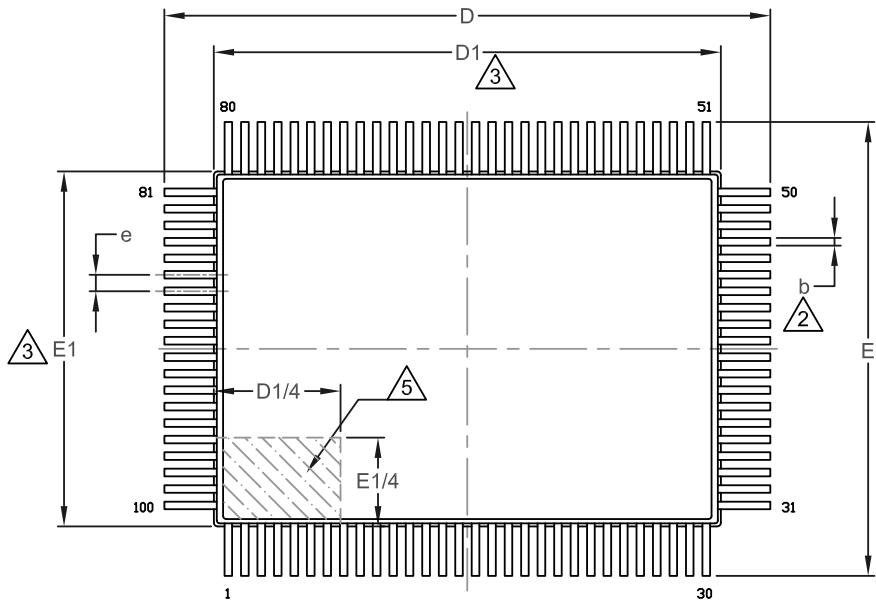
Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE PACKAGE DATA
72 PINS QFN-7904, 10x10mm BODY, 0.5mm PITCH,
7.9x7.9mm EXPOSED PAD, 0.4mm LEAD LENGTH
Package Outline Drawing (POD)

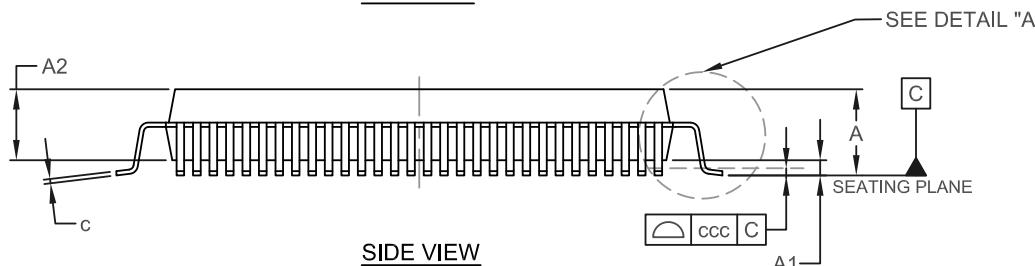
DWG NUMBER	AP-72QFN-7904-10x10B	REV	A
STD COMPLIANCE	MO-220	SHEET	1 OF 1
SCALE	1:1		

NOTES

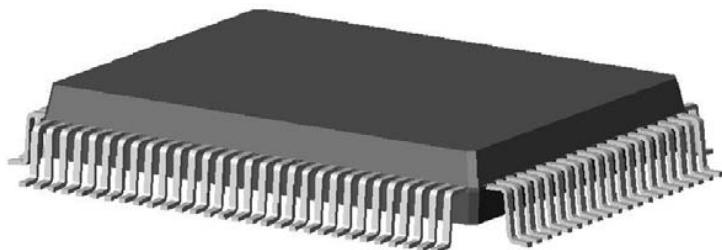
REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
SEE SPEC FRONT PAGE FOR REVISION HISTORY			



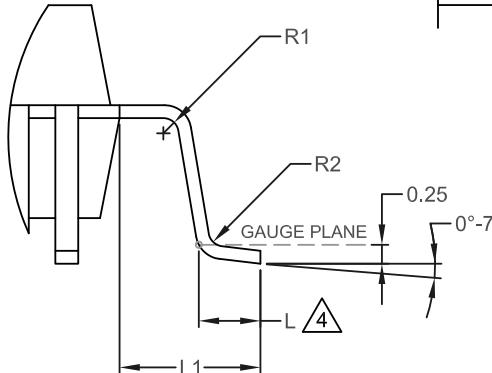
TOP VIEW



SIDE VIEW



3-D VIEW



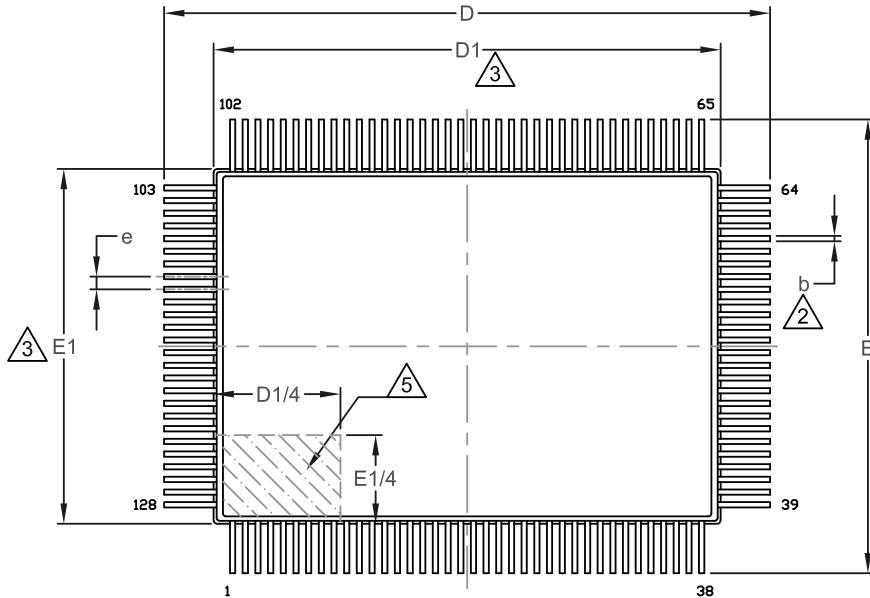
DETAIL "A" (SCALE: 3/1)

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	3.40	-	OVERALL PACKAGE HEIGHT
A1	0.05	-	0.50	-	STANDOFF
A2	2.55	-	3.05	-	BODY THICKNESS
D	23.65	-	24.15	-	"X" SPAN
D1	19.90	20.00	20.10	3	"X" BODY SIZE
E	17.65	-	18.15	-	"Y" SPAN
E1	13.90	14.00	14.10	3	"Y" BODY SIZE
L	0.73	0.88	1.03	4	LEAD FOOT LENGTH
L1	1.95 REF			-	LEAD LENGTH
b	0.20	-	0.40	2	LEAD WIDTH
c	0.11	-	0.23	-	LEAD FOOT THICKNESS
e	0.65 BSC			-	LEAD PITCH
R1	0.10	-	0.25	-	LEAD SHOULDER RADIUS
R2	0.15	-	0.40	-	LEAD FOOT RADIUS
ccc	-	-	0.10	-	COPLANARITY

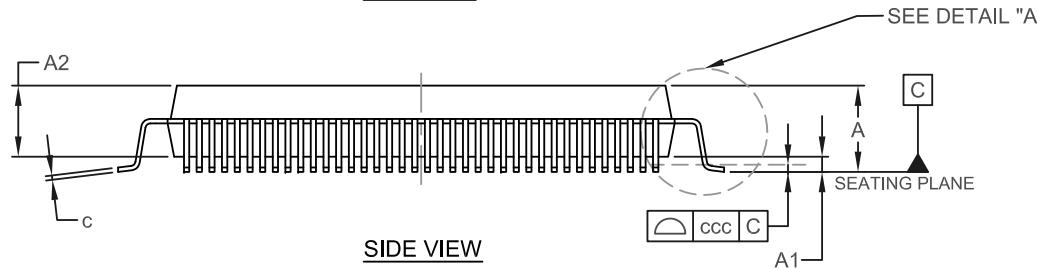
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ±0.1 XXX ±0.05 XXXX ±0.025		THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging	
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994		NAME		TITLE	
MATERIAL	-	DRAWN S.K.ILIEV	11/30/04	PACKAGE OUTLINE	
FINISH	-	CHECKED S.K.ILIEV	11/30/04	DWG NUMBER MO-100 QFP-14x20-3.9FP	REV C
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		APPROVED S.K.ILIEV	11/30/04	SCALE 1:1	STD COMPLIANCE JEDEC: MO-112 (B)
				SHEET	-

NOTES:

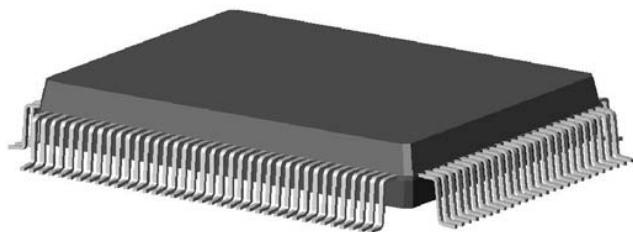
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TOLERANCE OF THE TRUE POSITION OF THE LEADS IS $\pm 0.065\text{mm}$ MAXIMUM.
3. PACKAGE BODY DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM MOLD PROTRUSION IS 0.25 mm.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.



TOP VIEW



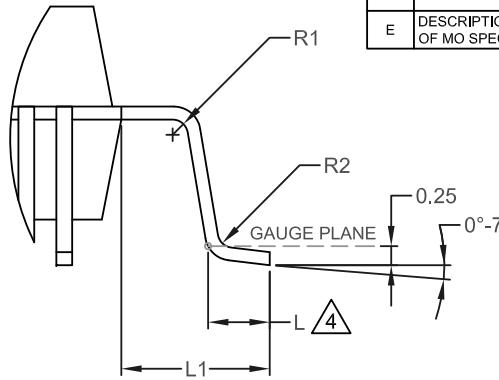
SIDE VIEW



3-D VIEW

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETER.
- TOLERANCE OF THE TRUE POSITION OF THE LEADS IS ± 0.04 mm MAXIMUM.
- PACKAGE BODY DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM MOLD PROTRUSION IS 0.25 mm.
- DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
- DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.



DETAIL "A" (SCALE: 3/1)

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
E	DESCRIPTION OF CHANGES - IN FRONT PAGE OF MO SPEC	12/13/04	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	3.40	-	OVERALL PACKAGE HEIGHT
A1	0.05	-	0.50	-	STANOFF
A2	2.55	-	3.05	-	BODY THICKNESS
D	23.70	23.90	24.10	-	"X" SPAN
D1	19.90	20.00	20.10	3	"X" BODY SIZE
E	17.70	17.90	18.10	-	"Y" SPAN
E1	13.90	14.00	14.10	3	"Y" BODY SIZE
L	0.73	0.88	1.03	4	LEAD FOOT LENGTH
L1	1.95 REF			-	LEAD LENGTH
b	0.10	-	0.30	2	LEAD WIDTH
c	0.09	-	0.20	-	LEAD FOOT THICKNESS
e	0.50 BSC			-	LEAD PITCH
R1	0.13	-	-	-	LEAD SHOULDER RADIUS
R2	0.13	-	0.30	-	LEAD FOOT RADIUS
ccc	-	-	0.08	-	COPLANARITY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL
XX. XX ±0.1
XXX. XXX ±0.05
XXXX. XXXX ±0.025

ANGULAR
±1°
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE

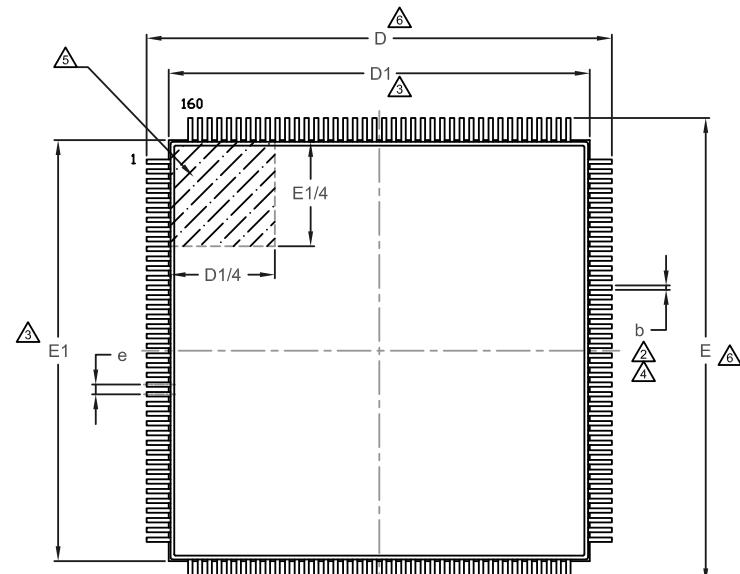
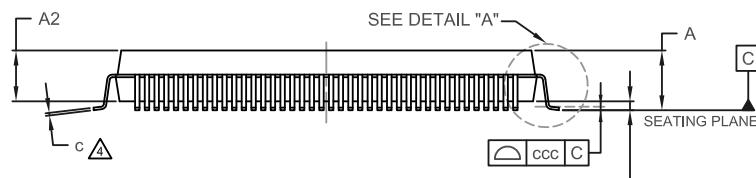
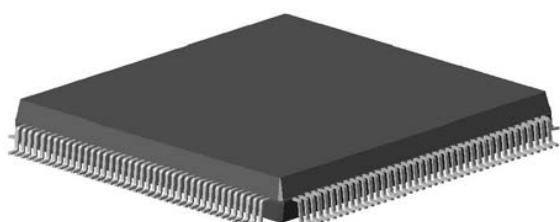
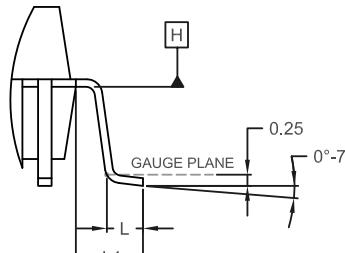
PACKAGE OUTLINE

128 QFP-14x20x2.7mm BODY, 3.9mm FOOTPRINT

MATERIAL	DRAWN N/A	NAME S.K.ILIEV	DATE 11/30/04	DWG NUMBER MO-128 QFP-14x20-3.9FP		REV E	
FINISH	CHECKED N/A	S.K.ILIEV	11/30/04	DWG NUMBER MO-128 QFP-14x20-3.9FP		REV E	
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING				APPROVED S.K.ILIEV	SCALE 1:1	STD COMPLIANCE JEDEC: MO-112 / MS-029	SHEET 1 OF 1

REVISION HISTORY

REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/17/05	S.K.ILIEV

TOP VIEWSIDE VIEW3-D VIEWDETAIL "A"

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	4.10	-	OVERALL PACKAGE HEIGHT
A1	0.05	-	0.50	-	STANOFF
A2	3.20	3.40	3.60	-	BODY THICKNESS
D/E	30.95	-	31.45	6	"X"/"Y" SPAN
D1/E1	27.80	28.00	28.20	3	"X"/"Y" BODY SIZE
L	0.73	0.88	1.03	-	LEAD FOOT LENGTH
L1	1.60 REF			-	LEAD LENGTH
b	0.22	-	0.40	2,4	LEAD WIDTH
c	0.11	-	0.23	4	LEAD FOOT THICKNESS
e	0.65 BSC			-	LEAD PITCH
ccc	-	-	0.10	-	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS $\pm 0.065\text{mm}$ AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE. "D1" AND "E1" DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE "H".
4. DIMENSIONS "b" AND "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 mm AND 0.25 mm FROM THE LEAD TIP.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.
6. DIMENSIONS "D" AND "E" TO BE DETERMINED AT SEATING PLANE "C".

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL ANGULAR
X.X ± 0.1 $\pm 1^\circ$
X.XX ± 0.05
X.XXX ± 0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

NAME DATE
S.K.ILIEV 2/17/05

NAME DATE
S.K.ILIEV 2/17/05

NAME DATE
S.K.ILIEV 2/17/05

THIRD ANGLE PROJECTION



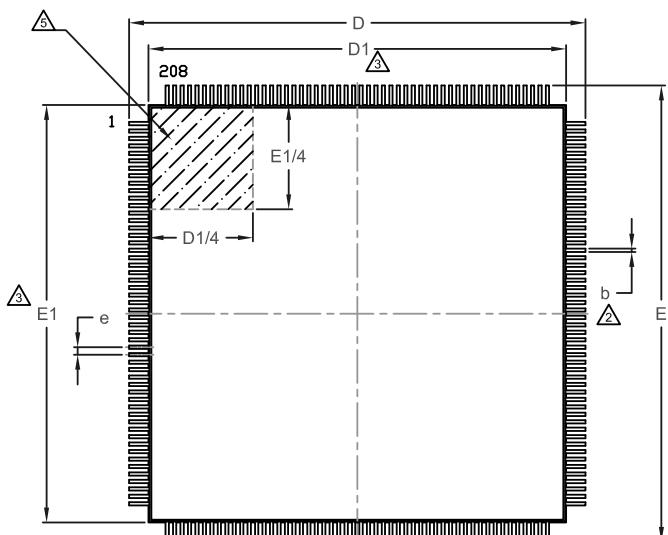
Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE
PACKAGE OUTLINE
160 QFP, 28x28x3.4 MM BODY, 0.65 MM PITCH

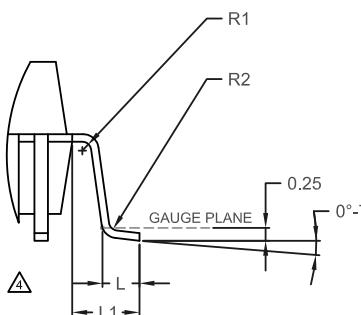
DWG NUMBER
MO-160-QFP-28x28B-0.65P

REV
A
SCALE STD COMPLIANCE
1:1 JEDEC: MS-022 / B
SHEET
1 OF 1

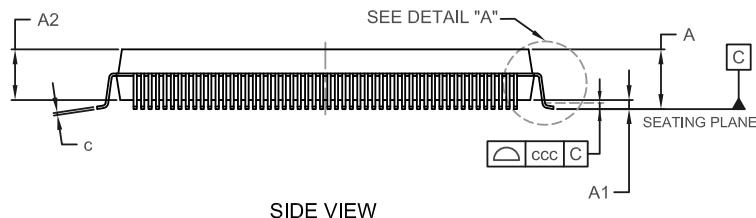
REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-



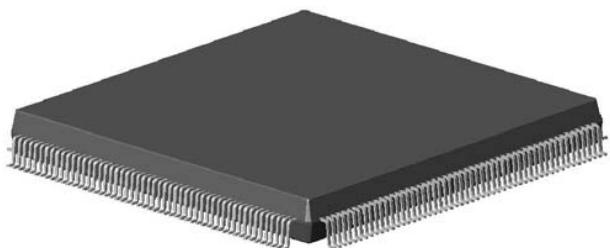
TOP VIEW



DETAIL "A"



SIDE VIEW



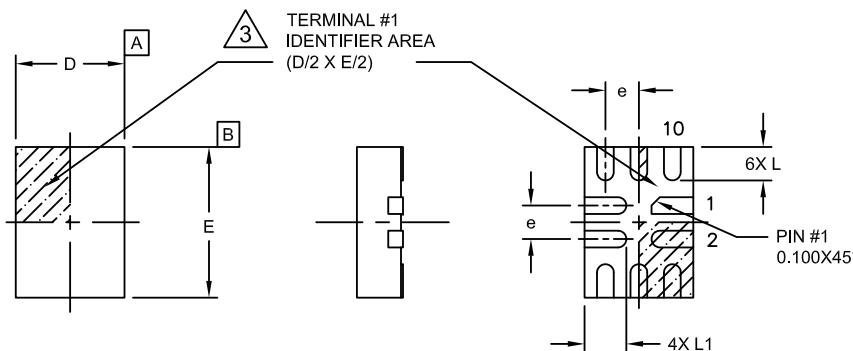
3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	4.07	-	OVERALL PACKAGE HEIGHT
A1	0.05	-	0.50	-	STANOFF
A2	3.17	-	3.67	-	BODY THICKNESS
D/E	30.35	-	30.85	-	"X"/"Y" SPAN
D1/E1	27.90	28.00	28.10	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.30 REF			-	LEAD LENGTH
b	0.10	-	0.30	2	LEAD WIDTH
c	0.09	-	0.20		LEAD FOOT THICKNESS
e	0.50 BSC			-	LEAD PITCH
R1	0.08	-	-		LEAD SHOULDER RADIUS
R2	0.08	-	0.25		LEAD FOOT RADIUS
ccc	-	-	0.08	-	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS $\pm 0.04\text{mm}$ MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

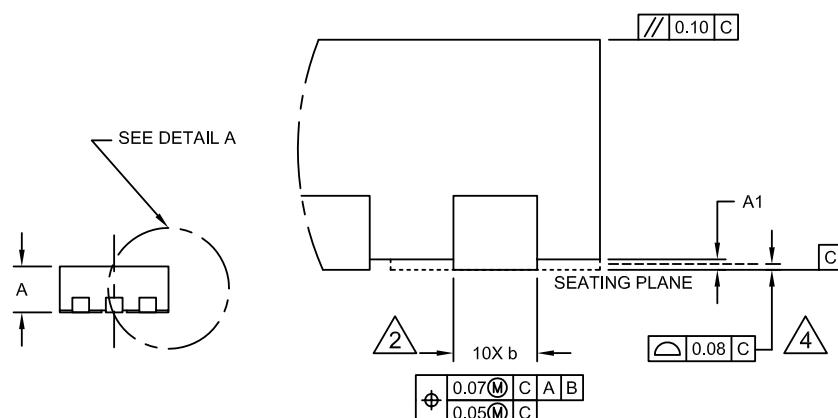
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ±0.1 X.XX ±0.05 X.XXX ±0.025		THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging	
INTERPRET DIM AND TOL PER ASME Y14.5M -1994					
MATERIAL	-	DRAWN	NAME	DATE	TITLE
FINISH	-	CHECKED	S.K.ILIEV	12/20/04	PACKAGE OUTLINE
		APPROVED	S.K.ILIEV	12/20/04	DWG NUMBER MO-208-QFP-28x28x3.4
				SCALE 1:1	REV C STD COMPLIANCE JEDEC: MS-029 / A SHEET 1 OF 1
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING					



TOP VIEW

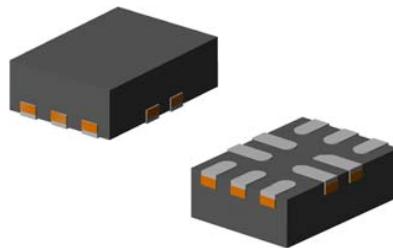
SIDE VIEW 1

BOTTOM VIEW



SIDE VIEW 2

DETAIL A



3-D VIEWS

REVISION HISTORY

REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	12/17/10	SKI
B	PRODUCTION RELEASE	4/19/2011	SKI

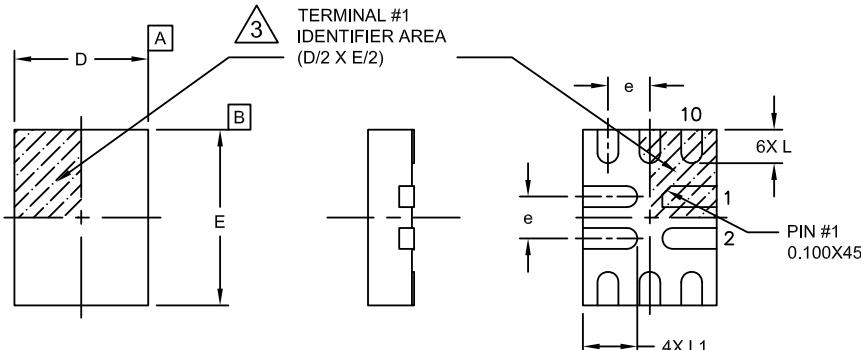
COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.50	0.55	0.60	-	OVERALL PACKAGE HEIGHT
A1	0.00	0.02	0.05	-	STANDOFF
D	1.20	1.30	1.40	-	X BODY SIZE
E	1.70	1.80	1.90	-	Y BODY SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH (SHORT SIDE)
L1	0.45	0.50	0.55	-	TERMINAL LENGTH (LONG SIDE)
b	0.15	0.20	0.25	2	TERMINAL WIDTH
e	0.40 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. IT CAN BE EITHER A MOLD OR MARKED FEATURE.
4. UNILATERAL COPLANARITY ZONE APPLIES TO ALL TERMINALS.

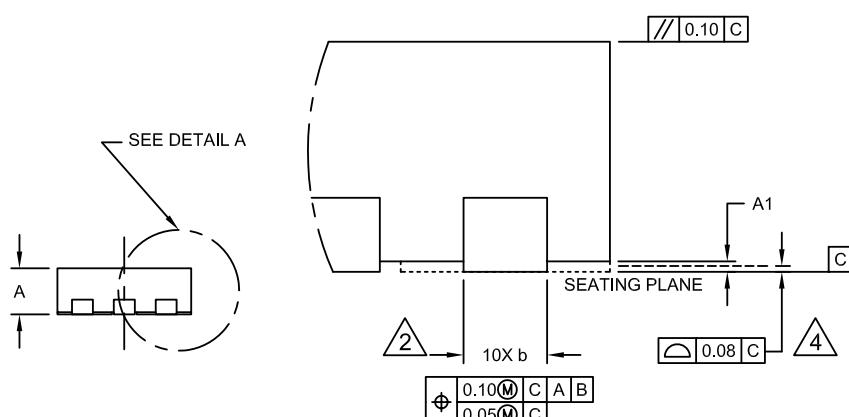
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ±0.1 XXX ±0.05 XXXX ±0.025 INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
	NAME	DATE			
MATERIAL	DRAWN	12/17/10	TITLE	PACKAGE OUTLINE	
FINISH	CHECKED	4/15/11	10 PINS S18QLeX, 1.8x1.3mm BODY, 0.40mm PITCH (CHIP-ON-LEAD, SAW QFN)		
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.Iliev	SCALE	1:1	STD COMPLIANCE
		4/19/11		MO-248	SHEET
					1 OF 1



TOP VIEW

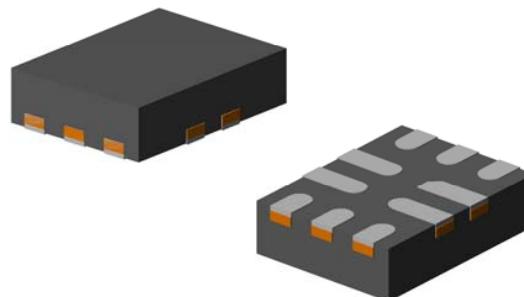
SIDE VIEW 1

BOTTOM VIEW



SIDE VIEW 2

DETAIL A



3-D VIEWS

TERMINAL #1 IDENTIFIER AREA (D/2 X E/2)		3

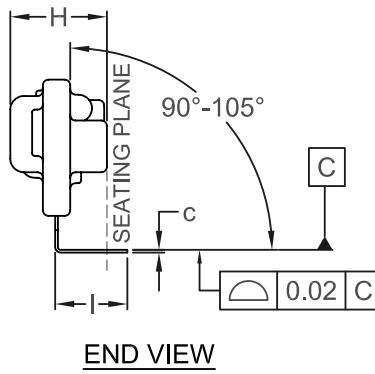
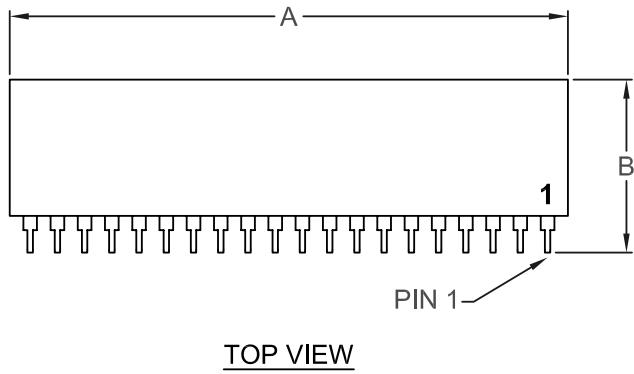
REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	12/17/10	SKI
B	PRODUCTION RELEASE	4/19/2011	SKI

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.50	0.55	0.60	-	OVERALL PACKAGE HEIGHT
A1	0.00	0.02	0.05	-	STANDOFF
D	1.50	1.60	1.70	-	X BODY SIZE
E	2.00	2.10	2.20	-	Y BODY SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH (SHORT SIDE)
L1	0.60	0.65	0.70	-	TERMINAL LENGTH (LONG SIDE)
b	0.20	0.25	0.30	2	TERMINAL WIDTH
e	0.50 BSC		-		TERMINAL PITCH

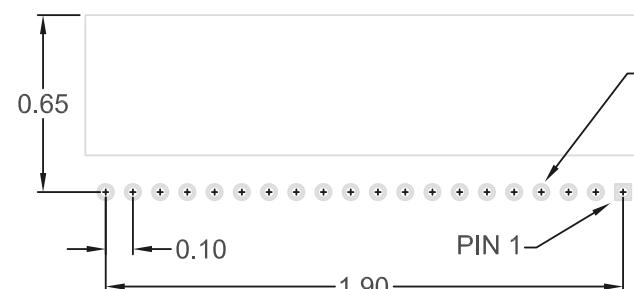
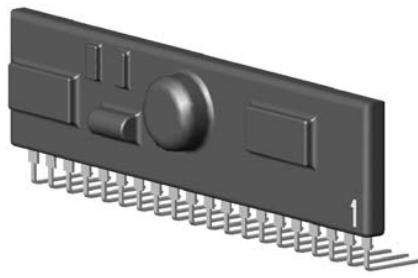
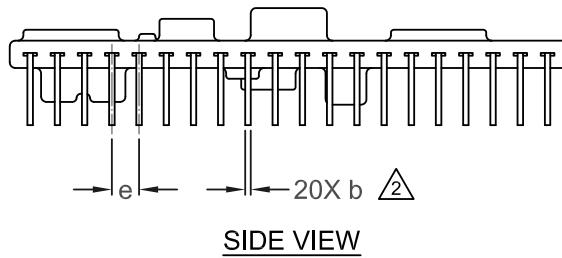
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED. IT CAN BE EITHER A MOLD OR MARKED FEATURE.
4. UNILATERAL COPLANARITY ZONE APPLIES TO ALL TERMINALS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ± 0.1 X.XX ± 0.05 XXXX ± 0.025 INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION 	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging
MATERIAL -	NAME DRAWN - DATE 12/17/10	TITLE PACKAGE OUTLINE 10 PINS S21QLeX, 2.1x1.6mm BODY, 0.50mm PITCH (CHIP-ON-LEAD, SAW QFN)
FINISH -	CHECKED - 4/15/11	DWG NUMBER 10-S21QLeX-2.1x1.6B-0.5P REV B
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.Iliev 4/19/11	SCALE 1:1 STD COMPLIANCE MO-248 SHEET 1 OF 1



REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	CONVERTING THE DRAWING TO DWG FORMAT	6/23/06	S.K.ILIEV
A	PCB LAND PATTERN IS ADDED	9/23/08	S.K.ILIEV



HOLE: 20X Ø0.04 (PLATED)
ANNULAR RING: 20X Ø0.03

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL X.X ±0.1
X.XX ±0.05
X.XXX ±0.025
INTERPENETRATION TOLERANCE
ASME Y14.5M - 1994

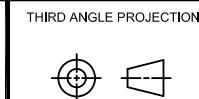
ANGULAR ±1°

MATERIAL
-
FINISH
-

DRAWN
S.K.ILIEV
5/26/06

CHECKED
S.K.ILIEV
6/23/06

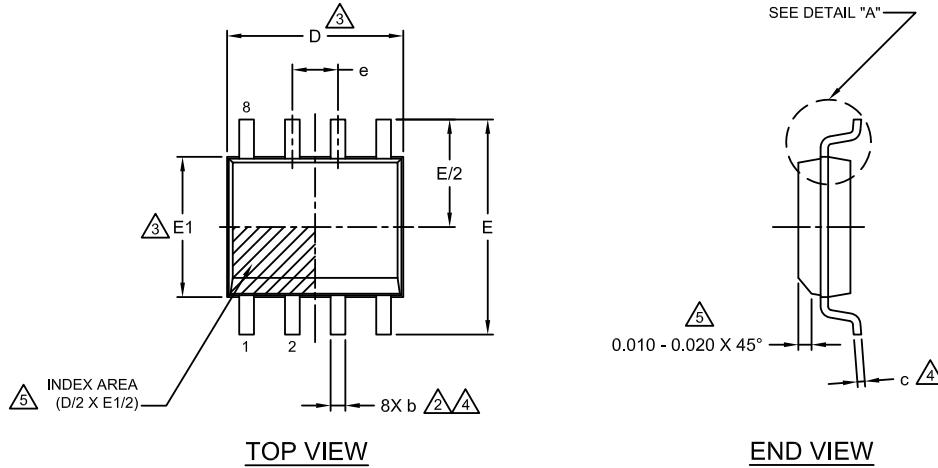
APPROVED
S.K.ILIEV
6/23/06



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

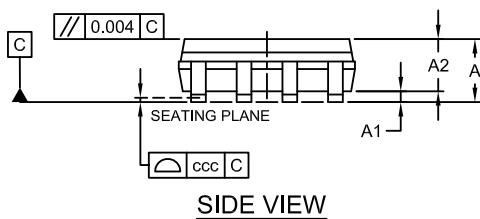
TITLE			PACKAGE OUTLINE	
			20 LEADS SIP, 0.100 INCHES PITCH (RIGHT ANGLE LEAD DESIGN)	
			DWG NUMBER	
			PS-HYC9088-20SIP-R	
			REV B	
			SCALE 1:1	STD COMPLIANCE N/A
			SHEET 1 OF 1	

NOTES

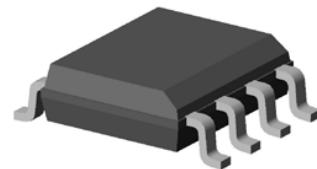


TOP VIEW

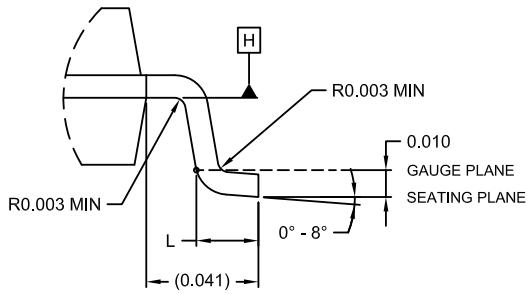
END VIEW



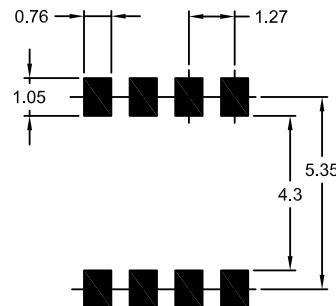
SIDE VIEW



3-D VIEW



DETAIL "A"



PCB LAND PATTERN

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	5/20/04	S.K.ILIEV
B	ADDED PCB LAND PATTERN	7/9/12	SKI

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.053	—	0.069	—	OVERALL PKG HEIGHT
A1	0.004	—	0.010	—	STANOFF
A2	0.049	—	0.065	—	BODY THICKNESS
D	0.189	0.193	0.197	3	"X" BODY SIZE
E	0.228	0.236	0.244	—	LEAD SPAN
E1	0.150	0.154	0.158	3	"Y" BODY SIZE
L	0.016	—	0.035	—	LEAD FOOT LENGTH
b	0.012	—	0.020	2,4	LEAD WIDTH
c	0.007	—	0.010	4	LEAD FOOT THICKNESS
e	0.050 BSC			—	LEAD PITCH
ccc	—	—	0.0035	—	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.0049 inches AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
3. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MAXIMUM MOLD FLASH, PROTRUSIONS OR GATE BURRS IS 0.006" PER END. DIMENSION "E1" DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. MAXIMUM INTERLEAD FLASH OR PROTRUSION IS 0.010" PER SIDE. "D1" & "E1" DIMENSIONS ARE DETERMINED AT DATUM PLANE "H" AND INCLUDE ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
4. "b" & "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.004 TO 0.010" FROM THE LEAD TIP.
5. THE CHAMFER FEATURE IS OPTIONAL. IF IT IS NOT PRESENT, THEN A PIN 1 IDENTIFIER MUST BE LOCATED WITHIN THE INDEX AREA INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL
X.X ± 0.1
X.XX ± 0.05
X.XXX ± 0.025

THIRD ANGLE PROJECTION

ANGULAR
 $\pm 1^\circ$
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

NAME DATE
DRAWN S.K.ILIEV 5/17/04

MATERIAL FINISH
- -
CHECKED S.K.ILIEV 5/19/04

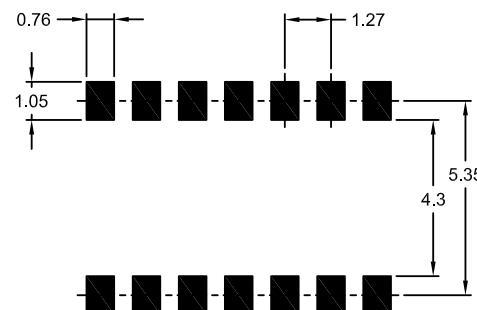
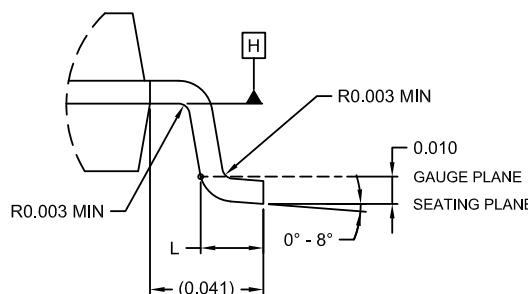
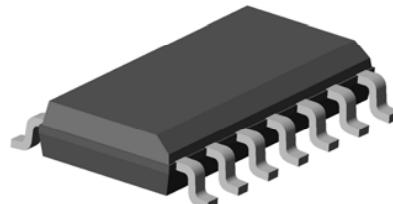
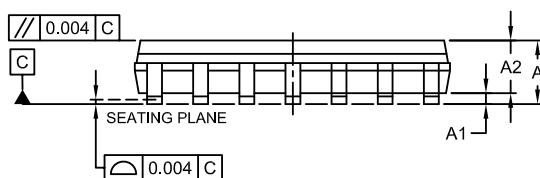
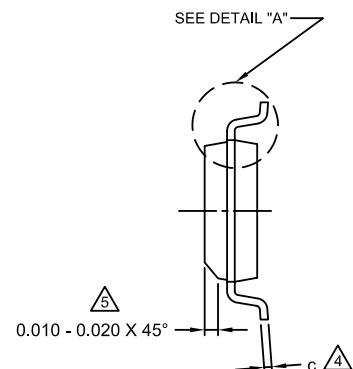
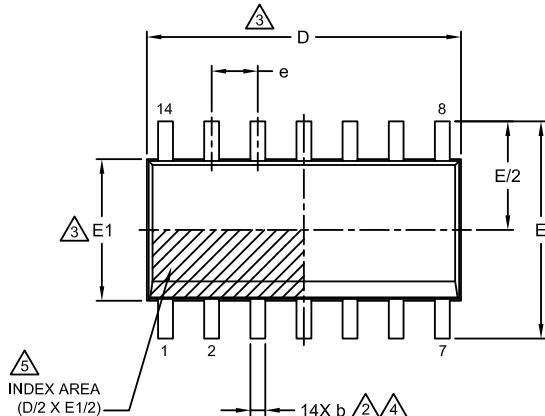
PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING
APPROVED S.K.ILIEV 5/20/04

Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE
PACKAGE OUTLINE
8 SOIC, 0.150" WIDE BODY, 0.05" PITCH

DWG NUMBER REV
AP-8SOIC-0.150"-WIDE B

SCALE STD COMPLIANCE SHEET
1:1 JEDEC: MS-012 1 OF 1



THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/29/08	S.K.ILIEV
B	3-D VIEW FROM 16 TO 14 LEADS	1/28/09	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.053	—	0.069	—	OVERALL PKG HEIGHT
A1	0.004	—	0.010	—	STANOFF
A2	0.049	—	0.065	—	BODY THICKNESS
D	0.336	0.340	0.344	3	"X" BODY SIZE
E	0.228	0.236	0.244	—	LEAD SPAN
E1	0.150	0.154	0.158	3	"Y" BODY SIZE
L	0.016	0.025	0.035	—	LEAD FOOT LENGTH
b	0.012	—	0.020	2,4	LEAD WIDTH
c	0.007	—	0.010	4	LEAD FOOT THICKNESS
e	0.050 BSC		—	—	LEAD PITCH

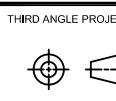
NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.0049 inches AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
3. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MAXIMUM MOLD FLASH, PROTRUSIONS OR GATE BURRS IS 0.006" PER END. DIMENSION "E1" DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. MAXIMUM INTERLEAD FLASH OR PROTRUSION IS 0.010" PER SIDE. "D1" & "E1" DIMENSIONS ARE DETERMINED AT DATUM PLANE "H" AND INCLUDE ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
4. "b" & "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.004 TO 0.010" FROM THE LEAD TIP.
5. THE CHAMFER FEATURE IS OPTIONAL. IF IT IS NOT PRESENT, THEN A PIN 1 IDENTIFIER MUST BE LOCATED WITHIN THE INDEX AREA INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL ± 0.1
XX ± 0.05
XXXX ± 0.025

ANGULAR $\pm 1^\circ$

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994



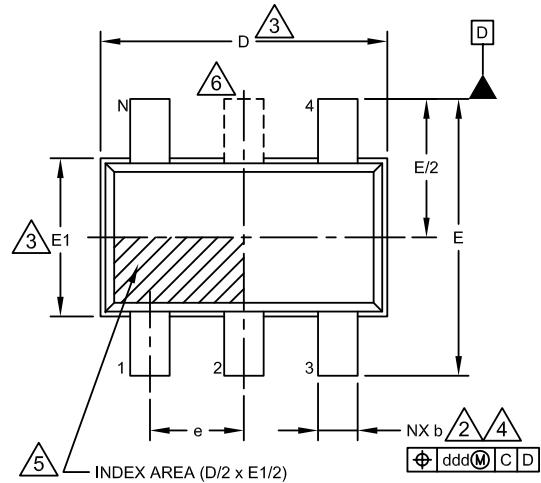
Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE
PACKAGE OUTLINE
14 SOIC, 0.150" WIDE BODY, 0.05" PITCH

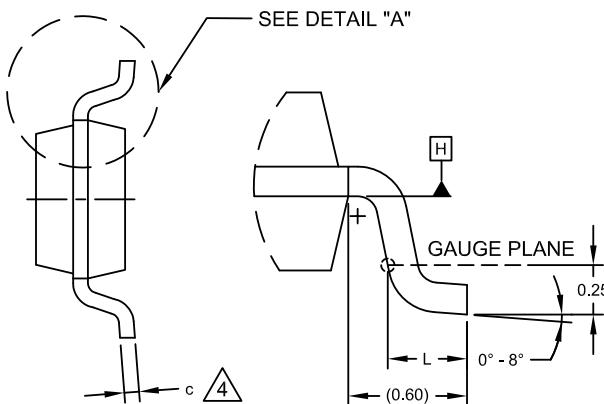
MATERIAL	DRAWN	NAME	DATE	REV
-	S.K.ILIEV	2/29/08		B
FINISH	CHECKED	S.K.ILIEV	2/29/08	
-	APPROVED	S.K.ILIEV	2/29/08	

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

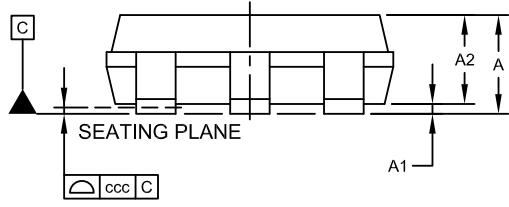
SCALE 1:1 STD COMPLIANCE JEDEC: MS-012 SHEET 1 OF 1



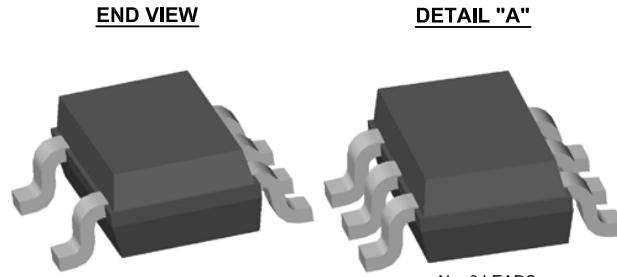
TOP VIEW



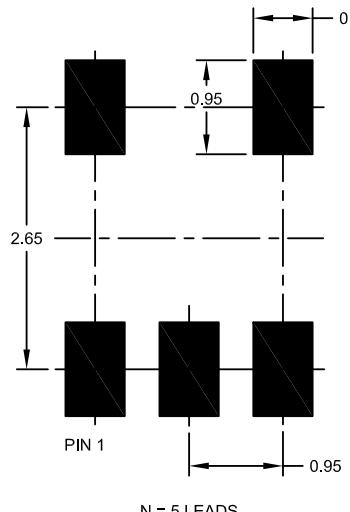
DETAIL "A"



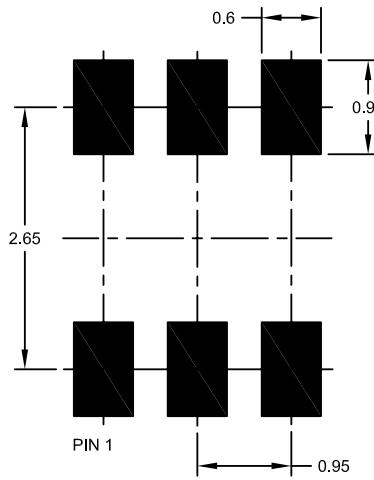
SIDE VIEW



3-D VIEWS



RECOMMENDED PCB LAND PATTERN



REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	10/18/04	S.K.IIEV
B	DIMENSION "E" FROM 2.80 ± 0.20 TO 2.80 ± 0.25 MM	6/12/06	S.K.IIEV
C	REMOVE THE LOGO FROM THE TITLE BLOCK	9/25/07	S.K.IIEV
D	ADDED PCB FOOTPRINT	3/17/08	S.K.IIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	-	0.10	-	STANDOFF
A2	0.70	0.90	1.00	-	BODY THICKNESS
D	2.75	2.90	3.05	3	X BODY SIZE
E	2.55	2.80	3.05	-	LEAD SPAN
E1	1.45	1.60	1.75	3	Y BODY SIZE
L	0.30	0.45	0.60	-	LEAD FOOT LENGTH
b	0.30	-	0.50	2,4	LEAD WIDTH
c	0.08	-	0.20	4	LEAD FOOT THICKNESS
e	0.95 BSC		-	-	LEAD PITCH
ccc	-	-	0.10	-	COPLANARITY
ddd	0	-	0.20	-	LEAD TRUE POSITION SPREAD

NOTES:

- "N" IS THE TOTAL NUMBER OF LEADS.
- dimension "b" DOES NOT INCLUDE DAMBAR PROTRUSION. DANBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
- dimension "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MAXIMUM MOLD FLASH, PROTRUSIONS OR GATE BURRS IS 0.15 mm PER END. dimension "E1" DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. MAXIMUM INTERLEAD FLASH OR PROTRUSION IS 0.15 mm PER SIDE. "D1" & "E1" ARE DETERMINED AT DATUM PLANE "H" AND INCLUDE ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
- "b" & "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 TO 0.15 mm FROM THE LEAD TIP.
- DETAILS OF PIN 1 IDENTIFIER ARE OPTIONAL, BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.
- FIVE LEAD PACKAGE IS A VERSION OF 6 LEAD PACKAGE, WHERE LEAD #5 HAS BEEN REMOVED FROM 6 LEAD PACKAGE.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL
XX ± 0.1
XXX ± 0.05
XXXX ± 0.025
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

NAME DATE

MATERIAL DRAWN S.K.IIEV 10/15/04

FINISH CHECKED S.K.IIEV 10/18/04

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

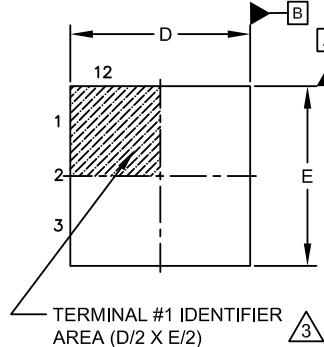
Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE
PACKAGE OUTLINE
SOT FAMILY, 2.9 X 1.6 MM BODY, 0.95 MM PITCH

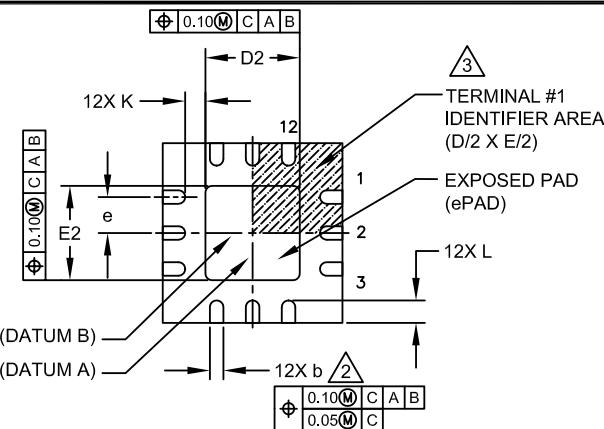
DWG NUMBER MO-SOT-2.9x1.6B REV D

SCALE 1:1 STD COMPLIANCE JEDEC: MO-193 SHEET 1 OF 1

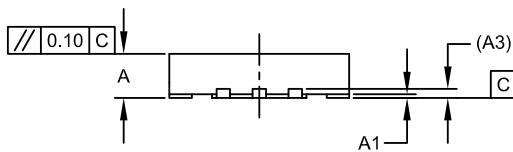
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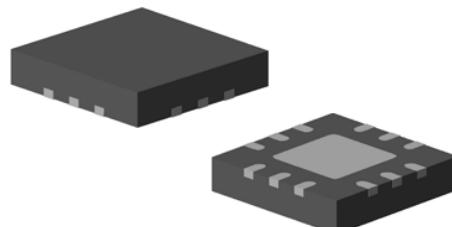
TOP VIEW



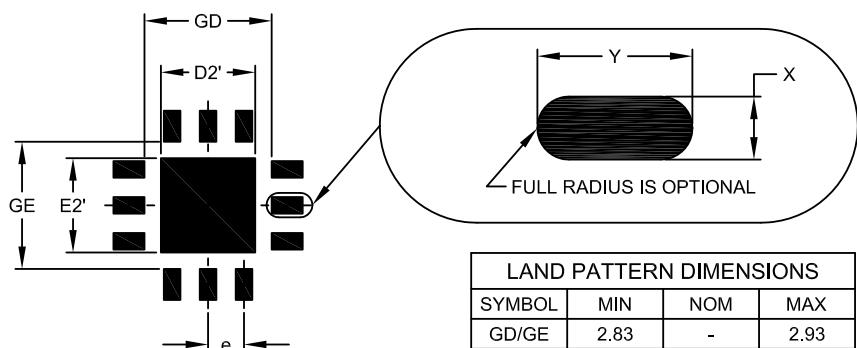
BOTTOM VIEW



SIDE VIEW



3-D VIEWS



THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	2.83	-	2.93
D2'/E2'	-	2.10	2.10
X	-	-	0.37
Y	0.79	-	-
e	0.80		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
XX ± 0.1
XXX ± 0.05
XXXX ± 0.025

ANGULAR
 $\pm 1^\circ$

INTERPRET DIM AND TOL PER

ASME Y14.5M - 1994

NAME DATE

MATERIAL - DRAWN -

3/14/07

FINISH - CHECKED -

S.K.ILIEV 3/15/07

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

APPROVED -

S.K.ILIEV 3/18/07

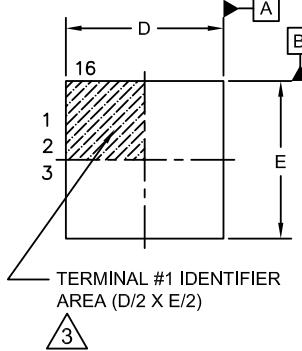


Note: For the most current package drawings, see the Microchip Packaging Specification at <http://www.microchip.com/packaging>

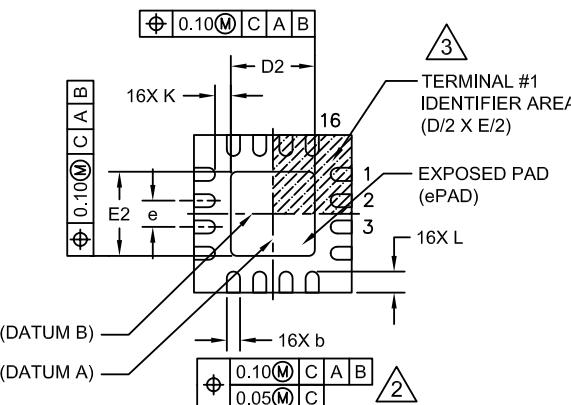
TITLE PACKAGE OUTLINE
12 PINS SQFNE3, 4x4mm BODY, 0.8mm PITCH
(SAW SINGULATED, e3 PLATING)

DWG NUMBER 12SQFNE3-4x4B-0.8P REV C

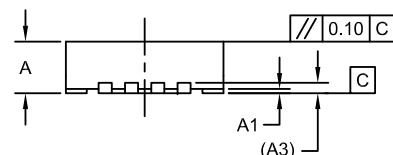
SCALE 1:1 STD COMPLIANCE JEDEC: MO-220 SHEET 1 OF 1



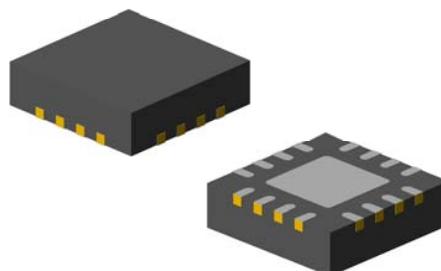
TOP VIEW



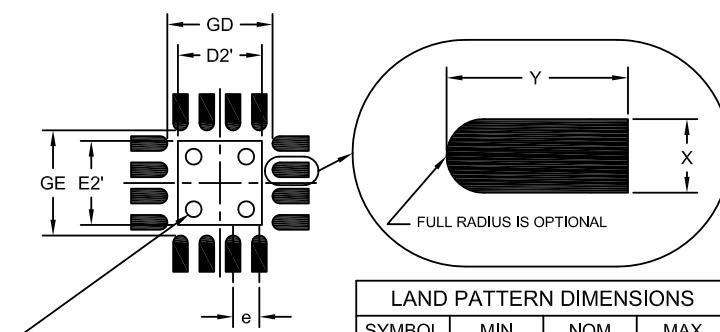
BOTTOM VIEW



SIDE VIEW



3-D VIEWS



THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	2.00	-	2.10
D2'/E2'	-	1.60	1.60
X	-	0.28	0.28
Y	0.69	-	-
e	0.50		

REVISION HISTORY

REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	3/31/10	S.K.ILIEV
B	INITIAL RELEASE. ADDED THERMAL VIA IN PCB INFO	7/30/11	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	0.90	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A3	0.20 REF			-	LEAD-FRAME THICKNESS
D/E	2.90	3.00	3.10	-	X/Y BODY SIZE
D2/E2	1.50	1.60	1.70	-	X/Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.25	0.30	-	-	TERMINAL TO PAD DISTANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL ANGULAR
XX.X ± 0.1 $\pm 1^\circ$
XXX ± 0.05
XXXX ± 0.025

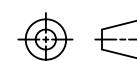
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

MATERIAL DRAWN

FINISH CHECKED

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION



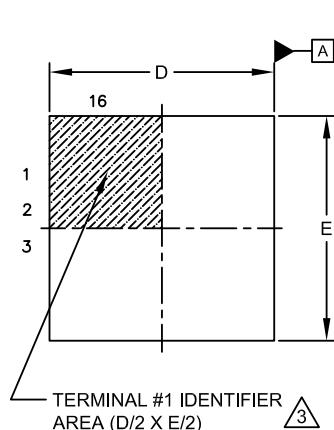
TITLE

Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

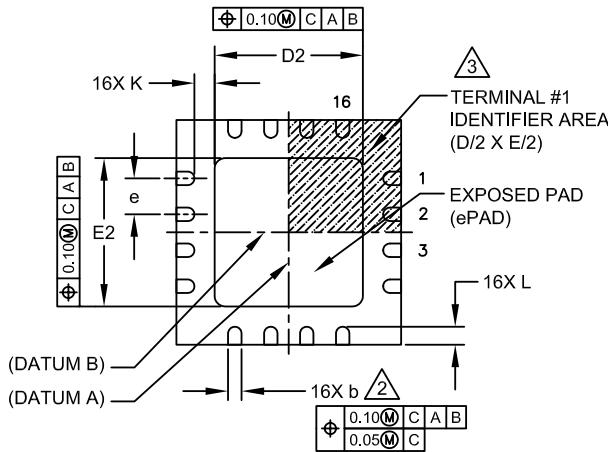
PACKAGE OUTLINE

16 PINS SQFN3, 3x3mm BODY, 0.5mm PITCH
(SAWN QFN, FULL LEAD TERMINATION)

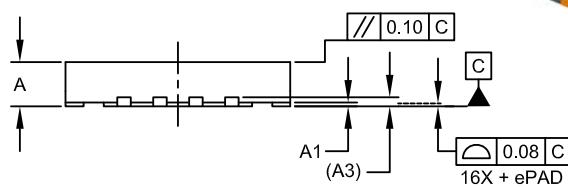
DWG NUMBER			REV
16-SQFN3-3x3B-0.5P			B
SCALE	STD COMPLIANCE	JEDEC: MO-220	1 OF 1
1:1	JEDEC: MO-220	1 OF 1	



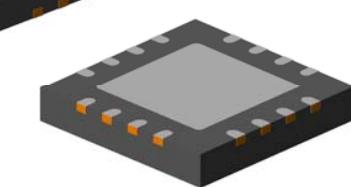
TOP VIEW



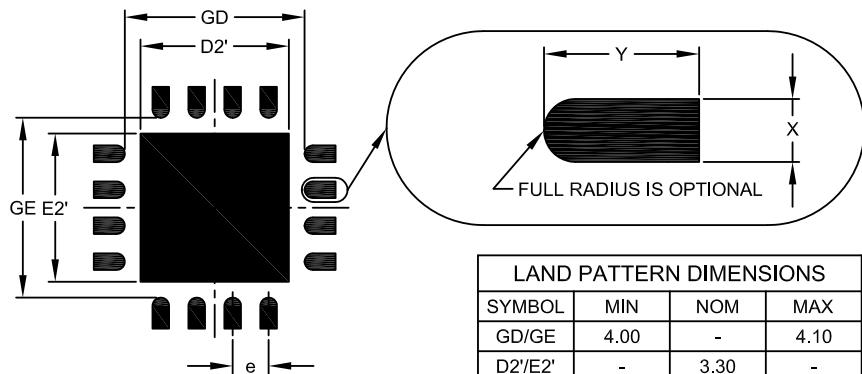
BOTTOM VIEW



SIDE VIEW



3-D VIEWS



THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	4.00	-	4.10
D2'/E2'	-	3.30	-
X	-	-	0.37
Y	0.69	-	-
e	0.80		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
X.X ± 0.1
X.XX ± 0.05
X.XXX ± 0.025

ANGULAR
 $\pm 1^\circ$

INTERPRET DIM AND TOL PER

ASME Y14.5M - 1994

MATERIAL

-

FINISH

-

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

NAME DATE

DRAWN 3/23/10

CHECKED

S.K.ILIEV

3/24/10

APPROVED

S.K.ILIEV

3/25/10

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY DESIGN	3/25/10	S.K.ILIEV
A1	L tolerance from ± 0.10 to ± 0.05 . 3D vies updated	6/3/10	S.K.ILIEV
A2	A from 0.85 ± 0.05 to 0.90 ± 0.10 . Add profile tolerance at C	6/10/10	S.K.ILIEV
B	INITIAL RELEASE	11/12/10	SKI

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A3	0.20 REF			-	LEAD-FRAME THICKNESS
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D2/E2	3.20	3.30	3.40	-	X/Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.25	0.30	0.35	2	TERMINAL WIDTH
K	0.35	0.45	-	-	TERMINAL TO PAD DISTANCE
e	0.80 BSC			-	TERMINAL PITCH

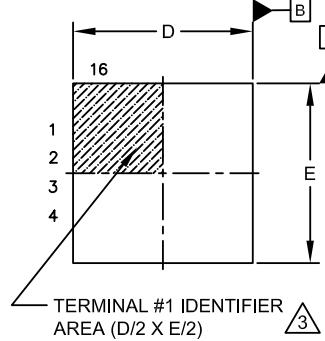
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

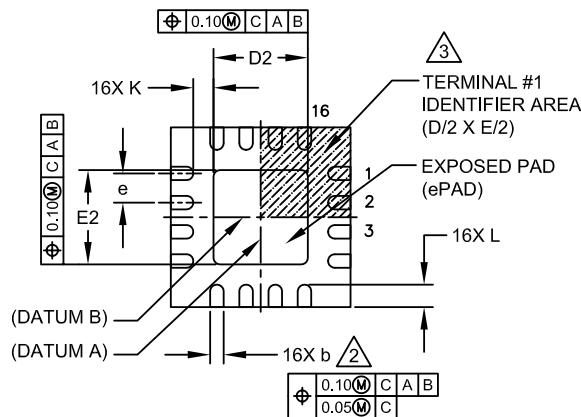
Note: For the most current package drawings, see the Microchip Packaging Specification at <http://www.microchip.com/packaging>

TITLE PACKAGE OUTLINE
16 PINS S5QFN, 5x5mm BODY, 0.80mm PITCH
(SAWN QFN, FULL LEAD TERMINATION DESIGN)

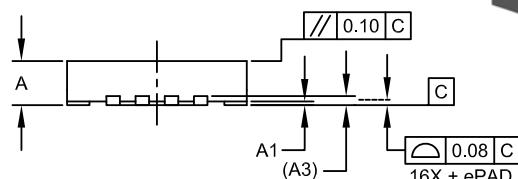
DWG NUMBER	16-S5QFN-5x5B-0.80P	REV	B
STD COMPLIANCE	JEDEC: MO-220	SHEET	1 OF 1
SCALE	1:1		



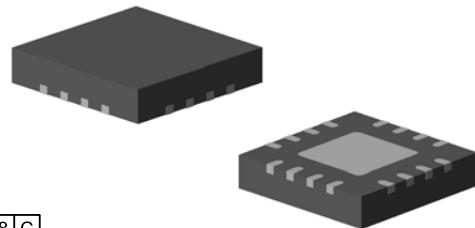
TOP VIEW



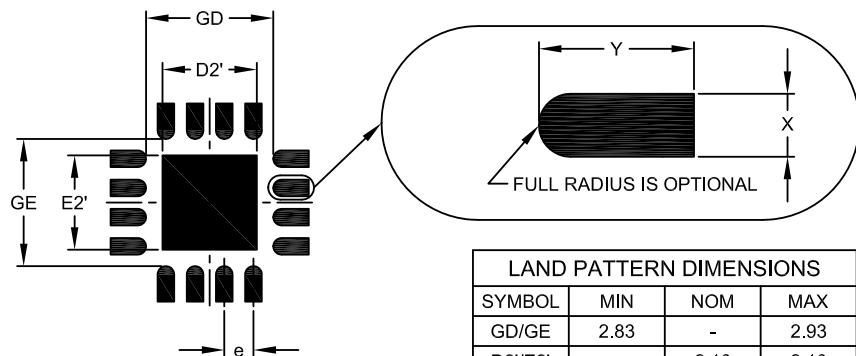
BOTTOM VIEW



SIDE VIEW



3-D VIEWS



THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	2.83	-	2.93
D2'/E2'	-	2.10	2.10
X	-	-	0.37
Y	-	0.79	-
e		0.65	

REVISION HISTORY

REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	4/25/07	S.K.IIEV
B	INITIAL RELEASE, L from 0.5±0.05 to 0.5±0.1mm, K(min) from 0.20 to 0.35mm, Y from 0.69 to 0.79mm.	3/26/08	S.K.IIEV
C	A (nom) from 0.85 to 0.90; A (max) from 0.90 to 1.00; Y was 0.79 (min) now is 0.79 (nom); Added coplanarity limit.	7/2/12	SKI

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A3	0.20 REF			-	LEAD-FRAME THICKNESS
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D2/E2	2.00	2.10	2.20	-	X/Y EXPOSED PAD SIZE
L	0.40	0.50	0.60	-	TERMINAL LENGTH
b	0.25	0.30	0.35	2	TERMINAL WIDTH
K	0.35	0.45	-	-	TERMINAL TO PAD DISTANCE
e	0.65 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
XX ±0.1
XXX ±0.05
XXXX ±0.025

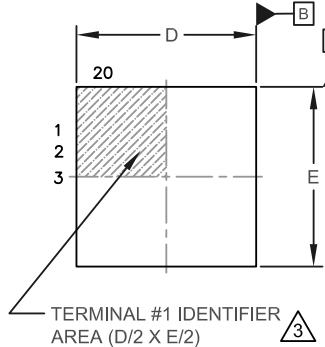
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

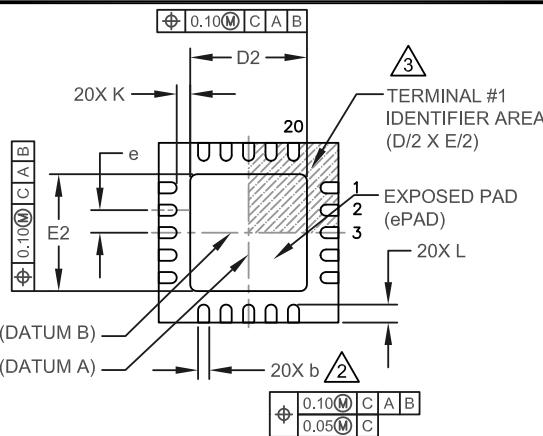


Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

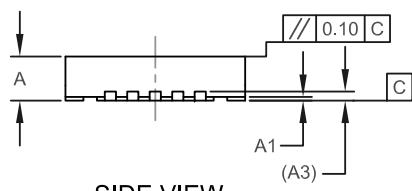
TITLE		PACKAGE OUTLINE	
		16 PINS SQFN, 4x4mm BODY, 0.65mm PITCH (SAW SINGULATED DESIGN)	
FINISH	-	CHECKED S.K.IIEV	4/23/07
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.IIEV	4/25/07	SCALE 1:1
		STD COMPLIANCE JEDEC: MO-220	REV C
			SHEET 1 OF 1



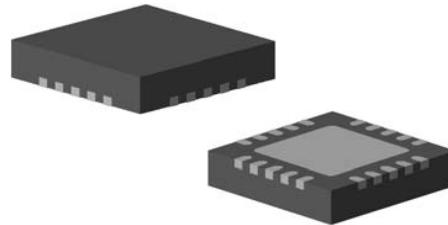
TOP VIEW



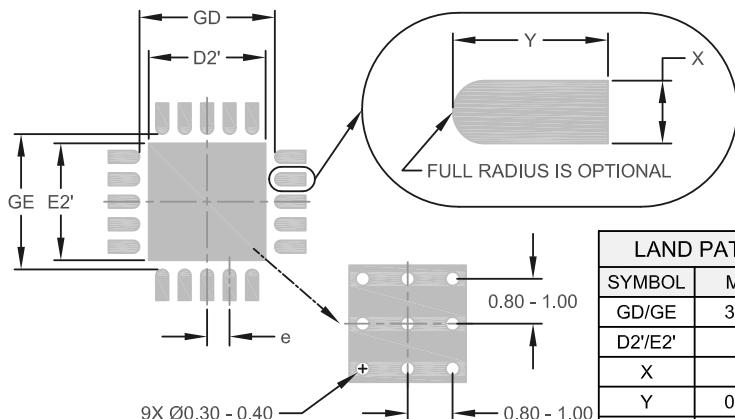
BOTTOM VIEW



SIDE VIEW



3-D VIEWS



PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	3.00	-	3.10
D2'/E2'	-	2.60	2.60
X	-	0.28	0.28
Y	0.69	-	0.80
e	0.50		

THE USER MAY MODIFY THE PCB
LAND PATTERN DIMENSIONS
BASED ON THEIR EXPERIENCE
AND/OR PROCESS CAPABILITY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
XXX ± 0.1
XXX ± 0.05
XXXX ± 0.025

ANGULAR
 $\pm 1^\circ$

INTERPRET DIM AND TOL PER

ASME Y14.5M - 1994

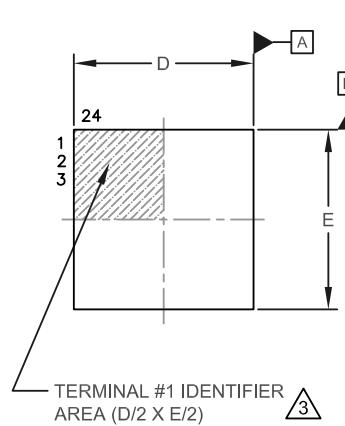
THIRD ANGLE PROJECTION



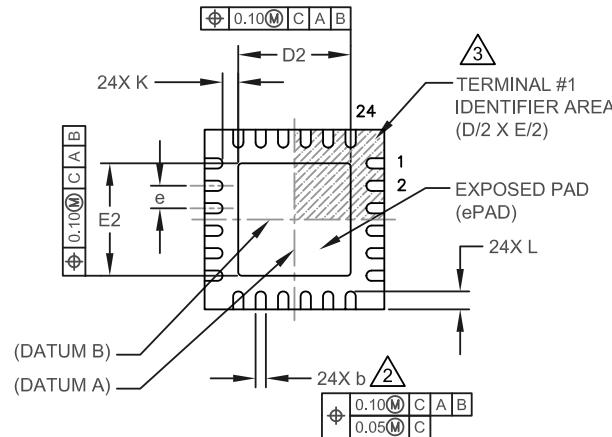
Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE
PACKAGE OUTLINE
20 PINS SQFN, 4x4mm BODY, 0.5mm PITCH
(SAWN QFN, FULL LEAD TERMINATION)

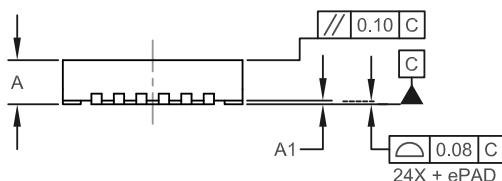
MATERIAL	DRAWN	3/14/07	DWG NUMBER	REV
-	CHECKED S.K.Iliev	3/15/07	20SQFN-4x4B-0.5P	F
-	APPROVED S.K.Iliev	3/18/07	SCALE 1:1	STD COMPLIANCE JEDEC: MO-220



TOP VIEW



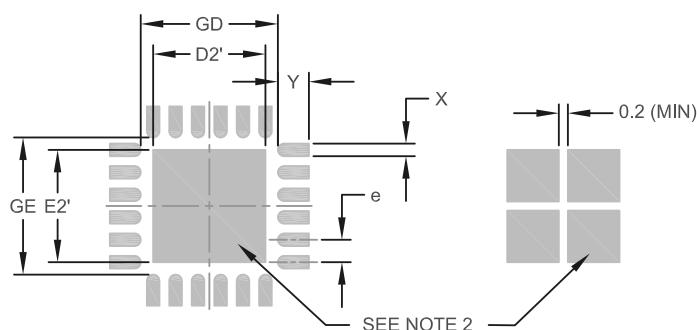
BOTTOM VIEW



SIDE VIEW



3-D VIEW



LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
GD/GE	3.05	-	3.10
D2'/E2'	-	2.50	2.50
Pad: X	-	0.28	0.28
Pad: Y	-	0.69	-
e		0.50	

PCB LAND PATTERN

NOTES:

1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	2/16/12	S.K.Iliev

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D2/E2	2.40	2.50	2.60	-	X/Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.25	0.35	-	-	PINL TO ePAD CLEARANCE
e	0.50 BSC		-	-	TERMINAL PITCH

NOTES:

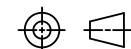
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
X.X ± 0.1
X.XX ± 0.05
XXXX ± 0.025

ANGULAR
 $\pm 1^\circ$
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

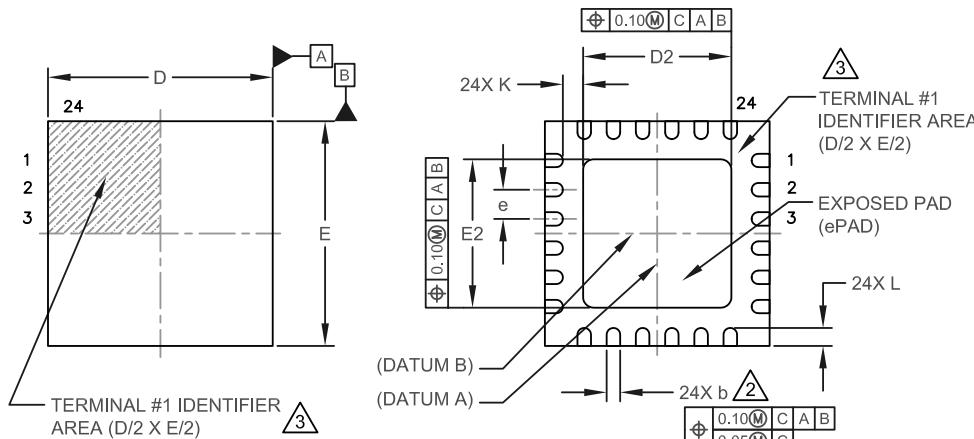


Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

PACKAGE OUTLINE

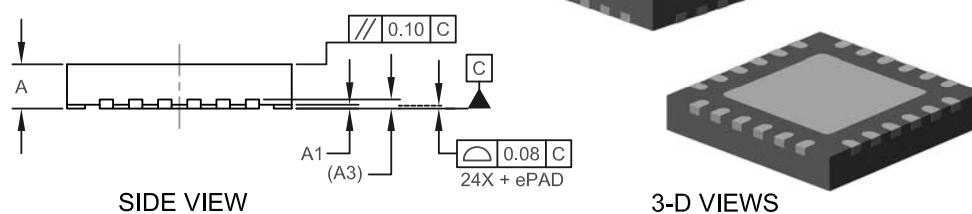
24 PINS S4QFN, 4x4mm BODY, 0.5mm PITCH
(S4QFN = 4x4mm BODY SAWN QFN, FULL LEAD TERMINATION)

MATERIAL	DRAWN	DATE	DWG NUMBER		REV
			NAME	DATE	
FINISH	CHECKED S.K.Iliev	2/15/12	24-S4QFN-4x4B-0.5P		A
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.Iliev	2/16/12	SCALE 1:1	STD COMPLIANCE JEDEC: MO-220	SHEET 1 OF 1



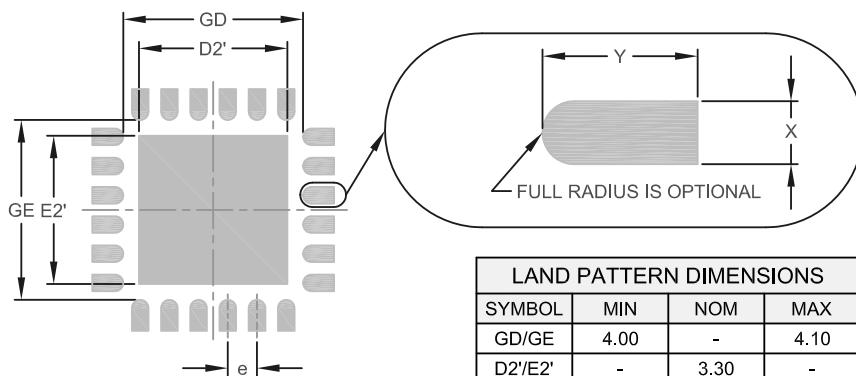
TOP VIEW

BOTTOM VIEW



SIDE VIEW

3-D VIEWS



THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	4.00	-	4.10
D2'/E2'	-	3.30	-
X	-	-	0.37
Y	0.69	-	-
e	0.65		

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY DESIGN	3/25/10	S.K.ILIEV
A1	L tolerance from ± 0.10 to ± 0.05	6/3/10	S.K.ILIEV
A2	A from 0.85 ± 0.05 to 0.90 ± 0.10 . Add profile tolerance at C	6/10/10	S.K.ILIEV
B	INITIAL RERLEASE	5/12/10	SKI

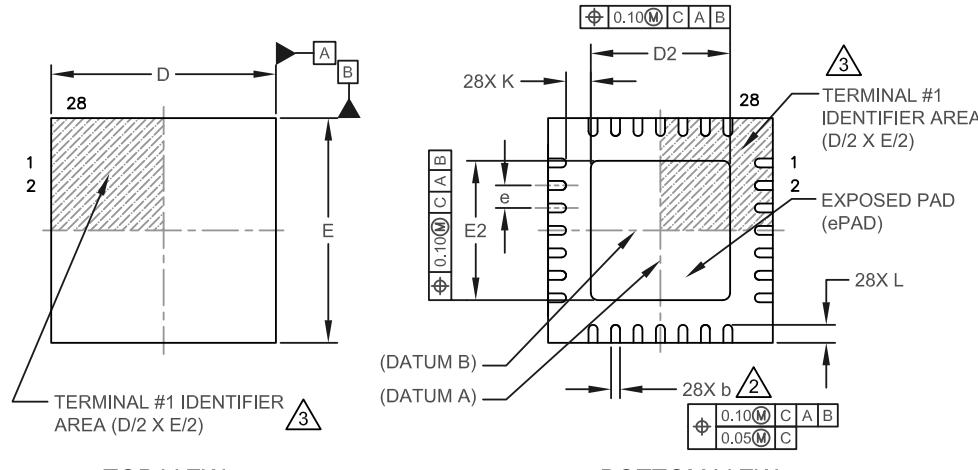
COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
A3	0.20 REF			-	LEAD-FRAME THICKNESS
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D2/E2	3.20	3.30	3.40	-	X/Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.25	0.30	0.35	2	TERMINAL WIDTH
K	0.35	0.45	-	-	TERMINAL TO PAD DISTANCE
e	0.65 BSC			-	TERMINAL PITCH

NOTES:

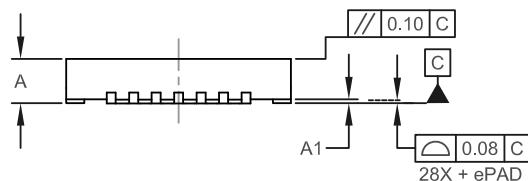
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025	ANGULAR $\pm 1^\circ$	THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
INTERP.DIM AND TOL PER ASME Y14.5M - 1994					
MATERIAL	DRAWN	3/23/10	TITLE	PACKAGE OUTLINE	
FINISH	CHECKED	3/24/10	24 PINS SQFN, 5x5mm BODY, 0.65mm PITCH (SAWN QFN, FULL LEAD TERMINATION DESIGN)		
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	3/25/10	DWG NUMBER	24-SQFN-5x5B-0.65P	REV B
S.K.ILIEV	S.K.ILIEV	3/25/10	SCALE	1:1	STD COMPLIANCE
				JEDEC: MO-220	SHEET 1 OF 1

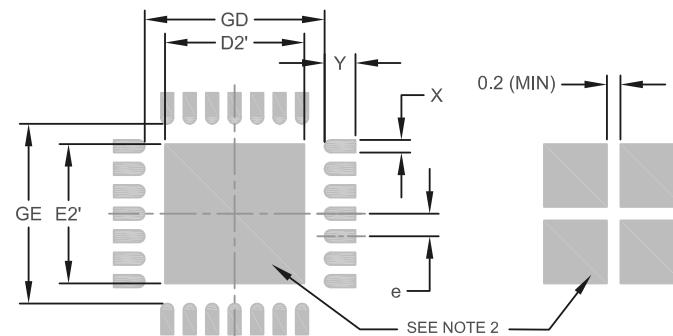


TOP VIEW

BOTTOM VIEW



SIDE VIEW



LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	4.00	-	4.10
D2'/E2'	-	3.10	3.10
X	-	0.28	0.28
Y	-	0.69	-
e	0.50		

PCB LAND PATTERN

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/6/12	S.K.ILIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D2/E2	3.00	3.10	3.20	-	X/Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.45	0.55	-	-	PIN TO ePAD CLEARANCE
e	0.50 BSC		-	-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

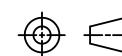
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
X-X ±0.1
X-XX ±0.05
XXXX ±0.025

ANGULAR
±1°

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

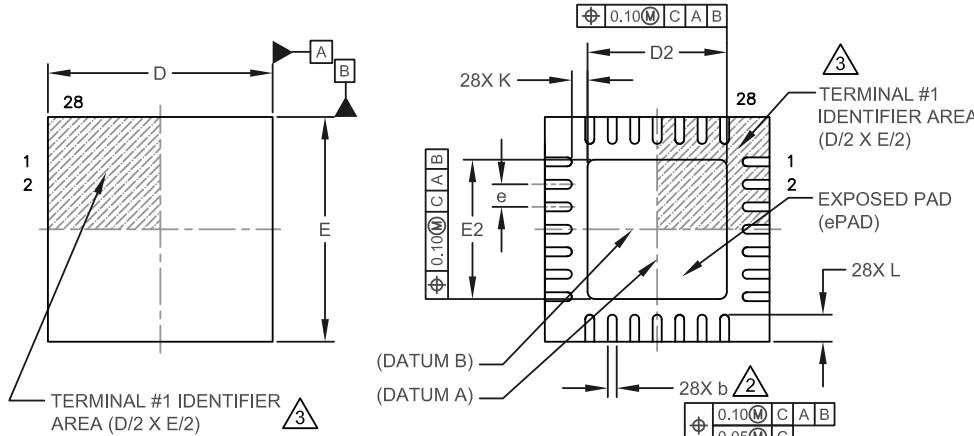


Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

PACKAGE OUTLINE

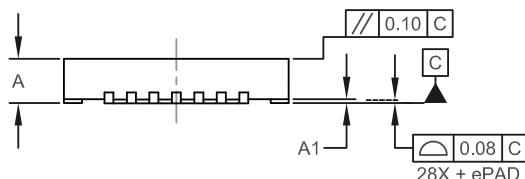
28 SQFN-3104, 5x5mm BODY, 0.5mm PITCH
(SAWN QFN, 0.4 MM LEAD LENGTH)

NAME	DATE	DWG NUMBER			REV
DRAWN	3/10/12	28-SQFN-3104-5x5B-0.5P			A
FINISH	CHECKED S.K.ILIEV	4/3/12	SCALE 1:1	STD COMPLIANCE JEDEC: MO-220	1 OF 1
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	4/6/12			

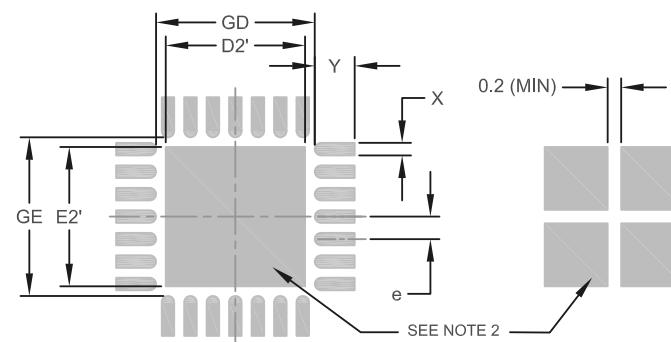


TOP VIEW

BOTTOM VIEW



SIDE VIEW



LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	3.65	-	3.70
D2'/E2'	-	3.10	3.10
X	-	0.28	0.28
Y	-	0.89	-
e		0.50	

PCB LAND PATTERN

NOTES:

1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

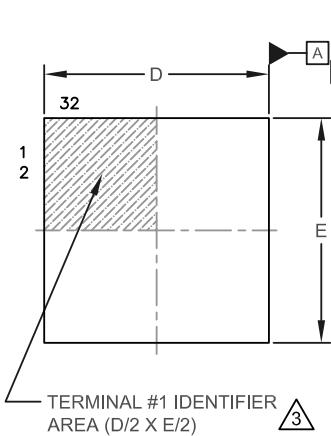
REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/6/12	S.K.ILIEV

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D2/E2	3.00	3.10	3.20	-	X/Y EXPOSED PAD SIZE
L	0.50	0.60	0.75	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.25	0.35	-	-	PIN TO ePAD CLEARANCE
e	0.50 BSC		-	-	TERMINAL PITCH

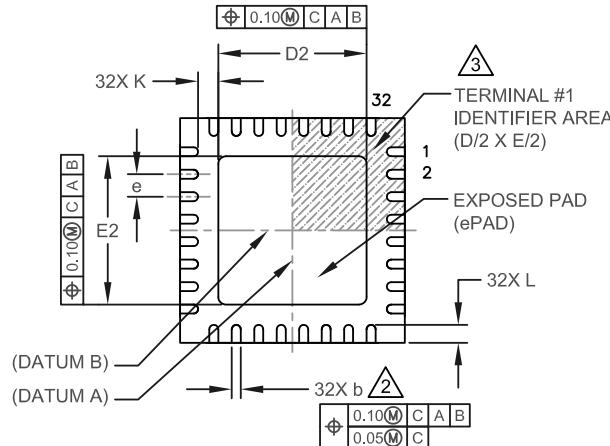
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

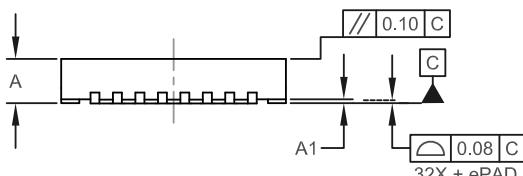
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025 ANGULAR $\pm 1^\circ$ INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
	NAME	DATE			
MATERIAL	DRAWN	3/10/12	TITLE	PACKAGE OUTLINE	
FINISH	CHECKED	4/3/12	28 SQFN-3106, 5x5mm BODY, 0.5mm PITCH (SAWN QFN, 0.6 MM LEAD LENGTH)	DWG NUMBER	REV
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	4/6/12	28-SQFN-3106-5x5B-0.5P	1 OF 1	A
S.K.ILIEV	S.K.ILIEV	JEDEC: MO-220	STD COMPLIANCE	1 OF 1	
SCALE	1:1	JEDEC: MO-220	1 OF 1		



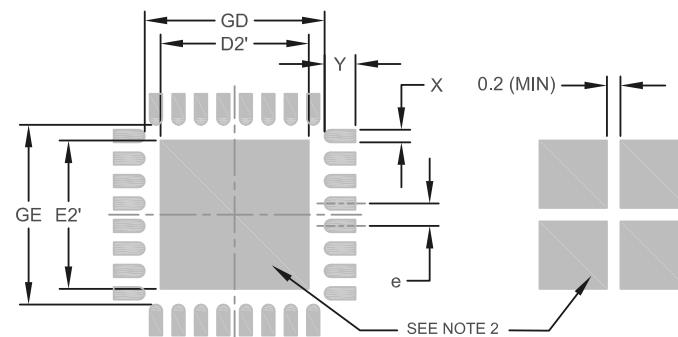
TOP VIEW



BOTTOM VIEW



SIDE VIEW



LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	4.00	-	4.10
D2'/E2'	-	3.30	3.30
X	-	0.28	0.28
Y	-	0.69	-
e	0.50		

PCB LAND PATTERN

- NOTES:**
1. THE USER MAY MODIFY THE PCB LAND PATTERN DESIGN AND DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY
 2. EXPOSED SOLDERABLE COPPER AREA OF THE CENTER PAD CAN BE EITHER SOLID OR SEGMENTED
 3. MAXIMUM THERMAL AND ELECTRICAL PACKAGE PERFORMANCE IS ACHIEVED WHEN AN ARRAY OF SOLID VIAS IS INCORPORATED IN THE CENTER LAND PATTERN

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL PRELIMINARY RELEASE	2/16/12	S.K.ILIEV
B	INITIAL RELEASE	5/20/12	SKI

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
D/E	4.90	5.00	5.10	-	X/Y BODY SIZE
D2/E2	3.20	3.30	3.40	-	X/Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.35	0.45	-	-	PIN TO ePAD CLEARANCE
e	0.50 BSC		-	-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
X-X ±0.1
X-XX ±0.05
XXXX ±0.025

ANGULAR
±1°

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

THIRD ANGLE PROJECTION

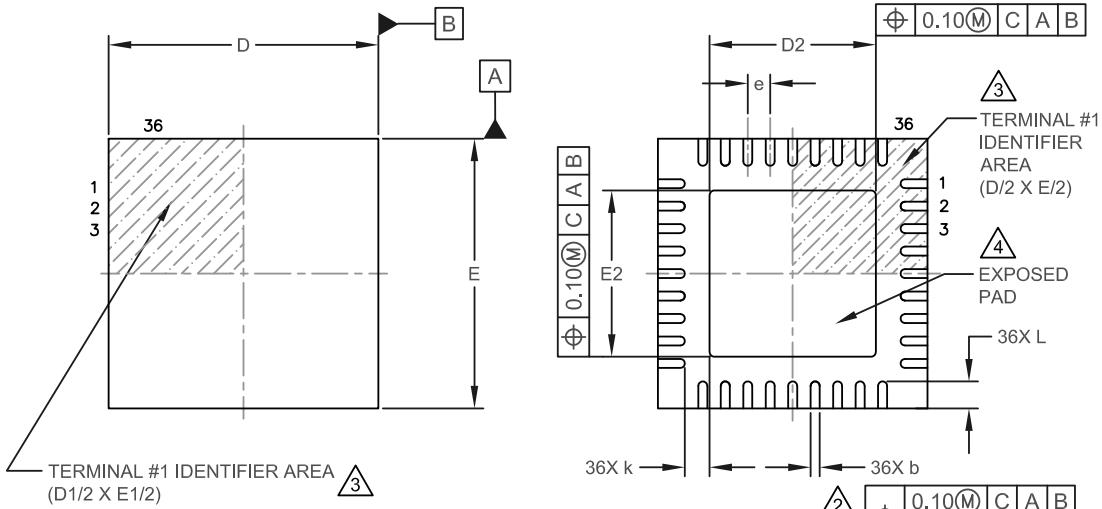


Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

PACKAGE OUTLINE

32 PINS SQFN, 5x5mm BODY, 0.5mm PITCH
(SAWN QFN, FULL LEAD TERMINATION)

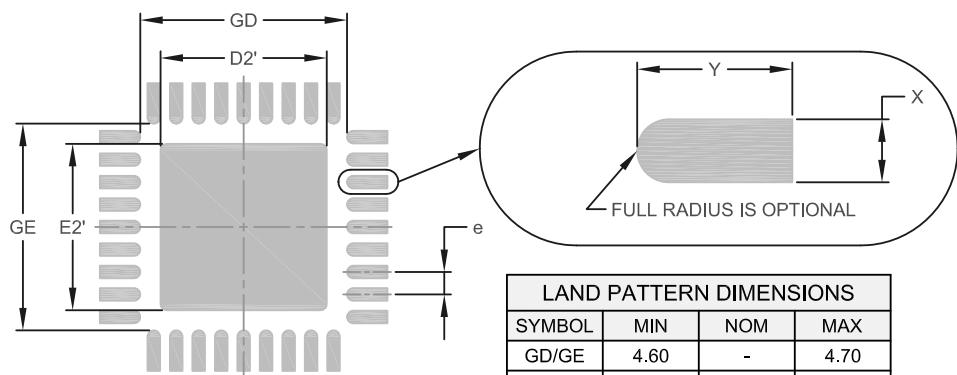
NAME	DATE	DWG NUMBER		REV
		32-SQFN-5x5B-0.5P	1 OF 1	
DRAWN	2/10/12			
CHECKED	S.K.ILIEV	2/16/12	SCALE 1:1	STD COMPLIANCE JEDEC: MO-220
APPROVED	S.K.ILIEV	2/16/12	1 OF 1	



TOP VIEW

BOTTOM VIEW

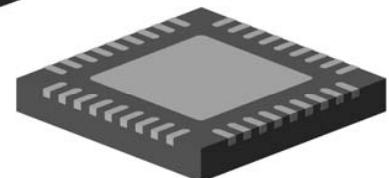
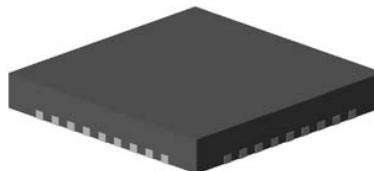
SIDE VIEW



PCB LAND PATTERN

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	10/5/2011	H. CABALLERO
B	A(min) from 0.70 to 0.80. A(nom) from 0.85 to 0.90. Added K(nom). PCB view updated.	6/18/2012	SKI



3-D VIEWS

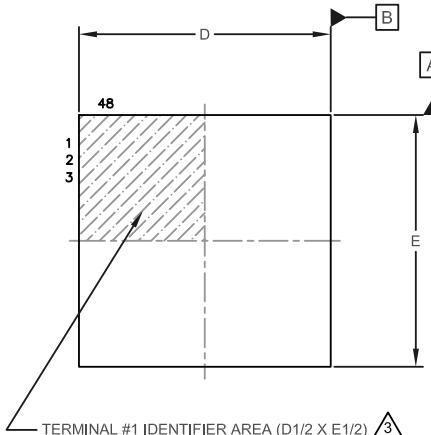
COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
D/E	5.90	6.00	6.10	-	X/Y BODY SIZE
D2/E2	3.60	3.70	3.80	4	X/Y EXPOSED PAD SIZE
L	0.50	0.60	0.75	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2, 4	TERMINAL WIDTH
k	0.45	0.55	-	-	TERMINAL TO ePAD CLEARANCE
ccc	-	-	0.08	4	COPLANARITY
e	0.50 BSC			-	TERMINAL PITCH

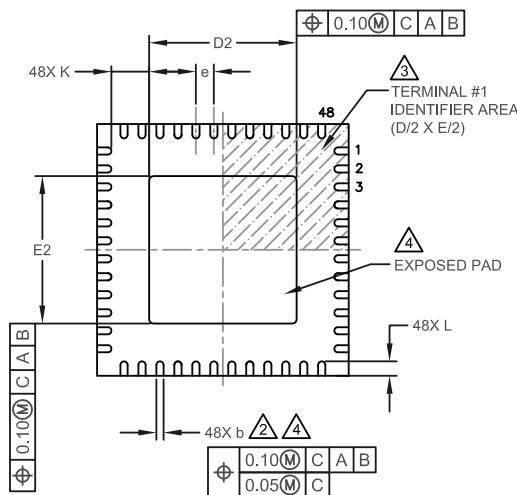
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. COPLANARITY ZONE APPLIES TO EXPOSED PAD AND TERMINALS.

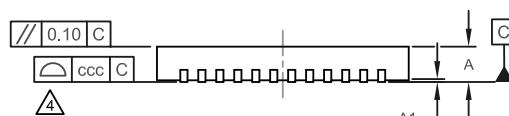
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025	ANGULAR $\pm 1^\circ$	THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994			TITLE PACKAGE OUTLINE 36 PIN SQFN, 6x6mm BODY, 0.5mm PITCH 3.7x3.7mm ePAD		
MATERIAL	NAME	DATE	DWG NUMBER 36SQFN-3706-6x6B		
FINISH	DRAWN H. CABALLERO	10/25/11	REV B	SCALE 1:1	
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.Iliev	10/25/11	STD COMPLIANCE JEDEC: MO-220	SHEET 1 OF 1	



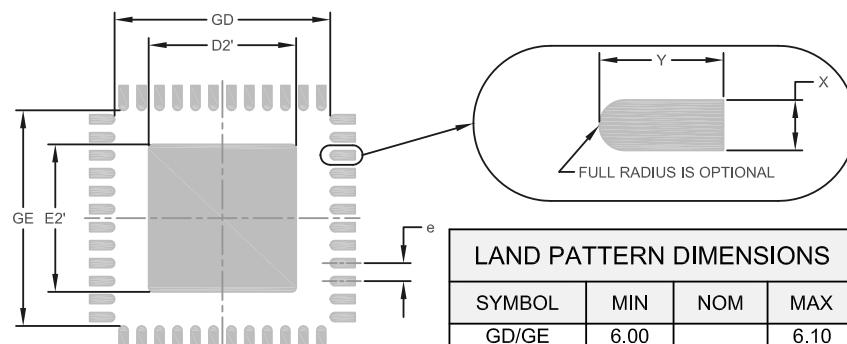
TOP VIEW



BOTTOM VIEW



SIDE VIEW

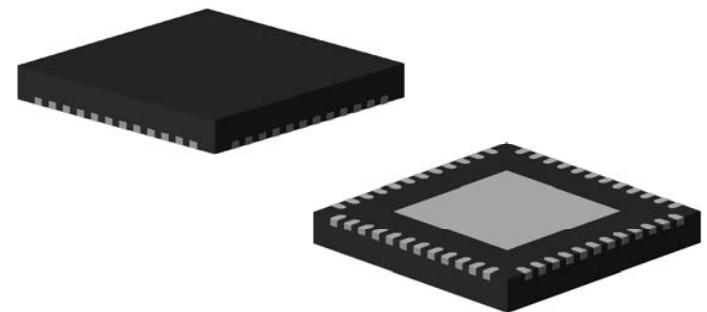


THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	6.00		6.10
D2'/E2'		4.10	
X		0.28	0.28
Y		0.70	
e		0.50	

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	1/17/2012	HC
B	A(min) from 0.70 to 0.80. A(nom) from 0.85 to 0.90. Added K(nom)	6/18/2012	SKI



3-D VIEWS

COMMON DIMENSIONS				
SYMBOL	MIN	NOM	MAX	NOTE
A	0.80	0.90	1.00	-
A1	0	0.02	0.05	-
D/E	6.90	7.00	7.10	-
D2/E2	4.00	4.10	4.20	4
L	0.30	0.40	0.50	-
b	0.18	0.25	0.30	2, 4
K	0.95	1.05	-	-
ccc	-	-	0.08	4
e	0.50 BSC		-	TERMINAL PITCH

NOTES:

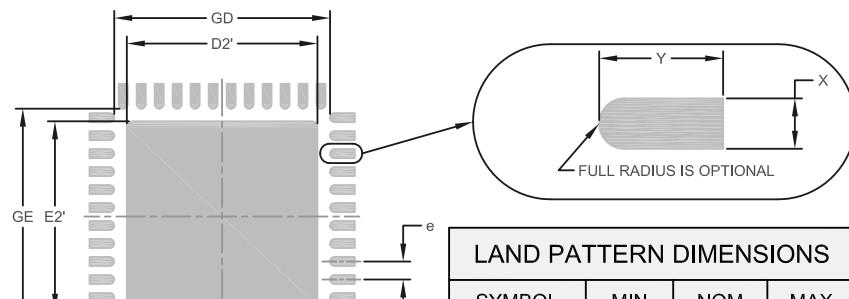
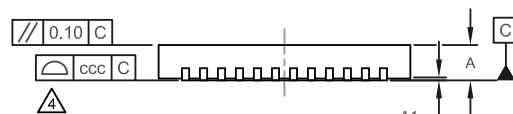
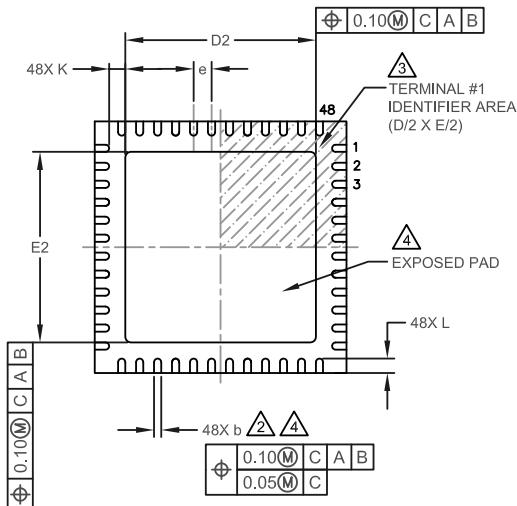
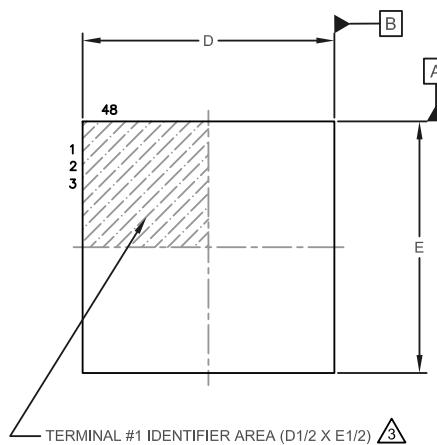
- ALL DIMENSIONS ARE IN MILLIMETER.
- DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
- DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
- COPLANARITY ZONE APPLIES TO EXPOSED PAD AND TERMINALS.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL
X.X ±0.1
X.XX ±0.05
X.XXX ±0.025

THIRD ANGLE PROJECTION

Note: For the most current package drawings, see the Microchip Packaging Specification at <http://www.microchip.com/packaging>

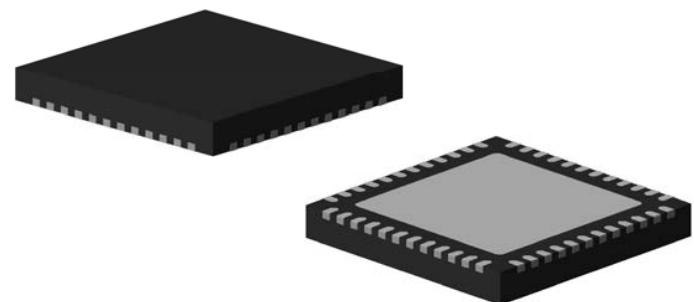
TITLE		PACKAGE OUTLINE		
		48 SQFN, 7x7mm BODY, 0.5mm PITCH, 4.1x4.1mm EXPOSED PAD, 0.4mm LEAD LENGTH		
MATERIAL		DRAWN	1/17/12	REV B
FINISH		CHECKED	1/17/12	DWG NUMBER 48SQFN-4104-7x7B
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	H. CABALLERO	1/17/12	SCALE 1:1 STD COMPLIANCE JEDEC: MO-220 SHEET 1 OF 1



THE USER MAY MODIFY THE PCB
LAND PATTERN DIMENSIONS
BASED ON THEIR EXPERIENCE
AND/OR PROCESS CAPABILITY

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	6.00	-	6.10
D2'/E2'	-	4.10	-
X	-	0.28	0.28
Y	-	0.70	-
e		0.50	

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	2/17/2012	SKI



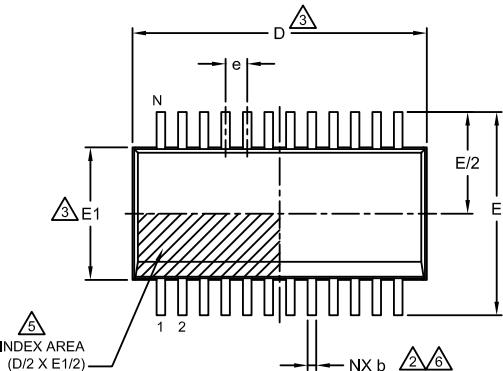
COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.90	1.00	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANOFF
D/E	6.90	7.00	7.10	-	X/Y BODY SIZE
D2/E2	5.20	5.30	5.40	4	X/Y EXPOSED PAD SIZE
L	0.30	0.40	0.50	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2, 4	TERMINAL WIDTH
K	0.35	0.45	-	-	CENTER PAD TO PIN CLEARANCE
ccc	-	-	0.08	4	COPLANARITY
e	0.50 BSC		-	TERMINAL PITCH	

NOTES:

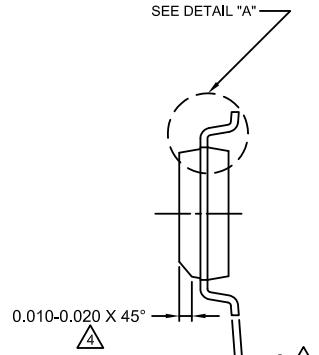
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.
4. COPLANARITY ZONE APPLIES TO EXPOSED PAD AND TERMINALS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ±0.1 XXX ±0.05 XXXX ±0.025		THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
MATERIAL	DRAWN	NAME	DATE	TITLE	
-	-		1/17/12	PACKAGE OUTLINE	
FINISH	CHECKED	-	1/17/12	DWG NUMBER	REV A
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	SKI	2/17/12	48SQFN-5304-7x7B	SHEET 1 OF 1
	SCALE	1:1	STD COMPLIANCE	JEDEC: MO-220	

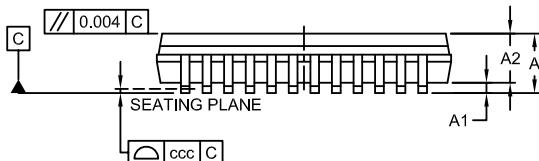
NOTES



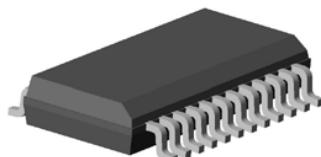
TOP VIEW



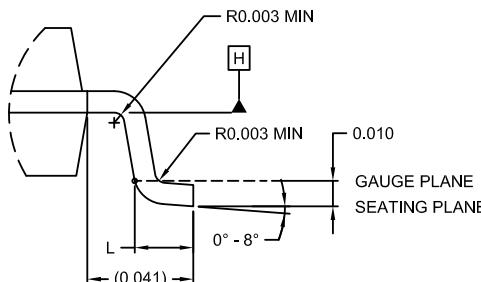
END VIEW



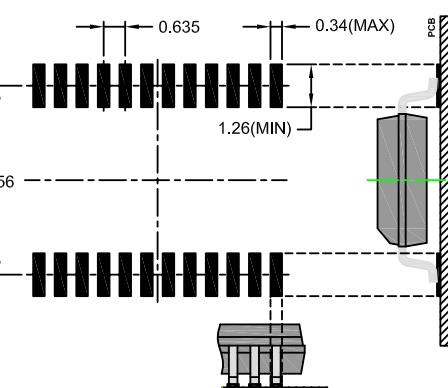
SIDE VIEW



3-D VIEW



DETAIL "A"



THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY.

PCB LAND PATTERN

REVISION HISTORY

REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/26/01	S.K.ILIEV
B	W&H to be b&c, par tol, 3-D & note 6 added, note 4 add	3/11/05	S.K.ILIEV
C	REMOVED THE LOGO FROM THE TITLE BLOCK	9/25/07	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.053	—	0.069	—	OVERALL PKG HEIGHT
A1	0.004	—	0.010	—	STANOFF
A2	0.049	—	0.065	—	BODY THICKNESS
D	SEE VARIATIONS			3	"X" BODY SIZE
E	0.228	—	0.244	—	LEAD SPAN
E1	0.150	0.154	0.158	3	"Y" BODY SIZE
L	0.016	—	0.035	—	LEAD FOOT LENGTH
b	0.008	0.010	0.012	2,6	LEAD WIDTH
c	0.006	—	0.010	6	LEAD FOOT THICKNESS
e	0.025 BSC			—	LEAD PITCH
ccc	SEE VARIATIONS			—	COPLANARITY

ccc (VARIATIONS)

SITE	MODE	MAX
ASSEMBLY	100% SCAN	0.0027
HOUSE	QA	0.0030
TEST HOUSE	100% & QA	0.0035

D (VARIATIONS)

N	MIN	NOM	MAX
16	0.189	0.193	0.197
24	0.337	0.341	0.345
28	0.386	0.390	0.394

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. TRUE POSITION TOLERANCE OF EACH LEAD IS ± 0.0035 INCHES AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
3. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. THEY SHALL NOT EXCEED 0.006 INCHES PER END. DIMENSION "E1" DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. THEY SHALL NOT EXCEED 0.006 INCHES PER SIDE. "D" AND "E1" ARE DETERMINED AT DATUM "H" AND INCLUDE ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
4. THIS CHAMFER FEATURE IS OPTIONAL.
5. DETAILS OF PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.
6. "b" AND "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.004 TO 0.010 INCHES FROM THE LEAD TIP.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL ANGULAR
XX ± 0.1 $\pm 1^\circ$
XXX ± 0.05
XXXX ± 0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

MATERIAL	DRAWN	NAME	DATE
-	S.K.ILIEV	4/20/01	

FINISH	CHECKED	NAME	DATE
-	S.K.ILIEV	4/21/01	

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	NAME	DATE
-	S.K.ILIEV	4/26/01	

THIRD ANGLE PROJECTION



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE

PACKAGE OUTLINE
SSOP FAMILY, 0.150" WIDE BODY, 0.025" PITCH

DWG NUMBER

AP-SSOP-0.150"-WIDE

REV
C

SCALE

1:1

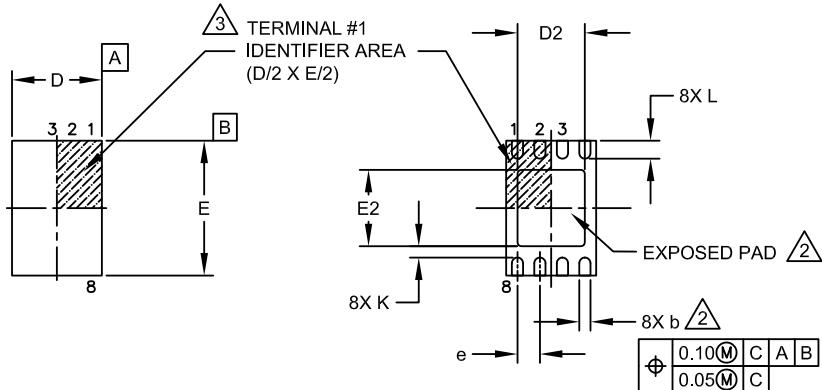
STD COMPLIANCE

JEDEC: MO-137

HEET

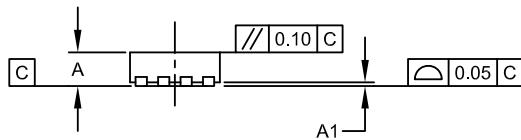
1 OF 1

NOTES

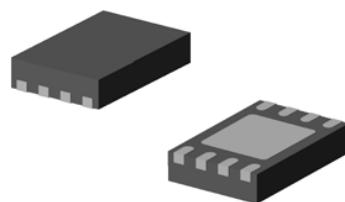


TOP VIEW

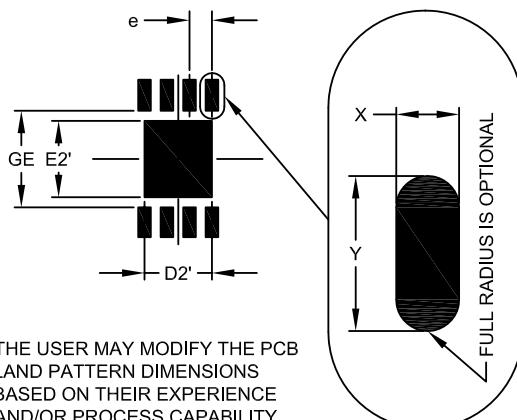
BOTTOM VIEW



SIDE VIEW



3-D VIEWS



THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

RECOMMENDED PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GE	2.10	-	2.20
D2'	-	1.50	1.50
E2'	-	1.70	1.70
X	-	-	0.28
Y	-	-	0.69
e	0.50		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL
X.X ±0.1
X.XX ±0.05
X.XXX ±0.025

ANGULAR
±1°

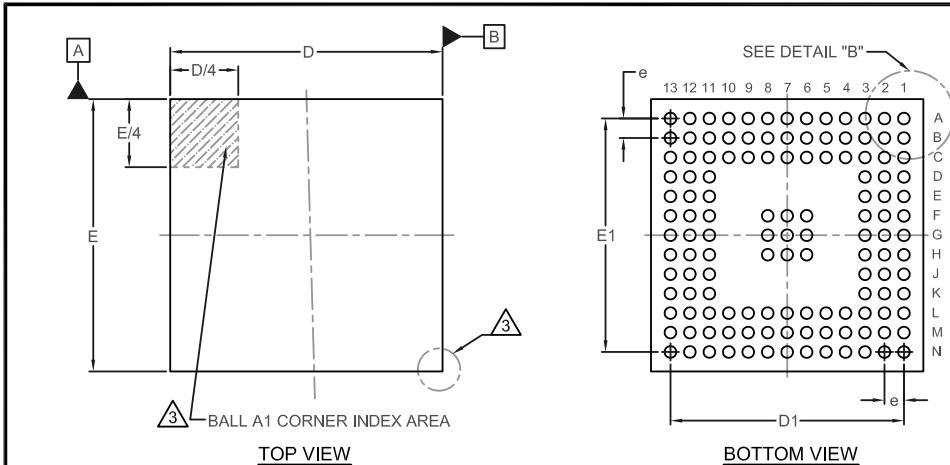
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

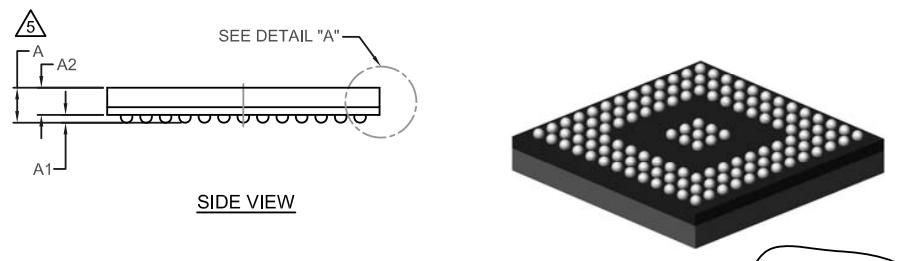
TITLE		PACKAGE OUTLINE	
		8 TERMINAL TDFN, 2x3mm BODY, 0.50mm PITCH (TYPE-1, DUAL-IN-LINE & SAW SINGULATE DESIGN)	
MATERIAL		DRAWN	8/6/09
FINISH		CHECKED	8/6/09
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	SCALE	STD COMPLIANCE
	S.K.Iliev	1:1	MO-229
	8/6/09		
REV	A	SHEET	
		1 OF 1	

NOTES

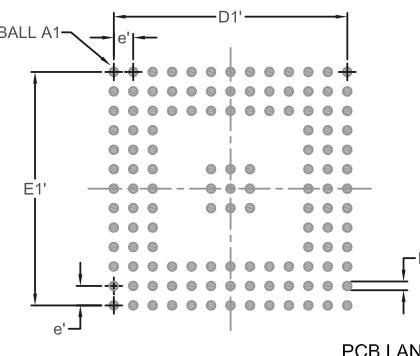
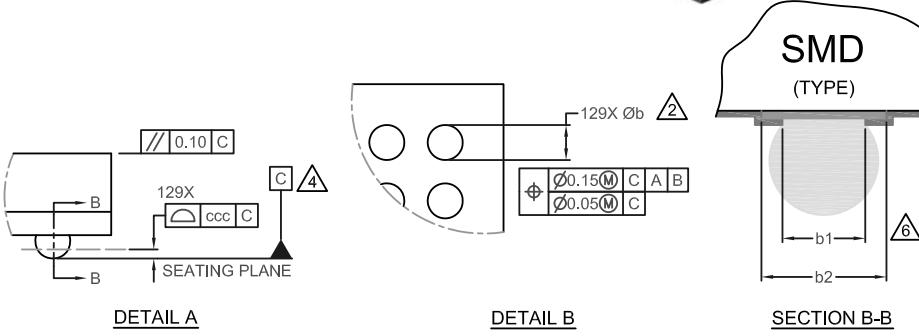


REVISION HISTORY

REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	7/28/10	S.K.ILIEV
B	INITIAL RELEASE	11/4/10	S.K.ILIEV
C	ADDED b1 AND b2 DIMENSIONS	11/15/11	SKI



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.99	1.10	1.20	5	OVERALL PACKAGE HEIGHT
A1	0.20	0.24	0.28	-	STANOFF
A2	0.80	0.86	0.92	-	PKG BODY THICKNESS
D/E	6.90	7.00	7.10	-	X/Y BODY SIZE
D1/E1	6.00 BSC			-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
b1	0.23	0.27	0.31	6	FINISHED SOLDER MASK OPENING
b2	0.30	0.35	0.40	-	FINISHED BOTTOM BALL PAD
e	0.50 BSC			-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY



LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'/E1'	-	6.00	-
b'	-	0.27	-
e'	-	0.50	-

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

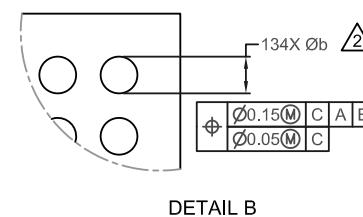
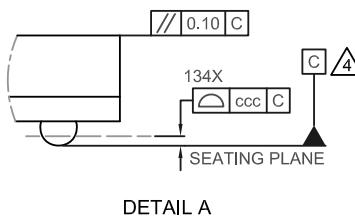
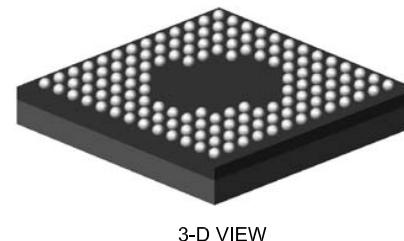
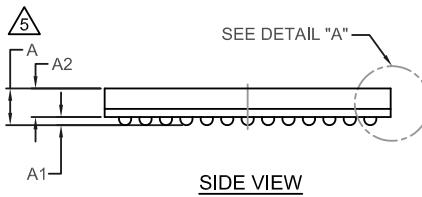
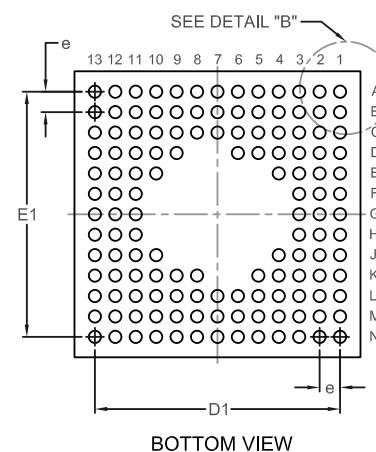
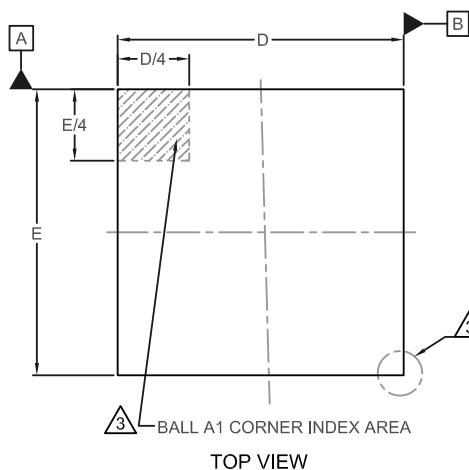
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. THE PKG BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD).

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ±0.1 XXX ±0.05 XXXX ±0.025	ANGULAR ±1°	THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994			NAME	DATE	
MATERIAL	N/A		DRAWN	7/27/10	
FINISH	N/A		CHECKED	S.K.ILIEV	7/28/10
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING			APPROVED	S.K.ILIEV	7/28/10
DWG NUMBER	129TFBGA-7x7B-0.5P		REV	C	
SCALE	1:1	STD COMPLIANCE	JEDEC: MO-195		SHEET 1 OF 1

REVISION HISTORY

REV	DESCRIPTION	DATE	REL. BY
A	INITIAL RELEASE	10/21/07	S.K.ILIEV
B	INITIAL PRODUCTION RELEASE. ADDED A2 (min)	2/20/09	S.K.ILIEV



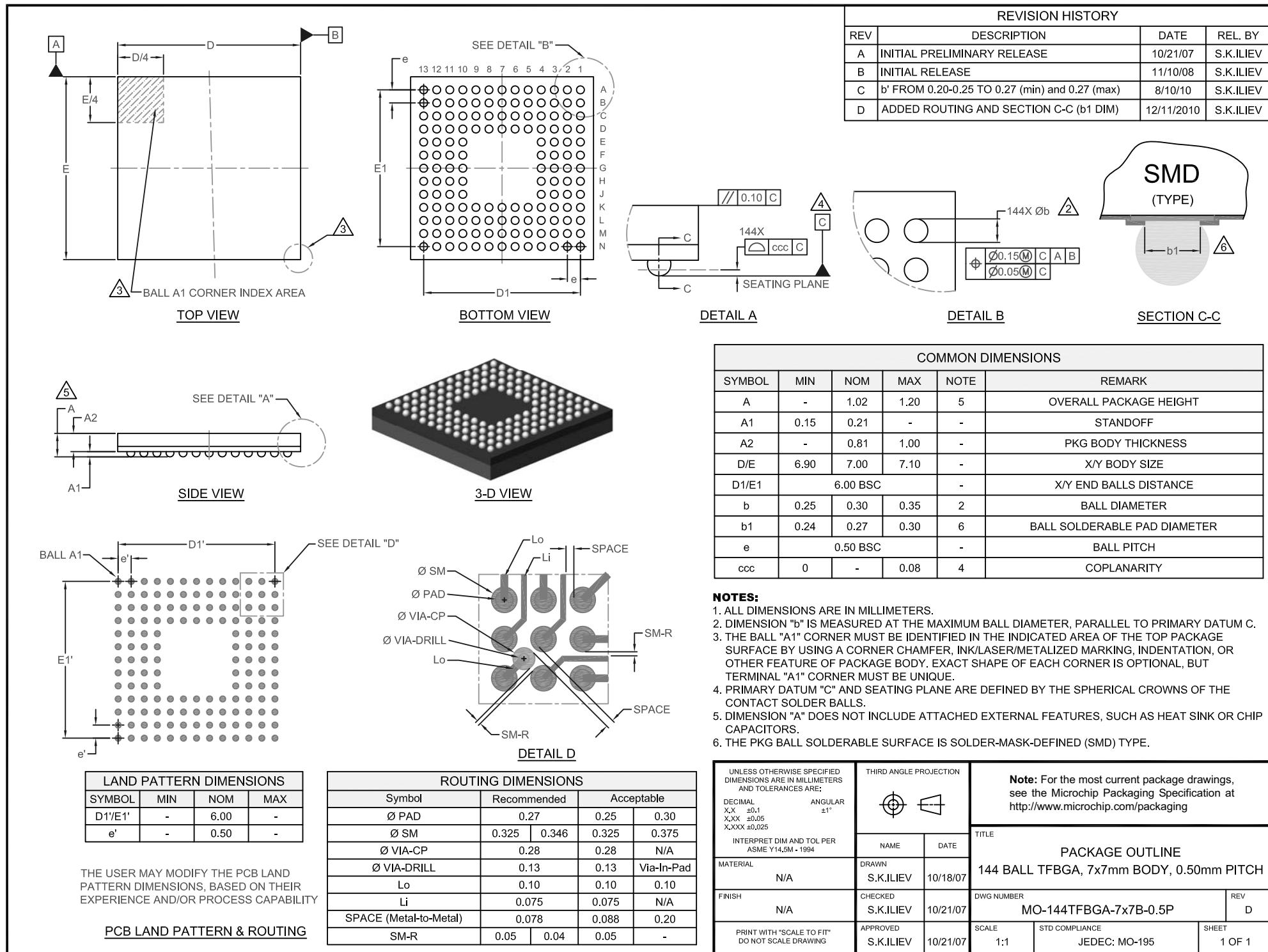
COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	1.02	1.20	5	OVERALL PACKAGE HEIGHT
A1	0.15	0.21	-	-	STANOFF
A2	0.71	0.81	1.00	-	PKG BODY THICKNESS
D/E	6.90	7.00	7.10	-	X/Y BODY SIZE
D1/E1	6.00 BSC			-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
e	0.50 BSC			-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

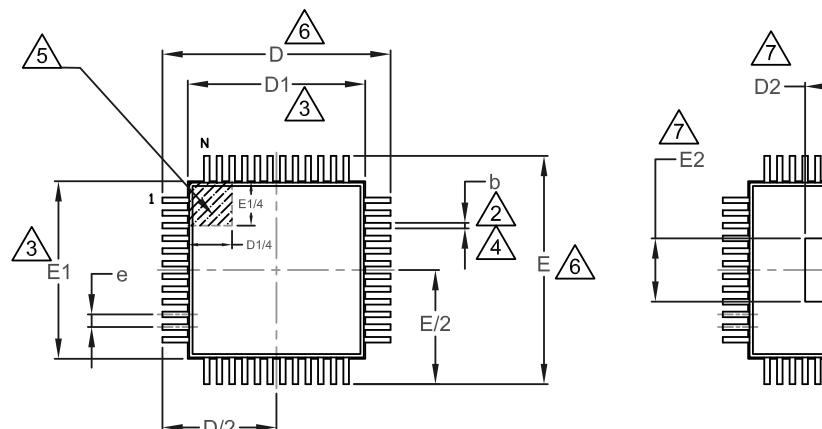
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.

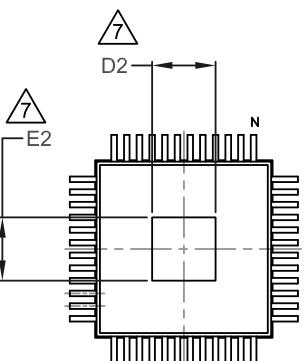
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025	THIRD ANGLE PROJECTION ANGULAR $\pm 1^\circ$	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	NAME DRAWN - DATE 10/18/07	TITLE PACKAGE OUTLINE 134 BALL TFBGA, 7x7mm BODY, 0.50mm PITCH
MATERIAL N/A	FINISH N/A	DWG NUMBER MO-134TFBGA-7x7B-0.5P REV B
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV 10/21/07	SCALE 1:1 STD COMPLIANCE JEDEC: MO-195 SHEET 1 OF 1



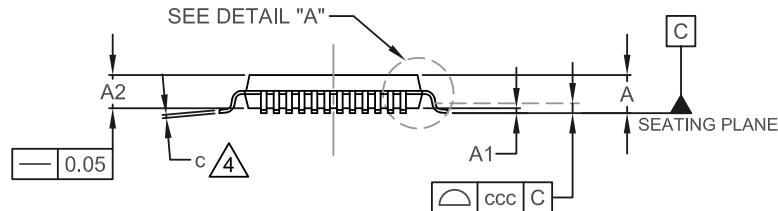
NOTES



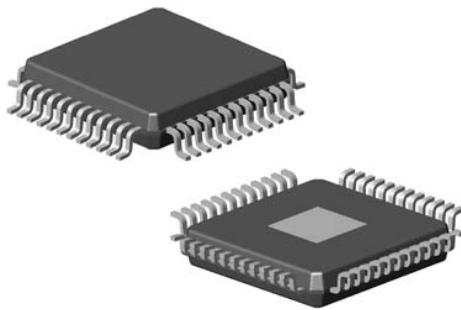
TOP VIEW



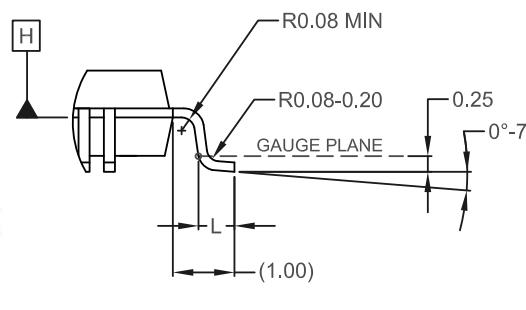
BOTTOM VIEW
(XTQFP only)



SIDE VIEW



3-D VIEWS



DETAIL "A"

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/26/01	S.K.ILIEV
B	Par tol, 3-D & note 6 added, note 4 changed	3/18/05	S.K.ILIEV
C	Removed logo in title block, added XTQFP package	9/25/07	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.60	-	OVERALL PKG HEIGHT
A1	0.05	-	0.15	-	STANOFF
A2	1.35	1.40	1.45	-	BODY THICKNESS
L	0.45	0.60	0.75	-	LEAD FOOT LENGTH
c	0.09	-	0.20	4	LEAD FOOT THICKNESS
ccc	SEE TABLE		-	COPLANARITY	

VARIATIONS

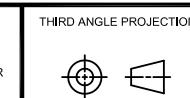
N	48-TQFP		208-TQFP		256-XTQFP		NOTE
	SYM	MIN	MAX	MIN	MAX	MIN	MAX
D/E	8.80	9.20	29.80	30.20	29.80	30.20	6
D1/E1	6.80	7.20	27.80	28.20	27.80	28.20	3
D2/E2	N/A		N/A		5.85	6.15	7
e	0.50	BSC	0.50	BSC	0.40 BSC		
b	0.17	0.27	0.17	0.27	0.13	0.23	2, 4

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.04 mm AT MAXIMUM MATERIAL CONDITIONS. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED MOLD PROTRUSION IS 0.25 mm PER SIDE. "D1" AND "E1" ARE MAXIMUM PLASTIC BODY SIZE DIMENSIONS INCLUDING MOLD MISMATCH, AND ARE DETERMINED AT PLANE "H".
4. DIMENSIONS "b" AND "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 mm AND 0.25 mm FROM THE LEAD TIP.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.
6. DIMENSIONS "D" AND "E" TO BE DETERMINED AT SEATING PLANE "C".
7. EXPOSED PAD SHALL BE COPLANAR WITH BOTTOM OF PACKAGE WITHIN 0.05 MM.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL X.X ± 0.1
X.XX ± 0.05
X.XXX ± 0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994



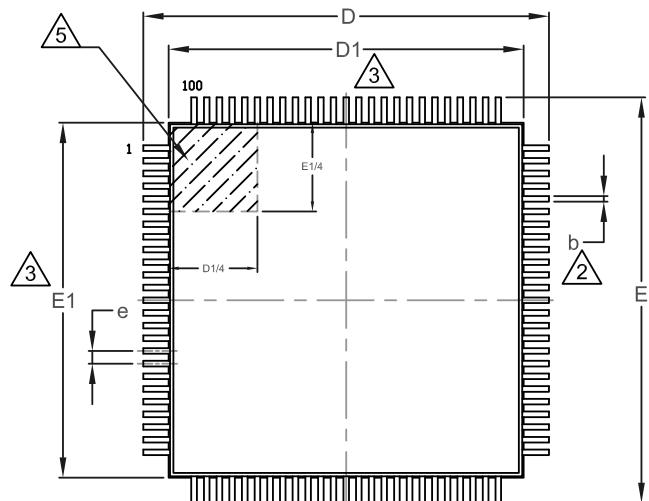
TITLE
PACKAGE OUTLINE
TQFP, 1.4mm THICK, SQUARE FAMILY

Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

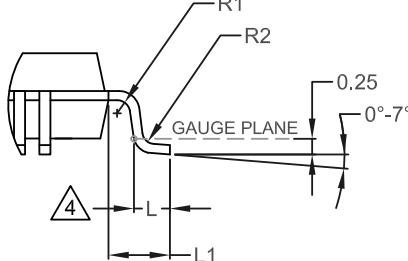
MATERIAL	DRAWN	NAME	DATE	DWG NUMBER	REV
FINISH	CHECKED	S.K.ILIEV	4/23/01	AP-TQFP-1.4T-SQ	C
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED	S.K.ILIEV	4/26/01	SCALE 1:1	STD COMPLIANCE JEDEC: MS-026

REVISION HISTORY

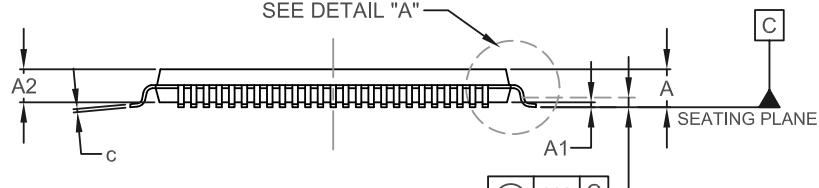
REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-



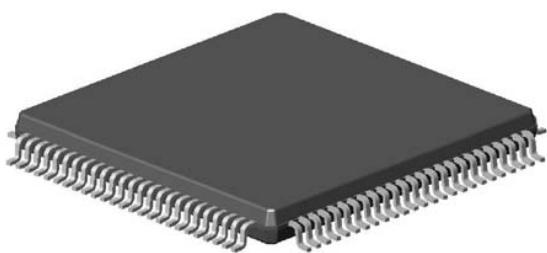
TOP VIEW



DETAIL "A"



SIDE VIEW



3-D VIEW

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.60	-	OVERALL PACKAGE HEIGHT
A1	0.05	-	0.15	-	STANOFF
A2	1.35	1.40	1.45	-	BODY THICKNESS
D/E	15.80	-	16.20	-	"X"/"Y" SPAN
D1/E1	13.90	14.00	14.10	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			-	LEAD LENGTH
b	0.17	0.22	0.27	2	LEAD WIDTH
c	0.09	-	0.20		LEAD FOOT THICKNESS
e	0.50 BSC			-	LEAD PITCH
R1	0.08	-	-		LEAD SHOULDER RADIUS
R2	0.08	-	0.20		LEAD FOOT RADIUS
ccc	-	-	0.08	-	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.04 mm MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL ANGULAR
XX ± 0.1 $\pm 1^\circ$
XXX ± 0.05
XXXX ± 0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

MATERIAL DRAWN
- S.K.JLIEV 12/17/04

FINISH CHECKED
- S.K.JLIEV 12/17/04

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE
PACKAGE OUTLINE

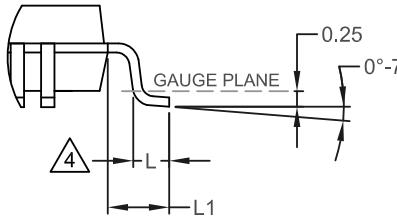
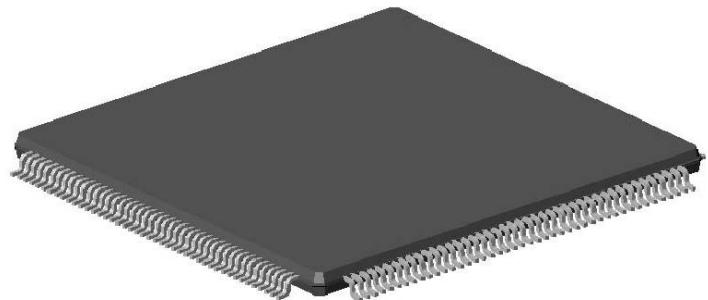
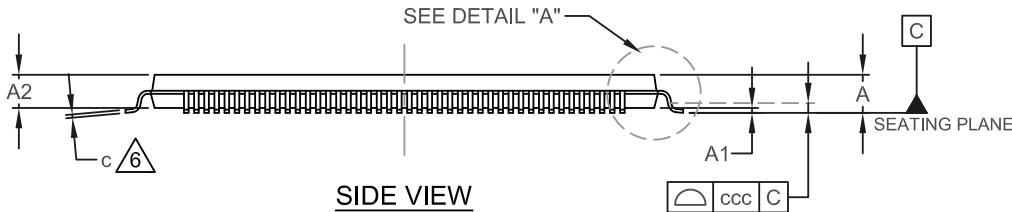
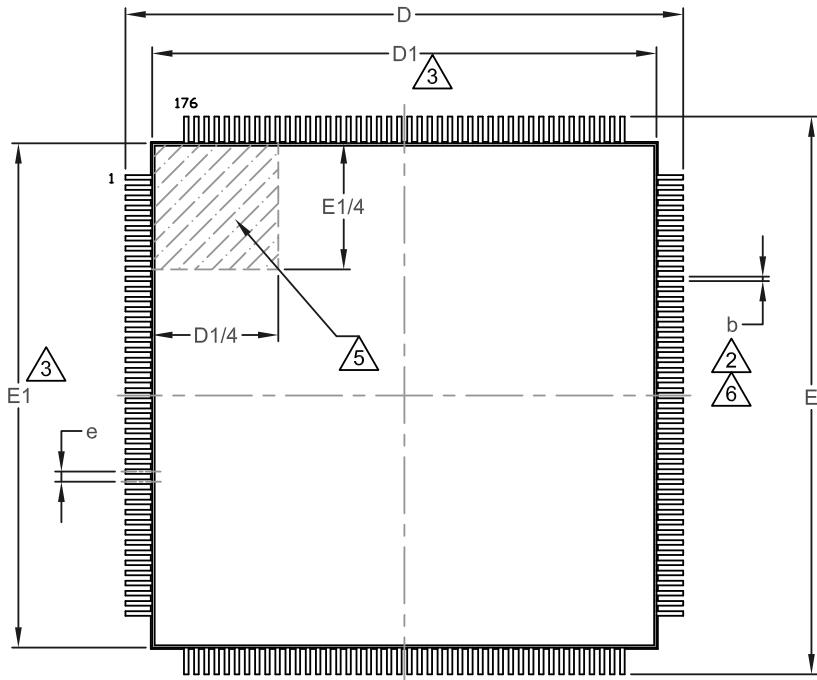
100 PIN TQFP-14x14x1.4mm BODY-0.5mm PITCH

DWG NUMBER
MO-100-TQFP-14x14x1.4 REV
C

SCALE
1:1 STD COMPLIANCE
JEDEC: MS-026 (D) SHEET
1 OF 1

REVISION HISTORY

REVISION	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	7/20/04	S.K.ILIEV



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	—	—	1.60	—	OVERALL PACKAGE HEIGHT
A1	0.05	—	0.15	—	STANDOFF
A2	1.35	1.40	1.45	—	BODY THICKNESS
D/E	21.80	—	22.20	—	"X"/"Y" SPAN
D1/E1	19.80	20.00	20.20	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			—	LEAD LENGTH
b	0.13	0.18	0.23	2,6	LEAD WIDTH
c	0.09	—	0.20	6	LEAD FOOT THICKNESS
e	0.40 BSC			—	LEAD PITCH
ccc	—	—	0.08	—	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS $\pm 0.035\text{mm}$ AT MAXIMUM MATERIAL CONDITION.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE. "D1" AND "E1" ARE MAXIMUM PLASTIC BODY SIZE DIMENSIONS INCLUDING MOLD MISMATCH.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.
6. DIMENSIONS "b" & "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10mm AND 0.25 mm FROM THE LEAD TIP.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:DECIMAL
X.X ± 0.1
X.XX ± 0.05
X.XXX ± 0.025
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994ANGULAR
 $\pm 1^\circ$
NAME DATE
S.K.ILIEV 5/4/04MATERIAL -
FINISH -
PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWINGDRAWN
APPROVED
S.K.ILIEV 7/19/04CHECKED
S.K.ILIEV 7/20/04SCALE
1:1

THIRD ANGLE PROJECTION



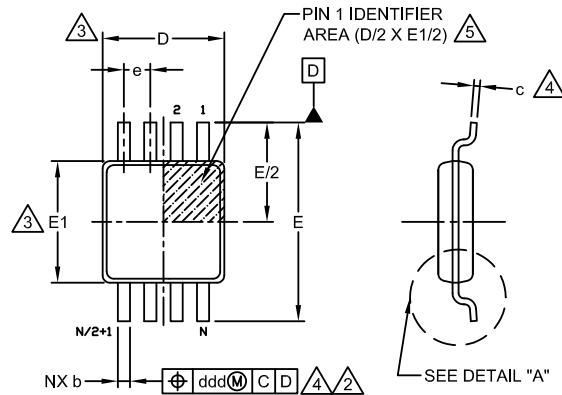
NAME DATE

TITLE
PACKAGE OUTLINE

176 PIN TQFP-20x20x1.4mm BODY-0.4mm PITCH

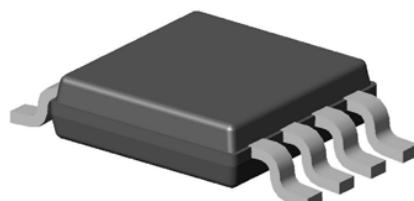
DWG NUMBER
MO-176-TQFP-20x20x1.4REV
ASTD COMPLIANCE
JEDEC: MS-026 (D)SHEET
1 OF 1Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

NOTES

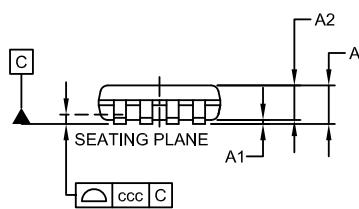


TOP VIEW

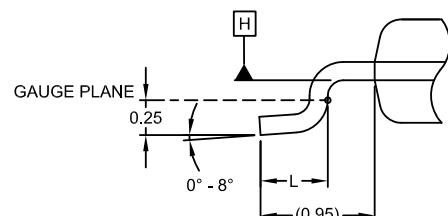
END VIEW



3-D VIEW



SIDE VIEW



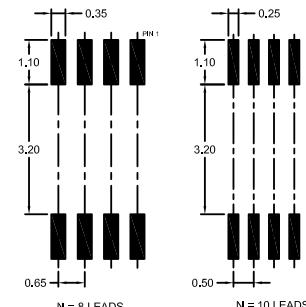
DETAIL "A"

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
3. DIMENSIONS "D" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS, FLASH OR INTERLEAD FLASH. MAXIMUM MOLD PROTRUSIONS, FLASH OR INTERLEAD FLASH IS 0.15 mm PER END OR SIDE. "D" AND "E1" ARE DETERMINED AT DATUM PLANE "H" AND INCLUDE ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
4. DIMENSIONS "b" AND "c" APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 AND 0.15 mm FROM THE LEAD TIP.
5. DETAILS OF PIN 1 IDENTIFIER ARE OPTIONAL, BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

VAR	D		e	ddd	b	
N	MIN	MAX	BSC	MAX	MIN	MAX
8	2.80	3.20	0.65	0.13	0.22	0.38
10	2.80	3.20	0.50	0.08	0.17	0.27

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	7/07/04	S.K.ILIEV
B	REMOVED THE LOGO FROM THE TITLE BLOCK	9/25/07	S.K.ILIEV



RECOMMENDED PCB LAND PATTERN

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	—	1.10	—	OVERALL PKG HEIGHT
A1	0.05	—	0.15	—	STANOFF
A2	0.75	0.85	0.95	—	BODY THICKNESS
D	SEE VARIATIONS			3	"X" BODY SIZE
E	4.65	4.90	5.15	—	LEAD SPAN
E1	2.80	3.00	3.20	3	"Y" BODY SIZE
L	0.40	0.60	0.80	—	LEAD FOOT LENGTH
b	SEE VARIATIONS			2,4	LEAD WIDTH
c	0.08	—	0.23	4	LEAD FOOT THICKNESS
e	SEE VARIATIONS			—	LEAD PITCH
0	—		0.10	—	COPLANARITY
ddd	SEE VARIATIONS			—	LEAD TRUE POSITION SPREAD

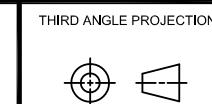
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL
X.X ±0.1
X.XX ±0.05
X.XXX ±0.025

ANGULAR
±1°
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

MATERIAL
-
DRAWN
S.K.ILIEV
7/05/04

FINISH
-
CHECKED
S.K.ILIEV
7/05/04

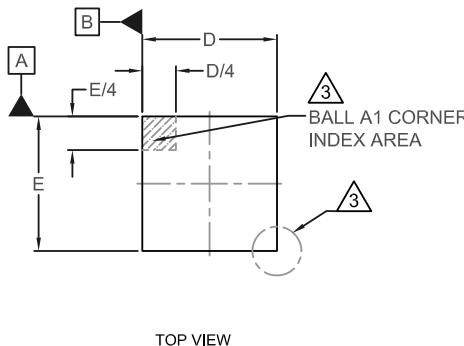
PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING



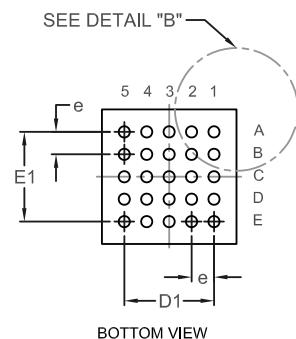
Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE			
PACKAGE OUTLINE			
TSSOP FAMILY, 3.0 MM WIDE BODY			
DWG NUMBER		REV	
MO-TSSOP-3.0mm-WIDE		B	
APPROVED S.K.ILIEV 7/07/04	SCALE 1:1	STD COMPLIANCE JEDEC: MO-187	SHEET 1 OF 1

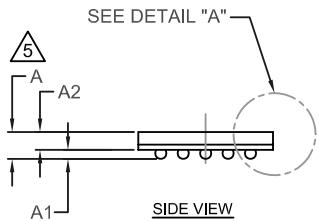
NOTES



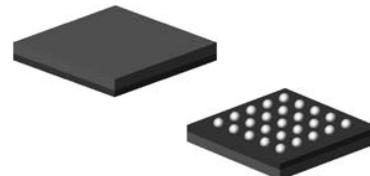
TOP VIEW



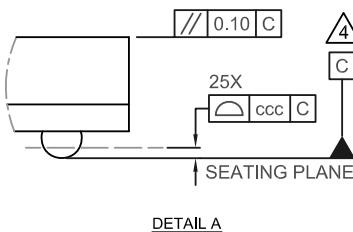
BOTTOM VIEW



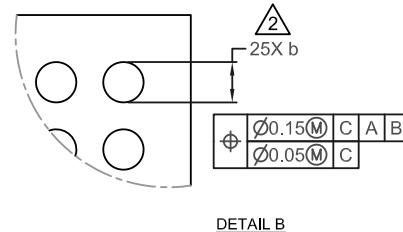
SIDE VIEW



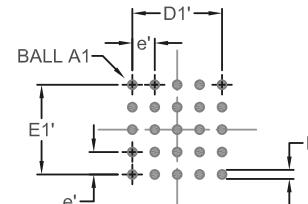
3-D VIEWS



DETAIL A



DETAIL B



PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'/E1'	-	2.00	-
b'	0.20	-	0.25
e'	-	0.50	-

PCB LAND PATTERN

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	0.61	0.62	5	OVERALL PACKAGE HEIGHT
A1	0.18	0.23	-	-	STANDOFF
A2	0.40 REF			-	PKG BODY THICKNESS
D/E	2.90	3.00	3.10	-	X/Y BODY SIZE
D1/E1	2.00 BSC			-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
e	0.50 BSC			-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

DECIMAL ANGULAR
XX ±0.1 ±1°
XXX ±0.05
XXXX ±0.025

INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

MATERIAL	DRAWN
N/A	S.K.ILIEV
	11/7/07

FINISH	CHECKED
N/A	S.K.ILIEV
	11/7/07

PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED
	S.K.ILIEV
	11/7/07



Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

TITLE
PACKAGE OUTLINE
25 BALL UFBGA, 3x3mm BODY, 0.50mm PITCH

DWG NUMBER
AP-25UFBGA-3x3B-0.5P

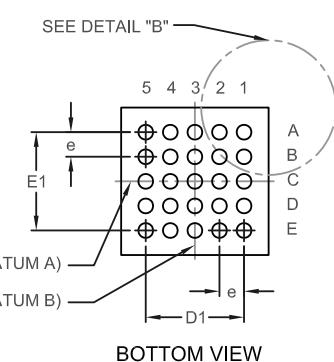
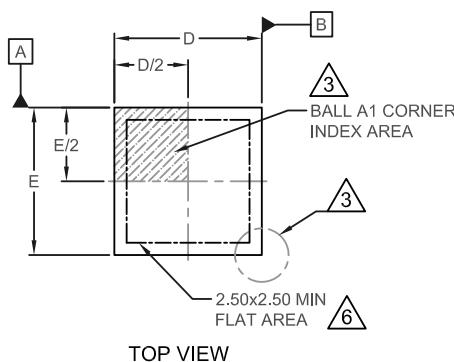
REV
B

SCALE
1:1

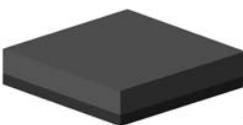
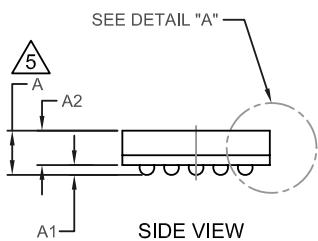
STD COMPLIANCE
MO-280

SHEET
1 OF 1

NOTES

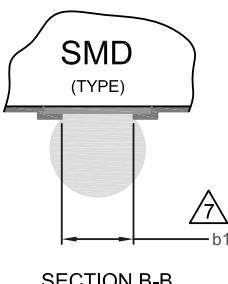


TOP VIEW

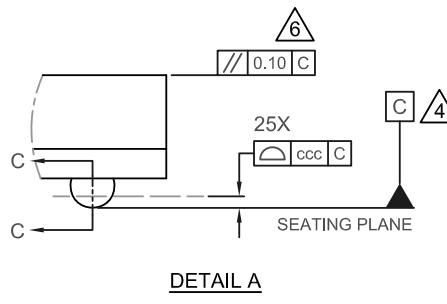


SIDE VIEW

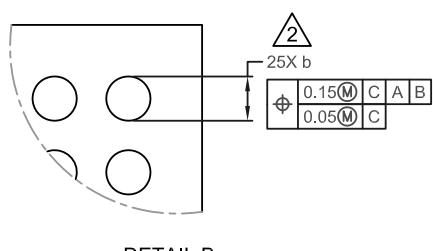
3-D VIEWS



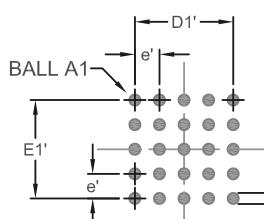
SECTION B-B



DETAIL A



DETAIL B



THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

LAND PATTERN DIMENSIONS

SYMBOL	MIN	NOM	MAX
D1'/E1'		2.00 BSC	
b'	0.25	0.25	0.28
e'		0.50 BSC	

REVISION HISTORY				
REV	DESCRIPTION	DATE	REL. BY	
A	INITIAL RELEASE	6/8/06	S.K.ILIEV	
B	ADDED b1, Amin, Amax and A2max. Updated PCB dimensions accordingly.	April-2010	S.K.ILIEV	

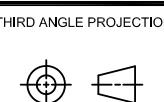
COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.77	-	1.00	5	OVERALL PACKAGE HEIGHT
A1	0.15	-	0.29	-	STANDOFF
A2	0.65	-	0.71	-	PKG BODY THICKNESS
D/E	2.90	3.00	3.10	-	X/Y BODY SIZE
D1/E1	2.00 BSC			-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
b1	0.22	0.25	0.28	7	SOLDERABLE SURFACE
e	0.50 BSC			-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. PARALLELISM ON THE TOP SURFACE APPLIES ONLY TO THE MINIMUM FLAT AREA SHOWN ON THE TOP VIEW.
7. THE PACKAGE BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD).

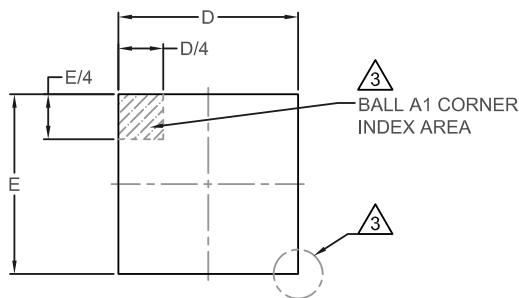
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:
DECIMAL
X.X ± 0.1
X.XX ± 0.05
XXXX ± 0.025

ANGULAR $\pm 1^\circ$
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

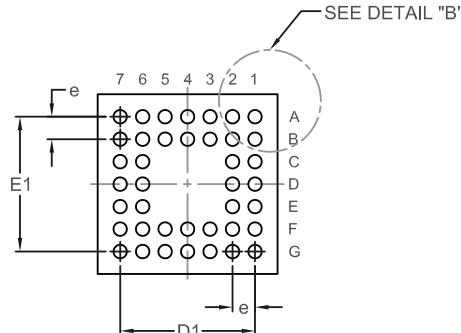


Note: For the most current package drawings,
see the Microchip Packaging Specification at
<http://www.microchip.com/packaging>

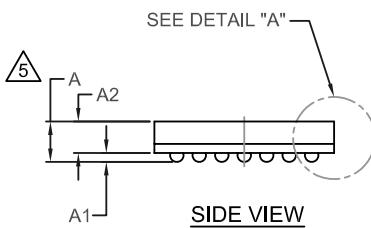
TITLE		PACKAGE OUTLINE		
		25 BALL VFBGA, 3x3mm BODY, 0.50mm PITCH		
		DWG NUMBER		REV
25VFBGA-3x3B-0.5P				
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	SCALE 1:1	STD COMPLIANCE -	SHEET 1 OF 1



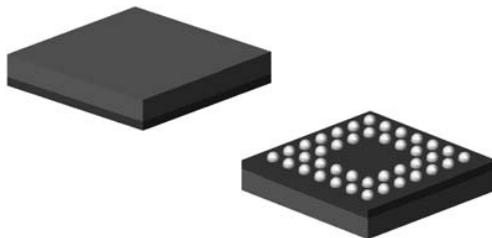
TOP VIEW



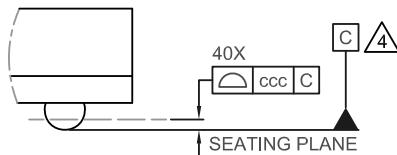
BOTTOM VIEW



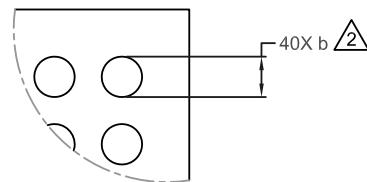
SIDE VIEW



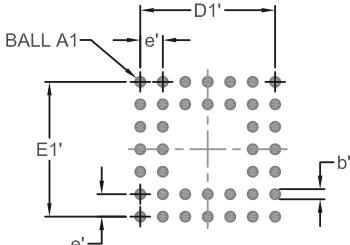
3-D VIEWS



DETAIL A



DETAIL B



RECOMMENDED PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'E1'	-	3.00	-
b'	0.20	-	0.25
e'	-	0.50	-

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS, BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

REVISION HISTORY			
REV	DESCRIPTION	DATE	REL. BY
A	INITIAL RELEASE	5/25/06	S.K.ILIEV

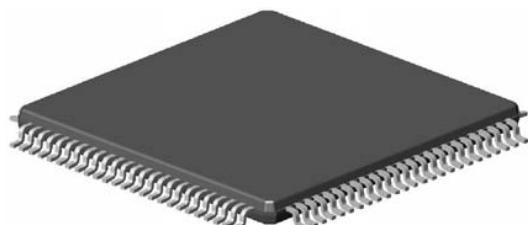
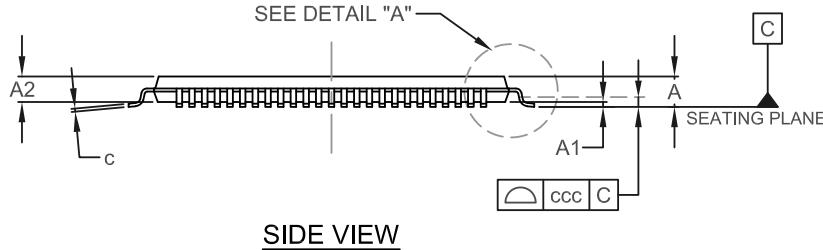
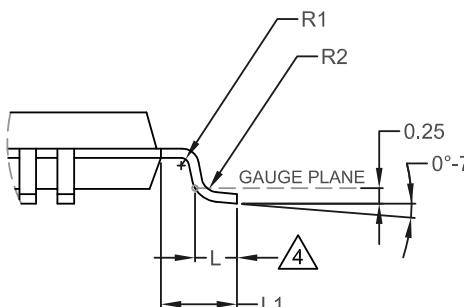
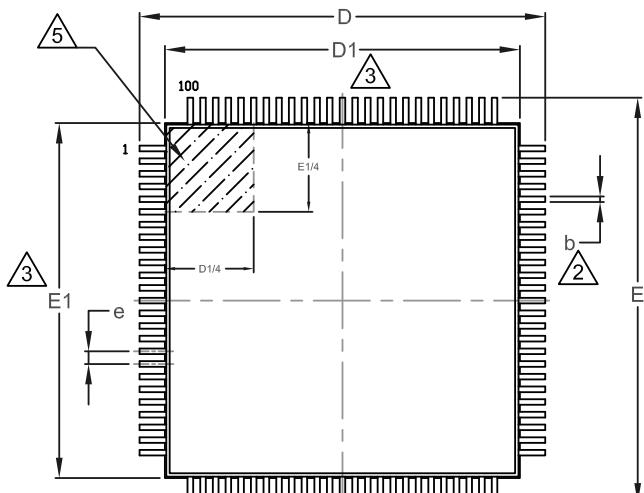
COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.00	5	OVERALL PACKAGE HEIGHT
A1	0.15	-	-	-	STANDOFF
A2	0.65	-	-	-	PKG BODY THICKNESS
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D1/E1	3.00 BSC			-	X/Y END BALLS DISTANCE
b	0.25	0.30	0.35	2	BALL DIAMETER
e	0.50 BSC			-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. MAXIMUM RADIAL TRUE POSITION TOLERANCE OF EACH BALL IS $\pm 0.075\text{mm}$ AT MAXIMUM MATERIAL CONDITION. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XXX ± 0.05 XXXX ± 0.025		ANGULAR $\pm 1^\circ$	THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging	
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994	NAME	DATE		TITLE	
MATERIAL	DRAWN S.K.ILIEV	5/25/06		PACKAGE OUTLINE	
FINISH	CHECKED S.K.ILIEV	5/25/06		40 BALL VFBGA, 4x4mm BODY, 0.50mm PITCH	
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	5/25/06	DWG NUMBER	MO-40VFBGA-4x4B-0.5P	REV A
			SCALE	STD COMPLIANCE	SHEET
			1:1	JEDEC: MO-225	1 OF 1

REVISION	DESCRIPTION	DATE	RELEASED BY
-	SEE SPEC FRONT PAGE FOR REVISION HISTORY	-	-



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.20	-	OVERALL PACKAGE HEIGHT
A1	0.05	-	0.15	-	STANOFF
A2	0.95	-	1.05	-	BODY THICKNESS
D/E	15.80	-	16.20	-	"X"/"Y" SPAN
D1/E1	13.90	14.00	14.10	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			-	LEAD LENGTH
b	0.17	0.22	0.27	2	LEAD WIDTH
c	0.09	-	0.20	-	LEAD FOOT THICKNESS
e	0.50 BSC			-	LEAD PITCH
R1	0.08	-	-	-	LEAD SHOULDER RADIUS
R2	0.08	-	0.20	-	LEAD FOOT RADIUS
ccc	-	-	0.08	-	COPLANARITY

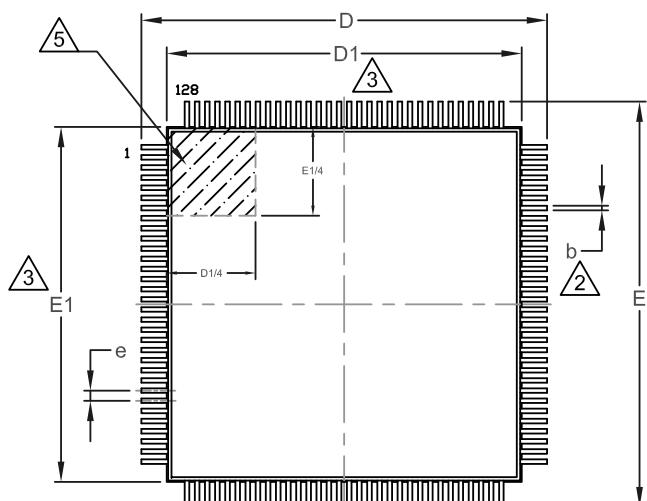
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.04 mm MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

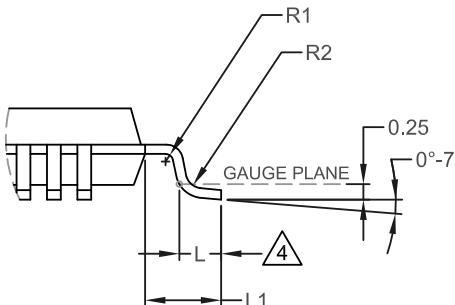
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL XX ± 0.1 XX.X ± 0.05 XXX ± 0.025 INTERPRET DIM AND TOL PER ASME Y14.5M - 1994		THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
MATERIAL	NAME	DATE	TITLE PACKAGE OUTLINE 100 VTQFP-14x14x1.0mm BODY-0.5mm PITCH			
FINISH	CHECKED S.K.Iliev	12/17/04	DWG NUMBER MO-100-VTQFP-14x14x1.0		REV C	SHEET 1 OF 1
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.Iliev	12/17/04	SCALE 1:1	STD COMPLIANCE JEDEC: MS-026 (D)		

REVISION HISTORY

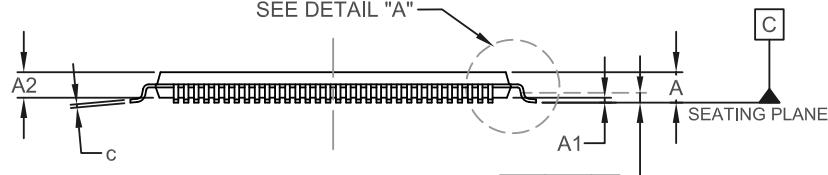
REV	DESCRIPTION	DATE	RELEASED BY
C	DESCRIPTION OF CHANGES - IN FRONT PAGE OF MO SPEC	12/28/04	S.K.ILIEV



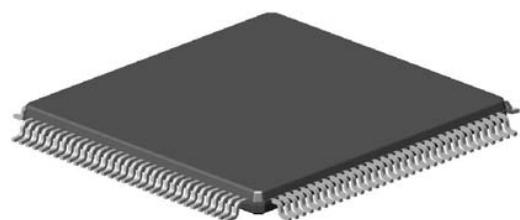
TOP VIEW



DETAIL "A"



SIDE VIEW



3-D VIEW

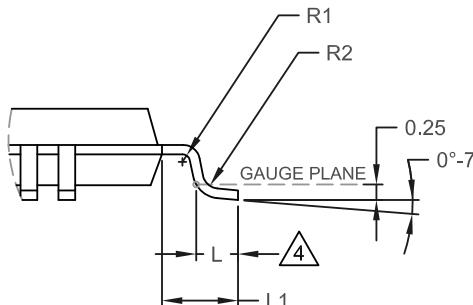
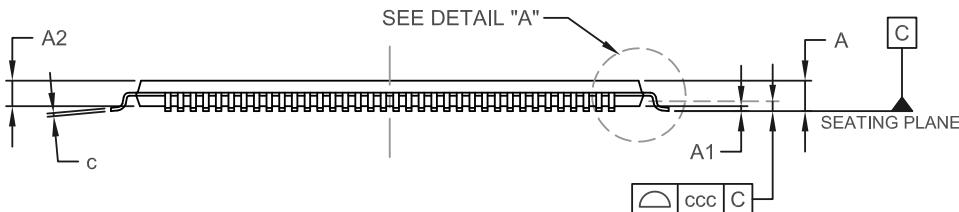
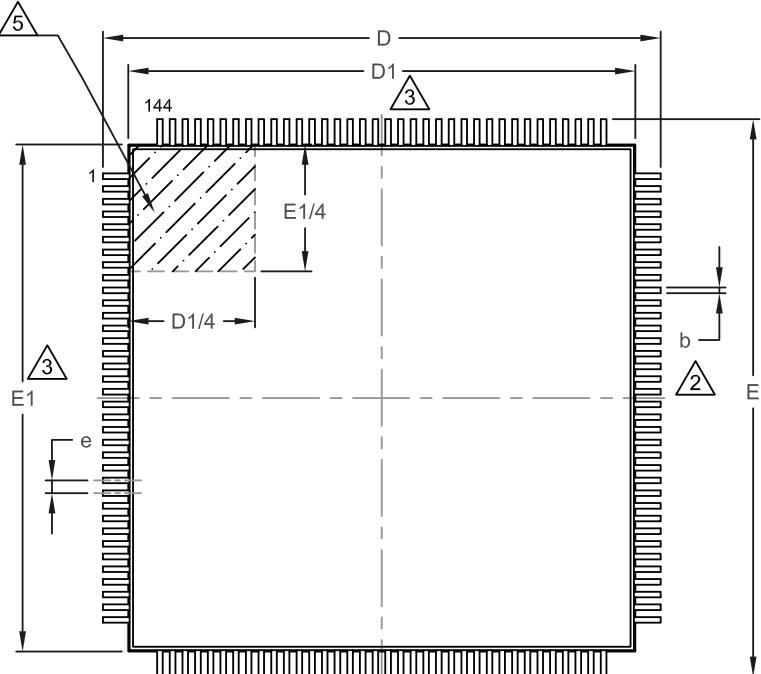
COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	—	—	1.20	—	OVERALL PACKAGE HEIGHT
A1	0.05	—	0.15	—	STANOFF
A2	0.95	—	1.05	—	BODY THICKNESS
D/E	15.80	—	16.20	—	"X"/"Y" SPAN
D1/E1	13.80	14.00	14.20	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			—	LEAD LENGTH
b	0.13	0.18	0.23	2	LEAD WIDTH
c	0.09	—	0.20	—	LEAD FOOT THICKNESS
e	0.40 BSC			—	LEAD PITCH
R1	0.08	—	—	—	LEAD SHOULDER RADIUS
R2	0.08	—	0.20	—	LEAD FOOT RADIUS
ccc	—	—	0.08	—	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS $\pm 0.035\text{mm}$ MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ± 0.1 X.XX ± 0.05 X.XXX ± 0.025		THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging	
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994		NAME	DATE	TITLE	
MATERIAL	DRAWN N/A	S.K.ILIEV	12/17/04	PACKAGE OUTLINE	
FINISH	CHECKED N/A	S.K.ILIEV	12/17/04	DWG NUMBER	
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING	APPROVED S.K.ILIEV	12/17/04	MO-128-VTQFP-14x14x1.0mm	REV	C 1 OF 1
			1:1	STD COMPLIANCE	JEDEC: MS-026

REVISION HISTORY			
REVISION	DESCRIPTION	DATE	RELEASED BY
SEE SPEC FRONT PAGE FOR REVISION HISTORY			



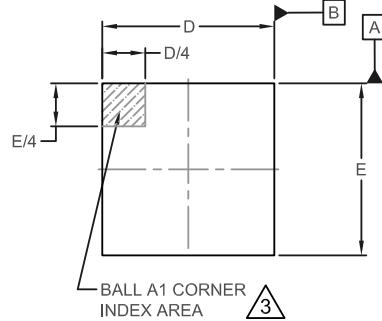
COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	—	—	1.20	—	OVERALL PACKAGE HEIGHT
A1	0.05	—	0.15	—	STANOFF
A2	0.95	—	1.05	—	BODY THICKNESS
D/E	21.80	—	22.20	—	"X"/"Y" SPAN
D1/E1	19.80	20.00	20.20	3	"X"/"Y" BODY SIZE
L	0.45	0.60	0.75	4	LEAD FOOT LENGTH
L1	1.00 REF			—	LEAD LENGTH
b	0.17	0.22	0.27	2	LEAD WIDTH
c	0.09	—	0.20	—	LEAD FOOT THICKNESS
e	0.50 BSC			—	LEAD PITCH
R1	0.08	—	—	—	LEAD SHOULDER RADIUS
R2	0.08	—	0.20	—	LEAD FOOT RADIUS
ccc	—	—	0.08	—	COPLANARITY

NOTES:

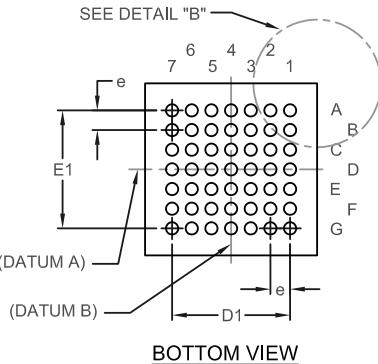
1. ALL DIMENSIONS ARE IN MILLIMETER.
2. TRUE POSITION SPREAD TOLERANCE OF EACH LEAD IS ± 0.04 mm MAXIMUM.
3. DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE.
4. DIMENSION "L" IS MEASURED AT THE GAUGE PLANE, 0.25mm ABOVE THE SEATING PLANE.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL X.X ± 0.1 X.XX ± 0.05 X.XXX ± 0.025		THIRD ANGLE PROJECTION		Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging	
INTERPRET DIM AND TOL PER ASME Y14.5M - 1994					
MATERIAL	-	DRAWN	S.K.Iliev	2/16/05	TITLE PACKAGE OUTLINE
FINISH	-	CHECKED	S.K.Iliev	2/16/05	144 VTQFP-20x20x1.0mm BODY-0.5mm PITCH
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWING		APPROVED	S.K.Iliev	2/16/05	DWG NUMBER MO-144-VTQFP-20x20x1.0
		SCALE	1:1	STD COMPLIANCE JEDEC: MS-026 (D)	REV A SHEET 1 OF 1

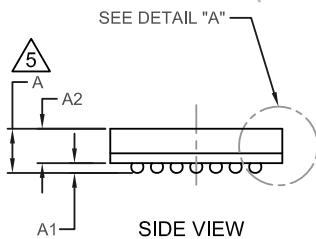
NOTES



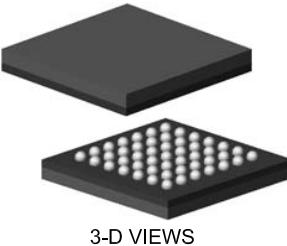
TOP VIEW



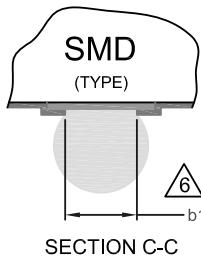
BOTTOM VIEW



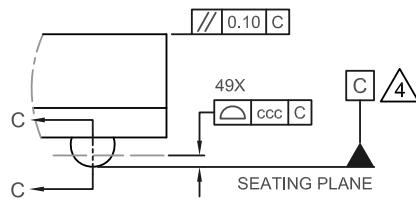
SIDE VIEW



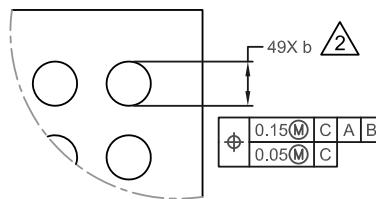
3-D VIEWS



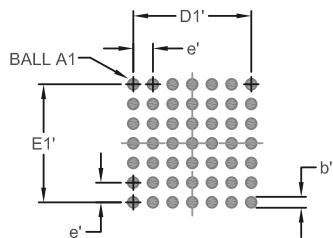
SECTION C-C



DETAIL A



DETAIL B



THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
D1'/E1'		2.40 BSC	
b'	0.22	0.22	0.25
e'		0.40 BSC	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
AND TOLERANCES ARE:

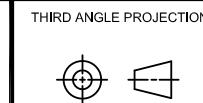
DECIMAL
X.X ± 0.1
X.XX ± 0.05
XXXX ± 0.025

ANGULAR
 $\pm 1^\circ$
INTERPRET DIM AND TOL PER
ASME Y14.5M - 1994

MATERIAL
N/A

FINISH
N/A

PRINT WITH "SCALE TO FIT"
DO NOT SCALE DRAWING



NAME DATE

DRAWN
-

CHECKED
S.K.ILIEV

APPROVED
S.K.ILIEV

11/9/10

11/22/10

11/30/10

1:1

MO-298

1 OF 1

REVISION HISTORY

REV	DESCRIPTION	DATE	REL. BY
A	INITIAL PRELIMINARY RELEASE	11/30/2010	S.K.ILIEV

COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.60	0.70	0.80	5	OVERALL PACKAGE HEIGHT
A1	0.12	0.20	0.24	-	STANOFF
A2	0.53	REF		-	PKG BODY THICKNESS
D/E	3.40	3.50	3.60	-	X/Y BODY SIZE
D1/E1	2.40	BSC		-	X/Y END BALLS DISTANCE
b	0.20	0.25	0.30	2	BALL DIAMETER
b1	0.19	0.22	0.25	6	SOLDERABLE SURFACE
e	0.40	BSC		-	BALL PITCH
ccc	0	-	0.08	4	COPLANARITY

NOTES:

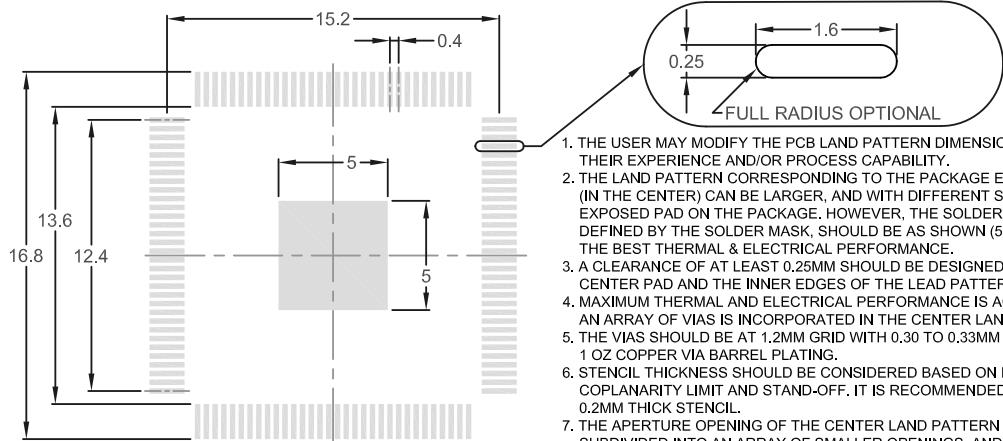
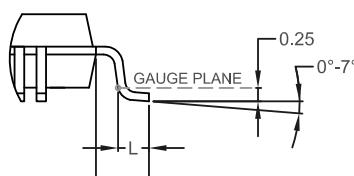
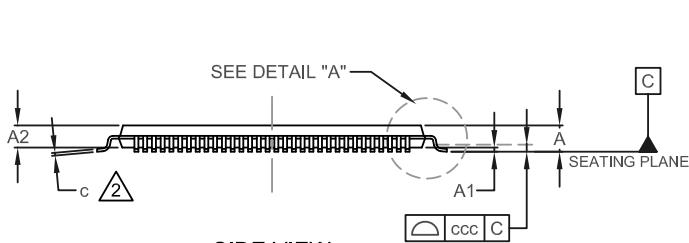
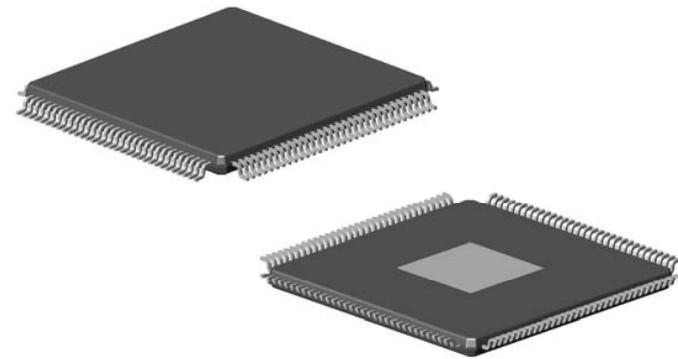
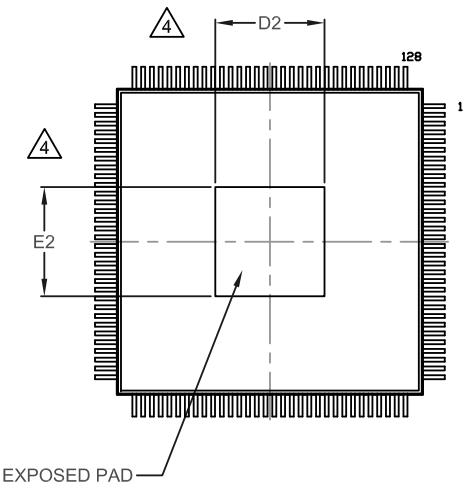
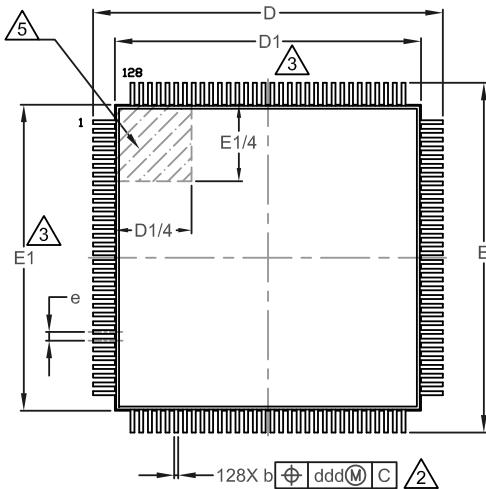
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSION "b" IS MEASURED AT THE MAXIMUM BALL DIAMETER, PARALLEL TO PRIMARY DATUM "C".
3. THE BALL "A1" CORNER MUST BE IDENTIFIED IN THE INDICATED AREA OF THE TOP PACKAGE SURFACE BY USING A CORNER CHAMFER, INK/LASER/METALIZED MARKING, INDENTATION, OR OTHER FEATURE OF PACKAGE BODY. EXACT SHAPE OF EACH CORNER IS OPTIONAL, BUT TERMINAL "A1" CORNER MUST BE UNIQUE.
4. PRIMARY DATUM "C" AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE CONTACT SOLDER BALLS.
5. DIMENSION "A" DOES NOT INCLUDE ATTACHED EXTERNAL FEATURES, SUCH AS HEAT SINK OR CHIP CAPACITORS.
6. THE PACKAGE BALL SOLDERABLE SURFACE IS SOLDER-MASK-DEFINED (SMD).

Note: For the most current package drawings, see the Microchip Packaging Specification at <http://www.microchip.com/packaging>

TITLE			PACKAGE OUTLINE	
49 BALL WFBGA, 3.5x3.5mm BODY			0.40mm PITCH	
DWG NUMBER			REV	
49WFBGA-3.5x3.5B-0.4P			A	

NOTES

REVISION HISTORY			
REV	DESCRIPTION	DATE	RELEASED BY
A	INITIAL RELEASE	4/14/07	S.K.ILIEV



COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	-	-	1.20	-	OVERALL PACKAGE HEIGHT
A1	0.05	-	0.15	-	STANDOFF
A2	0.95	1.00	1.05	-	PLASTIC BODY THICKNESS
D/E	15.80	16.00	16.20	-	X/Y SPAN
D1/E1	13.80	14.00	14.20	3	X/Y PLASTIC BODY SIZE
D2/E2	4.85	5.00	5.15	4	X/Y EXPOSED PAD SIZE
L	0.45	0.60	0.75	-	LEAD FOOT LENGTH
b	0.13	0.18	0.23	2	LEAD WIDTH
c	0.09	-	0.20	2	LEAD FOOT THICKNESS
e	0.40 BSC		-	-	LEAD PITCH
ddd	0	-	0.07	-	TRUE POSITION SPREAD
ccc	-	-	0.08	-	COPLANARITY

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. DIMENSIONS b & c APPLIES TO THE FLAT SECTION OF THE LEAD FOOT BETWEEN 0.10 AND 0.25 MM FROM THE LEAD TIP. THE BASE METAL IS EXPOSED AT THE LEAD TIP.
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE. D1 AND E1 ARE MAXIMUM PLASTIC BODY SIZE DIMENSIONS INCLUDING MOLD MISMATCH.
4. DIMENSIONS D2 AND E2 REPRESENT THE SIZE OF THE EXPOSED PAD, AND IT SHALL BE COPLANAR WITH BOTTOM OF PACKAGE WITHIN 0.05 mm.
5. DETAILS ON PIN 1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE ZONE INDICATED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DELTAS ±0.1 XX ±0.05 XXX ±0.025		ANGULAR ±1°	THIRD ANGLE PROJECTION	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging		
NAME	DATE	TITLE			DWG NUMBER	
DRAWN S.K.ILIEV	4/12/07	PACKAGE OUTLINE			128-XVTQFP-14x14x1.0mm BODY, EXPOSED PAD	
CHECKED S.K.ILIEV	4/12/07	REV			A	
PRINT WITH "SCALE TO FIT" DO NOT SCALE DRAWINGS	APPROVED S.K.ILIEV	4/14/07	SCALE	1:1	STD COMPLIANCE	JEDEC: MS-026
					SHEET	1 OF 1

NOTES

APPENDIX A: REVISION HISTORY

Revision AL (February 2007)

Packages were revised. Telcom package designators were added where the designators vary from Microchip designators.

1. Revised 3-Lead Plastic Transistor Outline (TO or ZB) [TO-92]
2. Revised 3-Lead Plastic Small Outline Transistor (TT or NB) [SOT-23]
3. Revised 3-Lead Plastic Small Outline Transistor (CB or NB) [SOT-23A]
4. Revised 3-Lead Plastic Small Outline Transistor (DB) [SOT-223]
5. Revised 5-Lead Plastic Small Outline Transistor (DB) [SOT-223]
6. Revised 4-Lead Plastic Small Outline Transistor (RC) [SOT-143]
7. Revised 5-Lead Plastic Small Outline Transistor (OT or CT) [SOT-23]
8. Revised 6-Lead Plastic Small Outline Transistor (CH) [SOT-23]
9. Revised 8-Lead Plastic Dual In-Line (P or PA) 300 mil Body [PDIP]
10. Revised 14-Lead Plastic Dual In-Line (P or PD) 300 mil Body [PDIP]
11. Revised 16-Lead Plastic Dual In-Line (P or PE) 300 mil Body [PDIP]
12. Revised 24-Lead Plastic Dual In-Line (P or PG) 600 mil Body [PDIP]
13. Revised 24-Lead Skinny Plastic Dual In-Line (SP or PF) 300 mil Body [SPDIP]
14. Revised 28-Lead Skinny Plastic Dual In-Line (SP or PJ) 300 mil Body [SPDIP]
15. Revised 28-Lead Plastic Dual In-Line (P or PI) 600 mil Body [PDIP]
16. Revised 40-Lead Plastic Dual In-Line (P or PL) 600 mil Body [PDIP]
17. Revised 20-Lead Plastic Leaded Chip Carrier (L) Square [PLCC]
18. Revised 28-Lead Plastic Leaded Chip Carrier (L or LI) Square [PLCC]
19. Revised 32-Lead Plastic Leaded Chip Carrier (L) Rectangle [PLCC]
20. Revised 44-Lead Plastic Leaded Chip Carrier (L or LW) Square [PLCC]
21. Revised 68-Lead Plastic Leaded Chip Carrier (L or LS) Square [PLCC]
22. Revised 84-Lead Plastic Leaded Chip Carrier (L) Square [PLCC]
23. Revised 8-Lead Plastic Small Outline (SN or OA) Narrow, 3.90 mm Body [SOIC]
24. Revised 14-Lead Plastic Small Outline (SL or OD) Narrow, 3.90 mm Body [SOIC]

25. Revised 16-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body [SOIC]
26. Revised 8-Lead Plastic Small Outline (SM) Medium, 5.28 mm Body [SOIJ]
27. Revised 16-Lead Plastic Small Outline (SO or OE) Wide, 7.50 mm Body [SOIC]
28. Revised 18-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC]
29. Revised 20-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC]
30. Revised 24-Lead Plastic Small Outline (SO or PF) Wide, 7.50 mm Body [SOIC]
31. Revised 28-Lead Plastic Small Outline (SO or OI) Wide, 7.50 mm Body [SOIC]
32. Revised 8-Lead Plastic Micro Small Outline Package (MS or UA) [MSOP]
33. Revised 10-Lead Plastic Micro Small Outline Package (MS or UN) [MSOP]
34. Revised 16-Lead Plastic Shrink Small Outline Narrow Body (QR).150" Body [QSOP]
35. Revised 64-Lead Plastic Metric Quad Flatpack (KU) 14x14x2.7 mm Body, 3.20 mm Footprint [MQFP]
36. Revised 44-Lead Plastic Metric Quad Flatpack (KW) 10x10x2.0 mm Body, 3.9 mm Footprint [PQFP]

Revision AM (March 2007)

Four Microchip and Telcom package designators were corrected and one package was removed.

1. Revised 6-Lead Plastic Small Outline Transistor (CH) [SOT-23] to (CH or OT)
2. Revised 3-Lead Plastic Small Outline Transistor (CB or NB) [SOT-23A] to (CB)
3. Revised 44-Lead Plastic Metric Quad Flatpack (PQ) [MQFP] to (PQ or KW)
4. Revised 64-Lead Plastic Metric Quad Flatpack (KU) [MQFP] to (BU)
5. Deleted 44-Lead Plastic Metric Quad Flatpack (KW) – 10x10x2.0 mm Body, 3.9 mm Footprint [PQFP]

Revision AN (March 2007)

16-Lead Plastic Shrink Small Outline Narrow Body (QR) .150" Body [QSOP]: the nominal pitch value for the package is corrected to ".025." This correction revises MCHP Drawing C04-024B to C04-024C.

Packages with a Microchip and a Telcom designator are represented on separate pages, rather than having both designators on a single page.

Packaging

Revision AP (April 2007)

Revised 40-Lead Ceramic Dual In-Line with Window (JW) .600" Body []. The E-1 MAX dimension has changed from ".540" to ".583". This correction revises MCHP Drawing C04-014B to C04-014C.

Revision AQ (July 2007)

Revised 5-Lead Plastic Small Outline Transistor [SOT-223] package designator from (DB) to (DC). This correction revises MCHP Drawing C04-137A to C04-137B.

Revision AR (September 2007)

Land patterns have been added for the following 13 packages:

8-Lead Plastic Small Outline (SN) – Narrow, 3.90 mm Body [SOIC]

28-Lead Plastic Quad Flat, No Lead Package (ML) – 6x6 mm Body [QFN]
with 0.55 mm Contact Length

28-Lead Plastic Quad Flat, No Lead Package (MM) – 6x6x0.9 mm Body [QFN-S]
with 0.40 mm Contact Length

44-Lead Plastic Quad Flat, No Lead Package (ML) – 8x8 mm Body [QFN]

44-Lead Plastic Metric Quad Flatpack (PQ) – 10x10x2 mm Body, 3.20 mm [MQFP]

64-Lead Plastic Metric Quad Flatpack (BU) – 14x14x2.7 mm Body, 3.20 mm [MQFP]

44-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

64-Lead Plastic Thin Quad Flatpack (PT) – 10x10x1 mm Body, 2.00 mm [TQFP]

64-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

80-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

80-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

100-Lead Plastic Thin Quad Flatpack (PT) – 12x12x1 mm Body, 2.00 mm [TQFP]

100-Lead Plastic Thin Quad Flatpack (PF) – 14x14x1 mm Body, 2.00 mm [TQFP]

Please refer to the Packaging Index for page numbers.

Notes: Packaging outline drawings and land pattern drawings appear on facing pages.

The last three digits of a package outline drawing number will always correspond to the last three digits of the land pattern drawing number.

The Microchip drawing number for any land pattern begins with the following characters: C04-2xx.

Revision AS (January 2008)

The following packages are new:

- Drawing 0129B, 8-Lead Plastic Dual Flat, No Lead Package (MN) - 2x3x0.75 mm Body [TDFN] on page 156.
- Drawing 136B, 8-Lead Plastic Dual Flat, No Lead Package (MU) - 2x3x0.5 mm Body [UDFN] on page 158.

Land patterns have been added for the following packages:

- Drawing 2032A, 3-Lead Plastic Small Outline Transistor (DB) Footprint [SOT-223] on page 33.
- Drawing 2137A, 5-Lead Plastic Small Outline Transistor (DC) Footprint [SOT-223] on page 35.
- Drawing 2031A, 4-Lead Plastic Small Outline Transistor (RC) Footprint [SOT-143] on page 37.
- Drawing 2057A, 8-Lead Plastic Small Outline (SN) Narrow, 3.90 mm Body Footprint [SOIC] on page 79.
- Drawing 2057A, 8-Lead Plastic Small Outline (OA) Narrow, 3.90 mm Body Footprint [SOIC] on page 81.
- Drawing 2056A, 8-Lead Plastic Small Outline (SM) Medium, 5.28 mm Body Footprint [SOIJ] on page 86.
- Drawing 2123A, 8-Lead Plastic Dual Flat, No Lead Package (MC) 2x3x0.9 mm Body Footprint [DFN] on page 99.
- Drawing 2062A, 8-Lead Plastic Dual Flat, No Lead Package (MF) - 3x3x0.9 mm Body Footprint [DFN] on page 103.
- Drawing 2131A, 8-Lead Plastic Dual Flat, No Lead Package (MD) 4x4x0.9 mm Body Footprint [DFN] on page 105.
- Drawing 2063A, 10-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body Footprint [DFN] on page 109.
- Drawing 2129A, 8-Lead Plastic Dual Flat, No Lead Package (MN) - 2x3x0.75 mm Body Footprint [TDFN] on page 157.
- Drawing 2136A, 8-Lead Plastic Dual Flat, No Lead Package (MU) - 2x3x0.5 mm Body Footprint [UDFN] on page 159.

Corrections have been made to the following packages:

- Drawing 123C, 8-Lead Plastic Dual Flat, No Lead Package (MC) 2x3x0.9 mm Body [DFN] on page 98.
- Drawing 131D, 8-Lead Plastic Dual Flat, No Lead Package (MD) 4x4x0.9 mm Body [DFN] on page 104.
- Drawing 2116A, 80-Lead Plastic Thin Quad Flatpack (PF) 14x14x1 mm Body, 2.00 mm Footprint [TQFP] on page 151.

Revision AT (June 2008)

Revised 24-Lead Plastic Small Outline [SOIC], Wide, 7.50 mm Body package designator from (PF) to (OG) on page 104.

The following packages are new:

- Drawing 0143A, 24-Lead Plastic Quad Flat, No Lead Package (MJ) 4x4 mm Body [QFN] on page 130.
- Drawing 0144A, 28-Lead Plastic Quad Flat, No Lead Package (MK) 4x4 mm Body [QFN] on page 132.
- Drawing 0140A, 28-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5 mm Body [QFN] on page 134.
- Drawing 0145A, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern [CSP] on page 182.

Land patterns have been added for the following packages:

- Drawing 2060A, 3-Lead Plastic Small Outline Transistor (LB) Footprint [SC70] on page 43.
- Drawing 2061A, 5-Lead Plastic Small Outline Transistor (LT) Footprint [SC70] on page 45.
- Drawing 2015A, 7-Lead Plastic (EK) Footprint [DDPAK] on page 51.
- Drawing 2065A, 14-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body Footprint [SOIC] on page 89.
- Drawing 2065A, 14-Lead Plastic Small Outline (OD) Narrow, 3.90 mm Body Footprint [SOIC] on page 91.
- Drawing 2108A, 16-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body Footprint [SOIC] on page 93.
- Drawing 2102A, 16-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 97.
- Drawing 2102A, 16-Lead Plastic Small Outline (OE) Wide, 7.50 mm Body Footprint [SOIC] on page 99.
- Drawing 2051A, 18-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 101.
- Drawing 2122A, 8-Lead Plastic Dual Flat, No Lead Package (MF) 6x5 mm Body Footprint [DFN-S] on page 119.
- Drawing 2127A, 16-Lead Plastic Quad Flat, No Lead Package (ML) 4x4x0.9 mm Body Footprint [QFN] on page 127.
- Drawing 2126A, 20-Lead Plastic Quad Flat, No Lead Package (ML) 4x4x0.9 mm Body Footprint [QFN] on page 129.
- Drawing 2143A, 24-Lead Plastic Quad Flat, No Lead Package (MJ) 4x4 mm Body Footprint [QFN] on page 131.

- Drawing 2144A, 28-Lead Plastic Quad Flat, No Lead Package (MK) 4x4 mm Body Footprint [QFN] on page 133.
- Drawing 2140A, 28-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5 mm Body Footprint [QFN] on page 135.

Revision AU (June 2008)

Updated 8-Lead Plastic Small Outline (SM) Medium 5.28 mm Body Footprint [SOIJ] on page 95.

Revision AV (September 2008)

Added Drawing 0139A, 20-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5x0.9 mm Body [QFN] on page 124.

Revision AW (October 2008)

Revised 40-Lead Plastic Quad Flat, No Lead Package (MM) 6x6x0.9 mm Body [QFN] on page 136, correcting the package designator from (MM) to (ML).

Revision AX (January 2009)

Added Drawing 149A, 64-Lead Plastic Quad Flat, No Lead Package (ML) 6x6x0.9 mm Body [QFN] on page 140. This package is presented on 2 pages to facilitate a more explicit specification through the addition of geometric dimensioning and tolerancing (GD&T) information. GD&T symbols and rules are described and defined in the ASME Y14.5M-1994 standard (www.asme.org).

Revision AY (March 2009)

Revised Drawing 0131E, 8-Lead Plastic Dual Flat, No Lead Package (MD) 4x4x0.9 mm Body [DFN] to the new two-page format. It is shown on pages 115-116.

Also revised Drawing 149B, 64-Lead Plastic Quad Flat No Lead Package (MR) 9x9x0.9 mm Body [QFN] on pages 147-148. A corresponding land pattern (2149A), in the list below, was added.

The following packages are new:

- Drawing 151A, 6-Lead Plastic Small Outline Transistor (LT) [SC70] on pages 45-46.
- Drawing 2151A, 6-Lead Plastic Small Outline Transistor (LT) Footprint [SC70] on page 47.
- Drawing 2149A, 64-Lead Plastic Quad Flat, No Lead Package (MR) 9x9x0.9 mm Body Footprint [QFN] on page 149.
- Drawing 068A, 16-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body [TSSOP] on page 161-162.
- Drawing 2068A, 16-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 163.

Packaging

- Drawing 6005A, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern [CSP] on pages 191-192.
- Drawing 8005A, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern Footprint [CSP] on page 193.
- Drawing 6004A, 5-Lead Chip Scale Package (CS) 2x1x2 Ball Pattern [CSP] on pages 195-196.
- Drawing 8004A, 5-Lead Chip Scale Package (CS) 2x1x2 Ball Pattern Footprint [CSP] on page 197.
- Drawing 6001A, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern [CSP] on pages 199-200. This package was designated Drawing 145A in the last version of the packaging specification (00049AX).
- Drawing 8001A, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern Footprint [CSP] on page 201.
- Drawing 6003A, 20-Lead Chip Scale Package (CS) 4x5 Special Array Pattern [CSP] on pages 203-204.
- Drawing 8003A, 20-Lead Chip Scale Package (CS) 4x5 Special Array Pattern Footprint [CSP] on page 205.
- Drawing 6002A, 28-Lead Chip Scale Package (CS) 7-6-7-6-7 [CSP] on pages 207-208.
- Drawing 8002A, 28-Lead Chip Scale Package (CS) 7-6-7-6-7 Footprint [CSP] on page 209.
- Appendix B: Control Dimensions (inspection information) on page 217.

Revision AZ (April 2009)

The following drawings were removed:

- Drawing 6003A, 20-Lead Chip Scale Package (CS) 4x5 Special Array Pattern [CSP] on pages 203-204.
- Drawing 8003A, 20-Lead Chip Scale Package (CS) 4x5 Special Array Pattern Footprint [CSP] on page 205.
- Drawing 6002A, 28-Lead Chip Scale Package (CS) 7-6-7-6-7 [CSP] on pages 207-208.
- Drawing 8002A, 28-Lead Chip Scale Package (CS) 7-6-7-6-7 Footprint [CSP] on page 209.

Appendix B: “Control Dimensions” was modified to include the item “Foot Angle” under **B.1 “On Surface Mount Devices (SMD)”** on page 549.

Revision BA (April 2009)

The following drawing is new:

- Drawing 142A, 16-Lead Plastic Quad Flat, No Lead Package (MG) 3x3x0.9 mm Body [QFN] on pages 126-127.

The following drawing was corrected:

- Drawing 2051A, 18-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 99. The second page of this drawing was incorrectly labeled as Drawing 2015A.

Note 4 on the following drawings has been modified to refer interested parties to a Microchip representative, instead of a data Sheet, for details about the package:

- Drawing 6005A, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern [CSP] on page 194.
- Drawing 6004A, 5-Lead Chip Scale Package (CS) 2x1x2 Ball Pattern [CSP] on page 198.
- Drawing 6001A, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern [CSP] on page 202.

Revision BB (August 2009)

The following drawings are new:

- Drawing 0154A, 64-Lead Plastic Quad Flat, No Lead Package (MR) 9x9x0.9 mm Body with 5.40x5.40 Exp. Pad [QFN] on pages 152-153.
- Drawing 0152A, 28-Lead Plastic Ultra Thin Quad Flat, No Lead Package (MV) 4x4x0.5 mm Body [UQFN] on pages 154-155.
- Drawing 2111A, 8-Lead Plastic Micro Small Outline Package (MS) Footprint [MSOP] on page 157.
- Drawing 2021A, 10-Lead Plastic Micro Small Outline Package (MS) Footprint [MSOP] on page 161.
- Drawing 2086A, 8-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 169.
- Drawing 2087A, 14-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 171.
- Drawing 2088A, 20-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 177.
- Drawing 148A, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body [XBGA] on pages 216-217.

Revision BC (January 2010)

The following drawings are new or corrected:

- Drawing 2097A, 68-Lead Ceramic Leaded (CL) Chip Carrier w/Window Square Footprint [CER-QUAD] on page 31.
- Drawing 2112A, 84-Lead Ceramic Leaded (CL) Chip Carrier w/Window Square Footprint [CER-QUAD] on page 33.
- Drawing 2104A, 3-Lead Plastic Small Outline Transistor (NB) Footprint [SOT-23] on page 44.
- Drawing 2104A, 3-Lead Plastic Small Outline Transistor (TT) Footprint [SOT-23] on page 46.
- Drawing 2091A, 5-Lead Plastic Small Outline Transistor (CT) Footprint [SOT-23] on page 48.
- Drawing 2091A, 5-Lead Plastic Small Outline Transistor (OT) Footprint [SOT-23] on page 50.
- Drawing 2028A, 6-Lead Plastic Small Outline Transistor (CH) Footprint [SOT-23] on page 52.

- Drawing 2028A, 6-Lead Plastic Small Outline Transistor (OT) Footprint [SOT-23] on page 54.
- Drawing 2130A, 3-Lead Plastic Small Outline Transistor (CB) Footprint [SOT-23A] on page 56.
- Drawing 2029A, 3-Lead Plastic Small Outline Transistor Header (MB) Footprint [SOT-89] on page 58.
- Drawing 2030A, 5-Lead Plastic Small Outline Transistor Header (MT) Footprint [SOT-89] on page 60.
- Drawing 2128A, 5-Lead Plastic Thin Small Outline Transistor (OS) Footprint [TSOT] on page 73.
- Drawing 2011A, 3-Lead Plastic (EB) Footprint [DDPAK] on page 77.
- Drawing 2012A, 5-Lead Plastic (ET) Footprint [DDPAK] on page 79.
- Drawing 2064A, 20-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 105.
- Drawing 2026A, 28-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 107.
- Drawing 2026A, 28-Lead Plastic Leaded Chip Carrier (LI) Square Footprint [PLCC] on page 109.
- Drawing 2023A, 32-Lead Plastic Leaded Chip Carrier (L) Rectangle Footprint [PLCC] on page 111.
- Drawing 2048A, 44-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 113.
- Drawing 2048A, 44-Lead Plastic Leaded Chip Carrier (LW) Square Footprint [PLCC] on page 115.
- Drawing 2049A, 68-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 117.
- Drawing 2049A, 68-Lead Plastic Leaded Chip Carrier (LS) Square Footprint [PLCC] on page 119.
- Drawing 2093A, 84-Lead Plastic Leaded Chip Carrier (L) Square Footprint [PLCC] on page 121.
- Drawing 056C, 8-Lead Plastic Small Outline (SM) Medium, 5.28 mm Body [SOIJ] on pages 134-135.
- Drawing 2094A, 20-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 144.
- Drawing 2025A, 24-Lead Plastic Small Outline (OG) Wide, 7.50 mm Body Footprint [SOIC] on page 146.
- Drawing 2025A, 24-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 148.
- Drawing 2052A, 28-Lead Plastic Small Outline (OI) Wide, 7.50 mm Body Footprint [SOIC] on page 150.
- Drawing 2052A, 28-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body Footprint [SOIC] on page 152.
- Drawing 062C, 8-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body [DFN] on pages 159-160.
- Drawing 2131C, 8-Lead Plastic Dual Flat, No Lead Package (MD) 4x4x0.9 mm Body Footprint [DFN] on page 164.
- Drawing 0129C, 8-Lead Plastic Dual Flat, No Lead Package (MN) - 2x3x0.75 mm Body [TDFN] on pages 168-169.
- Drawing 2142A, 16-Lead Plastic Quad Flat, No Lead Package (MG) 3x3x0.9 mm Body Footprint [QFN] on page 177.
- Drawing 2139A, 20-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5x0.9 mm Body Footprint [QFN] on page 183.
- Drawing 118D, 40-Lead Plastic Quad Flat, No Lead Package (ML) 6x6x0.9 mm Body [QFN] on pages 194-195.
- Drawing 2118A, 40-Lead Plastic Quad Flat, No Lead Package (ML) 6x6x0.9 mm Body Footprint [QFN] on page 196.
- Drawing 2111A, 8-Lead Plastic Micro Small Outline Package (UA) Footprint [MSOP] on page 211.
- Drawing 2021A, 10-Lead Plastic Micro Small Outline Package (UN) Footprint [MSOP] on page 215.
- Drawing 2024A, 16-Lead Plastic Shrink Small Outline Narrow Body (QR) .150" Body Footprint [QSOP] on page 217.
- Drawing 2072A, 20-Lead Plastic Shrink Small Outline (SS) 5.30 mm Body Footprint [SSOP] on page 221.
- Drawing 2132A, 24-Lead Plastic Shrink Small Outline (SS) 5.30 mm Body Footprint [SSOP] on page 223.
- Drawing 2073A, 28-Lead Plastic Shrink Small Outline (SS) 5.30 mm Body Footprint [SSOP] on page 225.
- Drawing 2086A, 8-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body Footprint [TSSOP] on page 229.
- Drawing 044A, 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm [LQFP] on pages 243-244.
- Drawing 2044A, 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm Footprint [LQFP] on page 245.
- Drawing 2071A, 44-Lead Plastic Metric Quad Flatpack (KW) 10x10x2 mm Body, 3.20 mm Footprint [MQFP] on page 249.
- Drawing 2074A, 32-Lead Plastic Thin Quad Flatpack (PT) 7x7x1.0 mm Body, 2.00 mm Footprint [TQFP] on page 257.
- Drawing 155A, 144-Lead Plastic Thin Quad Flatpack (PH) 16x16x1 mm Body, 2.00 mm [TQFP] on pages 272-273.

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- Drawing 2155A, 144-Lead Plastic Thin Quad Flatpack (PH) 16x16x1 mm Body, 2.00 mm Footprint [TQFP] on page 274.
- Drawing 6005D, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern [CSP] on pages 276-277.
- Drawing 8005A, 4-Lead Chip Scale Package (CS) 2x2 Ball Pattern Footprint [CSP] on page 276.
- Drawing 6004D, 5-Lead Chip Scale Package (CS) 2x1x2 Ball Pattern [CSP] on pages 279-280.
- Drawing 6001C, 8-Lead Chip Scale Package (CS) 3x2x3 Ball Pattern [CSP] on pages 282-283.
- Drawing 148A, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body [XBGA] on pages 286-287.
- Drawing 2148A, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body Footprint [XBGA] on page 288.

Revision BD (February 2010)

The following drawings are new:

Drawings 6008A (2) and 8008A, 4-Lead Chip Scale Package (CS) Package Code AL [CSP] on pages 279-282.

Revision BE (June 2010)

The following drawings are new:

- Drawing 162A, 8-Lead Thermally Enhanced Plastic Small Outline (SE) Narrow, 3.90 mm Body w/Exp. heat slug [SOIC] on pages 130-131.
- Drawing 2162A, 8-Lead Thermally Enhanced Plastic Small Outline (SE) Narrow, 3.90 mm Body Footprint [SOIC] on page 132.
- Drawing 120B (Sheet 2), 6-Lead Plastic Dual Flat, No Lead Package (MA) 2x2x0.9 mm Body [DFN] on page 161.
- Drawing 2120A, 6-Lead Plastic Dual Flat, No Lead Package (MA) 2x2x0.9 mm Body Footprint [DFN] on page 162.
- Drawing 2143B, 24-Lead Plastic Quad Flat, No Lead Package (MJ) 4x4 mm Body Footprint [QFN] on page 193.
- Drawing 156A, 40-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 5x5 mm Body [UQFN] on pages 214-215.
- Drawing 2156A, 40-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 5x5 mm Body Footprint [UQFN] on page 216.
- Drawing 087C (Sheet 2), 14-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body [TSSOP] on page 241.
- Drawing 2044A, 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm Footprint [LQFP] on page 257.

The following drawings have been revised:

- Drawing 2030C 5-Lead Plastic Small Outline Transistor Header (MT) Footprint [SOT-89] on page 60.
- Drawing 057C 8-Lead Plastic Small Outline (SN) Narrow, 3.90 mm Body [SOIC] on pages 124-125.
- Drawing 057C 8-Lead Plastic Small Outline (OA) Narrow, 3.90 mm Body [SOIC] on pages 124-125.
- Drawing 120B 6-Lead Plastic Dual Flat, No Lead Package (MA) 2x2x0.9 mm Body [DFN] on page 160.
- Drawing 0129C 8-Lead Plastic Dual Flat, No Lead Package (MN) - 2x3x0.75 mm Body [TDFN] on page 176-177.
- Drawing 087C 14-Lead Plastic Thin Shrink Small Outline (ST) 4.4 mm Body [TSSOP] on page 240.
- Drawing 044B 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm [LQFP] on page 255-256.
- Drawing 008A 4-Lead Chip Scale (CS) [CSP] on page 291.
- Drawing 6008A 4-Lead Chip Scale Package Pkg-Code.AL (continued) (CS) 2x2 Ball Pattern [CSP] on page 292.
- Drawing 148B 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body [XBGA] on pages 302-303.
- Drawing 2148B 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body Footprint [XBGA] on page 304.

Revision BF (July 2010)

Drawings C04-028A and C04-2028A with CHY package designators have been added for the 6-Lead Plastic Small Outline Transistor (CHY) [SOT-23] package and associated land pattern. The drawings appear on pages 53 and 54.

Revision BG (March 2011)

The following drawings are new:

- Drawing 065C, 14-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body [SOIC] on page 136.
- Drawing 065C, 14-Lead Plastic Small Outline (Sheet 2) (OD) Narrow, 3.90 mm Body [SOIC] on page 139.
- Drawing 108C, 16-Lead Plastic Small Outline (Sheet 2) (SL) Narrow, 3.90 mm Body [SOIC] on page 142.
- Drawing 102C, 16-Lead Plastic Small Outline (Sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 148.

- Drawing 102C, 16-Lead Plastic Small Outline (Sheet 2) (OE) Wide, 7.50 mm Body [SOIC] on page 151.
 - Drawing 051C, 18-Lead Plastic Small Outline (Sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 154.
 - Drawing 094C, 20-Lead Plastic Small Outline (Sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 157.
 - Drawing 025C, 24-Lead Plastic Small Outline (Sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 160.
 - Drawing 025C, 24-Lead Plastic Small Outline (Sheet 2) (OG) Wide, 7.50 mm Body [SOIC] on page 163.
 - Drawing 052C, 28-Lead Plastic Small Outline (Sheet 2) (SO) Wide, 7.50 mm Body [SOIC] on page 166.
 - Drawing 052C, 28-Lead Plastic Small Outline (Sheet 2) (OI) Wide, 7.50 mm Body [SOIC] on page 169.
 - Drawing 078A, 6-Lead Plastic Dual Flat, No Lead Package (MY) 2x2x0.8 mm Body [TDFN] on pages 188-189.
 - Drawing 185A, 10-Lead Plastic Dual Flat, No Lead Package (MN) 3x3x0.8 mm Body [TDFN] on pages 193-194.
 - Drawing 063C, 10-Lead Plastic Dual Flat, No Lead Package (Sheet 2) (MF) 3x3x0.9 mm Body [DFN] on page 198.
 - Drawing 2063B, 10-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body Footprint [DFN] on page 199.
 - Drawing 140B, 28-Lead Plastic Quad Flat, No Lead Package (Sheet 2) (MQ) 5x5x0.9 mm Body [QFN] on page 214.
 - Drawing 153A, 48-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 6x6x0.5 mm Body [UQFN] on pages 235-236.
 - Drawing 184A, 20-Lead Thermal Leadless Array Package (TL) 3x3x0.7 Exp. Pad [UQFN] on pages 326-327.
 - Drawing 187B, 36-Lead Thermal Leadless Array Package (TL) 5x5x0.9 Exp. Pad [TLA] on pages 328-329.
 - Drawing 157B, 44-Lead Thermal Leadless Array Package (TL) 6x6x0.9 Exp. Pad [TLA] on pages 330-331.
- The following drawings have been revised:
- Drawing 001C, 8-Lead Ceramic Dual In-Line w/Window (JA) .300" Body [] on page 16.
 - Drawing 027C, 8-Lead Ceramic Dual In-Line (JW) .300" Body [] on page 17.
 - Drawing 002C, 14-Lead Ceramic Dual In-Line (JD) .300" Body [] on page 18.
- Drawing 099C, 14-Lead Ceramic Dual In-Line w/Window (JW) .300" Body [] on page 19.
 - Drawing 003C, 16-Lead Ceramic Dual In-Line w/Window (JE) .300" Body [] on page 20.
 - Drawing 010C, 18-Lead Ceramic Dual In-Line (JW) .300" Body [] on page 21.
 - Drawing 115C, 20-Lead Ceramic Dual In-Line w/Window (JW) .300" Body [] on page 22.
 - Drawing 004C, 24-Lead Ceramic Dual In-Line (JG) .600" Body [] on page 23.
 - Drawing 006C, 28-Lead Ceramic Dual In-Line (JN) .600" Body [] on page 24.
 - Drawing 080C, 28-Lead Ceramic Dual In-Line w/Window (JW) .300" Body [] on page 25.
 - Drawing 013C, 28-Lead Ceramic Dual In-Line w/Window (JW) .600" Body [] on page 26.
 - Drawing 008C, 40-Lead Ceramic Dual In-Line (JK) .600" Body [] on page 27.
 - Drawing 014C, 40-Lead Ceramic Dual In-Line w/Window (JW) .600" Body [] on page 28.
 - Drawing 162B, 8-Lead Thermally Enhanced Plastic Small Outline (SE) Narrow, 3.90 mm Body [SOIC] on page 132.
 - Drawing 162B, 8-Lead Thermally Enhanced Plastic Small Outline w/Exp. heat slug (Sheet 2) (SE) Narrow, 3.90 mm Body [SOIC] on page 133.
 - Drawing 065C, 14-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body [SOIC] on page 135.
 - Drawing 065C, 14-Lead Plastic Small Outline (OD) Narrow, 3.90 mm Body [SOIC] on page 138.
 - Drawing 108C, 16-Lead Plastic Small Outline (SL) Narrow, 3.90 mm Body [SOIC] on page 141.
 - Drawing 102C, 16-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 147.
 - Drawing 102C, 16-Lead Plastic Small Outline (OE) Wide, 7.50 mm Body [SOIC] on page 150.
 - Drawing 051C, 18-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 153.
 - Drawing 094C, 20-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 156.
 - Drawing 025C, 24-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 159.
 - Drawing 025C, 24-Lead Plastic Small Outline (OG) Wide, 7.50 mm Body [SOIC] on page 162.
 - Drawing 052C, 28-Lead Plastic Small Outline (SO) Wide, 7.50 mm Body [SOIC] on page 165.
 - Drawing 052C, 28-Lead Plastic Small Outline (OI) Wide, 7.50 mm Body [SOIC] on page 168.

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- Drawing 2123B, 8-Lead Plastic Dual Flat, No Lead Package (MC) 2x3x0.9 mm Body Footprint [DFN] on page 178.
- Drawing 2062B, 8-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body Footprint [DFN] on page 181.
- Drawing 063C, 10-Lead Plastic Dual Flat, No Lead Package (MF) 3x3x0.9 mm Body [DFN] on page 197.
- Drawing 140B, 28-Lead Plastic Quad Flat, No Lead Package (MQ) 5x5x0.9 mm Body [QFN] on page 213.
- Drawing 149C, 64-Lead Plastic Quad Flat No Lead Package (MR) 9x9x0.9 mm Body w/7.15x7.15 Exp. pad [QFN] on page 225-226.
- Drawing 2156B, 40-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 5x5 mm Body Footprint [UQFN] on page 234.
- Drawing 2044B, 144-Lead Plastic Low Profile Quad Flatpack (PL) 20x20x1.40 mm Body, 2.0 mm Footprint [LQFP] on page 277.
- Drawing 2071B, 44-Lead Plastic Metric Quad Flatpack (KW) 10x10x2 mm Body, 3.20 mm Footprint [MQFP] on page 281.
- Drawing 2071B, 44-Lead Plastic Metric Quad Flatpack (PQ) 10x10x2 mm Body, 3.20 mm Footprint [MQFP] on page 283.
- Drawing 2022B, 64-Lead Plastic Metric Quad Flatpack (BU) 14x14x2.7 mm Body, 3.20 mm Footprint [MQFP] on page 285.
- Drawing 2074B, 32-Lead Plastic Thin Quad Flatpack (PT) 7x7x1.0 mm Body, 2.00 mm Footprint [TQFP] on page 289.
- Drawing 2076B, 44-Lead Plastic Thin Quad Flatpack (PT) 10x10x1 mm Body, 2.00 mm Footprint [TQFP] on page 291.
- Drawing 2085B, 64-Lead Plastic Thin Quad Flatpack (PT) 10x10x1 mm Body, 2.00 mm Footprint [TQFP] on page 293.
- Drawing 2116C, 80-Lead Plastic Thin Quad Flatpack (PF) 14x14x1 mm Body, 2.00 mm Footprint [TQFP] on page 297.
- Drawing 2092B, 80-Lead Plastic Thin Quad Flatpack (PT) 12x12x1 mm Body, 2.00 mm Footprint [TQFP] on page 299.
- Drawing 2110B, 100-Lead Plastic Thin Quad Flatpack (PF) 14x14x1 mm Body, 2.00 mm Footprint [TQFP] on page 301.
- Drawing 2100B, 100-Lead Plastic Thin Quad Flatpack (PT) 12x12x1 mm Body, 2.00 mm Footprint [TQFP] on page 303.
- Drawing 155B, 144-Lead Plastic Thin Quad Flatpack (PH) 16x16x1 mm Body, 2.00 mm [TQFP] on page 304.
- Drawing 155B, 144-Lead Plastic Thin Quad Flatpack (Sheet 2) (PH) 16x16x1 mm Body, 2.00 mm [TQFP] on page 305.
- Drawing 2155B, 144-Lead Plastic Thin Quad Flatpack (PH) 16x16x1 mm Body, 2.00 mm Footprint [TQFP] on page 306.

Revision BH (November 2011)

The following drawings are new:

- Drawing 121A, 8-Lead Thermally Enhanced Plastic Outline Body (SE) Narrow 3.90 Body on pages 130-131.
- Drawing 2121A, 8-Lead Thermally Enhanced Plastic Outline Body (SE) Narrow 3.90 Body Footprint on page 132.
- Drawing 194A, 10-Lead Plastic Ultra Thin Dual Flat No Lead (NA[Y]) 3x3x05 mm Body [UDFN] on pages 342-343.
- Drawing 2148D, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body Footprint [TFBGA] on page 344.

The following drawings have been revised:

- Drawing 111C, 8-Lead Plastic Micro Small Outline Package (MS) [MSOP] on pages 254-255.
- Drawing 111C, 8-Lead Plastic Micro Small Outline Package (UA) [MSOP] on pages 257-258.
- Drawing 021C, 10-Lead Plastic Micro Small Outline Package (MS) [MSOP] on pages 260-261.
- Drawing 021C, 10-Lead Plastic Micro Small Outline Package (UN) [MSOP] on pages 263-264.
- Drawing 148D, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body [TFBGA] on pages 342-343.
- Drawing 2148D, 121-Lead Plastic Thin Profile Ball Grid Array (BG) 10x10x1.10 mm Body Footprint [TFBGA] on page 344.

Revision BJ (December 2011)

The following drawings are new:

- Drawing 188A, 8-Lead High Power Dual Flat, No Lead Package (MF) 5x6x1.0 mm Body [PDFN] on pages 200-201.
- Drawing 197A, 16-Lead Plastic Quad Flat, No Lead Package (NG) 3x3x0.9 mm Body [QFN] on pages 216-217.
- Drawing 2197A, 16-Lead Plastic Quad Flat, No Lead Package (NG) 3x3x0.9 mm Body Footprint [QFN] on page 220.

The following drawing has been revised:

- Drawing 120C, 6-Lead Plastic Dual Flat, No Lead Package (MA[Y]) 2x2x0.9 mm Body [DFN] on pages 180-181.

Revision BK (June 2012)

The following drawings are new:

- Drawing 141A, 6-Lead Plastic Thin Small Outline Transistor (OS) [TSOT] on pages 78-79.
- Drawing 2188B, 8-Lead Plastic Dual Flat No Lead Package (MF) 5x6x1.0 mm Body Footprint [PDFN] on page 204
- Drawing 195A, 8-Lead Plastic Dual Flat No Lead Package (LC) 3.3x3.3x1.0 mm Body [PDFN] on pages 205-206.
- Drawing 2195A, 8-Lead Plastic Dual Flat No Lead Package (LC) 3.3x3.3x1.0 mm Body Footprint [PDFN] on page 207.
- Drawing 078A, 6-Lead Plastic Dual Flat, No Lead Package (MYY) 2x2x0.8 mm Body [TDFN] on pages 212-213.
- Drawing 198A, 8-Lead Plastic Dual Flat No Lead Package (LZ) 2x2x0.9 mm Body [VDFN] on pages 226-227.
- Drawing 2198A, 8-Lead Plastic Dual Flat No Lead Package (LZ) 2x2x0.9 mm Body Footprint [VDFN] on page 228.
- Drawing 2153A, 48-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 6x6x0.5 mm Body Footprint [UQFN] on page 273.
- Drawing 058A, 128-Lead Plastic Low Profile Quad Flatpack (PT) 14x14x1.4 mm Body [LQFP] on pages 317-318.
- Drawing 133A, 256-Lead Plastic Metric Quad Flatpack (PQ) 28x28x3.40 mm Body [MQFP] on pages 330-331.
- Drawing 193A, 124-Terminal Very Thin Leadless Array (TL) 9x9x0.9 mm Body [VTLA] on pages 378-379.

The following drawings have been revised:

- Drawing 188B, 8-Lead Plastic Dual Flat No Lead Package (MF) 5x6x1.0 mm Body [PDFN] on pages 202-203.
- Drawing 105C, 28-Lead Plastic Quad Flat, No Lead Package (ML) 6x6 mm Body [QFN] on pages 249-250.
- Drawing 124C, 28-Lead Plastic Quad Flat, No Lead Package (MM) 6x6x0.9 mm Body [QFN-S] on pages 252-253.
- Drawing 184B, 20-Terminal Very, Very Thin Thermal Leadless Array (TL) 3x3x0.7 mm Body [WTLA] on pages 372-373.
- Drawing 187C, 36-Terminal Very Thin Thermal Leadless Array (TL) 5x5x0.9 mm Body [VTLA] on pages 374-375.
- Drawing 157C, 44-Terminal Very Thin Thermal Leadless Array (TL) 6x6x0.9 mm Body [VTLA] on pages 376-377.

Revision BL (September 2012)

The following drawings are new:

- Drawing 061B, 5-Lead Plastic Small Outline Transistor (LTY) [SC70] on page 46.
- Drawing 2061B, 5-Lead Plastic Small Outline Transistor (LTY) Footprint [SC70] on page 47.
- Drawing 103C, 44-Lead Plastic Quad Flat, No Lead Package (ML) 8x8 mm Body [QFN], Sheet 2 was added on page 265.
- Drawing 2152A, 28-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 4x4x0.5 mm Body Footprint [UQFN] on page 276.
- Drawing 209A, 28-Lead Plastic Quad Flat No Lead Package (MV) 6x6x0.5 Ultra-Thin [UQFN] on pages 277 and 278.
- Drawing 2209A, 28-Lead Plastic Quad Flat No Lead Package (MV) 6x6x0.5 Ultra-Thin Footprint [UQFN] on pages 279.
- Drawing 6014B, 32-Lead Chip Scale Package (CS) [CSP] on pages 378 and 379.

The following drawings have been revised:

- Drawing 103C, 44-Lead Plastic Quad Flat, No Lead Package (ML) 8x8 mm Body [QFN], Sheet 1 on page 264.
- Drawing 2103C, 44-Lead Plastic Quad Flat, No Lead Package (ML) 8x8 mm Body Footprint [QFN] on page 266.

Revision BM (December 2012)

The following drawings are new:

- Drawing 203A, 8-Lead Plastic Ultra Thin Small Outline No Lead (NP) 2x3 mm Body [USON] on pages 288-289.
- Drawing 210A, 8-Lead Plastic Very, Very Thin Small Outline No Lead (MF) 5x6 mm Body [WSON] on pages 292-293.
- Drawing 177A, 48-Lead Thin Small Outline Package (TV) 12x20 mm Body [TSOP] on pages 333-334.
- Drawing 199A, 24-Lead Thin Fine Pitch Ball Grid Array (TD) 6x8 mm [TFBGA] on pages 392-393.
- Drawing 168B, 48-Lead Thin Fine Pitch Ball Grid Array (CD) 6x8 mm [TFBGA] on pages 394-395.

Revision BN (April 2013)

The following drawings are new:

- Drawing 2194A, 10-Lead Plastic Ultra Thin Dual Flat No Lead Package (NA[Y]) 3x3x0.5 mm Body Footprint [UDFN] on page 230.
- Drawing 213A, 64-Lead Plastic Quad Flat No Lead Package (MR) 9x9x0.9 mm Body w/7.7x7.7 exposed pad [QFN] on pages 272-273.

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- Drawing 216A, 16-Lead Plastic Ultra Thin Quad Flat No Lead Package (MV) 2.5x2.5x0.6 mm Body [UQFN] on pages 276-277.
- Drawing 217A, 16-Lead Extremely Thin Quad Flat No Lead Package (NL) 3x3x0.5 mm Body [XQFN] on pages 290-290.
- Drawing 210A, 6-Lead Plastic Super Thin Small Outline No Lead Package (NR) 1.5x1.5x0.4 mm Body [X2SON] on pages 302-303.

The following drawings have been revised:

- Drawing 148E, 121-Lead Plastic Thin Profile Ball Grid Array Package (BG) 10x10x1.10 mm Body [TFBGA], on pages 406-407.
- Drawing 187C, 36-Terminal Very Thin Leadless Array Package (TL) 5x5x0.9 Body Footprint [WTLA] on page 414.

APPENDIX B: CONTROL DIMENSIONS

Microchip inspects the first lot of every new package. Thereafter, one lot of each package, from each assembly site, shall be inspected yearly.

The following dimensions shall be inspected on all types of packages:

- Package Length
- Package Width
- Package Height
- Lead or Contact Width
- Lead or Contact Pitch

The following packages contain dimensions that shall be added to the inspection described above.

B.1 On Surface Mount Devices (SMD)

- § Lead Coplanarity¹
- § Standoff*
- Molded Package Length (if different from overall package length)
- Side Flash
- Foot Angle

B.2 Through-Hole

- § Lead Span*

B.3 Surface Mount Devices And Through-Hole

- Molded Package Width
- Molded Package Thickness

B.4 DFN and QFN Only

- Contact Length
- Contact to Exp. Pad
- Exp. Pad Length
- Exp. Pad Width

¹ The § symbol denotes a significant characteristic specified in the control plan.

Packaging

NOTES:



MICROCHIP

Overview of Microchip Die/Wafer Support

INTRODUCTION

In addition to packaged devices, Microchip Technology Inc. devices are available in wafer and die form. All products sold in die or wafers have been characterized and qualified according to the requirements of Microchip Technology Inc. Specifications SPI-41014, "Characterization and Qualification of Integrated Circuits" and QCI-39000, "Worldwide Quality Conformance Requirements".

PRODUCT INTEGRITY

Product supplied in die or wafer form is fully tested and characterized. Die and wafers are inspected to Microchip Technology Inc. Specification, QCI-30014.

CAUTION

Some EEPROM devices use EEPROM cells for device configuration. Exposure to ultraviolet light must be avoided. Exposure to ultraviolet light may cause the device to operate improperly.

Extreme care is urged in the handling and assembly of these products since they are susceptible to damage from electro-static discharge.

PACKAGING OPTIONS

Die/wafer products are available as individual Die in Waffle Pack, Whole Wafers or as Sawn Wafer on Frame. As a standard, all die on a wafer are tested and Ink Dots are used to indicate the bad die on a wafer. Inkless wafers with electronic wafer maps are also available upon request. To acquire individual electronic wafer maps, customers can request a password-protected account on a Microchip FTP site where their wafer maps are stored and easily downloaded.

Various wafer thicknesses are available, which include 8, 11, 15 and 29 mils for unground wafers. Standard wafer thickness varies from product to product, so contact your Microchip Sales Office for details.

ORDERING INFORMATION

Die sales must be initiated by contacting your Microchip Sales Office. To order or to obtain information (on pricing or delivery) for a specific device, use one of the following part numbers.

Standard Thickness Die/Wafer

DEVICE.NUMBER/S	Die in Waffle Pack
DEVICE.NUMBER/W	Whole Wafers
DEVICE.NUMBER/WF	Sawn Wafer on Frame

EEPROM Examples

24LC01B-I/S
24LC01B-I/W
24LC01B-I/WF

No Backgrind Wafers

DEVICE.NUMBER/WNBG	Whole Wafers with Ink	24LC01B-I/WNBG
DEVICE.NUMBER/WNBI	Whole Wafers without Ink	24LC01B-I/WNBI

Standard Die/Wafers with Manufacturing Process Included in Part Number

DEVICE.NUMBER/SXXX	Die in Waffle Pack	24LC01B-I/S15K
DEVICE.NUMBER/WXXX	Whole Wafers	24LC01B-I/W15K
DEVICE.NUMBER/WFXXX	Sawn Wafer on Frame	24LC01B-I/WF15K

DEVICE.NUMBER is the base part number of the device that you require, the S specifies Die in Waffle Pack, a W specifies a Whole Wafer and WF specifies Sawn Wafer on Frame. Whole wafers specified as NBG are shipped as inked wafers with no backgrind (29 mils) and those specified as NBI are shipped with no backgrind and without Ink.

As further clarification, the manufacturing process is sometimes indicated with a three digit suffix added at the end of the part number. For example, a wafer from the 160K process will use the suffix 16K, one from the 150K process will use 15K and one from the 121K process will use 12K.

Overview of Microchip Die/Wafer Support

ELECTRICAL SPECIFICATIONS

The functional and electrical specifications of Microchip devices in die form are identical to those of a packaged version. Please refer to individual data Sheets for complete details.

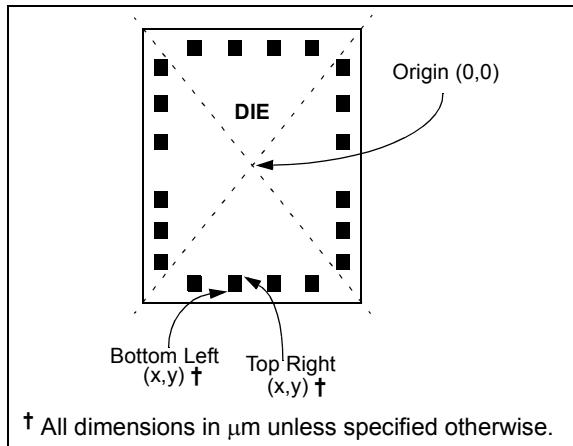
DIE MECHANICAL SPECIFICATIONS

Refer to the individual data Sheet for these specifications.

BOND PAD COORDINATES

The die figures have associated bond pad coordinates. These coordinates assist in the attaching of the bond wire to the die. All the dimensions of these coordinates are in micrometers (μm) unless otherwise specified. The origin for the coordinates is the center of the die, as shown in Figure 1. Refer to the specific die data Sheet for each device for openings and pitch.

FIGURE 1: DIE COORDINATE ORIGIN



The die is capable of thermosonic gold or ultrasonic wire bonding. Die meet the minimum conditions of MIL-STD 883, Method 2011 on "Bond Strength (Destructive Bond Pull Test)". The Bond Pad metallization is silicon doped aluminum.

SUBSTRATE BONDING

Substrate bonding may be required on certain product families. For more information, refer to the specific die data Sheet for that product.

SHIPPING OPTIONS

Die Form (/S)

Microchip product in die form can be shipped in waffle pack. The waffle pack has sufficient cavity area to restrain the die, while maintaining their orientation. Lint free paper inserts are placed over the waffle packs, and each pack is secured with a plastic locking clip. Groups of waffle packs are assembled into sets for shipment. A label with lot number, quantity and part number is attached.

These waffle packs are hermetically sealed in bags.

Wafer Form (/W)

Products may also be shipped in wafer form (see ordering information). Wafers are uncut and shipped in a wafer tub. The tub is padded with non-conductive foam. Lint free paper inserts are placed around each wafer. A label with lot number, quantity and part number is attached.

Sawn Wafer on Frames (/WF)

Products may also be shipped on wafer frames. Wafers are mounted on plastic frames and 100% sawn through. Sawn wafer on frames may be shipped in bulk (25 wafers per carrier) or as a single wafer in a carrier. A label with lot number, quantity and part number is attached with each shipment.

Storage Procedures

Temperature and humidity greatly affect the storage life of die. It is recommended that the die be used as soon as possible after receipt.

Upon receipt, the sealed bags should be stored in a cool and dry environment (25°C and 25% relative humidity). In these conditions, sealed bags have a shelf life of 12 months. Temperatures or humidities greater than these will reduce the storage life.

Once a bag containing waffle packs has been opened, the devices should be assembled and encapsulated within 48 hours (assuming 25°C and 25% humidity).

Overview of Microchip Die/Wafer Support

NOTES:



MICROCHIP

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
<http://www.microchip.com/support>
Web Address:
www.microchip.com

Atlanta

Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Boston

Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago

Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Cleveland

Independence, OH
Tel: 216-447-0464
Fax: 216-447-0643

Dallas

Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit

Farmington Hills, MI
Tel: 248-538-2250
Fax: 248-538-2260

Indianapolis

Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453

Los Angeles

Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608

Santa Clara

Santa Clara, CA
Tel: 408-961-6444
Fax: 408-961-6445

Toronto

Mississauga, Ontario,
Canada
Tel: 905-673-0699
Fax: 905-673-6509

ASIA/PACIFIC

Asia Pacific Office
Suites 3707-14, 37th Floor
Tower 6, The Gateway
Harbour City, Kowloon
Hong Kong
Tel: 852-2401-1200
Fax: 852-2401-3431

Australia - Sydney

Tel: 61-2-9868-6733
Fax: 61-2-9868-6755

China - Beijing

Tel: 86-10-8569-7000
Fax: 86-10-8528-2104

China - Chengdu

Tel: 86-28-8665-5511
Fax: 86-28-8665-7889

China - Chongqing

Tel: 86-23-8980-9588
Fax: 86-23-8980-9500

China - Hangzhou

Tel: 86-571-2819-3187
Fax: 86-571-2819-3189

China - Hong Kong SAR

Tel: 852-2943-5100
Fax: 852-2401-3431

China - Nanjing

Tel: 86-25-8473-2460
Fax: 86-25-8473-2470

China - Qingdao

Tel: 86-532-8502-7355
Fax: 86-532-8502-7205

China - Shanghai

Tel: 86-21-5407-5533
Fax: 86-21-5407-5066

China - Shenyang

Tel: 86-24-2334-2829
Fax: 86-24-2334-2393

China - Shenzhen

Tel: 86-755-8864-2200
Fax: 86-755-8203-1760

China - Wuhan

Tel: 86-27-5980-5300
Fax: 86-27-5980-5118

China - Xian

Tel: 86-29-8833-7252
Fax: 86-29-8833-7256

China - Xiamen

Tel: 86-592-2388138
Fax: 86-592-2388130

China - Zhuhai

Tel: 86-756-3210040
Fax: 86-756-3210049

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-3090-4444
Fax: 91-80-3090-4123

India - New Delhi

Tel: 91-11-4160-8631
Fax: 91-11-4160-8632

India - Pune

Tel: 91-20-2566-1512
Fax: 91-20-2566-1513

Japan - Osaka

Tel: 81-6-6152-7160
Fax: 81-6-6152-9310

Japan - Tokyo

Tel: 81-3-6880-3770
Fax: 81-3-6880-3771

Korea - Daegu

Tel: 82-53-744-4301
Fax: 82-53-744-4302

Korea - Seoul

Tel: 82-2-554-7200
Fax: 82-2-558-5932 or
82-2-558-5934

Malaysia - Kuala Lumpur

Tel: 60-3-6201-9857
Fax: 60-3-6201-9859

Malaysia - Penang

Tel: 60-4-227-8870
Fax: 60-4-227-4068

Philippines - Manila

Tel: 63-2-634-9065
Fax: 63-2-634-9069

Singapore

Tel: 65-6334-8870
Fax: 65-6334-8850

Taiwan - Hsin Chu

Tel: 886-3-5778-366
Fax: 886-3-5770-955

Taiwan - Kaohsiung

Tel: 886-7-213-7828
Fax: 886-7-330-9305

Taiwan - Taipei

Tel: 886-2-2508-8600
Fax: 886-2-2508-0102

Thailand - Bangkok

Tel: 66-2-694-1351
Fax: 66-2-694-1350

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4450-2828
Fax: 45-4485-2829

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

UK - Wokingham
Tel: 44-118-921-5869
Fax: 44-118-921-5820