

HIGH VOLTAGE CERAMIC CHIP CAPACITOR

- CHV SERIES -

■ SCOPE

- Cal-Chip's unique construction process ensures excellent volumetric efficiency and stability of capacitance with temperature.
- Our high voltage capacitors have extended values to those previously offered.



■ FEATURES

- Special internal electrode design offers the highest voltage rating.
- Surface mount suitable for wave and reflow soldering
- High reliability
- RoHS compliant

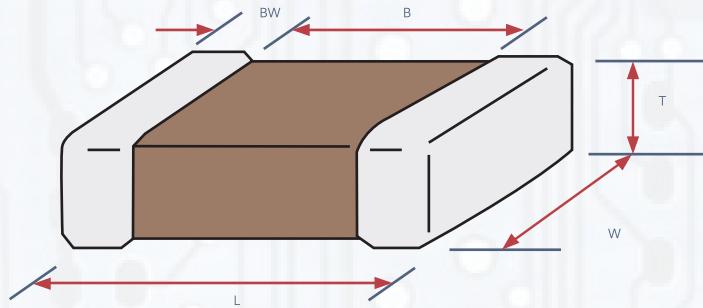
■ APPLICATIONS

- Suitable for LAN/WLAN interface
- Back-lighting inverter, DC-DC converters,
- Ballast, Modems and Power Supplies

■ ELECTRICAL SPECIFICATIONS

Operating Temperature	-55°C to 125°C
Rating Voltage	100Vdc to 5000Vdc
Temperature Coefficient	NPO: $\leq \pm 30\text{ppm}/^{\circ}\text{C}$, -55°C ~ +125°C (EIA Class I) X7R: $\leq \pm 15\text{ppm}/^{\circ}\text{C}$, -55°C ~ +125°C (EIA Class II)
Dissipation Factor	NPO: Q>1000, X7R: D.F. $\leq 2.5\%$
Insulation Resistance	10GΩ or 500/CΩ whichever is smaller
Aging	NPO: 0%, X&R: Typically 1.0% per decade of time 100 $\leq V < 500\text{V}$, 200% Rated Voltage
Dielectric Strength	500 $\leq V < 1000\text{V}$, 150% Rated Voltage 1000 $\leq V$, 120% Rated Voltage

■ CONSTRUCTION & DIMENSIONS



TYPE (MM)	L (MM)	W (MM)	T (MAX) (MM)	B (MIN) (MM)	BW (MIN) (MM)
0603	1.60 \pm 0.10	0.80 \pm 0.10	*	0.4	0.15
0805	2.00 \pm 0.20	1.25 \pm 0.20	*	0.7	0.20
1206	3.20 \pm 0.30	1.60 \pm 0.20	*	1.5	0.30
1210	3.20 \pm 0.30	2.50 \pm 0.20	*	1.6	0.30
1808	4.60 \pm 0.30	2.00 \pm 0.20	*	2.5	0.30
1812	4.60 \pm 0.30	3.20 \pm 0.30	*	2.5	0.30
1825	4.60 \pm 0.30	6.35 \pm 0.40	*	2.5	0.30
2220	5.70 \pm 0.40	5.00 \pm 0.40	*	3.5	0.30
2225	5.70 \pm 0.40	6.35 \pm 0.40	*	3.5	0.30

*REFERENCE CHARTS BELOW

■ ORDERING INFORMATION

CHV	0805	N	250	103	K	X	T	D
PRODUCT TYPE	SIZE	TERMINATION OPTIONS	RATED VOLTAGE	CAPACITANCE	TOLERANCE	DIELECTRIC	PACKAGING	PACKAGING
0603 : 0603			250 : 250V		B: $\pm 0.1\text{pF}$	C: $\pm 0.25\text{pF}$		
0805 : 0805			450 : 450V		D: $\pm 0.50\text{pF}$	F: $\pm 1\%$		
1206 : 1206		X: Nickel Barrier / Flex Term.	500 : 500V		G: $\pm 2\%$	J: $\pm 5\%$		
1210 : 1210			630 : 630V		K: $\pm 10\%$			
1808 : 1808			1K0 : 1KV		M: $\pm 20\%$			
1812 : 1812		A: Nickel Barrier / Arc Protection	1K5 : 1.5KV					
1825 : 1825			2K0 : 2KV					
2220 : 2220			2K5 : 2.5KV					
2225 : 2225		P: Pd/Ag	3K0 : 3KV					
			4K0 : 4KV					
			5K0 : 5KV					
			6K0 : 6KV					

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CAPACITANCE RANGE

DIMENSION (MM)		CHV0603				CHV0805			
L(L1)		1.6±0.1				2.00 ± 0.2			
W		0.8±0.1				1.25 ± 0.2			
BW(L2/L3)		0.40 ± 0.05				0.7 ± 0.2			
DIELECTRIC		COG		X7R		COG		X7R	
T (max)		0.95	0.95	0.95	0.95	1.45	1.45	1.45	1.45
RATED VOLTAGE		250	500	250	500	250	500	250	500
CAP. RANGE									
1.0pF	1R0								
1.3	1R3								
1.5	1R5								
1.8	1R8								
2.0	2R0								
2.2	2R2								
2.4	2R4								
2.5	2R5								
2.7	2R7								
3.0	3R0								
3.3	3R3								
3.6	3R6								
3.9	3R9								
4.0	4R0								
4.3	4R3								
4.7	4R7								
5.0	5R0								
5.1	5R1								
5.6	5R6								
6.0	6R0								
6.8	6R8								
7.0	7R0								
7.5	7R5								
8.0	8R0								
8.2	8R2								
9	9R0								
9.1	9R1								
10	100								
11	110								
12	120								
13	130								
15	150								
16	160								
18	180								
20	200								
22	220								
24	240								
27	270								
30	300								
33	330								
36	360								
39	390								
43	430								



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CAPACITANCE RANGE

DIMENSION (MM)	CHV0603					CHV0805						
L(L1)	1.6±0.1					2.00 ± 0.2						
W	0.8±0.1					1.25 ± 0.2						
BW(L2/L3)	0.40 ± 0.05					0.7 ± 0.2						
DIELECTRIC	COG			X7R			COG			X7R		
T (max)	0.95	0.95	0.95	0.95	0.95	0.95	1.45	1.45	1.45	1.45	1.45	
RATED VOLTAGE	250	500	250	500	1KV		250	500	1KV	250	500	1KV
CAP. RANGE												
47	470											
51	510											
56	560											
62	620											
68	680											
75	750											
82	820											
91	910											
100	101											
120	121											
130	131											
150	151											
160	161											
180	181											
200	201											
220	221											
240	241											
270	271											
300	301											
330	331											
360	361											
390	391											
430	431											
470	471											
510	511											
560	561											
620	621											
680	681											
750	751											
820	821											
910	911											
1.0nF	102											
1.2	122											
1.3	132											
1.5	152											
1.6	162											
1.8	182											
2.0	202											
2.2	222											
2.7	272											
3.3	332											
3.9	392											
4.7	472											
5.6	562											
6.8	682											
8.2	822											
10	103											
12	123											
15	153											
18	183											
22	223											
27	273											
33	333											
39	393											
47	473											
56	563											
68	683											
82	823											
100	104											



 CAPACITANCE RANGE

DIMENSION (MM)	CHV1206											
L(L1)	3.2±0.30											
W	1.6±0.2											
BW(L2/L3)	1.50±0.3											
DIELECTRIC	COG						X7R					
H (max)	1.9						1.45					
RATED VOLTAGE	250	500	630	1KV	2KV	3KV	250	500	630	1KV	1.5KV	2KV
CAP. RANGE												
1.0pF	1R0											
2.0	2R0											
3.3	3R3											
3.9	3R9											
5.0	5R0											
8.2	8R2											
10	100											
12	120											
15	150											
18	180											
22	220											
27	270											
33	330											
39	390											
47	470											
56	560											
68	680											
82	820											
100	101											
120	121											
150	151											
180	181											
220	221											
270	271											
330	331											
390	391											
470	471											
560	561											
680	681											
820	821											
1.0nF	102											
1.2	122											
1.5	152											
1.8	182											
2.2	222											
2.7	272											
3.3	332											
3.9	392											
4.7	472											
5.6	562											
6.8	682											
8.2	822											
10	103											
12	123											
15	153											
18	183											
22	223											
27	273											
33	333											
39	393											
47	473											
56	563											
68	683											
82	823											
100	104											
124	124											
154	154											
184	184											
224	224											
274	274											
334	334											
393	394											
564	564											
684	684											
824	824											
1.0uF	105											
2.2	225											


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CAPACITANCE RANGE

DIMENSION (MM)		CHV1210									
L(L1)		3.20±0.30									
W		2.50±0.20									
BW(L2/L3)		1.60±0.30									
DIELECTRIC	COG						X7R				
T (max)	2.2						2.6	2.2	2.6		
RATED VOLTAGE	250	500	630	1KV	1.5KV	2KV	250	500	1KV	1.5KV	2KV
CAP. RANGE											
2.0pF	2R0										
3.3	3R3										
3.9	3R9										
5.0	5R0										
8.2	8R2										
10	100										
12	120										
15	150										
18	180										
22	220										
27	270										
33	330										
39	390										
47	470										
56	560										
68	680										
82	820										
100	101										
120	121										
150	151										
180	181										
220	221										
270	271										
330	331										
390	391										
470	471										
560	561										
680	681										
820	821										
1.0nF	102										
1.2	122										
1.5	152										
1.8	182										
2.2	222										
2.7	272										
3.3	332										
3.9	392										
4.7	472										
5.6	562										
6.8	682										
8.2	822										
10	103										
12	123										
15	153										
18	183										
22	223										
27	273										
33	333										
39	393										
47	473										
56	563										
68	683										
82	823										
100	104										
124	124										
154	154										
184	184										
224	224										
274	274										
334	334										
393	394										
474	474										
564	564										
684	684										
824	824										
1.0uF	105										
2.2	225										
3.3	335										
6.8	685										





CAPACITANCE RANGE

DIMENSION (MM)		CHV1808													
L(L1)		4.60±0.30													
W		2.00±0.20													
BW(L2/L3)		2.50±0.30													
DIELECTRIC		COG										X7R			
T (max)		1.8			2.2					2.2		2.2	2.2		
RATED VOLTAGE	CAP. RANGE	250	500	630	1KV	2KV	3KV	4KV	5KV	250	500	1KV	2KV	3KV	4KV
2.0pF	2R0														
3.3	3R3														
3.9	3R9														
5.0	5R0														
8.2	8R2														
10	100														
12	120														
15	150														
18	180														
22	220														
27	270														
33	330														
39	390														
47	470														
56	560														
68	680														
82	820														
100	101														
120	121														
150	151														
180	181														
220	221														
270	271														
330	331														
390	391														
470	471														
560	561														
680	681														
820	821														
1.0nF	102														
1.2	122														
1.5	152														
1.8	182														
2.2	222														
2.7	272														
3.3	332														
3.9	392														
4.7	472														
5.6	562														
6.8	682														
8.2	822														
10	103														
12	123														
15	153														
18	183														
22	223														
27	273														
33	333														
39	393														
47	473														
56	563														
68	683														
82	823														
100nF	104														

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CAPACITANCE RANGE

DIMENSION (MM)		CHV1812																
L(L1)		4.60±0.30																
W		3.20±0.30																
BW(L2/L3)		2.50±0.30																
DIELECTRIC		COG										X7R						
T (max)		1.8	1.8	2.6	2.2	2.6	2.6	2.6	2.7	2.6	3	3	2.2	2.7	2.7	2.7		
RATED VOLTAGE		250	500	630	1KV	2KV	3KV	4KV	5KV	6KV	250	500	1KV	2KV	3KV	4KV	5KV	6KV
CAP. RANGE		2.0pF	2R0															
3.3	3R3																	
3.9	3R9																	
5.0	5R0																	
8.2	8R2																	
10	100																	
12	120																	
15	150																	
18	180																	
22	220																	
27	270																	
33	330																	
39	390																	
47	470																	
56	560																	
68	680																	
82	820																	
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220	221																	
270	271																	
330	331																	
390	391																	
470	471																	
560	561																	
680	681																	
820	821																	
1.0nF	102																	
1.2	122																	
1.5	152																	
1.8	182																	
2.2	222																	
2.4	242																	
2.7	272																	
3.3	332																	
3.9	392																	
4.7	472																	
5.6	562																	
6.8	682																	
8.2	822																	
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224	224																	
274	274																	
334	334																	
393	394																	
474	474																	
564	564																	
684	684																	
824	824																	
1.0uF	105																	
2.2	225																	
3.3	335																	
4.7	475																	
6.8	685																	




CAPACITANCE RANGE

DIMENSION (MM)	CHV1825														
L(L1)	4.60±0.30														
W	6.35±0.40														
BW(L2/L3)	2.50±0.30														
DIELECTRIC	COG									X7R					
T (max)	1.8	2.6	2.6	2.6	2.6	2.6	2.6	2.6	3.0	1.8	2.2	2.6	2.6	2.7	
RATED VOLTAGE	250	500	630	1KV	1.5KV	2KV	2.5KV	3KV	250	500	1KV	2KV	3KV	4KV	5KV
CAP. RANGE															
2.0pF	2R0														
3.3	3R3														
3.9	3R9														
5.0	5R0														
8.2	8R2														
10	100														
12	120														
15	150														
18	180														
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27	270														
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39	390														
47	470														
56	560														
68	680														
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330	331														
390	391														
470	471														
560	561														
680	681														
820	821														
1.0nF	102														
1.2	122														
1.5	152														
1.8	182														
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224	224														
274	274														
334	334														
393	394														
474	474														
564	564														
684	684														
824	824														
1.0uF	105														
2.2	225														
3.3	335														
4.7	475														
6.8	685														
8.2	825														
100	106														



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CAPACITANCE RANGE

DIMENSION (MM)	CHV2220																	
L(L1)	5.70±0.40																	
W	5.00±0.40																	
BW(L2/L3)	3.50±0.30																	
DIELECTRIC	COG										X7R							
T (MAX)	1.8				2.2	2.2	1.8	2.5	3	2.2		2.6	1.8	1.8	2.2	2.7		
RATED VOLTAGE	250	500	630	1KV	1.5KV	2KV	3KV	4KV	5KV	6KV	250	500	1KV	2KV	3KV	4KV	5KV	6KV
CAP. RANGE																		
2.0pF	2R0																	
3.3	3R3																	
3.9	3R9																	
5.0	5R0																	
8.2	8R2																	
10	100																	
12	120																	
15	150																	
18	180																	
22	220																	
27	270																	
33	330																	
39	390																	
47	470																	
56	560																	
68	680																	
82	820																	
100	101																	
120	121																	
150	151																	
180	181																	
220	221																	
270	271																	
330	331																	
390	391																	
470	471																	
560	561																	
600	601																	
680	681																	
820	821																	
1.0nF	102																	
1.2	122																	
1.5	152																	
1.8	182																	
2.2	222																	
2.7	272																	
3.3	332																	
3.9	392																	
4.7	472																	
5.6	562																	
6.8	682																	
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82	823																	
100	104																	
124	124																	
154	154																	
184	184																	
224	224																	
274	274																	
334	334																	
394	394																	
474	474																	
564	564																	
684	684																	
824	824																	
1.0uF	105																	
2.2	225																	
3.3	335																	
4.7	475																	
6.8	685																	
8.2	825																	
100	106																	




CAPACITANCE RANGE

DIMENSION (MM)		CHV2225														
L(L1)		5.70±0.40														
W		6.35±0.40														
BW(L2/L3)		3.50±0.30														
DIELECTRIC		COG								X7R						
T (max)		3.0								3.0	2.2	2.6	1.8	2.2	2.7	
RATED VOLTAGE		250	500	630	1KV	2KV	3KV	4KV	5KV	250	500	1KV	2KV	3KV	4KV	5KV
CAP. RANGE																
2.0pF		2R0														
3.3		3R3														
3.9		3R9														
5.0		5R0														
8.2		8R2														
10		100														
12		120														
15		150														
18		180														
22		220														
27		270														
33		330														
39		390														
47		470														
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680		681														
820		821														
1.0nF		102														
1.2		122														
1.5		152														
1.8		182														
2.2		222														
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56		563														
68		683														
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100		104														
124		124														
154		154														
184		184														
224		224														
274		274														
334		334														
393		394														
474		474														
564		564														
684		684														
824		824														
1.0uF		105														
1.2		125														
2.2		225														
3.3		335														
4.7		475														
6.8		685														
8.2		825														
100		106														

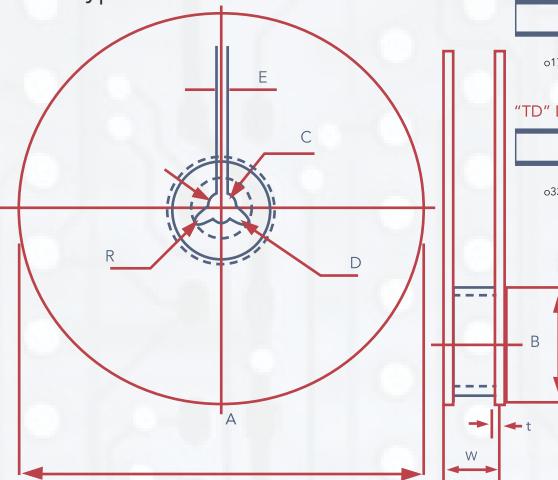


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PACKAGING (TAPING)

Reel Type Size



STANDARD REEL

A	B	C	D	E	W	t	R
$\phi 178 \pm 2.0$	$\phi 50 \text{ min}$	$\phi 13.0 \pm 0.5$	$\phi 21.0 \pm 0.8$	2.0 ± 0.5	$10.2\text{-}8mm$ $14.0\text{-}12mm$ ± 1.5	0.8 ± 0.2	1.0

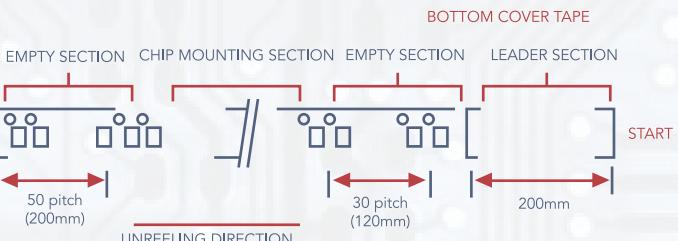
UNIT: mm

"TD" DESIGNATOR FOR OPTIONAL 10/13 INCH REELS

A	B	C	D	E	W	t	R
$\phi 330 \pm 2.0$	$\phi 50 \text{ min}$	$\phi 13.0 \pm 0.5$	$\phi 21.0 \pm 0.8$	2.0 ± 0.5	10.0 ± 1.5	0.8 ± 0.2	1.0

UNIT: mm

Carrier Tape (Standard)



- To peel off the cover tape by the method shown in the right figure apply a peel-off force of 20GF - 60GF (card board); 10GF - 75GF (plastic tape).

- The cover tape should not touch the top or bottom of the chip.

- If the cover tape has been peeled off it may be difficult to remove the chip due to punch-hole clearance, dirt, and debris. Make sure therefore that no paper waste will adhere to and block the absorption nozzle.

- If the cover tape has been peeled off from the top, stick it back on with a suitable adhesive.

- Follow the illustration for the start and end of the winding operation.

CARDBOARD CARRIER TAPE FOR 0402, 0603, 0805/1206 TYPE

TYPE	A	B	W	F	E	P1	P2	P0	D0	t1	t2	MOUNTING HOLE	STD. REEL QTY 7"	UNIT=mm
0402	0.7 ± 0.2	1.3 ± 0.2												10,000 (20,000)
0603	1.1 ± 0.2	1.9 ± 0.2												4,000 (10,000)
0805	1.65 ± 0.2	2.4 ± 0.2												4,000 (10,000)
1206	2.0 ± 0.2	3.6 ± 0.2												4,000 (10,000)

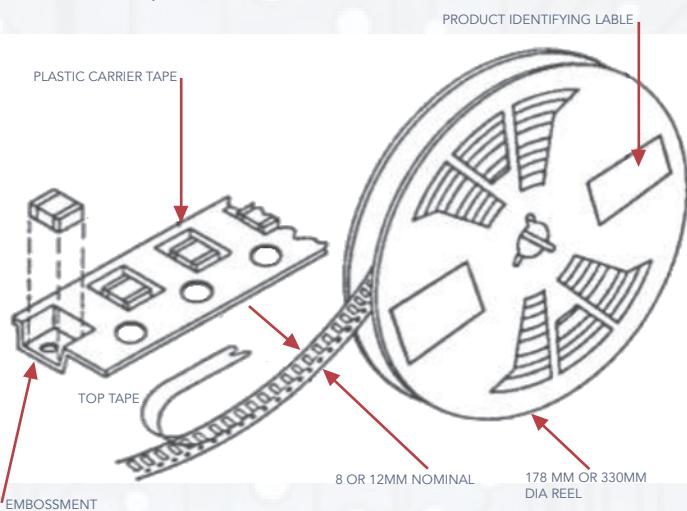
EMBOSSING PLASTIC CARRIER TAPE FOR 0805/1206 TYPE AND 1210 TYPE

TYPE	A	B	W	F	E	P1	P2	P0	D0	t1	t2	MOUNTING HOLE	STD. REEL QTY 7"	OPTIONAL REEL QTY (10/13")	
0805	1.45 ± 0.2	2.3 ± 0.2												2,000, 3,000	10,000
1206	2.0 ± 0.2	3.6 ± 0.2												2,000, 3,000	10,000
1210	2.9 ± 0.2	3.6 ± 0.2												1,000, 2,000, 3,000	4,000
1808	3.6 ± 0.2	4.9 ± 0.2												500, 1,000	2,000
1812	3.6 ± 0.2	4.9 ± 0.2												500, 1,000	2,000
1825	6.8 ± 0.3	4.9 ± 0.2												500, 1,000	1,500
2220	5.5 ± 0.3	6.2 ± 0.3												500, 700, 1,000	1,500
2225	6.8 ± 0.3	6.2 ± 0.3												500, 700	1,000



PACKAGING

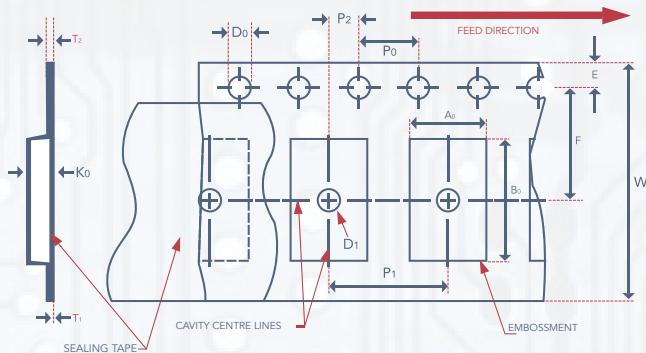
Tape and reel packing of surface mounting chip capacitors for automatic placement are in accordance with IEC286 part 3 and RS481



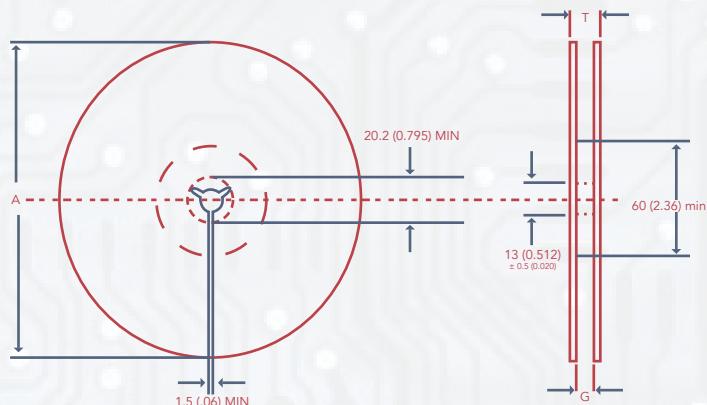
Peel Force

The peel force of the top sealing tape is between 0.2 and 1.0 Newton at 1800. The breaking force of the carrier and sealing tape in the direction of unreeling is greater than 10 Newtons.

Tape dimensions mm (inches)



Reel dimensions mm (inches)



SYMBOL	DESCRIPTION	178MM REEL	330MM REEL
A	Reel Diameter	178 (7) ±2 (0.079)	330 (13) max
G	Reel Inside with	8.4 (0.33) ± 1.5 (0.059) - 0	12.4 (0.49) ± 1.5 (0.059) - 0
T	Reel Outside with	14.4 (0.56) max	18.4 (0.72) max



SYMBOL	DESCRIPTION	8MM TAPE	12MM TAPE	
A ₀	Width of cavity	Dependent of chip size to minimize rotation		
B ₀	Length of cavity			
K ₀	Depth of cavity			
W	Width of tape	8 (0.315) ± 0.2 (0.008)	12 (0.472) ± 0.2 (0.008)	
F	Distance between drive hole centres and cavity centres	3.5 (0.138) ± 0.5 (0.002)	5.5 (0.213) ± 0.05 (0.002)	
E	Distance between drive hole centres and tape edge	1.75 (0.069) ± 0.1 (0.004)		
P ₁	Distance between cavity centres	4 (0.156) ± 0.1 (0.004)	8 (0.315) ± 0.1 (0.004)	
P ₂	Axial distance between drive hole centres and cavity centres	2 (0.079) ± 0.5 (0.002)		
P ₀	Axial distance between drive hole centres	4 (0.156) ± 0.1 (0.004)		
D ₀	Drive to hole diameter	1.5 (0.059) ± 0.1 (0.004) - 0		
D ₁	Diameter of cavity piercing	1 (0.039) ± 0.1 (0.004) - 0	1.5 (0.059) ± 0.1 (0.004) - 0	
t ₁	Embossed tape thickness	0.3 (0.012) ± 0.1 (0.004)	0.4 (0.016) ± 0.1 (0.004)	
t ₂	Top tape thickness	0.1 (0.004) max		

