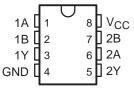
SDLS025B - DECEMBER 1983 - REVISED OCTOBER 2003

- Package Options Include Plastic Small-Outline (D, NS, PS), Shrink Small-Outline (DB), and Ceramic Flat (W) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) DIPs
- Also Available as Dual 2-Input Positive-NAND Gate in Small-Outline (PS) Package

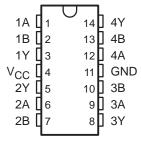
SN5400 . . . J PACKAGE SN54LS00, SN54S00 . . . J OR W PACKAGE SN7400, SN74S00 . . . D, N, OR NS PACKAGE SN74LS00 . . . D, DB, N, OR NS PACKAGE (TOP VIEW)

1A [1B [1Y [2A [2B [2Y [GND [1 2 3 4 5 6 7	U	14 13 12 11 10 9 8	6	V _{CC} 4B 4A 4Y 3B 3A 3Y	,
GND [7		8	Н	3Y	

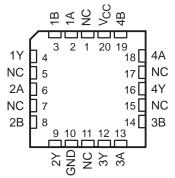




SN5400 . . . W PACKAGE (TOP VIEW)



SN54LS00, SN54S00 . . . FK PACKAGE (TOP VIEW)



NC - No internal connection

description/ordering information

These devices contain four independent 2-input NAND gates. The devices perform the Boolean function $Y = \overline{A} \bullet \overline{B}$ or $Y = \overline{A} + \overline{B}$ in positive logic.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.



description/ordering information (continued)

ORDERING INFORMATION

TA	PACH	(AGE†	ORDERABLE PART NUMBER	TOP-SIDE MARKING
			SN7400N	SN7400N
	PDIP – N	Tube	SN74LS00N	SN74LS00N
			SN74S00N	SN74S00N
		Tube	SN7400D	7400
		Tape and reel	SN7400DR	7400
	colc D	Tube	SN74LS00D	1,000
	SOIC - D	Tape and reel	SN74LS00DR	LS00
0°C to 70°C		Tube	SN74S00D	S00
		Tape and reel	SN74S00DR	500
			SN7400NSR	SN7400
	SOP - NS	Tape and reel	SN74LS00NSR	74LS00
			SN74S00NSR	74S00
	000 00	T	SN74LS00PSR	LS00
	SOP – PS	Tape and reel	SN74S00PSR	S00
	SSOP – DB	Tape and reel	SN74LS00DBR	LS00
			SNJ5400J	SNJ5400J
	CDIP – J	Tube	SNJ54LS00J	SNJ54LS00J
			SNJ54S00J	SNJ54S00J
5500 to 40500			SNJ5400W	SNJ5400W
–55°C to 125°C	CFP – W	Tube	SNJ54LS00W	SNJ54LS00W
			SNJ54S00W	SNJ54S00W
	LCCC – FK	Tube	SNJ54LS00FK	SNJ54LS00FK
	LUCC - FK	Tube	SNJ54S00FK	SNJ54S00FK

[†] Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

FUNCTION TABLE (each gate)

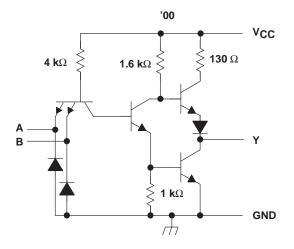
INP	JTS	OUTPUT
Α	В	Υ
Н	Н	L
L	X	Н
X	L	Н

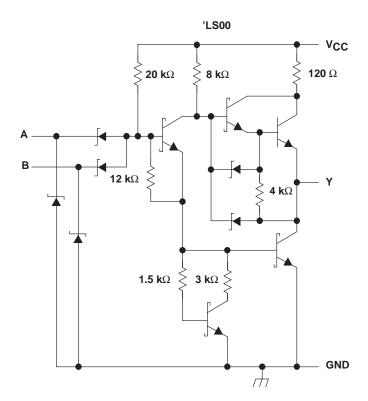
logic diagram, each gate (positive logic)

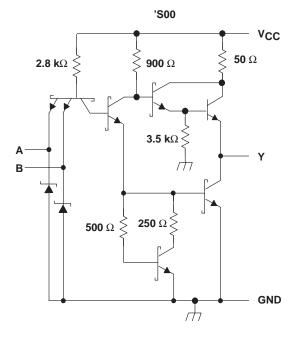




schematic







Resistor values shown are nominal.

SN5400, SN54LS00, SN54S00 SN7400, SN74LS00, SN74S00 QUADRUPLE 2-INPUT POSITIVE-NAND GATES

SDLS025B - DECEMBER 1983 - REVISED OCTOBER 2003

absolute maximum ratings over operating free-air temperature (unless otherwise noted)

Supply voltage, V _{CC} (see Note 1)		
Input voltage: '00, 'S00		5.5 V
'LS00		7 V
Package thermal impedance, θ_{JA} (see Note 2):	D package	86°C/W
***	DB package	96°C/W
	N package	80°C/W
	NS package	76°C/W
	PS package	95°C/W
Storage temperature range, T _{stg}		. −65°C to 150°C

[†] Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

recommended operating conditions (see Note 3)

		,	SN5400		;	SN7400		
		MIN	NOM	MAX	MIN	NOM	MAX	UNIT
Vcc	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
VIH	High-level input voltage	2			2			V
VIL	Low-level input voltage			0.8			0.8	V
ІОН	High-level output current			-0.4			-0.4	mA
loL	Low-level output current			16			16	mA
TA	Operating free-air temperature	-55		125	0		70	°C

NOTE 3: All unused inputs of the device must be held at VCC or GND to ensure proper device operation. Refer to the TI application report, Implications of Slow or Floating CMOS Inputs, literature number SCBA004.

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

	TEST CONDITIONS‡			SN5400						
PARAMETER				MIN	TYP§	MAX	MIN	TYP§	MAX	UNIT
VIK	V _{CC} = MIN,	I _I = -12 mA				-1.5			-1.5	V
Voн	V _{CC} = MIN,	$V_{IL} = 0.8 V$,	$I_{OH} = -0.4 \text{ mA}$	2.4	3.4		2.4	3.4		V
VOL	V _{CC} = MIN,	V _{IH} = 2 V,	$I_{OL} = 16 \text{ mA}$		0.2	0.4		0.2	0.4	V
lį	V _{CC} = MAX,	V _I = 5.5 V				1			1	mA
lіН	V _{CC} = MAX,	V _I = 2.4 V				40			40	μΑ
Ι _{ΙL}	$V_{CC} = MAX$,	$V_{I} = 0.4 \ V$				-1.6			-1.6	mA
los¶	V _{CC} = MAX			-20		-55	-18		-55	mA
IССН	V _{CC} = MAX,	$V_I = 0 V$			4	8		4	8	mA
^I CCL	$V_{CC} = MAX$,	V _I = 4.5 V			12	22		12	22	mA

[‡] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.



NOTES: 1. Voltage values are with respect to network ground terminal.

^{2.} The package termal impedance is calculated in accordance with JESD 51-7.

[§] All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$.

[¶] Not more than one output should be shorted at a time.

SDLS025B - DECEMBER 1983 - REVISED OCTOBER 2003

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$ (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		SN5400 SN7400		
	(INPUT)	(001701)		MIN	TYP	MAX	
t _{PLH}	A or B	٧	$R_L = 400 \Omega$, $C_L = 15 pF$		11	22	ns
t _{PHL}	AOID	Y	TC_ = 400 sz,		7	15	113

recommended operating conditions (see Note 4)

		S	N54LS0)	S	SN74LS00		
		MIN	NOM	MAX	MIN	NOM	MAX	UNIT
Vcc	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
VIH	High-level input voltage	2			2			V
VIL	Low-level input voltage			0.7			0.8	V
IOH	High-level output current			-0.4			-0.4	mA
lOL	Low-level output current			4			8	mA
TA	Operating free-air temperature	-55		125	0		70	°C

NOTE 4: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, Implications of Slow or Floating CMOS Inputs, literature number SCBA004.

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

			4	S	N54LS0	0	S	N74LS0	0	
PARAMETER		TEST CONDITIO	ONST	MIN	TYP‡	MAX	MIN	TYP‡	MAX	UNIT
VIK	V _{CC} = MIN,	I _I = -18 mA				-1.5			-1.5	V
Voн	V _{CC} = MIN,	$V_{IL} = MAX$,	$I_{OH} = -0.4 \text{ mA}$	2.5	3.4		2.7	3.4		V
V	N/ MINI	V 2.V	$I_{OL} = 4 \text{ mA}$		0.25	0.4		0.25	0.4	V
VOL	$V_{CC} = MIN,$	V _{IH} = 2 V	$I_{OL} = 8mA$					0.35	0.5	V
lį	$V_{CC} = MAX$,	V _I = 7 V				0.1			0.1	mA
lіН	$V_{CC} = MAX$,	$V_I = 2.7V$				20			20	μΑ
I _{IL}	$V_{CC} = MAX$,	$V_{I} = 0.4 \ V$				-0.4			-0.4	mA
I _{OS} §	$V_{CC} = MAX$			-20		-100	-20		-100	mA
^I ССН	V _{CC} = MAX,	$V_I = 0 V$	-		0.8	1.6		0.8	1.6	mA
^I CCL	$V_{CC} = MAX$,	V _I = 4.5 V			2.4	4.4		2.4	4.4	mA

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$ (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST C	SI SI	UNIT			
	(INPOT)	(001F01)			MIN	TYP	MAX	
^t PLH	A or B	V	$R_L = 2 k\Omega$,	C _I = 15 pF		9	15	ns
t _{PHL}	AOIB	'		OL = 13 pi		10	15	113



[‡] All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$.

[§] Not more than one output should be shorted at a time.

SN5400, SN54LS00, SN54S00 SN7400, SN74LS00, SN74S00 QUADRUPLE 2-INPUT POSITIVE-NAND GATES

SDLS025B - DECEMBER 1983 - REVISED OCTOBER 2003

recommended operating conditions (see Note 5)

		SN54S00			5	N74S00)	
		MIN	NOM	MAX	MIN	NOM	MAX	UNIT
Vcc	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
VIH	High-level input voltage	2			2			V
VIL	Low-level input voltage			8.0			0.8	V
loH	High-level output current			-1			-1	mA
loL	Low-level output current			20			20	mA
TA	Operating free-air temperature	-55		125	0		70	°C

NOTE 5: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

					SN54S00)	5	LINIT		
PARAMETER		TEST CONDITIO	NST	MIN	TYP [‡]	MAX	MIN	TYP‡	MAX	UNIT
VIK	$V_{CC} = MIN,$	$I_{I} = -18 \text{ mA}$				-1.2			-1.2	V
Voн	$V_{CC} = MIN,$	$V_{IL} = 0.8 V$,	$I_{OH} = -1 \text{ mA}$	2.5	3.4		2.7	3.4		V
V _{OL}	V _{CC} = MIN,	V _{IH} = 2 V,	$I_{OL} = 20 \text{ mA}$			0.5			0.5	V
lį	$V_{CC} = MAX$,	$V_{I} = 5.5 V$				1			1	mA
l _{IH}	$V_{CC} = MAX$,	$V_{I} = 2.7 \ V$				50			50	μΑ
I _{IL}	$V_{CC} = MAX$,	$V_{I} = 0.5V$				-2			-2	mA
IOS§	$V_{CC} = MAX$			-40		-100	-40		-100	mA
IССН	$V_{CC} = MAX$,	$V_I = 0 V$	•		10	16		10	16	mA
^I CCL	$V_{CC} = MAX$,	V _I = 4.5 V	_		20	36		20	36	mA

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see Figure 1)

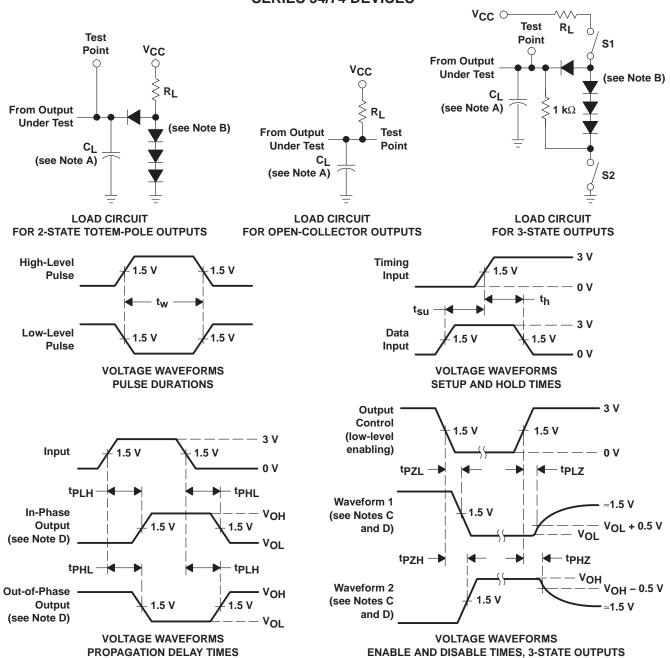
PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CO	SN54S00 SN74S00			UNIT	
	(INPUT)				MIN	TYP	MAX	
^t PLH	A or B	Y	$R_L = 280 \Omega$,	C _L = 15 pF		3	4.5	ns
^t PHL						3	5	
^t PLH	A or B	Y	R _L = 280 Ω,	C _L = 50 pF		4.5		ns
^t PHL	AOIB					5		115

[‡] All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$.

[§] Not more than one output should be shorted at a time.

SDLS025B - DECEMBER 1983 - REVISED OCTOBER 2003

PARAMETER MEASUREMENT INFORMATION **SERIES 54/74 DEVICES**



NOTES: A. C_L includes probe and jig capacitance.

- B. All diodes are 1N3064 or equivalent.
- C. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
- D. S1 and S2 are closed for tpLH, tpHZ, and tpLZ; S1 is open and S2 is closed for tpZH; S1 is closed and S2 is open for tpZL.
- E. All input pulses are supplied by generators having the following characteristics: PRR \leq 1 MHz, $Z_{\Omega} \approx 50 \Omega$; t_r and $t_f \leq$ 7 ns for Series 54/74 devices and t_r and $t_f \le 2.5$ ns for Series 54S/74S devices.
- F. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms









PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finis	n MSL Peak Temp ⁽³⁾
JM38510/00104BCA	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
JM38510/00104BDA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
JM38510/07001BCA	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
JM38510/07001BDA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
JM38510/30001B2A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
JM38510/30001BCA	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
JM38510/30001BDA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
JM38510/30001SCA	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
JM38510/30001SDA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
SN5400J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SN54LS00J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SN54S00J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SN7400D	ACTIVE	SOIC	D	14	50	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN7400DR	ACTIVE	SOIC	D	14	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN7400N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN7400N3	OBSOLETE	PDIP	N	14		None	Call TI	Call TI
SN7400NSR	ACTIVE	SO	NS	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS00D	ACTIVE	SOIC	D	14	50	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS00DBLE	OBSOLETE	SSOP	DB	14		None	Call TI	Call TI
SN74LS00DBR	ACTIVE	SSOP	DB	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS00DR	ACTIVE	SOIC	D	14	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS00J	OBSOLETE	CDIP	J	14		None	Call TI	Call TI
SN74LS00N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS00NSR	ACTIVE	SO	NS	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS00PSR	ACTIVE	SO	PS	8	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74S00D	ACTIVE	SOIC	D	14	50	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74S00DR	ACTIVE	SOIC	D	14	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74S00N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74S00N3	OBSOLETE	PDIP	N	14		None	Call TI	Call TI
SN74S00NSR	ACTIVE	SO	NS	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74S00PSR	ACTIVE	SO	PS	8	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SNJ5400J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC



PACKAGE OPTION ADDENDUM

28-Feb-2005

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SNJ5400W	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
SNJ5400WA	OBSOLETE	CFP	WA	14		None	Call TI	Level-NC-NC-NC
SNJ54LS00FK	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
SNJ54LS00J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SNJ54LS00W	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
SNJ54S00FK	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
SNJ54S00J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SNJ54S00W	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - May not be currently available - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

None: Not yet available Lead (Pb-Free).

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Green (RoHS & no Sb/Br): TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDECindustry standard classifications, and peak solder temperature.

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14 LEADS SHOWN



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package is hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
- E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

W (R-GDFP-F14)

CERAMIC DUAL FLATPACK



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only.
- E. Falls within MIL STD 1835 GDFP1-F14 and JEDEC MO-092AB



FK (S-CQCC-N**)

28 TERMINAL SHOWN

LEADLESS CERAMIC CHIP CARRIER



NOTES: A. All linear dimensions are in inches (millimeters).

- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a metal lid.
- D. The terminals are gold plated.
- E. Falls within JEDEC MS-004



N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- The 20 pin end lead shoulder width is a vendor option, either half or full width.



D (R-PDSO-G14)

PLASTIC SMALL-OUTLINE PACKAGE



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
- D. Falls within JEDEC MS-012 variation AB.





NOTES: A. All linear dimensions are in millimeters.

B. This drawing is subject to change without notice.

C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



MECHANICAL DATA

NS (R-PDSO-G**)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



DB (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

28 PINS SHOWN



NOTES: A. All linear dimensions are in millimeters.

B. This drawing is subject to change without notice.

C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.

D. Falls within JEDEC MO-150

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