SDLS007 D2635, JANUARY 1981 – REVISED MARCH 1988

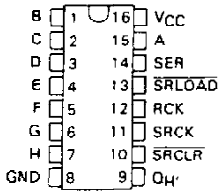
- **8-Bit Parallel Storage Register Inputs ('LS597)**
- **Parallel 3-State I/O, Storage Register Inputs, Shift Register Outputs ('LS598)**
- **Shift Register has Direct Overriding Load and Clear**
- **Accurate Shift-Frequency . . . DC to 20 MHz**

description

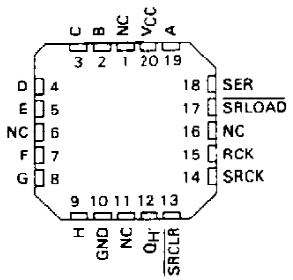
The 'LS597 comes in a 16-pin package and consists of an 8-bit storage latch feeding a parallel-in, serial-out 8-bit shift register. Both the storage register and shift register have positive-edge triggered clocks. The shift register also has direct load (from storage) and clear inputs.

The 'LS598 comes in a 20-pin package and has all the features of the 'LS597 plus 3-state I/O ports that provide parallel shift register outputs and also has multiplexed serial data inputs.

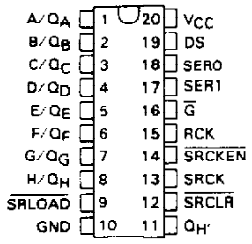
SN54LS597 . . . J OR W PACKAGE
SN74LS597 . . . N PACKAGE
(TOP VIEW)



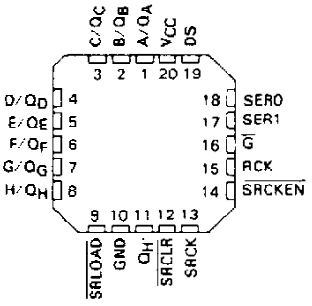
SN54LS597 . . . FK PACKAGE
(TOP VIEW)



SN54LS598 . . . J OR W PACKAGE
LS598 . . . DW OR N PACKAGE
(TOP VIEW)



SN54LS598 . . . FK PACKAGE
(TOP VIEW)

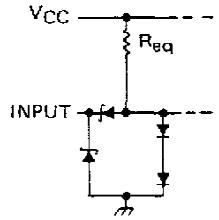


NC - No internal connection

PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

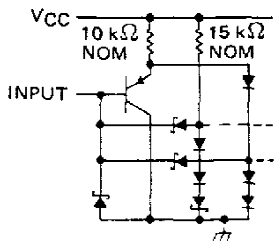
schematics of inputs and outputs

EQUIVALENT OF SERIAL AND A THRU H INPUTS

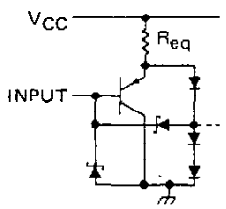


SERIAL: R_{eq} = 20 kΩ NOM
A thru H: R_{eq} = 25 kΩ NOM

EQUIVALENT OF SRCK INPUT ('LS598 ONLY)

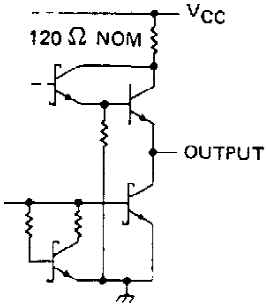


EQUIVALENT OF ALL OTHER INPUTS

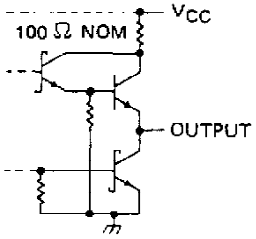


('LS597) RCK, SRCK: R_{eq} = 10 kΩ NOM
('LS598) RCK: R_{eq} = 10 kΩ NOM
ALL OTHER: R_{eq} = 13 kΩ NOM

TYPICAL OF $Q_{H'}$ OUTPUTS

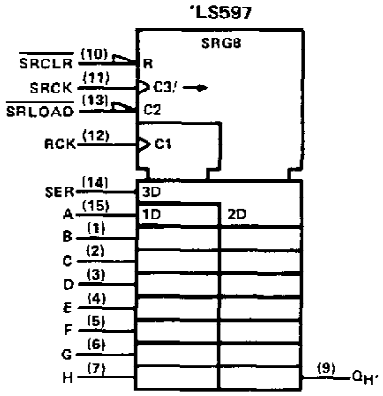


TYPICAL OF Q_A THRU Q_H OUTPUTS ('LS598 ONLY)

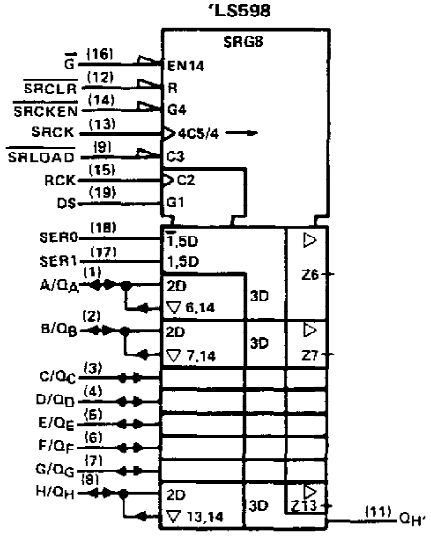


logic symbols†

'LS597

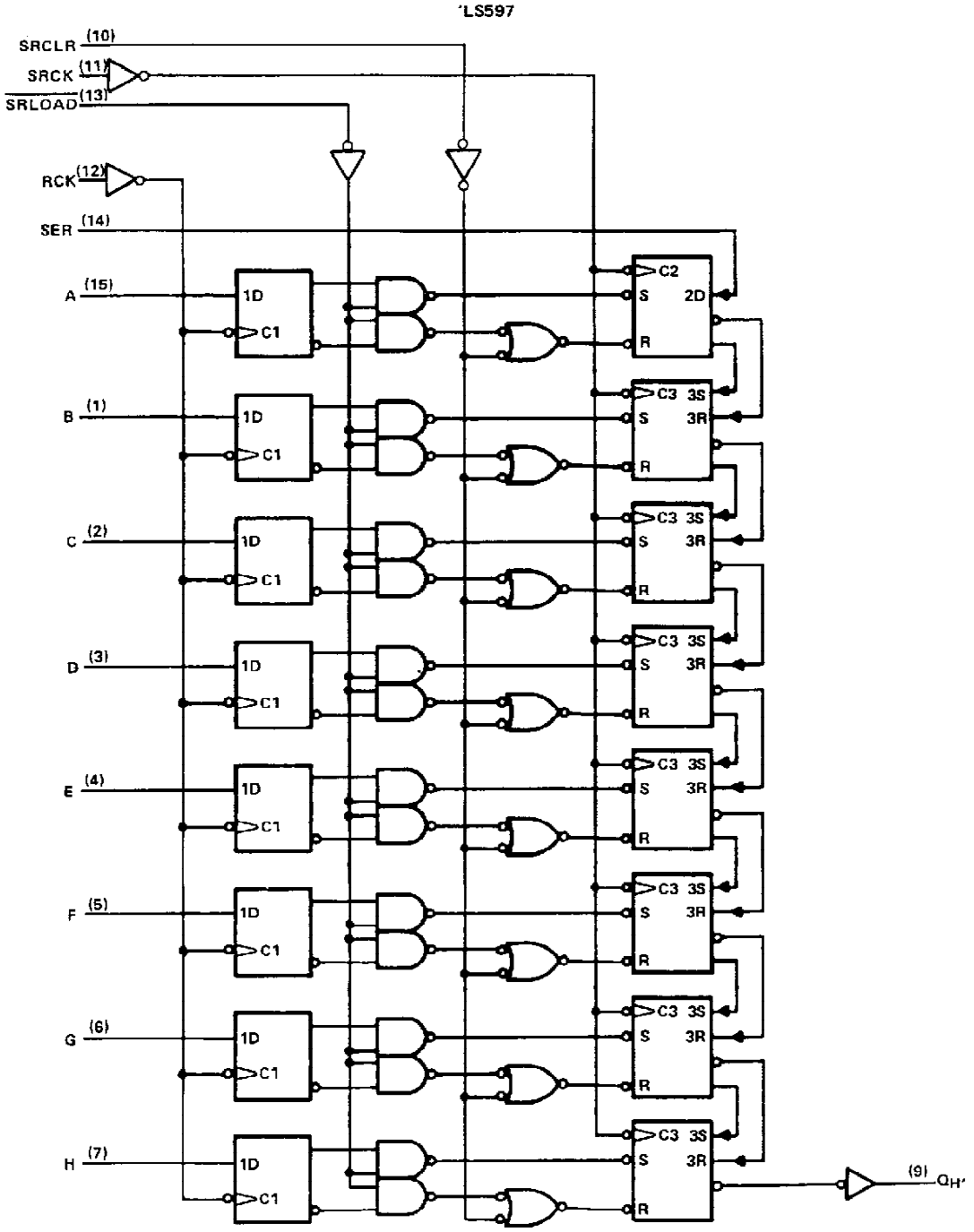


'LS598



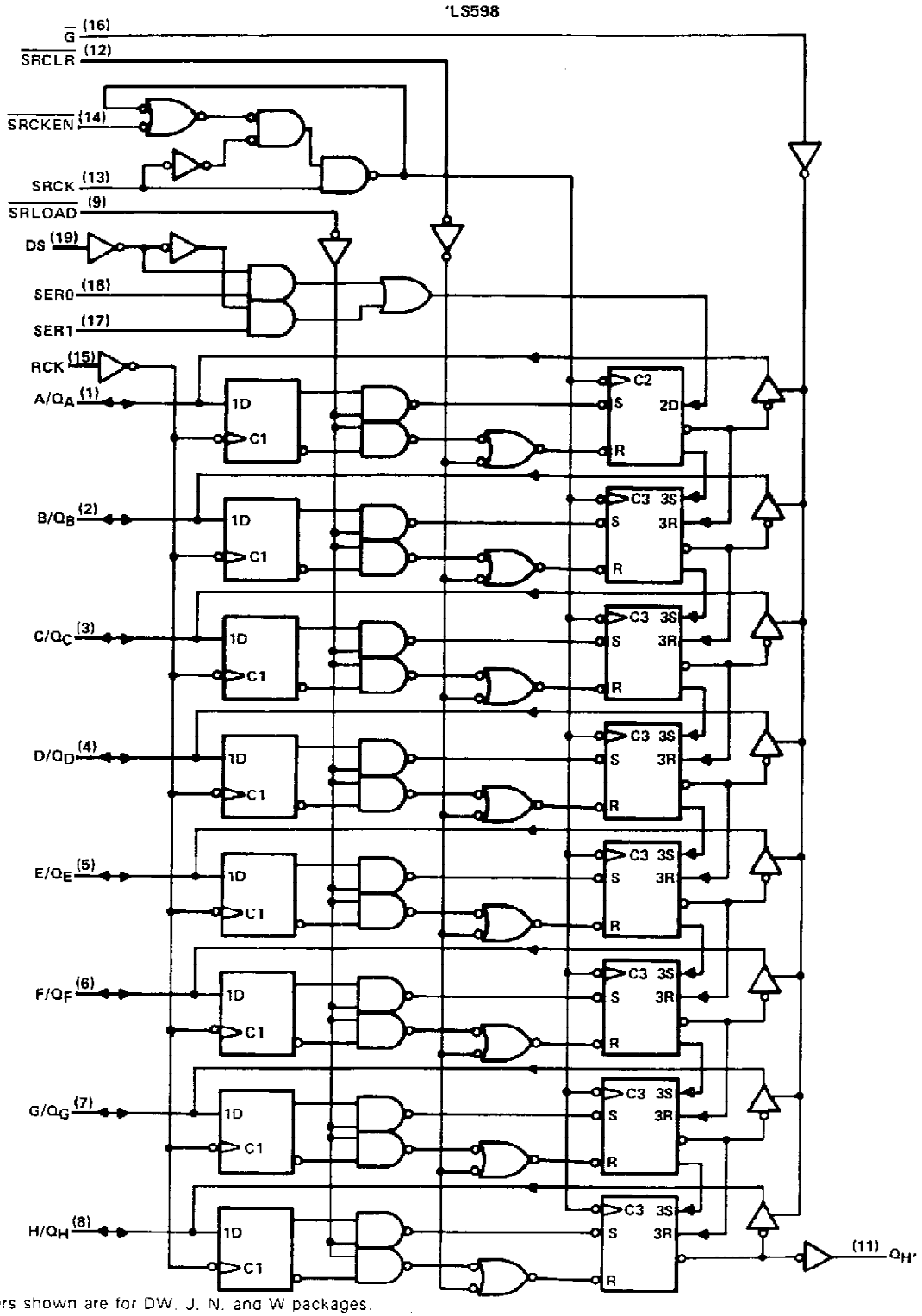
†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.
Pin numbers shown are for DW, J, N, and W packages.

logic diagram (positive logic)



Pin numbers shown are for DW, J, N, and W packages.

logic diagram (positive logic)



Pin numbers shown are for DW, J, N, and W packages.

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

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Input voltage (excluding I/O ports) . . . . . 7 V
Off-state output voltage (including I/O ports) . . . . . 5.5 V
Operating free-air temperature range: SN54LS597, SN54LS598 . . . . . −55°C to 125°C
SN74LS597, SN74LS598 . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

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

recommended operating conditions

				SN54LS'			SN74LS'			UNIT
				MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage			4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High-level input voltage			2			2			V
V_{IL}	Low-level input voltage					0.7			0.8	V
I_{OH}	High-level output current	Q_H'				−1			−1	mA
		Q_A thru Q_H, 'LS598 only				−1			−2.6	
I_{OL}	Low-level output current	Q_H'				8			16	mA
		Q_A thru Q_H, 'LS598 only				12			24	
f_{SCK}	Shift clock frequency			0		20	0		20	MHz
t_w	Pulse duration	SRCK	high	15			15			ns
			low	35			35			
		RCK		20			20			
		$\overline{\text{SRCLR}}$		20			20			
		$\overline{\text{SRLOAD}}$		40			40			
t_{su}	Setup time	Data before RCK ↑		20			20			ns
		DS before SRCK ↑ ('LS598 only)		30			30			
		$\overline{\text{SRCKEN}}$ low before SRCK ↑ ('LS598 only)		20			20			
		$\overline{\text{SRCLR}}$ inactive before SRCK ↑		25			25			
		$\overline{\text{SRLOAD}}$ inactive before SRCK ↑		30			30			
		RCK ↑ before $\overline{\text{SRLOAD}}$ ↑ (see Note 2)		40			40			
		SER before SRCK ↑		20			20			
t_h	Hold time			0			0			ns
T_A	Operating free-air temperature			−55		125	0		70	°C

NOTE 2: The RCK ↑ before $\overline{\text{SRLOAD}}$ ↑ setup time ensures the data saved by RCK ↑ will also be loaded into the shift register.

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

PARAMETER			TEST CONDITIONS†			SN54LS' MIN	SN54LS' TYP‡	SN54LS' MAX	SN74LS' MIN	SN74LS' TYP‡	SN74LS' MAX	UNIT
V_{IK}			V_{CC} = MIN, I_I = −18 mA					−1.5			−1.5	V
V_{OH}	'LS598 Q		V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = MAX	I_{OH} = −1 mA		2.4	3.2					V
				I_{OH} = −2.6 mA					2.4	3.1		
	Q_H'			I_{OH} = −1 mA		2.4	3.2		2.4	3.2		
V_{OL}	'LS598 Q		V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = MAX	I_{OL} = 12 mA			0.25	0.4		0.25	0.4	V
				I_{OL} = 24 mA						0.35	0.5	
	Q_H'			I_{OL} = 8 mA			0.25	0.4		0.25	0.4	
				I_{OL} = 16 mA						0.35	0.5	
I_{OZH}	'LS598 Q		V_{CC} = MAX, V_{IH} = 2 V, V_{IL} = MAX, V_O = 2.7 V					20			20	μA
I_{OZL}	'LS598 Q		V_{CC} = MAX, V_{IH} = 2 V, V_{IL} = MAX, V_O = 0.4 V					−0.4			−0.4	mA
I_I	'LS598 Q		V_{CC} = MAX	V_I = 5.5 V				0.1			0.1	mA
	Others			V_I = 7 V				0.1			0.1	
I_{IH}			V_{CC} = MAX, V_I = 2.7 V					20			20	μA
I_{IL}	'LS598 SRCK		V_{CC} = MAX, V_I = 0.4 V					−0.8			−0.8	mA
	SER, A Thru H							−0.4			−0.4	
	Others							−0.2			−0.2	
I_{OS}§	'LS598 Q		V_{CC} = MAX, V_O = 0 V			−30		−130	−30		−130	mA
	Q_H'					−20		−100	−20		−100	
I_{CC}	'LS597	I_{CCH}	V_{CC} = MAX, All possible inputs grounded, All outputs open				35	53		35	53	mA
		I_{CCL}					35	53		35	53	
	'LS598	I_{CCH}					45	68		45	68	
		I_{CCL}					54	80		54	80	
		I_{CCZ}					56	85		56	85	

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
‡ All typical values are at V_{CC} = 5 V, T_A = 25°C
§ Not more than one output should be shorted at a time and the duration of the short-circuit should not exceed one second.

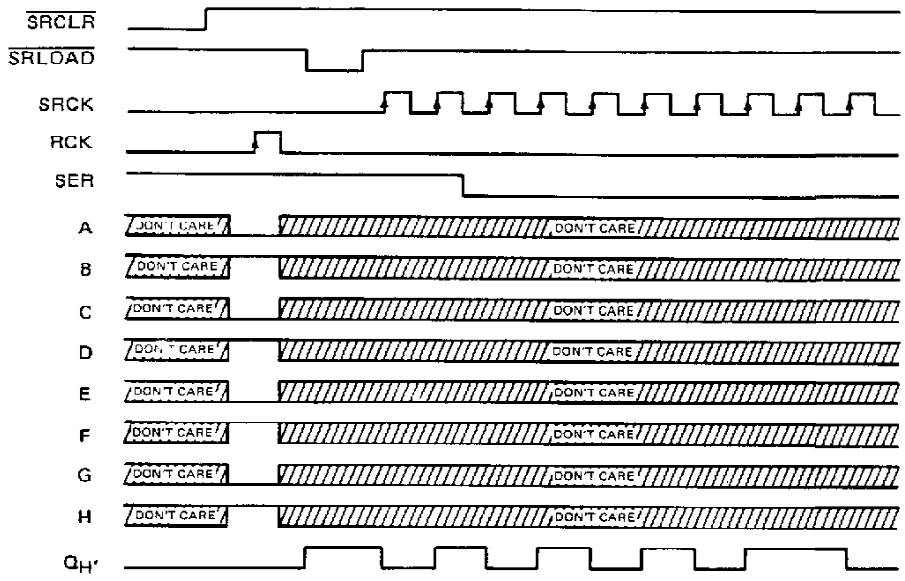
switching characteristics, V_{CC} = 5 V, T_A = 25°C, (see note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	'LS597			'LS598			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
f_{max}	SRCK	Q	R_L = 667 Ω, C_L = 45 pF	20	35		20	35		MHz
f_{max}	SRCK	Q_H'	R_L = 1 kΩ, C_L = 30 pF	20	35					MHz
t_{PLH}	SRCK↑	Q_H'	R_L = 1 kΩ, C_L = 30 pF		15	23		11	17	ns
t_{PHL}	SPCK↑	Q_H'			20	30		15	23	ns
t_{PLH}	$\overline{\text{SRLOAD}}$↓	Q_H'			38	57		28	42	ns
t_{PHL}	$\overline{\text{SRLOAD}}$↓	Q_H'			29	44		20	30	ns
t_{PHL}	$\overline{\text{SRCLR}}$↓	Q_H'			24	36		18	27	ns
t_{PLH}	RCK↑	Q_H'	R_L = 1 kΩ, C_L = 30 pF		41	60		32	48	ns
t_{PHL}	RCK↑	Q_H'	SRLOAD = L		32	48		24	36	ns
t_{PLH}	SRCK↑	Q	R_L = 667 Ω, C_L = 45 pF					12	18	ns
t_{PHL}	SRCK↑	Q						19	28	ns
t_{PLH}	$\overline{\text{SRLOAD}}$↓	Q						32	48	ns
t_{PHL}	$\overline{\text{SRLOAD}}$↓	Q						27	40	ns
t_{PHL}	$\overline{\text{SRCLR}}$↓	Q						25	38	ns
t_{PZH}	G↓	Q						26	31	ns
t_{PZL}	G↓	Q						29	43	ns
t_{PHZ}	G↑	Q	R_L = 667 Ω, C_L = 5 pF					25	38	ns
t_{PLZ}	G↑	Q						20	30	ns

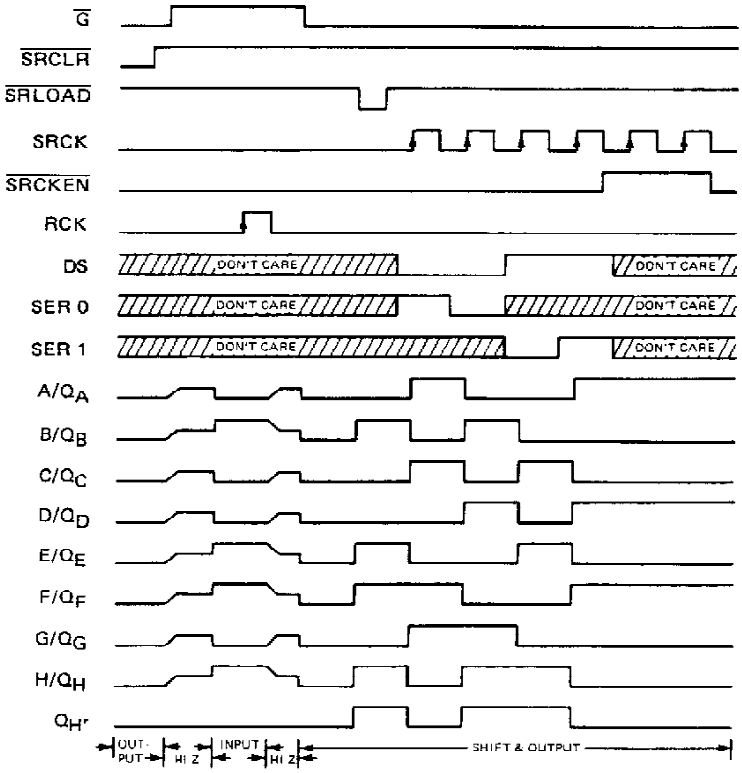
NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

typical operating sequences

'LS597



'LS598



PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
5962-89444012A	Active	Production	LCCC (FK) | 20	55 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-89444012A SNJ54LS 597FK
5962-8944401EA	Active	Production	CDIP (J) | 16	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8944401EA SNJ54LS597J
5962-8944401FA	Active	Production	CFP (W) | 16	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8944401FA SNJ54LS597W
SN74LS597D	Active	Production	SOIC (D) | 16	40 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	LS597
SN74LS597D.A	Active	Production	SOIC (D) | 16	40 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	LS597
SN74LS597N	Active	Production	PDIP (N) | 16	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74LS597N
SN74LS597N.A	Active	Production	PDIP (N) | 16	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74LS597N
SN74LS598N	Active	Production	PDIP (N) | 20	20 | TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74LS598N
SN74LS598N.A	Active	Production	PDIP (N) | 20	20 | TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74LS598N
SNJ54LS597FK	Active	Production	LCCC (FK) | 20	55 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-89444012A SNJ54LS 597FK
SNJ54LS597FK.A	Active	Production	LCCC (FK) | 20	55 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-89444012A SNJ54LS 597FK
SNJ54LS597J	Active	Production	CDIP (J) | 16	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8944401EA SNJ54LS597J
SNJ54LS597J.A	Active	Production	CDIP (J) | 16	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8944401EA SNJ54LS597J
SNJ54LS597W	Active	Production	CFP (W) | 16	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8944401FA SNJ54LS597W
SNJ54LS597W.A	Active	Production	CFP (W) | 16	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8944401FA SNJ54LS597W

(1) **Status:** For more details on status, see our product life cycle.

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

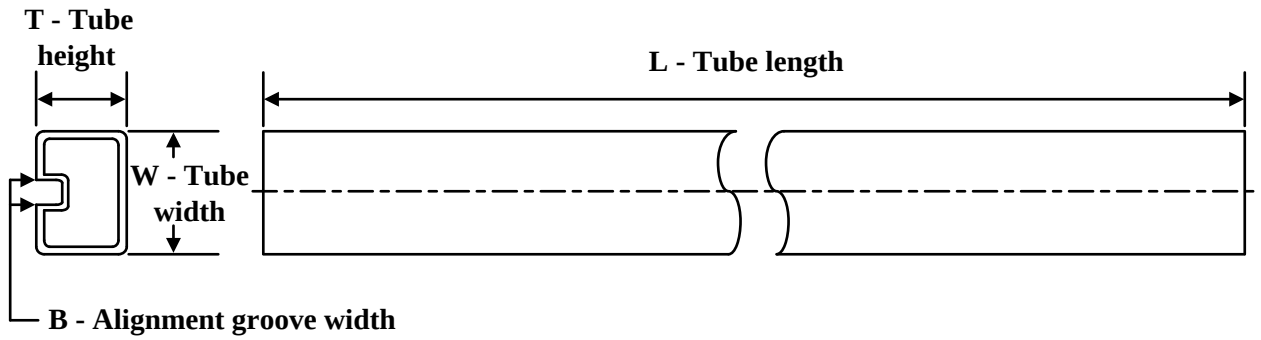
OTHER QUALIFIED VERSIONS OF SN54LS597, SN74LS597 :

- Catalog : SN74LS597
- Military : SN54LS597

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

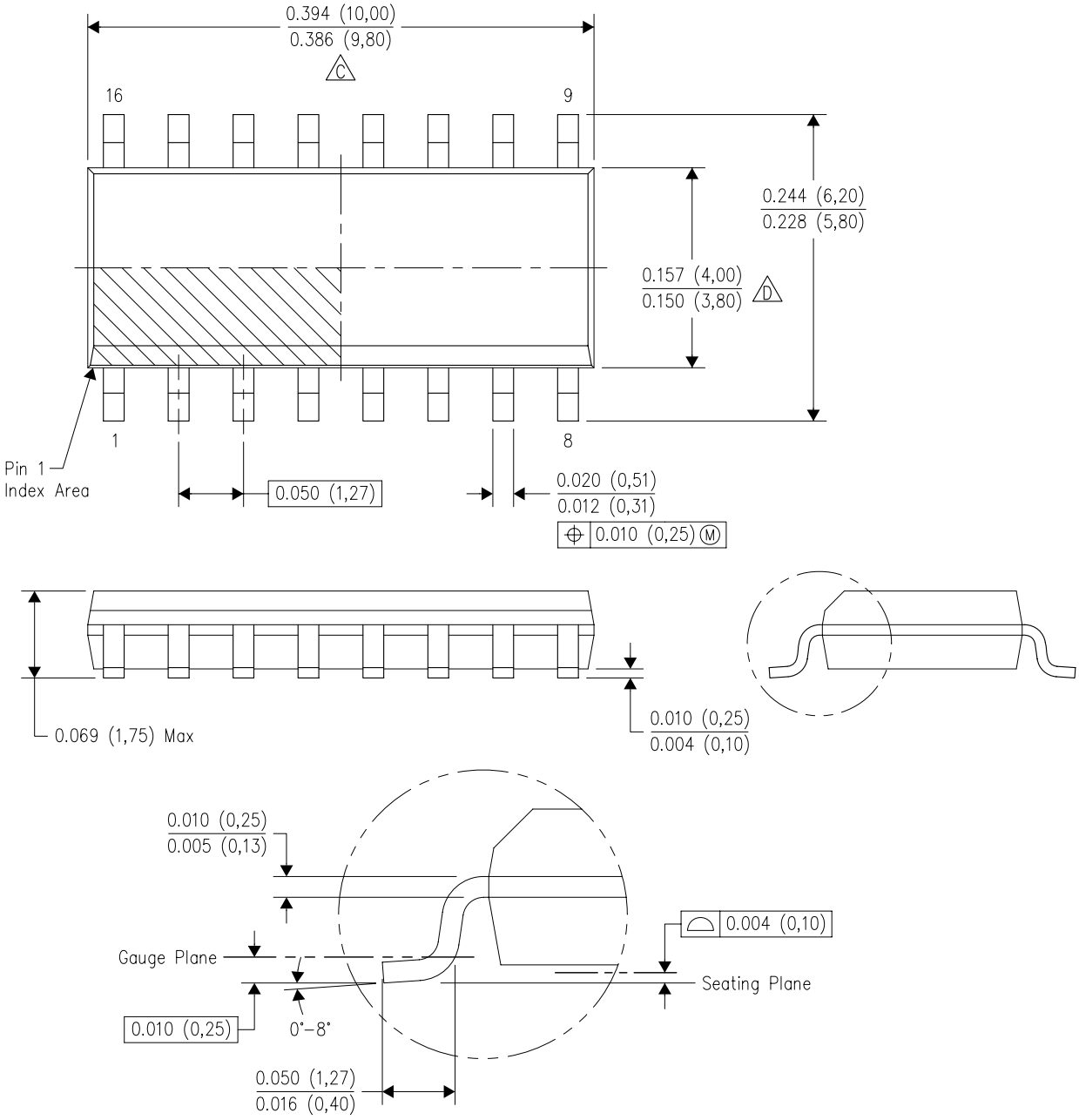
TUBE



*All dimensions are nominal

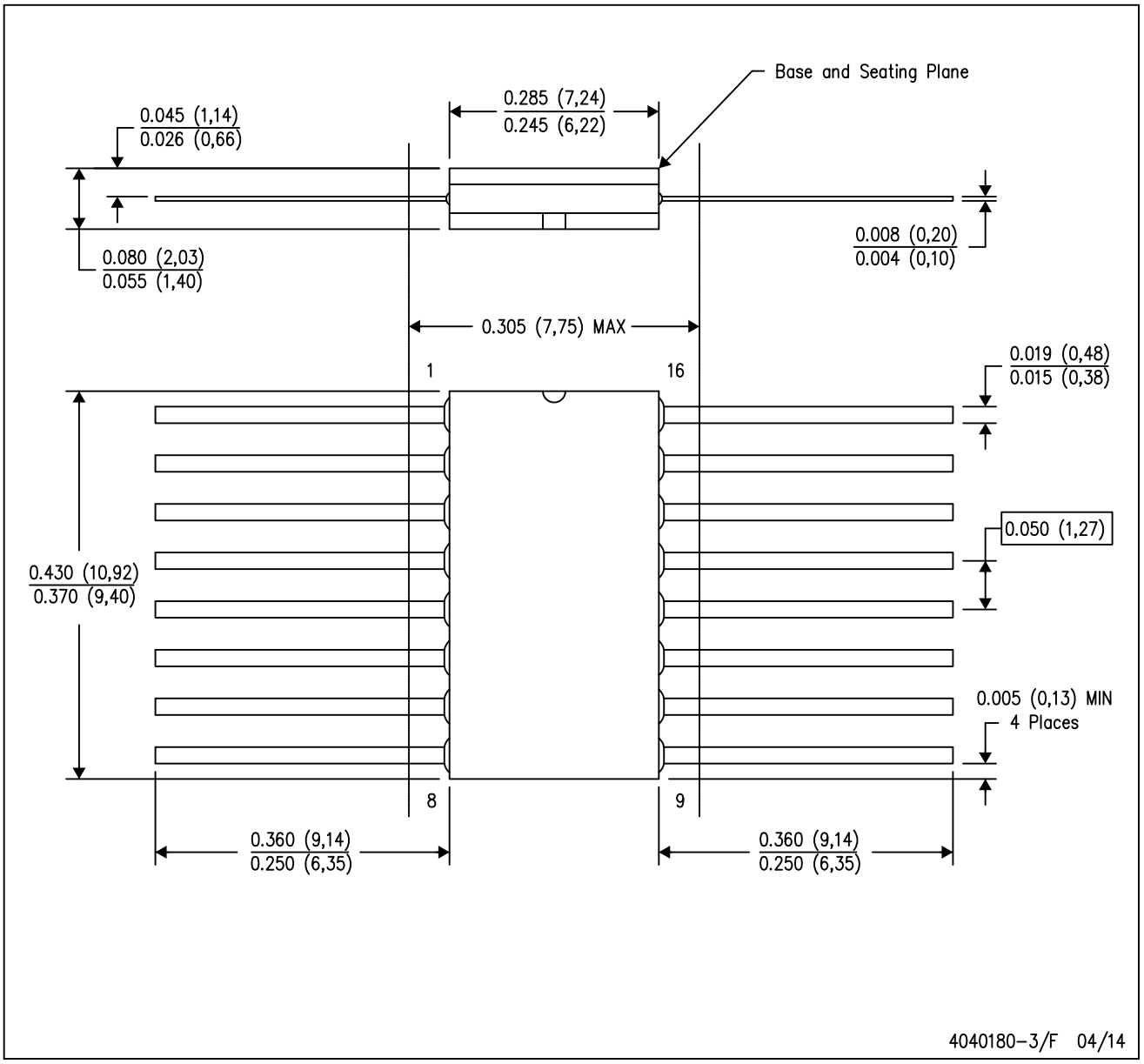
Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
5962-89444012A	FK	LCCC	20	55	506.98	12.06	2030	NA
5962-8944401FA	W	CFP	16	25	506.98	26.16	6220	NA
SN74LS597D	D	SOIC	16	40	507	8	3940	4.32
SN74LS597D.A	D	SOIC	16	40	507	8	3940	4.32
SN74LS597N	N	PDIP	16	25	506	13.97	11230	4.32
SN74LS597N	N	PDIP	16	25	506	13.97	11230	4.32
SN74LS597N.A	N	PDIP	16	25	506	13.97	11230	4.32
SN74LS597N.A	N	PDIP	16	25	506	13.97	11230	4.32
SN74LS598N	N	PDIP	20	20	506	13.97	11230	4.32
SN74LS598N.A	N	PDIP	20	20	506	13.97	11230	4.32
SNJ54LS597FK	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54LS597FK.A	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54LS597W	W	CFP	16	25	506.98	26.16	6220	NA
SNJ54LS597W.A	W	CFP	16	25	506.98	26.16	6220	NA

D (R–PDSO–G16) PLASTIC SMALL OUTLINE



NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
E. Reference JEDEC MS–012 variation AC.

W (R–GDFP–F16) CERAMIC DUAL FLATPACK



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 ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only.
E. Falls within MIL STD 1835 GDFP2–F16

GENERIC PACKAGE VIEW

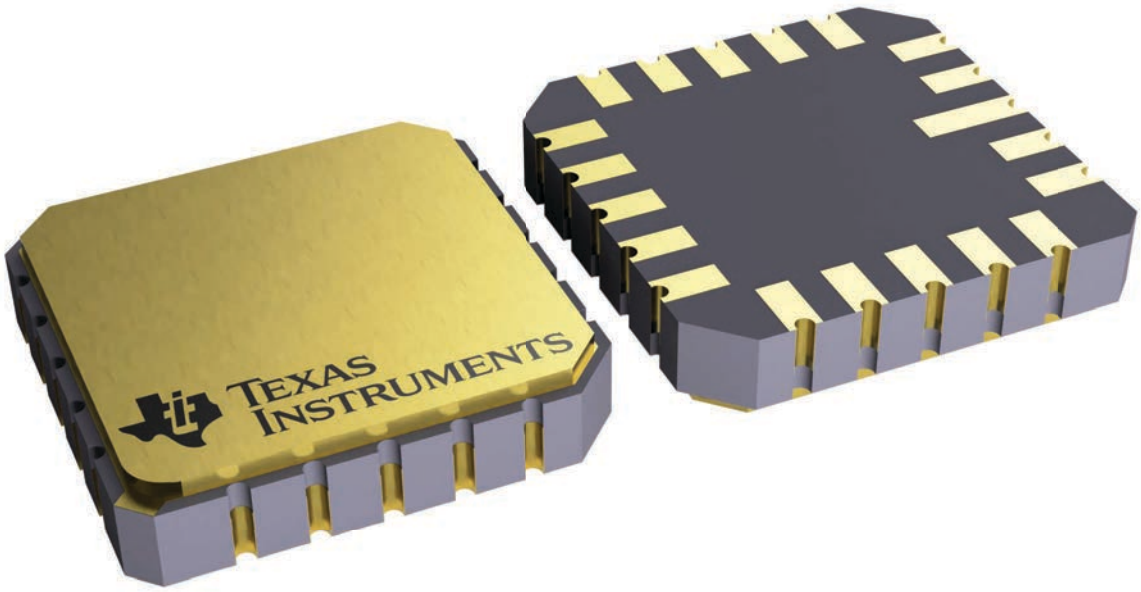
FK 20

LCCC - 2.03 mm max height

8.89 x 8.89, 1.27 mm pitch

LEADLESS CERAMIC CHIP CARRIER

This image is a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.

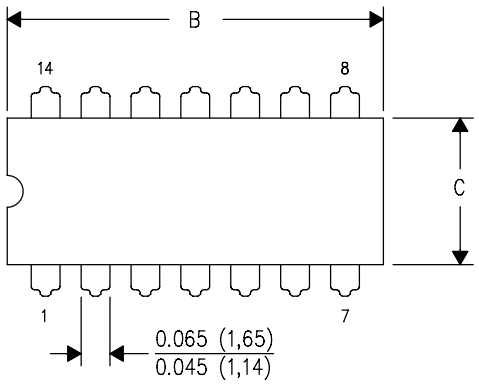


4229370VA\

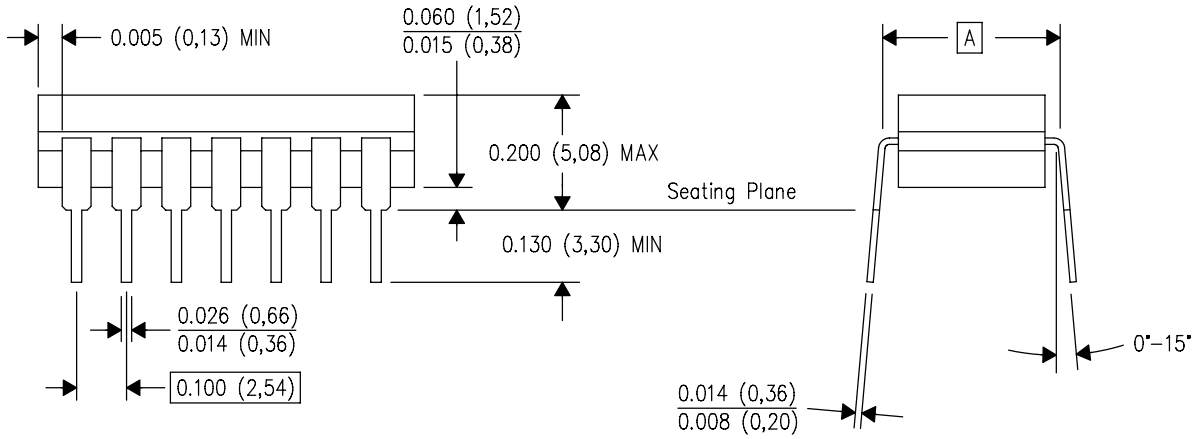
J (R–GDIP–T**)

14 LEADS SHOWN

CERAMIC DUAL IN–LINE PACKAGE



DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



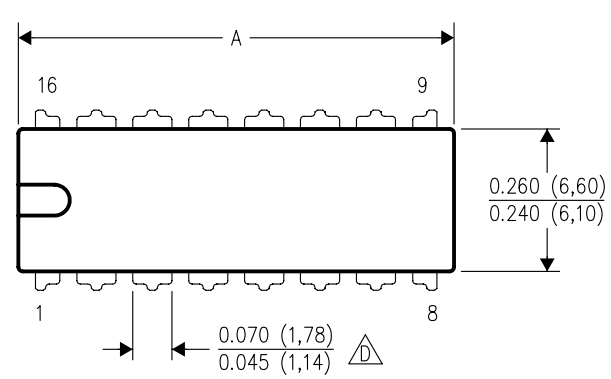
4040083/F 03/03

NOTES:
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.

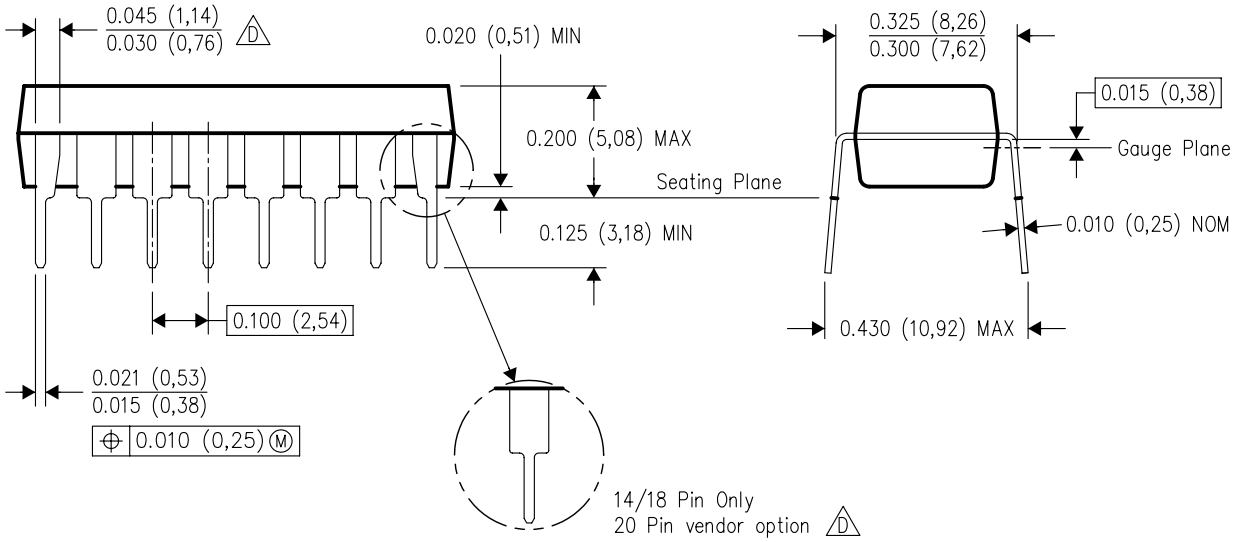
N (R–PDIP–T**)

PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN



DIM \ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS–001 VARIATION (C)	AA	BB	AC	AD



4040049/E 12/2002

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

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Last updated 10/2025