TEXAS INSTRUMENTS

Data sheet acquired from Harris Semiconductor
SCHS075

CD4517B Types

CMOS Dual 64-Stage Static Shift Register

High-Voltage Types (20-Volt Rating)

■ CD4517B dual 64-stage static shift register consists of two independent registers each having a clock, data, and write enable input and outputs accessible at taps following the 16th, 32nd, 48th, and 64th stages. These taps also serve as input points allowing data to be inputted at the 17th, 33rd, and 49th stages when the write enable input is a logic 1 and the clock goes through a low-to-high transition. The truth table indicates how the clock and write enable inputs control the operation of the CD4517B. Inputs at the intermediate taps allow entry of 64 bits into the register with 16 clock pulses. The 3-state outputs permit connection of this device to an external bus.

The CD4517B is supplied in 16-lead hermetic dual-in-line ceramic packages (D and F suffixes), 16-lead dual-in-line plastic packages (E suffix), and in chip form (H suffix).

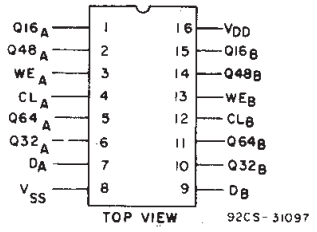
Features:

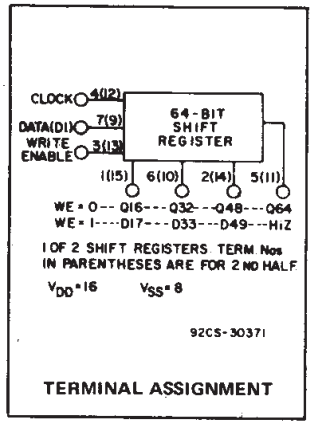
- Low quiescent current – 10 nA/pkg (typ.) at V_{DD} = 5 V
- Clock frequency 12 MHz (typ.) at V_{DD} = 10 V
- Schmitt trigger clock inputs allow operation with very slow clock rise and fall times
- Capable of driving two low-power TTL loads, one low- power Schottky TTL load, or two HTL loads
- Three-state outputs
- 100% tested for quiescent current at 20 V
- Standardized, symmetrical output characteristics
- 5-V, 10-V and 15-V parametric ratings
- Meets all requirements of JEDEC Tentative **Standard No. 13B,** "Standard Specifications for Description of 'B' Series CMOS Devices"

Applications:

- Time-delay circuits
- Scratch-pad memories
- General-purpose serial shift-register applications

TERMINAL ASSIGNMENT





TERMINAL ASSIGNMENT

MAXIMUM RATINGS, *Absolute-Maximum Values:*

DC SUPPLY-VOLTAGE RANGE, (V_{DD})
(Voltages referenced to V_{SS} Terminal) ..... -0.5V to +20V
INPUT VOLTAGE RANGE, ALL INPUTS ..... -0.5V to V_{DD} +0.5V
DC INPUT CURRENT, ANY ONE INPUT ..... ±10mA
POWER DISSIPATION PER PACKAGE (P_D):
For T_A = -55°C to +100°C 500mW
For T_A = +100°C to +125°C ..... Derate Linearity at 12mW/°C to 200mW
DEVICE DISSIPATION PER OUTPUT TRANSISTOR
FOR T_A = FULL PACKAGE-TEMPERATURE RANGE (All Package Types) 100mW
OPERATING-TEMPERATURE RANGE (T_A) ..... -55°C to +125°C
STORAGE TEMPERATURE RANGE (T_{stg}) ..... -65°C to +150°C
LEAD TEMPERATURE (DURING SOLDERING):
At distance 1/16 ± 1/32 inch (1.59 ± 0.79mm) from case for 10s max ..... +265°C

RECOMMENDED OPERATING CONDITIONS

For maximum reliability, nominal operating conditions should be selected so that operation is always within the following ranges:

CHARACTERISTIC	LIMITS		UNITS
	MIN.	MAX.	
Supply-Voltage Range (For T_A = Full Package Temperature Range)	3	18	V

TRUTH TABLE

Clock	Write Enable	Data	Stage 16 Tap	Stage 32 Tap	Stage 48 Tap	Stage 64 Tap
0	0	X	Q16	Q32	Q48	Q64
0	1	X	Z	Z	Z	Z
1	0	X	Q16	Q32	Q48	Q64
1	1	X	Z	Z	Z	Z
⌒	0	DI In	Q16	Q32	Q48	Q64
⌒	1	DI In	D17 In	D33 In	D49 In	Z
⌒	0	X	Q16	Q32	Q48	Q64
⌒	1	X	Z	Z	Z	Z

X = Don't Care Z = High Impedance

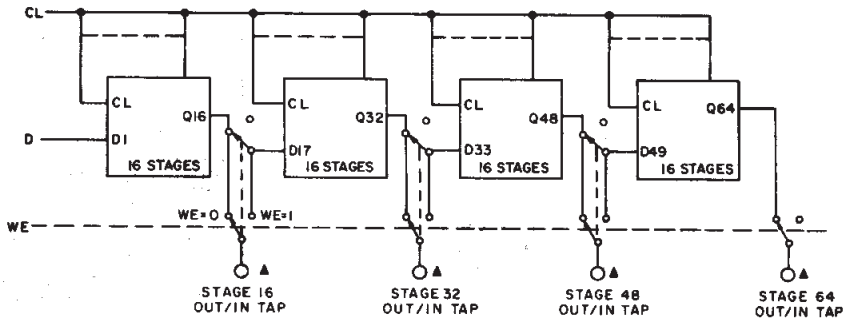


Fig. 1—CD4517B functional block diagram (one half).

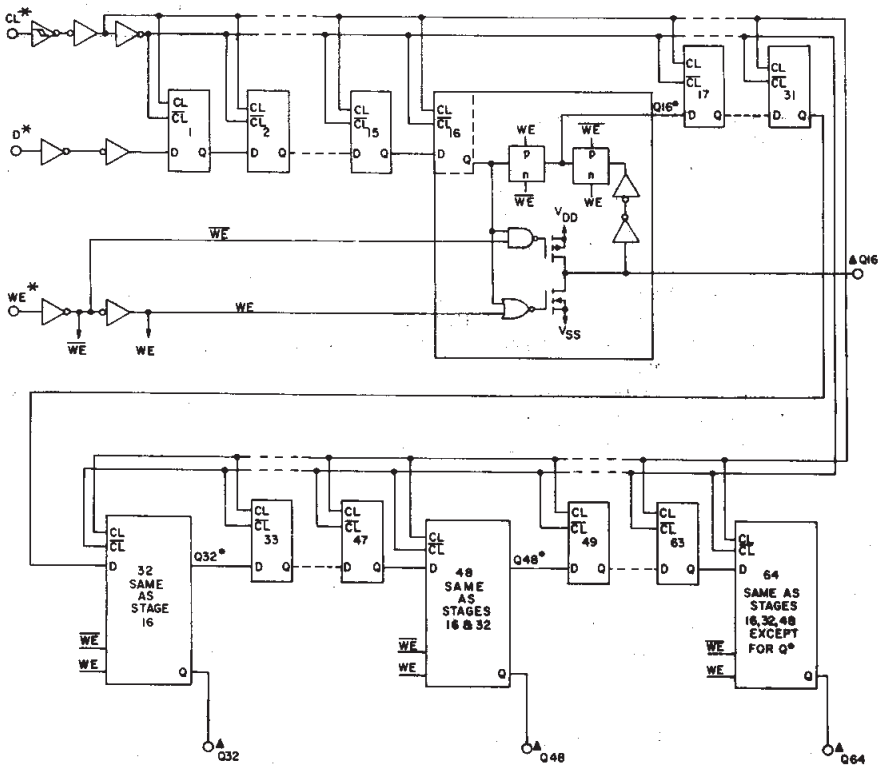
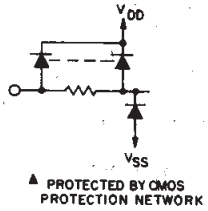
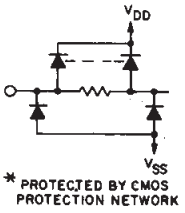


Fig. 2—CD4517B logic block diagram (one half).





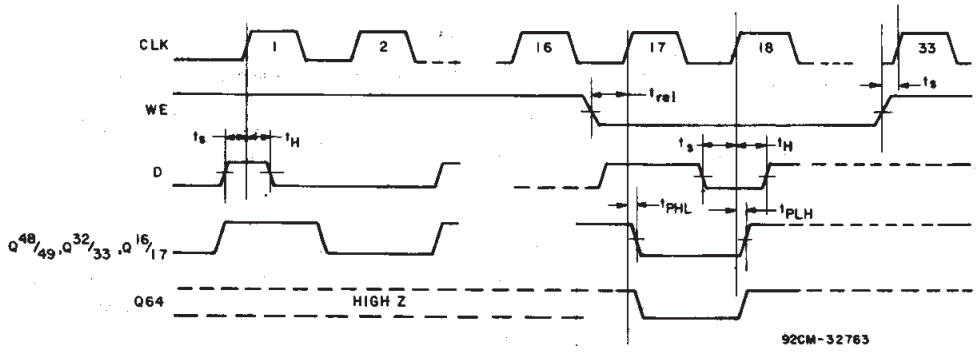


Fig. 3—Dynamic test waveforms.

STATIC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	CONDITIONS			LIMITS AT INDICATED TEMPERATURES (°C)							UNITS
								+25			
	V_O (V)	V_{IN} (V)	V_{DD} (V)	−55	−40	+85	+125	Min.	Typ.	Max.	
Quiescent Device Current, I_{DD} Max.	–	0,5	5	5	5	150	150	–	0.04	5	μA
	–	0,10	10	10	10	300	300	–	0.04	10	
	–	0,15	15	20	20	600	600	–	0.04	20	
	–	0,20	20	100	100	3000	3000	–	0.08	100	
Output Low (Sink) Current I_{OL} Min.	0.4	0,5	5	0.64	0.61	0.42	0.36	0.51	1	–	mA
	0.5	0,10	10	1.6	1.5	1.1	0.9	1.3	2.6	–	
	1.5	0,15	15	4.2	4	2.8	2.4	3.4	6.8	–	
Output High (Source) Current, I_{OH} Min.	4.6	0,5	5	−0.64	−0.61	−0.42	−0.36	−0.51	−1	–	
	2.5	0,5	5	−2	−1.8	−1.3	−1.15	−1.6	−3.2	–	
	9.5	0,10	10	−1.6	−1.5	−1.1	−0.9	−1.3	−2.6	–	
	13.5	0,15	15	−4.2	−4	−2.8	−2.4	−3.4	−6.8	–	
Output Voltage: Low-Level, V_{OL} Max.	–	0,5	5	0.05				–	0	0.05	V
	–	0,10	10	0.05				–	0	0.05	
	–	0,15	15	0.05				–	0	0.05	
Output Voltage: High-Level, V_{OH} Min.	–	0,5	5	4.95				4.95	5	–	
	–	0,10	10	9.95				9.95	10	–	
	–	0,15	15	14.95				14.95	15	–	
Input Low Voltage V_{IL} Max.	0.5,4.5	–	5	1.5				–	–	1.5	V
	1,9	–	10	3				–	–	3	
	1.5,13.5	–	15	4				–	–	4	
Input High Voltage, V_{IH} Min.	0.5,4.5	–	5	3.5				3.5	–	–	
	1,9	–	10	7				7	–	–	
	1.5,13.5	–	15	11				11	–	–	
Input Current I_{IN} Max.	–	0,18	18	±0.1	±0.1	±1	±1	–	$±10^{-5}$	±0.1	μA
3-State Output Leakage Current I_{OUT} Max.	0,18	0,18	18	±0.4	±0.4	±12	±12	–	$±10^{-4}$	±0.4	μA

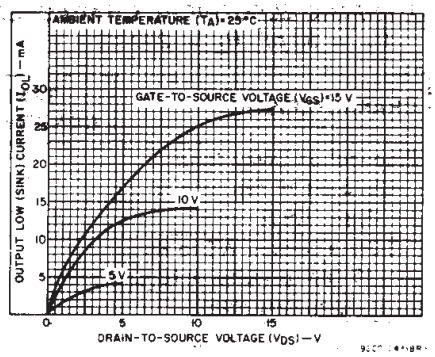


Fig. 4—Typical n-channel output low (sink) current characteristics.

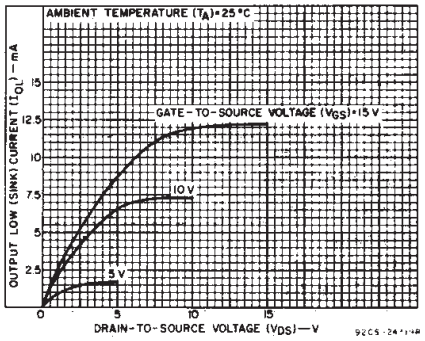


Fig. 5—Minimum n-channel output low (sink) current characteristics.

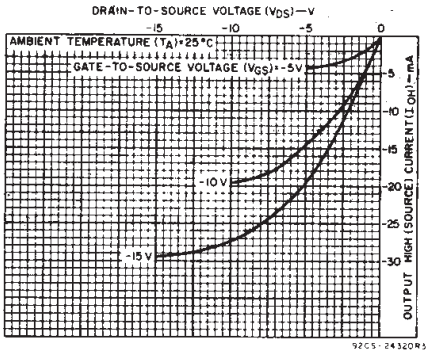


Fig. 6—Typical p-channel output high (source) current characteristics.

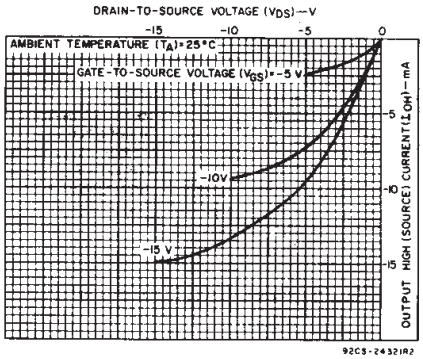


Fig. 7—Minimum p-channel output high (source) current characteristics.

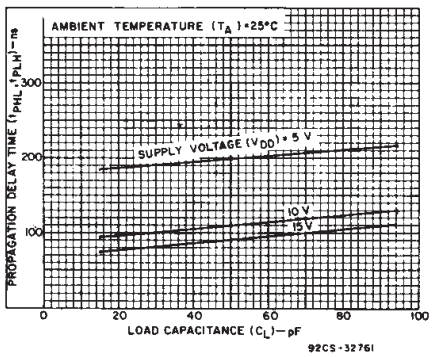


Fig. 8—Typical propagation delay time as a function of load capacitance.

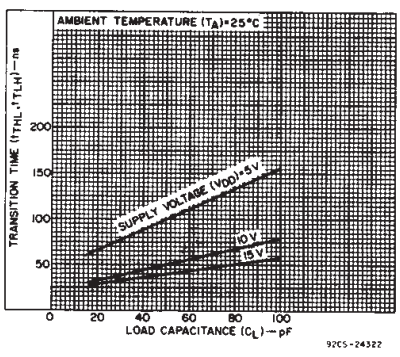


Fig. 9—Typical transition time a a function of load capacitance.

DYNAMIC ELECTRICAL CHARACTERISTICS *at T_A = 25°C; Input t_r, t_f = 20 ns, C_L = 50 pF, R_L = 200 kΩ*

CHARACTERISTIC	TEST CONDITIONS	V_{DD} (V)	LIMITS Min.	LIMITS Typ.	LIMITS Max.	UNITS
Propagation Delay Time: CL to Bit 16 Tap t_{PHL}, t_{PLH}		5	—	200	400	ns
		10	—	110	220	
		15	—	90	180	
3-State Output, WE to Bit 16 Tap t_{PHZ}, t_{PLZ}, t_{PZH}, t_{PZL} (See Note)		5	—	75	150	ns
		10	—	40	80	
		15	—	30	60	
Output Transition Time t_{THL}, t_{TLH}		5	—	100	200	ns
		10	—	50	100	
		15	—	40	80	
Write Enable-to-Clock Setup Time		5	0	−50	—	ns
		10	0	−25	—	
		15	0	−15	—	
Data-to-Clock Setup Time, t_s		5	20	0	—	ns
		10	10	0	—	
		15	10	0	—	
Minimum Write Enable-to-Clock Release Time		5	—	50	100	ns
		10	—	25	50	
		15	—	20	40	
Minimum Data-to-Clock Hold Time, t_H		5	—	100	200	ns
		10	—	50	100	
		15	—	25	50	
Minimum Clock Pulse Width, t_W		5	—	90	180	ns
		10	—	40	80	
		15	—	25	50	
Maximum Clock Input Frequency, f_{CL}		5	3	6	—	MHz
		10	6	12	—	
		15	8	15	—	
Maximum Clock Input Rise or Fall Time, t_{fCL} t_{rCL}		5	UNLIMITED			μs
		10				
		15				
Input Capacitance C_{IN}	Any Input		—	5	7.5	pF

NOTE: Measured at the point of 10% change in output with an output load of 50 pF, RL = 1 kΩ to V_{DD} for t_{PZL}, t_{PLZ} and R_L = 1 kΩ to V_{SS} for t_{PZH}, t_{PHZ}.

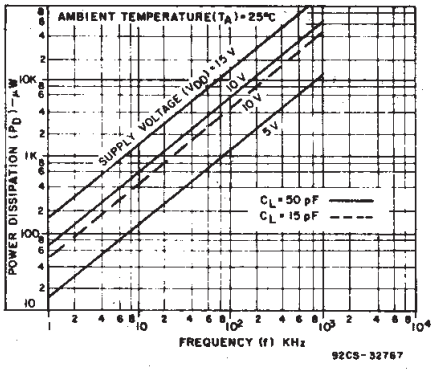


Fig. 10—Typical power dissipation as a function of frequency.

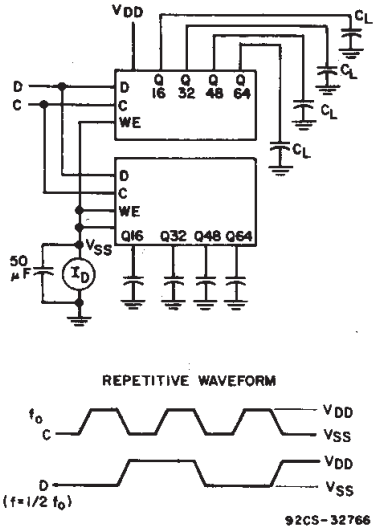


Fig. 11—Dynamic power dissipation test circuit and waveforms.

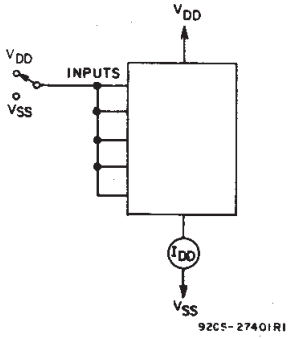


Fig. 12—Quiescent-device-current test circuit.

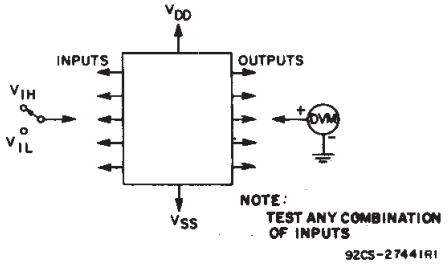


Fig. 13—Input-voltage test circuit.

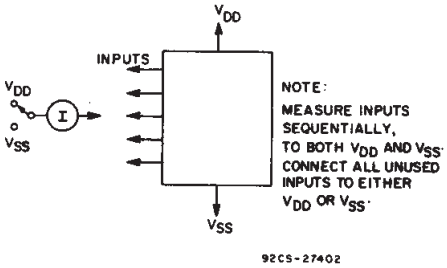
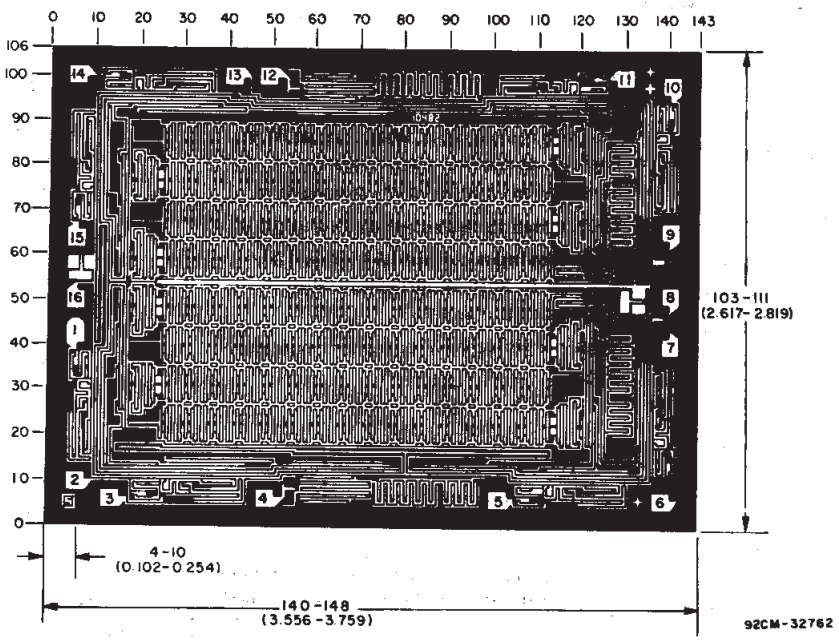


Fig. 14—Input current test circuit.



Dimensions and pad layout for CD4517B.

Dimensions in parentheses are in millimeters and are derived from the basic inch dimensions as indicated. Grid graduations are in mils (10^{-3} inch).

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)
CD4517BE	Active	Production	PDIP (N) | 16	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD4517BE
CD4517BE.A	Active	Production	PDIP (N) | 16	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD4517BE
CD4517BF3A	Active	Production	CDIP (J) | 16	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	CD4517BF3A
CD4517BF3A.A	Active	Production	CDIP (J) | 16	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	CD4517BF3A

(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.

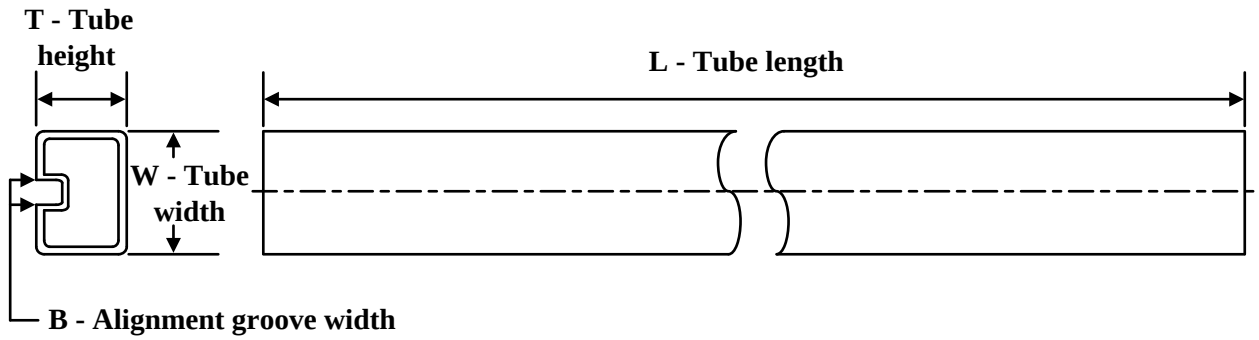
OTHER QUALIFIED VERSIONS OF CD4517B, CD4517B-MIL :

- Catalog : CD4517B
- Military : CD4517B-MIL

NOTE: Qualified Version Definitions:

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

TUBE



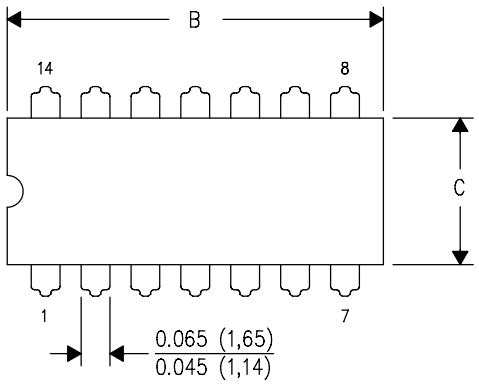
*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
CD4517BE	N	PDIP	16	25	506	13.97	11230	4.32
CD4517BE.A	N	PDIP	16	25	506	13.97	11230	4.32

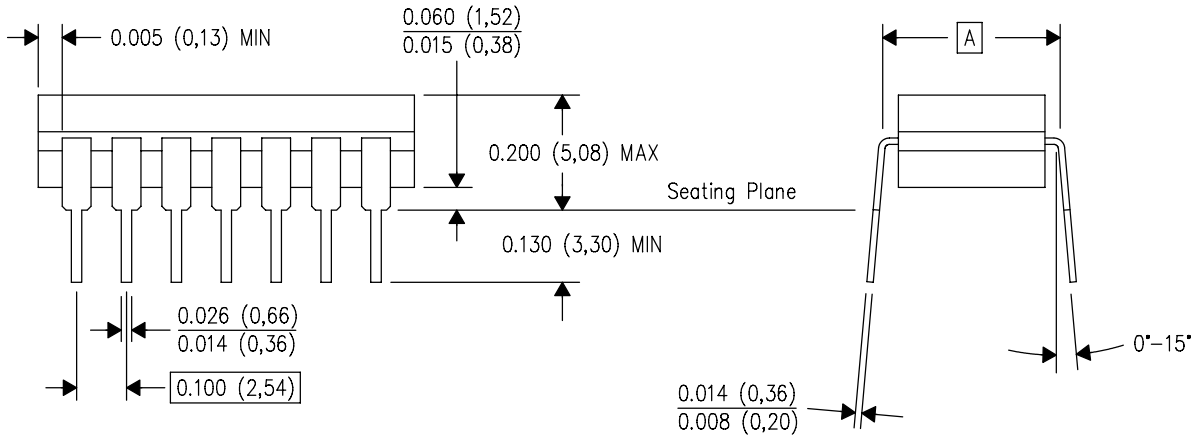
J (R–GDIP–T**)

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)



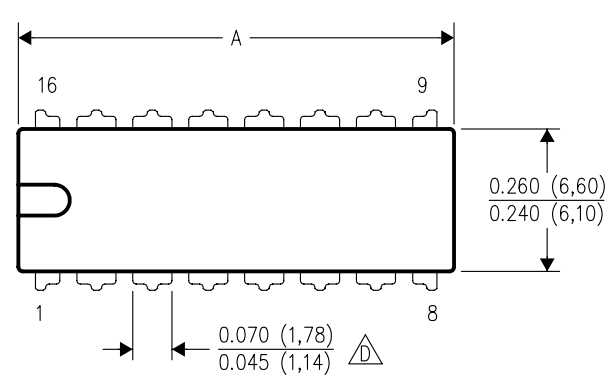
4040083/F 03/03

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.

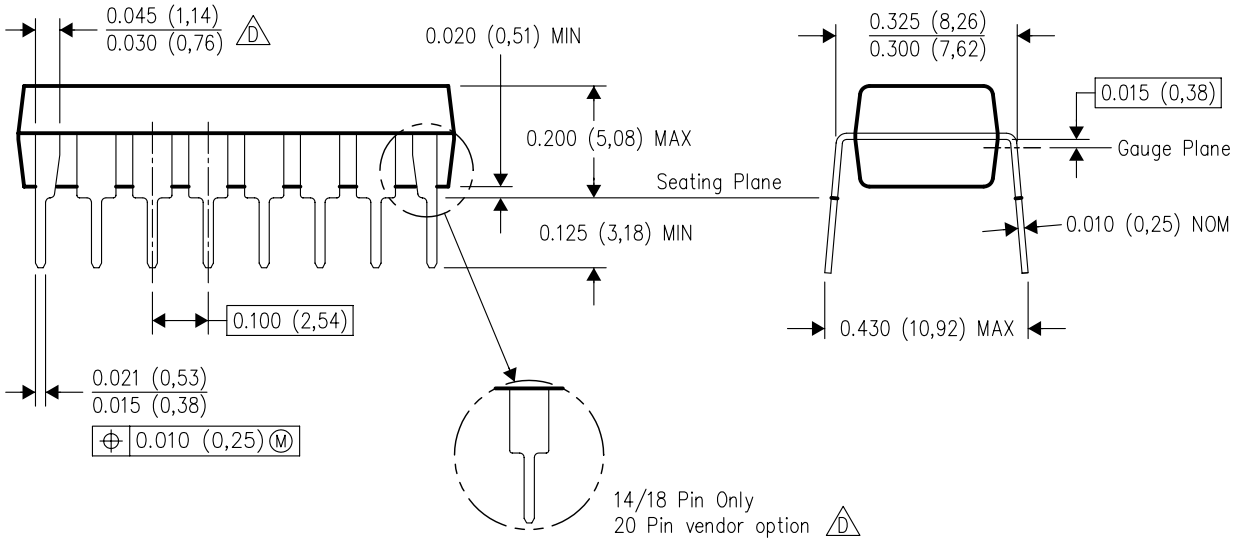
N (R–PDIP–T**)

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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