

**CMOS**
**8-Bit Addressable Latch**
**High-Voltage Types (20-Volt Rating)**

■ CD4724B 8-bit addressable latch is a serial-input, parallel-output storage register that can perform a variety of functions.

Data are inputted to a particular bit in the latch when that bit is addressed (by means of inputs A0, A1, A2) and when WRITE DISABLE is at a low level. When WRITE DISABLE is high, data entry is inhibited; however, all 8 outputs can be continuously read independent of WRITE DISABLE and address inputs.

A master RESET input is available, which resets all bits to a logic "0" level when RESET and WRITE DISABLE are at a high level. When RESET is at a high level, and WRITE DISABLE is at a low level, the latch acts as a 1-of-8 demultiplexer; the bit that is addressed has an active output which follows the data input, while all unaddressed bits are held to a logic "0" level.

The CD4724B types are supplied in 16-lead hermetic dual-in-line ceramic packages (F3A suffix), 16-lead dual-in-line plastic packages (E suffix), 16-lead small-outline packages (NSR suffix), and 16-lead thin shrink small-outline packages (PW and PWR suffixes).

**Feature**

- Serial data input
- Active parallel output
- Storage register capability
- Master clear
- Can function as demultiplexer
- Standardized, symmetrical output characteristics
- 100% tested for quiescent current at 20 V
- Maximum input current of 1  $\mu$ A at 18 V (full package-temperature range), 100 nA at 18 V and 25°C
- Noise margin (full package-temperature range) = 1 V at  $V_{DD} = 5$  V, 2 V at  $V_{DD} = 10$  V, 2.5 V at  $V_{DD} = 15$  V
- 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"

**MAXIMUM RATINGS, Absolute-Maximum Values:**

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

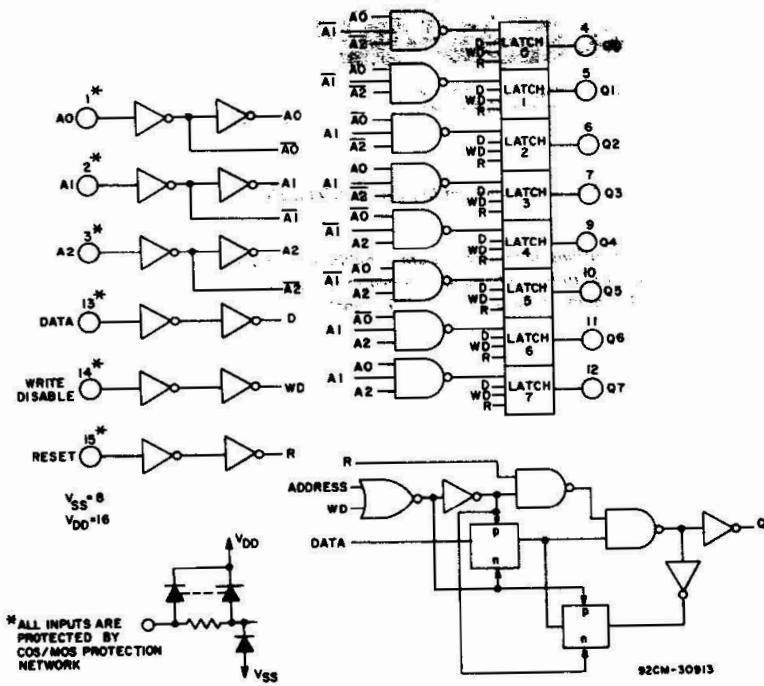
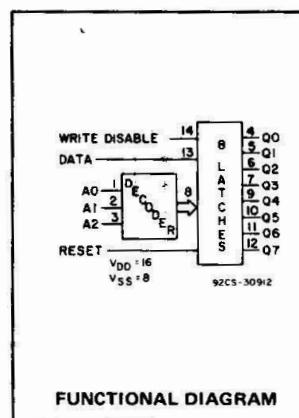


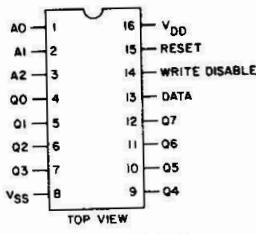
Fig. 1 – Logic diagram of CD4724B and detail of 1 of 8 latches.



FUNCTIONAL DIAGRAM

**Applications:**

- Multi-line decoders
- A/D converters



TERMINAL ASSIGNMENT

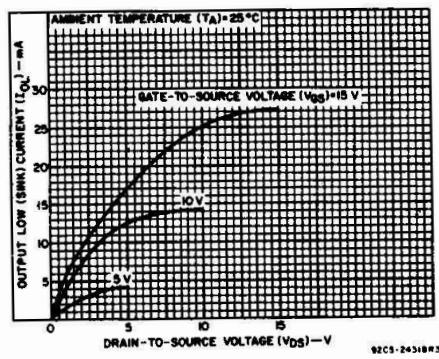


Fig. 2 – Typical output low (sink) current characteristics.

## CD4724B Types

**RECOMMENDED OPERATING CONDITIONS** at  $T_A = 25^\circ C$  (Unless otherwise specified)  
 For maximum reliability, nominal operating conditions should be selected so that operation  
 is always within the following ranges.

CHARACTERISTIC	SEE FIG. 15*	V <sub>DD</sub> (V)	LIMITS		UNITS
			MIN.	MAX.	
Supply Voltage Range: (At $T_A = 25^\circ C$ Temperature Range)			3	18	V
Pulse Width, $t_W$ Data	4	5	200	—	ns
		10	100	—	
		15	80	—	
Address	8	5	400	—	ns
		10	200	—	
		15	125	—	
Reset	5	5	150	—	ns
		10	75	—	
		15	50	—	
Setup Time, $t_S$ Data to WRITE DISABLE	6	5	100	—	ns
		10	50	—	
		15	35	—	
Hold Time, $t_H$ Data to WRITE DISABLE	7	5	150	—	ns
		10	75	—	
		15	50	—	

\* Circled numbers refer to times indicated on master timing diagram.

Note: In addition to the above characteristics, a WRITE DISABLE ON time (the time that WRITE DISABLE is at a high level) must be observed during an address change for the total time that the external address lines A<sub>0</sub>, A<sub>1</sub>, and A<sub>2</sub> are settling to a stable level, to prevent a wrong cell from being addressed.

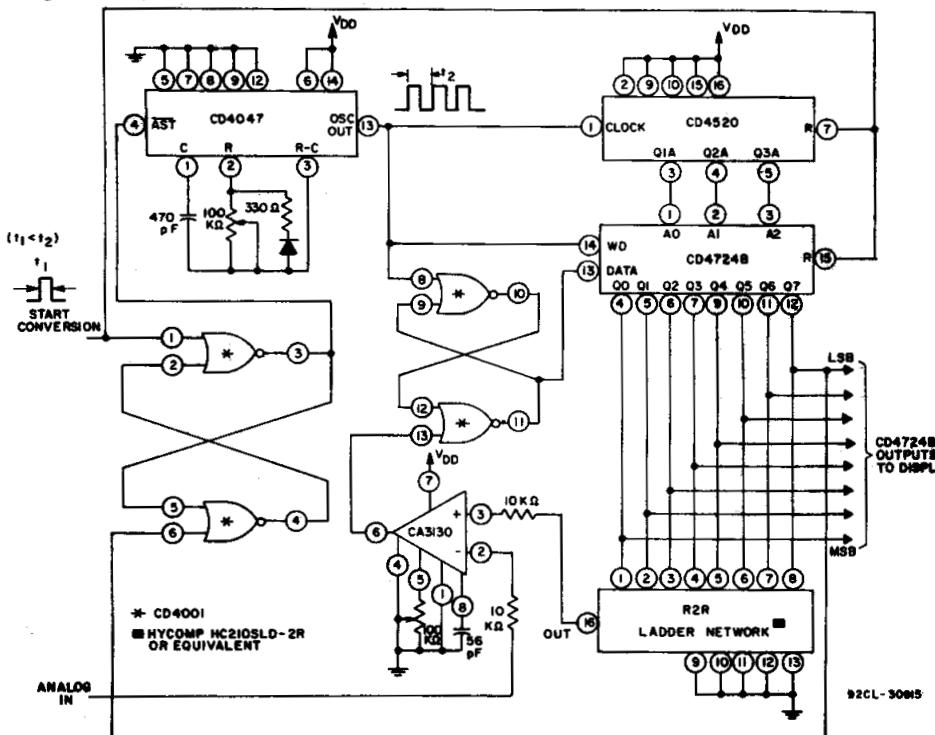


Fig. 5—A/D converter

MODE SELECTION			
WD	R	ADDRESSED LATCH	UNADDRESSED LATCH
0	0	Follows Data	Holds Previous State
0	1	Follows Data (Active High 8-Channel Demultiplexer)	Reset to "0"
1	0	Holds Previous State	
1	1	Reset to "0"	Reset to "0"

WD = WRITE DISABLE

R = RESET

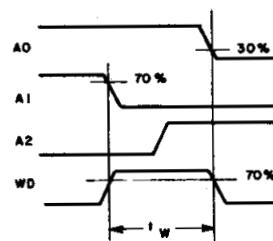


Fig. 3—Definition of WRITE DISABLE ON time.

3

COMMERCIAL CMOS  
HIGH VOLTAGE ICs

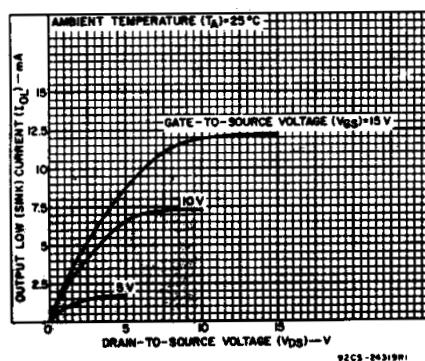


Fig. 4—Minimum output low (sink) current characteristics.

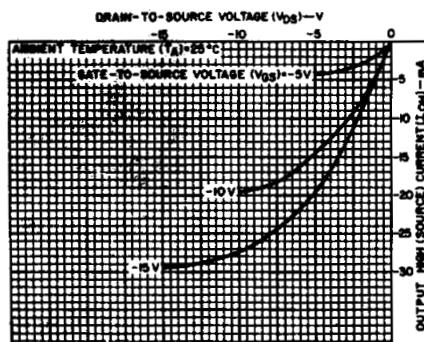
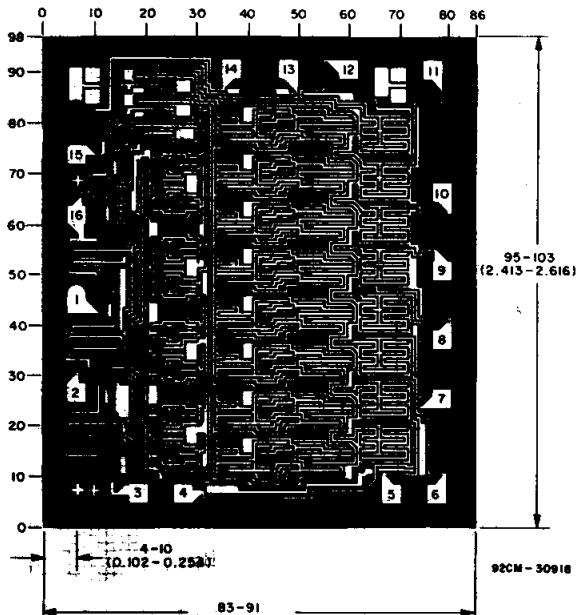


Fig. 6—Typical output high (source) current characteristics.

## CD4724B Types

### STATIC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	CONDITIONS			LIMITS AT INDICATED TEMPERATURES (°C)							UNITS
				+25				Min.	Typ.	Max.	
	$V_O$ (V)	$V_{IN}$ (V)	$V_{DD}$ (V)	-55	-40	+85	+125				
Quiescent Device Current, $I_{DD}$ Max.	-	0,5	5	5	5	150	150	-	0.04	5	$\mu A$
	-	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	-	$mA$
	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	-	$V$
	-	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	-	-	$V$
	1,9	-	10	7				7	-	-	
	1.5, 13.5	-	15	11				11	-	-	
Input Current $I_{IN}$ Max.	-	0,18	18	$\pm 0.1$	$\pm 0.1$	$\pm 1$	$\pm 1$	-	$\pm 10^{-5}$	$\pm 0.1$	$\mu A$



CD4724BH  
DIMENSIONS AND PAD LAYOUT

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

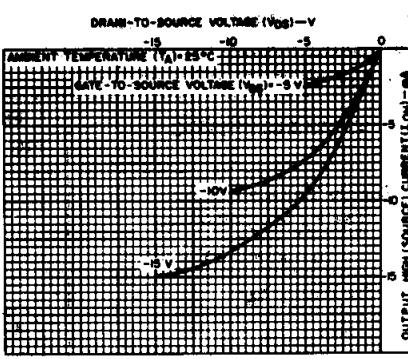


Fig. 7 - Minimum output high (source) current characteristics.

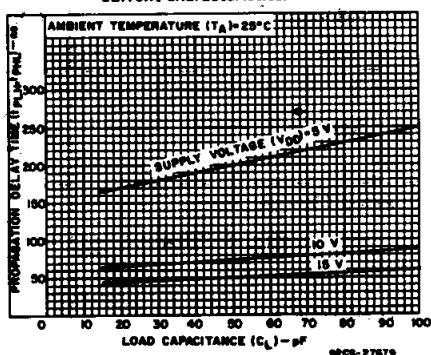


Fig. 8 - Typical propagation delay time (data to  $Q_n$ ) vs. load capacitance.

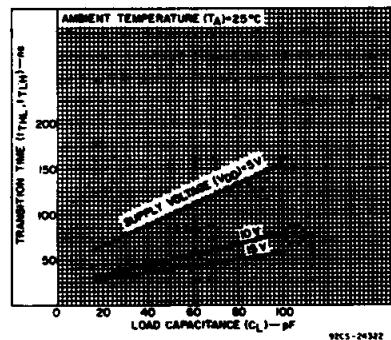


Fig. 9 - Typical transition time vs. load capacitance.

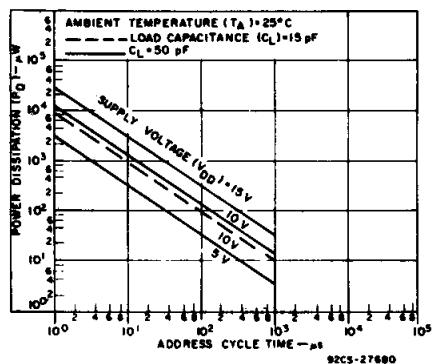


Fig. 10 - Typical dynamic power dissipation vs. address cycle time.

## CD4724B Types

**DYNAMIC ELECTRICAL CHARACTERISTICS** at  $T_A = 25^\circ C$ ,  $C_L = 50 pF$ ,  
 Input  $t_r, t_f = 20 \text{ ns}$ ,  $R_L = 200 \text{ k}\Omega$

CHARACTERISTIC	CONDITIONS		LIMITS ALL PACKAGE TYPES		UNITS
	SEE Fig. 15*	$V_{DD}$ (V)	TYP.	MAX.	
Propagation Delay: $t_{PLH}$ , $t_{PHL}$ Data to Output,	(1)	5	200	400	ns
		10	75	150	
		15	50	100	
WRITE DISABLE to Output, $t_{PLH}$ , $t_{PHL}$	(2)	5	200	400	ns
		10	80	160	
		15	60	120	
Reset to Output, $t_{PHL}$	(3)	5	175	350	ns
		10	80	160	
		15	65	130	
Address to Output, $t_{PLH}$ , $t_{PHL}$	(8)	5	225	450	ns
		10	100	200	
		15	75	150	
Transition Time, $t_{THL}$ (Any Output) $t_{TLH}$		5	100	200	ns
		10	50	100	
		15	40	80	
Minimum Pulse Width, $t_W$ Data	(4)	5	100	200	ns
		10	50	100	
		15	40	80	
Address	(8)	5	200	400	ns
		10	100	200	
		15	65	125	
Reset	(5)	5	75	150	ns
		10	40	75	
		15	25	50	
Minimum Setup Time, $t_S$ Data to WRITE DISABLE	(6)	5	50	100	ns
		10	25	50	
		15	20	35	
Minimum Hold Time, $t_H$ Data to WRITE DISABLE	(7)	5	75	150	ns
		10	40	75	
		15	25	50	
Input Capacitance, $C_{IN}$	Any Input	5	7.5	pF	

\*Circled numbers refer to times indicated on master timing diagram.

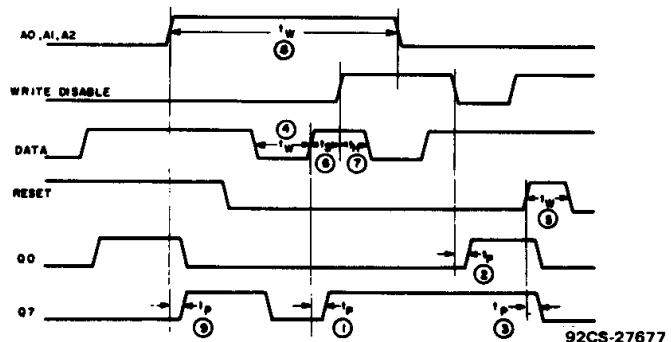


Fig. 15 - Master timing diagram.

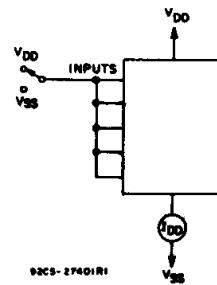


Fig. 11 - Quiescent device current test circuit.

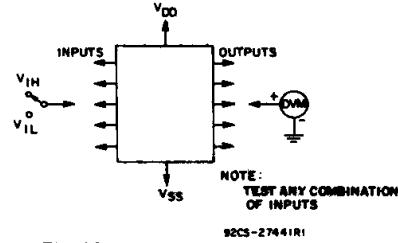


Fig. 12 - Input voltage test circuit.

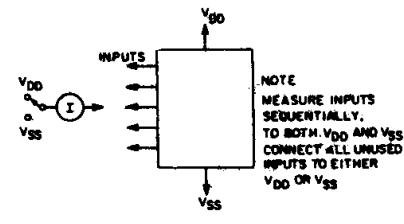


Fig. 13 - Input current test circuit.

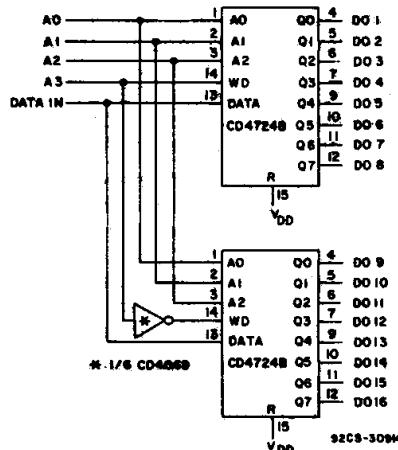


Fig. 14 - 1 of 16 decoder/demultiplexer.

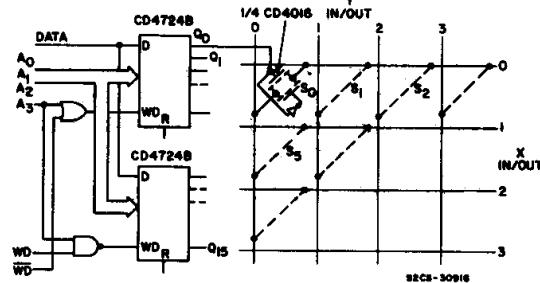


Fig. 16 - Multiple selection decoding - 4 x 4 crosspoint switch.

**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)
CD4724BE	Active	Production	PDIP (N)   16	25   TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD4724BE
CD4724BE.A	Active	Production	PDIP (N)   16	25   TUBE	Yes	NIPDAU	N/A for Pkg Type	-55 to 125	CD4724BE
CD4724BF3A	Active	Production	CDIP (J)   16	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	CD4724BF3A
CD4724BF3A.A	Active	Production	CDIP (J)   16	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	CD4724BF3A

<sup>(1)</sup> **Status:** For more details on status, see our [product life cycle](#).

<sup>(2)</sup> **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.

<sup>(3)</sup> **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

<sup>(4)</sup> **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.

<sup>(5)</sup> **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.

<sup>(6)</sup> **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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**OTHER QUALIFIED VERSIONS OF CD4724B, CD4724B-MIL :**

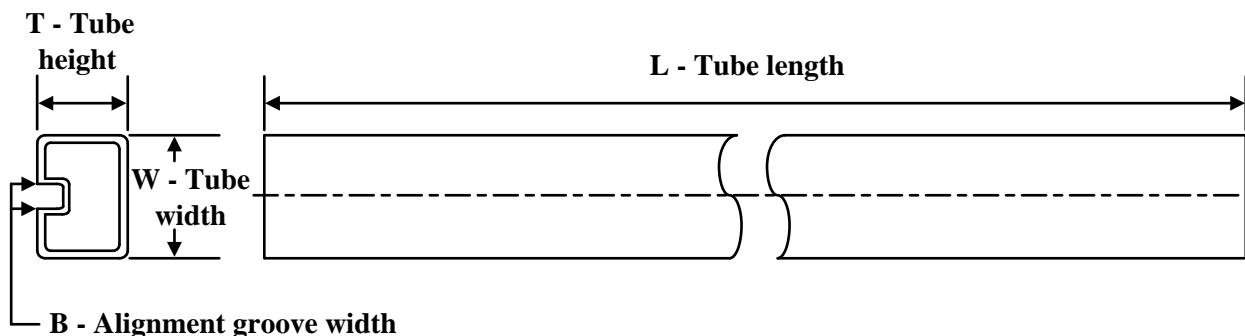
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- Catalog : [CD4724B](#)

- Military : [CD4724B-MIL](#)

NOTE: Qualified Version Definitions:

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

**TUBE**


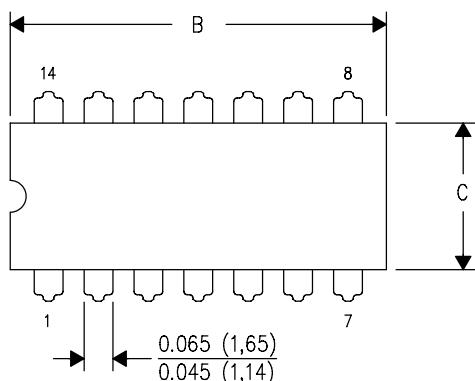
\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T ( $\mu$ m)	B (mm)
CD4724BE	N	PDIP	16	25	506	13.97	11230	4.32
CD4724BE	N	PDIP	16	25	506	13.97	11230	4.32
CD4724BE.A	N	PDIP	16	25	506	13.97	11230	4.32
CD4724BE.A	N	PDIP	16	25	506	13.97	11230	4.32

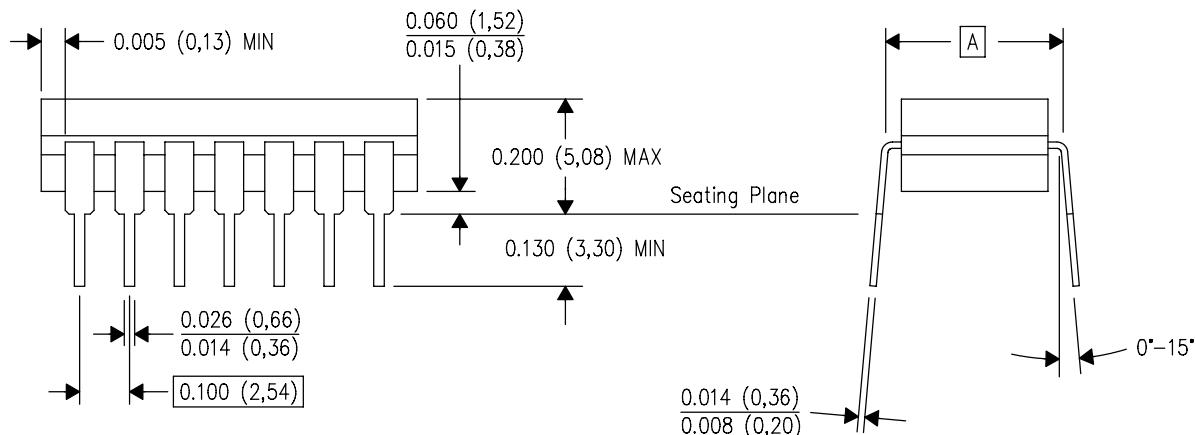
J (R-GDIP-T\*\*)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



PINS ** DIM	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)



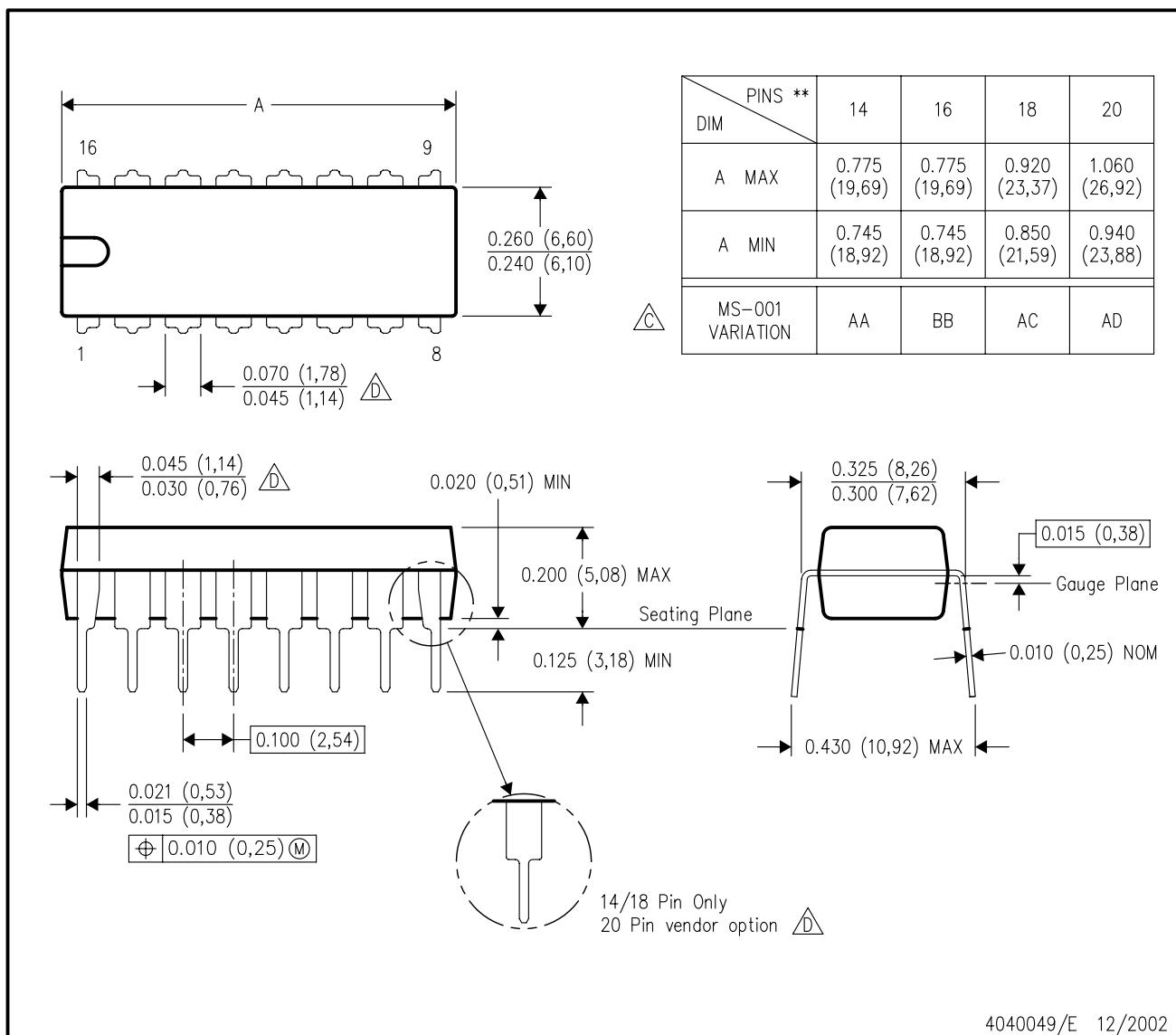
4040083/F 03/03

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\*\*)

16 PINS SHOWN

## PLASTIC DUAL-IN-LINE PACKAGE



NOTES: 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.

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