

CD4724B Types

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.

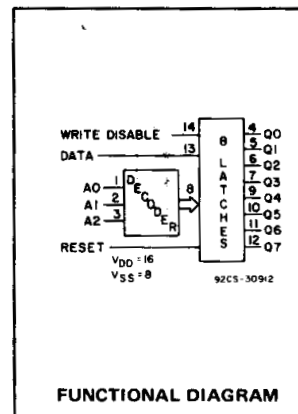
A master RESET input is available, which resets all bits to a logic "0" level when RESET and WRITE DISABLE are at a high level. When RESET is at a high level, and WRITE DISABLE is at a low level, the latch acts as a 1-of-8 demultiplexer; the bit that is addressed has an active output which follows the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

- Features**
- 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 μ 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 $V_{DD} + 0.5$ V
DC INPUT CURRENT, ANY ONE INPUT	± 10 mA
POWER DISSIPATION PER PACKAGE (P_D):	
For $T_A = -55^\circ\text{C}$ to $+125^\circ\text{C}$	500mW
For $T_A = +125^\circ\text{C}$ to $+150^\circ\text{C}$	Derate Linearly 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 0.79mm) from case for 10s max	$+265^\circ\text{C}$



Applications:

- Multi-line decoders
- A/D converters

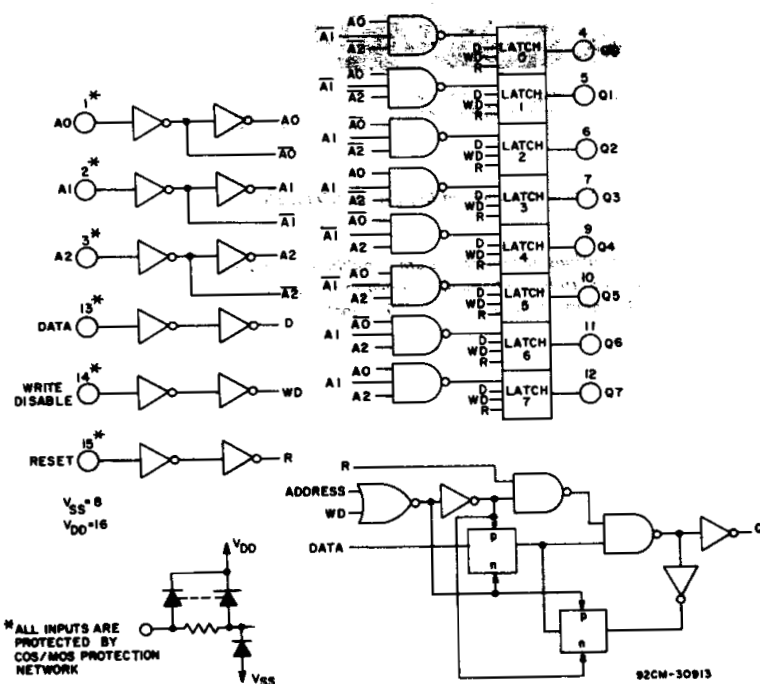
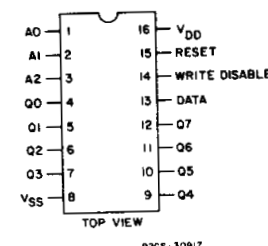


Fig. 1— Logic diagram of CD4724B and detail of 1 of 8 latches.



TERMINAL ASSIGNMENT

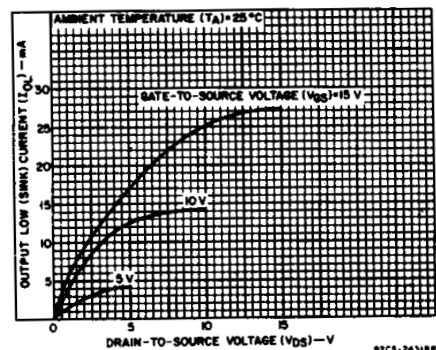


Fig. 2— Typical output low (sink) current characteristics.

CD4724B Types

RECOMMENDED OPERATING CONDITIONS at $T_A = 25^\circ\text{C}$ (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_{DD} (V)	LIMITS		UNITS
			MIN.	MAX.	
Supply Voltage Range: (At T_A = Full Package Temperature Range)			3	18	V
Pulse Width, t_W Data	4	5	200	—	ns
		10	100	—	
		15	80	—	
Address	8	5	400	—	
		10	200	—	
		15	125	—	
Reset	5	5	150	—	
		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 A0, A1, and A2 are setting to a stable level, to prevent a wrong cell from being addressed.

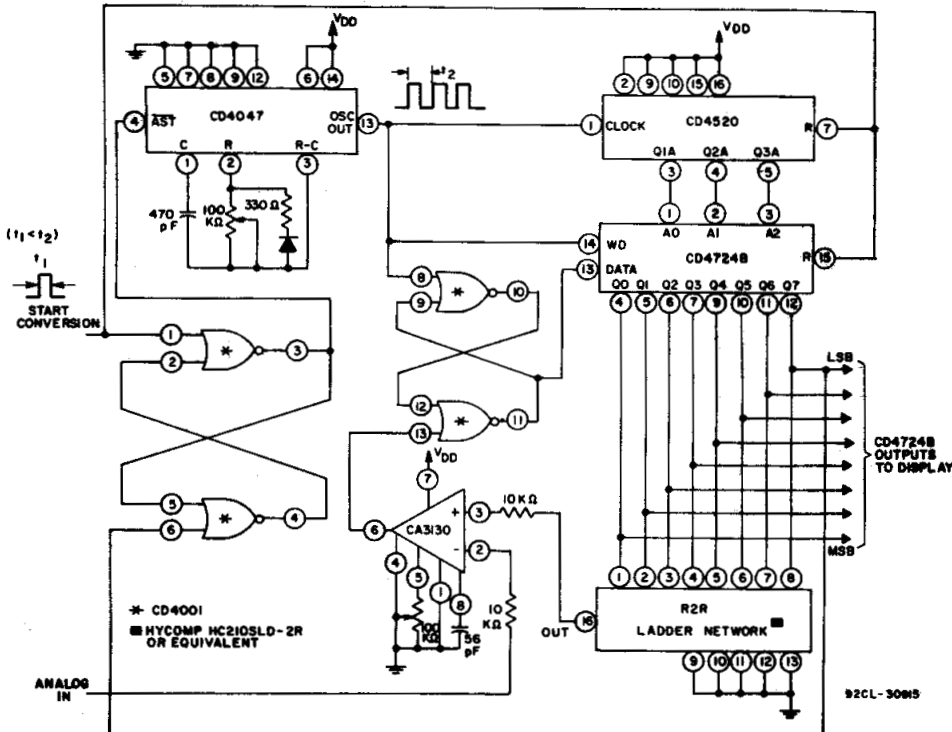
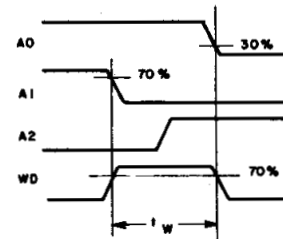


Fig. 5— A/D converter

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"

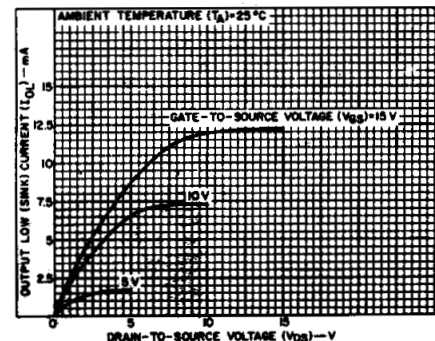
WD = WRITE DISABLE

R = RESET



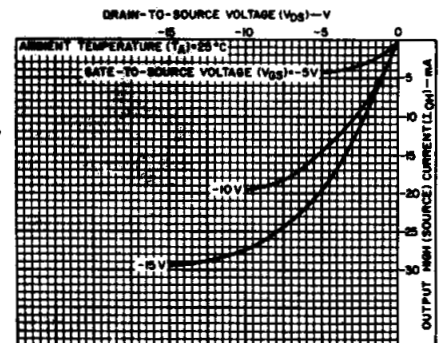
92CS-27676R1

Fig. 3— Definition of WRITE DISABLE ON time.



92CS-24319R1

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



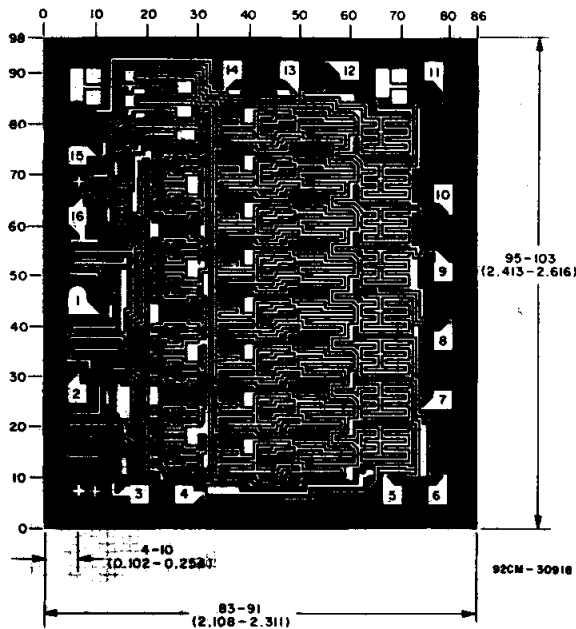
92CS-24320R3

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

CD4724B Types

STATIC ELECTRICAL CHARACTERISTICS

CHARACTER- ISTIC	CONDITIONS			LIMITS AT INDICATED TEMPERATURES (°C)							UNITS
	V _O (V)	V _{IN} (V)	V _{DD} (V)	+25							
				-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	—	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	±0.1	±0.1	±1	±1	—	±10 ⁻⁵	±0.1	μA



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).

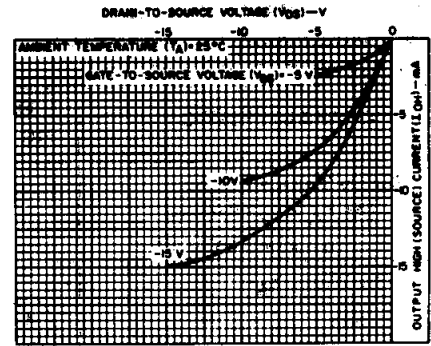


Fig. 7 — Minimum output high (source) current characteristics.

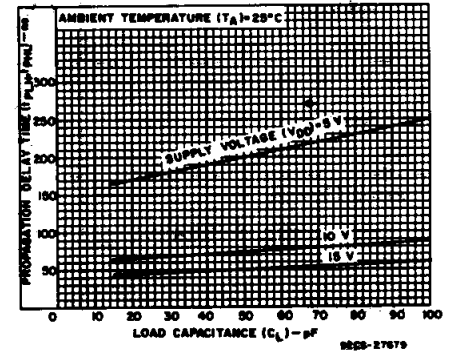


Fig. 8 — Typical propagation delay time (data to Qn) vs. load capacitance.

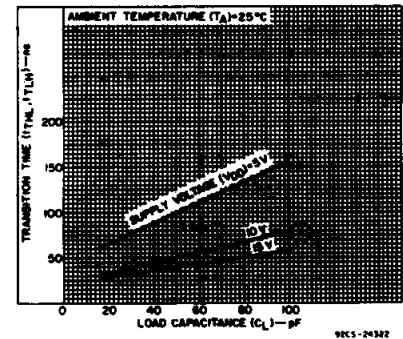


Fig. 9 — Typical transition time vs. load capacitance.

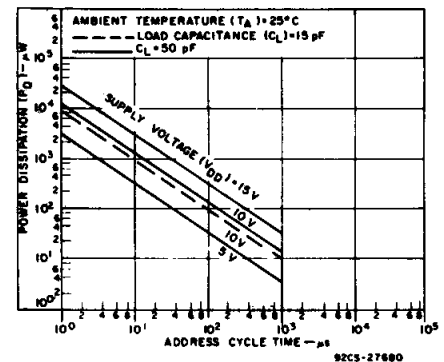


Fig. 10 — Typical dynamic power dissipation vs. address cycle time.

CD4724B Types

DYNAMIC ELECTRICAL CHARACTERISTICS at $T_A = 25^\circ\text{C}$, $C_L = 50\text{ pF}$,
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}	①	5	200	400	ns
Data to Output, WRITE DISABLE to Output, t _{PLH} , t _{PHL}		10	75	150	
		15	50	100	
Reset to Output, t _{PHL}	②	5	200	400	
		10	80	160	
		15	60	120	
Address to Output, t _{PLH} , t _{PHL}	③	5	175	350	
		10	80	160	
		15	65	130	
Transition Time, (Any Output) t _{THL} , t _{TLH}	④	5	225	450	
		10	100	200	
		15	75	150	
Minimum Pulse Width, t _W Data	⑤	5	100	200	
		10	50	100	
		15	40	80	
Address	⑥	5	200	400	
		10	100	200	
		15	65	125	
Reset	⑦	5	75	150	
		10	40	75	
		15	25	50	
Minimum Setup Time, t _S Data to WRITE DISABLE	⑧	5	50	100	
		10	25	50	
		15	20	35	
Minimum Hold Time, t _H Data to WRITE DISABLE	⑨	5	75	150	
		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.

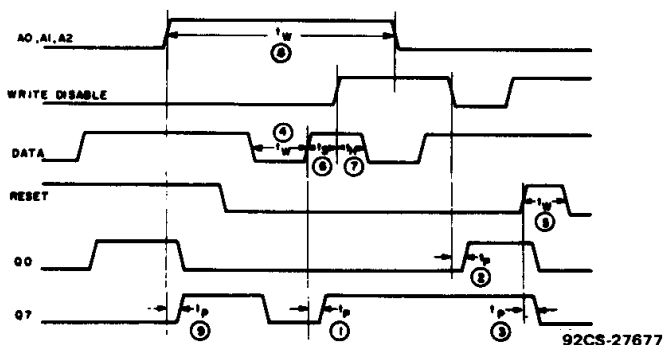


Fig. 15— Master timing diagram.

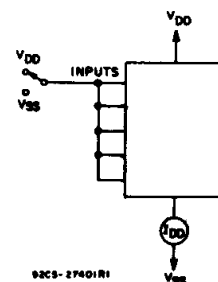


Fig. 11— Quiescent device current test circuit.

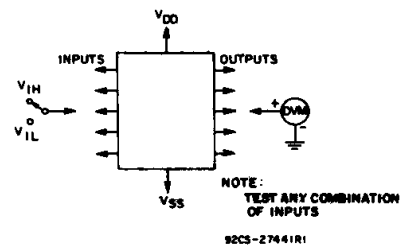


Fig. 12— Input voltage test circuit.

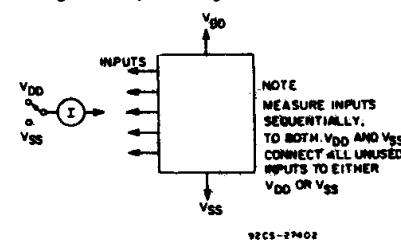


Fig. 13— Input current test circuit.

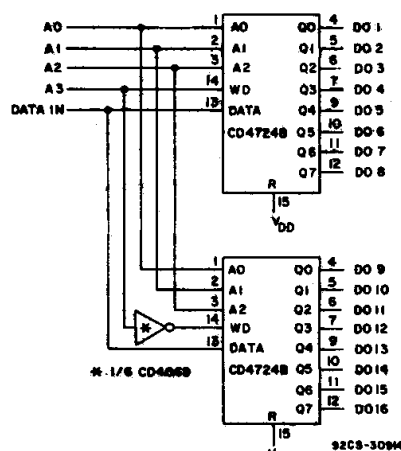


Fig. 14— 1 of 16 decoder/demultiplexer.

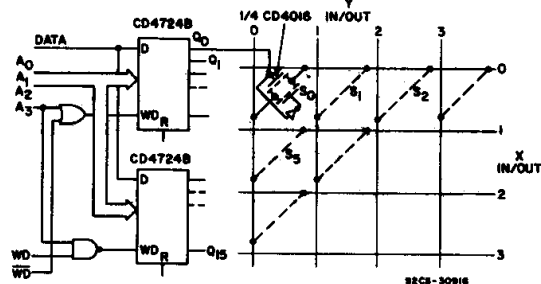


Fig. 16— Multiple selection decoding - 4 x 4 crosspoint switch.

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)

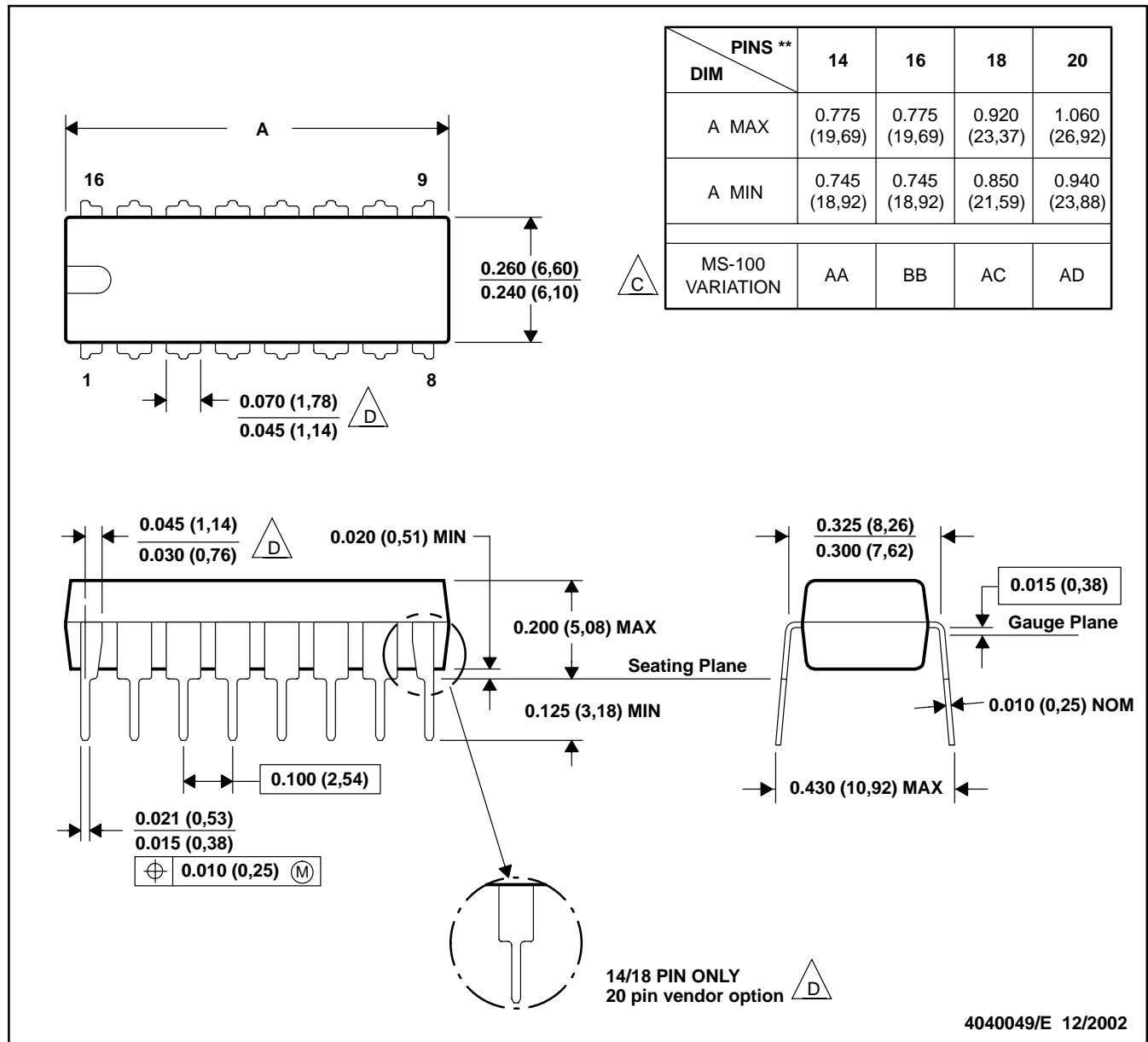


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- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package is hermetically sealed with a ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal 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.

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.

MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14-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.

PW (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Body dimensions do not include mold flash or protrusion not to exceed 0,15.
 - Falls within JEDEC MO-153

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