

SN74ALS679 12-BIT ADDRESS COMPARATOR

SDAS003C – JUNE 1982 – REVISED JANUARY 1995

- 12-Bit Address Comparator With Enable
- Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic (N) 300-mil DIPs

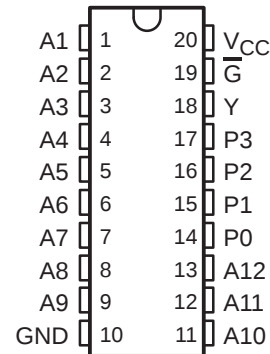
description

This 12-bit address comparator simplifies addressing of memory boards and/or other peripheral devices. The four P inputs are normally hardwired with a preprogrammed address. An internal decoder determines what input information applied to the A inputs must be low or high to cause a low state at the Y output. For example, a positive-logic bit combination of 0111 (decimal 7) at the P input determines that inputs A1 through A7 must be low and that inputs A8 through A12 must be high to cause the output to go low. Equality of the address applied at the A inputs to the preprogrammed address is indicated by the output being low.

This device features an enable ($\overline{G}$) input. When $\overline{G}$ is low, the device is enabled. When $\overline{G}$ is high, the device is disabled and the output is high, regardless of the A and P inputs.

The SN74ALS679 is characterized for operation from 0°C to 70°C.

DW OR N PACKAGE
(TOP VIEW)



FUNCTION TABLE

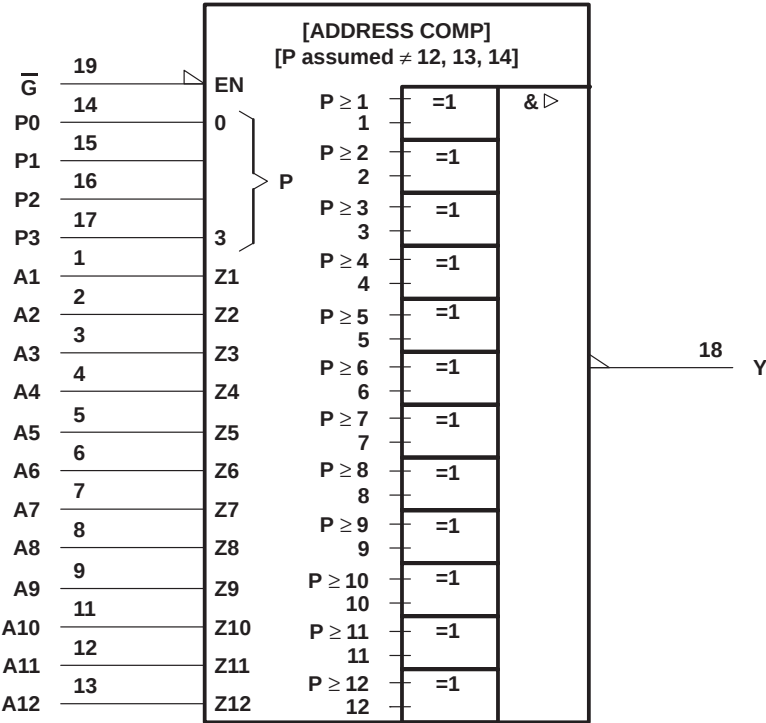
INPUTS																	OUTPUT Y
$\overline{G}$	P3	P2	P1	P0	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	
L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	L
L	L	L	L	H	L	H	H	H	H	H	H	H	H	H	H	H	L
L	L	L	H	L	L	L	H	H	H	H	H	H	H	H	H	H	L
L	L	L	H	H	L	L	L	H	H	H	H	H	H	H	H	H	L
L	L	H	L	L	L	L	L	H	H	H	H	H	H	H	H	H	L
L	L	H	L	H	L	L	L	L	H	H	H	H	H	H	H	H	L
L	L	H	H	L	L	L	L	L	L	H	H	H	H	H	H	H	L
L	L	H	H	H	L	L	L	L	L	L	H	H	H	H	H	H	L
L	H	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	L
L	H	L	L	H	L	L	L	L	L	L	L	L	L	H	H	H	L
L	H	L	H	L	L	L	L	L	L	L	L	L	L	L	H	H	L
L	H	L	H	H	L	L	L	L	L	L	L	L	L	L	L	H	L
L	H	H	L	L	L	L	L	L	L	L	L	L	H	H	H	L	L [†]
L	H	H	L	H	L	L	L	L	L	L	L	L	L	H	H	L	L [†]
L	H	H	H	L	L	L	L	L	L	L	L	L	L	L	H	L	L [†]
L	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L
L	All other combinations																H
H	Any combination																H

[†] The three shaded rows of the function table show combinations that would normally not be used in address comparator applications. The logic symbols above are not valid for these combinations in which P = 12, 13, and 14. If symbols valid for all combinations are required, starting with the fourth exclusive-OR from the bottom, change P ≥ 9 to P = 9 . . . 11/13 . . . 15, P ≥ 10 to P = 10/11/14/15, and P ≥ 11 to P = 11/15.

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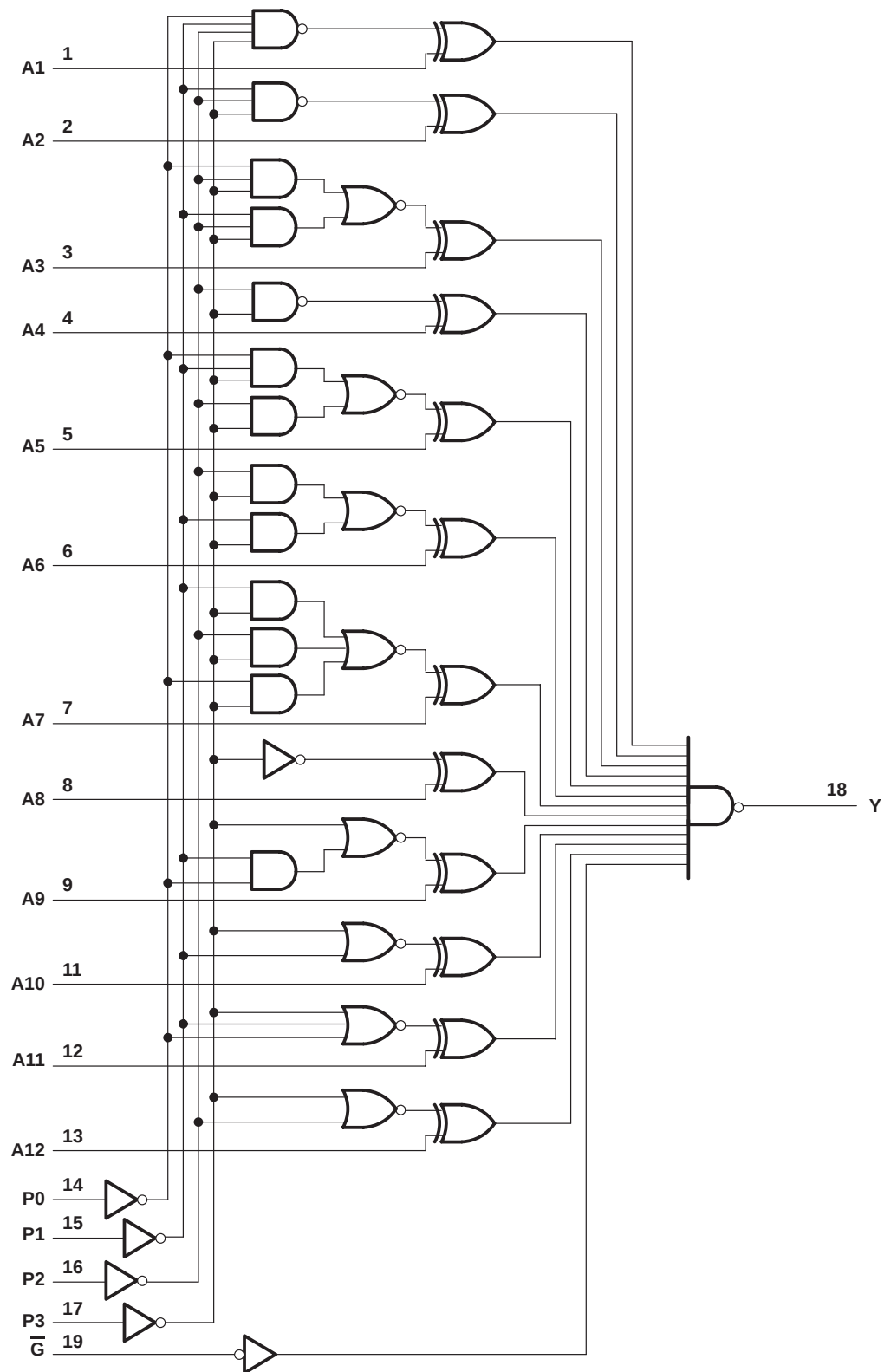
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logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



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

Supply voltage, V_{CC}	7 V
Input voltage, V_I	7 V
Operating free-air temperature range, T_A	0°C to 70°C
Storage temperature range	–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

	MIN	NOM	MAX	UNIT
V_{CC} Supply voltage	4.5	5	5.5	V
V_{IH} High-level input voltage	2			V
V_{IL} Low-level input voltage			0.8	V
I_{OH} High-level output current			–2.6	mA
I_{OL} Low-level output current			24	mA
T_A Operating free-air temperature	0		70	°C

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

PARAMETER	TEST CONDITIONS	MIN	TYP [‡]	MAX	UNIT
V_{IK}	$V_{CC} = 4.5$ V, $I_I = -18$ mA			–1.5	V
V_{OH}	$V_{CC} = 4.5$ V to 5.5 V, $I_{OH} = -0.4$ mA	$V_{CC} - 2$			V
	$V_{CC} = 4.5$ V, $I_{OH} = -2.6$ mA	2.4	3.2		
V_{OL}	$V_{CC} = 4.5$ V	$I_{OL} = 12$ mA		0.25	V
		$I_{OL} = 24$ mA		0.35	
I_I	$V_{CC} = 5.5$ V, $V_I = 7$ V			0.1	mA
I_{IH}	$V_{CC} = 5.5$ V, $V_I = 2.7$ V			20	μA
I_{IL}	$V_{CC} = 5.5$ V, $V_I = 0.4$ V			–0.1	mA
$I_{O}^{\S}$	$V_{CC} = 5.5$ V, $V_O = 2.25$ V	–30		–112	mA
I_{CC}	$V_{CC} = 5.5$ V		17	28	mA

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

^{\S} The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .

switching characteristics (see Figure 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5$ V to 5.5 V, $C_L = 50$ pF, $R_L = 500 \Omega$, $T_A = \text{MIN to MAX}^{\dagger\dagger}$		UNIT
			MIN	MAX	
t_{PLH}	Any P	Y	4	25	ns
t_{PHL}			8	35	
t_{PLH}	Any A	Y	5	22	ns
t_{PHL}			5	30	
t_{PLH}	$\overline{G}$	Y	3	13	ns
t_{PHL}			5	25	

^{\dagger\dagger} For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.



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APPLICATION INFORMATION

The SN74ALS679 can be wired to recognize any one of 2^{12} addresses. The number of lows in the address determines the input pattern for the P inputs. The system address lines that are low in the address to be recognized are connected to the lowest-numbered A inputs of the address comparator. The system address lines that are high are connected to the highest-numbered A inputs.

For example, assume the comparator is to enable a device when the 12-bit system address is:

A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
H	H	L	L	H	H	L	L	H	H	H	H

Because the address contains four lows and eight highs, the following connections are made:

- P3 to 0 V, P2 to V_{CC} , P1 to 0 V, and P0 to 0 V
- System address lines A9, A8, A5, and A4 to comparator inputs A1 through A4 in any convenient order
- The remaining eight system address lines to comparator inputs A5 through A12 in any convenient order

The output provides an active-low enabling signal.

Figure 1 is a register-bank decoder that examines the 14 most significant bits (A0 through A13) of a 20-bit address to select banks corresponding to the hex addresses 10000, 10040, 10080, and 100C0.

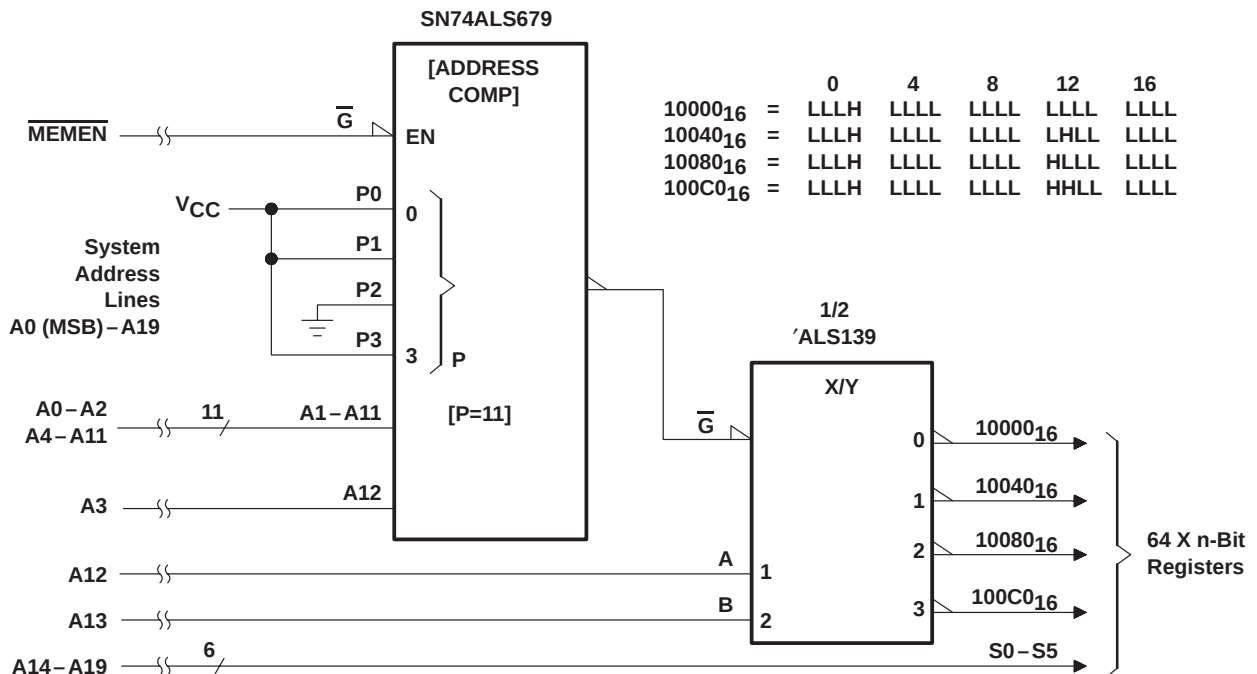


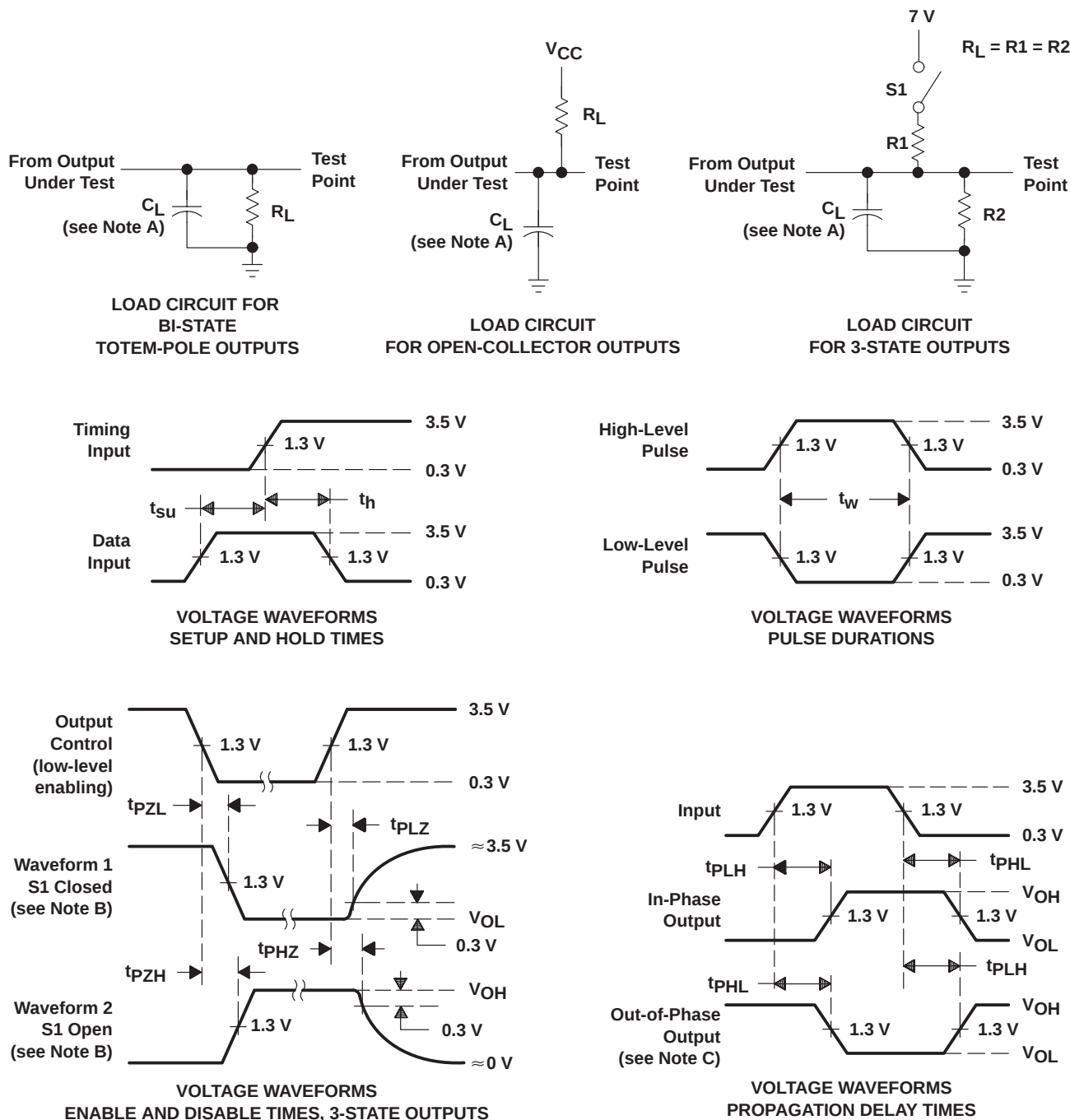
Figure 1. Register-Bank Decoder

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PARAMETER MEASUREMENT INFORMATION SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



- NOTES: A. C_L includes probe and jig capacitance.
 B. 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.
 C. When measuring propagation delay items of 3-state outputs, switch S1 is open.
 D. All input pulses have the following characteristics: $PRR \leq 1$ MHz, $t_r = t_f = 2$ ns, duty cycle = 50%.
 E. The outputs are measured one at a time with one transition per measurement.

Figure 2. Load Circuits and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
SN74ALS679N	NRND	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	SN74ALS679N	

(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 - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

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.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

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

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "-" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

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

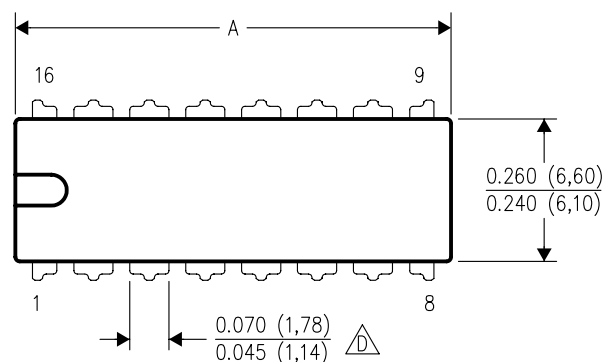
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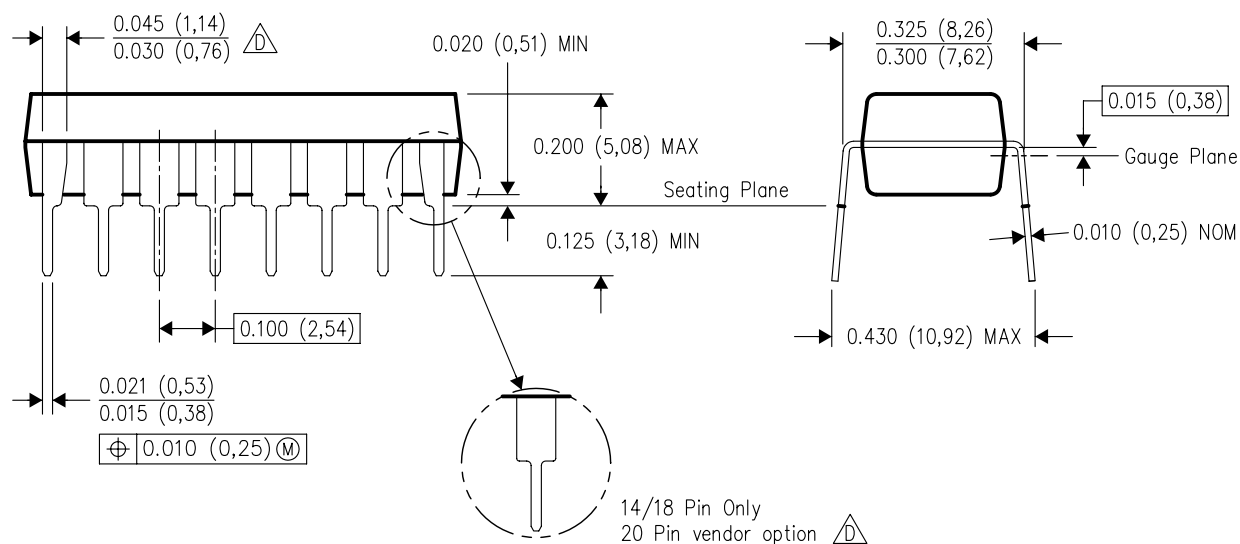
N (R-PDIP-T**)

16 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE



PINS **	14	16	18	20
DIM				
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	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.
 - 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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