

ALS Products

FEATURES

- Octal bidirectional bus interface
- 3-state buffer outputs sink 24mA and source 15mA.
- Outputs are placed in high impedance state during power-off conditions
- The -1 version sinks 48mA I_{OL} within the $\pm 5\%$ V_{CC} range

DESCRIPTION

The 74ALS245A is an octal transceiver featuring non-inverting 3-state bus compatible outputs in both transmit and receive directions. The device features an Output Enable (\overline{OE}) input for easy cascading and Transmit/Receive (T/\overline{R}) input for direction control. The 74ALS245A-1 is the same as the 74ALS245A except that the B port sinks 48 mA within the $\pm 5\%$ V_{CC} range.

Octal Transceivers (3-State) Product Specification

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74ALS245A 74ALS245A-1	7.0ns	34mA

ORDERING INFORMATION

PACKAGES	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$; $T_A = 0^\circ C$ to $+70^\circ C$
20-Pin Plastic DIP	74ALS245AN, 74ALS245A-1N
20-Pin Plastic SOL	74ALS245AD, 74ALS245A-1D

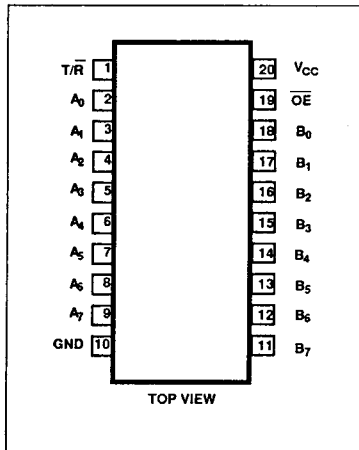
INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74ALS(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
$A_0 - A_7, B_0 - B_7$	Data inputs	1.0/1.0	20 μ A/0.1mA
\overline{OE}	Output enable input (active Low)	1.0/1.0	20 μ A/0.1mA
T/\overline{R}	Transmit/Receive input	1.0/1.0	20 μ A/0.1mA
$A_0 - A_7$	A port outputs	750/240	15mA/24mA
$B_0 - B_7$	B Port outputs	750/240	15mA/24mA
$B_0 - B_7$	B Port outputs (-1 version)	750/480	15mA/48mA

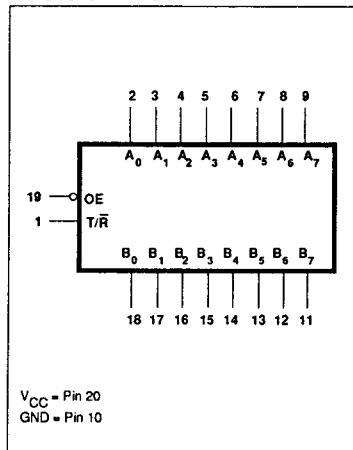
NOTE:

One (1.0) ALS Unit Load is defined as: 20 μ A in the High state and 0.1mA in the Low state.

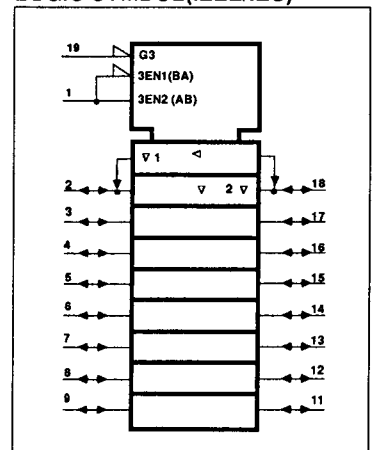
PIN CONFIGURATION



LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



Transceivers

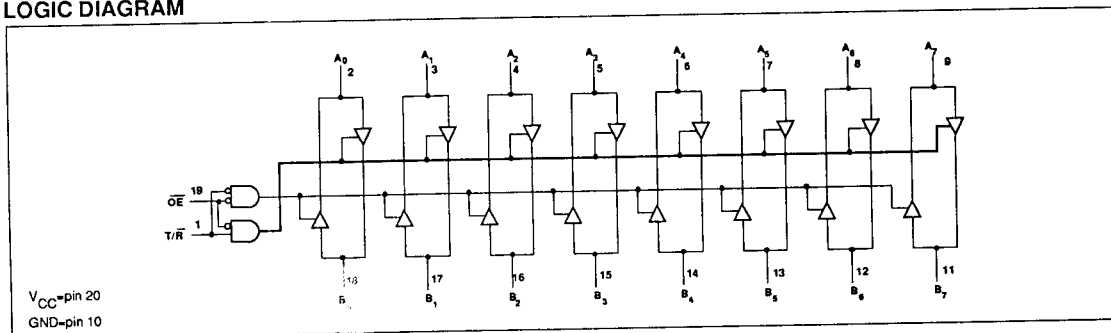
74ALS245A, 74ALS245A-1

FUNCTION TABLE

INPUTS		OUTPUTS
\overline{OE}	$\overline{T/R}$	
L	L	Bus B data to Bus A
L	H	Bus A data to Bus B
H	X	Z

H=High voltage level
 L=Low voltage level
 X=Don't care
 Z=High impedance "off" state

LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Operation beyond the limits set forth in this table may impair the useful life of the device. Unless otherwise noted these limits are over the operating free-air temperature range.)

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage	-0.5 to +7.0	V
V_{IN}	Input voltage	-0.5 to +7.0	V
I_{IN}	Input current	-30 to +5	mA
V_{OUT}	Voltage applied to output in High output state	-0.5 to +5.5	V
I_{OUT}	Current applied to output in Low output state	All versions	48
		-1 version only	96
T_A	Operating free-air temperature range	0 to +70	°C
T_{STG}	Storage temperature	-65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Nom	Max	
V_{CC}	Supply voltage	4.5	5.0	5.5	V
V_{IH}	High-level input voltage	2.0			V
V_{IL}	Low-level input voltage			0.8	V
I_{IK}	Input clamp current			-18	mA
I_{OH}	High-level output current			-15	mA
I_{OL}	Low-level output current	All versions		24	mA
		-1 version only		48 ¹	mA
T_A	Operating free-air temperature range	0		70	°C

NOTE: 1. The 48 mA limit applies only under the condition of $V_{CC} = 5.0V \pm 5\%$.

Transceivers

74ALS245A, 74ALS245A-1

DC ELECTRICAL CHARACTERISTICS (Over recommended operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER		TEST CONDITIONS ¹			LIMITS			UNIT
						Min	Typ ²	Max	
V_{OH}	High-level output voltage		$V_{CC} \pm 10\%$	$V_{IL} = \text{MAX}$ $V_{IH} = \text{MIN}$	$I_{OH} = -0.4\text{mA}$	$V_{CC} - 2$			V
			$V_{CC} = \text{MIN}$		$I_{OH} = -3\text{mA}$	2.4	3.2		V
					$I_{OH} = -15\text{mA}$	2.0			V
V_{OL}	Low-level output voltage	All versions	$V_{CC} = \text{MIN}$	$V_{IL} = \text{MAX}$ $V_{IH} = \text{MIN}$	$I_{OL} = 12\text{mA}$		0.25	0.4	V
		-1 version			$V_{CC} = 4.75\text{V}$	$I_{OL} = 24\text{mA}$		0.35	0.5
						$I_{OL} = 48\text{mA}$		0.35	0.5
V_{IK}	Input clamp voltage		$V_{CC} = \text{MIN}, I_1 = I_{IK}$				-0.73	-1.5	V
I_1	Input current at maximum input voltage - \overline{OE} or T/\overline{R}		$V_{CC} = \text{MAX}, V_1 = 7.0\text{V}$					0.1	mA
I_1	Input current at maximum input voltage - A or B ports		$V_{CC} = \text{MAX}, V_1 = 5.5\text{V}$					0.1	mA
I_{IH}	High-level input current ³		$V_{CC} = \text{MAX}, V_1 = 2.7\text{V}$					20	μA
I_{IL}	Low-level input current ³		$V_{CC} = \text{MAX}, V_1 = 0.4\text{V}$					-0.1	mA
I_O	Short-circuit output current ⁴		$V_{CC} = \text{MAX}, V_O = 2.25\text{V}$			-30		-112	mA
I_{CC}	Supply current (total)		$V_{CC} = \text{MAX}$	I_{CCH}		28	45	mA	
				I_{CCL}		40	55	mA	
				I_{CCZ}		44	58	mA	

NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at $V_{CC} = 5\text{V}, T_A = 25^\circ\text{C}$.
- For I/O ports, the parameters I_{IH} and I_{IL} include the off-state current.
- The output conditions have been chosen to produce current that closely approximates one half of the true short-circuit output current, I_{OS} .

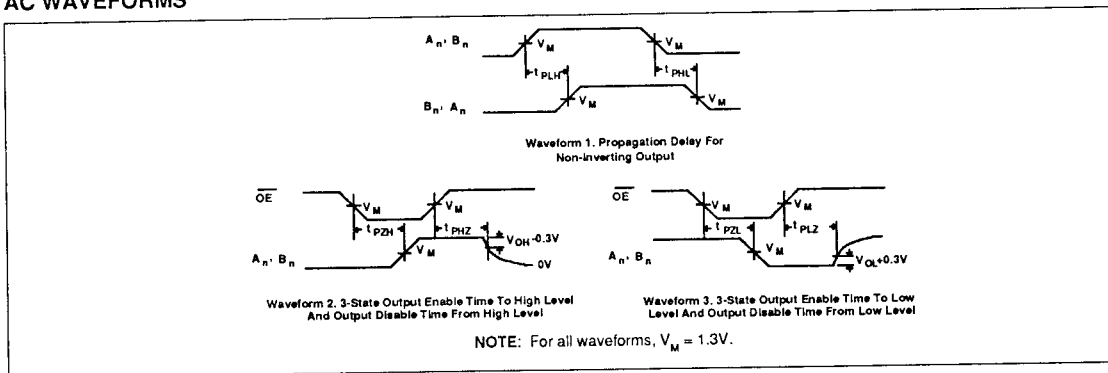
Transceivers

74ALS245A, 74ALS245A-1

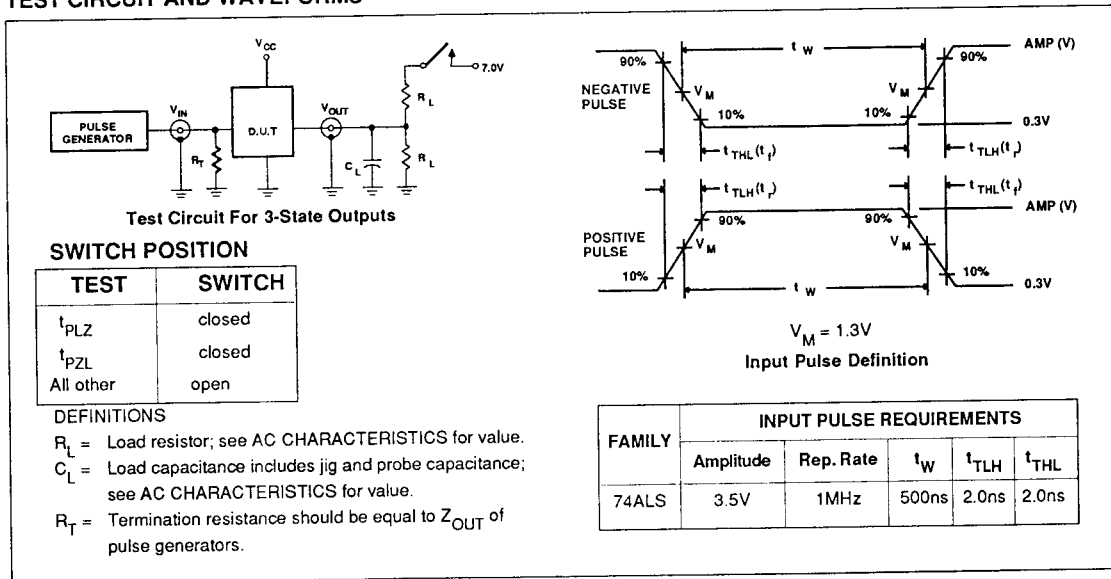
AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS		UNIT
			$T_A = 0^\circ\text{C to } +70^\circ\text{C}$		
			$V_{CC} = 5V \pm 10\%$ $C_L = 50\text{pF}$ $R_L = 500\Omega$		
			Min	Max	
t_{PLH} t_{PHL}	Propagation delay A_n to B_n , B_n to A_n	Waveform 1	2	10	ns
t_{PZH} t_{PZL}	Output Enable time to High or Low level	Waveform 2 Waveform 3	3	20	ns
t_{PHZ} t_{PLZ}	Output Disable time to High or Low level	Waveform 2 Waveform 3	2	10	ns

AC WAVEFORMS



TEST CIRCUIT AND WAVEFORMS



Signetics

Package Outlines

T-90-20

ALS Products

PACKAGE OUTLINES FOR PLASTIC PACKAGES

The following information applies to all plastic packages unless otherwise specified on individual package outline drawings.

1. Dimensions are shown in Metric units (Millimeters) and English units (Inches).
2. Lead material: Copper Alloy, solder (63%Sn/37%Pb) dipped.
3. Body material: Plastic (Epoxy)
4. Thermal resistance values are determined by temperature sensitive parameter (TSP) method. This method uses the forward voltage drop of a calibrated diode to measure the change in junction temperature due to a known power application. The substrate diode of a Bipolar technology device is generally the diode used in these tests. Die size and test environment have significant effects on thermal resistance values.

PLASTIC PACKAGES OUTLINES

Package Type	Number of Leads	Package Feature	Package Ordering Code	Package Outline Code	Thermal Resistance θ_{JA}/θ_{JC} ($^{\circ}C/W$)	Die Size (square mls)	Test Conditions	
							Test Ambient	Test Fixture
SO ¹ (Copper Leadframe)	14-pin (SO-14)	3.9mm (0.15") Body width	D	DH1	124/37	2,500	Still air at room temperature	Device soldered to Philips glass epoxy test board (1.12" x 0.75" x 0.059") with 0.008 - 0.009" stand-off. Accuracy: ± 15%
	16-pin (SOL-16)		D	DJ1	113/36			
	20-pin (SOL-20)	7.5mm (0.30") Body width	D	DL2	90/28	5,000		Device soldered to Philips glass epoxy test board (1.58" x 0.75" x 0.059") with 0.008 - 0.009" stand-off. Accuracy: ± 15%
	24-pin (SOL-24)		D	DN2	76/26			
DIP ² (Copper Leadframe)	14-pin (DIP-14)	0.300" Lead row centers	N	NH1	89/44	2,500	Still air at room temperature	Device in Textool ZIF socket with 0.040" stand-off. Accuracy: ± 15%
	16-pin (DIP-16)		N	NJ1	86/43			
	20-pin (DIP-20)		N	NL1	74/32	5,000		Device in Textool ZIF socket with 0.040" stand-off. Accuracy: ± 15%
	24-pin SLIM DIP (DIP-24)			NN1	65/36			

NOTES:

1. SO = Small Outline
2. DIP = Dual-In-Line Package

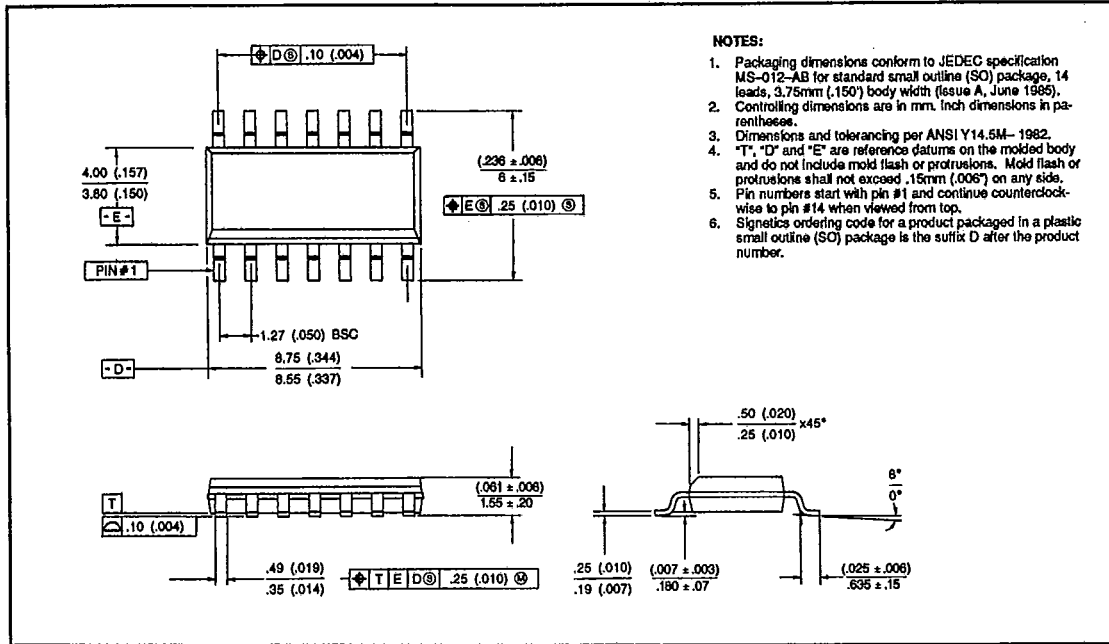
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Package Outlines

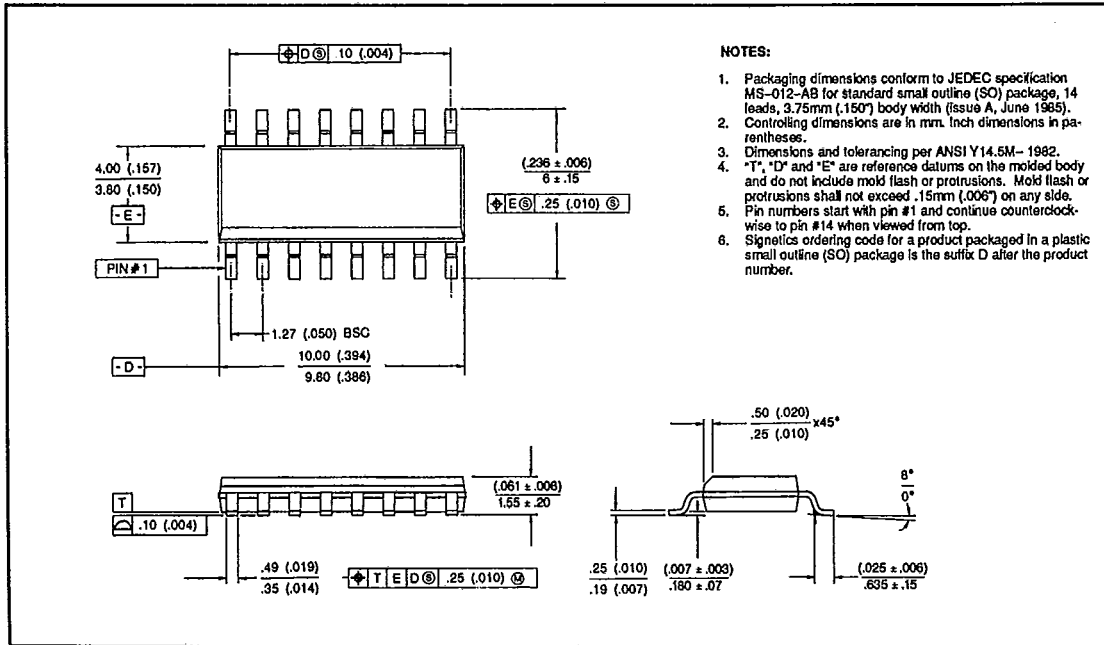
NAPC/ SIGNETICS

T-90-20

14-PIN PLASTIC SO



16-PIN PLASTIC SO

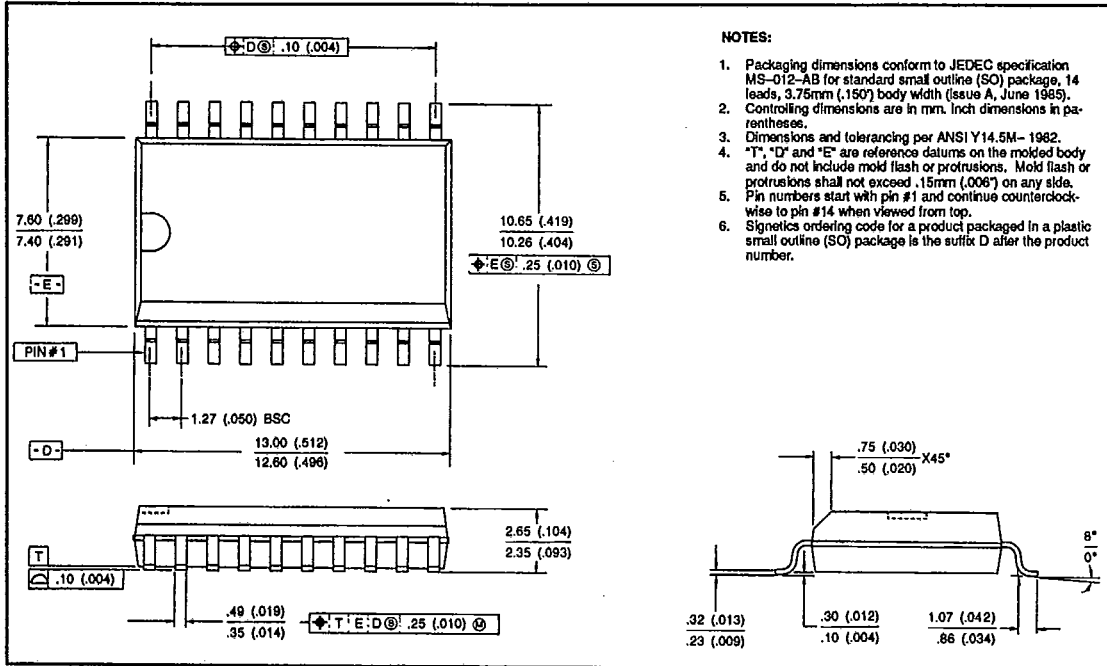


Package Outlines

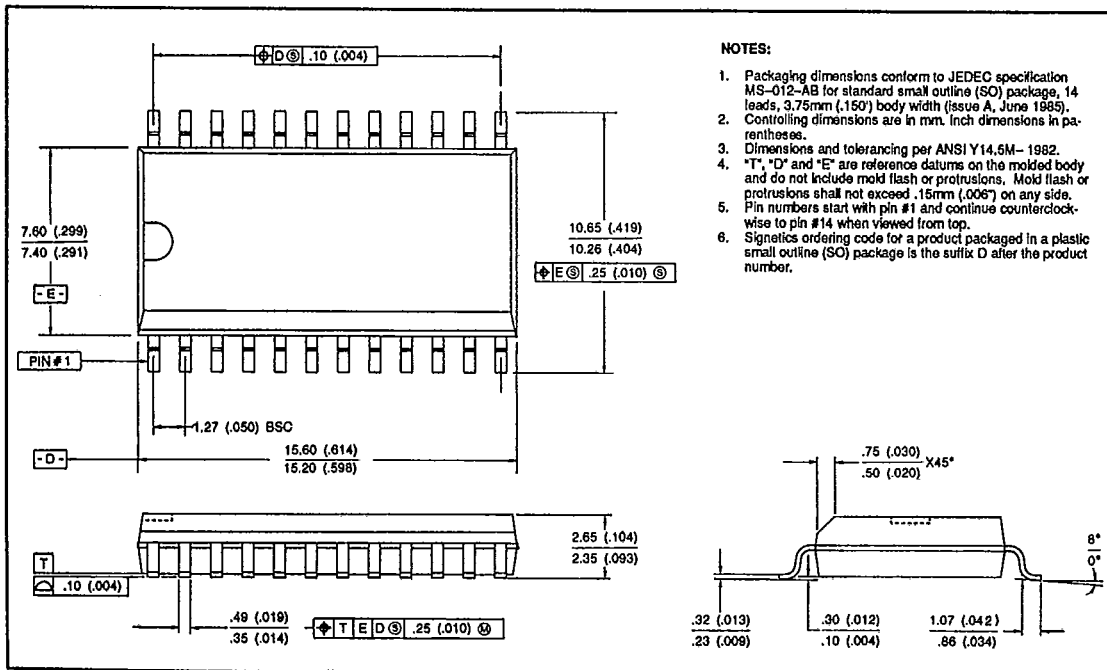
NAPC/ SIGNETICS

T-90-20

20-PIN PLASTIC SOL



24-PIN PLASTIC SOL

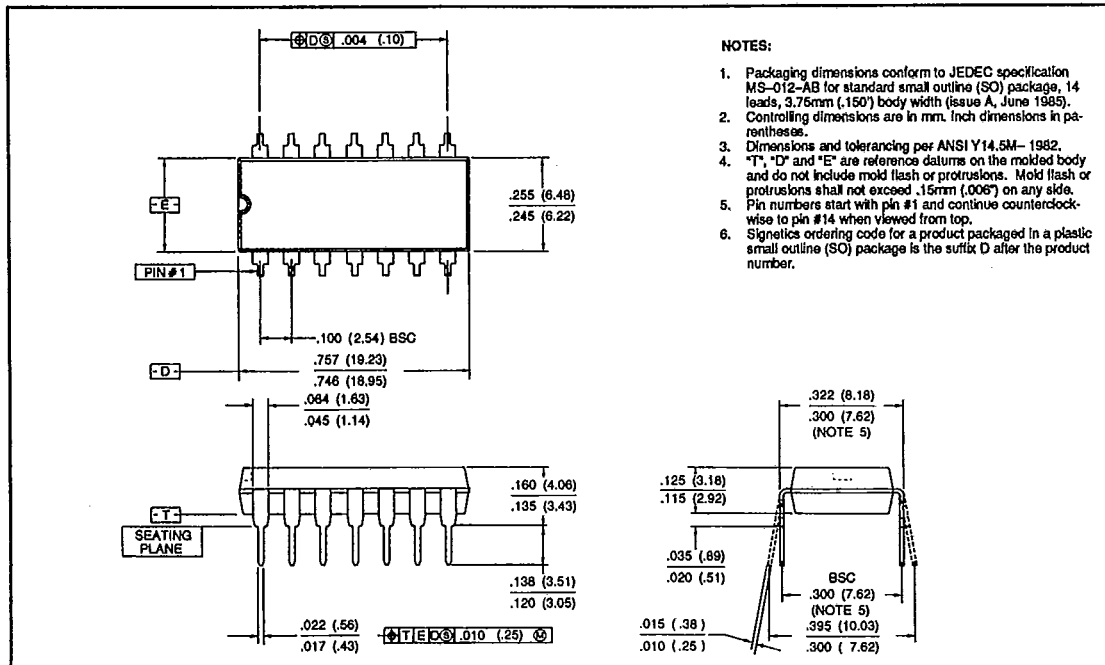


Package Outlines

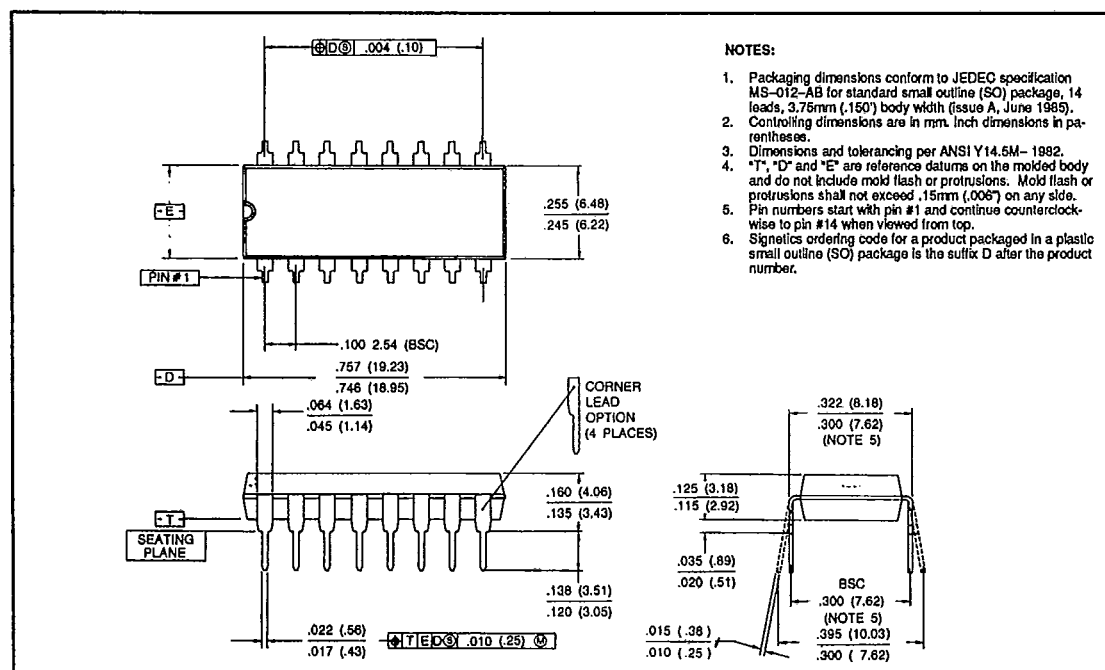
NAPC/ SIGNETICS

T-90-20

14-PIN PLASTIC DIP



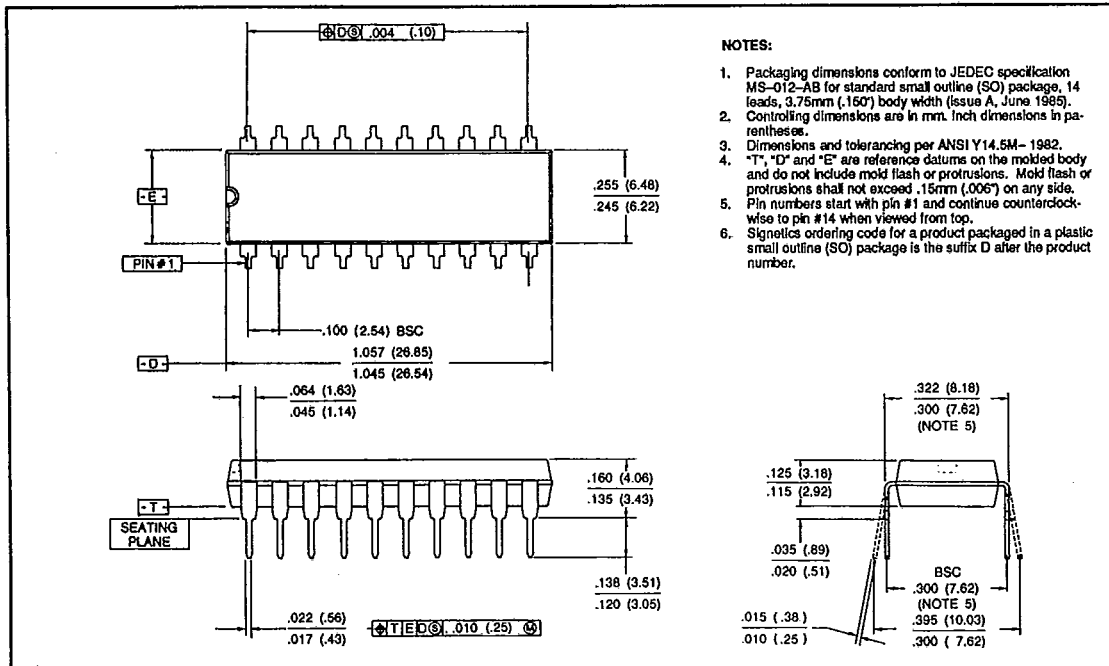
16-PIN PLASTIC DIP



Package Outlines

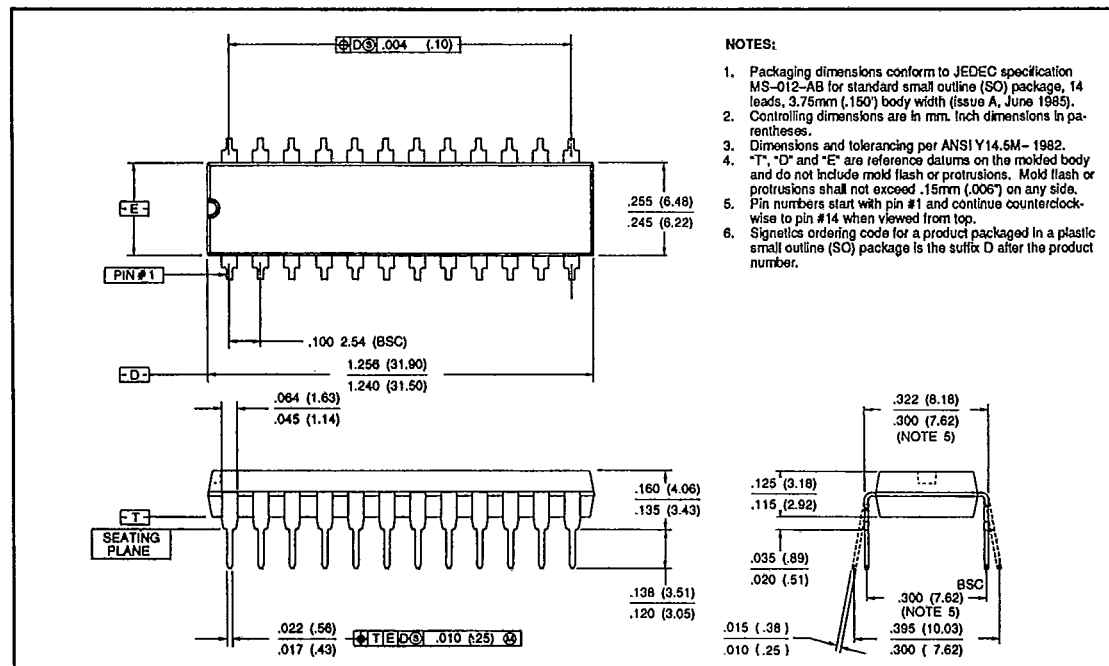
T-90-20

20-PIN PLASTIC PDIP



- NOTES:
1. Packaging dimensions conform to JEDEC specification MS-012-AB for standard small outline (SO) package, 14 leads, 3.75mm (.150") body width (issue A, June 1985).
 2. Controlling dimensions are in mm. Inch dimensions in parentheses.
 3. Dimensions and tolerancing per ANSI Y14.5M-1982.
 4. "T", "D" and "E" are reference datums on the molded body and do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .15mm (.006") on any side.
 5. Pin numbers start with pin #1 and continue counterclockwise to pin #14 when viewed from top.
 6. Signetics ordering code for a product packaged in a plastic small outline (SO) package is the suffix D after the product number.

24-PIN PLASTIC PDIP



- NOTES:
1. Packaging dimensions conform to JEDEC specification MS-012-AB for standard small outline (SO) package, 14 leads, 3.75mm (.150") body width (issue A, June 1985).
 2. Controlling dimensions are in mm. Inch dimensions in parentheses.
 3. Dimensions and tolerancing per ANSI Y14.5M-1982.
 4. "T", "D" and "E" are reference datums on the molded body and do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .15mm (.006") on any side.
 5. Pin numbers start with pin #1 and continue counterclockwise to pin #14 when viewed from top.
 6. Signetics ordering code for a product packaged in a plastic small outline (SO) package is the suffix D after the product number.