

Signetics

74ALS30A

8-Input NAND Gate

Preliminary Specification

ALS Products

FUNCTION TABLE

| INPUTS | | | | | | | | OUTPUT |
|--------|---|---|---|---|---|---|---|-----------|
| A | B | C | D | E | F | G | H | \bar{Y} |
| H | H | H | H | H | H | H | H | L |
| L | X | X | X | X | X | X | X | H |
| X | L | X | X | X | X | X | X | H |
| X | X | L | X | X | X | X | X | H |
| X | X | X | L | X | X | X | X | H |
| X | X | X | X | L | X | X | X | H |
| X | X | X | X | X | L | X | X | H |
| X | X | X | X | X | X | L | X | H |
| X | X | X | X | X | X | X | L | H |

NOTES:
 H = High voltage level
 L = Low voltage level
 X = Don't care

| TYPE | TYPICAL PROPAGATION DELAY | TYPICAL SUPPLY CURRENT (TOTAL) |
|----------|---------------------------|--------------------------------|
| 74ALS30A | 7.0 ns | 0.5 mA |

ORDERING INFORMATION

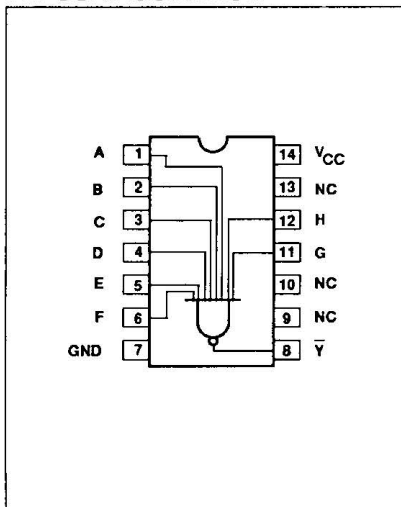
| PACKAGES | COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$; $T_A = 0^\circ C$ to $+70^\circ C$ |
|--------------------|---|
| 14-Pin Plastic DIP | 74ALS30AN |
| 14-Pin Plastic SO | 74ALS30AD |

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

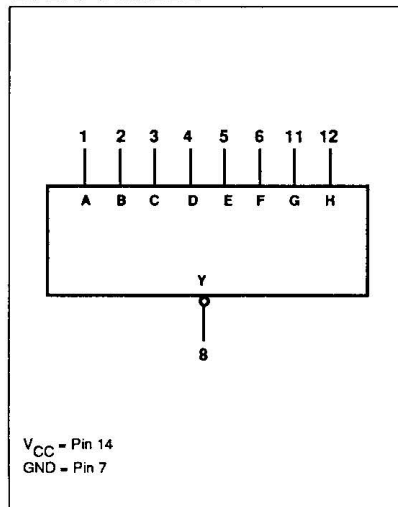
| PINS | DESCRIPTION | 74ALS(U.L.) HIGH/LOW | LOAD VALUE HIGH/LOW |
|-----------|-------------|----------------------|---------------------|
| A - H | Data inputs | 1.0/1.0 | 20 μ A/0.1mA |
| \bar{Y} | Data Output | 20/80 | 0.4mA/8mA |

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

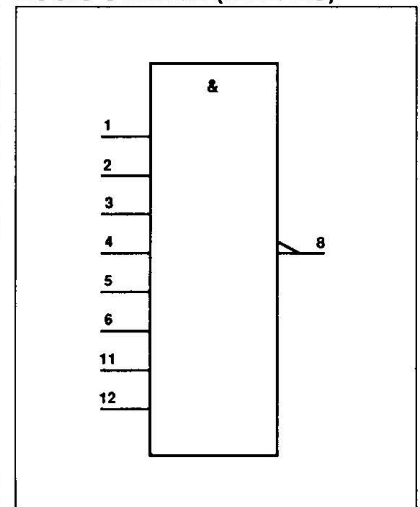
PIN CONFIGURATION



LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



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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 V_{CC} | V |
| I_{OUT} | Current applied to output in Low output state | 16 | mA |
| 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 | | | -0.4 | mA |
| I_{OL} | Low-level output current | | | 8 | mA |
| T_A | Operating free-air temperature range | 0 | | 70 | °C |

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 | $V_{CC} \pm 10\%$, $V_{IL} = \text{MAX}$, $V_{IH} = \text{MIN}$, $I_{OH} = \text{MAX}$ | $V_{CC} - 2$ | | | V | |
| V_{OL} | Low-level output voltage | $V_{CC} = \text{MIN}$, $V_{IL} = \text{MAX}$, $V_{IH} = \text{MIN}$ | | 0.25 | 0.4 | V | |
| | | | $I_{OL} = 4\text{mA}$ | 0.35 | 0.5 | V | |
| V_{IK} | Input clamp voltage | $V_{CC} = \text{MIN}$, $I_I = I_{IK}$ | | | -1.5 | V | |
| I_I | Input current at maximum input voltage | $V_{CC} = \text{MAX}$, $V_I = 7.0\text{V}$ | | | 0.1 | mA | |
| I_{IH} | High-level input current | $V_{CC} = \text{MAX}$, $V_I = 2.7\text{V}$ | | | 20 | μA | |
| I_{IL} | Low-level input current | $V_{CC} = \text{MAX}$, $V_I = 0.4\text{V}$ | | | -0.1 | mA | |
| I_O | Output current ³ | $V_{CC} = \text{MAX}$, $V_O = 2.25\text{V}$ | -30 | | -112 | mA | |
| I_{CC} | Supply current (total) | $V_{CC} = \text{MAX}$ | I_{CCH} | $V_I = 0\text{V}$ | 0.22 | 0.36 | mA |
| | | | I_{CCL} | $V_I = 4.5\text{V}$ | 0.54 | 0.9 | 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 $V_{CC} = 5\text{V}$, $T_A = 25^\circ\text{C}$.
- The output conditions have been chosen to produce current that closely approximates one half of the true short-circuit output current, I_{OS} .

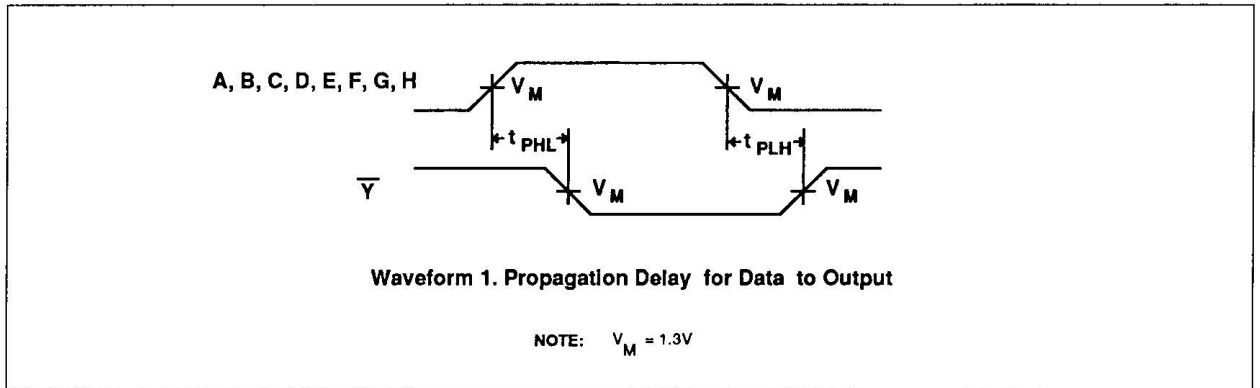
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AC ELECTRICAL CHARACTERISTICS

| SYMBOL | PARAMETER | TEST CONDITIONS | LIMITS | | UNIT |
|------------------------|---|-----------------|---|--------------|------|
| | | | $T_A = 0^\circ\text{C to } +70^\circ\text{C}$ $V_{CC} = 5V \pm 10\%$ $R_L = 500\Omega$ $C_L = 50\text{pF}$ | | |
| | | | Min | Max | |
| t_{PLH} t_{PHL} | Propagation delay A,B,C,D,E,F,G,H to \bar{Y} | Waveform 1 | 3.0 3.0 | 10.0 12.0 | ns |

AC WAVEFORM



TEST CIRCUIT AND WAVEFORMS

Test Circuit for Totem-Pole Outputs

DEFINITIONS

R_L = Load resistor; see AC CHARACTERISTICS for value.

C_L = Load capacitance includes jig and probe capacitance; see AC CHARACTERISTICS for value.

R_T = Termination resistance should be equal to Z_{OUT} of pulse generators.

$V_M = 1.3V$

Input Pulse Definition

| FAMILY | INPUT PULSE REQUIREMENTS | | | | |
|--------|--------------------------|-----------|-------|-----------|-----------|
| | Amplitude | Rep. Rate | t_w | t_{TLH} | t_{THL} |
| 74ALS | 3.5V | 1MHz | 500ns | 2.0ns | 2.0ns |

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 mils) | 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) | | N | NN1 | 65/36 | | | |

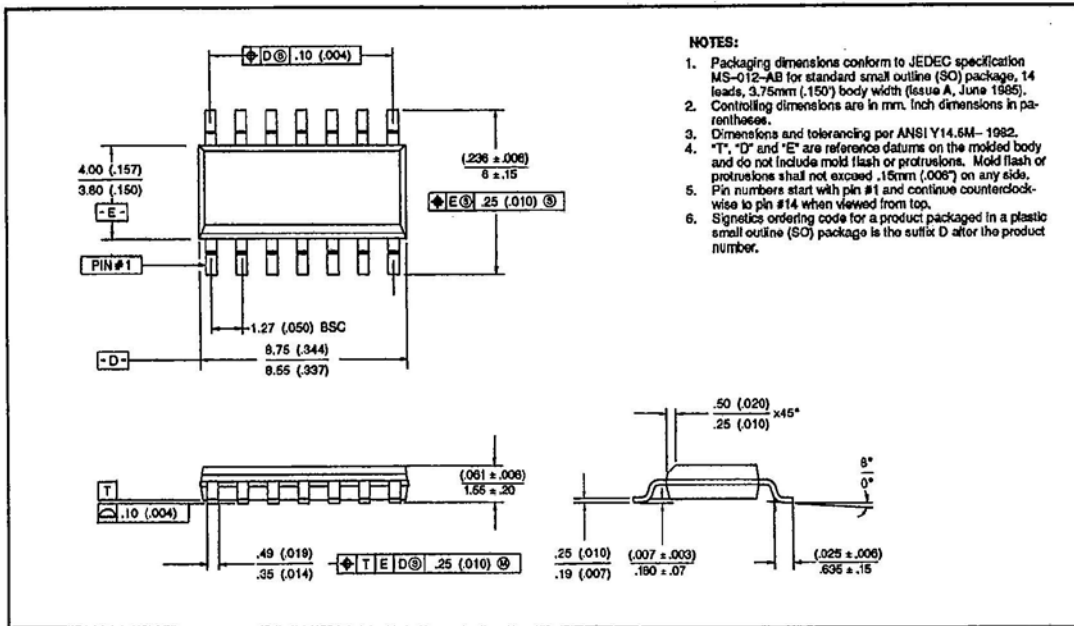
- NOTES:**
 1. SO = Small Outline
 2. DIP = Dual-In-Line Package

Package Outlines

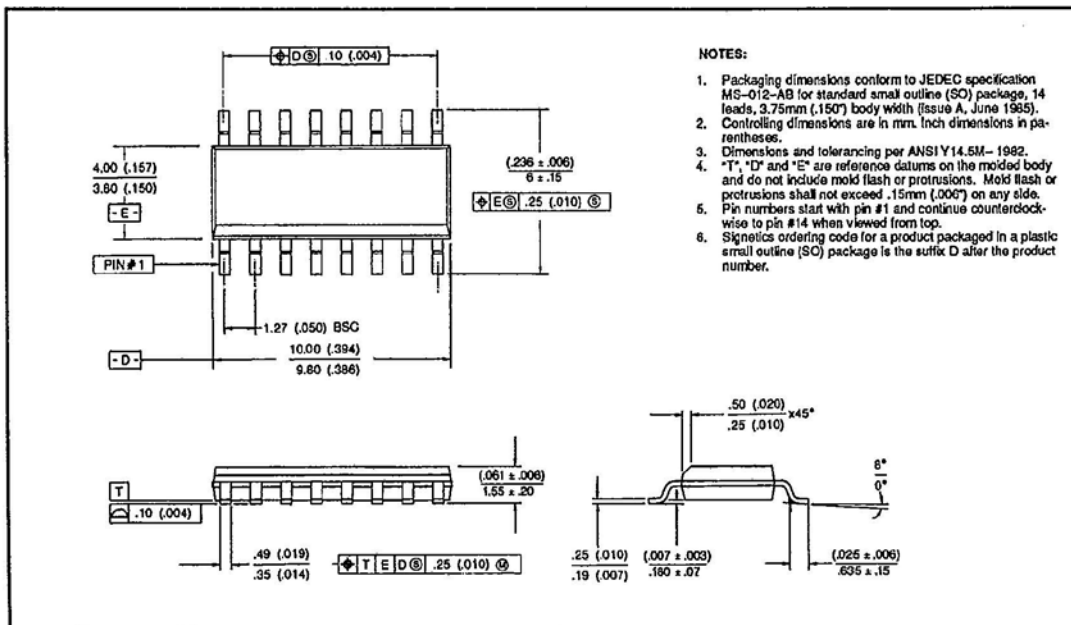
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T-90-20

14-PIN PLASTIC SO



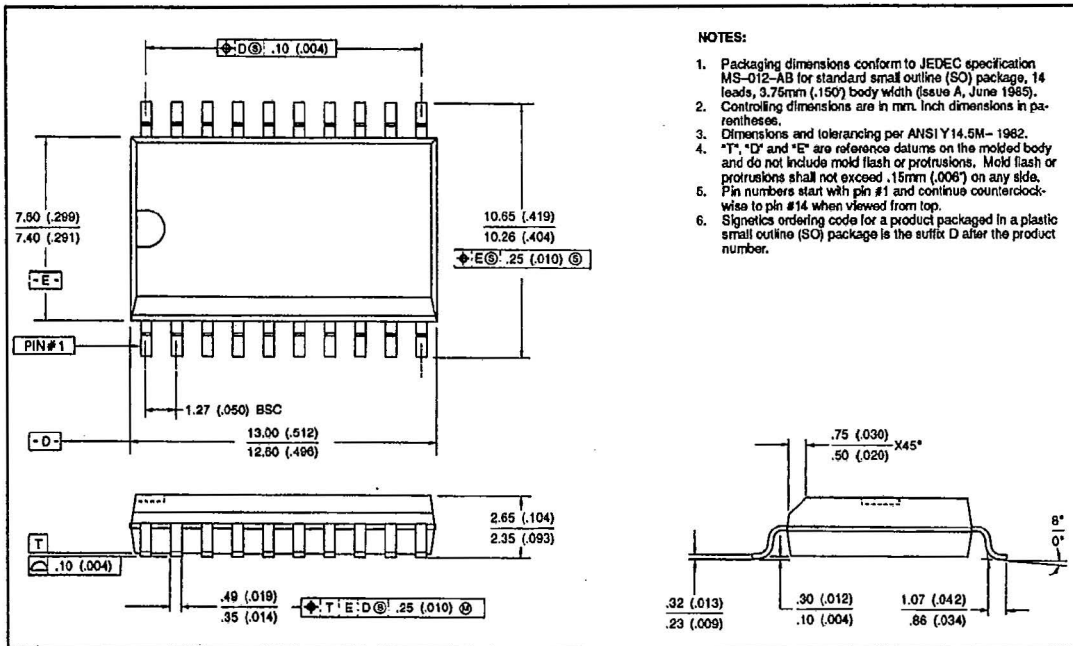
16-PIN PLASTIC SO



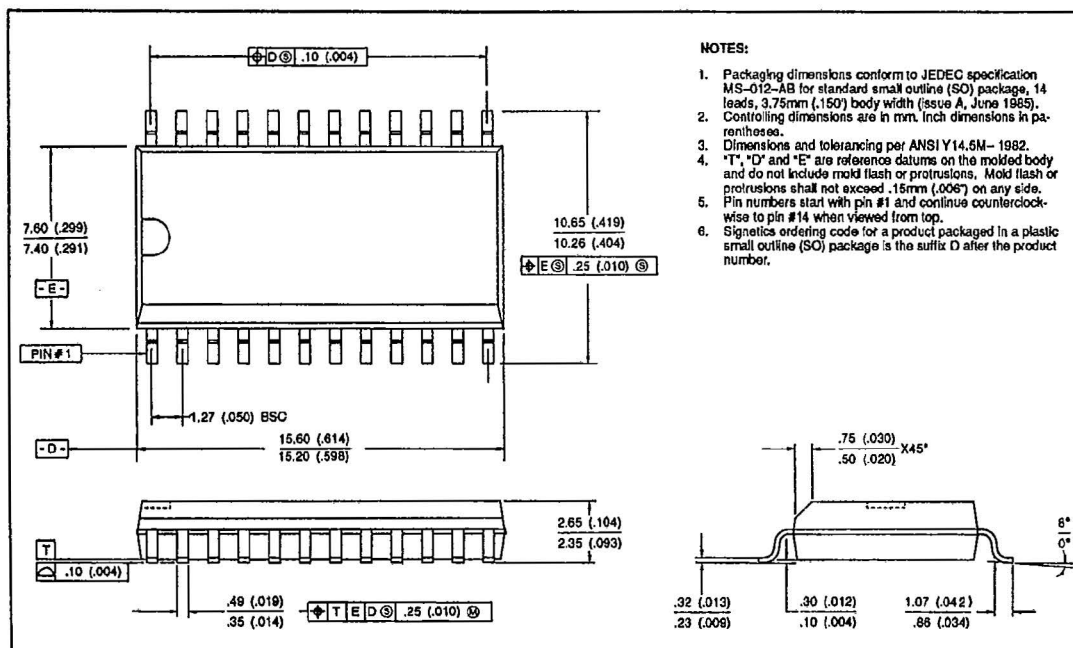
Package Outlines NAPC/ SIGNETICS

T-90-20

20-PIN PLASTIC SOL



24-PIN PLASTIC SOL

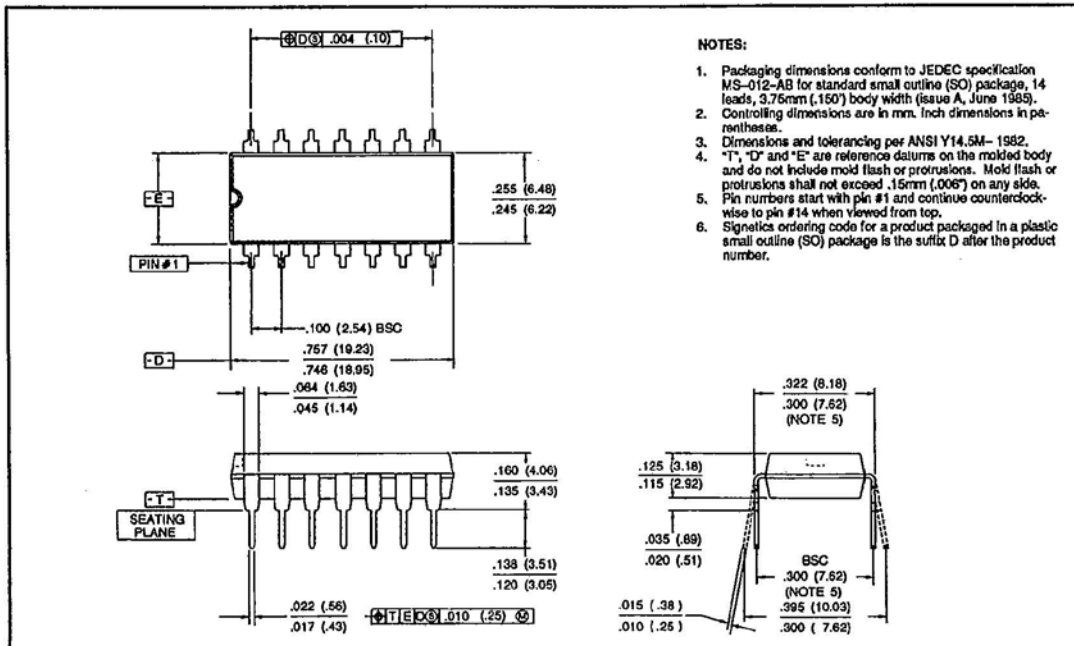


Package Outlines

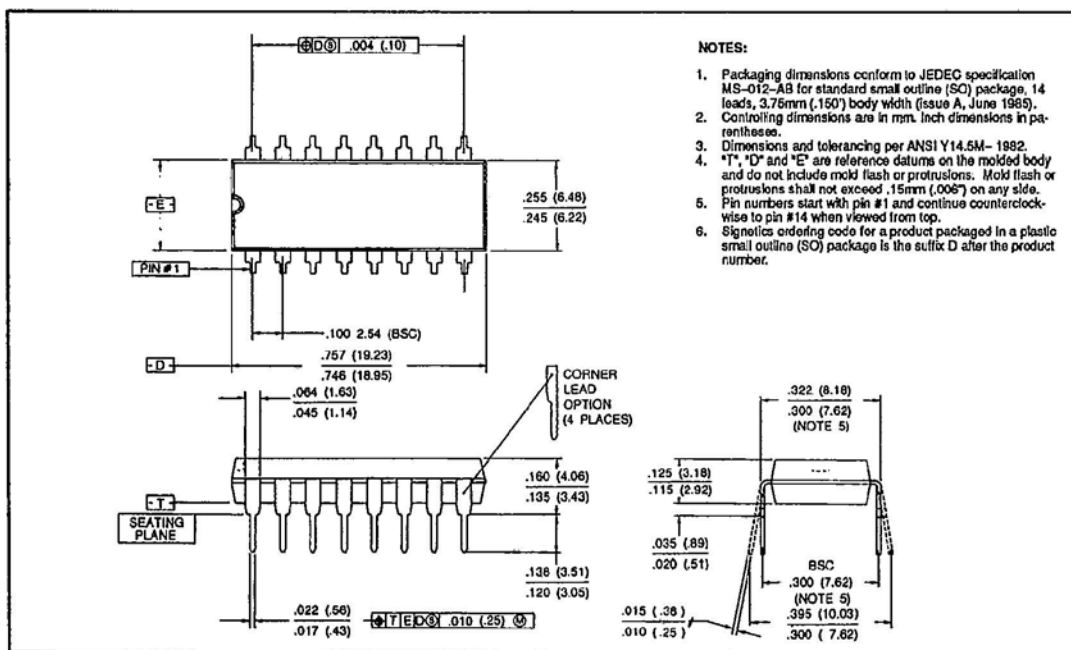
NAPC/ SIGNETICS

T-90-20

14-PIN PLASTIC DIP



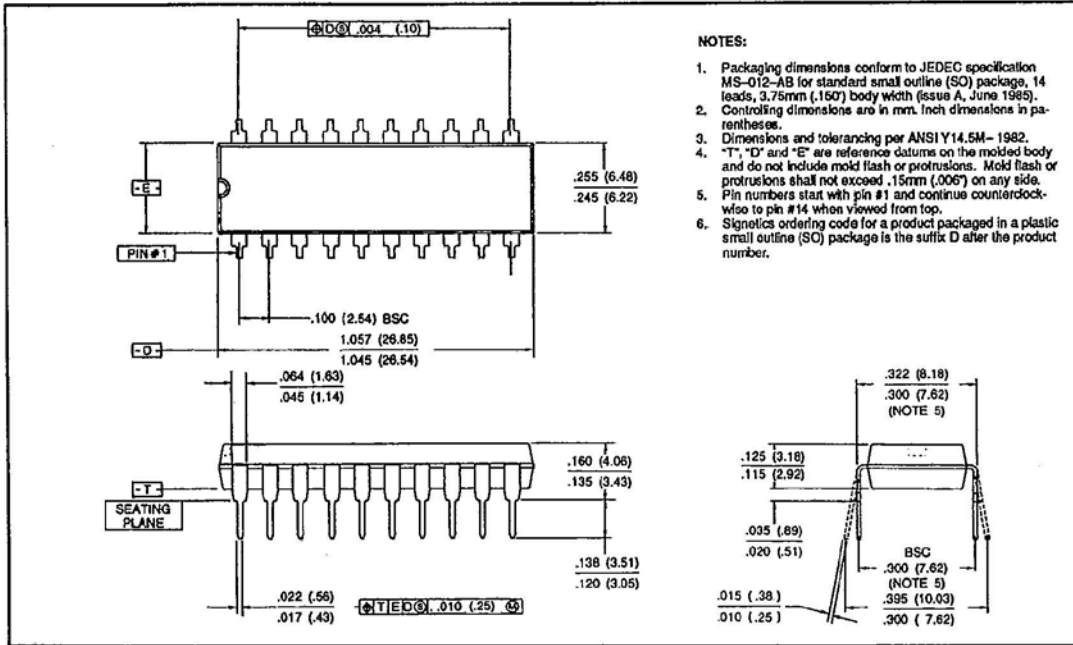
16-PIN PLASTIC DIP



Package Outlines

T-90-20

20-PIN PLASTIC PDIP



24-PIN PLASTIC PDIP

