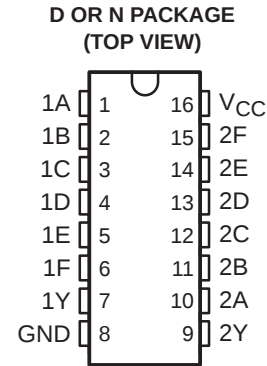


- Meets or Exceeds the Requirements of IBM™ System 360 Input/Output Interface Specification
- Operate From Single 5-V Supply
- TTL Compatible
- 3.11-V Output at  $I_{OH} = -59.3 \text{ mA}$
- Uncommitted Emitter-Follower Output Structure for Party-Line Operation
- Short-Circuit Protection
- AND-OR Logic Configuration
- Designed for Use With Triple Line Receiver SN75124
- Designed to Be Interchangeable With N8T13 and N8T23



THE SN751730 IS RECOMMENDED  
FOR NEW IBM 360/370 INTERFACE DESIGNS.

### description

The SN75123 is a dual line driver specifically designed to meet the input/output interface specifications for IBM System 360. It also is compatible with standard-TTL logic and supply-voltage levels.

The SN75123 low-impedance emitter-follower outputs drive terminated lines such as coaxial cable or twisted pair. Having the outputs uncommitted allows wired-OR logic to be performed in party-line applications. Output short-circuit protection is provided by an internal clamping network that turns on when the output voltage drops below approximately 1.5 V. All the inputs are in conventional TTL configuration, and the gating can be used during power-up and power-down sequences to ensure that no noise is introduced to the line.

The SN75123 is characterized for operation from 0°C to 70°C.

**FUNCTION TABLE**

| INPUTS                       |   |   |   |   |   | OUTPUT<br>Y |
|------------------------------|---|---|---|---|---|-------------|
| A                            | B | C | D | E | F |             |
| H                            | H | H | H | X | X | H           |
| X                            | X | X | X | H | H | H           |
| All other input combinations |   |   |   |   |   | L           |

H = high level, L = low level, X = irrelevant



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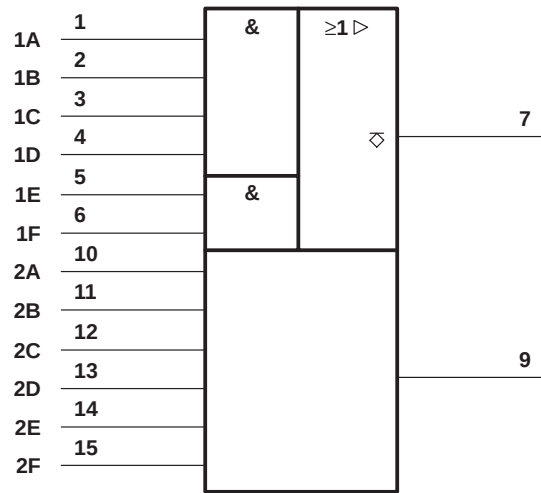
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SN75123  
DUAL LINE DRIVER

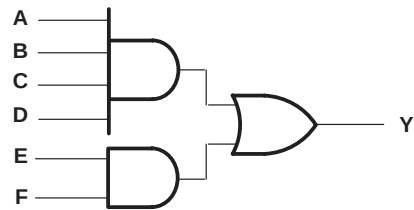
SLLS086C – SEPTEMBER 1973 – REVISED APRIL 1998

logic symbol†

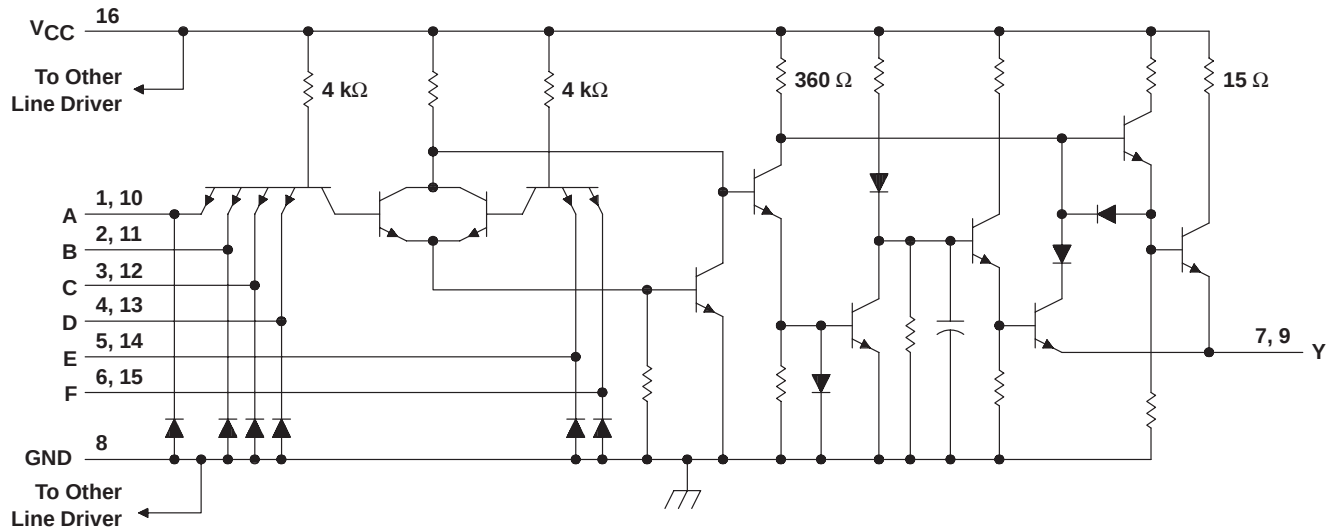


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



## schematic (each driver)



Resistor values shown are nominal.

## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>†</sup>

|                                                                                              |                |
|----------------------------------------------------------------------------------------------|----------------|
| Supply voltage, $V_{CC}$ (see Note 1)                                                        | 7 V            |
| Input voltage, $V_I$                                                                         | 5.5 V          |
| Output voltage, $V_O$                                                                        | 7 V            |
| Continuous total dissipation at (or below) 25°C free-air temperature (see Note 2): D package | 950 mW         |
| N package                                                                                    | 1150 mW        |
| Operating free-air temperature range, $T_A$                                                  | 0°C to 70°C    |
| Storage temperature range, $T_{stg}$                                                         | –65°C to 150°C |
| Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds                                 | 260°C          |

<sup>†</sup> 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.

NOTES: 1. All voltage values, except differential input voltage, are with respect to network ground terminal.

2. For operation above 25°C free-air temperature, derate the D package to 608 mW at 70°C at the rate of 7.6 mW/°C and the N package to 736 mW at 70°C at the rate of 9.2 mW/°C.

## recommended operating conditions

|                                       | MIN  | NOM | MAX  | UNIT |
|---------------------------------------|------|-----|------|------|
| Supply voltage, $V_{CC}$              | 4.75 | 5   | 5.25 | V    |
| High-level input voltage, $V_{IH}$    | 2    |     |      | V    |
| Low-level input voltage, $V_{IL}$     |      |     | 0.8  | V    |
| High-level output current, $I_{OH}$   |      |     | –100 | mA   |
| Operating free-air temperature, $T_A$ | 0    |     | 70   | °C   |

# SN75123

## DUAL LINE DRIVER

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electrical characteristics,  $V_{CC} = 4.75 \text{ V to } 5.25 \text{ V}$ ,  $T_A = 0^\circ\text{C to } 70^\circ\text{C}$  (unless otherwise noted)

| PARAMETER           |                               | TEST CONDITIONS                                                                                          |                                   | MIN  | MAX  | UNIT |
|---------------------|-------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------|------|------|------|
| V <sub>IK</sub>     | Input clamp voltage           | V <sub>CC</sub> = 5 V, I <sub>I</sub> = −12 mA                                                           |                                   | −1.5 |      | V    |
| V <sub>I(BR)</sub>  | Input breakdown voltage       | V <sub>CC</sub> = 5 V, I <sub>I</sub> = 10 mA                                                            |                                   | 5.5  |      | V    |
| V <sub>OH</sub>     | High-level output voltage     | V <sub>CC</sub> = 5 V, V <sub>IH</sub> = 2 V, I <sub>OH</sub> = −59.3 mA, See Note 3                     | T <sub>A</sub> = 25°C             | 3.11 |      | V    |
|                     |                               |                                                                                                          | T <sub>A</sub> = 0°C to 70°C      | 2.9  |      |      |
| V <sub>OL</sub>     | Low-level output voltage      | V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = −240 μA, See Note 3                                           |                                   | 0.15 |      | V    |
| I <sub>OH</sub>     | High-level output current     | V <sub>CC</sub> = 5 V, V <sub>IH</sub> = 4.5 V, V <sub>OH</sub> = 2 V, T <sub>A</sub> = 25°C, See Note 3 |                                   | −100 | −250 | mA   |
| I <sub>O(off)</sub> | Off-state output current      | V <sub>CC</sub> = 0, V <sub>O</sub> = 3 V                                                                |                                   | 40   |      | μA   |
| I <sub>IH</sub>     | High-level input current      | V <sub>I</sub> = 4.5 V                                                                                   |                                   | 40   |      | μA   |
| I <sub>IL</sub>     | Low-level input current       | V <sub>I</sub> = 0.4 V                                                                                   |                                   | −0.1 | −1.6 | mA   |
| I <sub>OS</sub>     | Short-circuit output current† | V <sub>CC</sub> = 5 V, T <sub>A</sub> = 25°C                                                             |                                   | −30  |      | mA   |
| I <sub>CCH</sub>    | Supply current, outputs high  | V <sub>CC</sub> = 5.25 V,                                                                                | All inputs at 2 V, Outputs open   | 28   |      | mA   |
| I <sub>CCL</sub>    | Supply current, outputs low   | V <sub>CC</sub> = 5.25 V,                                                                                | All inputs at 0.8 V, Outputs open | 60   |      | mA   |

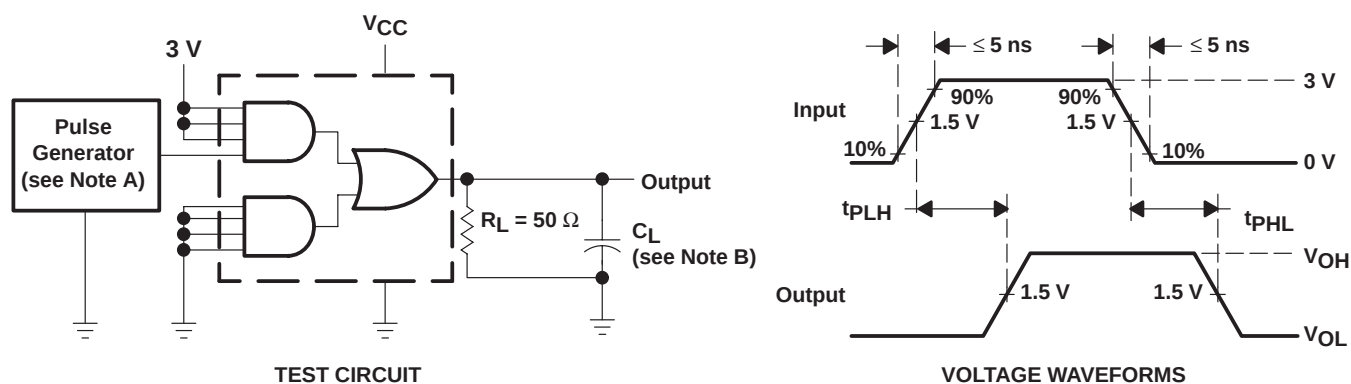
† Not more than one output should be shorted at a time.

NOTE 3: The output voltage and current limits are valid for any appropriate combination of high and low inputs specified by the function table for the desired output.

switching characteristics,  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ\text{C}$

| PARAMETER                                                   | TEST CONDITIONS                                           | MIN | TYP | MAX | UNIT |
|-------------------------------------------------------------|-----------------------------------------------------------|-----|-----|-----|------|
| $t_{PLH}$ Propagation delay time, low- to high-level output | $R_L = 50 \Omega$ , $C_L = 15 \text{ pF}$ , See Figure 1  |     | 12  | 20  | ns   |
| $t_{PHL}$ Propagation delay time, high- to low-level output | $R_L = 50 \Omega$ , $C_L = 15 \text{ pF}$ , See Figure 1  |     | 12  | 20  | ns   |
| $t_{PLH}$ Propagation delay time, low- to high-level output | $R_L = 50 \Omega$ , $C_L = 100 \text{ pF}$ , See Figure 1 |     | 20  | 35  | ns   |
| $t_{PHL}$ Propagation delay time, high- to low-level output | $R_L = 50 \Omega$ , $C_L = 100 \text{ pF}$ , See Figure 1 |     | 15  | 25  | ns   |

### PARAMETER MEASUREMENT INFORMATION



NOTES: A. The pulse generator has the following characteristics:  $Z_O = 50 \Omega$ ,  $t_w = 200 \text{ ns}$ , duty cycle = 50%.

B.  $C_L$  Includes probe and jig capacitance.

Figure 1. Test Circuit and Voltage Waveforms

## TYPICAL CHARACTERISTICS

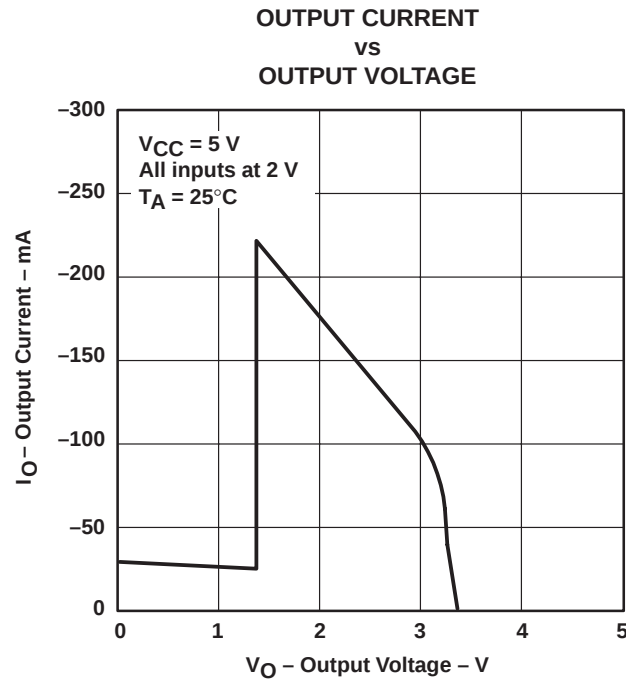


Figure 2

## APPLICATION INFORMATION

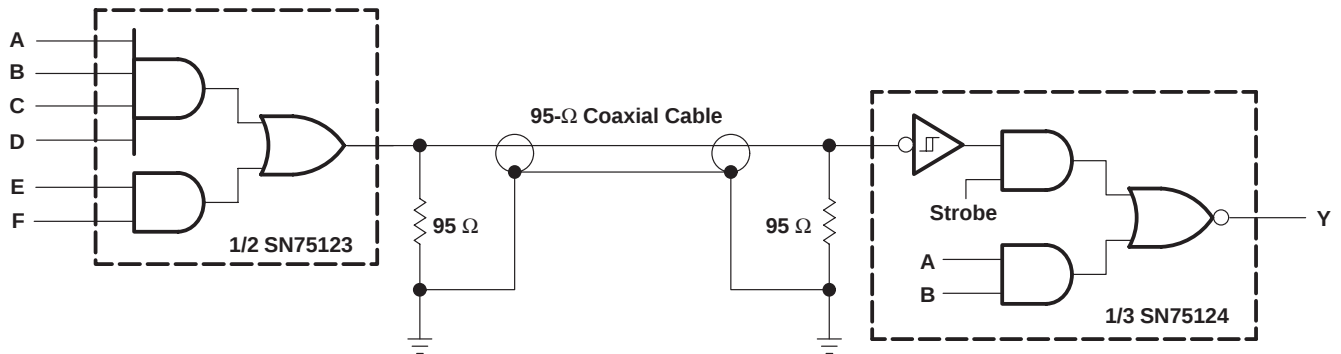


Figure 3. Unbalanced Line Communication Using SN75123 and SN75124

## PACKAGING INFORMATION

| Orderable Device | Status<br>(1) | Package Type | Package<br>Drawing | Pins | Package<br>Qty | Eco Plan<br>(2) | Lead finish/<br>Ball material<br>(6) | MSL Peak Temp<br>(3) | Op Temp (°C) | Device Marking<br>(4/5) | Samples                 |
|------------------|---------------|--------------|--------------------|------|----------------|-----------------|--------------------------------------|----------------------|--------------|-------------------------|-------------------------|
| SN75123N         | ACTIVE        | PDIP         | N                  | 16   | 25             | RoHS & Green    | NIPDAU                               | N / A for Pkg Type   | 0 to 70      | SN75123N                | <a href="#">Samples</a> |

(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) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(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.

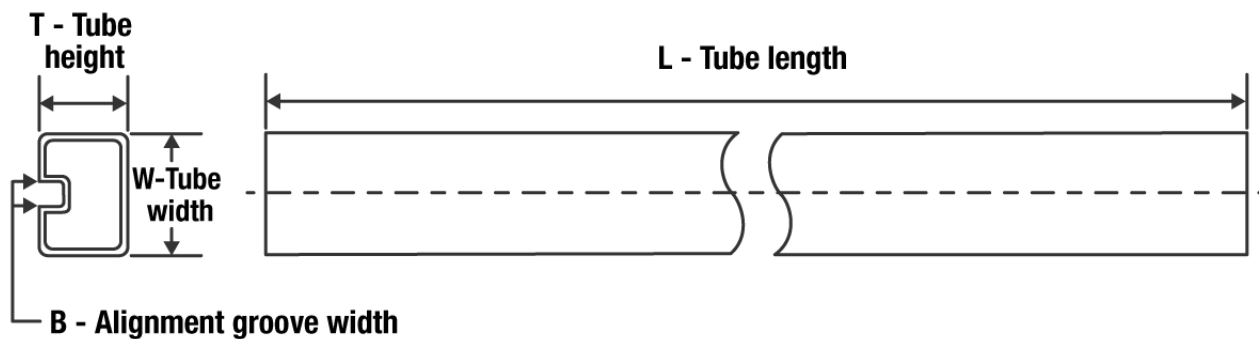
(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "-" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices 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.

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## TUBE



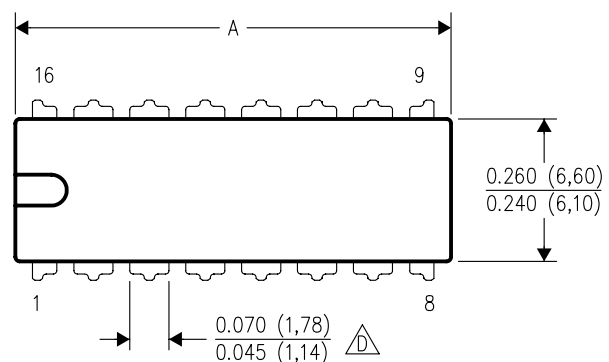
\*All dimensions are nominal

| Device   | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (μm) | B (mm) |
|----------|--------------|--------------|------|-----|--------|--------|--------|--------|
| SN75123N | N            | PDIP         | 16   | 25  | 506    | 13.97  | 11230  | 4.32   |

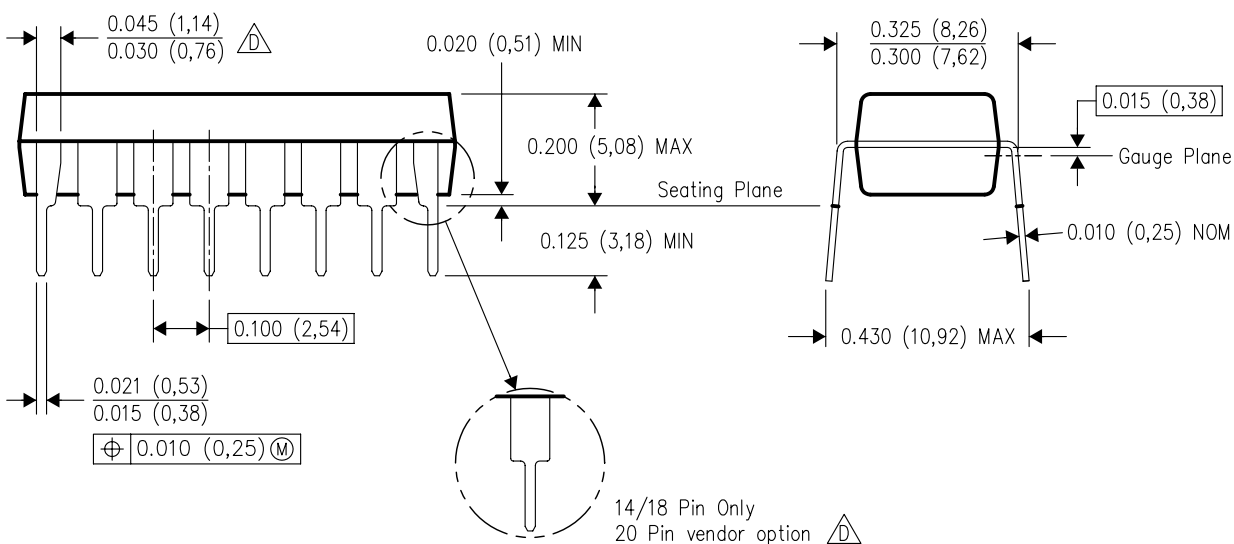
N (R-PDIP-T\*\*)

16 PINS SHOWN

## PLASTIC DUAL-IN-LINE PACKAGE



| PINS **<br>DIM      | 14               | 16               | 18               | 20               |
|---------------------|------------------|------------------|------------------|------------------|
| A MAX               | 0.775<br>(19,69) | 0.775<br>(19,69) | 0.920<br>(23,37) | 1.060<br>(26,92) |
| A MIN               | 0.745<br>(18,92) | 0.745<br>(18,92) | 0.850<br>(21,59) | 0.940<br>(23,88) |
| MS-001<br>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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