

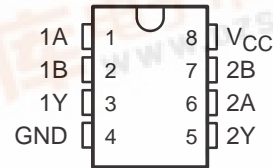
SN55451B, SN55452B, SN55453B, SN55454B  
 SN75451B, SN75452B, SN75453B, SN75454B  
**DUAL PERIPHERAL DRIVERS**

SLRS021B – DECEMBER 1976 – REVISED SEPTEMBER 1999

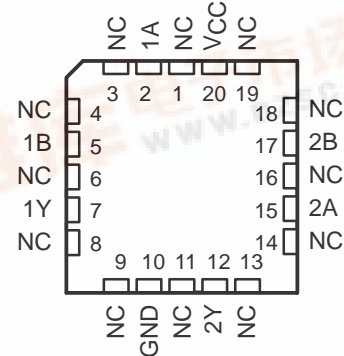
**PERIPHERAL DRIVERS FOR  
 HIGH-CURRENT SWITCHING AT  
 VERY HIGH SPEEDS**

- Characterized for Use to 300 mA
- High-Voltage Outputs
- No Output Latch-Up at 20 V (After Conducting 300 mA)
- High-Speed Switching
- Circuit Flexibility for Varied Applications
- TTL-Compatible Diode-Clamped Inputs
- Standard Supply Voltages
- Plastic DIP (P) With Copper Lead Frame Provides Cooler Operation and Improved Reliability
- Package Options Include Plastic Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs

SN55451B, SN55452B,  
 SN55453B, SN55454B . . . JG PACKAGE  
 SN75451B, SN75452B,  
 SN75453B, SN75454B . . . D OR P PACKAGE  
 (TOP VIEW)



SN55451B, SN55452B  
 SN55453B, SN55454B . . . FK PACKAGE  
 (TOP VIEW)



NC – No internal connection

SUMMARY OF DEVICES

| DEVICE   | LOGIC OF COMPLETE CIRCUIT | PACKAGES |
|----------|---------------------------|----------|
| SN55451B | AND                       | FK, JG   |
| SN55452B | NAND                      | JG       |
| SN55453B | OR                        | FK, JG   |
| SN55454B | NOR                       | JG       |
| SN75451B | AND                       | D, P     |
| SN75452B | NAND                      | D, P     |
| SN75453B | OR                        | D, P     |
| SN75454B | NOR                       | D, P     |

**description**

The SN55451B through SN55454B and SN75451B through SN75454B are dual peripheral drivers designed for use in systems that employ TTL logic. This family is functionally interchangeable with and replaces the SN75450 family and the SN75450A family devices manufactured previously. The speed of the devices is equal to that of the SN75450 family, and the parts are designed to ensure freedom from latch-up. Diode-clamped inputs simplify circuit design. Typical applications include high-speed logic buffers, power drivers, relay drivers, lamp drivers, MOS drivers, line drivers, and memory drivers.

The SN55451B/SN75451B, SN55452B/SN75452B, SN55453B/SN75453B, and SN55454B/SN75454B are dual peripheral AND, NAND, OR, and NOR drivers, respectively (assuming positive logic), with the output of the logic gates internally connected to the bases of the npn output transistors.

The SN55' drivers are characterized for operation over the full military range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN75' drivers are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .



**SN55451B, SN55452B, SN55453B, SN55454B  
SN75451B, SN75452B, SN75453B, SN75454B  
DUAL PERIPHERAL DRIVERS**

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**absolute maximum ratings over operating free-air temperature range (unless otherwise noted)**

|  | SN55'                        | SN75'      | UNIT |
|--|------------------------------|------------|------|
| Supply voltage, $V_{CC}$ (see Note 1)  | 7                            | 7          | V    |
| Input voltage, $V_I$   | 5.5                          | 5.5        | V    |
| Inter-emitter voltage (see Note 2)   | 5.5                          | 5.5        | V    |
| Off-state output voltage, $V_O$  | 30                           | 30         | V    |
| Continuous collector or output current, $I_{OK}$ (see Note 3)                                    | 400                          | 400        | mA   |
| Peak collector or output current, $I_I$ ( $t_W \leq 10$ ms, duty cycle $\leq 50\%$ , see Note 4) | 500                          | 500        | mA   |
| Continuous total power dissipation   | See Dissipation Rating Table |            |      |
| Operating free-air temperature range, $T_A$  | -55 to 125                   | 0 to 70    | °C   |
| Storage temperature range, $T_{stg}$   | -65 to 150                   | -65 to 150 | °C   |
| Case temperature for 60 seconds  | FK package                   | 260        | °C   |
| Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds                                     | JG package                   | 300        | °C   |
| Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds                                     | D or P package               | 260        | °C   |

- NOTES: 1. Voltage values are with respect to network GND, unless otherwise specified.  
 2. This is the voltage between two emitters of a multiple-emitter transistor.  
 3. This value applies when the base-emitter resistance ( $R_{BE}$ ) is equal to or less than 500  $\Omega$ .  
 4. Both halves of these dual circuits may conduct rated current simultaneously; however, power dissipation averaged over a short time interval must fall within the continuous dissipation rating.

**DISSIPATION RATING TABLE**

| PACKAGE | $T_A \leq 25^\circ\text{C}$<br>POWER RATING | DERATING FACTOR<br>ABOVE $T_A = 25^\circ\text{C}$ | $T_A = 70^\circ\text{C}$<br>POWER RATING | $T_A = 125^\circ\text{C}$<br>POWER RATING |
|---------|---|---|--|---|
| D       | 725 mW                                      | 5.8 mW/°C   | 464 mW                                   | —   |
| FK      | 1375 mW                                     | 11.0 mW/°C  | 880 mW                                   | 275 mW                                    |
| JG      | 1050 mW                                     | 8.4 mW/°C   | 672 mW                                   | 210 mW                                    |
| P       | 1000 mW                                     | 8.0 mW/°C   | 640 mW                                   | —   |

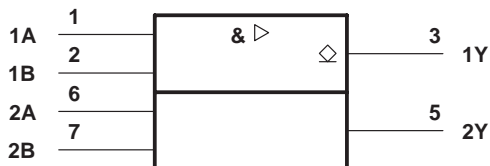
**recommended operating conditions**

|                                       | SN55' |     |     | SN75' |     |      | UNIT |    |    |
|---------------------------------------|-------|-----|-----|-------|-----|------|------|----|----|
|                                       | MIN   | NOM | MAX | MIN   | NOM | MAX  |      |    |    |
| Supply voltage, $V_{CC}$              | 4.5   | 5   | 5.5 | 4.75  | 5   | 5.25 | V    |    |    |
| High-level input voltage, $V_{IH}$    | 2     |     |     | 2     |     |      | V    |    |    |
| Low-level input voltage, $V_{IL}$     | 0.8   |     |     | 0.8   |     |      | V    |    |    |
| Operating free-air temperature, $T_A$ | -55   |     |     | 125   |     |      | 0    | 70 | °C |

# SN55451B, SN55452B, SN55453B, SN55454B SN75451B, SN75452B, SN75453B, SN75454B DUAL PERIPHERAL DRIVERS

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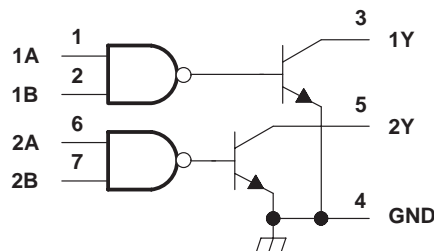
## logic symbol†



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

Pin numbers shown are for the D, JG, and P packages.

## logic diagram (positive logic)

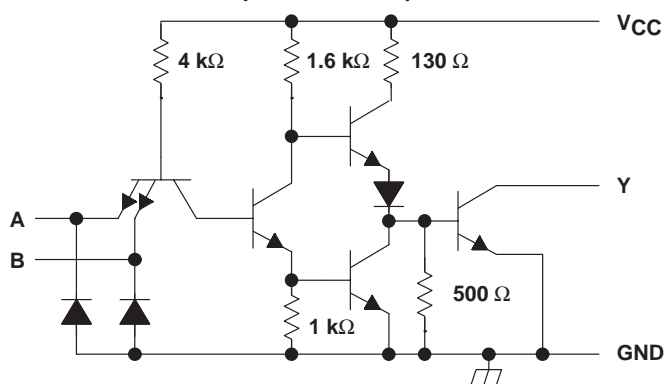


FUNCTION TABLE  
(each driver)

| A | B | Y             |
|---|---|---------------|
| L | L | L (on state)  |
| L | H | L (on state)  |
| H | L | L (on state)  |
| H | H | H (off state) |

positive logic:  
 $Y = AB$  or  $\overline{A+B}$

## schematic (each driver)



Resistor values shown are nominal.

## electrical characteristics over recommended operating free-air temperature range

| PARAMETER                                    | TEST CONDITIONS‡   | SN55451B |      | SN75451B |      | UNIT |      |               |
|--|--|----------|------|----------|------|------|------|---------------|
|  |  | MIN      | TYP§ | MAX      | MIN  |      | TYP§ | MAX           |
| $V_{IK}$ Input clamp voltage                 | $V_{CC} = \text{MIN}$ , $I_I = -12 \text{ mA}$                               | -1.2     |      | -1.5     | -1.2 |      | -1.5 | V             |
| $V_{OL}$ Low-level output voltage            | $V_{CC} = \text{MIN}$ , $V_{IL} = 0.8 \text{ V}$ , $I_{OL} = 100 \text{ mA}$ | 0.25     |      | 0.5      | 0.25 |      | 0.4  | V             |
|  | $V_{CC} = \text{MIN}$ , $V_{IL} = 0.8 \text{ V}$ , $I_{OL} = 300 \text{ mA}$ | 0.5      |      | 0.8      | 0.5  |      | 0.7  |               |
| $I_{OH}$ High-level output current           | $V_{CC} = \text{MIN}$ , $V_{IH} = \text{MIN}$ , $V_{OH} = 30 \text{ V}$      |          |      | 300      |      |      | 100  | $\mu\text{A}$ |
| $I_I$ Input current at maximum input voltage | $V_{CC} = \text{MAX}$ , $V_I = 5.5 \text{ V}$                                |          |      | 1        |      |      | 1    | mA            |
| $I_{IH}$ High-level input current            | $V_{CC} = \text{MAX}$ , $V_I = 2.4 \text{ V}$                                |          |      | 40       |      |      | 40   | $\mu\text{A}$ |
| $I_{IL}$ Low-level input current             | $V_{CC} = \text{MAX}$ , $V_I = 0.4 \text{ V}$                                | -1       |      | -1.6     | -1   |      | -1.6 | mA            |
| $I_{CCH}$ Supply current, outputs high       | $V_{CC} = \text{MAX}$ , $V_I = 5 \text{ V}$                                  | 7        |      | 11       | 7    |      | 11   | mA            |
| $I_{CCL}$ Supply current, outputs low        | $V_{CC} = \text{MAX}$ , $V_I = 0$  | 52       |      | 65       | 52   |      | 65   | mA            |

‡ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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

## 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 | $I_O \approx 200 \text{ mA}$ , $C_L = 15 \text{ pF}$ , $R_L = 50 \Omega$ , See Figure 1 |             | 18  | 25  | ns   |
| $t_{PHL}$ Propagation delay time, high-to-low-level output |   |             | 18  | 25  |      |
| $t_{TLH}$ Transition time, low-to-high-level output        |   |             | 5   | 8   |      |
| $t_{THL}$ Transition time, high-to-low-level output        |   |             | 7   | 12  |      |
| $V_{OH}$ High-level output voltage after switching         | SN55451B  | $V_S - 6.5$ |     |     | mV   |
|  | SN75451B  | $V_S - 6.5$ |     |     |      |

# SN55451B, SN55452B, SN55453B, SN55454B SN75451B, SN75452B, SN75453B, SN75454B DUAL PERIPHERAL DRIVERS

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## logic symbol†



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

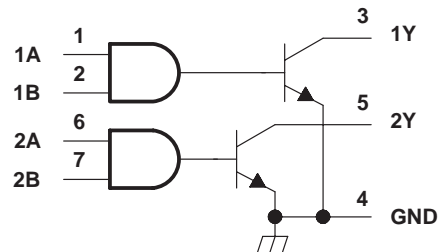
Pin numbers shown are for the D, JG, and P packages.

**FUNCTION TABLE**  
(each driver)

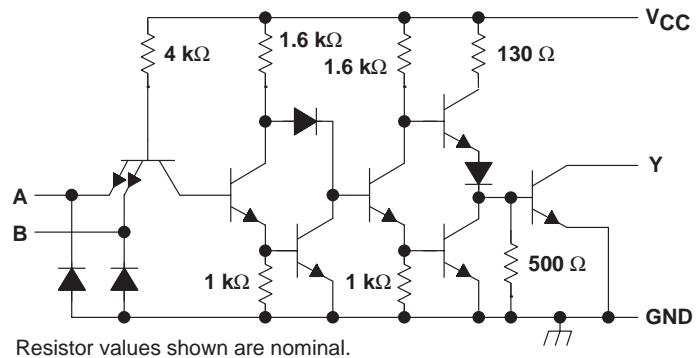
| A | B | Y             |
|---|---|---------------|
| L | L | H (off state) |
| L | H | H (off state) |
| H | L | H (off state) |
| H | H | L (on state)  |

positive logic:  
 $Y = AB$  or  $\overline{A+B}$

## logic diagram (positive logic)



## schematic (each driver)



## electrical characteristics over recommended operating free-air temperature range

| PARAMETER                                    | TEST CONDITIONS‡   | SN55452B |      | SN75452B |      | UNIT          |
|--|--|----------|------|----------|------|---------------|
|  |  | MIN      | TYP§ | MAX      | MIN  |               |
| $V_{IK}$ Input clamp voltage                 | $V_{CC} = \text{MIN}$ , $I_I = -12 \text{ mA}$                             | -1.2     | -1.5 | -1.2     | -1.5 | V             |
| $V_{OL}$ Low-level output voltage            | $V_{CC} = \text{MIN}$ , $V_{IH} = \text{MIN}$ , $I_{OL} = 100 \text{ mA}$  | 0.25     | 0.5  | 0.25     | 0.4  | V             |
|  | $V_{CC} = \text{MIN}$ , $V_{IH} = \text{MIN}$ , $I_{OL} = 300 \text{ mA}$  | 0.5      | 0.8  | 0.5      | 0.7  |               |
| $I_{OH}$ High-level output current           | $V_{CC} = \text{MIN}$ , $V_{IL} = 0.8 \text{ V}$ , $V_{OH} = 30 \text{ V}$ |          |      | 300      | 100  | $\mu\text{A}$ |
| $I_I$ Input current at maximum input voltage | $V_{CC} = \text{MAX}$ , $V_I = 5.5 \text{ V}$                              |          |      | 1        | 1    | mA            |
| $I_{IH}$ High-level input current            | $V_{CC} = \text{MAX}$ , $V_I = 2.4 \text{ V}$                              |          |      | 40       | 40   | $\mu\text{A}$ |
| $I_{IL}$ Low-level input current             | $V_{CC} = \text{MAX}$ , $V_I = 0.4 \text{ V}$                              | -1.1     | -1.6 | -1.1     | -1.6 | mA            |
| $I_{CCH}$ Supply current, outputs high       | $V_{CC} = \text{MAX}$ , $V_I = 0$  | 11       | 14   | 11       | 14   | mA            |
| $I_{CCL}$ Supply current, outputs low        | $V_{CC} = \text{MAX}$ , $V_I = 5 \text{ V}$                                | 56       | 71   | 56       | 71   | mA            |

‡ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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

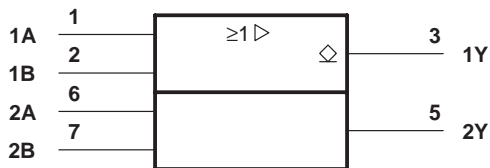
## switching characteristics, $V_{CC} = 5 \text{ V}$ , $T_A = 25^\circ\text{C}$

| PARAMETER  | TEST CONDITIONS   | MIN         | TYP | MAX | UNIT |
|--|---|-------------|-----|-----|------|
| $t_{PLH}$ Propagation delay time, low-to-high-level output | $I_O \approx 200 \text{ mA}$ , $C_L = 15 \text{ pF}$ , $R_L = 50 \Omega$ , See Figure 1 |             | 26  | 35  | ns   |
| $t_{PHL}$ Propagation delay time, high-to-low-level output |   |             | 24  | 35  |      |
| $t_{TLH}$ Transition time, low-to-high-level output        |   |             | 5   | 8   |      |
| $t_{THL}$ Transition time, high-to-low-level output        |   |             | 7   | 12  |      |
| $V_{OH}$ High-level output voltage after switching         | SN55452B  | $V_S - 6.5$ |     |     | mV   |
|  | SN75452B  | $V_S - 6.5$ |     |     |      |

# SN55451B, SN55452B, SN55453B, SN55454B SN75451B, SN75452B, SN75453B, SN75454B DUAL PERIPHERAL DRIVERS

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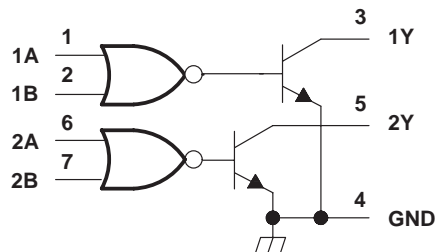
## logic symbol†



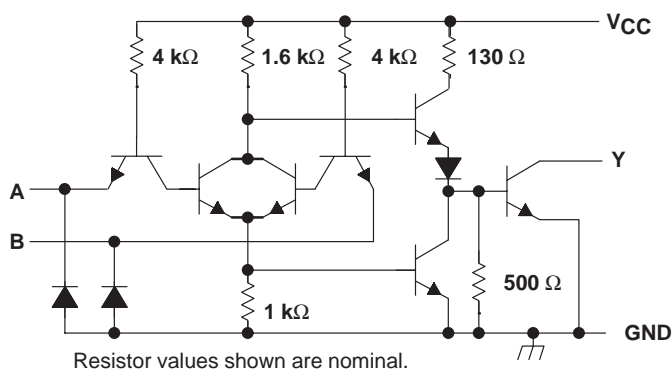
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC publication 617-12.

Pin numbers shown are for the D, JG, and P packages.

## logic diagram (positive logic)



## schematic (each driver)



**FUNCTION TABLE**  
(each driver)

| A | B | Y             |
|---|---|---------------|
| L | L | L (on state)  |
| L | H | H (off state) |
| H | L | H (off state) |
| H | H | H (off state) |

positive logic:  $Y = A+B$  or  $\overline{A} \overline{B}$

## electrical characteristics over recommended operating free-air temperature range

| PARAMETER                                    | TEST CONDITIONS‡   | SN55453B |      | SN75453B |      | UNIT |      |               |
|--|--|----------|------|----------|------|------|------|---------------|
|  |  | MIN      | TYP§ | MAX      | MIN  |      | TYP§ | MAX           |
| $V_{IK}$ Input clamp voltage                 | $V_{CC} = \text{MIN}$ , $I_I = -12 \text{ mA}$                               | -1.2     |      | -1.5     | -1.2 |      | -1.5 | V             |
| $V_{OL}$ Low-level output voltage            | $V_{CC} = \text{MIN}$ , $V_{IL} = 0.8 \text{ V}$ , $I_{OL} = 100 \text{ mA}$ | 0.25     |      | 0.5      | 0.25 |      | 0.4  | V             |
|  | $V_{CC} = \text{MIN}$ , $V_{IL} = 0.8 \text{ V}$ , $I_{OL} = 300 \text{ mA}$ | 0.5      |      | 0.8      | 0.5  |      | 0.7  |               |
| $I_{OH}$ High-level output current           | $V_{CC} = \text{MIN}$ , $V_{IH} = \text{MIN}$ , $V_{OH} = 30 \text{ V}$      |          |      | 300      |      |      | 100  | $\mu\text{A}$ |
| $I_I$ Input current at maximum input voltage | $V_{CC} = \text{MAX}$ , $V_I = 5.5 \text{ V}$                                |          |      | 1        |      |      | 1    | mA            |
| $I_{IH}$ High-level input current            | $V_{CC} = \text{MAX}$ , $V_I = 2.4 \text{ V}$                                |          |      | 40       |      |      | 40   | $\mu\text{A}$ |
| $I_{IL}$ Low-level input current             | $V_{CC} = \text{MAX}$ , $V_I = 0.4 \text{ V}$                                | -1       |      | -1.6     | -1   |      | -1.6 | mA            |
| $I_{CCH}$ Supply current, outputs high       | $V_{CC} = \text{MAX}$ , $V_I = 5 \text{ V}$                                  | 8        |      | 11       | 8    |      | 11   | mA            |
| $I_{CCL}$ Supply current, outputs low        | $V_{CC} = \text{MAX}$ , $V_I = 0$  | 54       |      | 68       | 54   |      | 68   | mA            |

‡ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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

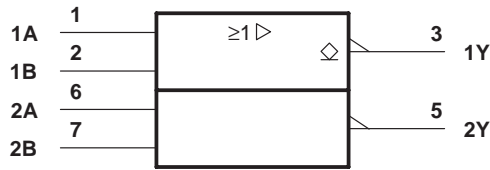
## switching characteristics, $V_{CC} = 5 \text{ V}$ , $T_A = 25^\circ\text{C}$

| PARAMETER  | TEST CONDITIONS   | MIN         | TYP | MAX | UNIT |
|--|---|-------------|-----|-----|------|
| $t_{PLH}$ Propagation delay time, low-to-high-level output | $I_O \approx 200 \text{ mA}$ , $C_L = 15 \text{ pF}$ , $R_L = 50 \Omega$ , See Figure 1 |             | 18  | 25  | ns   |
| $t_{PHL}$ Propagation delay time, high-to-low-level output |   |             | 18  | 25  |      |
| $t_{TLH}$ Transition time, low-to-high-level output        |   |             | 5   | 8   |      |
| $t_{THL}$ Transition time, high-to-low-level output        |   |             | 7   | 12  |      |
| $V_{OH}$ High-level output voltage after switching         | SN55453B  | $V_S - 6.5$ |     |     | mV   |
|  | SN75453B  | $V_S - 6.5$ |     |     |      |

# SN55451B, SN55452B, SN55453B, SN55454B SN75451B, SN75452B, SN75453B, SN75454B DUAL PERIPHERAL DRIVERS

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## logic symbol†



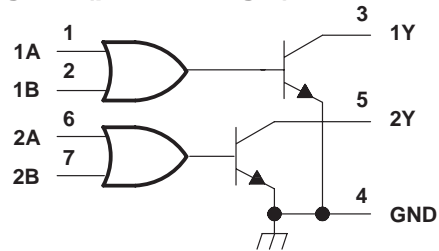
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC publication 617-12. Pin numbers shown are for the D, JG, and P packages.

**FUNCTION TABLE**  
(each driver)

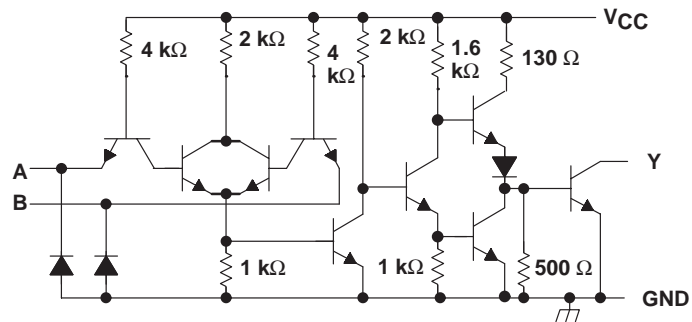
| A | B | Y             |
|---|---|---------------|
| L | L | H (off state) |
| L | H | L (on state)  |
| H | L | L (on state)  |
| H | H | L (on state)  |

positive logic:  
 $Y = A+B$  or  $\overline{AB}$

## logic diagram (positive logic)



## schematic (each driver)



Resistor values shown are nominal.

## electrical characteristics over recommended operating free-air temperature range

| PARAMETER                                    | TEST CONDITIONS‡   | SN55454B |      |     | SN75454B |      |     | UNIT          |
|--|--|----------|------|-----|----------|------|-----|---------------|
|  |  | MIN      | TYP§ | MAX | MIN      | TYP§ | MAX |               |
| $V_{IK}$ Input clamp voltage                 | $V_{CC} = \text{MIN}$ , $I_I = -12 \text{ mA}$                             | -1.2     | -1.5 |     | -1.2     | -1.5 |     | V             |
| $V_{OL}$ Low-level output voltage            | $V_{CC} = \text{MIN}$ , $V_{IH} = \text{MIN}$ , $I_{OL} = 100 \text{ mA}$  | 0.25     | 0.5  |     | 0.25     | 0.4  |     | V             |
|  | $V_{CC} = \text{MIN}$ , $V_{IH} = \text{MIN}$ , $I_{OL} = 300 \text{ mA}$  | 0.5      | 0.8  |     | 0.5      | 0.7  |     |               |
| $I_{OH}$ High-level output current           | $V_{CC} = \text{MIN}$ , $V_{IL} = 0.8 \text{ V}$ , $V_{OH} = 30 \text{ V}$ |          |      | 300 |          |      | 100 | $\mu\text{A}$ |
| $I_I$ Input current at maximum input voltage | $V_{CC} = \text{MAX}$ , $V_I = 5.5 \text{ V}$                              |          |      | 1   |          |      | 1   | mA            |
| $I_{IH}$ High-level input current            | $V_{CC} = \text{MAX}$ , $V_I = 2.4 \text{ V}$                              |          |      | 40  |          |      | 40  | $\mu\text{A}$ |
| $I_{IL}$ Low-level input current             | $V_{CC} = \text{MAX}$ , $V_I = 0.4 \text{ V}$                              | -1       | -1.6 |     | -1       | -1.6 |     | mA            |
| $I_{CCH}$ Supply current, outputs high       | $V_{CC} = \text{MAX}$ , $V_I = 0$  | 13       | 17   |     | 13       | 17   |     | mA            |
| $I_{CCL}$ Supply current, outputs low        | $V_{CC} = \text{MAX}$ , $V_I = 5 \text{ V}$                                | 61       | 79   |     | 61       | 79   |     | mA            |

‡ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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

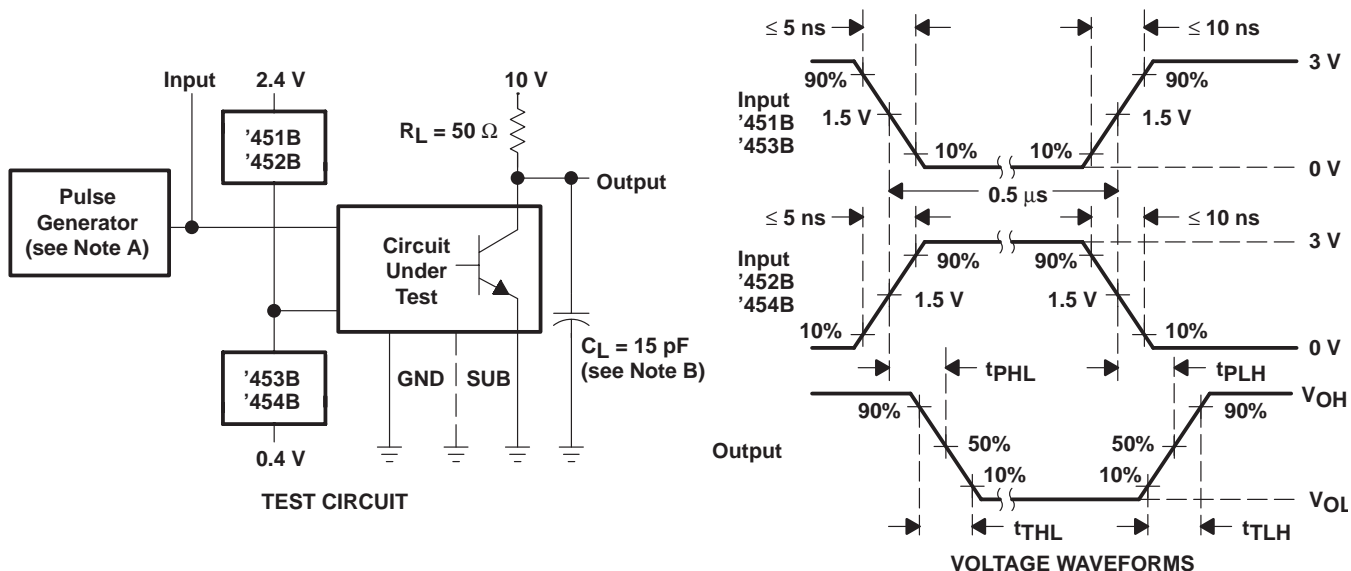
## switching characteristics, $V_{CC} = 5 \text{ V}$ , $T_A = 25^\circ\text{C}$

| PARAMETER  | TEST CONDITIONS   | MIN         | TYP | MAX | UNIT |
|--|---|-------------|-----|-----|------|
| $t_{PLH}$ Propagation delay time, low-to-high-level output | $I_O \approx 200 \text{ mA}$ , $C_L = 15 \text{ pF}$ , $R_L = 50 \Omega$ , See Figure 1 |             | 27  | 35  | ns   |
| $t_{PHL}$ Propagation delay time, high-to-low-level output |   |             | 24  | 35  |      |
| $t_{TLH}$ Transition time, low-to-high-level output        |   |             | 5   | 8   |      |
| $t_{THL}$ Transition time, high-to-low-level output        |   |             | 7   | 12  |      |
| $V_{OH}$ High-level output voltage after switching         | SN55454B  | $V_S - 6.5$ |     |     | mV   |
|  | SN75454B  | $V_S - 6.5$ |     |     |      |

SN55451B, SN55452B, SN55453B, SN55454B  
 SN75451B, SN75452B, SN75453B, SN75454B  
**DUAL PERIPHERAL DRIVERS**

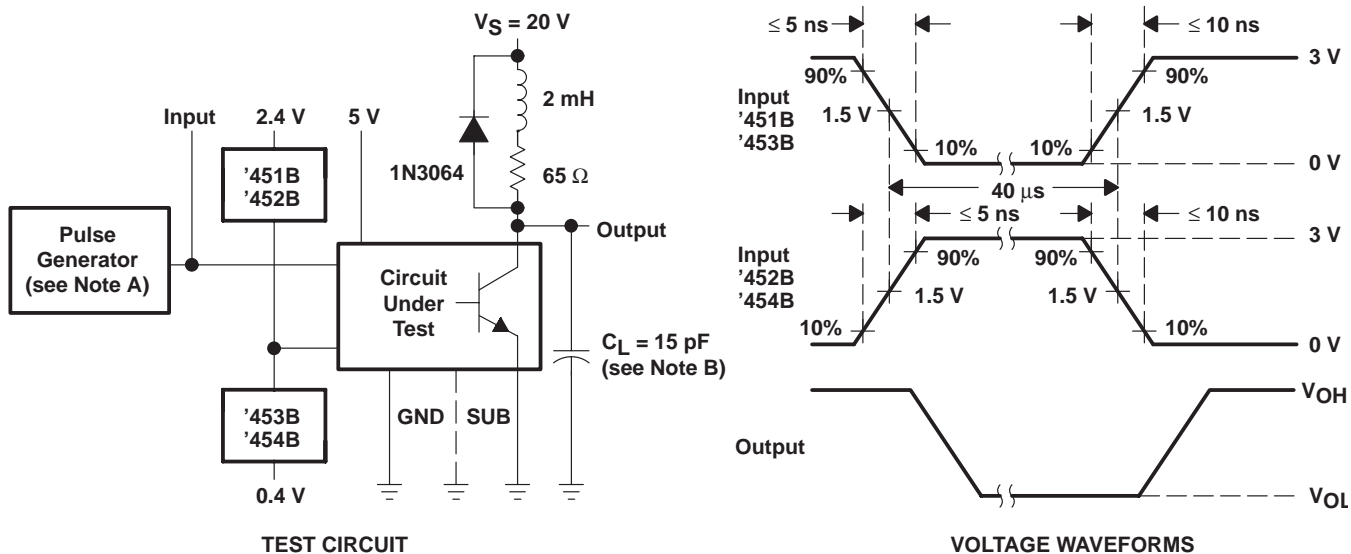
SLRS021B – DECEMBER 1976 – REVISED SEPTEMBER 1999

**PARAMETER MEASUREMENT INFORMATION**



- NOTES: A. The pulse generator has the following characteristics:  $PRR \leq 1 \text{ MHz}$ ,  $Z_O = 50 \Omega$ .  
 B.  $C_L$  includes probe and jig capacitance.

**Figure 1. Test Circuit and Voltage Waveforms, Complete Drivers**



- NOTES: A. The pulse generator has the following characteristics:  $PRR \leq 12.5 \text{ kHz}$ ,  $Z_O = 50 \Omega$ .  
 B.  $C_L$  includes probe and jig capacitance.

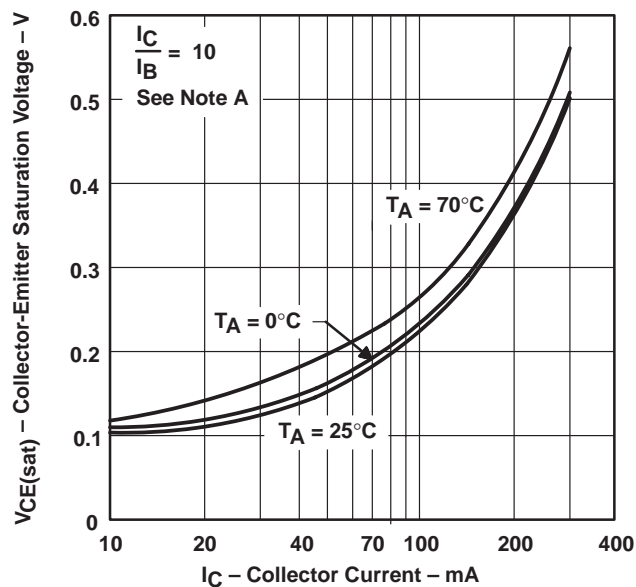
**Figure 2. Test Circuit and Voltage Waveforms for Latch-Up Test of Complete Drivers**

SN55451B, SN55452B, SN55453B, SN55454B  
SN75451B, SN75452B, SN75453B, SN75454B  
DUAL PERIPHERAL DRIVERS

SLRS021B – DECEMBER 1976 – REVISED SEPTEMBER 1999

TYPICAL CHARACTERISTICS

TRANSISTOR  
COLLECTOR-EMITTER SATURATION VOLTAGE  
VS  
COLLECTOR CURRENT



NOTE A: These parameters must be measured using pulse techniques,  
 $t_w = 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

Figure 3



**PACKAGING INFORMATION**

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 5962-9563301Q2A  | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| 5962-9563301QPA  | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| 77049012A        | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| 7704901PA        | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| 77049022A        | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| 7704902PA        | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| JM38510/12902BPA | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| JM38510/12903BPA | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| JM38510/12905BPA | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SN55451BJG       | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SN55452BJG       | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SN55453BJG       | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SN55454BJG       | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SN75451BD        | ACTIVE                | SOIC         | D               | 8    | 75          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75451BDE4      | ACTIVE                | SOIC         | D               | 8    | 75          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75451BDR       | ACTIVE                | SOIC         | D               | 8    | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75451BDRE4     | ACTIVE                | SOIC         | D               | 8    | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75451BP        | ACTIVE                | PDIP         | P               | 8    | 50          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN75451BPE4      | ACTIVE                | PDIP         | P               | 8    | 50          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN75451BPSR      | ACTIVE                | SO           | PS              | 8    | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75451BPSRE4    | ACTIVE                | SO           | PS              | 8    | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75452BD        | ACTIVE                | SOIC         | D               | 8    | 75          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75452BDE4      | ACTIVE                | SOIC         | D               | 8    | 75          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75452BDR       | ACTIVE                | SOIC         | D               | 8    | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75452BDRE4     | ACTIVE                | SOIC         | D               | 8    | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75452BP        | ACTIVE                | PDIP         | P               | 8    | 50          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN75452BPE4      | ACTIVE                | PDIP         | P               | 8    | 50          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN75452BPSR      | ACTIVE                | SO           | PS              | 8    | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75452BPSRE4    | ACTIVE                | SO           | PS              | 8    | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75453BD        | ACTIVE                | SOIC         | D               | 8    | 75          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| SN75453BDE4      | ACTIVE                | SOIC         | D               | 8    | 75          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75453BDR       | ACTIVE                | SOIC         | D               | 8    | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75453BDRE4     | ACTIVE                | SOIC         | D               | 8    | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75453BP        | ACTIVE                | PDIP         | P               | 8    | 50          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN75453BPE4      | ACTIVE                | PDIP         | P               | 8    | 50          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN75453BPSR      | ACTIVE                | SO           | PS              | 8    | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75453BPSRE4    | ACTIVE                | SO           | PS              | 8    | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75454BD        | ACTIVE                | SOIC         | D               | 8    | 75          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75454BDE4      | ACTIVE                | SOIC         | D               | 8    | 75          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75454BDR       | ACTIVE                | SOIC         | D               | 8    | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75454BDRE4     | ACTIVE                | SOIC         | D               | 8    | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75454BP        | ACTIVE                | PDIP         | P               | 8    | 50          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN75454BPE4      | ACTIVE                | PDIP         | P               | 8    | 50          | Pb-Free (RoHS)          | CU NIPDAU        | N / A for Pkg Type           |
| SN75454BPSR      | ACTIVE                | SO           | PS              | 8    | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75454BPSRE4    | ACTIVE                | SO           | PS              | 8    | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SNJ55451BFK      | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| SNJ55451BJG      | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SNJ55452BFK      | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| SNJ55452BJG      | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SNJ55453BFK      | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| SNJ55453BJG      | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |
| SNJ55454BFK      | OBSOLETE              | LCCC         | FK              | 20   |             | TBD                     | POST-PLATE       | N / A for Pkg Type           |
| SNJ55454BJG      | ACTIVE                | CDIP         | JG              | 8    | 1           | TBD                     | A42 SNPB         | N / A for Pkg Type           |

<sup>(1)</sup> 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.

<sup>(2)</sup> 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)

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

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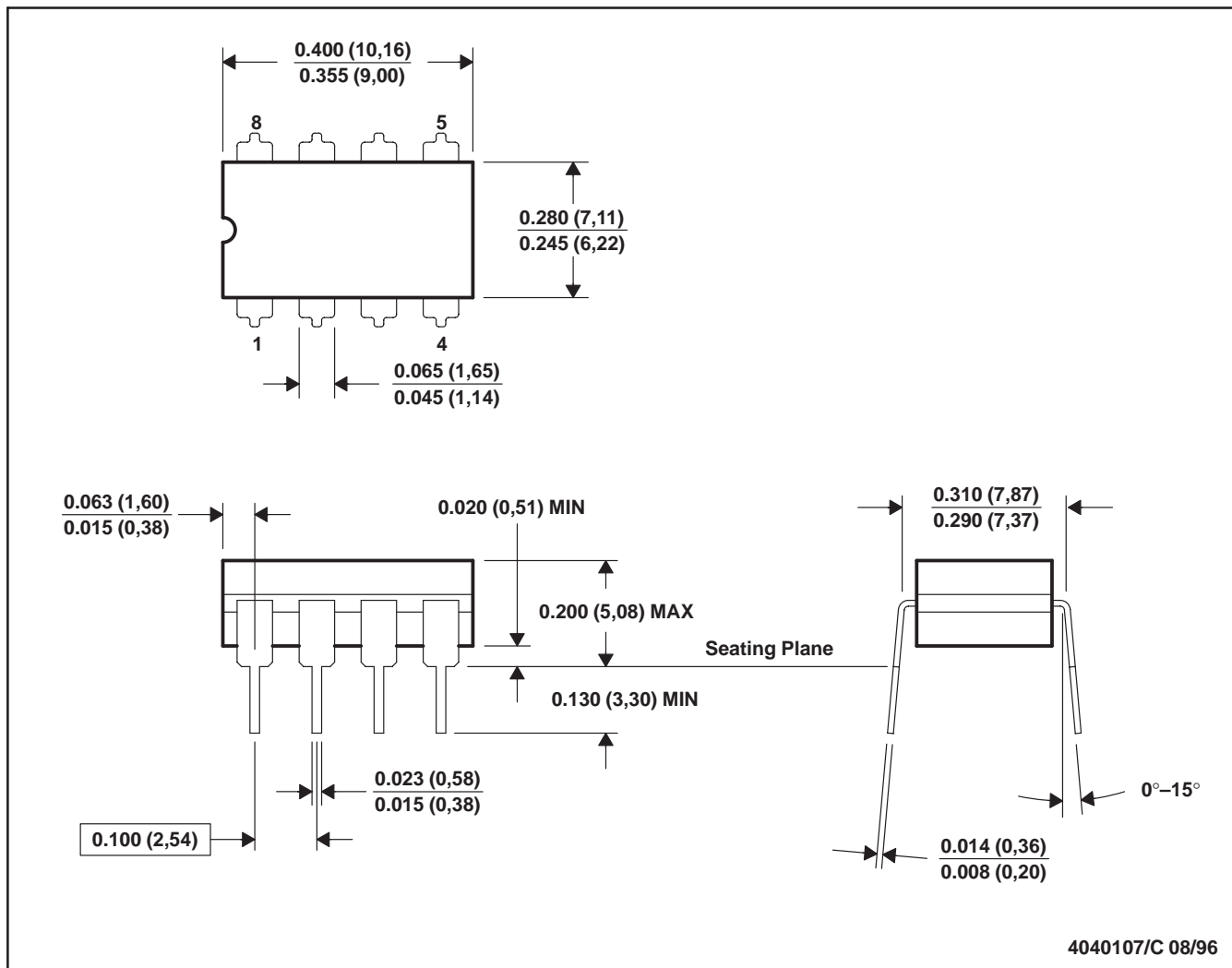
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# MECHANICAL DATA

MCER001A – JANUARY 1995 – REVISED JANUARY 1997

JG (R-GDIP-T8)

CERAMIC DUAL-IN-LINE



- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - This package can be hermetically sealed with a ceramic lid using glass frit.
  - Index point is provided on cap for terminal identification.
  - Falls within MIL STD 1835 GDIP1-T8

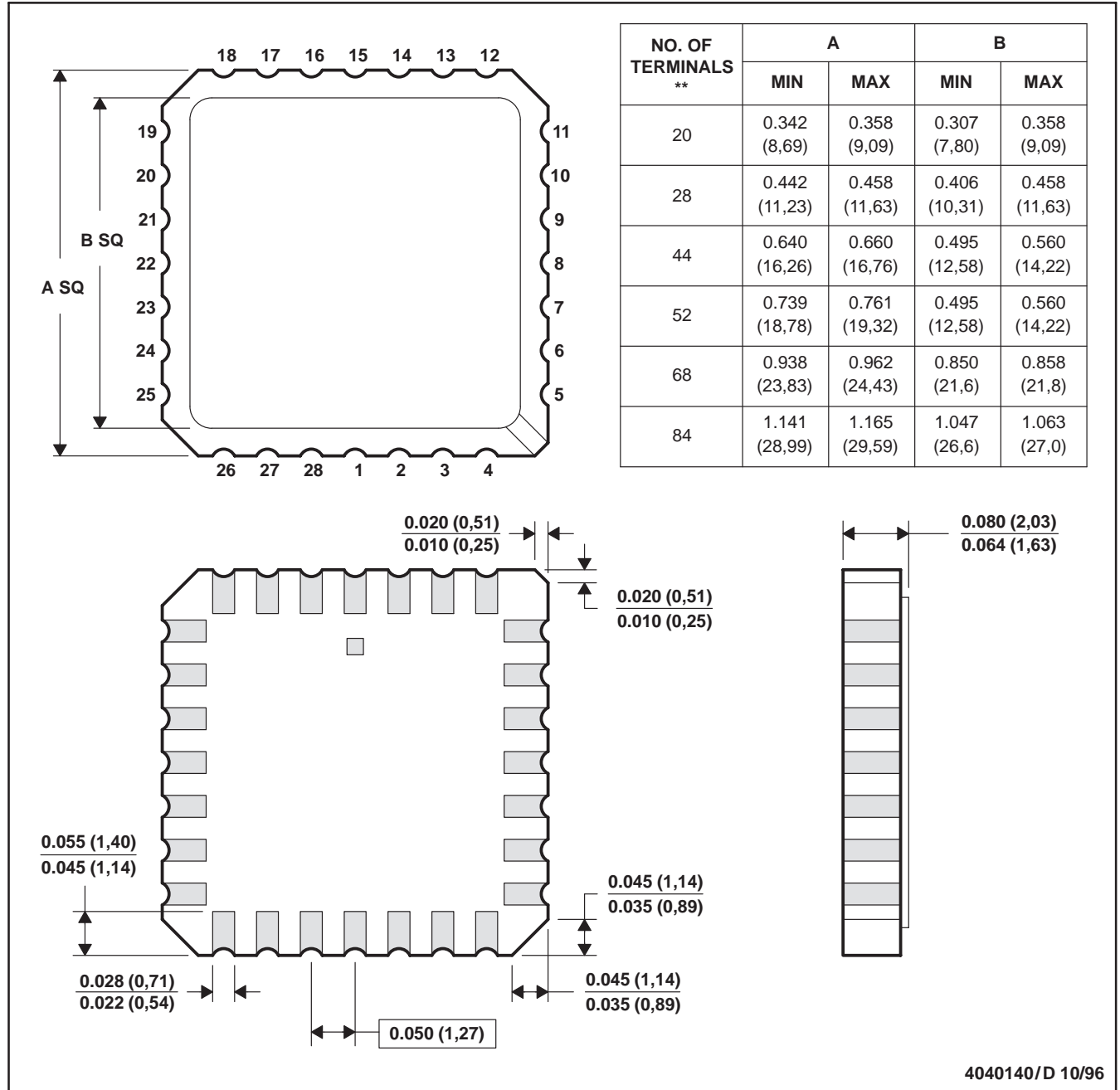
# MECHANICAL DATA

MLCC006B – OCTOBER 1996

## FK (S-CQCC-N\*\*)

## LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



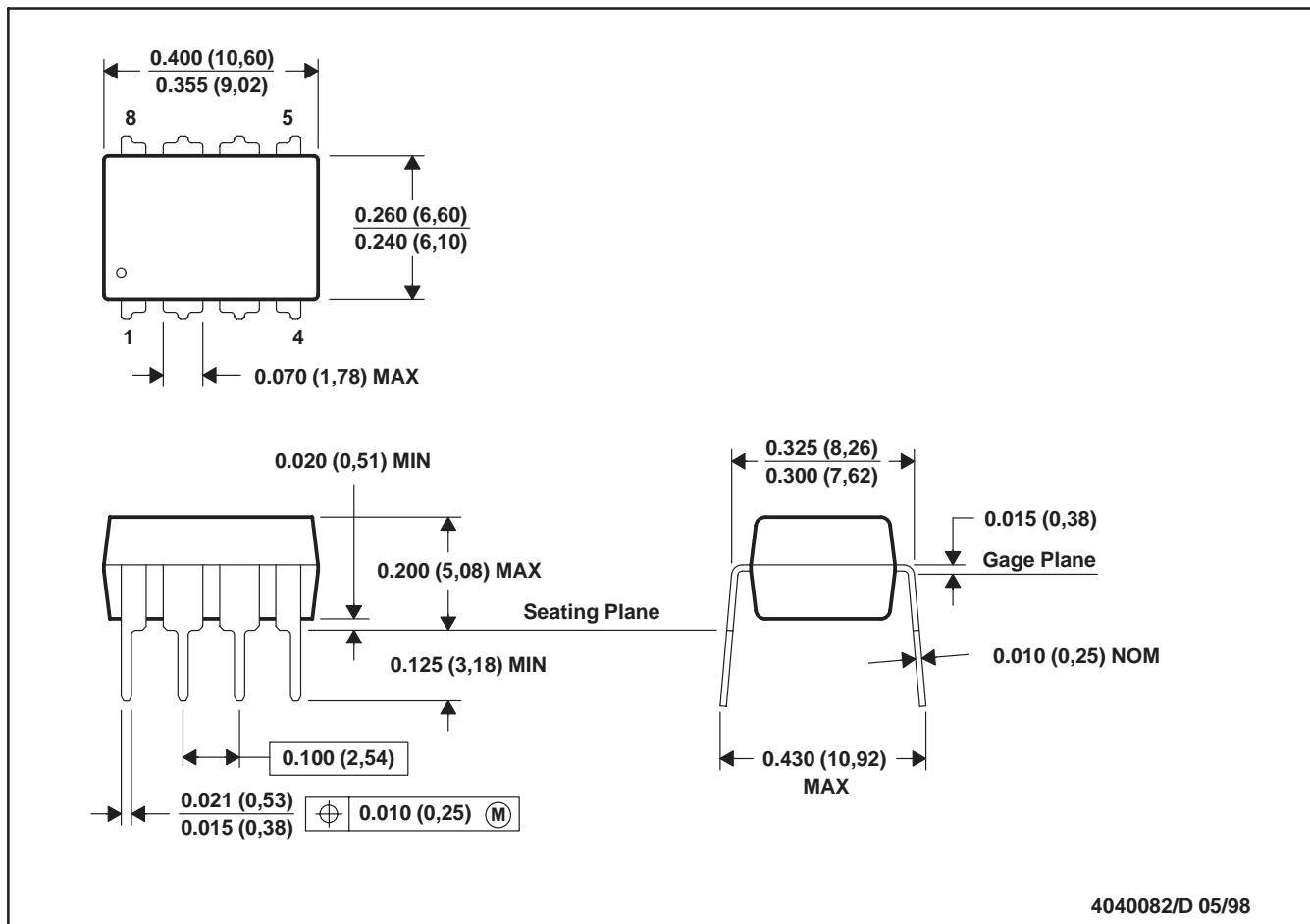
- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - This package can be hermetically sealed with a metal lid.
  - The terminals are gold plated.
  - Falls within JEDEC MS-004

# MECHANICAL DATA

MPDI001A – JANUARY 1995 – REVISED JUNE 1999

## P (R-PDIP-T8)

## PLASTIC DUAL-IN-LINE



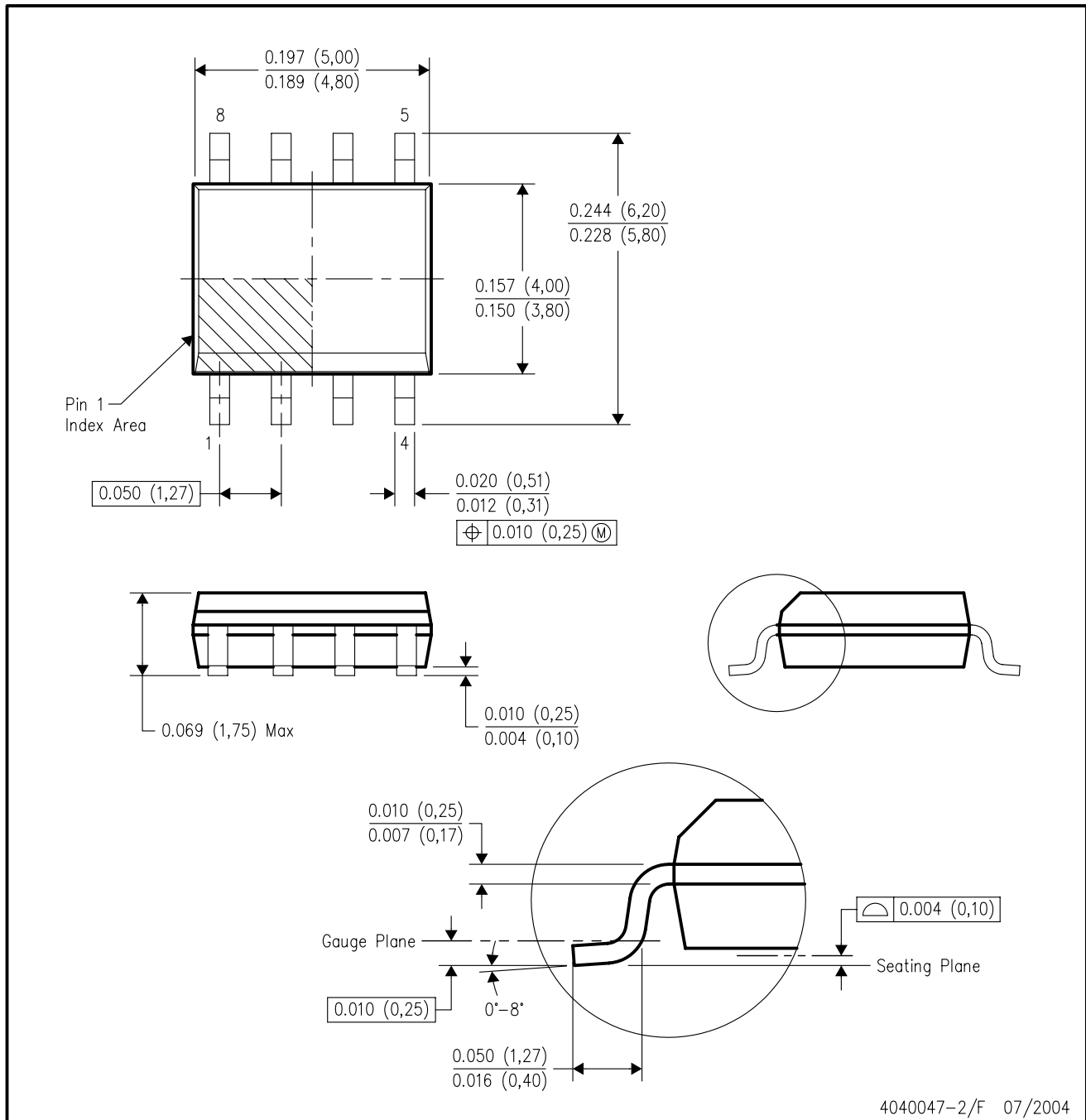
4040082/D 05/98

- NOTES: A. All linear dimensions are in inches (millimeters).  
 B. This drawing is subject to change without notice.  
 C. Falls within JEDEC MS-001

# MECHANICAL DATA

D (R-PDSO-G8)

PLASTIC SMALL-OUTLINE PACKAGE

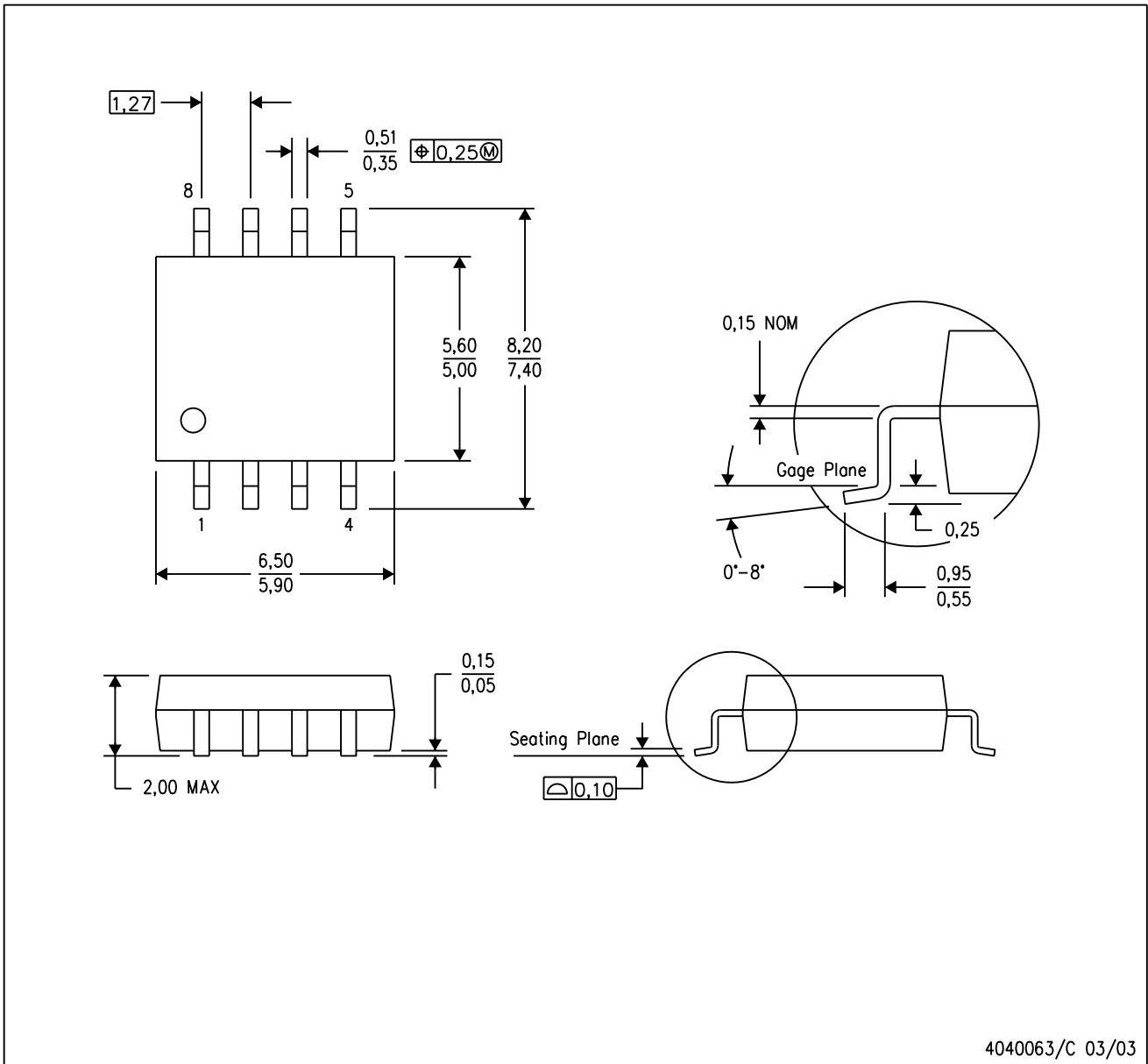


- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
  - Falls within JEDEC MS-012 variation AA.

MECHANICAL DATA

PS (R-PDSO-G8)

PLASTIC SMALL-OUTLINE PACKAGE



- 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.



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| DSP              | <a href="http://dsp.ti.com">dsp.ti.com</a>                         | Broadband           | <a href="http://www.ti.com/broadband">www.ti.com/broadband</a>           |
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