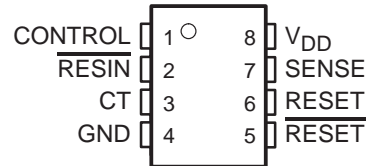


TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

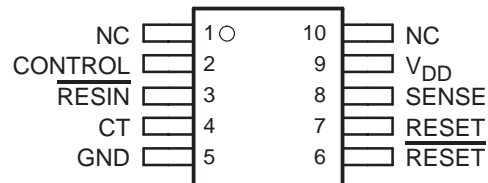
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- Power-On Reset Generator
- Automatic Reset Generation After Voltage Drop
- Precision Voltage Sensor
- Temperature-Compensated Voltage Reference
- Programmable Delay Time by External Capacitor
- Supply Voltage Range . . . 2 V to 6 V
- Defined $\overline{\text{RESET}}$ Output from $V_{DD} \geq 1$ V
- Power-Down Control Support for Static RAM With Battery Backup
- Maximum Supply Current of 16 μA
- Power Saving Totem-Pole Outputs
- Temperature Range . . . Up to -55°C to 125°C

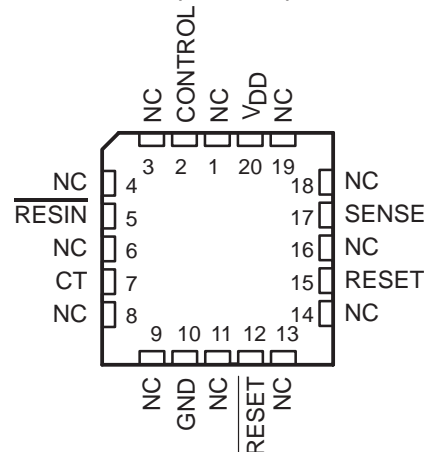
D, JG, P OR PW PACKAGE
(TOP VIEW)



U PACKAGE
(TOP VIEW)



FK PACKAGE
(TOP VIEW)



description

The TLC77xx family of micropower supply voltage supervisors provide reset control, primarily in microcomputer and microprocessor systems.

During power-on, $\overline{\text{RESET}}$ is asserted when V_{DD} reaches 1 V. After minimum V_{DD} (≥ 2 V) is established, the circuit monitors SENSE voltage and keeps the reset outputs active as long as SENSE voltage ($V_{I(\text{SENSE})}$) remains below the threshold voltage. An internal timer delays return of the output to the inactive state to ensure proper system reset. The delay time, t_d , is determined by an external capacitor:

$$t_d = 2.1 \times 10^4 \times C_T$$

Where

C_T is in farads

t_d is in seconds

Except for the TLC7701, which can be customized with two external resistors, each supervisor has a fixed SENSE threshold voltage set by an internal voltage divider. When SENSE voltage drops below the threshold voltage, the outputs become active and stay in that state until SENSE voltage returns above threshold voltage and the delay time, t_d , has expired.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS
INSTRUMENTS**

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TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

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description (continued)

In addition to the power-on-reset and undervoltage-supervisor function, the TLC77xx adds power-down control support for static RAM. When CONTROL is tied to GND, RESET will act as active high. The voltage monitor contains additional logic intended for control of static memories with battery backup during power failure. By driving the chip select (\overline{CS}) of the memory circuit with the RESET output of the TLC77xx and with the CONTROL driven by the memory bank select signal ($\overline{CSH1}$) of the microprocessor (see Figure 10), the memory circuit is automatically disabled during a power loss. (In this application the TLC77xx power has to be supplied by the battery.)

The TLC77xxI is characterized for operation over a temperature range of -40°C to 85°C ; the TLC77xxQ is characterized for operation over a temperature range of -40°C to 125°C ; and the TLC77xxM is characterized for operation over the full Military temperature range of -55°C to 125°C .

AVAILABLE OPTIONS

| T _A | THRESHOLD VOLTAGE (V) | PACKAGED DEVICES | | | | | |
|--|-----------------------|--------------------------------|-------------------|------------------|---------------------------|-----------------|---|
| | | SMALL OUTLINE (D) [†] | CHIP CARRIER (FK) | CERAMIC DIP (JG) | CERAMIC DUAL FLATPACK (U) | PLASTIC DIP (P) | THIN SHRINK SMALL OUTLINE (PW) [‡] |
| -40°C to 85°C | 1.1 | TLC7701ID | — | — | — | TLC7701IP | TLC7701IPWR |
| | 2.25 | TLC7725ID | — | — | — | TLC7725IP | TLC7725IPWR |
| | 2.63 | TLC7703ID | — | — | — | TLC7703IP | TLC7703IPWR |
| | 2.93 | TLC7733ID | — | — | — | TLC7733IP | TLC7733IPWR |
| | 4.55 | TLC7705ID | — | — | — | TLC7705IP | TLC7705IPWR |
| -40°C to 125°C | 1.1 | TLC7701QD | — | — | — | TLC7701QP | TLC7701QPWR |
| | 2.25 | TLC7725QD | — | — | — | TLC7725QP | TLC7725QPWR |
| | 2.63 | TLC7703QD | — | — | — | TLC7703QP | TLC7703QPWR |
| | 2.93 | TLC7733QD | — | — | — | TLC7733QP | TLC7733QPWR |
| | 4.55 | TLC7705QD | — | — | — | TLC7705QP | TLC7705QPWR |
| -55°C to 125°C | 2.93 | — | TLC7733MFK | TLC7733MJG | — | — | — |
| | 4.55 | — | TLC7705MFK | TLC7705MJG | TLC7705MU | — | — |

[†] The D package is available taped and reeled. Add the suffix R to the device type when ordering (e.g., TLC7705QDR).

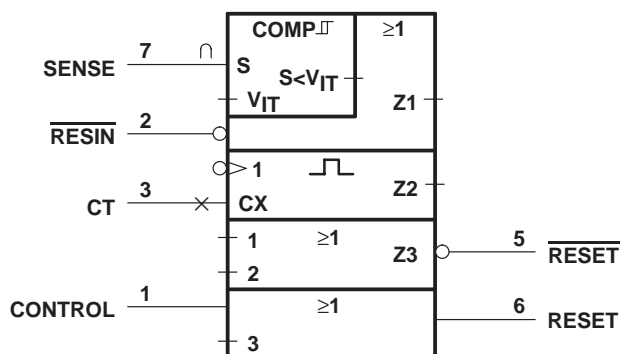
[‡] The PW package is only available left-end taped and reeled (indicated by the R suffix on the device type; e.g., TLC7705QPWR).

FUNCTION TABLE

| CONTROL | \overline{RESIN} | $V_I(\text{SENSE}) > V_{IT+}$ | RESET | \overline{RESET} |
|---------|--------------------|-------------------------------|--------|--------------------|
| L | L | False | H | L |
| L | L | True | H | L |
| L | H | False | H | L |
| L | H | True | L \S | H \S |
| H | L | False | H | L |
| H | L | True | H | L |
| H | H | False | H | L |
| H | H | True | H | H \S |

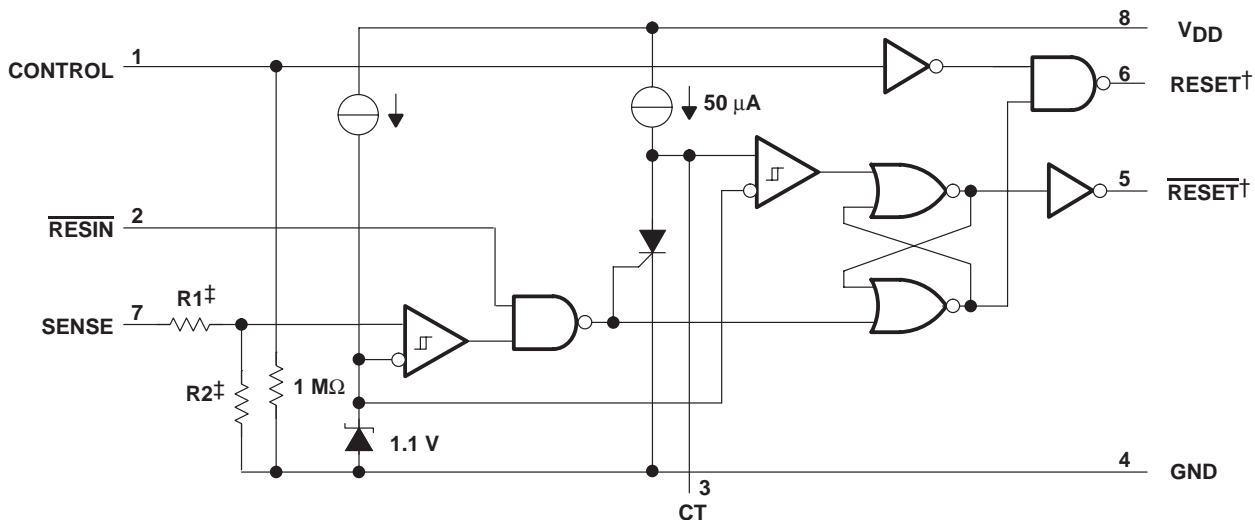
\S RESET and \overline{RESET} states shown are valid for $t > t_d$.

logic symbol[¶]



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

functional block diagram

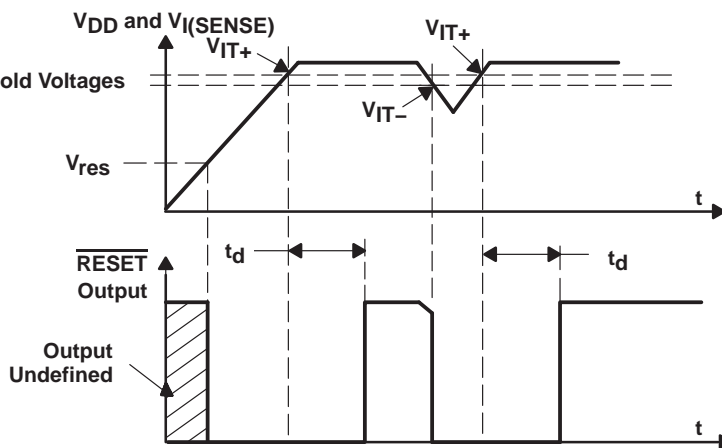


† Outputs are totem-pole configuration. External pullup or pulldown resistors are not required.

‡ Nominal values:

| | R1 (Typ) | R2 (Typ) |
|---------|----------------|----------------|
| TLC7701 | 0 | ∞ |
| TLC7725 | 600 k Ω | 600 k Ω |
| TLC7703 | 698 k Ω | 502 k Ω |
| TLC7733 | 750 k Ω | 450 k Ω |
| TLC7705 | 910 k Ω | 290 k Ω |

timing diagram



TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

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

| | |
|--|------------------------------|
| Supply voltage, V_{DD} (see Note 1) | 7 V |
| Input voltage range, CONTROL, $\overline{\text{RESIN}}$, SENSE (see Note 1) | -0.3 V to 7 V |
| Maximum low output current, I_{OL} | 10 mA |
| Maximum high output current, I_{OH} | -10 mA |
| Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{DD}$) | ± 10 mA |
| Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{DD}$) | ± 10 mA |
| Continuous total power dissipation | See Dissipation Rating Table |
| Operating free-air temperature range, T_A : TLC77xxI | -40°C to 85°C |
| TL77xxQ | -40°C to 125°C |
| TL77xxM | -55°C to 125°C |
| Storage temperature range, T_{stg} | -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.

NOTE 1: All voltage values are with respect to GND.

DISSIPATION RATING TABLE

| PACKAGE | $T_A \leq 25^\circ\text{C}$ POWER RATING | DERATING FACTOR ABOVE $T_A = 25^\circ\text{C}$ | $T_A = 85^\circ\text{C}$ POWER RATING | $T_A = 125^\circ\text{C}$ POWER RATING |
|---------|---|---|--|---|
| D | 725 mW | 5.8 mW/°C | 377 mW | 145 mW |
| FK | 1375 mW | 11.0 mW/°C | 715 mW | 275 mW |
| JG | 1050 mW | 8.4 mW/°C | 546 mW | 210 mW |
| P | 1000 mW | 8.0 mW/°C | 520 mW | 200 mW |
| PW | 525 mW | 4.2 mW/°C | 273 mW | 105 mW |
| U | 700 mW | 5.5 mW/°C | 370 mW | 150 mW |

recommended operating conditions at specified temperature range

| | MIN | MAX | UNIT | |
|---|---------------------|---------------------|------|----|
| Supply voltage, V_{DD} | 2 | 6 | V | |
| Input voltage, V_I | 0 | V_{DD} | V | |
| High-level input voltage at $\overline{\text{RESIN}}$ and CONTROL‡, V_{IH} | $0.7 \times V_{DD}$ | | V | |
| Low-level input voltage at $\overline{\text{RESIN}}$ and CONTROL‡, V_{IL} | | $0.2 \times V_{DD}$ | V | |
| High-level output current, I_{OH} | | -2 | mA | |
| Low-level output current, I_{OL} | $V_{DD} \geq 2.7$ V | 2 | mA | |
| Input transition rise and fall rate at $\overline{\text{RESIN}}$ and CONTROL, $\Delta t/\Delta V$ | | 100 | ns/V | |
| Operating free-air temperature range, T_A | TLC77xxI | -40 | 85 | °C |
| | TLC77xxQ | -40 | 125 | |
| Operating free-air temperature range, T_A | TLC77xxM | -55 | 125 | °C |

‡ To ensure a low supply current, V_{IL} should be kept < 0.3 V and $V_{IH} > V_{DD} - 0.3$ V.



TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

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electrical characteristics over recommended operating conditions (see Note 2) (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | TLC77xx | | | UNIT | |
|--------------------|--|---|---|------|------|------|---|
| | | | MIN | TYP† | MAX | | |
| V _{OH} | High-level output voltage | I _{OH} = -20 μA | V _{DD} = 2 V | 1.8 | | V | |
| | | | V _{DD} = 2.7 V | 2.5 | | | |
| | | | V _{DD} = 4.5 V | 4.3 | | | |
| | | I _{OH} = -2 mA | V _{DD} = 4.5 V | 3.7 | | | |
| V _{OL} | Low-level output voltage | I _{OL} = 20 μA | V _{DD} = 2 V | 0.2 | | V | |
| | | | V _{DD} = 2.7 V | 0.2 | | | |
| | | | V _{DD} = 4.5 V | 0.2 | | | |
| | | I _{OL} = 2 mA | V _{DD} = 4.5 V | 0.5 | | | |
| V _{IT-} | Negative-going input threshold voltage, SENSE (see Note 3) | TLC7701 | V _{DD} = 2 V to 6 V | 1.04 | 1.1 | 1.16 | V |
| | | TLC7725 | | 2.18 | 2.25 | 2.32 | |
| | | TLC7703 | | 2.56 | 2.63 | 2.70 | |
| | | TLC7733 | | 2.86 | 2.93 | 3 | |
| | | TLC7705 | | 4.47 | 4.55 | 4.63 | |
| V _{hys} | Hysteresis voltage, SENSE | TLC7701 | V _{DD} = 2 V to 6 V | 30 | | mV | |
| | | TLC7725 | V _{DD} = 2 V to 6 V | 70 | | mV | |
| | | TLC7703, | | | | | |
| | | TLC7733, | | | | | |
| | | TLC7705 | | | | | |
| V _{res} | Power-up reset voltage‡ | I _{OL} = 20 μA | 1 | | V | | |
| I _I | Input current | RESIN | V _I = 0 V to V _{DD} | 2 | | μA | |
| | | CONTROL | V _I = V _{DD} | 7 | 15 | | |
| | | SENSE | V _I = 5 V | 5 | 10 | | |
| | | SENSE, TLC7701 only | V _I = 5 V | 2 | | | |
| I _{DD} | Supply current | RESIN = V _{DD} , SENSE = V _{DD} ≥ V _{ITmax} + 0.2 V CONTROL = 0 V, Outputs open | 9 | 16 | μA | | |
| I _{DD(d)} | Supply current during t _d | V _{DD} = 5 V, V _{CT} = 0, RESIN = V _{DD} , SENSE = V _{DD} , CONTROL = 0 V, Outputs open | 120 | 150 | μA | | |
| C _I | Input capacitance, SENSE | V _I = 0 V to V _{DD} | 50 | | pF | | |

† Typical values apply at T_A = 25°C.

‡ The lowest supply voltage at which RESET becomes active. The symbol V_{RES} is not currently listed within EIA or JEDEC standards for semiconductor symbology. Rise time of V_{DD} ≥ 15 μs/V.

NOTES: 2. All characteristics are measured with C_T = 0.1 μF.

3. To ensure best stability of the threshold voltage, a bypass capacitor (ceramic, 0.1 μF) should be connected near the supply terminals.

TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

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electrical characteristics over recommended operating conditions (see Note 2) (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | | TLC77xxM | | | UNIT | |
|-------------------------|--|--|---|---------------------------------|---------------------------------|-----|------|--|
| | | | | MIN | TYP† | MAX | | |
| V _{OH} | High-level output voltage | I _{OH} = -20 μA | V _{DD} = 2 V, | T _A = 25°C | 1.8 | | V | |
| | | | | T _A = -55°C to 125°C | 1.7 | | | |
| | | | V _{DD} = 2.7 V | T _A = 25°C | 2.5 | | | |
| | | | | T _A = -55°C to 125°C | 2.3 | | | |
| | | | V _{DD} = 4.5 V | T _A = 25°C | 4.3 | | | |
| | | | | T _A = -55°C to 125°C | 4.2 | | | |
| I _{OH} = -2 mA | V _{DD} = 4.5 V | T _A = 25°C | 3.7 | | | | | |
| | | T _A = -55°C to 125°C | 3.6 | | | | | |
| V _{OL} | Low-level output voltage | I _{OL} = 20 μA | V _{DD} = 2 V | T _A = 25°C | 0.2 | | V | |
| | | | | T _A = -55°C to 125°C | 0.2 | | | |
| | | | V _{DD} = 2.7 V | T _A = 25°C | 0.2 | | | |
| | | | | T _A = -55°C to 125°C | 0.2 | | | |
| | | | V _{DD} = 4.5 V | T _A = 25°C | 0.2 | | | |
| | | | | T _A = -55°C to 125°C | 0.2 | | | |
| | | | I _{OL} = 2 mA | V _{DD} = 4.5 V | T _A = 25°C | 0.5 | | |
| | | | | | T _A = -55°C to 125°C | 0.5 | | |
| V _{IT-} | Negative-going input threshold voltage, SENSE (see Note 3) | TLC7733 | V _{DD} = 2 V to 6 V | 2.86 | 2.93 | 3.1 | V | |
| | | TLC7705 | | 4.3 | 4.5 | 4.8 | | |
| V _{hys} | Hysteresis voltage, SENSE | V _{DD} = 2 V to 6 V | V _{DD} = 2 V to 6 V | 70 | | mV | | |
| V _{res} | Power-up reset voltage‡ | I _{OL} = 20 μA | | 1 | | V | | |
| I _I | Input current | RESIN | V _I = 0 V to V _{DD} | 2 | | μA | | |
| | | CONTROL | V _I = V _{DD} | 7 | 15 | | | |
| | | SENSE | V _I = 5 V | 5 | 10 | | | |
| | | SENSE, TLC7701 only | V _I = 5 V | 2 | | | | |
| I _{DD} | Supply current | RESIN = V _{DD} , SENSE = V _{DD} ≥ V _{ITmax} + 0.2 V CONTROL = 0 V, Outputs open | | 9 | 16 | μA | | |
| I _{DD(d)} | Supply current during t _d | TLC7733 | V _{CT} = 0, RESIN = V _{DD} , CONTROL = 0 V, | V _{DD} = 3.3 V | 250 | | μA | |
| | | TLC7705 | SENSE = V _{DD} , Outputs open | V _{DD} = 5 V | 120 | 150 | | |
| C _I | Input capacitance, SENSE | V _I = 0 V to V _{DD} | | 50 | | pF | | |

† Typical values apply at T_A = 25°C.

‡ The lowest supply voltage at which RESIN becomes active. The symbol V_{res} is not currently listed within EIA or JEDEC standards for semiconductor symbology. Rise time of V_{DD} ≥ 15 μs/V.

NOTES: 2. All characteristics are measured with C_T = 0.1 μF.

3. To ensure best stability of the threshold voltage, a bypass capacitor (ceramic, 0.1 μF) should be placed near the supply terminals.



TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

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switching characteristics at $V_{DD} = 5\text{ V}$, $R_L = 2\text{ k}\Omega$, $C_L = 50\text{ pF}$, $T_A = 25^\circ\text{C}$ (unless otherwise noted)

| PARAMETER | MEASURED | | TEST CONDITIONS | TLC77xx | | | UNIT |
|--|------------------------------------|---------------------------|---|---------|-----|-----|---------------|
| | FROM (INPUT) | TO (OUTPUT) | | MIN | TYP | MAX | |
| t_d Delay time | $V_{I(\text{SENSE})} \geq V_{IT+}$ | RESET and RESET | $\overline{\text{RESIN}} = 0.7 \times V_{DD}$, CONTROL = $0.2 \times V_{DD}$, $C_T = 100\text{ nF}$, $T_A = \text{Full range}$, See timing diagram | 1.1 | 2.1 | 4.2 | ms |
| t_{PLH} Propagation delay time, low-to-high-level output | SENSE | $\overline{\text{RESET}}$ | $V_{IH} = V_{IT+\text{max}} + 0.2\text{ V}$, $V_{IL} = V_{IT-\text{min}} - 0.2\text{ V}$, $\overline{\text{RESIN}} = 0.7 \times V_{DD}$, CONTROL = $0.2 \times V_{DD}$, $C_T = \text{NC}^\dagger$ | | | 20 | μs |
| t_{PHL} Propagation delay time, high-to-low-level output | | $\overline{\text{RESET}}$ | | | | 5 | |
| t_{PLH} Propagation delay time, low-to-high-level output | | RESET | | | | 5 | |
| t_{PHL} Propagation delay time, high-to-low-level output | | RESET | | | | 20 | |
| t_{PLH} Propagation delay time, low-to-high-level output | $\overline{\text{RESIN}}$ | $\overline{\text{RESET}}$ | $V_{IH} = 0.7 \times V_{DD}$, $V_{IL} = 0.2 \times V_{DD}$, SENSE = $V_{IT+\text{max}} + 0.2\text{ V}$, CONTROL = $0.2 \times V_{DD}$, $C_T = \text{NC}^\dagger$ | | | 20 | μs |
| t_{PHL} Propagation delay time, high-to-low-level output | | $\overline{\text{RESET}}$ | | | | 40 | ns |
| t_{PLH} Propagation delay time, low-to-high-level output | | RESET | | | | 45 | |
| t_{PHL} Propagation delay time, high-to-low-level output | | RESET | | | | 20 | μs |
| t_{PLH} Propagation delay time, low-to-high-level output | CONTROL | RESET | $V_{IH} = 0.7 \times V_{DD}$, $V_{IL} = 0.2 \times V_{DD}$, SENSE = $V_{IT+\text{max}} + 0.2\text{ V}$, $\overline{\text{RESIN}} = 0.7 \times V_{DD}$, $C_T = \text{NC}^\dagger$ | | | 38 | ns |
| t_{PHL} Propagation delay time, high-to-low-level output | | | | | | | 38 |
| Low-level minimum pulse duration to switch RESET and RESET | SENSE | | $V_{IH} = V_{IT+\text{max}} + 0.2\text{ V}$, $V_{IL} = V_{IT-\text{min}} - 0.2\text{ V}$, | 3 | | | μs |
| | $\overline{\text{RESIN}}$ | | $V_{IL} = 0.2 \times V_{DD}$, $V_{IH} = 0.7 \times V_{DD}$ | 1 | | | |
| t_r Rise time | | RESET and RESET | 10% to 90% | | 8 | | ns/V |
| t_f Fall time | | RESET and RESET | 90% to 10% | | 4 | | |

† NC = No capacitor, and includes up to 100-pF probe and jig capacitance.

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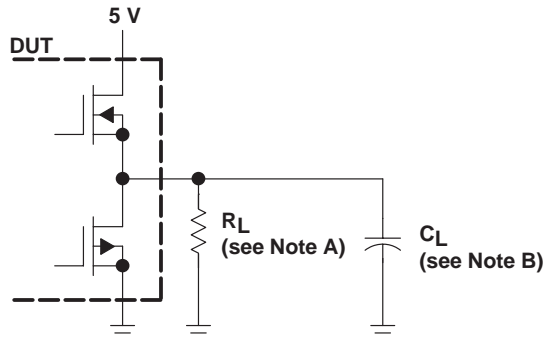
switching characteristics at $V_{DD} = 5\text{ V}$, $R_L = 2\text{ k}\Omega$, $C_L = 50\text{ pF}$

| PARAMETER | MEASURED | | TEST CONDITIONS | T_A | TLC77xxM | | | UNIT | | | |
|--|----------------------------------|-----------------|---|------------|----------|--|------------|---------------|--|----|---------------|
| | FROM (INPUT) | TO (OUTPUT) | | | MIN | TYP | MAX | | | | |
| t_d Delay time | $V_I(\text{SENSE}) \geq V_{IT+}$ | RESET and RESET | RESIN = 2.7 V, CONTROL = 0.4 V, $C_T = 100\text{ nF}$, See timing diagram | Full range | 1.1 | 2.1 | 4.2 | ms | | | |
| t_{PLH} Propagation delay time, low-to-high-level output | SENSE | RESET | $V_{IH} = V_{IT+max} + 0.2\text{ V}$, $V_{IL} = V_{IT-min} - 0.2\text{ V}$, RESIN = 2.7 V, CONTROL = 0.4 V, $C_T = \text{NC}^\dagger$ | 25°C | | | 20 | μs | | | |
| | | Full range | | | | 24 | | | | | |
| | | RESET | | 25°C | | | 5 | μs | | | |
| | | Full range | | | | 7 | | | | | |
| t_{PHL} Propagation delay time, high-to-low-level output | SENSE | RESET | $V_{IH} = V_{IT+max} + 0.2\text{ V}$, $V_{IL} = V_{IT-min} - 0.2\text{ V}$, RESIN = 2.7 V, CONTROL = 0.4 V, $C_T = \text{NC}^\dagger$ | 25°C | | | 5 | μs | | | |
| | | Full range | | | | 7 | | | | | |
| | | RESET | | 25°C | | | 20 | μs | | | |
| | | Full range | | | | 24 | | | | | |
| t_{PLH} Propagation delay time, low-to-high-level output | RESIN | RESET | $V_{IH} = 2.7\text{ V}$, $V_{IL} = 0.4\text{ V}$, SENSE = $V_{IT+max} + 0.2\text{ V}$, CONTROL = 0.4 V, $C_T = \text{NC}^\dagger$ | 25°C | | | 20 | μs | | | |
| | | Full range | | | | 24 | | | | | |
| | | RESET | | 25°C | | | 45 | ns | | | |
| | | Full range | | | | 65 | | | | | |
| t_{PHL} Propagation delay time, high-to-low-level output | RESIN | RESET | $V_{IH} = 2.7\text{ V}$, $V_{IL} = 0.4\text{ V}$, SENSE = $V_{IT+max} + 0.2\text{ V}$, CONTROL = 0.4 V, $C_T = \text{NC}^\dagger$ | 25°C | | | 40 | ns | | | |
| | | Full range | | | | 60 | | | | | |
| | | RESET | | 25°C | | | 20 | μs | | | |
| | | Full range | | | | 24 | | | | | |
| t_{PLH} Propagation delay time, low-to-high-level output | CONTROL | RESET | $V_{IH} = 2.7\text{ V}$, $V_{IL} = 0.4\text{ V}$, SENSE = $V_{IT+max} + 0.2\text{ V}$, RESIN = 2.7 V, $C_T = \text{NC}^\dagger$ | 25°C | | | 38 | ns | | | |
| | | | | Full range | | | 58 | | | | |
| t_{PHL} Propagation delay time, high-to-low-level output | | | | CONTROL | RESET | $V_{IH} = 2.7\text{ V}$, $V_{IL} = 0.4\text{ V}$, SENSE = $V_{IT+max} + 0.2\text{ V}$, RESIN = 2.7 V, $C_T = \text{NC}^\dagger$ | 25°C | | | 38 | ns |
| | | | | | | | Full range | | | 58 | |
| Low-level minimum pulse duration | SENSE | | $V_{IH} = V_{IT+max} + 0.2\text{ V}$, $V_{IL} = V_{IT-min} - 0.2\text{ V}$, $V_{IL} = 0.4\text{ V}$, $V_{IH} = 2.7\text{ V}$ | | | | Full range | 3 | | | μs |
| | RESIN | | | | | | | 1 | | | |
| t_r Rise time | | RESET and RESET | 10% to 90% | Full range | 8 | | | ns/V | | | |
| t_f Fall time | | | 90% to 10% | | 4 | | | | | | |

† NC = No capacitor, and includes up to 100-pF probe and jig capacitance.



PARAMETER MEASUREMENT INFORMATION



NOTES: A. For switching characteristics, $R_L = 2\text{ k}\Omega$.
B. $C_L = 50\text{ pF}$ includes jig and probe capacitance.

Figure 1. RESET AND $\overline{\text{RESET}}$ Output Configurations

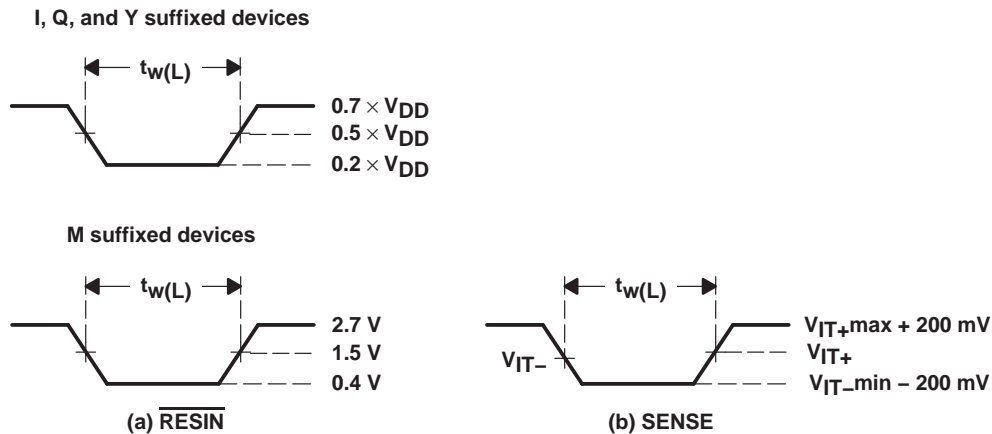


Figure 2. Input Pulse Definition Waveforms

TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

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TYPICAL CHARACTERISTICS

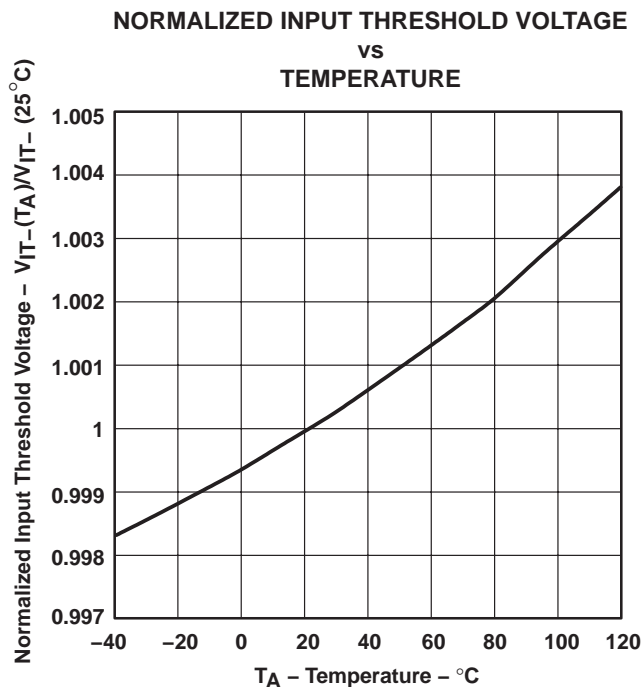


Figure 3

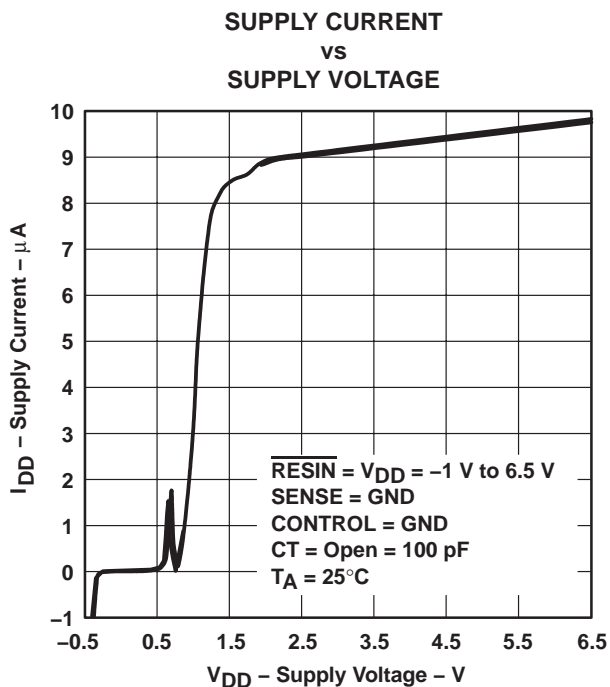


Figure 4

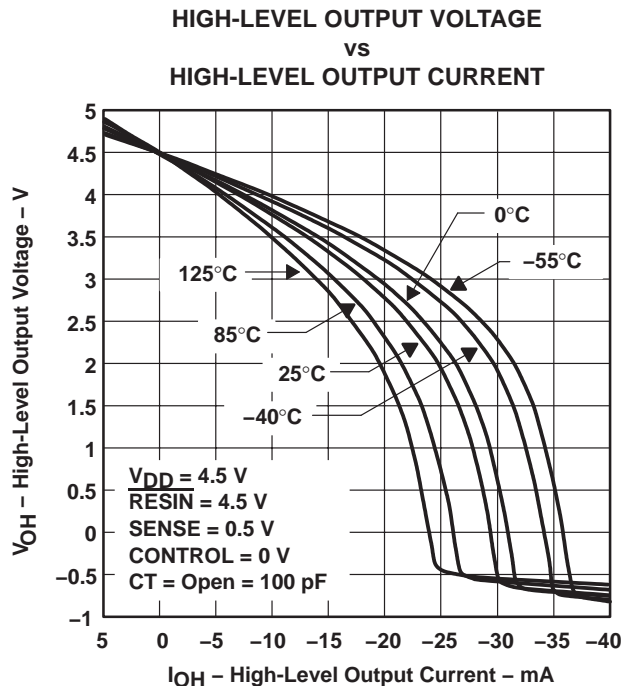


Figure 5

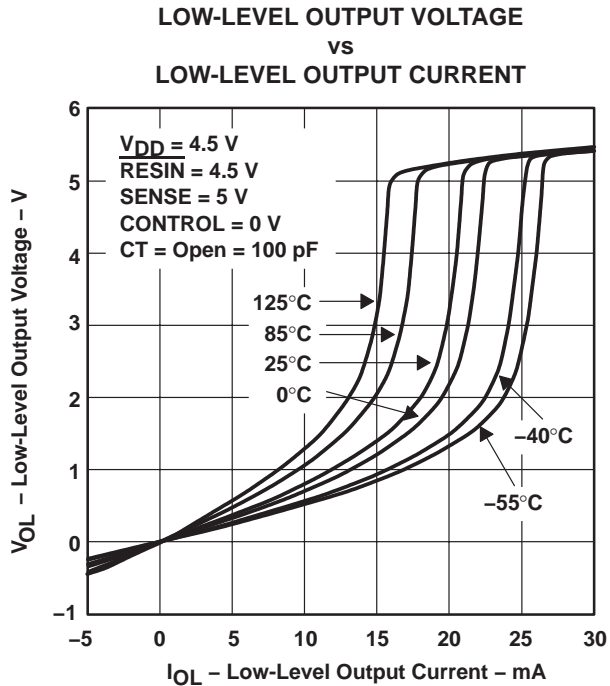
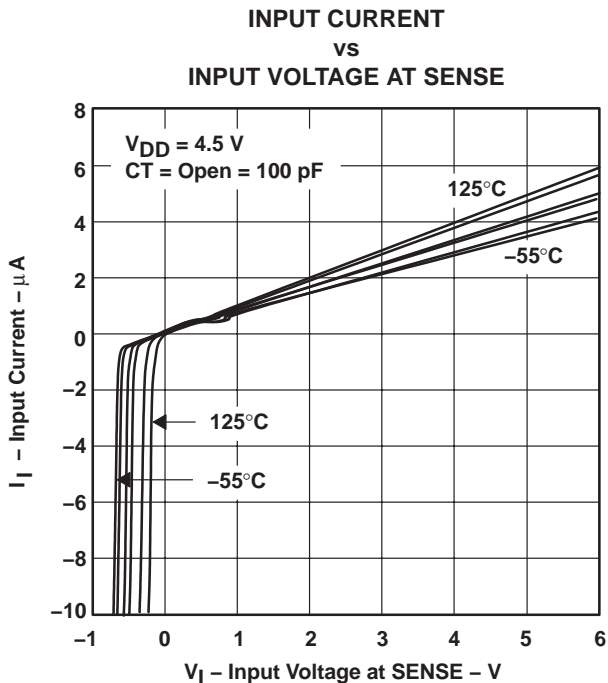


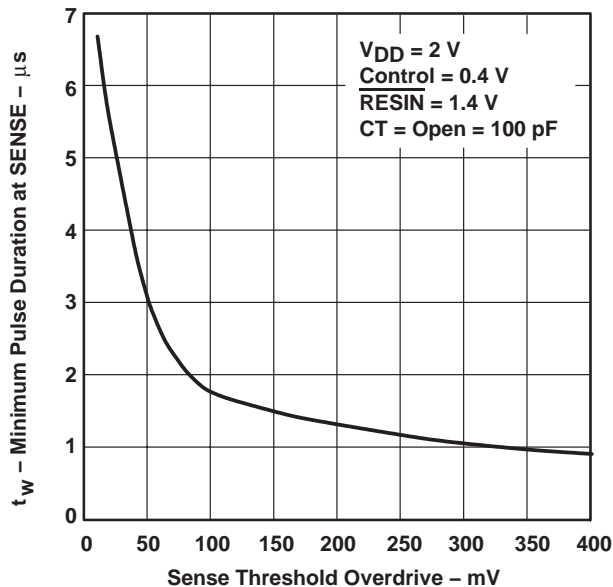
Figure 6



TYPICAL CHARACTERISTICS



MINIMUM PULSE DURATION AT SENSE
vs
SENSE THRESHOLD OVERDRIVE



TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

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APPLICATION INFORMATION

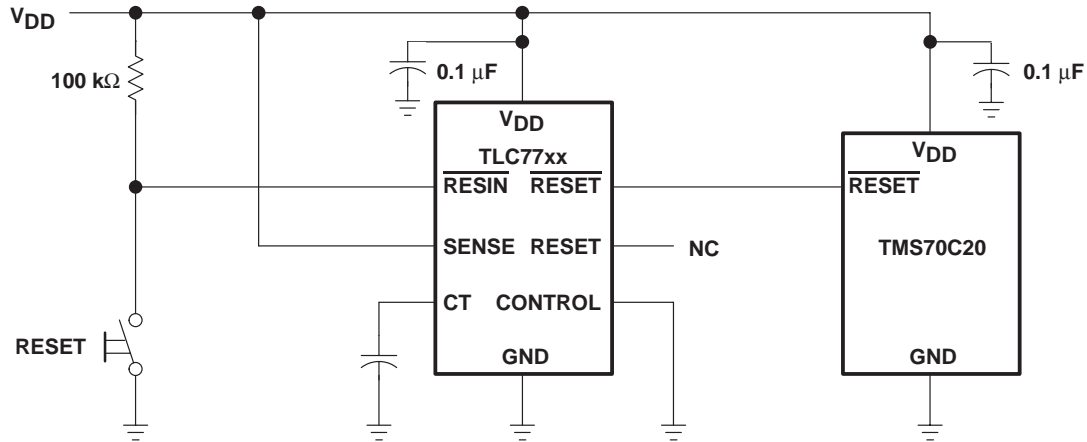


Figure 9. Reset Controller in a Microcomputer System

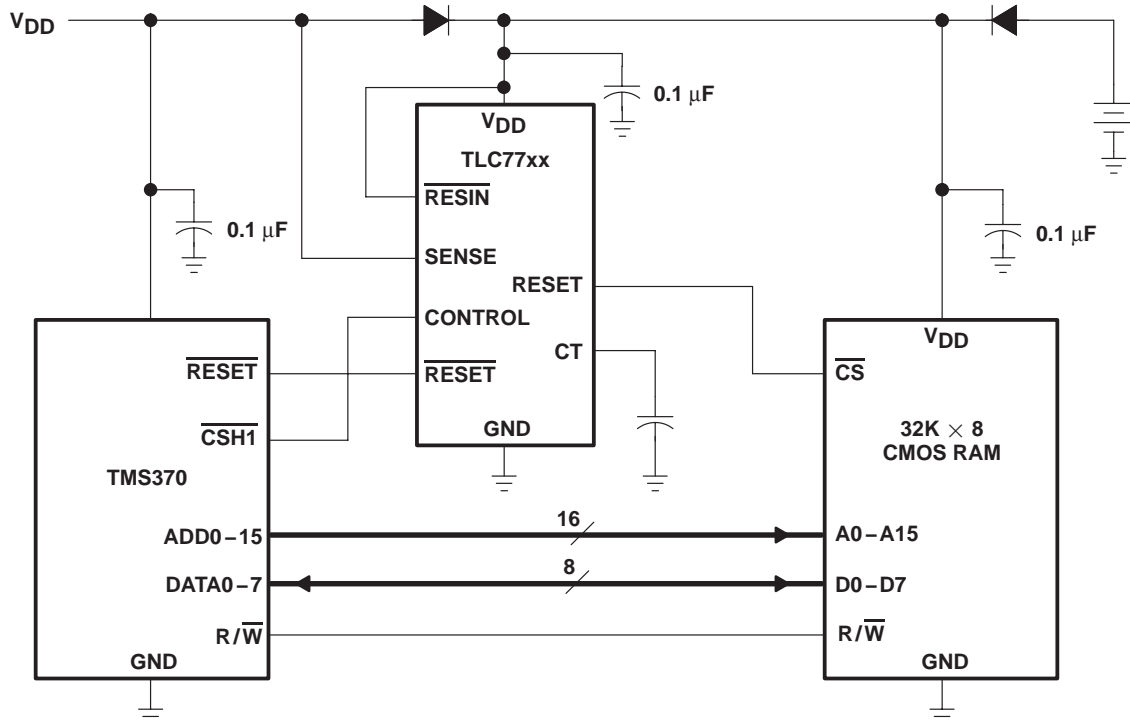


Figure 10. Data Retention During Power Down Using Static CMOS RAMs

TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

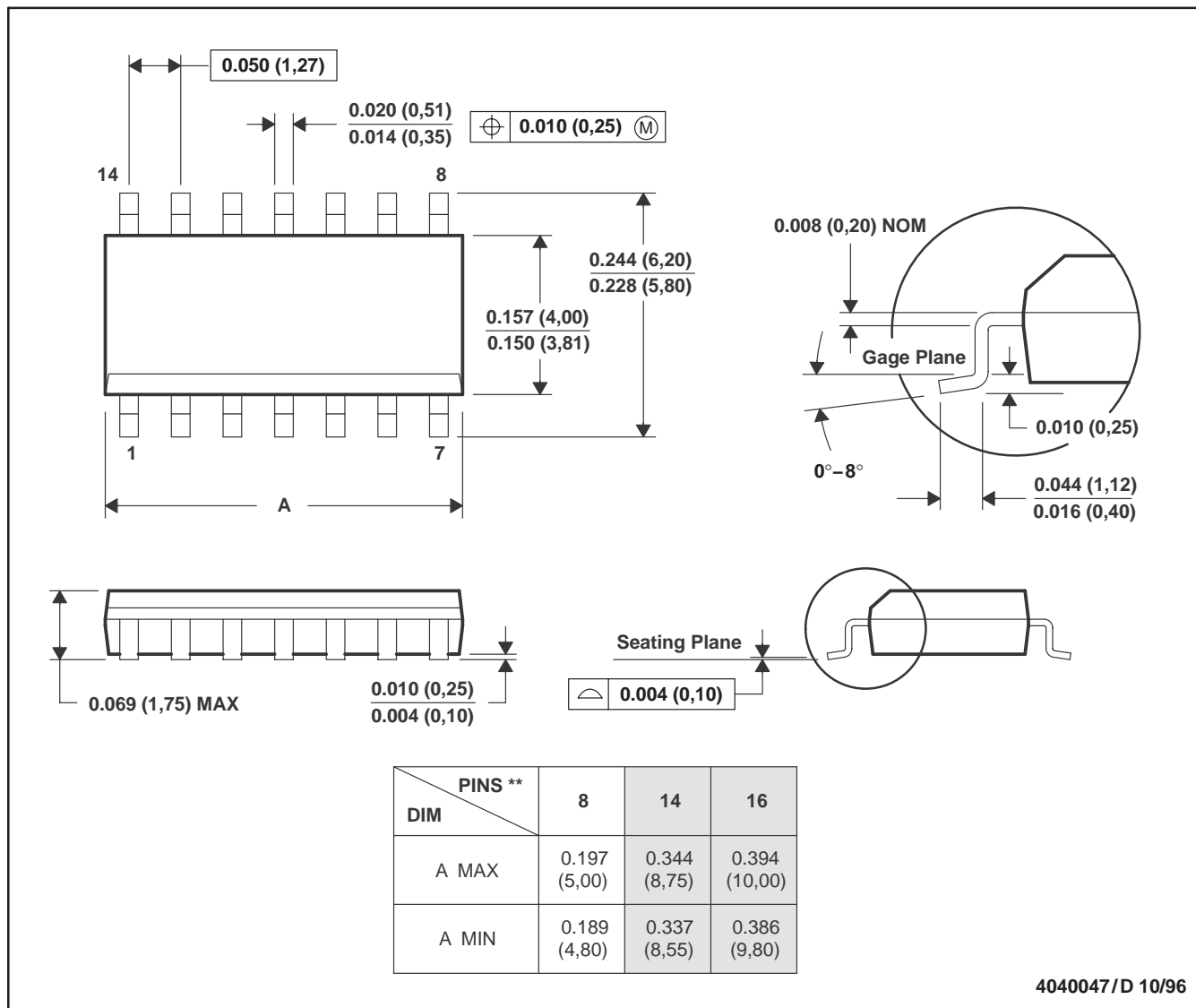
SLVS087L – DECEMBER 1994 – REVISED FEBRUARY 2003

MECHANICAL DATA

D (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14 PIN SHOWN



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

TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

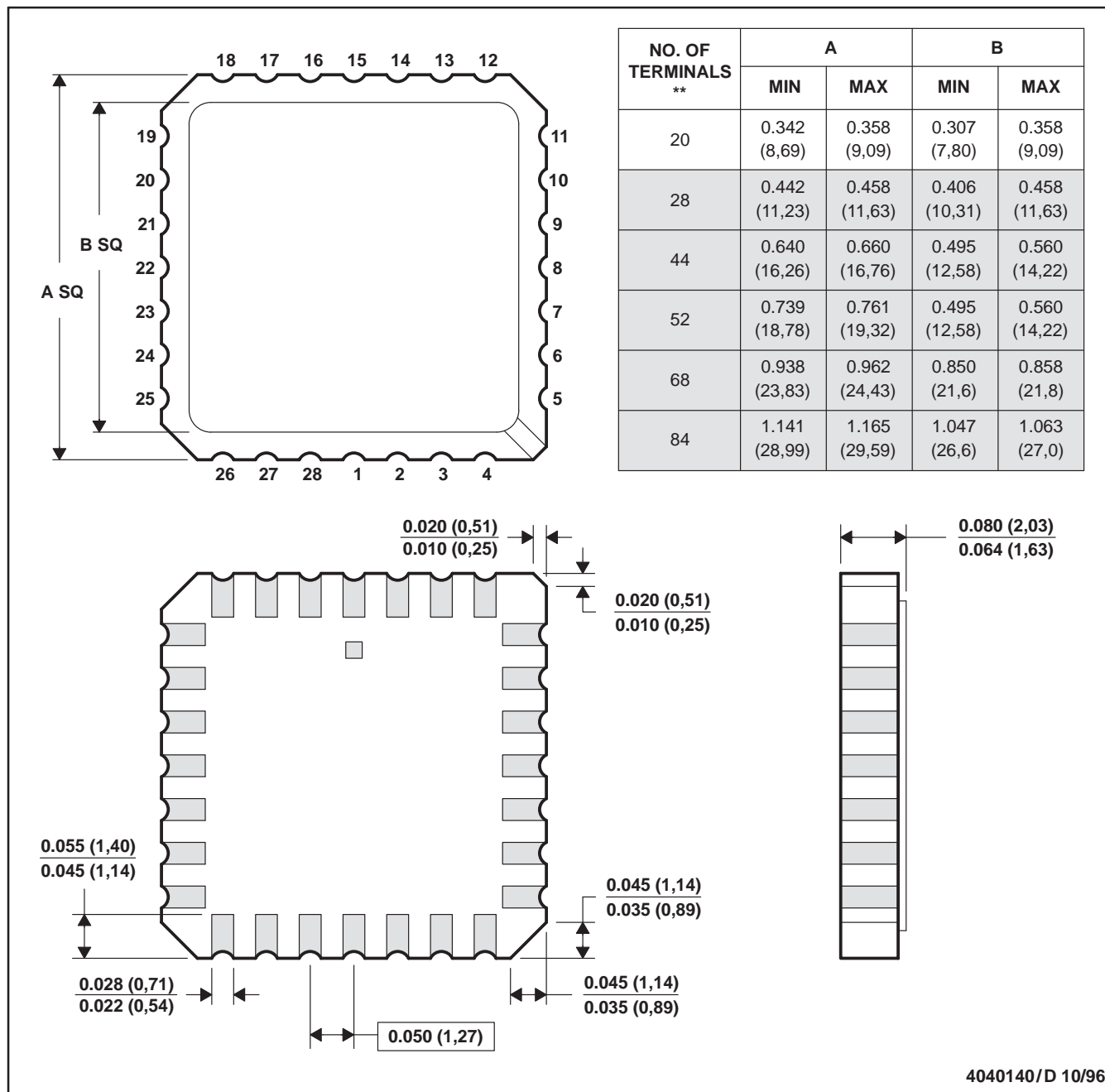
SLVS087L – DECEMBER 1994 – REVISED FEBRUARY 2003

MECHANICAL DATA

FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



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

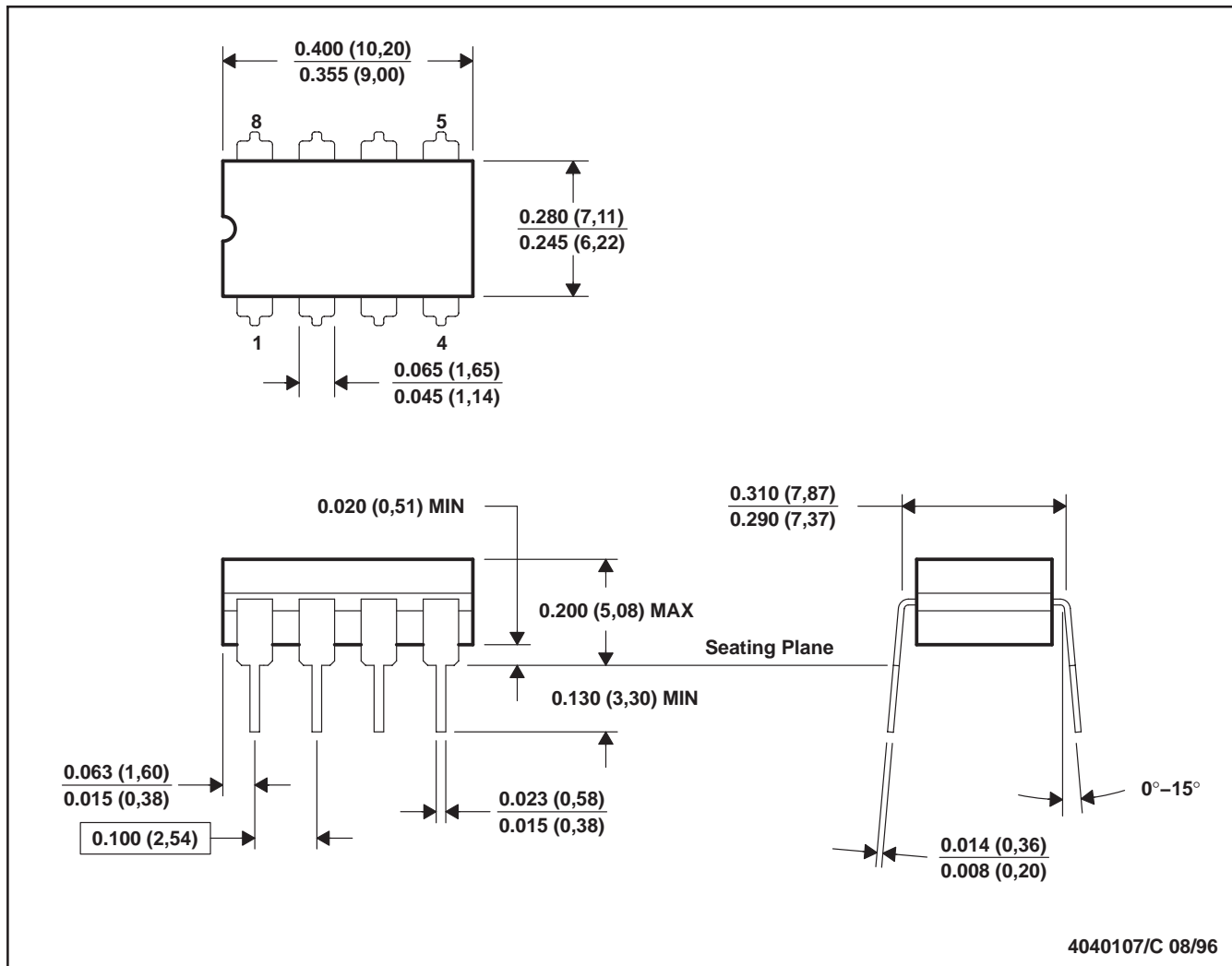
TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

SLVS087L – DECEMBER 1994 – REVISED FEBRUARY 2003

MECHANICAL DATA

JG (R-GDIP-T8)

CERAMIC DUAL-IN-LINE PACKAGE



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

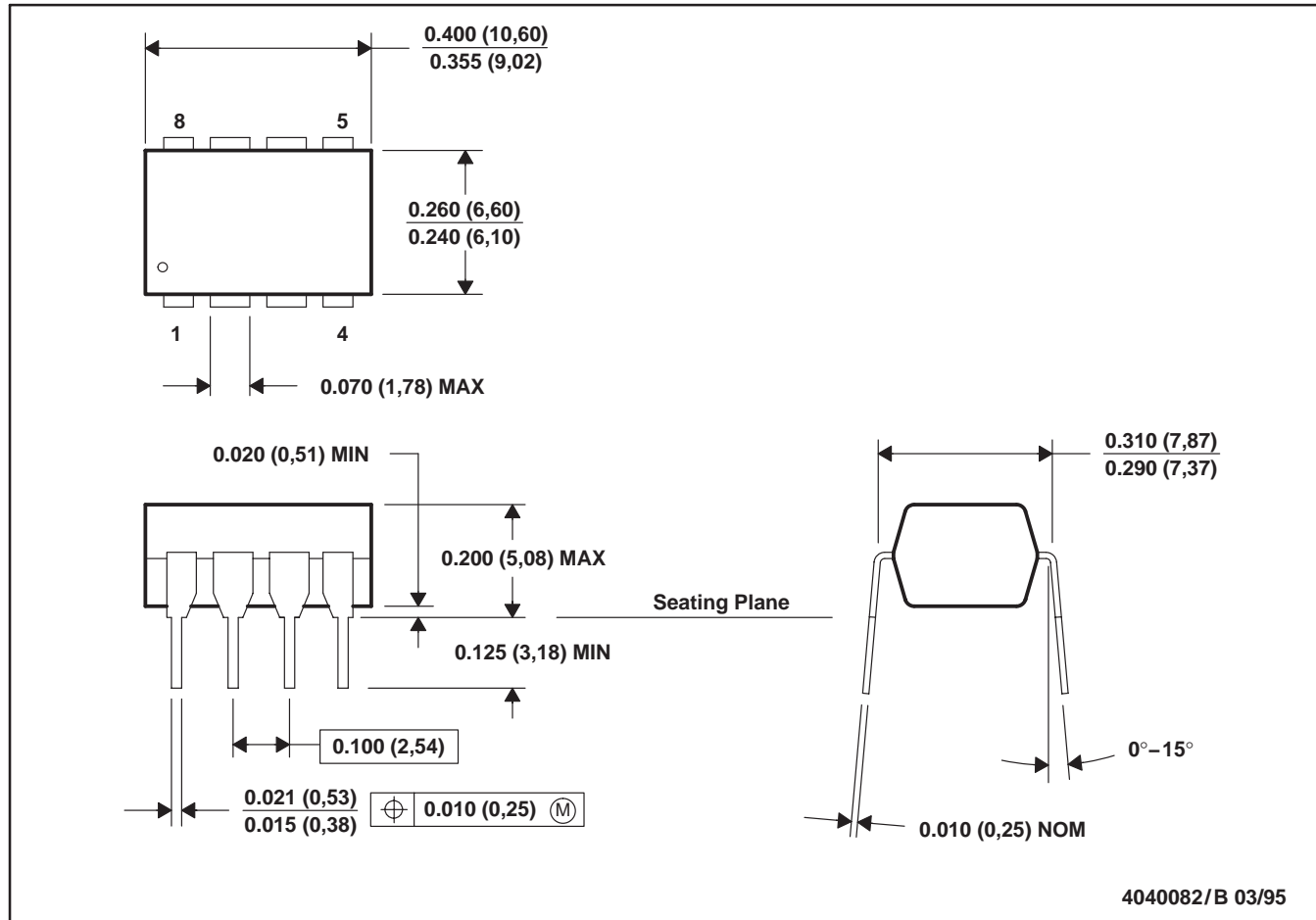
TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

SLVS087L – DECEMBER 1994 – REVISED FEBRUARY 2003

MECHANICAL DATA

P (R-PDIP-T8)

PLASTIC DUAL-IN-LINE PACKAGE



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

TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

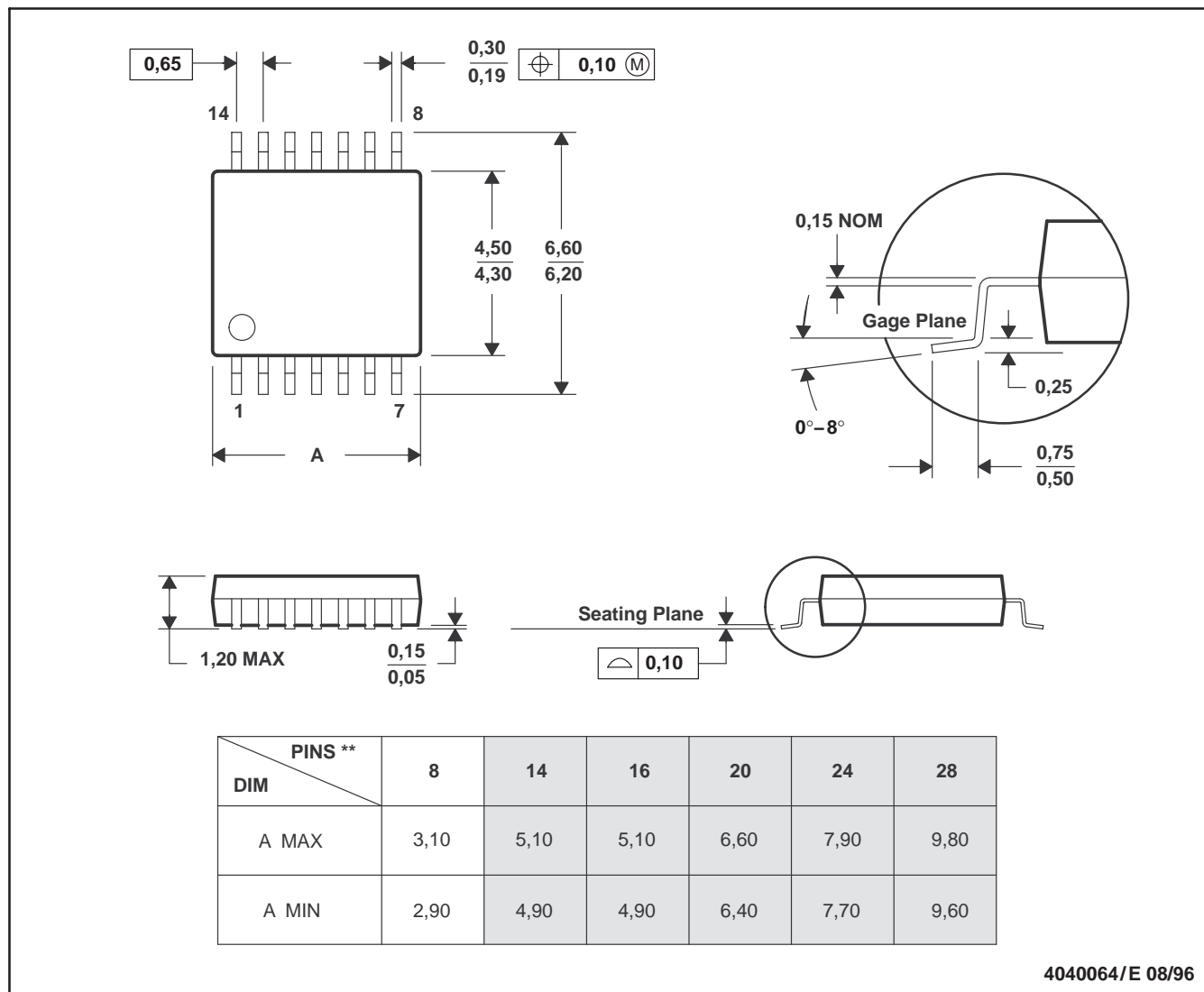
SLVS087L – DECEMBER 1994 – REVISED FEBRUARY 2003

MECHANICAL DATA

PW (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14 PIN SHOWN



4040064/E 08/96

- 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.
 D. Falls within JEDEC MO-153

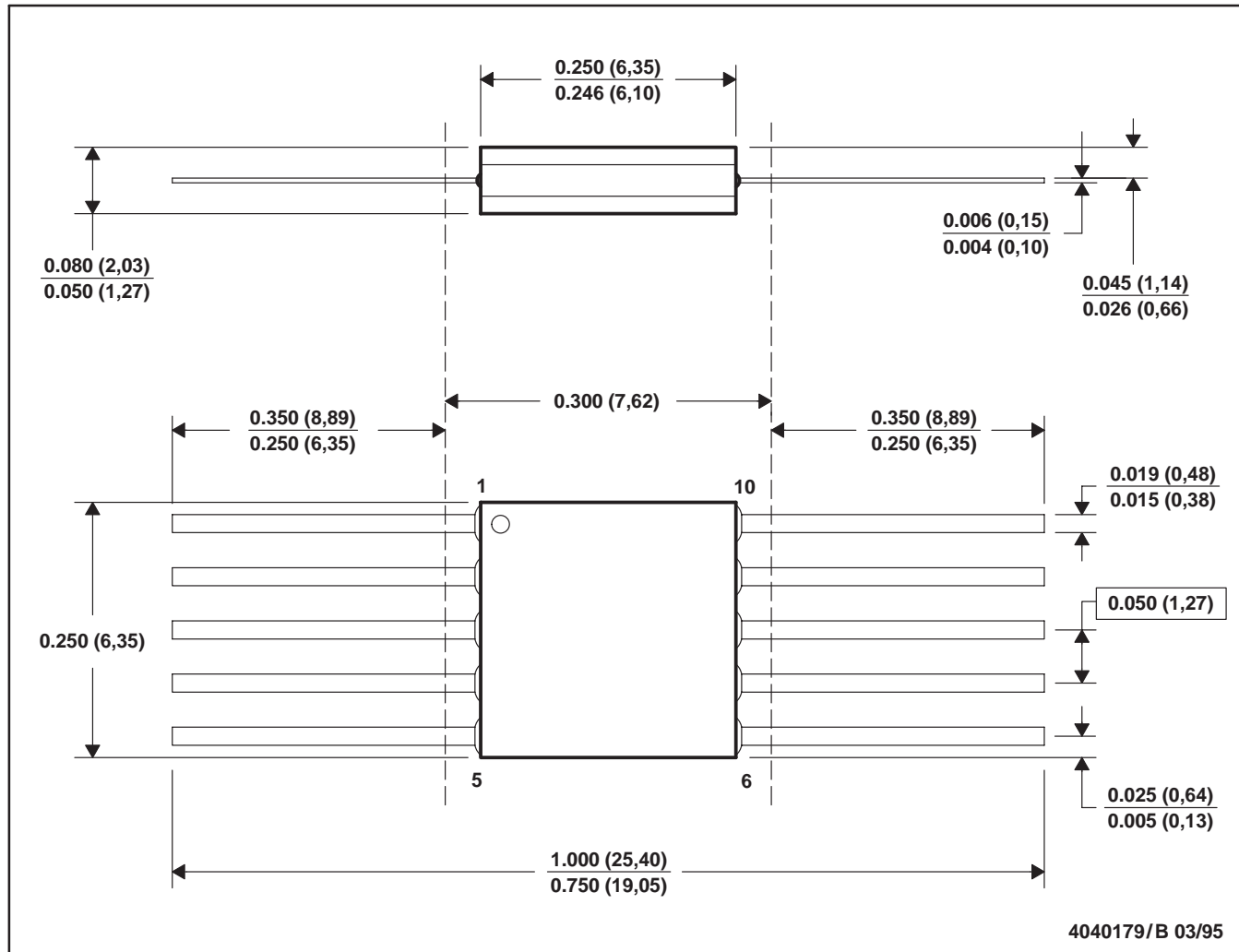
TLC7701, TLC7725, TLC7703, TLC7733, TLC7705 MICROPOWER SUPPLY VOLTAGE SUPERVISORS

SLVS087L – DECEMBER 1994 – REVISED FEBRUARY 2003

MECHANICAL DATA

U (S-GDFP-F10)

CERAMIC DUAL FLATPACK



- NOTES: A. All linear dimensions are in inches (millimeters).
 B. This drawing is subject to change without notice.
 C. This package can be hermetically sealed with a ceramic lid using glass frit.
 D. Index point is provided on cap for terminal identification only.
 E. Falls within MIL STD 1835 GDFP1-F10 and JEDEC MO-092AA

PACKAGING INFORMATION

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 5962-9750901Q2A | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| 5962-9750901QPA | ACTIVE | CDIP | JG | 8 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| 5962-9751301Q2A | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| 5962-9751301QHA | ACTIVE | CFP | U | 10 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| 5962-9751301QPA | ACTIVE | CDIP | JG | 8 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| TLC7701ID | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701IDG4 | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701IDR | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701IDRG4 | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701IP | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7701IPE4 | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7701IPW | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701IPWG4 | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701IPWLE | OBSOLETE | TSSOP | PW | 8 | | TBD | Call TI | Call TI |
| TLC7701IPWR | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701IPWRG4 | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701IQD | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701IQDG4 | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701QDR | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701QDRG4 | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701QP | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7701QPE4 | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7701QPW | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701QPWG4 | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701QPWLE | PREVIEW | TSSOP | PW | 8 | | TBD | Call TI | Call TI |
| TLC7701QPWR | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7701QPWRG4 | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703ID | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| | | | | | | no Sb/Br) | | |
| TLC7703IDG4 | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703IDR | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703IDRG4 | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703IP | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7703IPE4 | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7703IPW | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703IPWG4 | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703IPWLE | OBSOLETE | TSSOP | PW | 8 | | TBD | Call TI | Call TI |
| TLC7703IPWR | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703IPWRG4 | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703QD | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703QDG4 | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703QDR | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703QDRG4 | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703QP | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7703QPE4 | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7703QPW | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703QPWG4 | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703QPWR | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7703QPWRG4 | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705ID | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705IDG4 | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705IDR | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705IDRG4 | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705IP | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7705IPE4 | ACTIVE | PDIP | P | 8 | 50 | Pb-Free | CU NIPDAU | N / A for Pkg Type |

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| (RoHS) | | | | | | | | |
| TLC7705IPW | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705IPWG4 | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705IPWLE | OBSOLETE | TSSOP | PW | 8 | | TBD | Call TI | Call TI |
| TLC7705IPWR | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705IPWRG4 | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705MFKB | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| TLC7705MJG | ACTIVE | CDIP | JG | 8 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| TLC7705MJGB | ACTIVE | CDIP | JG | 8 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| TLC7705MUB | ACTIVE | CFP | U | 10 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| TLC7705QD | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705QDG4 | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705QDR | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705QDRG4 | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705QP | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7705QPE4 | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7705QPW | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705QPWG4 | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705QPWLE | OBSOLETE | TSSOP | PW | 8 | | TBD | Call TI | Call TI |
| TLC7705QPWR | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7705QPWRG4 | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725ID | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725IDG4 | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725IDR | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725IDRG4 | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725IP | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7725IPE4 | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7725IPW | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725IPWG4 | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| | | | | | | no Sb/Br) | | |
| TLC7725IPWLE | OBSOLETE | TSSOP | PW | 8 | | TBD | Call TI | Call TI |
| TLC7725IPWR | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725IPWRG4 | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725QD | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725QDR | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725QDRG4 | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725QP | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7725QPE4 | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7725QPW | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725QPWG4 | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725QPWLE | OBSOLETE | TSSOP | PW | 8 | | TBD | Call TI | Call TI |
| TLC7725QPWR | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7725QPWRG4 | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733ID | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733IDG4 | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733IDR | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733IDRG4 | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733IP | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7733IPE4 | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7733IPW | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733IPWG4 | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733IPWR | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733IPWRG4 | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733MFKB | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| TLC7733MJG | ACTIVE | CDIP | JG | 8 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| TLC7733MJGB | ACTIVE | CDIP | JG | 8 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| TLC7733QD | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| TLC7733QDG4 | ACTIVE | SOIC | D | 8 | 75 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733QDR | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733QDRG4 | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733QP | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7733QPE4 | ACTIVE | PDIP | P | 8 | 50 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| TLC7733QPW | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733QPWG4 | ACTIVE | TSSOP | PW | 8 | 150 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733QPWR | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| TLC7733QPWRG4 | ACTIVE | TSSOP | PW | 8 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |

⁽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.

OBSELETE: 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)

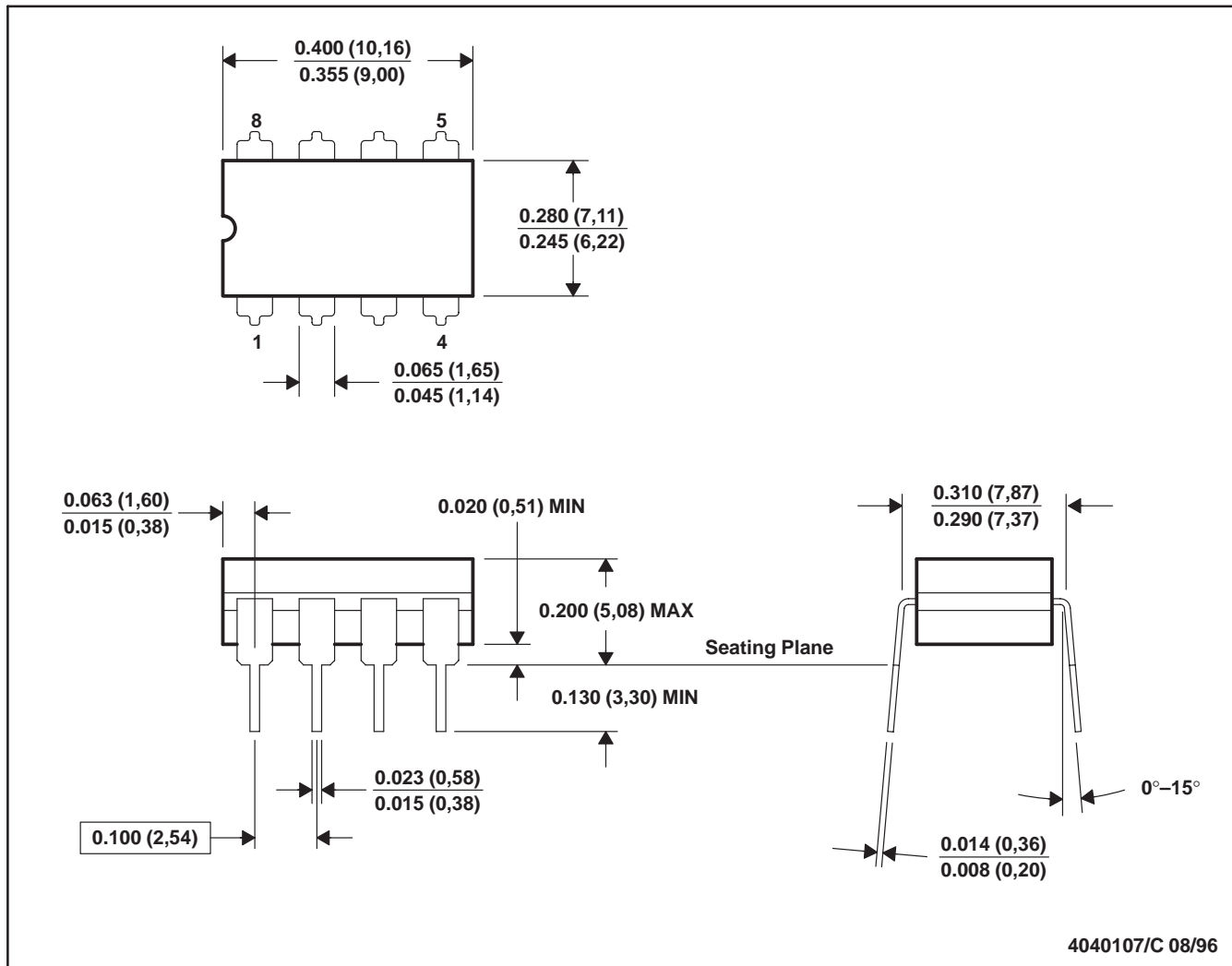
⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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JG (R-GDIP-T8)

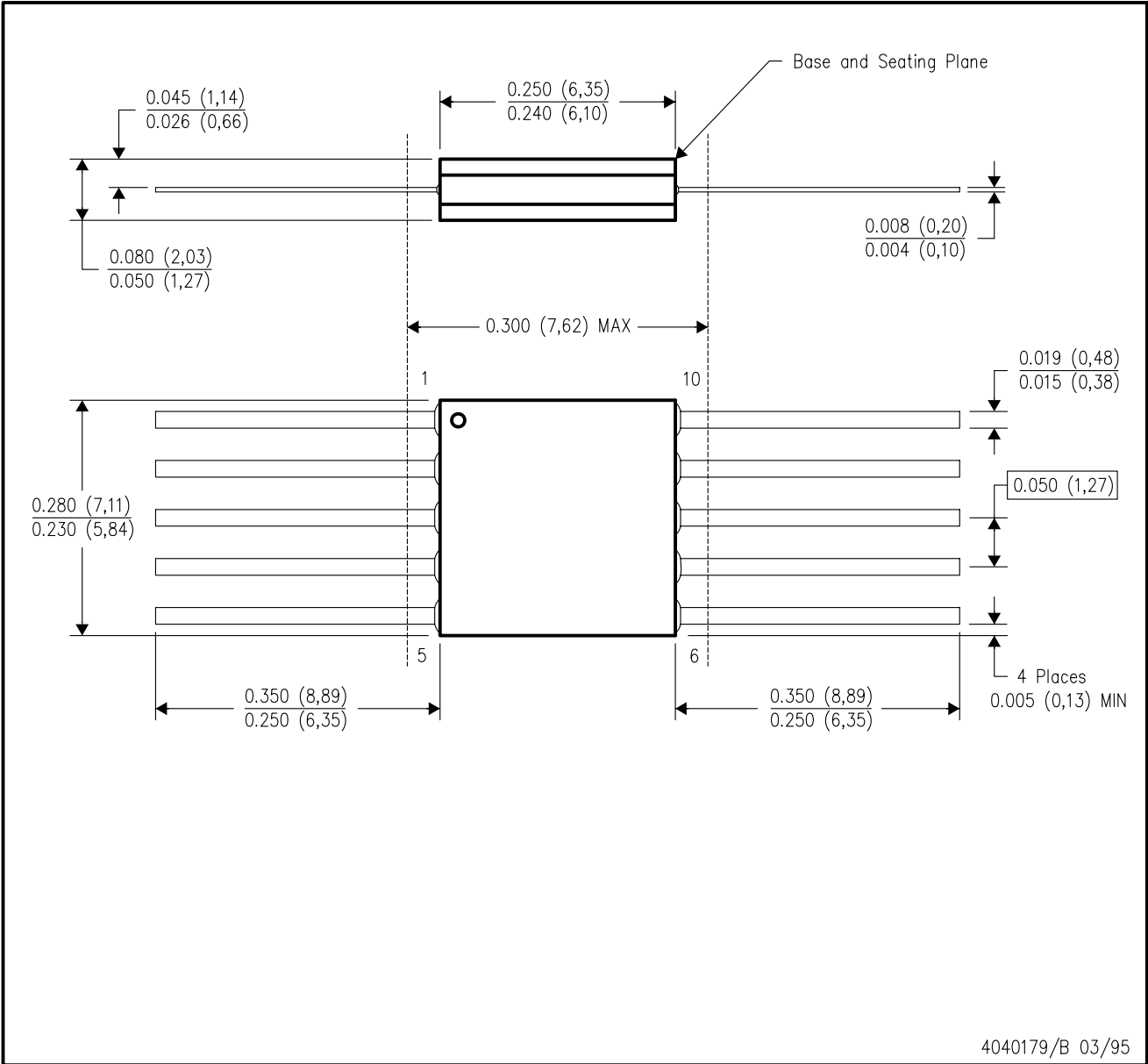
CERAMIC DUAL-IN-LINE



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

U (S-GDFP-F10)

CERAMIC DUAL FLATPACK



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package can be hermetically sealed with a ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal identification only.
 - E. Falls within MIL STD 1835 GDFP1-F10 and JEDEC MO-092AA

FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

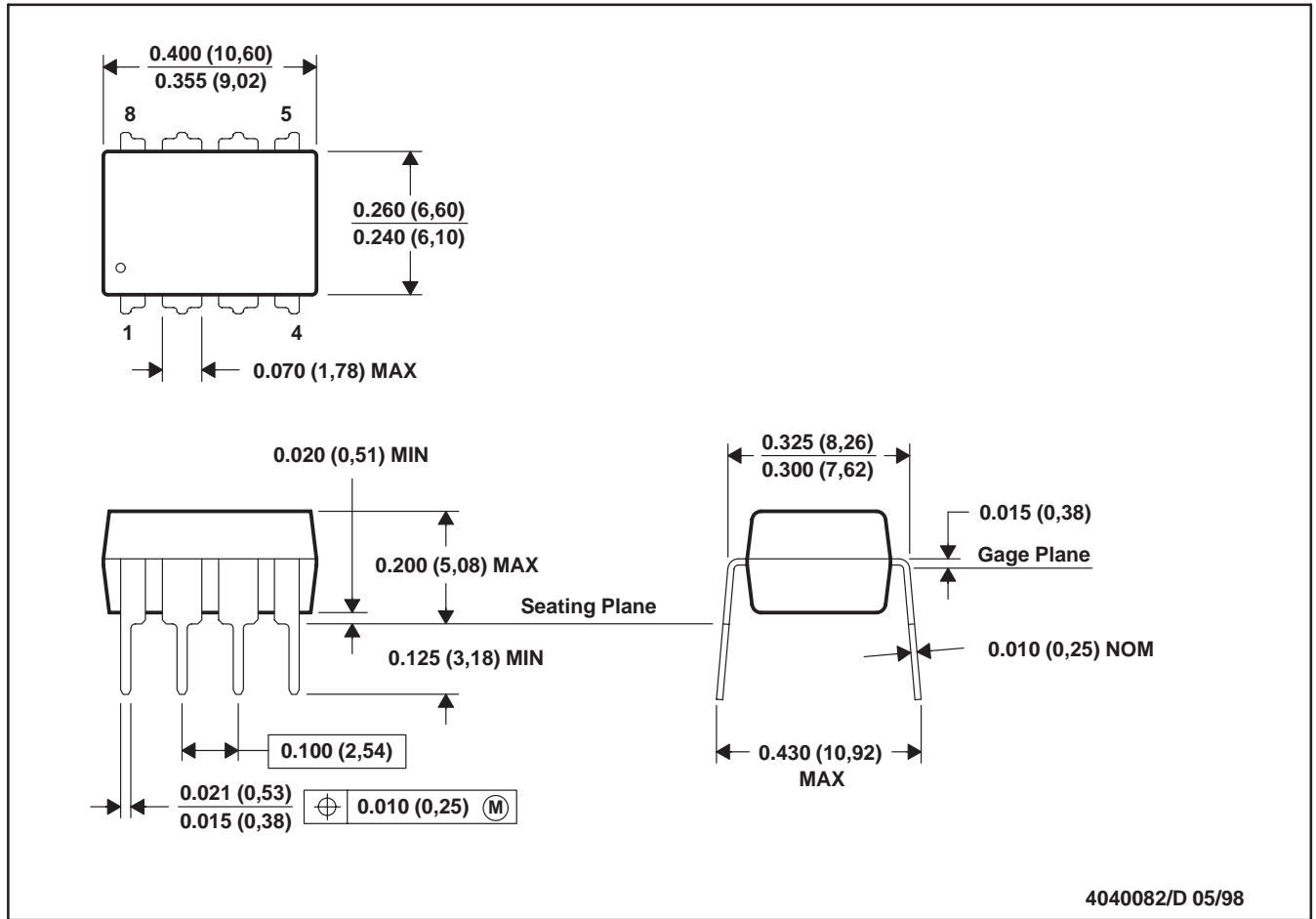
28 TERMINAL SHOWN



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

P (R-PDIP-T8)

PLASTIC DUAL-IN-LINE

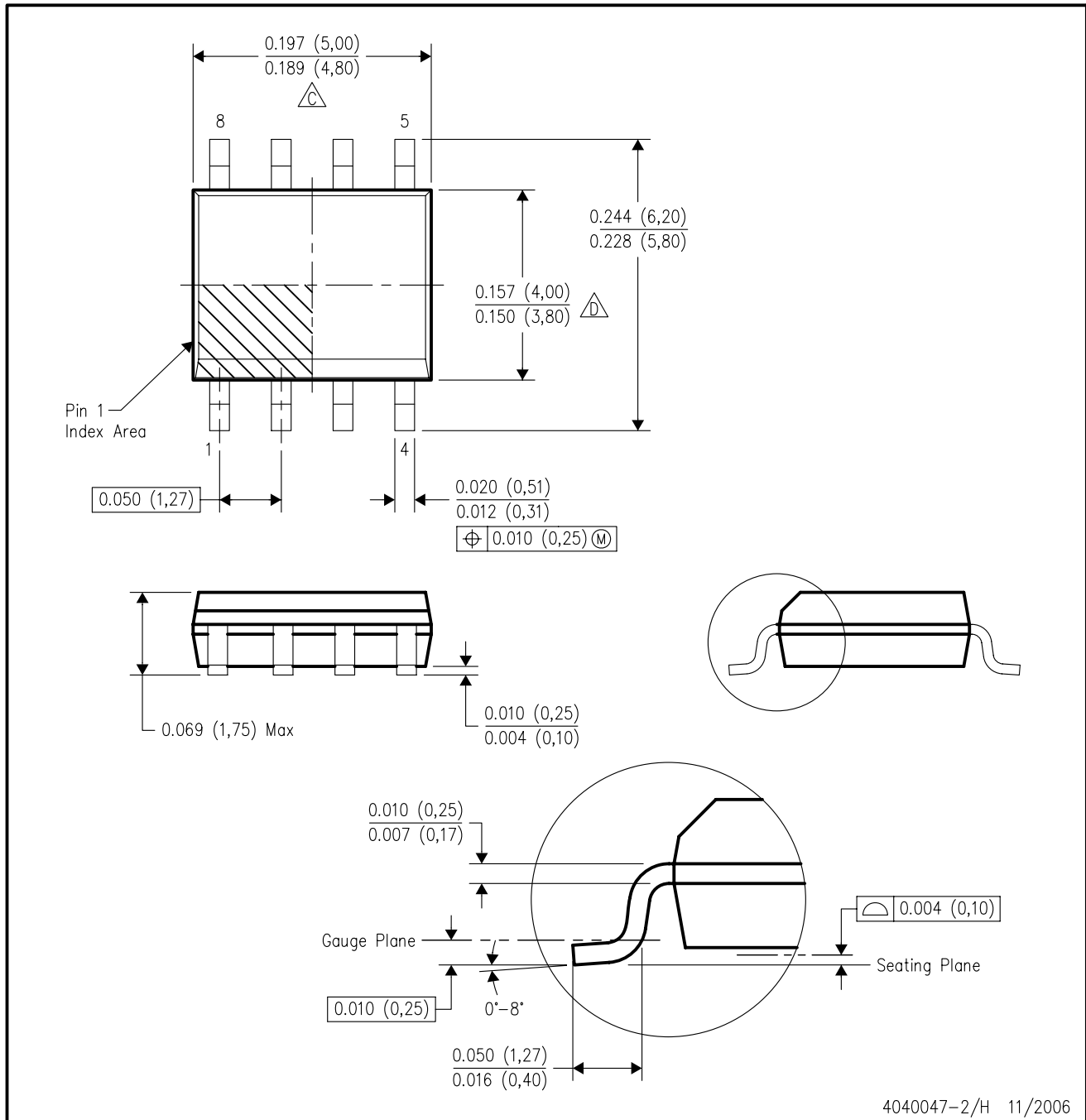


- NOTES: A. All linear dimensions are in inches (millimeters).
 B. This drawing is subject to change without notice.
 C. Falls within JEDEC MS-001

For the latest package information, go to http://www.ti.com/sc/docs/package/pkg_info.htm

D (R-PDSO-G8)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 (0,15) per end.
 - D. Body width does not include interlead flash. Interlead flash shall not exceed .017 (0,43) per side.
 - E. Reference JEDEC MS-012 variation AA.

PW (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



4040064/F 01/97

- 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.
 D. Falls within JEDEC MO-153

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