- **Meets or Exceeds the Requirements of ANSI Standards EIA/TIA-422-B and EIA/TIA-423-B and ITU Recommendation V.10 and V.11**
- **Operates From Single 5-V Power Supply**
- **Wide Common-Mode Voltage Range**
- **High Input Impedance**
- **TTL-Compatible Outputs**
- **High-Speed Schottky Circuitry**
- **8-Pin Dual-In-Line Package**

D or P PACKAGE
(TOP VIEW)

|		
1IN+	1	8	V_{CC}
1OUT	2	7	1IN−
2OUT	3	6	2IN+
GND	4	5	2IN−
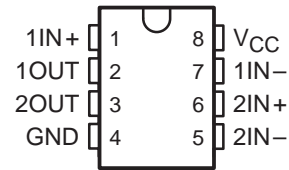
description

The SN75157 is a dual differential line receiver designed to meet Standards EIA/TIA-422-B and -423-B and ITU V.10 and V.11. It utilizes Schottky circuitry and has TTL-compatible outputs. The inputs are compatible with either a single-ended or a differential-line system. The device operates from a single 5-V power supply and is supplied in 8-pin dual-in-line and small-outline packages.
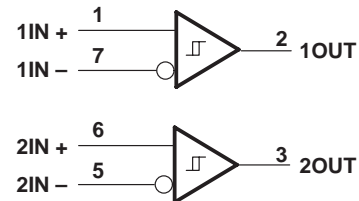
The SN75157 is characterized for operation from 0°C to 70°C.

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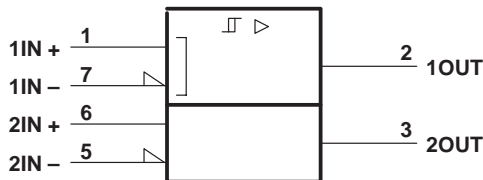
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)

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SN75157
DUAL DIFFERENTIAL LINE RECEIVER

schematics of inputs and outputs

EQUIVALENT OF EACH INPUT	TYPICAL OF ALL OUTPUTS
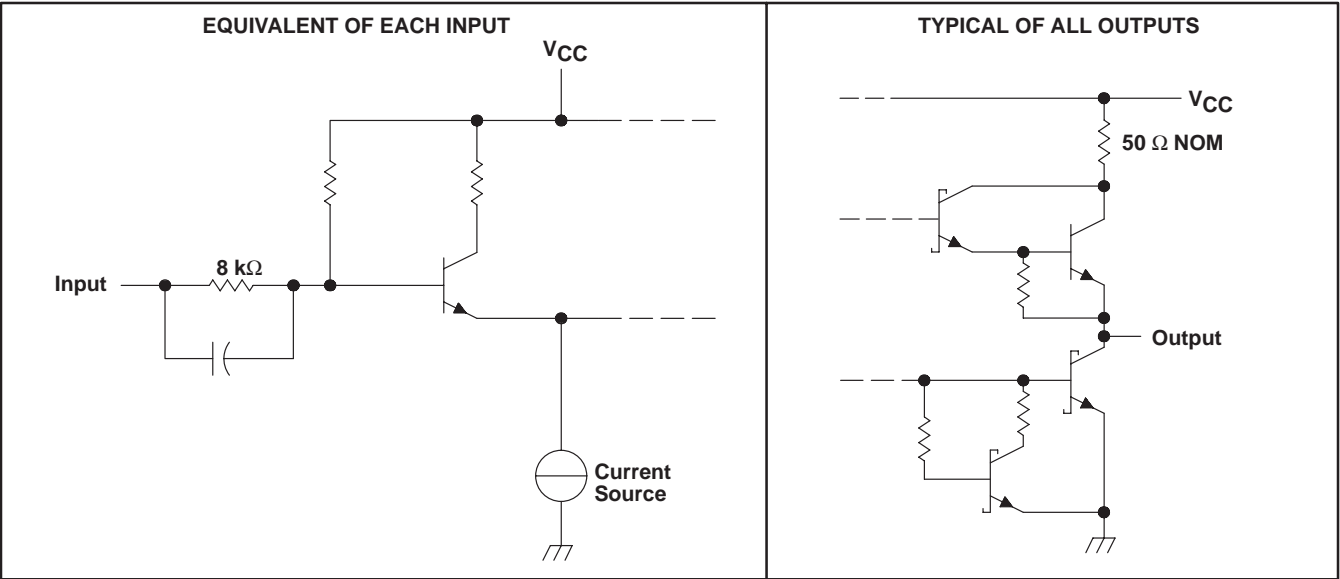
absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, V_{CC} (see Note 1)	−0.5 V to 7 V
Input voltage, V_I	±15 V
Differential input voltage, V_{ID} (see Note 2)	±15 V
Output voltage range, V_O (see Note 1)	−0.5 V to 5.5 V
Low-level output current, I_{OL}	50 mA
Continuous total dissipation	See Dissipation Rating Table
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

† 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 the network ground terminal.
2. Differential input voltage is measured at the noninverting input with respect to the corresponding inverting input.

DISSIPATION RATING TABLE

PACKAGE	$T_A \leq 25°C$ POWER RATING	OPERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING
D	725 mW	5.8 mW/°C	464 mW
P	1000 mW	8.0 mW/°C	640 mW

recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}	4.75	5	5.25	V
Common-mode input voltage, V_{IC}			±7	V
Operating free-air temperature, T_A	0	25	70	°C

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electrical characteristics over recommended ranges of supply voltage, common-mode input voltage, and operating free-air temperature (unless otherwise noted)†

	PARAMETER	TEST CONDITIONS		MIN	TYP‡	MAX	UNIT
V_{IT}	Input threshold voltage (V_{IT+} and V_{IT-})			−0.2		0.2	V
		See Note 3		−0.4		0.4	
V_{hys}	Hysteresis voltage ($V_{IT+} - V_{IT-}$)				70		mV
V_{OH}	High-level output voltage	$V_{ID} = 0.2$ V,	$I_O = -1$ mA	2.5	3.5		V
V_{OL}	Low-level output voltage	$V_{ID} = -0.2$ V,	$I_O = 20$ mA		0.35	0.5	V
I_I	Input current	$V_{CC} = 0$ to 5.5 V, See Note 4	$V_I = 10$ V		1.1	3.25	mA
			$V_I = -10$ V		−1.6	−3.25	
I_{OS}	Short-circuit output current§	$V_O = 0$,	$V_{ID} = 0.2$ V	−40	−75	−100	mA
I_{CC}	Supply current	$V_{ID} = -0.5$ V,	No load		35	50	mA

† The algebraic convention, where the less positive (more negative) limit is designated as minimum, is used in this data sheet for threshold levels only.
‡ All typical values are at $V_{CC} = 5$ V, $T_A = 25°C$.
§ Only one output should be shorted at a time and duration of the short circuit should not exceed one second.
NOTES: 3.   The expanded threshold parameter is tested with a 500-Ω resistor in series with each input.
        4.   The input not under test is grounded.

switching characteristics, $V_{CC} = 5$ V, $T_A = 25°C$

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low- to high-level output	$C_L = 15$ pF, See Figure 1		15	25	ns
t_{PHL}	Propagation delay time, high- to low-level output			13	25	ns

PARAMETER MEASUREMENT INFORMATION

TEST CIRCUIT
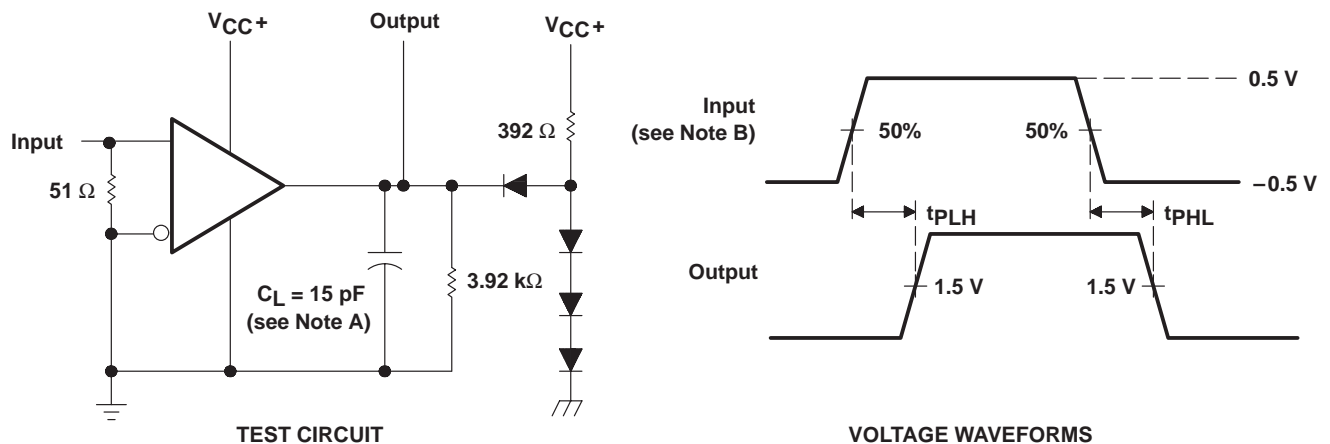
VOLTAGE WAVEFORMS

NOTES: A. C_L includes probe and jig capacitance.
        B.   The input pulse is supplied by a generator having the following characteristics: $t_r \leq 5$ ns, $t_f \leq 5$ ns, PRR ≤ 5 MHz, duty cycle = 50%.

Figure 1. Test Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS

**OUTPUT VOLTAGE
vs
DIFFERENTIAL INPUT VOLTAGE**

Figure 2

**OUTPUT VOLTAGE
vs
DIFFERENTIAL INPUT VOLTAGE**

Figure 3

**HIGH-LEVEL OUTPUT VOLTAGE
vs
HIGH-LEVEL OUTPUT CURRENT**

Figure 4

**LOW-LEVEL OUTPUT VOLTAGE
vs
LOW-LEVEL OUTPUT CURRENT**

Figure 5

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TYPICAL CHARACTERISTICS

SUPPLY CURRENT
vs
SUPPLY VOLTAGE
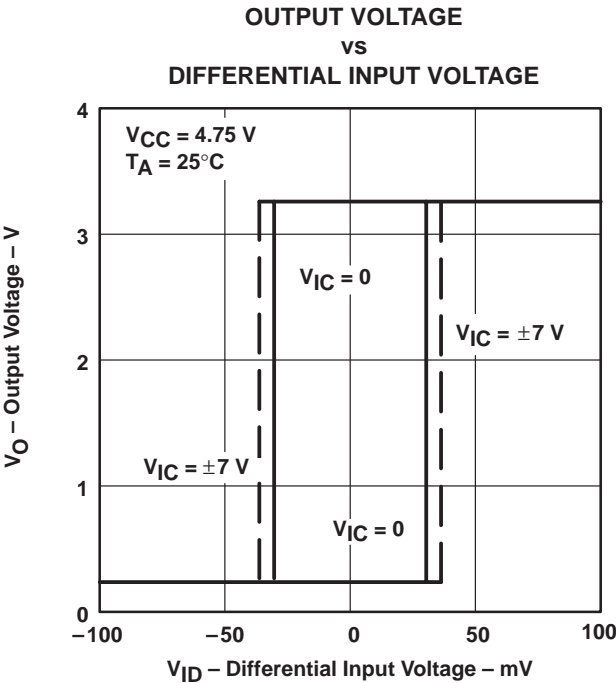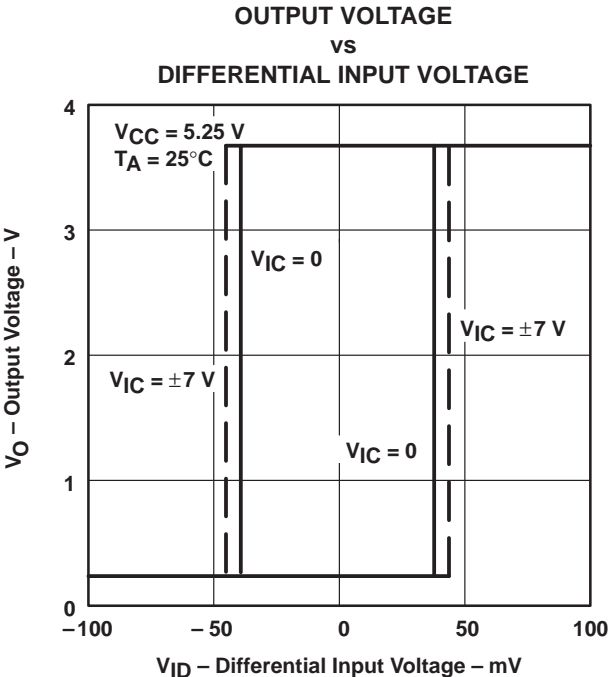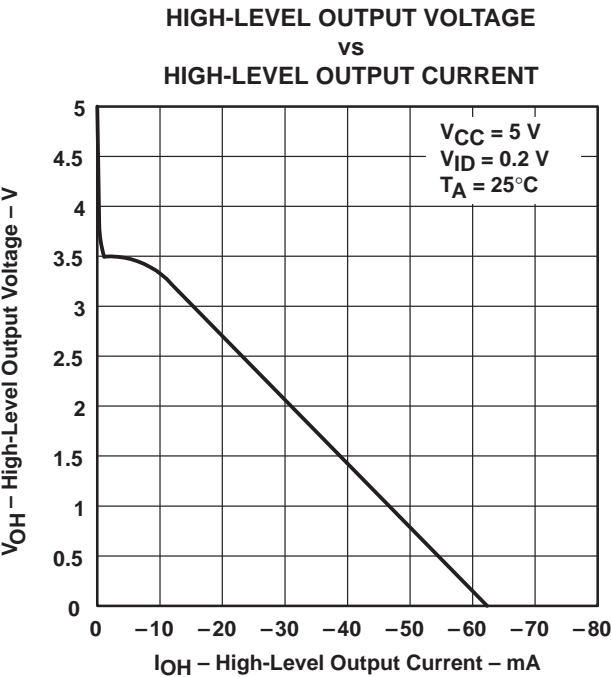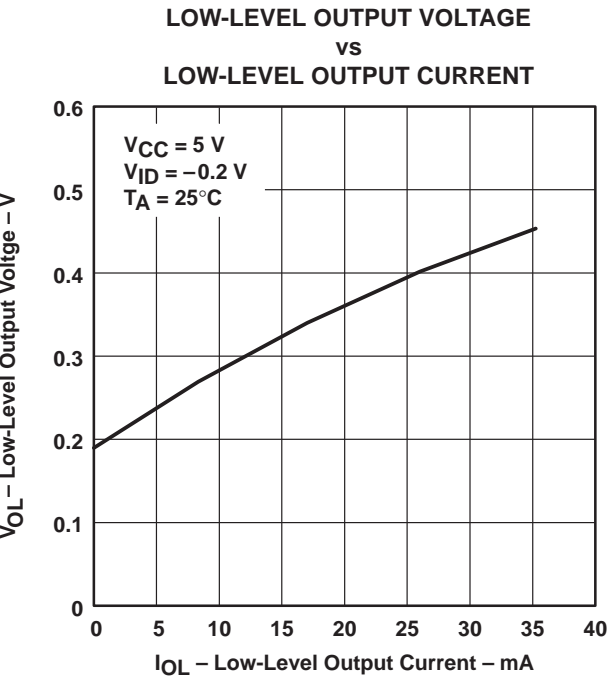
Figure 6

APPLICATION INFORMATION

Figure 7. EIA/TIA-422-B System Application

PACKAGING INFORMATION

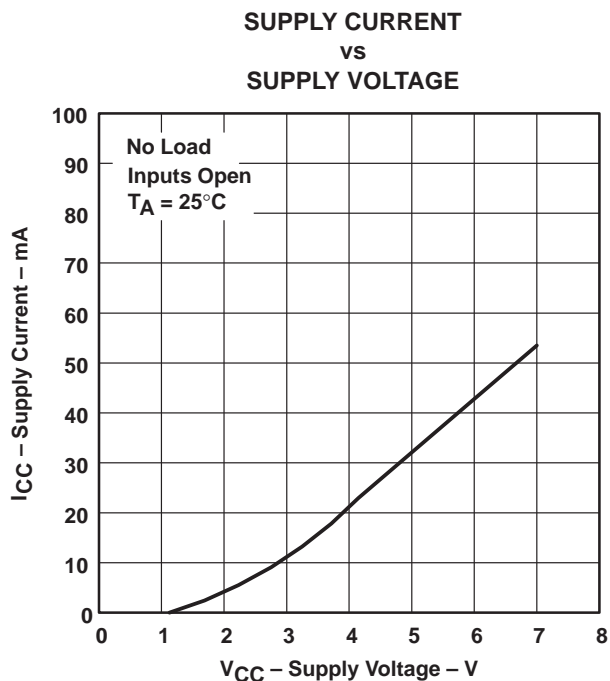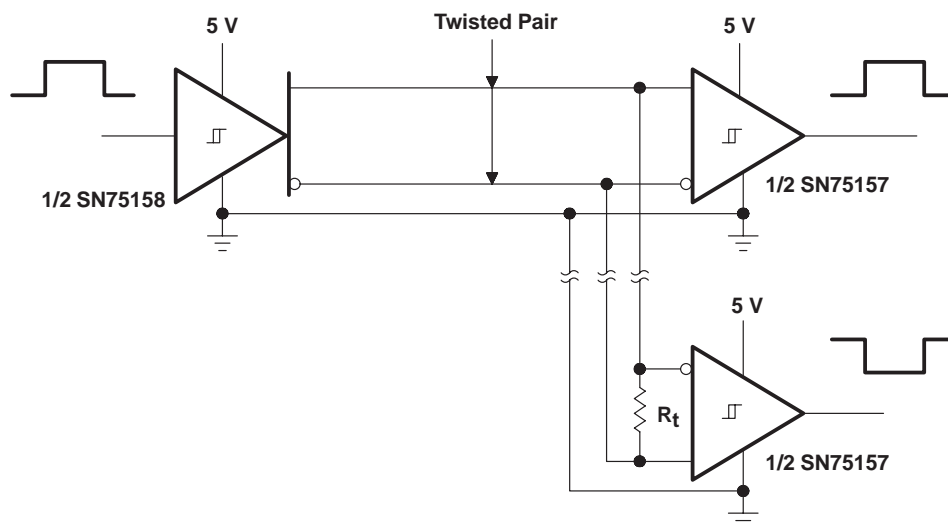| Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
SN75157D	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN75157DE4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN75157P	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN75157PE4	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN75157PSLE	OBSOLETE	SO	PS	8		TBD	Call TI	Call TI
SN75157PSR	ACTIVE	SO	PS	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN75157PSRE4	ACTIVE	SO	PS	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.
OBSOLETE: TI has discontinued the production of the device.

[2] Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) 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.
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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MECHANICAL DATA

P (R-PDIP-T8)   **PLASTIC DUAL-IN-LINE**
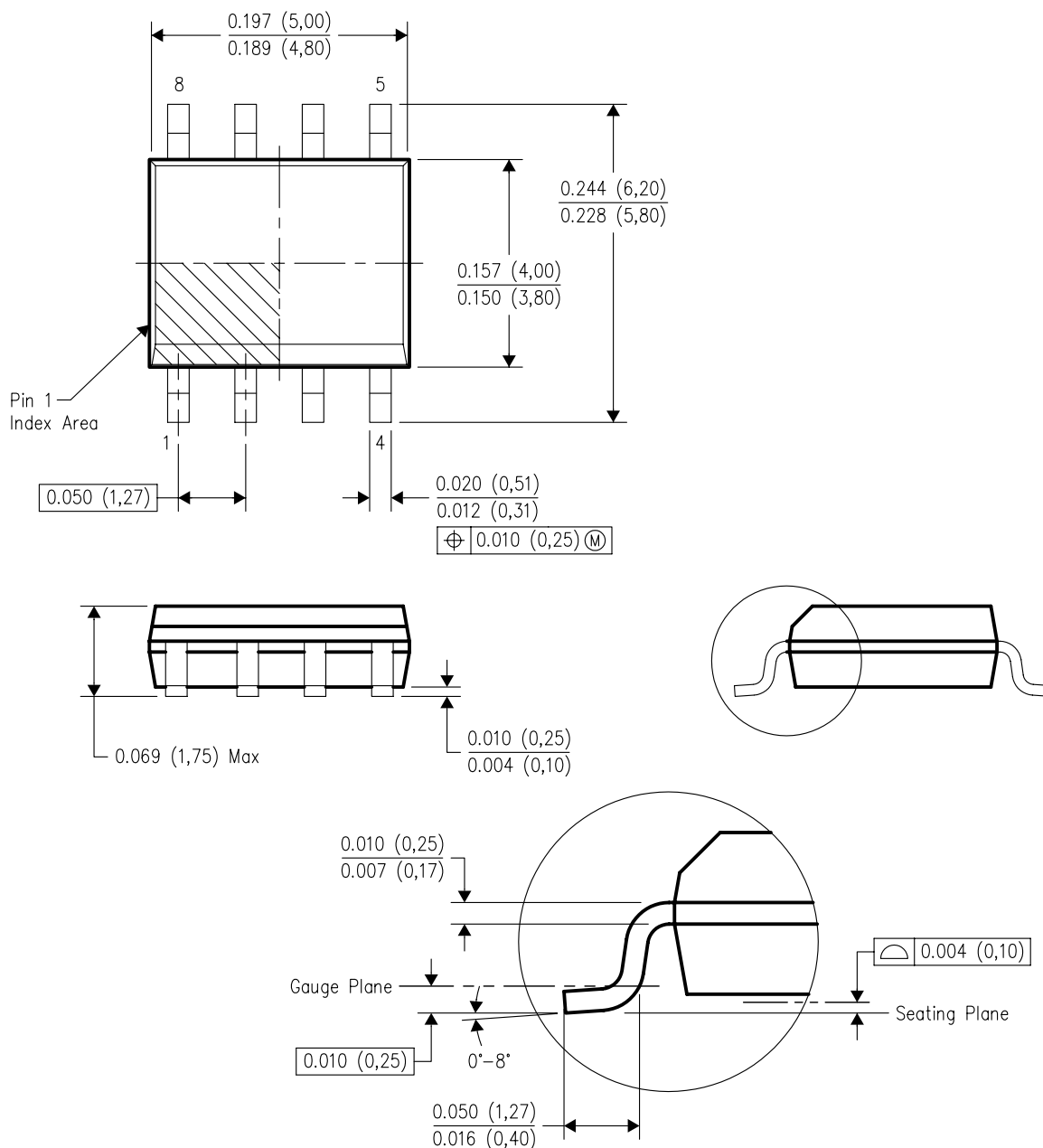

4040082/D 05/98

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

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

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D (R−PDSO−G8) PLASTIC SMALL−OUTLINE PACKAGE

0.197 (5,00)
0.189 (4,80)

8

5

0.244 (6,20)
0.228 (5,80)

0.157 (4,00)
0.150 (3,80)

Pin 1
Index Area

1

4

0.050 (1,27)

0.020 (0,51)
0.012 (0,31)

⊕ 0.010 (0,25) Ⓜ

0.069 (1,75) Max

0.010 (0,25)
0.004 (0,10)

0.010 (0,25)
0.007 (0,17)

0.004 (0,10)

Gauge Plane

Seating Plane

0.010 (0,25)

0°−8°

0.050 (1,27)
0.016 (0,40)

4040047−2/F 07/2004

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 variation AA.

PS (R-PDSO-G8)   **PLASTIC SMALL-OUTLINE PACKAGE**

4040063/C 03/03

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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