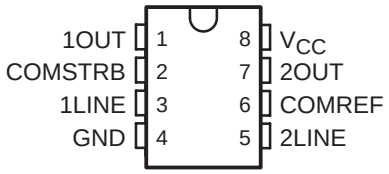
- **Single 5-V Supply**
- **±100-mV Sensitivity**
- **For Application as:**
  - **Single-Ended Line Receiver**
  - **Gated Oscillator**
  - **Level Comparator**
- **Adjustable Reference Voltage**
- **TTL Outputs**
- **TTL-Compatible Strobe**
- **Designed for Party-Line (Data-Bus) Applications**
- **Common Reference-Voltage Pin**
- **Common Strobe**

D PACKAGE
(TOP VIEW)



description/ordering information

This device consists of a dual single-ended line receiver with TTL-compatible strobes and outputs. The reference voltage (switching threshold) is applied externally and can be adjusted from 1.5 V to 3.4 V, making it possible to optimize noise immunity for a given system design. Due to the low input current (less than 100 μA), the device is suited ideally for party-line (data-bus) systems.

The SN74LS2323 has a common reference-voltage pin and a common strobe.

ORDERING INFORMATION

T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 70°C	SOIC − D	Tube	SN74LS2323D	LS2323
		Tape and reel	SN74LS2323DR	

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

FUNCTION TABLE
(each receiver)

LINE INPUT	STROBE	OUTPUT
≤(V_{REF} − 100 mV)	L	H
≥(V_{REF} + 100 mV)	X	L
X	H	L

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

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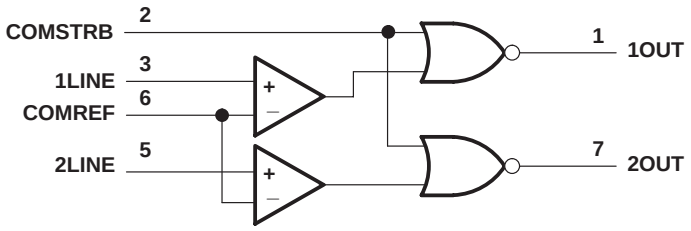
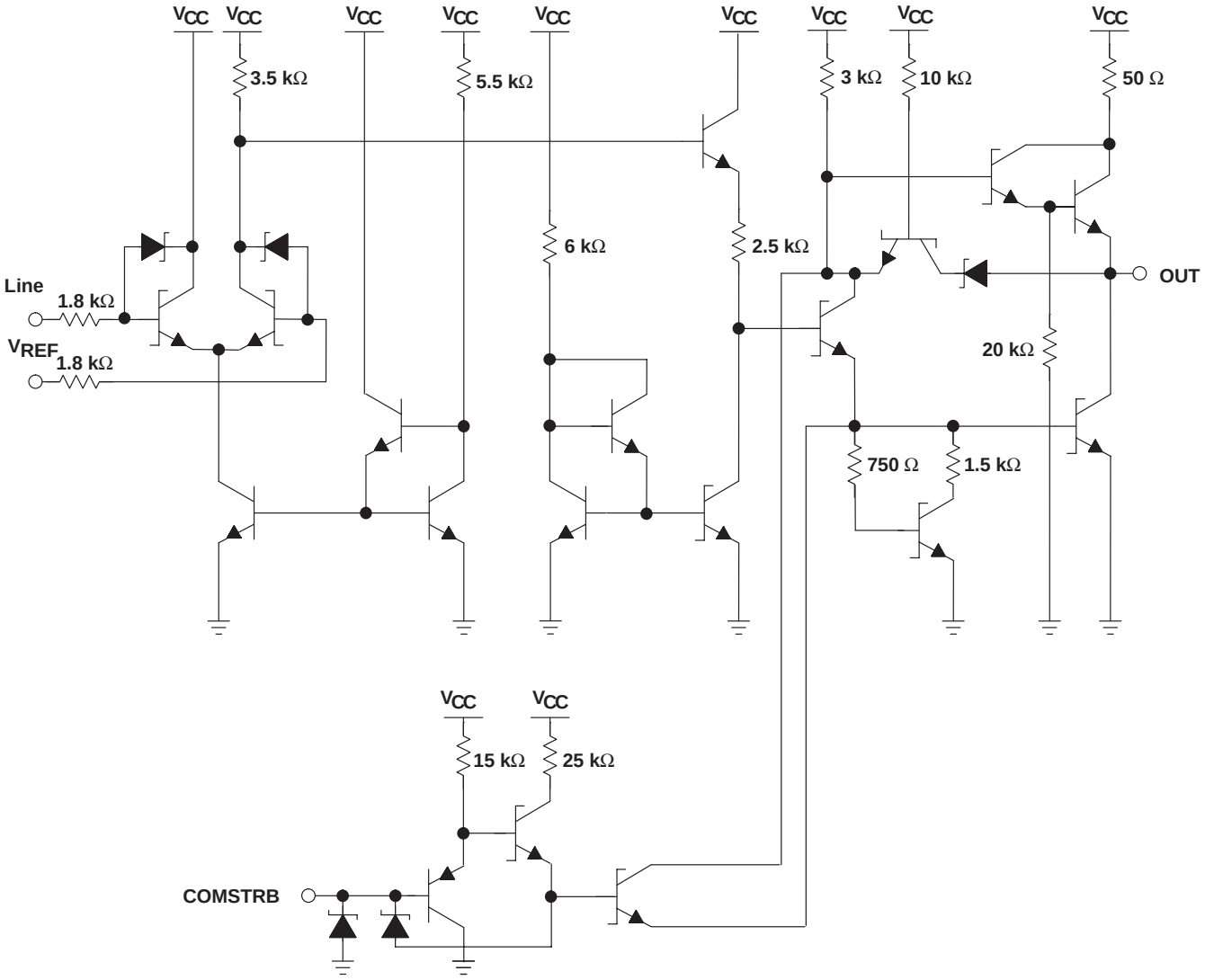
logic diagram (positive logic)



schematic (each receiver)



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

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Reference input voltage, V_{REF} . . . . . 5.5 V
Line input voltage range with respect to GND . . . . . −2 V to 7 V
Line input voltage with respect to V_{REF} . . . . . ±5 V
Strobe input voltage, $V_{I(S)}$ . . . . . 7 V
Package thermal impedance, θ_{JA} (see Note 2) . . . . . 97°C/W
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds . . . . . 260°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.

NOTES: 1. Unless otherwise specified, voltage values are with respect to network ground terminal.
2. The package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions

		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	4.5	5	5.5	V
V_{ref}	Reference input voltage	1.8		‡	V
$V_{I(L)}$	High-level line input voltage	0		V_{CC} − 1	V
$V_{I(S)}$	High-level strobe input voltage	0		7	V
T_A	Operating free-air temperature range	0		70	°C

‡ Max = V_{CC}−1.5 V > V_{REF} < 3.4 V

electrical characteristics over recommended operating free-air temperature range, V_{CC} = 5 V ±10%, V_{REF} = 1.5 V to 3.5 V (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	MAX	UNIT
$V_{IH(L)}$	High-level line input voltage	$V_{I(S)}$ = 0.8 V, I_{OL} = 12 mA, V_{REF} = 2.5 V, $V_{OL} \le$ 0.6 V	V_{CC} = 4.5 V	2.62	6	V
		$V_{I(S)}$ = 0.8 V, I_{OL} = 16 mA, V_{REF} = 3.4 V, $V_{OL} \le$ 0.5 V	V_{CC} = 5.5 V	3.5	7	
$V_{IL(L)}$	Low-level line input voltage	$V_{I(S)}$ = 0.8 V, I_{OH} = −0.4 mA, V_{REF} = 2.5 V, $V_{OH} \ge$ 2 V	V_{CC} = 4.5 V	−2	2.38	V
		$V_{I(S)}$ = 0.8 V, I_{OH} = −0.4 mA, V_{REF} = 3.4 V, $V_{OH} \ge$ 3.2 V	V_{CC} = 5.5 V	−2	3.3	
$V_{IH(S)}$	High-level output control input voltage	$V_{I(L)}$ = 1.8 V, V_{REF} = 2.5 V, $V_O \le$ 0.4 V	V_{CC} = 4.5 V	2		V
$V_{IL(S)}$	Low-level output control input voltage	$V_{I(L)}$ = 1.8 V, V_{REF} = 2.5 V, $V_O \ge$ 2.4 V	V_{CC} = 4.5 V		0.8	V
V_{OH}	High-level output voltage	$V_{I(L)}$ = 1.4 V, $V_{I(S)}$ = 0.8 V, I_{OH} = −1 mA, V_{REF} = 2.5 V	V_{CC} = 4.5 V	2		V
			V_{CC} = 5 V	2.7		
			V_{CC} = 5.5 V	2.7		
V_{OL}	Low-level output voltage	$V_{I(L)}$ = 3.8 V, $V_{I(S)}$ = 0.8 V, V_{REF} = 2.5 V	V_{CC} = 4.5 V, I_{OL} = 16 mA		0.6	V
			V_{CC} = 5 V, I_{OL} = 24 mA		0.5	
			V_{CC} = 5.5 V, I_{OL} = 24 mA		0.5	
$I_{IH(S)}$	High-level input current	$V_{I(L)}$ = 3.8 V, V_{REF} = 2.5 V	V_{CC} = 5.5 V, $V_{I(S)}$ = 2.4 V		20	µA
			V_{CC} = 5.5 V, $V_{I(S)}$ = 7 V		100	
$I_{IH(L)}$	High-level input current	$V_{I(S)}$ = 2.4 V, V_{REF} = 2.5 V	V_{CC} = 5 V, $V_{I(L)}$ = 5 V		100	µA
			V_{CC} = 5 V, $V_{I(L)}$ = 5.5 V		2	mA
$I_{IH(REF)}$	High-level input current	$V_{I(S)}$ = 2.4 V, V_{REF} = 3.4 V	V_{CC} = 5.5 V, $V_{I(L)}$ = 2.5 V		500	µA
$I_{IL(S)}$	Low-level input current	$V_{I(L)}$ = 1.8 V, V_{REF} = 0.1 V	V_{CC} = 5.5 V, $V_{I(S)}$ = 0.4 V		−400	µA
$I_{IL(L)}$	Low-level input current at Line input	$V_{I(L)}$ = 0.1 V, V_{REF} = 1.8 V	V_{CC} = 5.5 V, $V_{I(S)}$ = 0.4 V		−100	µA
$I_{IL(REF)}$	Low-level input current at REF pin	$V_{I(L)}$ = 1.8 V, V_{REF} = 0.1 V	V_{CC} = 5.5 V, $V_{I(S)}$ = 0.4 V		−100	µA
I_{OS}	Short-circuit output current‡	$V_{I(L)}$ = 1.8 V, V_{REF} = 2.8 V	V_{CC} = 5.5 V, $V_{I(S)}$ = 0.4 V	−30	−130	mA
I_{CCH}	Supply current, output high	$V_{I(S)}$ = 0,	V_{CC} = 5.5 V, $V_{I(L)} = V_{REF}$ − 100 mV		12	mA
I_{CCL}	Supply current, output low	$V_{I(S)}$ = 0,	V_{CC} = 5.5 V, $V_{I(L)} = V_{REF}$ + 100 mV		16	mA

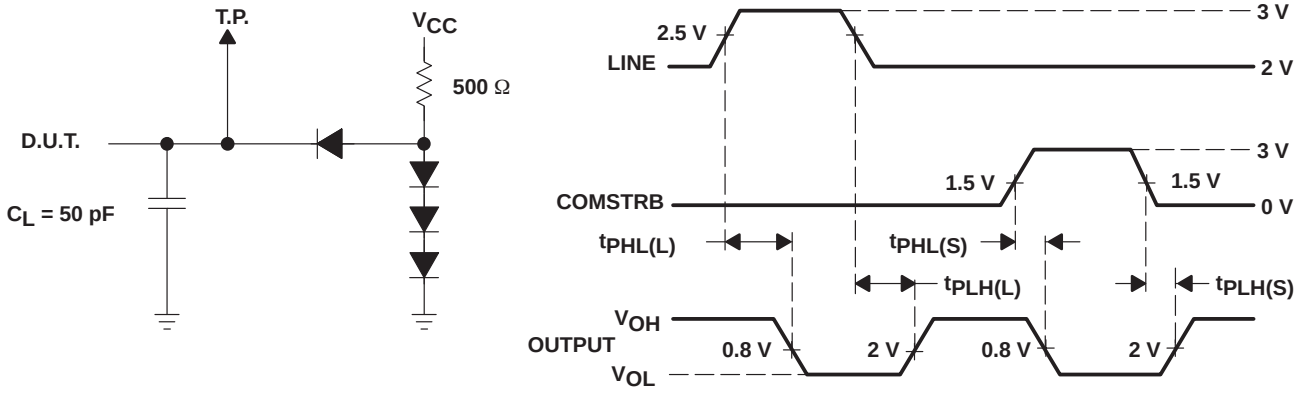
† Only one output should be shorted at a time, and duration of the short circuit should not exceed one second.

switching characteristics, V_{CC} = 5 V ±10%, V_{REF} = 2.5 V, T_A = 0°C to 70°C

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
$t_{PLH(L)}$	Propagation delay time, low- to high-level output from LINE	C_L = 50 pF, R_L = 500 Ω, See Figure 1	10	25	35	ns
$t_{PHL(L)}$	Propagation delay time, high- to low-level output from LINE	C_L = 50 pF, R_L = 500 Ω, See Figure 1	10	25	35	ns
$t_{PLH(S)}$	Propagation delay time, low- to high-level output from COMSTRB	C_L = 50 pF, R_L = 500 Ω, See Figure 1		11	22	ns
$t_{PHL(S)}$	Propagation delay time, high- to low-level output from COMSTRB	C_L = 50 pF, R_L = 500 Ω, See Figure 1		8	15	ns

† All typical values are at V_{CC} = 5 V, T_A = 25°C.

PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT **VOLTAGE WAVEFORMS**

NOTES: A. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, t_r and t_f ≤ 2 ns, and duty cycle = 50%.
B. C_L includes probe and jig capacitance.
C. All diodes are 1N914 (or equivalent).
D. The outputs are measured one at a time, with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
SN74LS2323DR	Active	Production	SOIC (D) | 8	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	LS2323
SN74LS2323DR.A	Active	Production	SOIC (D) | 8	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	LS2323

(1) **Status:** For more details on status, see our product life cycle.

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

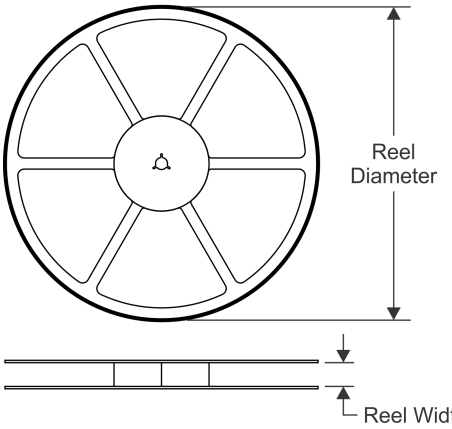
(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

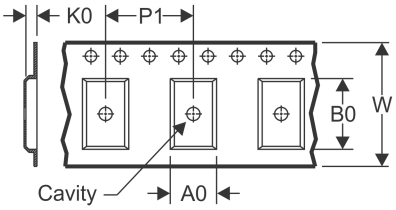
Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

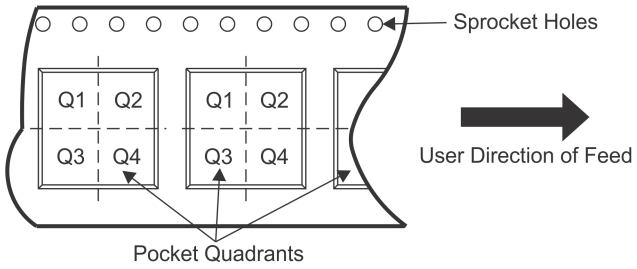


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

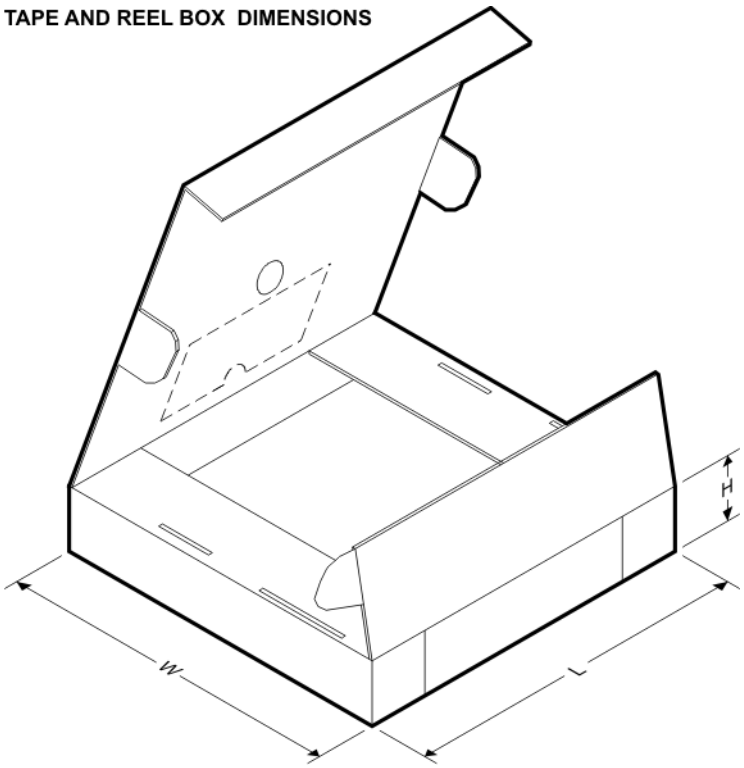
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

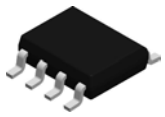
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LS2323DR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LS2323DR	SOIC	D	8	2500	340.5	336.1	25.0

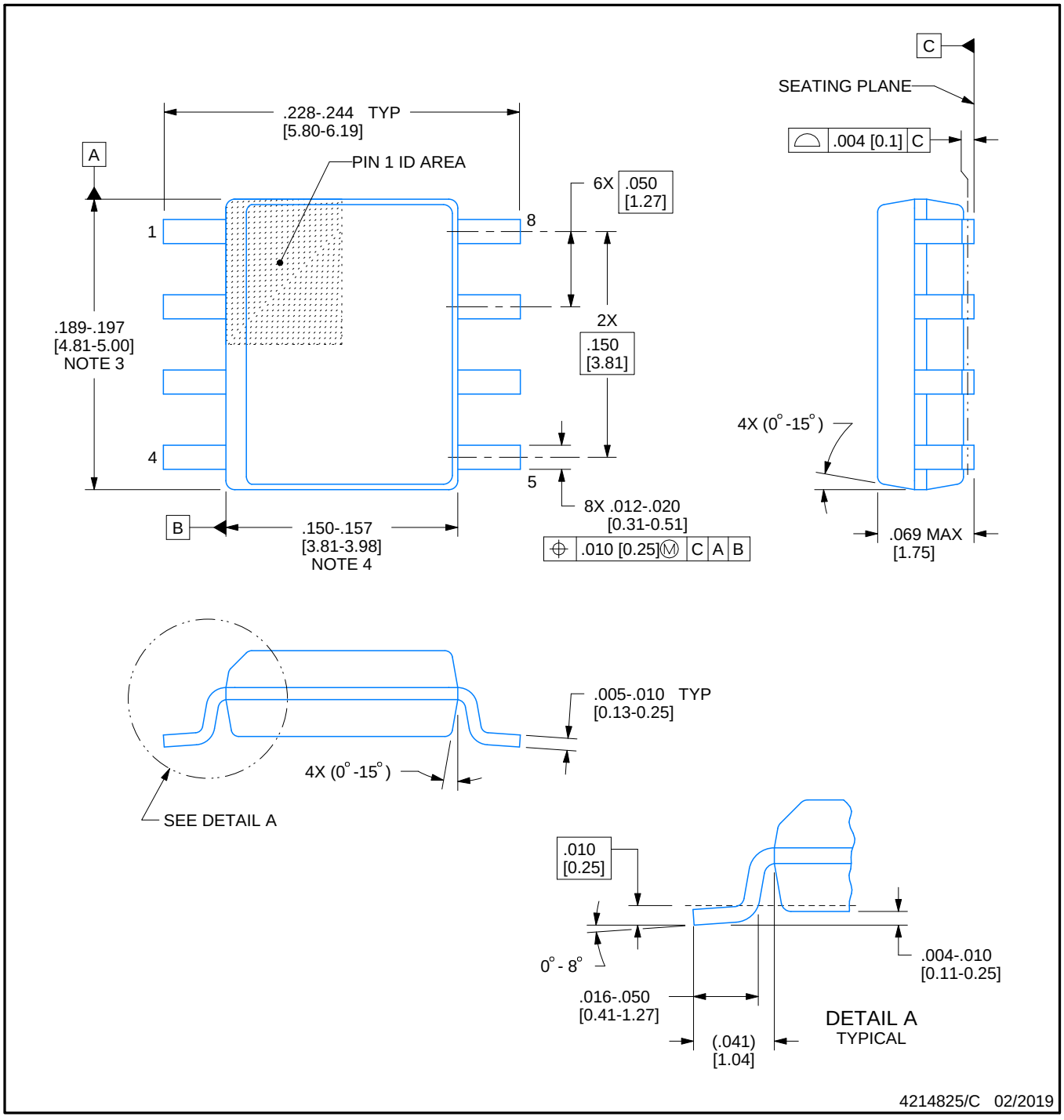


PACKAGE OUTLINE

D0008A

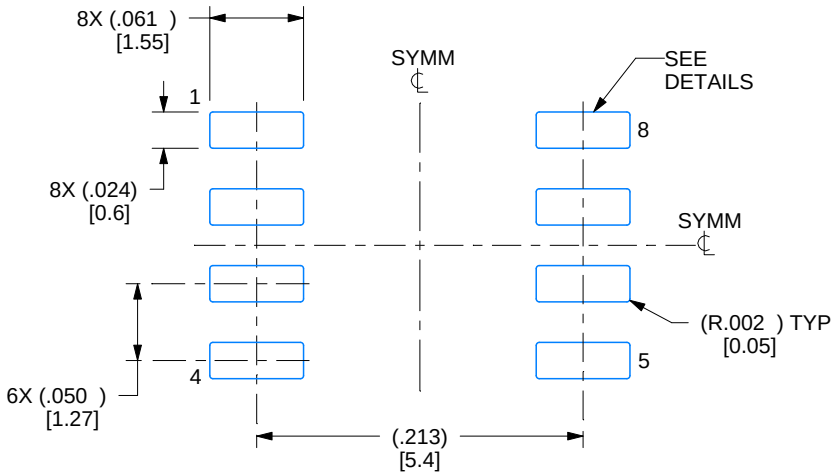
SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT

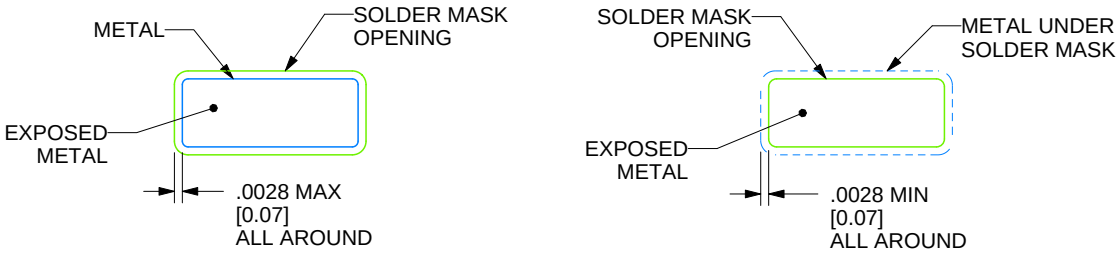


NOTES:

1. Linear dimensions are in inches [millimeters]. Dimensions in parenthesis are for reference only. Controlling dimensions are in inches. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 [0.15] per side.
4. This dimension does not include interlead flash.
5. Reference JEDEC registration MS-012, variation AA.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:8X



SOLDER MASK DETAILS

4214825/C 02/2019

NOTES: (continued)

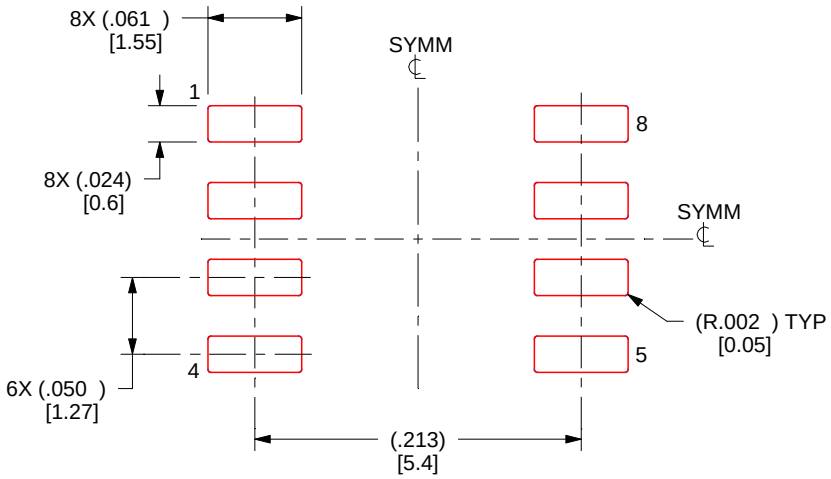
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

D0008A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



SOLDER PASTE EXAMPLE
BASED ON .005 INCH [0.125 MM] THICK STENCIL
SCALE:8X

4214825/C 02/2019

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

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