

DS90LV027 LVDS Dual High Speed Differential Driver

Check for Samples: [DS90LV027](#)

FEATURES

- Ultra Low Power Dissipation
- Operating Range above 155 Mbps
- Flow-through pinout simplifies PCB layout
- Conforms to TIA/EIA-644 Standard
- 8-Lead SOIC Package Saves Space
- $V_{CM} \pm 1V$ center around 1.2V
- Low Differential Output Swing Typical 340 mV
- Power Off Protection (outputs in high impedance)

DESCRIPTION

The DS90LV027 is a dual LVDS driver device optimized for high data rate and low power applications. The DS90LV027 is a current mode driver allowing power dissipation to remain low even at high frequency. In addition, the short circuit fault current is also minimized. The device is in a 8-lead SOIC package. The DS90LV027 has a flow-through design for easy PCB layout. The differential driver outputs provides low EMI with its low output swings typically 340 mV. Perfect for high speed transfer of clock and data. Pair with any of TI's LVDS receivers.

Connection Diagram

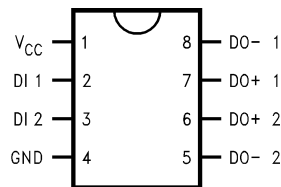
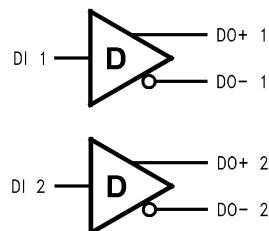


Figure 1. Dual-In-Line
See Package Number D (R-PDSO-G8)

Functional Diagram



Truth Table⁽¹⁾

Input/Output		
DI	DO+	DO-
L	L	H
H	H	L
DI > 0.8V and DI < 2.0V	X	X

- (1) H = Logic high level
L = Logic low level
X = indeterminant



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These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Absolute Maximum Ratings ⁽¹⁾

Supply Voltage (V_{CC})	-0.3V to +6V
Input Voltage (DI)	-0.3V to ($V_{CC} + 0.3V$)
Output Voltage (DO $\pm$)	-0.3V to +3.9V
Maximum Package Power Dissipation @ +25°C	
D Package	1190 mW
Derate D Package	9.5 mW/°C above +25°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature Range	
Soldering (4 sec.)	+260°C
ESD Rating ⁽²⁾	
(HBM 1.5 kΩ, 100 pF)	≥ 4.5 kV

- (1) "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be ensured. They are not meant to imply that the devices should be operated at these limits. [Electrical Characteristics](#) specifies conditions of device operation.
- (2) ESD Rating: HBM (1.5 kΩ, 100 pF) ≥ 4.5 kV

Recommended Operating Conditions

	Min	Typ	Max	Units
Supply Voltage (V_{CC})	3.0	3.3	3.6	V
Temperature (T_A)	0	25	70	°C

Electrical Characteristics

Over Supply Voltage and Operating Temperature ranges, unless otherwise specified. ⁽¹⁾ ⁽²⁾ ⁽³⁾

Symbol	Parameter	Conditions	Pin	Min	Typ	Max	Units
DIFFERENTIAL DRIVER CHARACTERISTICS							
V_{OD}	Output Differential Voltage	$R_L = 100\Omega$ (Figure 2)	DO+, DO-	250	340	450	mV
ΔV_{OD}	V_{OD} Magnitude Change			0	10	35	mV
V_{OH}	Output High Voltage				1.43	1.6	V
V_{OL}	Output Low Voltage			0.9	1.09		V
V_{OS}	Offset Voltage			0.9	1.25	1.6	V
ΔV_{OS}	Offset Magnitude Change			0	5	25	mV
I_{OZD}	TRI-STATE [®] Leakage	$V_{OUT} = V_{CC}$ or GND	DI	0	±1	±10	μA
I_{OXD}	Power-off Leakage	$V_{OUT} = 3.6V$ or GND, $V_{CC} = 0V$		0	±1	±10	μA
I_{OSD}	Output Short Circuit Current				-4	-6	mA
V_{IH}	Input High Voltage			2.0		V_{CC}	V
V_{IL}	Input Low Voltage			GND		0.8	V
I_{IH}	Input High Current	$V_{IN} = 3.6V$ or 2.4V			±1	±10	μA
I_{IL}	Input Low Current	$V_{IN} = GND$ or 0.5V			±1	±10	μA
V_{CL}	Input Clamp Voltage	$I_{CL} = -18$ mA		-1.5	-0.8		V
I_{CC}	Power Supply Current	No Load	V_{CC}		1	4	mA
		$R_L = 100\Omega$			8	11	mA

- (1) Current into device pins is defined as positive. Current out of device pins is defined as negative. All voltages are referenced to ground except V_{OD} .
- (2) All typicals are given for: $V_{CC} = +3.3V$ and $T_A = +25^\circ C$.
- (3) The DS90LV027 is a current mode device and only function with datasheet specification when a resistive load is applied to the drivers outputs.

Switching Characteristics

Over Supply Voltage and Operating Temperature Ranges, unless otherwise specified. ⁽¹⁾ ⁽²⁾

Symbol	Parameter	Conditions	Min	Typ	Max	Units
DIFFERENTIAL DRIVER CHARACTERISTICS						
t_{PHLD}	Differential Propagation Delay High to Low	$R_L = 100\Omega$, $C_L = 5\text{ pF}$ (Figure 3 and Figure 4)	1.5	3.4	6	ns
t_{PLHD}	Differential Propagation Delay Low to High		1.5	3.5	6	ns
t_{SKD}	Differential Skew $ t_{PHLD} - t_{PLHD} $		0	0.1	1.9	ns
t_{TLH}	Transition Low to High Time		0	1	3	ns
t_{THL}	Transition High to Low Time		0	1	3	ns

(1) C_L includes probe and fixture capacitance.

(2) Generator waveform for all tests unless otherwise specified: $f = 1\text{ MHz}$, $Z_O = 50\Omega$, $t_r \leq 6\text{ ns}$, $t_f \leq 6\text{ ns}$ (10%-90%).

PARAMETER MEASUREMENT INFORMATION

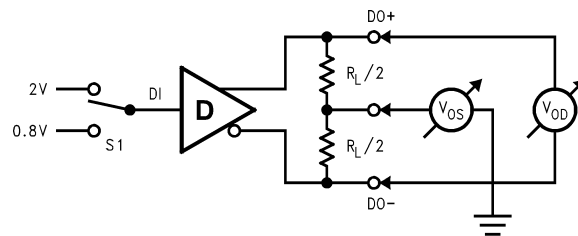


Figure 2. Differential Driver DC Test Circuit

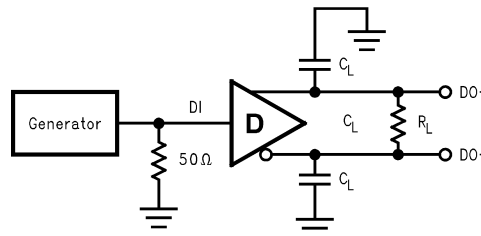


Figure 3. Differential Driver Propagation Delay and Transition Time Test Circuit

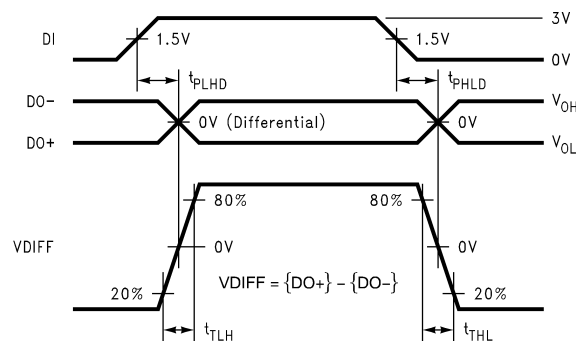


Figure 4. Differential Driver Propagation Delay and Transition Time Waveforms

APPLICATION INFORMATION

Table 1. Device Pin Descriptions

Pin #	Name	Description
2, 3	DI	TTL/CMOS driver input pins
6, 7	DO+	Non-inverting driver output pin
5, 8	DO–	Inverting driver output pin
4	GND	Ground pin
1	V _{CC}	Positive power supply pin, +3.3V ± 0.3V

REVISION HISTORY

Changes from Revision B (April 2013) to Revision C	Page
• Changed layout of National Data Sheet to TI format	4

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)
DS90LV027M/NOPB	Active	Production	SOIC (D) 8	95 TUBE	Yes	SN	Level-1-260C-UNLIM	0 to 70	90LV 027M
DS90LV027M/NOPB.A	Active	Production	SOIC (D) 8	95 TUBE	Yes	SN	Level-1-260C-UNLIM	0 to 70	90LV 027M
DS90LV027MX/NOPB	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	SN	Level-1-260C-UNLIM	0 to 70	90LV 027M
DS90LV027MX/NOPB.A	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	SN	Level-1-260C-UNLIM	0 to 70	90LV 027M

⁽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.

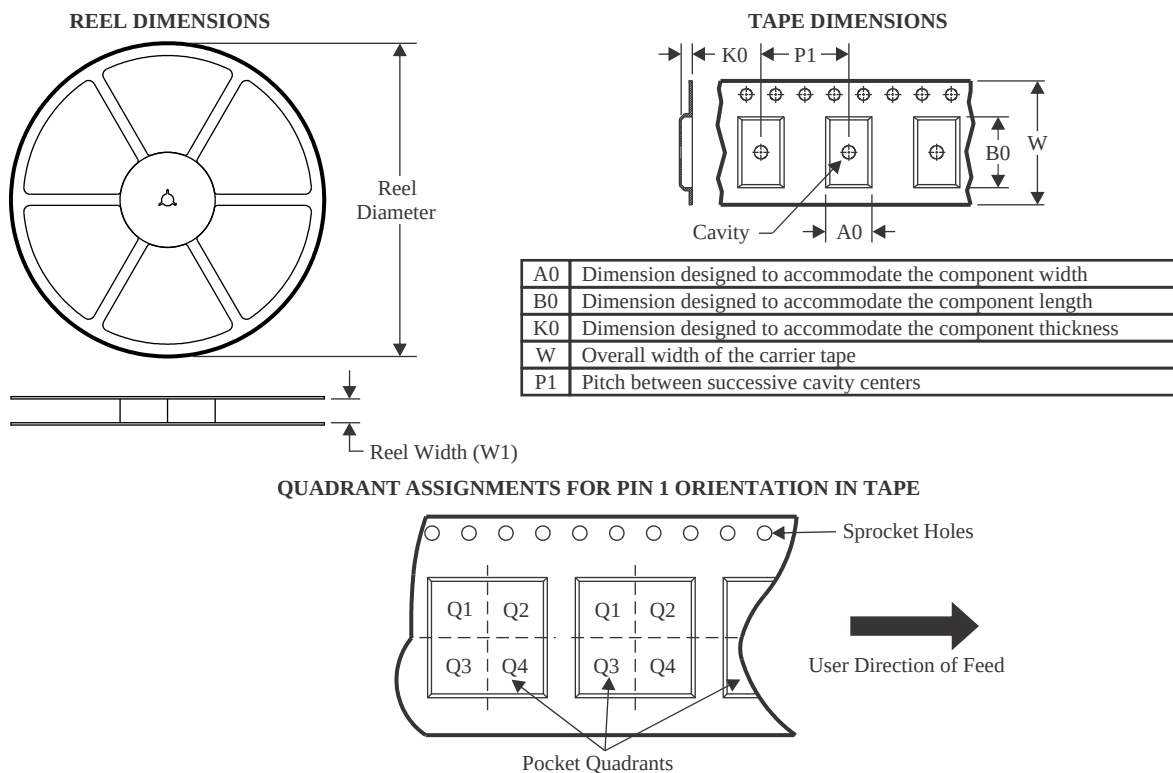
⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

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.

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TAPE AND REEL INFORMATION



*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
DS90LV027MX/NOPB	SOIC	D	8	2500	330.0	12.4	6.5	5.4	2.0	8.0	12.0	Q1

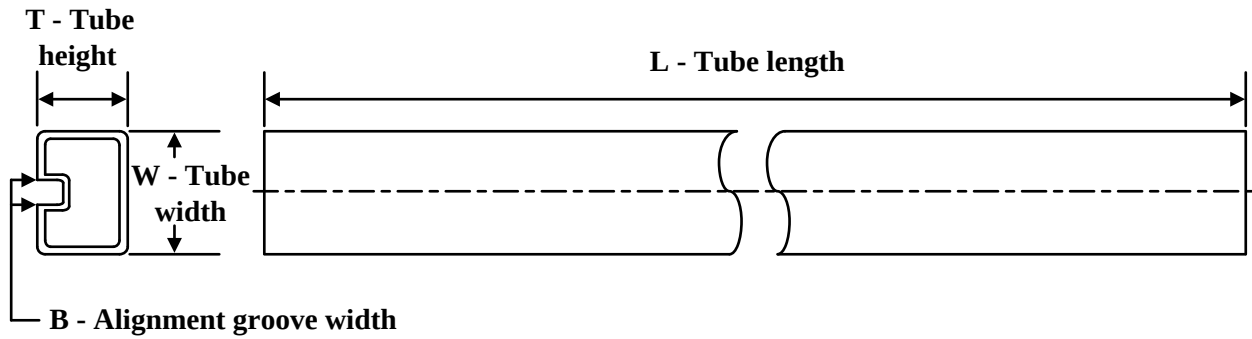
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

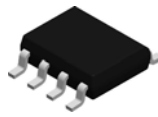
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
DS90LV027MX/NOPB	SOIC	D	8	2500	367.0	367.0	35.0

TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
DS90LV027M/NOPB	D	SOIC	8	95	495	8	4064	3.05
DS90LV027M/NOPB.A	D	SOIC	8	95	495	8	4064	3.05

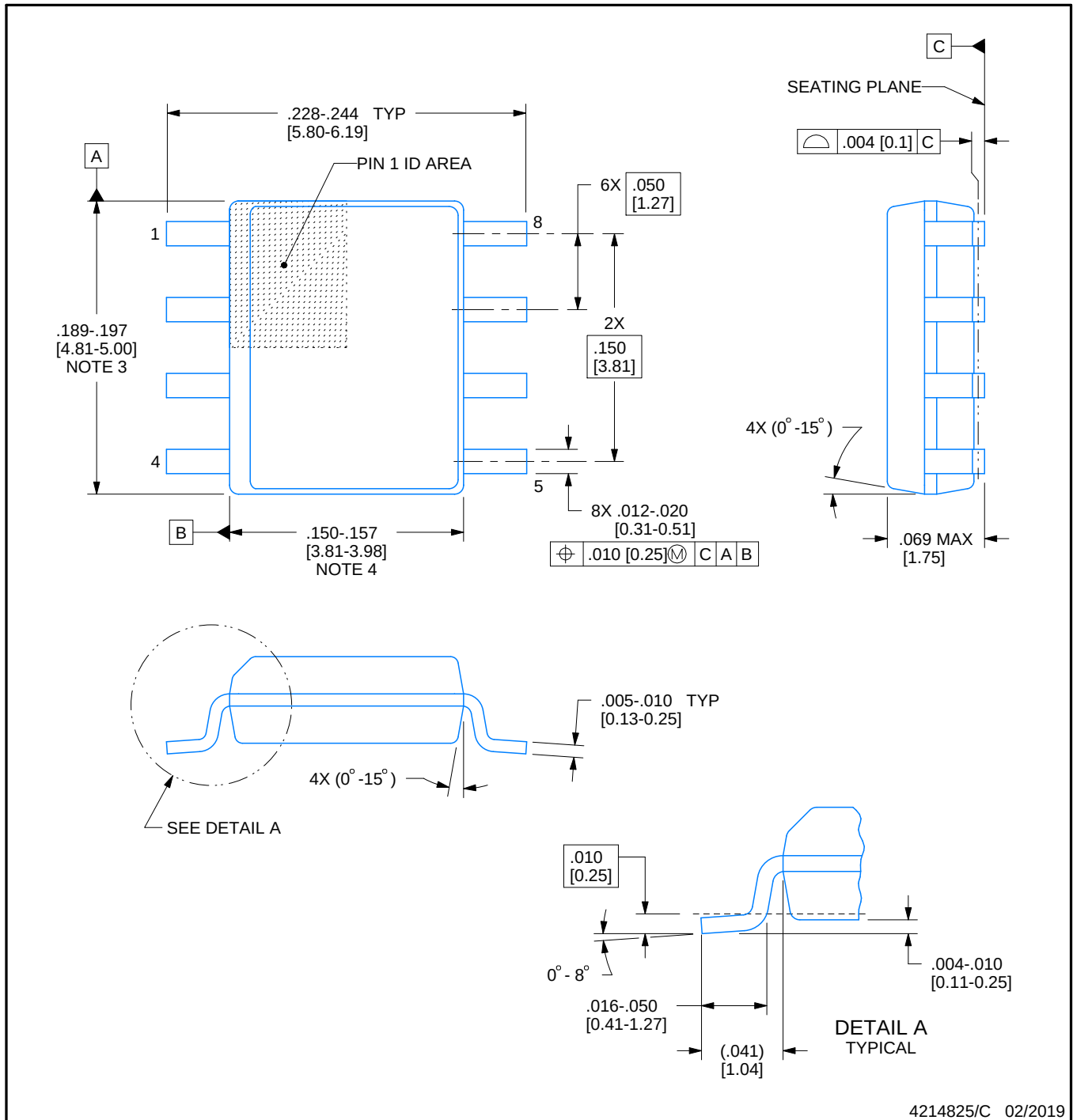


D0008A

PACKAGE OUTLINE

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



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NOTES:

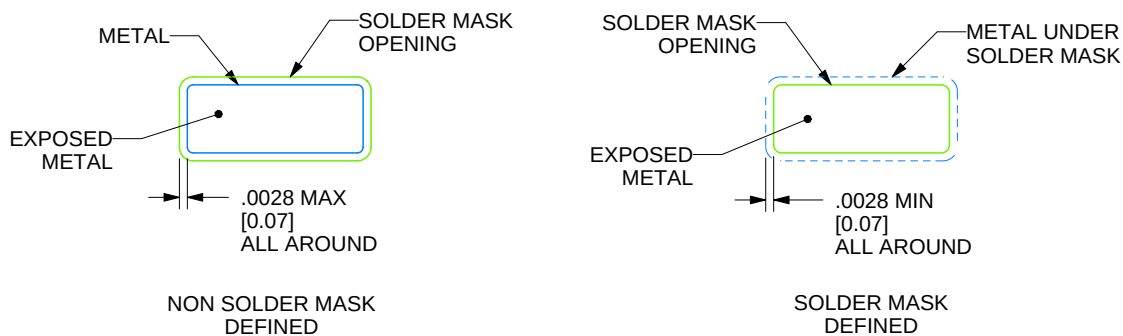
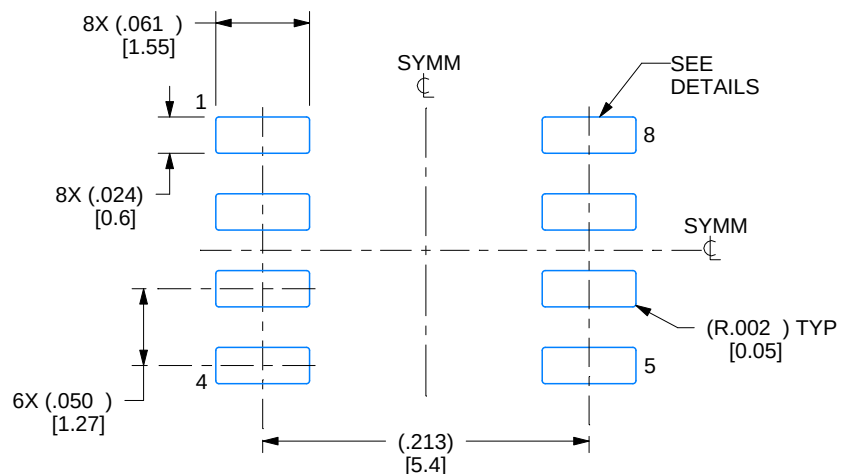
1. Linear dimensions are in inches [millimeters]. Dimensions in parenthesis are for reference only. Controlling dimensions are in inches. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate 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.

EXAMPLE BOARD LAYOUT

D0008A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



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NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

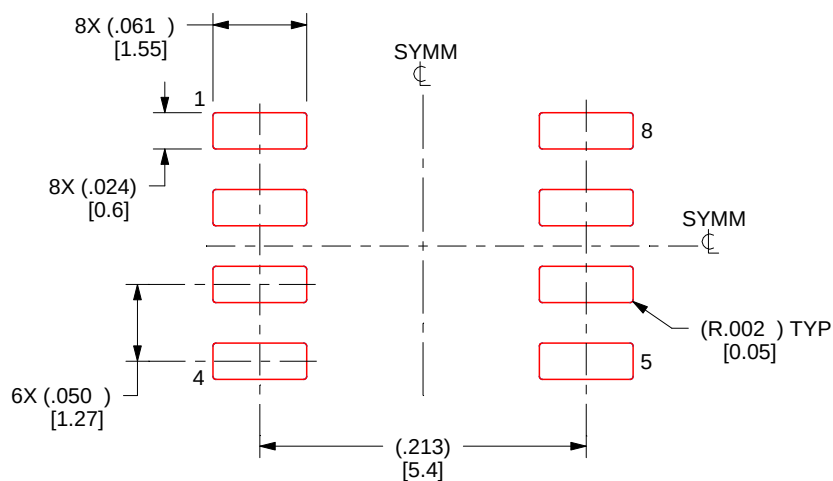
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

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

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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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