

LM1458/LM1558 Dual Operational Amplifier

Check for Samples: [LM1458](#), [LM1558](#)

FEATURES

- No Frequency Compensation Required
- Short-Circuit Protection
- Wide Common-Mode and Differential Voltage Ranges
- Low-Power Consumption
- 8-Lead TO-99 and 8-Lead PDIP
- No Latch Up When Input Common Mode Range is Exceeded

DESCRIPTION

The LM1458 and the LM1558 are general purpose dual operational amplifiers. The two amplifiers share a common bias network and power supply leads. Otherwise, their operation is completely independent.

The LM1458 is identical to the LM1558 except that the LM1458 has its specifications guaranteed over the temperature range from 0°C to +70°C instead of –55°C to +125°C.

Connection Diagram

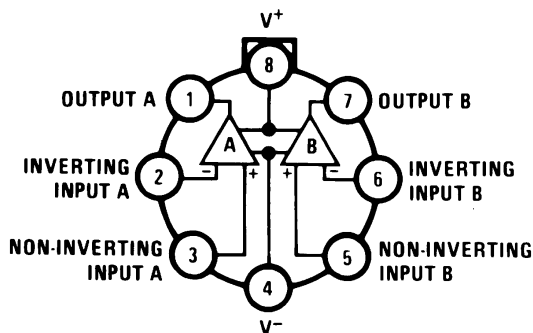


**Figure 1. TO-99 Package
(Top View)**
See Package Number LMC (O-MBCY-W8)

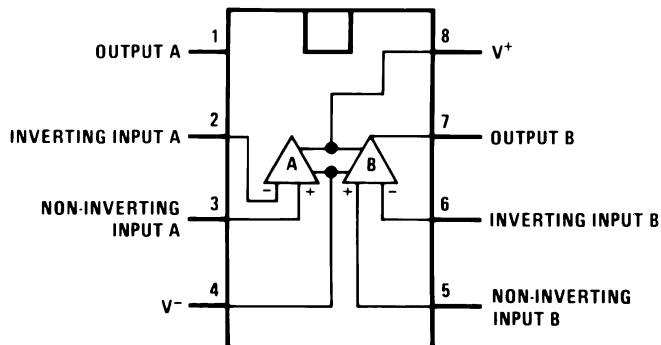


**Figure 2. Dual-In-Line Package
(Top View)**
See Package Number D (R-PDSO-G8) or
P (R-PDIP-T8)



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.



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Absolute Maximum Ratings⁽¹⁾⁽²⁾⁽³⁾

Supply Voltage	
LM1558	±22V
LM1458	±18V
Power Dissipation ⁽⁴⁾	
LM1558H/LM1458H	500 mW
LM1458N	400 mW
Differential Input Voltage	±30V
Input Voltage ⁽⁵⁾	±15V
Output Short-Circuit Duration	Continuous
Operating Temperature Range	
LM1558	–55°C to +125°C
LM1458	0°C to +70°C
Storage Temperature Range	–65°C to +150°C
Lead Temperature (Soldering, 10 sec.)	260°C
Soldering Information	
PDIP Package	
Soldering (10 seconds)	260°C
SOIC Package	
Vapor Phase (60 seconds)	215°C
Infrared (15 seconds)	220°C
See AN-450 "Surface Mounting Methods and Their Effect on Product Reliability" for other methods of soldering surface mount devices.	
ESD tolerance ⁽⁶⁾	300V

- (1) "Absolute Maximum Ratings" indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not guarantee specific performance limits.
- (2) Refer to RETS 1558V for LM1558J and LM1558H military specifications.
- (3) If Military/Aerospace specified devices are required, please contact the TI Sales Office/Distributors for availability and specifications.
- (4) The maximum junction temperature of the LM1558 is 150°C, while that of the LM1458 is 100°C. For operating at elevated temperatures, devices in the LMC package must be derated based on a thermal resistance of 150°C/W, junction to ambient or 20°C/W, junction to case. For the PDIP the device must be derated based on a thermal resistance of 187°C/W, junction to ambient.
- (5) For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
- (6) Human body model, 1.5 kΩ in series with 100 pF.

Electrical Characteristics⁽¹⁾

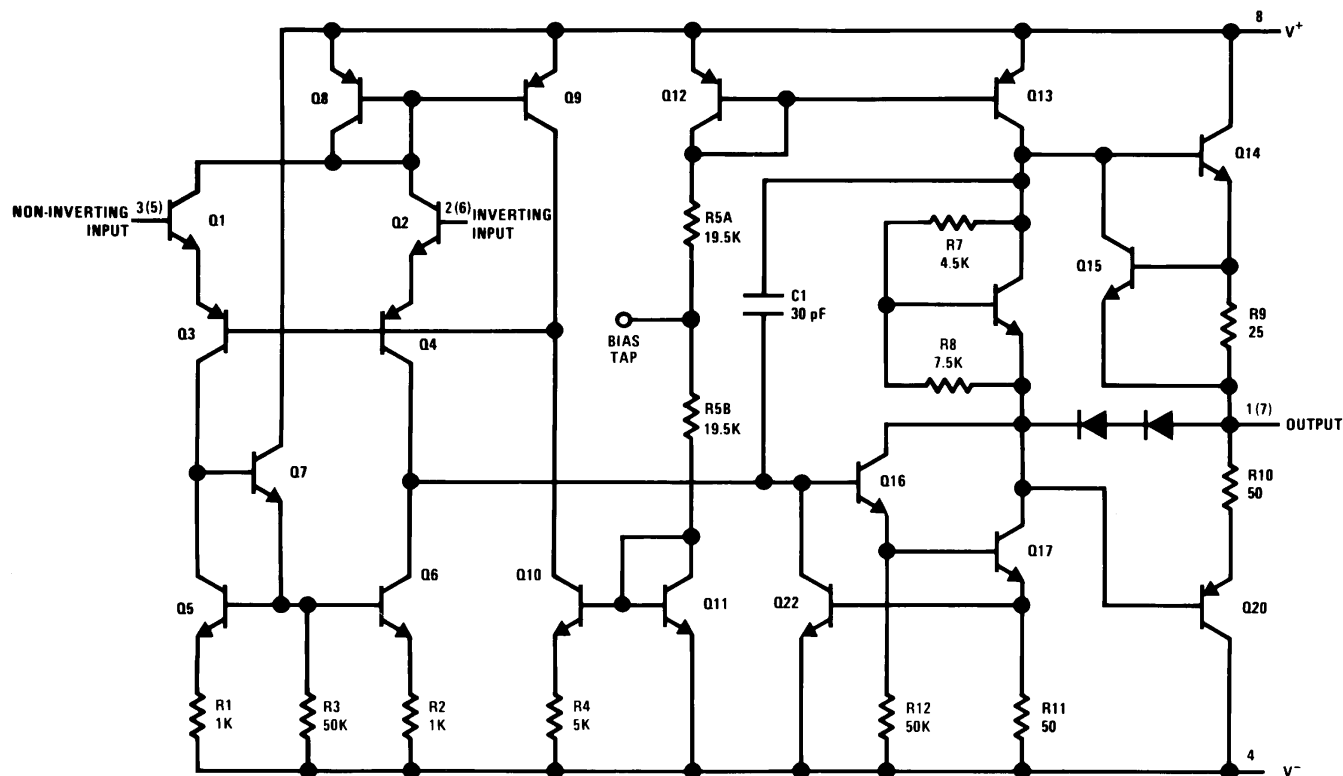
Parameter	Conditions	LM1558			LM1458			Units
		Min	Typ	Max	Min	Typ	Max	
Input Offset Voltage	$T_A = 25^\circ\text{C}$, $R_S \leq 10\text{ k}\Omega$		1.0	5.0		1.0	6.0	mV
Input Offset Current	$T_A = 25^\circ\text{C}$		80	200		80	200	nA
Input Bias Current	$T_A = 25^\circ\text{C}$		200	500		200	500	nA
Input Resistance	$T_A = 25^\circ\text{C}$	0.3	1.0		0.3	1.0		MΩ
Supply Current Both Amplifiers	$T_A = 25^\circ\text{C}$, $V_S = \pm 15\text{V}$		3.0	5.0		3.0	5.6	mA
Large Signal Voltage Gain	$T_A = 25^\circ\text{C}$, $V_S = \pm 15\text{V}$ $V_{OUT} = \pm 10\text{V}$, $R_L \geq 2\text{ k}\Omega$	50	160		20	160		V/mV
Input Offset Voltage	$R_S \leq 10\text{ k}\Omega$			6.0			7.5	mV
Input Offset Current				500			300	nA
Input Bias Current				1.5			0.8	μA
Large Signal Voltage Gain	$V_S = \pm 15\text{V}$, $V_{OUT} = \pm 10\text{V}$ $R_L \geq \text{k}\Omega$	25			15			V/mV
Output Voltage Swing	$V_S = \pm 15\text{V}$, $R_L = 10\text{ k}\Omega$ $R_L = 2\text{ k}\Omega$	±12	±14		±12	±14		V
		±10	±13		±10	±13		V

- (1) These specifications apply for $V_S = \pm 15\text{V}$ and $-55^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$, unless otherwise specified. With the LM1458, however, all specifications are limited to $0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ and $V_S = \pm 15\text{V}$.

Electrical Characteristics ⁽¹⁾ (continued)

Parameter	Conditions	LM1558			LM1458			Units
		Min	Typ	Max	Min	Typ	Max	
Input Voltage Range	$V_S = \pm 15V$	± 12			± 12			V
Common Mode Rejection Ratio	$R_S \leq 10\text{ k}\Omega$	70	90		70	90		dB
Supply Voltage Rejection Ratio	$R_S \leq 10\text{ k}\Omega$	77	96		77	96		dB

SCHEMATIC DIAGRAM



Numbers in parentheses are pin numbers for amplifier B.

REVISION HISTORY

Changes from Revision C (March 2013) to Revision D	Page
• Changed layout of National Data Sheet to TI format	3

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)
LM1458 MWC	Active	Production	WAFERSALE (YS) 0	1 NOT REQUIRED	-	Call TI	Level-1-NA-UNLIM	-40 to 85	
LM1458M/NOPB	Active	Production	SOIC (D) 8	95 TUBE	Yes	SN	Level-1-260C-UNLIM	0 to 70	LM 1458M
LM1458M/NOPB.B	Active	Production	SOIC (D) 8	95 TUBE	Yes	SN	Level-1-260C-UNLIM	0 to 70	LM 1458M
LM1458MX/NOPB	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	SN	Level-1-260C-UNLIM	0 to 70	LM 1458M
LM1458MX/NOPB.B	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	SN	Level-1-260C-UNLIM	0 to 70	LM 1458M
LM1458N/NOPB	Active	Production	PDIP (P) 8	40 TUBE	Yes	NIPDAU	Level-1-NA-UNLIM	0 to 70	LM1458N
LM1458N/NOPB.B	Active	Production	PDIP (P) 8	40 TUBE	Yes	NIPDAU	Level-1-NA-UNLIM	0 to 70	LM1458N
LM1458N/NOPBG4	Active	Production	PDIP (P) 8	40 TUBE	Yes	NIPDAU	Level-1-NA-UNLIM	0 to 70	LM1458N
LM1458N/NOPBG4.B	Active	Production	PDIP (P) 8	40 TUBE	Yes	NIPDAU	Level-1-NA-UNLIM	0 to 70	LM1458N
LM1558H	Active	Production	TO-99 (LMC) 8	500 OTHER	No	Call TI	Level-1-NA-UNLIM	-55 to 125	(LM1558H, LM1558H)
LM1558H/NOPB	Active	Production	TO-99 (LMC) 8	500 OTHER	Yes	Call TI	Level-1-NA-UNLIM	-55 to 125	(LM1558H, LM1558H)
MC1558G	Active	Production	TO-99 (LMC) 8	500 OTHER	No	Call TI	Level-1-NA-UNLIM	-55 to 125	(LM1558H, LM1558H)

⁽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.

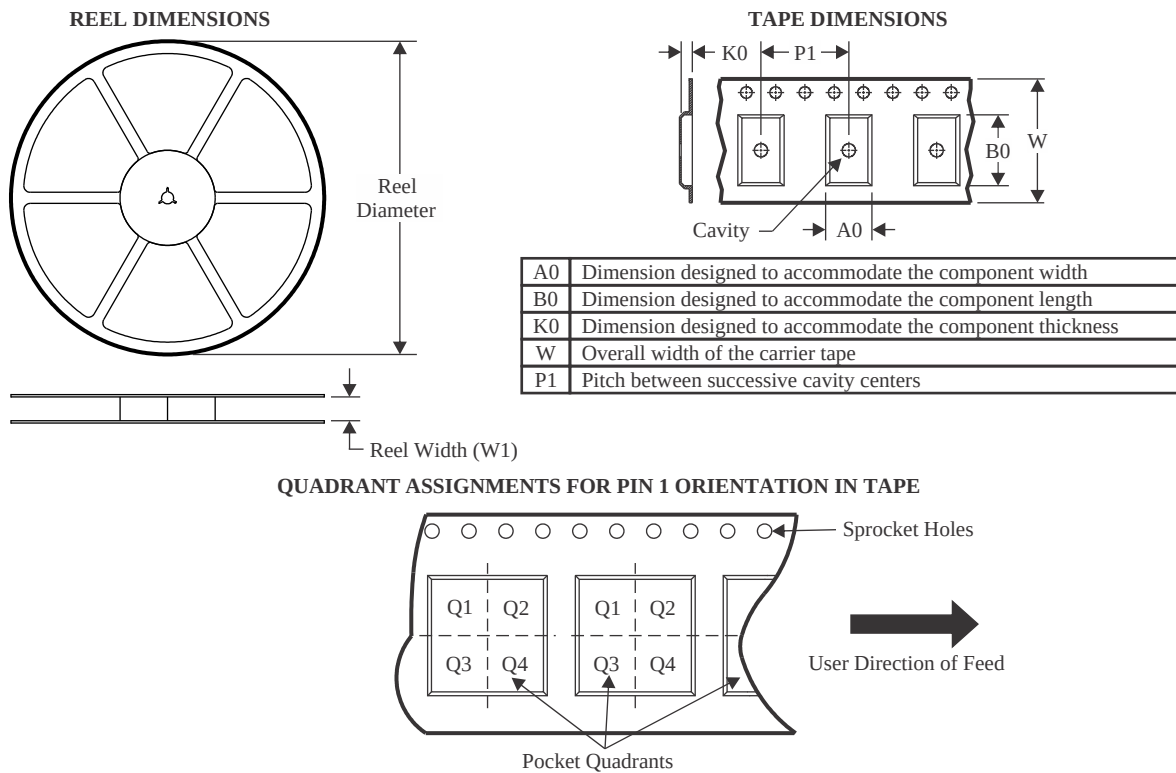
(6) Part marking: There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

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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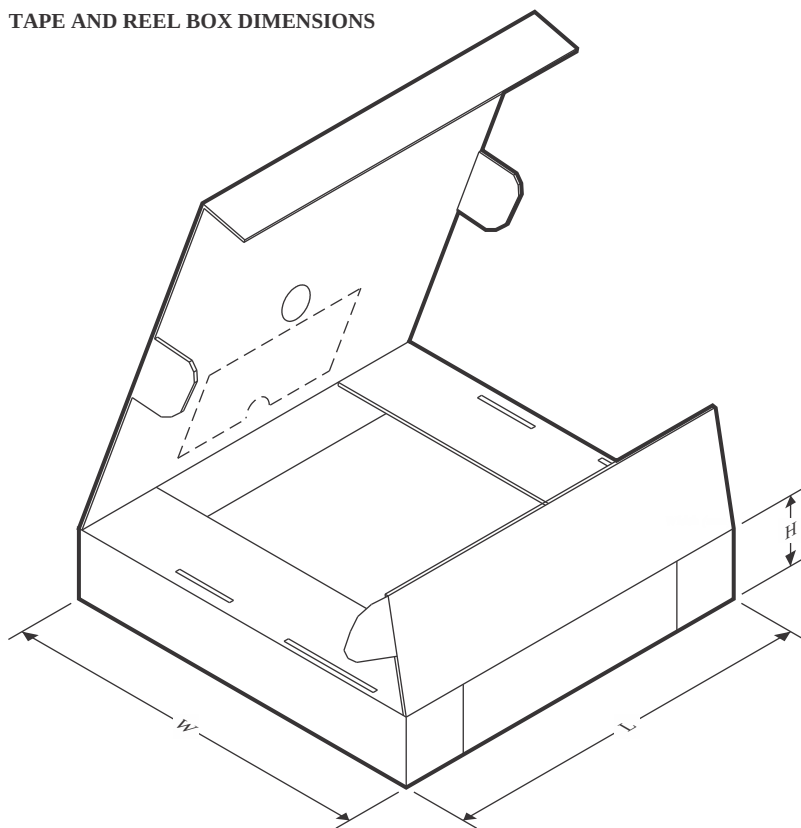
TAPE AND REEL INFORMATION



*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
LM1458MX/NOPB	SOIC	D	8	2500	330.0	12.4	6.5	5.4	2.0	8.0	12.0	Q1

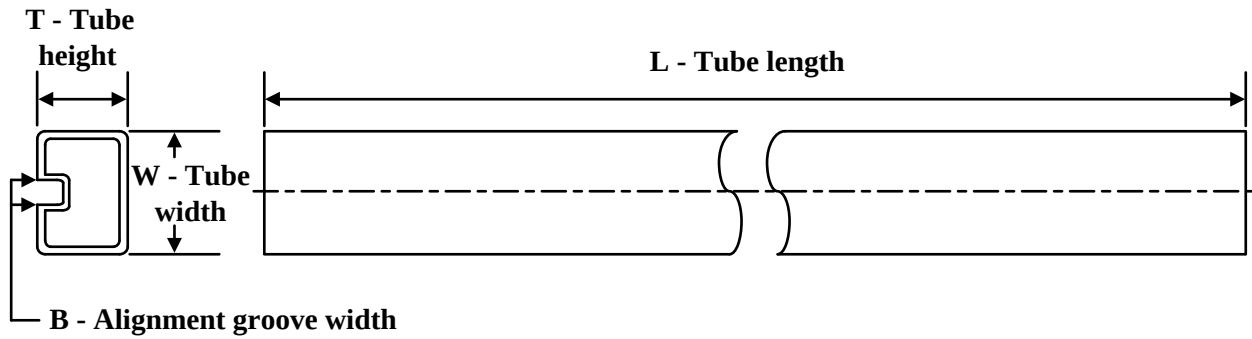
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
LM1458MX/NOPB	SOIC	D	8	2500	367.0	367.0	35.0

TUBE



*All dimensions are nominal

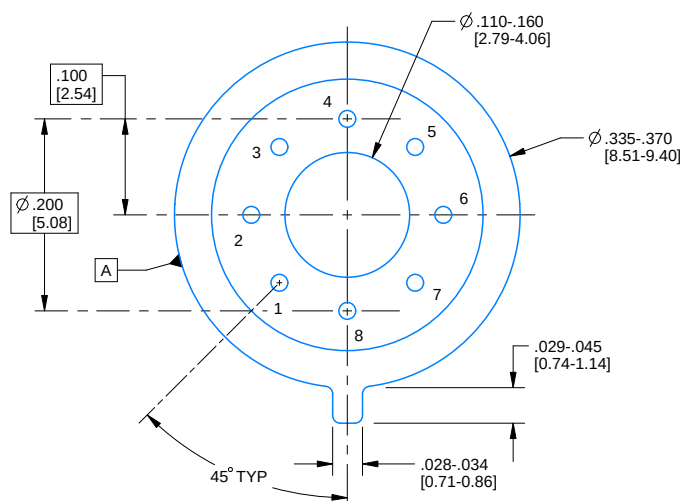
Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
LM1458M/NOPB	D	SOIC	8	95	495	8	4064	3.05
LM1458M/NOPB.B	D	SOIC	8	95	495	8	4064	3.05
LM1458N/NOPB	P	PDIP	8	40	502	14	11938	4.32
LM1458N/NOPB.B	P	PDIP	8	40	502	14	11938	4.32
LM1458N/NOPBG4	P	PDIP	8	40	502	14	11938	4.32
LM1458N/NOPBG4.B	P	PDIP	8	40	502	14	11938	4.32

LMC0008A

TO-CAN - 5.72 mm max height

Technical drawing of a mechanical part with dimensions and tolerances:

- Top view: $\varnothing .305-.335$ [7.75-8.51]
- Left side view: .040 MAX [1.02]
- Right side view: .165-.185 [4.19-4.70], .225 [5.72] MAX
- Bottom view: .500 MIN [12.7]
- Bottom view: 8X $\varnothing .016-.021$ [0.41-0.53]
- Bottom view: $\varnothing .010$ [0.25] (M) C A
- Bottom view: UNCONTROLLED LEAD DIA .055 [1.397] MAX
- Bottom view: SEATING PLANE
- Bottom view: .010-.040 [0.25-1.02]



NOTES:

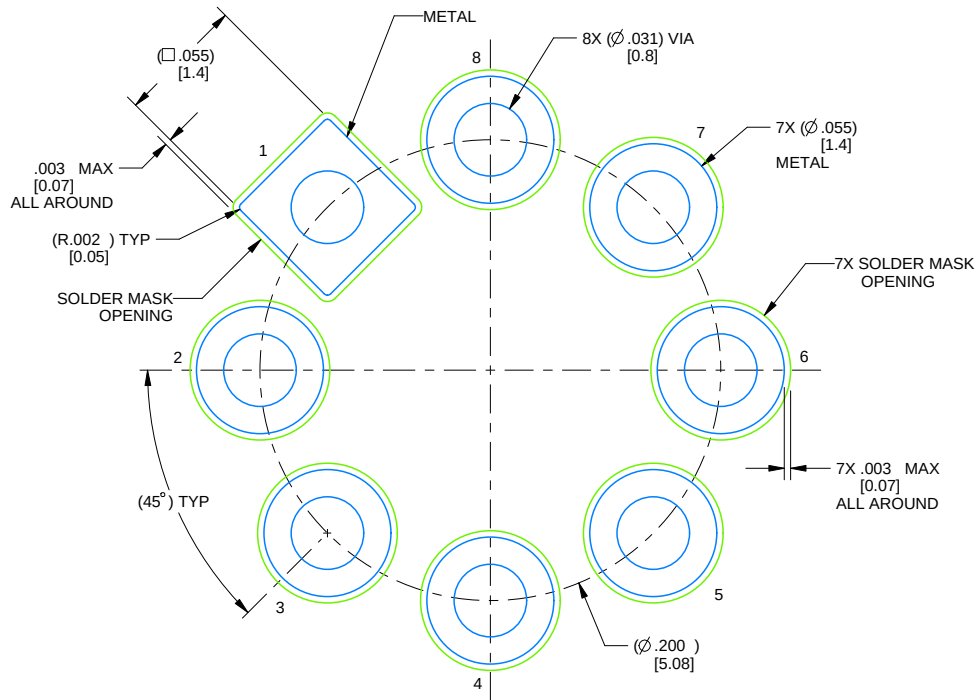
1. All linear dimensions are in inches [millimeters]. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Pin numbers shown for reference only. Numbers may not be marked on package.
4. Reference JEDEC registration MO-002/TO-99.

EXAMPLE BOARD LAYOUT

LMC0008A

TO-CAN - 5.72 mm max height

TRANSISTOR OUTLINE



LAND PATTERN EXAMPLE

NON-SOLDER MASK DEFINED
SCALE: 12X

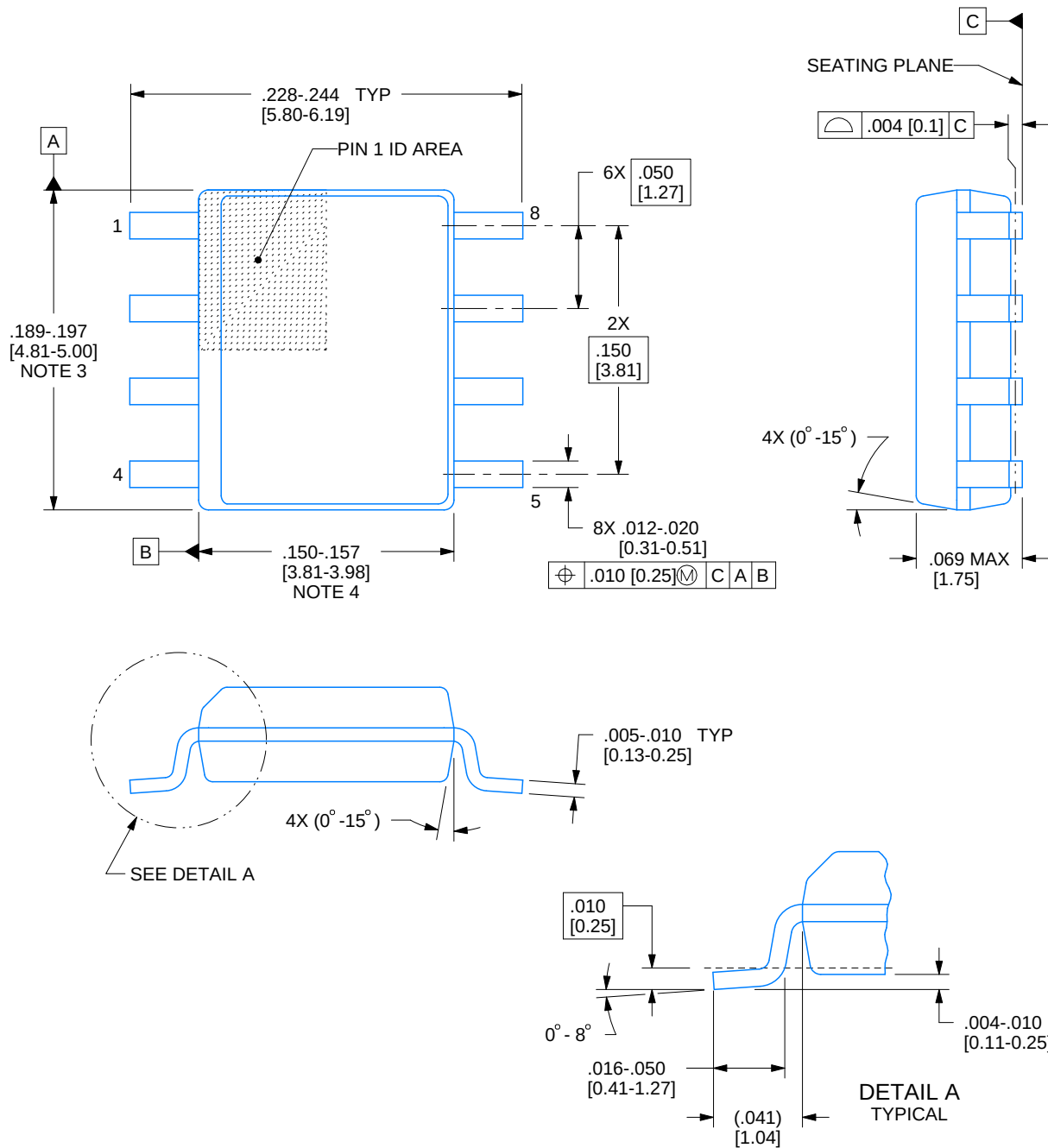
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D0008A

PACKAGE OUTLINE

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



4214825/C 02/2019

NOTES:

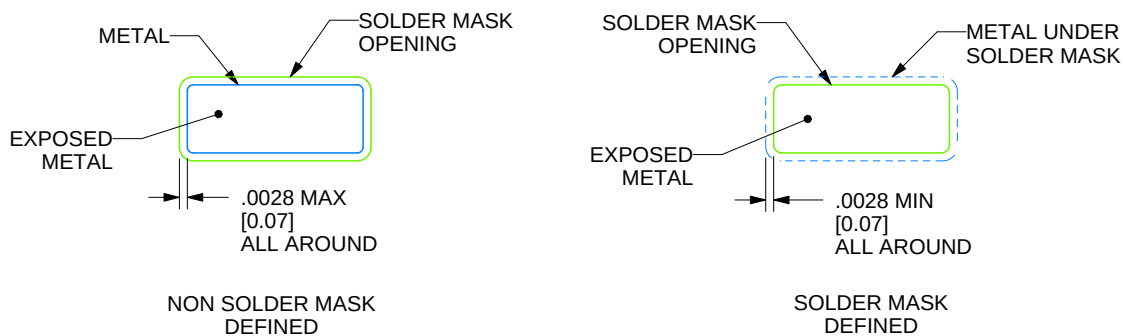
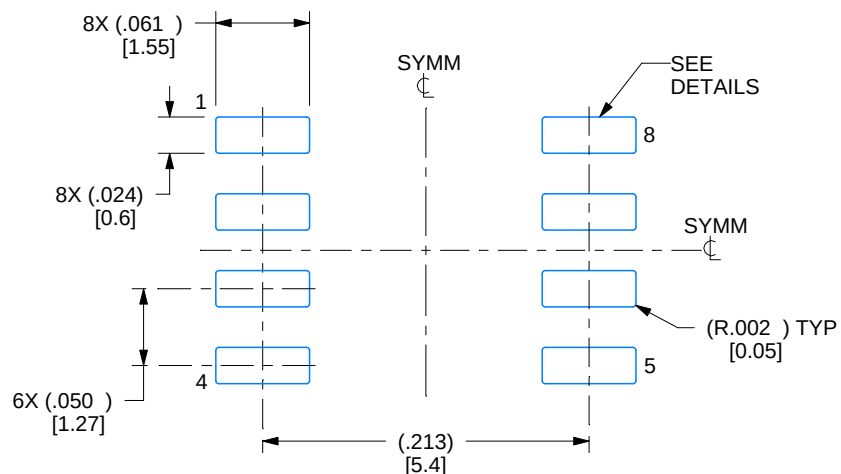
1. Linear dimensions are in inches [millimeters]. Dimensions in parenthesis are for reference only. Controlling dimensions are in inches. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate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



4214825/C 02/2019

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

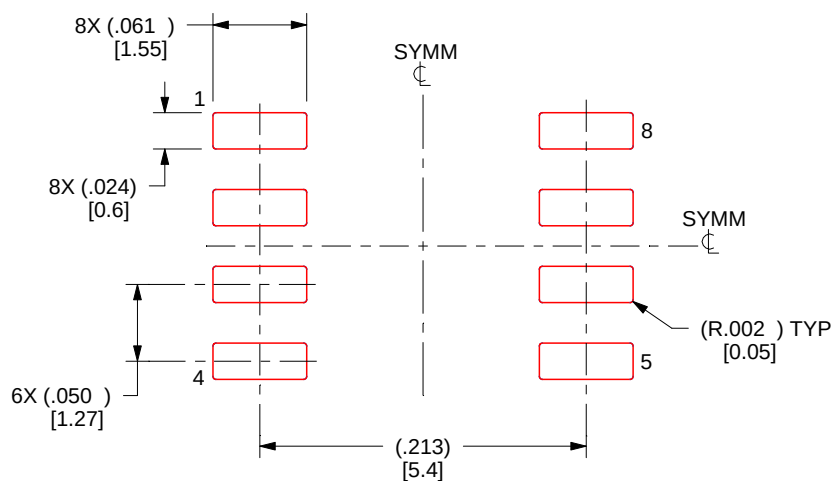
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

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

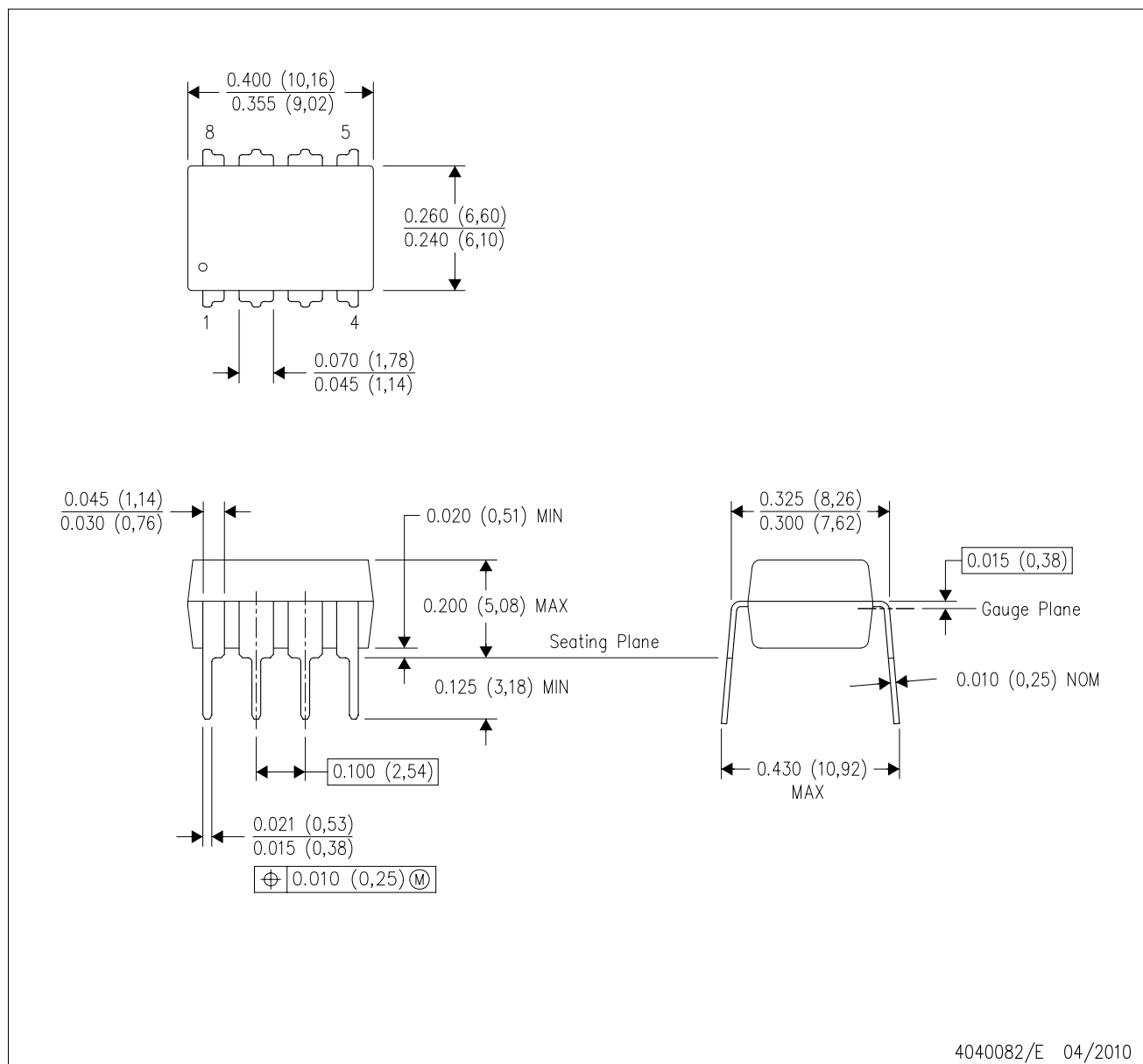
4214825/C 02/2019

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.

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 variation BA.

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