

TLV2361, TLV2362 HIGH-PERFORMANCE LOW-VOLTAGE OPERATIONAL AMPLIFIERS

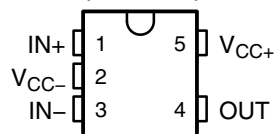
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- **Low Supply-Voltage Operation** . . . $V_{CC} = \pm 1 \text{ V Min}$
- **Wide Bandwidth** . . . 7 MHz Typ at $V_{CC\pm} = \pm 2.5 \text{ V}$
- **High Slew Rate** . . . 3 V/ μs Typ at $V_{CC\pm} = \pm 2.5 \text{ V}$
- **Wide Output Voltage Swing** . . . $\pm 2.4 \text{ V Typ}$ at $V_{CC\pm} = \pm 2.5 \text{ V}$, $R_L = 10 \text{ k}\Omega$
- **Low Noise** . . . 8 nV/ $\sqrt{\text{Hz}}$ Typ at $f = 1 \text{ kHz}$

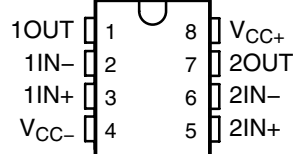
description/ordering information

The TLV236x devices are high-performance dual operational amplifiers built using an original Texas Instruments bipolar process. These devices can be operated at a very low supply voltage ($\pm 1 \text{ V}$), while maintaining a wide output swing. The TLV236x devices offer a dramatically improved dynamic range of signal conditioning in low-voltage systems. The TLV236x devices also provide higher performance than other general-purpose operational amplifiers by combining higher unity-gain bandwidth and faster slew rate. With their low distortion and low-noise performance, these devices are well suited for audio applications.

TLV2361 . . . DBV PACKAGE
(TOP VIEW)



TLV2362 . . . D, DGK, P, PS, OR PW PACKAGE
(TOP VIEW)



ORDERING INFORMATION

T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING‡
–0°C to 70°C	SOT-23-5 (DBV)	Reel of 3000	TLV2361CDBVR	YC3_
		Reel of 250	TLV2361CDBVT	
–40°C to 85°C	SOT-23-5 (DBV)	Reel of 3000	TLV2361IDBVR	YC4_
		Reel of 250	TLV2361IDBVT	
	MSOP/VSSOP (DGK)	Reel of 2500	TLV2362IDGKR	YBS
	PDIP (P)	Tube of 50	TLV2362IP	TLV2362IP
	SOIC (D)	Tube of 75	TLV2362ID	2362I
		Reel of 2500	TLV2362IDR	
	SOP (PS)	Reel of 2000	TLV2362IPSR	TY2362
	TSSOP (PW)	Tube of 150	TLV2362IPW	TY2362
		Reel of 2000	TLV2362IPWR	

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

‡ DBV: The actual top-side marking has one additional character that designates the wafer fab/assembly site.



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**TEXAS
INSTRUMENTS**

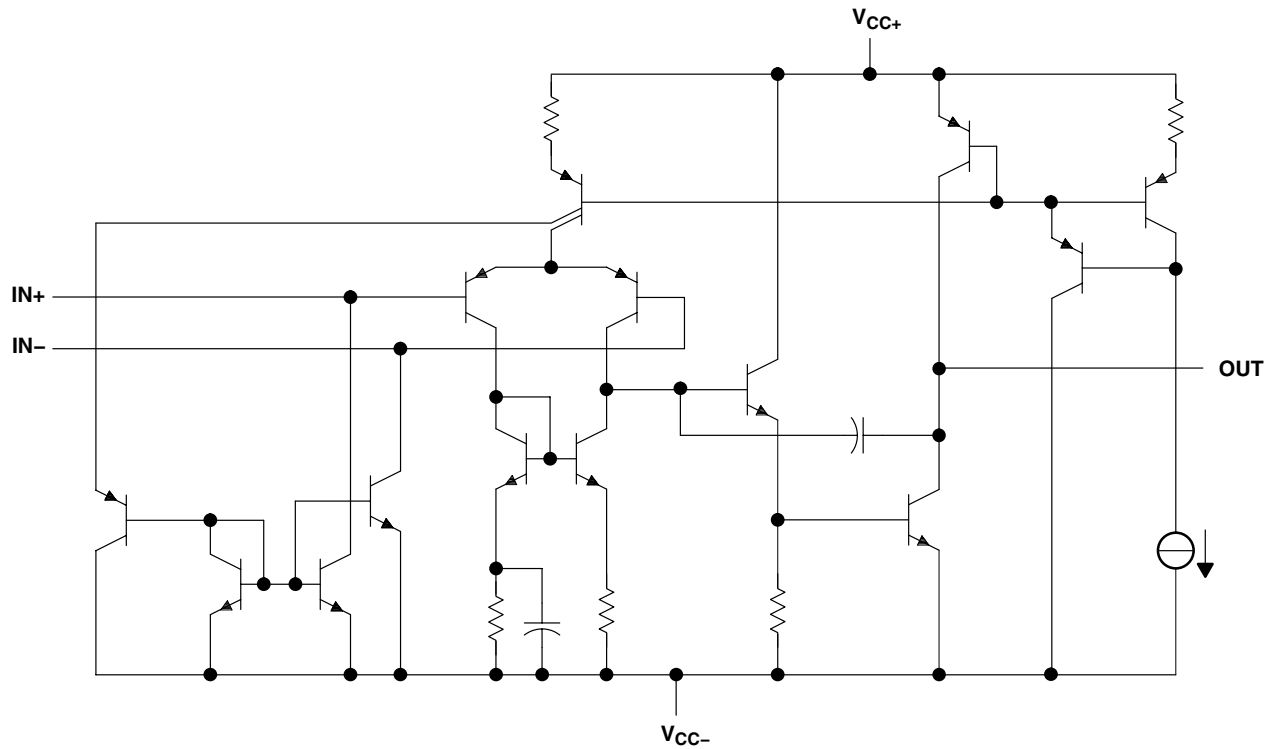
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equivalent schematic (each amplifier)



ACTUAL DEVICE COMPONENT COUNT		
COMPONENT	TLV2361	TLV2362
Transistors	30	46
Resistors	6	11
Diodes	1	1
Capacitors	2	4
JFET	1	1

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

Supply voltage, V_{CC+} (see Note 1)	3.5 V
Supply voltage, V_{CC-} (see Note 1)	–3.5 V
Differential input voltage, V_{ID} (see Note 2)	± 3.5 V
Input voltage, V_I (any input) (see Notes 1 and 3)	$V_{CC\pm}$
Output voltage, V_O	± 3.5 V
Output current, I_O	20 mA
Duration of short-circuit current at (or below) 25°C (output shorted to GND)	Unlimited
Package thermal impedance, θ_{JA} (see Notes 4 and 5):	
D package	97°C/W
DBV package	206°C/W
DGK package	172°C/W
P package	85°C/W
PS package	95°C/W
PW package	149°C/W
Operating virtual junction temperature, T_J	150°C
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. All voltage values, except differential voltages, are with respect to the midpoint between V_{CC+} and V_{CC-} .
 2. Differential voltages are at $IN+$ with respect to $IN-$.
 3. All input voltage values must not exceed V_{CC-} .
 4. Maximum power dissipation is a function of $T_J(\text{max})$, θ_{JA} , and T_A . The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(\text{max}) - T_A)/\theta_{JA}$. Selecting the maximum of 150°C can affect reliability.
 5. The package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions

			MIN	MAX	UNIT
V_{CC}	Supply voltage		± 1	± 2.5	V
T_A	Operating free-air temperature	TLV2361C	0	70	°C
		TLV2361I, TLV2362I	–40	85	



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TLV2361 and TLV2362 electrical characteristics, $V_{CC\pm} = \pm 1.5 \text{ V}$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T_A	MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage	$V_O = 0$, $V_{IC} = 0$		25°C		1	6	mV
				Full range			7.5	
I_{IO}	Input offset current	$V_O = 0$, $V_{IC} = 0$		25°C		5	100	nA
				Full range			150	
I_{IB}	Input bias current	$V_O = 0$, $V_{IC} = 0$		25°C		20	150	nA
				Full range			250	
V_{IC}	Common-mode input voltage	$ V_{IO} \leq 7.5 \text{ mV}$		25°C	± 0.5			V
				Full range	± 0.5			
V_{OM+}	Maximum positive-peak output voltage	$R_L = 10 \text{ k}\Omega$		25°C	1.2	1.4		V
		$R_L \geq 10 \text{ k}\Omega$		Full range	1.2			
V_{OM-}	Maximum negative-peak output voltage	$R_L = 10 \text{ k}\Omega$		25°C	-1.2	-1.4		V
		$R_L \geq 10 \text{ k}\Omega$		Full range	-1.2			
I_{CC}	Supply current (per amplifier)	$V_O = 0$, No load		25°C		1.4	2.25	mA
				Full range			2.75	
A_{VD}	Large-signal differential voltage amplification	$V_O = \pm 1 \text{ V}$, $R_L = 10 \text{ k}\Omega$	TLV2361	25°C	60	80		dB
			TLV2362			55		
CMRR	Common-mode rejection ratio	$V_{IC} = \pm 0.5 \text{ V}$		25°C		75		dB
k_{SVR}	Supply-voltage rejection ratio	$V_{CC\pm} = \pm 1.5 \text{ V}$ to $\pm 2.5 \text{ V}$		25°C		80		dB

TLV2361 and TLV2362 operating characteristics, $V_{CC\pm} = \pm 1.5 \text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS				TYP	UNIT
SR	Slew rate	$A_V = 1$,	$V_I = \pm 0.5 \text{ V}$			2.5	V/ μs
B_1	Unity-gain bandwidth	$A_V = 40$,	$R_L = 10 \text{ k}\Omega$,	$C_L = 100 \text{ pF}$		6	MHz
V_n	Equivalent input noise voltage	$R_S = 100 \Omega$,	$R_F = 10 \text{ k}\Omega$,	$f = 1 \text{ kHz}$		9	nV/ $\sqrt{\text{Hz}}$



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TLV2361 and TLV2362 electrical characteristics, $V_{CC\pm} = \pm 2.5$ V (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T_A	MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage	$V_O = 0,$ $V_{IC} = 0$		25°C		1	6	mV
				Full range			7.5	
I_{IO}	Input offset current	$V_O = 0,$ $V_{IC} = 0$		25°C		5	100	nA
				Full range			150	
I_{IB}	Input bias current	$V_O = 0,$ $V_{IC} = 0$		25°C		20	150	nA
				Full range			250	
V_{IC}	Common-mode input voltage	$ V_{IO} \leq 7.5$ mV		25°C	± 1.5			V
				Full range	± 1.4			
V_{OM+}	Maximum positive-peak output voltage	$R_L = 10$ k Ω		25°C	2	2.4		V
		$R_L \geq 10$ k Ω		Full range	2			
V_{OM-}	Maximum negative-peak output voltage	$R_L = 10$ k Ω		25°C	-2	-2.4		V
		$R_L \geq 10$ k Ω		Full range	-2			
I_{CC}	Supply current (per amplifier)	$V_O = 0,$ No load		25°C		1.75	2.5	mA
				Full range			3	
A_{VD}	Large-signal differential voltage amplification	$V_O = \pm 1$ V, $R_L = 10$ k Ω	TLV2361	25°C	60	80		dB
			TLV2362			60		
CMRR	Common-mode rejection ratio	$V_{IC} = \pm 0.5$ V		25°C		85		dB
k_{SVR}	Supply-voltage rejection ratio	$V_{CC\pm} = \pm 1.5$ V to ± 2.5 V		25°C		80		dB

TLV2361 and TLV2362 operating characteristics, $V_{CC\pm} = \pm 2.5$ V, $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS		TYP	UNIT
SR	Slew rate	$A_V = 1,$ $V_I = \pm 0.5$ V		3	V/ μ s
B_1	Unity-gain bandwidth	$A_V = 40,$ $R_L = 10$ k $\Omega,$ $C_L = 100$ pF		7	MHz
V_n	Equivalent input noise voltage	$R_S = 100$ $\Omega,$ $R_F = 10$ k $\Omega,$ $f = 1$ kHz		8	nV/ $\sqrt{\text{Hz}}$
THD + N	Total harmonic distortion, plus noise	$A_V = 1,$ $V_O = \pm 1.2$ V, $R_L = 10$ k $\Omega,$ $f = 3$ kHz		0.004	%



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TYPICAL CHARACTERISTICS

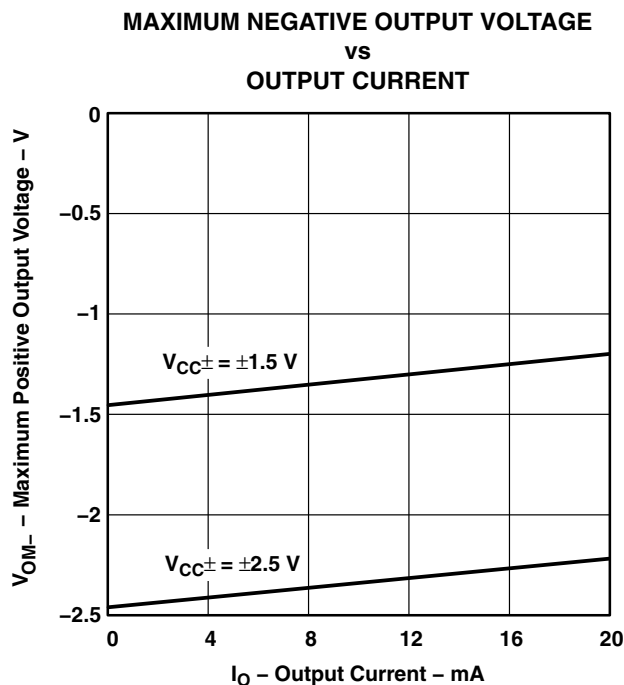
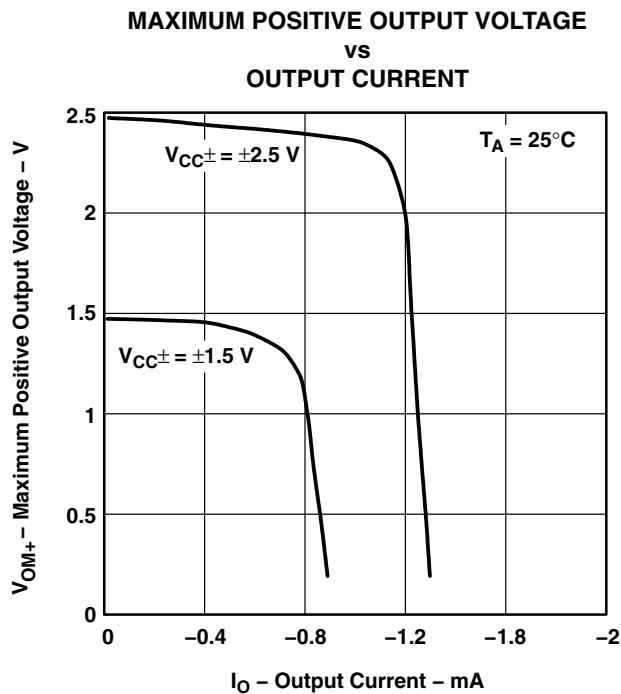
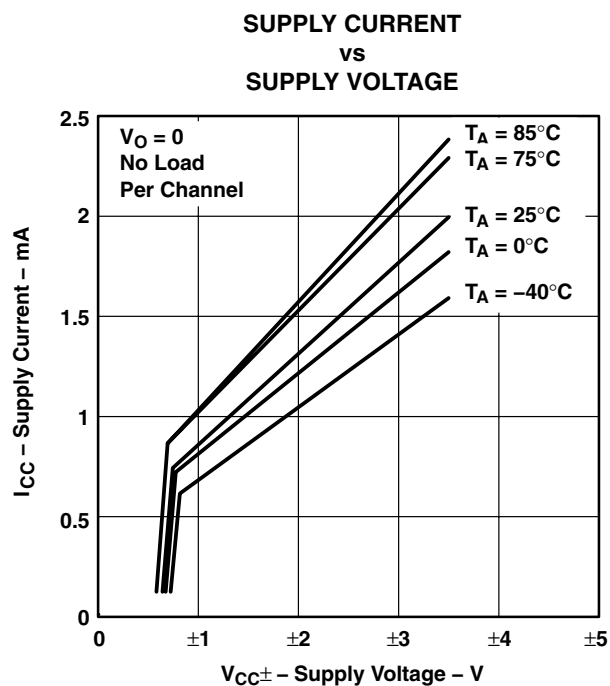
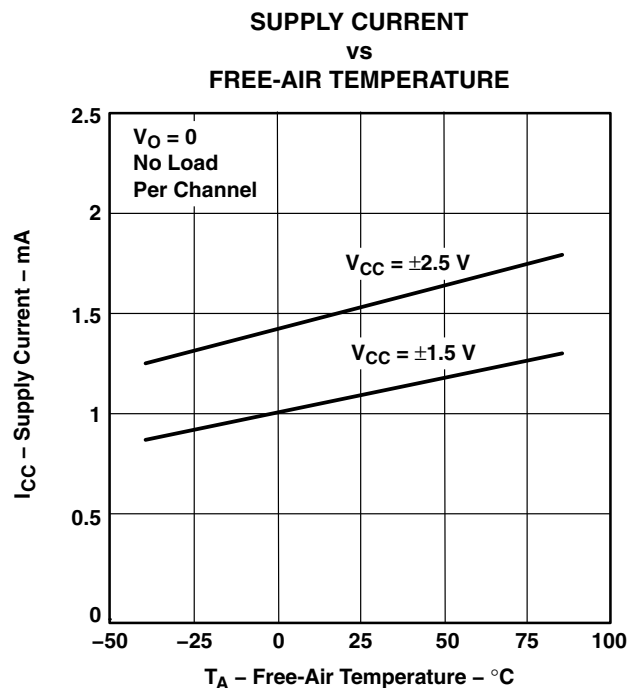
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Equivalent input noise voltage vs Frequency	6
Total harmonic distortion vs Frequency	7
Total harmonic distortion vs Output voltage	8



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TYPICAL CHARACTERISTICS



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TYPICAL CHARACTERISTICS

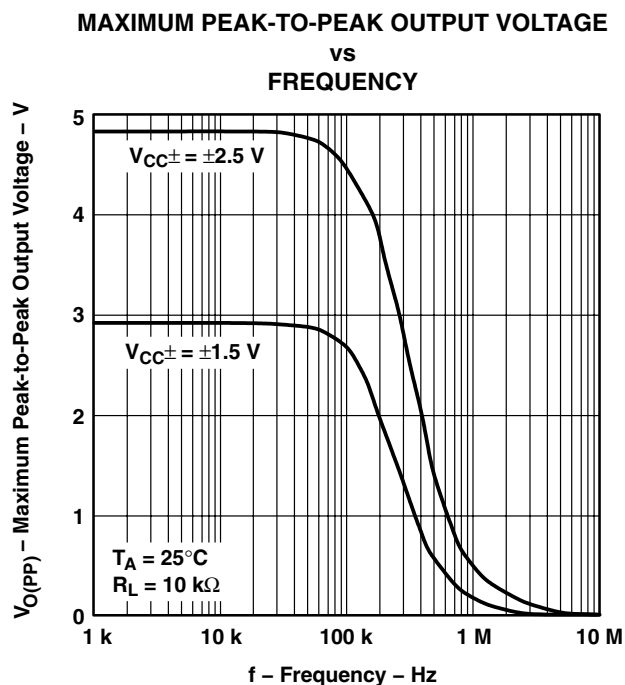


Figure 5

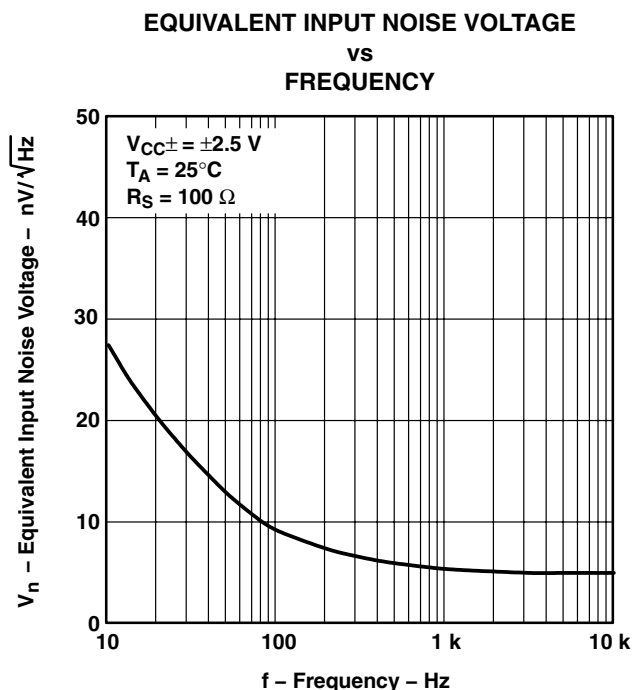


Figure 6

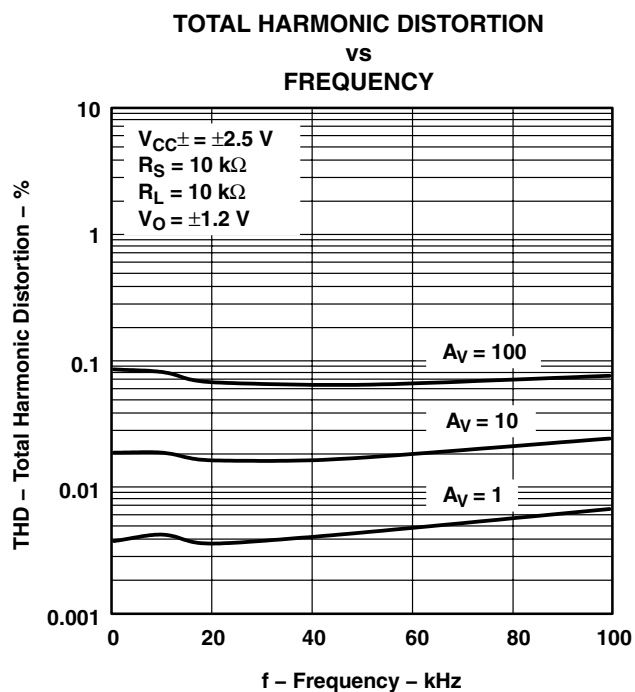


Figure 7

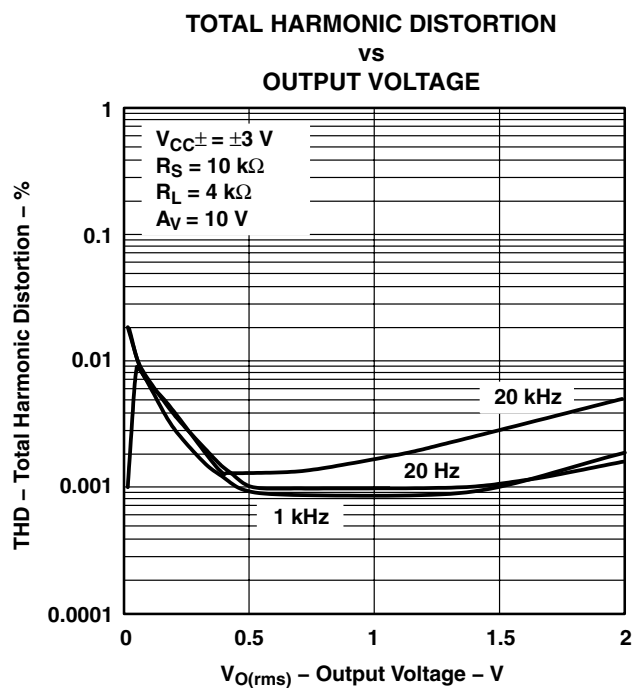


Figure 8



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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)
TLV2361CDBVR	Active	Production	SOT-23 (DBV) 5	3000 LARGE T&R	Yes	NIPDAU SN	Level-1-260C-UNLIM	0 to 70	(YC3B, YC3G, YC3J, YC3L)
TLV2361CDBVR.A	Active	Production	SOT-23 (DBV) 5	3000 LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 85	(YC3B, YC3G, YC3J, YC3L)
TLV2361CDBVT	Active	Production	SOT-23 (DBV) 5	250 SMALL T&R	Yes	NIPDAU SN	Level-1-260C-UNLIM	0 to 70	(YC3B, YC3G, YC3J, YC3L)
TLV2361CDBVT.A	Active	Production	SOT-23 (DBV) 5	250 SMALL T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 85	(YC3B, YC3G, YC3J, YC3L)
TLV2361IDBVR	Active	Production	SOT-23 (DBV) 5	3000 LARGE T&R	Yes	NIPDAU SN	Level-1-260C-UNLIM	-40 to 85	(YC4B, YC4G, YC4J, YC4L)
TLV2361IDBVR.A	Active	Production	SOT-23 (DBV) 5	3000 LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 85	(YC4B, YC4G, YC4J, YC4L)
TLV2361IDBVT	Active	Production	SOT-23 (DBV) 5	250 SMALL T&R	Yes	NIPDAU SN	Level-1-260C-UNLIM	-40 to 85	(YC4B, YC4G, YC4J, YC4L)
TLV2361IDBVT.A	Active	Production	SOT-23 (DBV) 5	250 SMALL T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 85	(YC4B, YC4G, YC4J, YC4L)
TLV2362ID	Active	Production	SOIC (D) 8	75 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2362I
TLV2362ID.A	Active	Production	SOIC (D) 8	75 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2362I
TLV2362IDGKR	Active	Production	VSSOP (DGK) 8	2500 LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 85	(YBL, YBS, YBU, YY BS)
TLV2362IDGKR.A	Active	Production	VSSOP (DGK) 8	2500 LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 85	(YBL, YBS, YBU, YY BS)
TLV2362IDR	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2362I
TLV2362IDR.A	Active	Production	SOIC (D) 8	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	2362I
TLV2362IP	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLV2362IP
TLV2362IP.A	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	TLV2362IP
TLV2362IPWR	Active	Production	TSSOP (PW) 8	2000 LARGE T&R	Yes	NIPDAU NIPDAU	Level-1-260C-UNLIM	-40 to 85	TY2362
TLV2362IPWR.A	Active	Production	TSSOP (PW) 8	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	TY2362

⁽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.

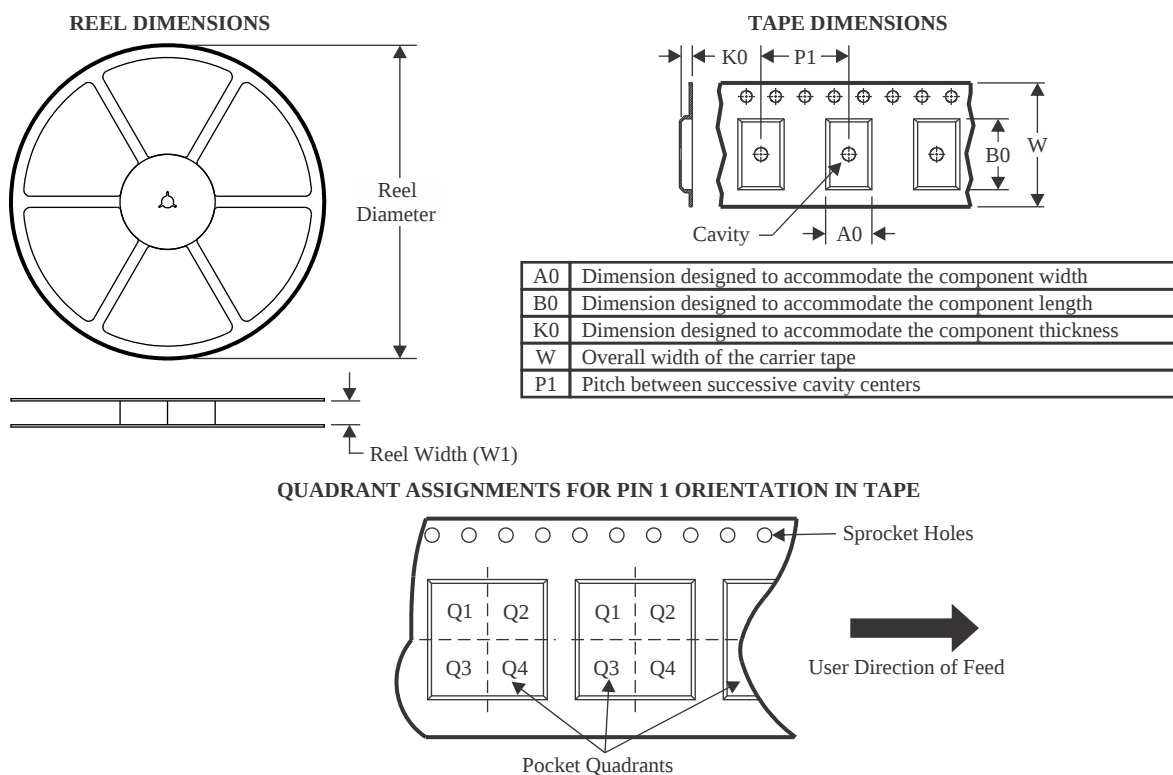
⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

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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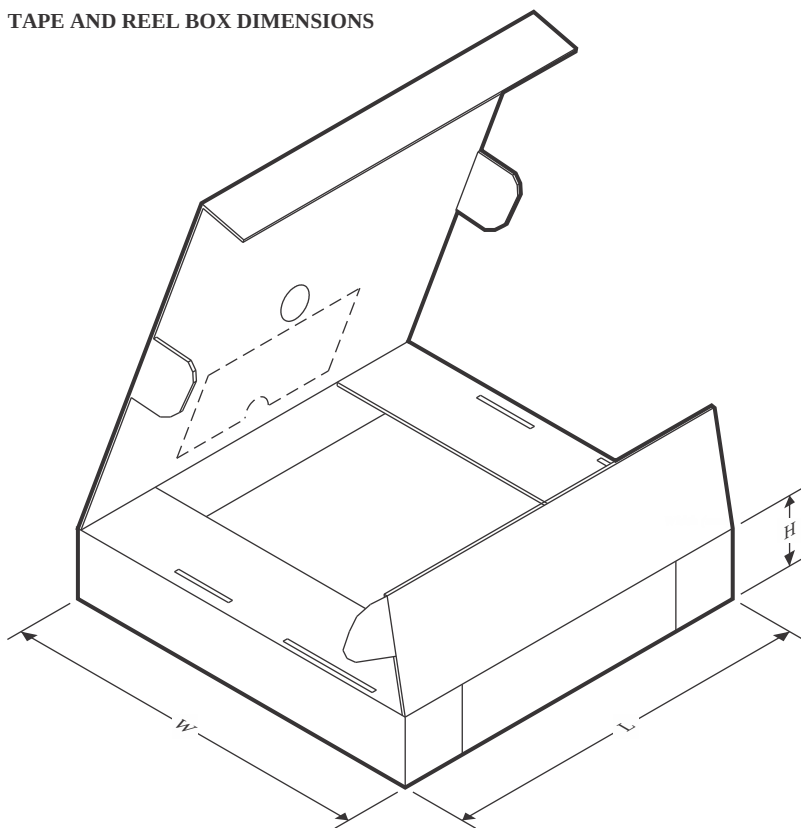
TAPE AND REEL INFORMATION



*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
TLV2361CDBVR	SOT-23	DBV	5	3000	180.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
TLV2361CDBVR	SOT-23	DBV	5	3000	178.0	9.0	3.3	3.2	1.4	4.0	8.0	Q3
TLV2361CDBVT	SOT-23	DBV	5	250	178.0	9.0	3.3	3.2	1.4	4.0	8.0	Q3
TLV2361IDBVR	SOT-23	DBV	5	3000	180.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
TLV2361IDBVR	SOT-23	DBV	5	3000	178.0	9.0	3.3	3.2	1.4	4.0	8.0	Q3
TLV2361IDBVT	SOT-23	DBV	5	250	178.0	9.0	3.3	3.2	1.4	4.0	8.0	Q3
TLV2362IDGKR	VSSOP	DGK	8	2500	330.0	12.4	5.25	3.35	1.25	8.0	12.0	Q1
TLV2362IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLV2362IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLV2362IPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
TLV2362IPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1

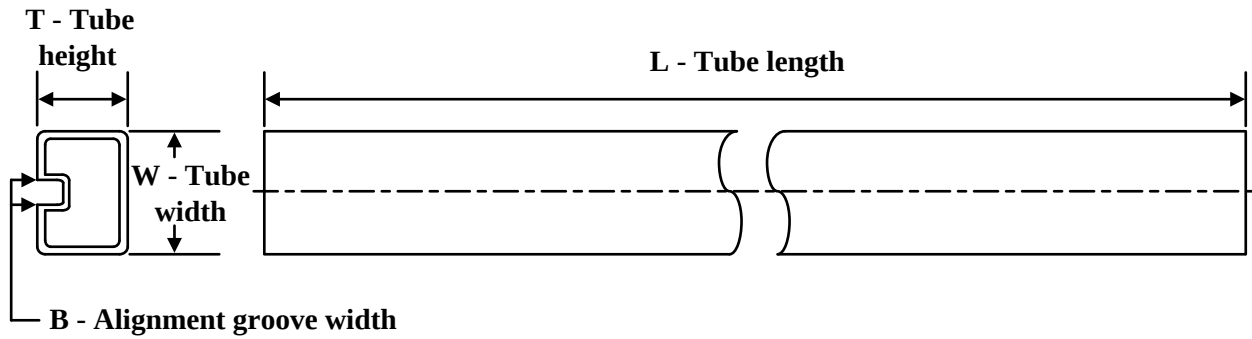
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TLV2361CDBVR	SOT-23	DBV	5	3000	203.0	203.0	35.0
TLV2361CDBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
TLV2361CDBVT	SOT-23	DBV	5	250	180.0	180.0	18.0
TLV2361IDBVR	SOT-23	DBV	5	3000	203.0	203.0	35.0
TLV2361IDBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
TLV2361IDBVT	SOT-23	DBV	5	250	180.0	180.0	18.0
TLV2362IDGKR	VSSOP	DGK	8	2500	366.0	364.0	50.0
TLV2362IDR	SOIC	D	8	2500	340.5	338.1	20.6
TLV2362IDR	SOIC	D	8	2500	353.0	353.0	32.0
TLV2362IPWR	TSSOP	PW	8	2000	353.0	353.0	32.0
TLV2362IPWR	TSSOP	PW	8	2000	356.0	356.0	35.0

TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
TLV2362ID	D	SOIC	8	75	507	8	3940	4.32
TLV2362ID.A	D	SOIC	8	75	507	8	3940	4.32
TLV2362IP	P	PDIP	8	50	506	13.97	11230	4.32
TLV2362IP.A	P	PDIP	8	50	506	13.97	11230	4.32



SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



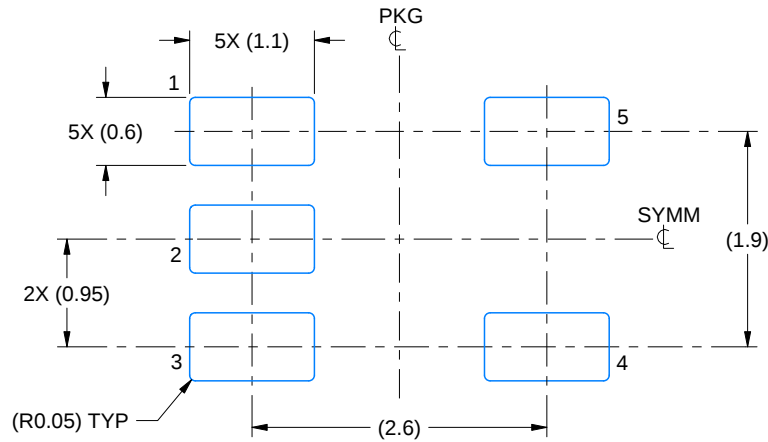
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Reference JEDEC MO-178.
4. Body dimensions do not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.25 mm per side.
5. Support pin may differ or may not be present.

EXAMPLE BOARD LAYOUT

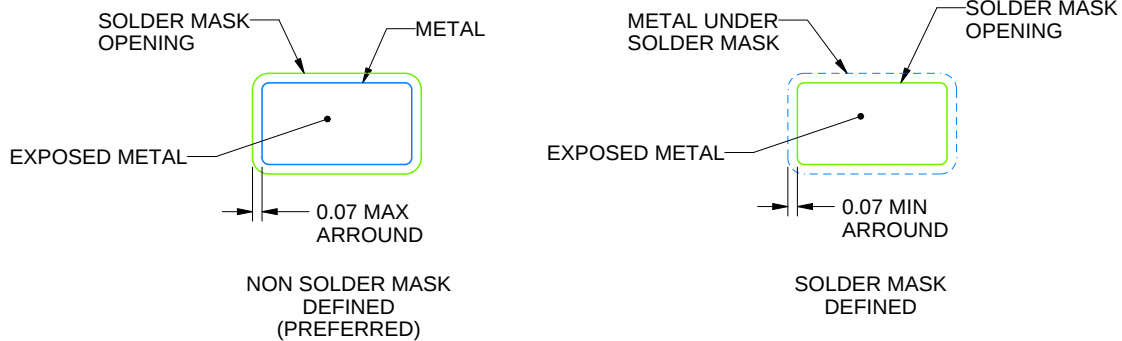
DBV0005A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X



SOLDER MASK DETAILS

4214839/K 08/2024

NOTES: (continued)

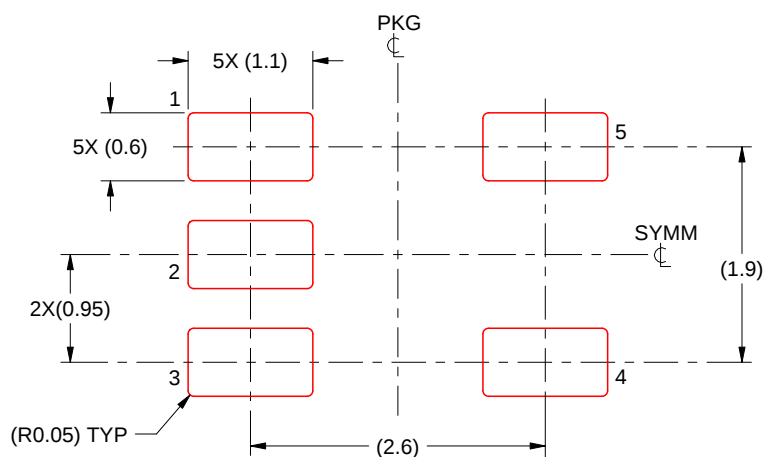
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DBV0005A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



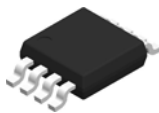
SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:15X

4214839/K 08/2024

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.

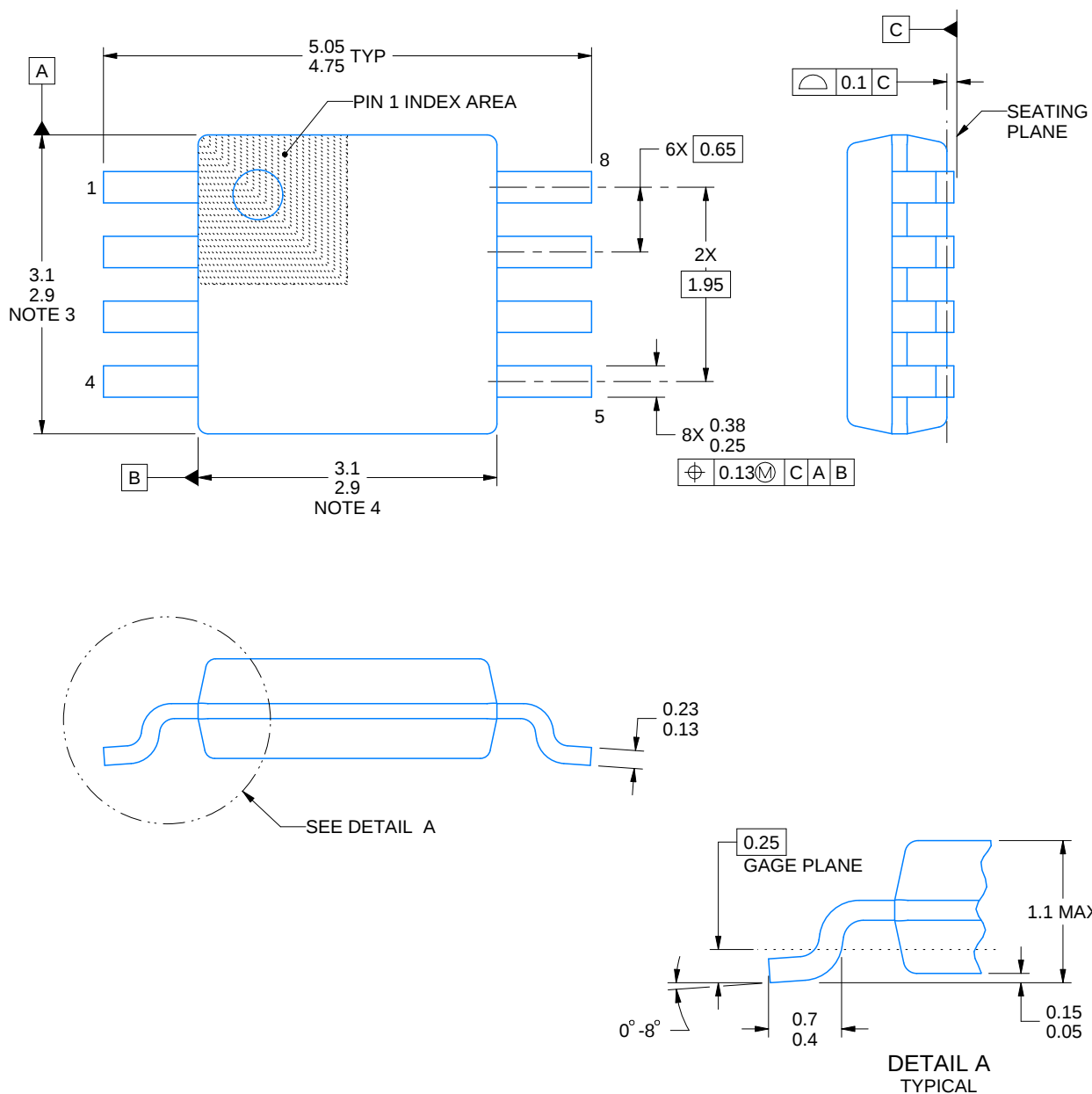
DGK0008A



PACKAGE OUTLINE

VSSOP - 1.1 mm max height

SMALL OUTLINE PACKAGE



4214862/A 04/2023

NOTES:

PowerPAD is a trademark of Texas Instruments.

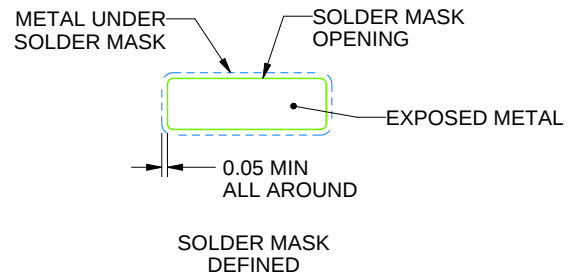
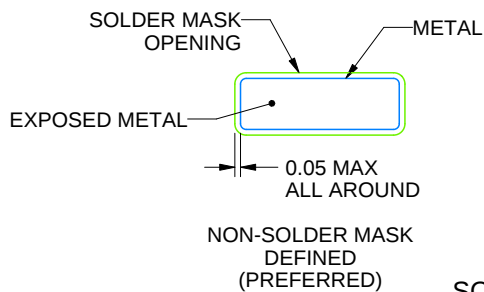
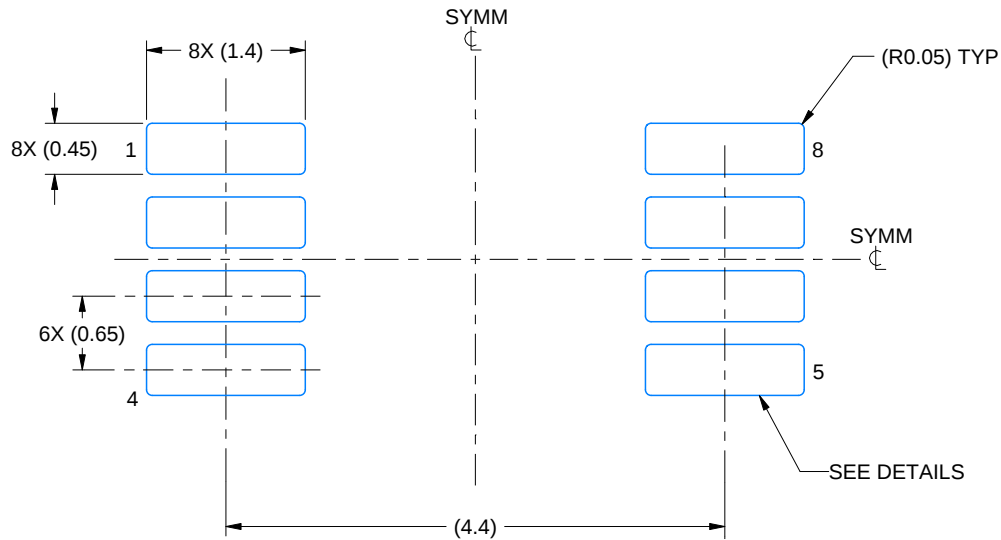
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
5. Reference JEDEC registration MO-187.

EXAMPLE BOARD LAYOUT

DGK0008A

TM VSSOP - 1.1 mm max height

SMALL OUTLINE PACKAGE



SOLDER MASK DETAILS

4214862/A 04/2023

NOTES: (continued)

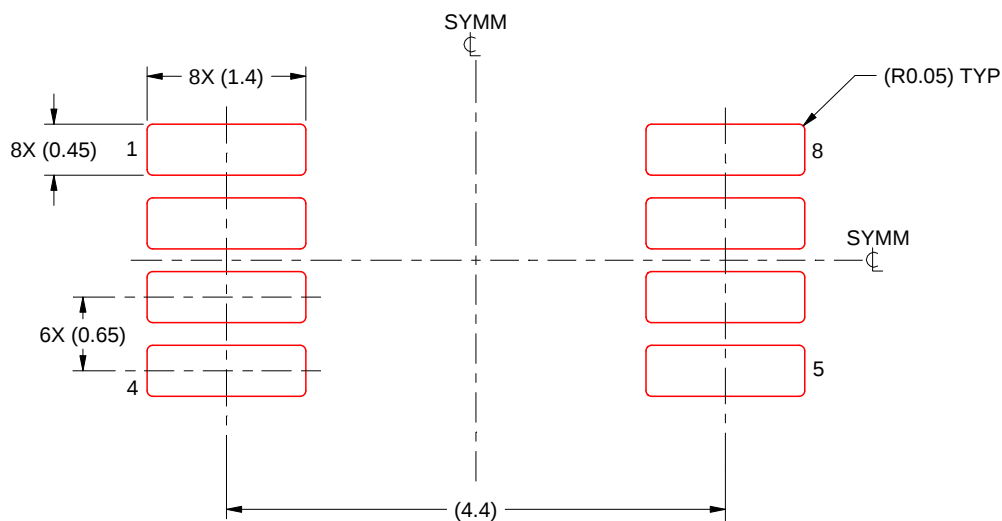
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.
8. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.
9. Size of metal pad may vary due to creepage requirement.

EXAMPLE STENCIL DESIGN

DGK0008A

TM VSSOP - 1.1 mm max height

SMALL OUTLINE PACKAGE

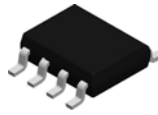


SOLDER PASTE EXAMPLE
SCALE: 15X

4214862/A 04/2023

NOTES: (continued)

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

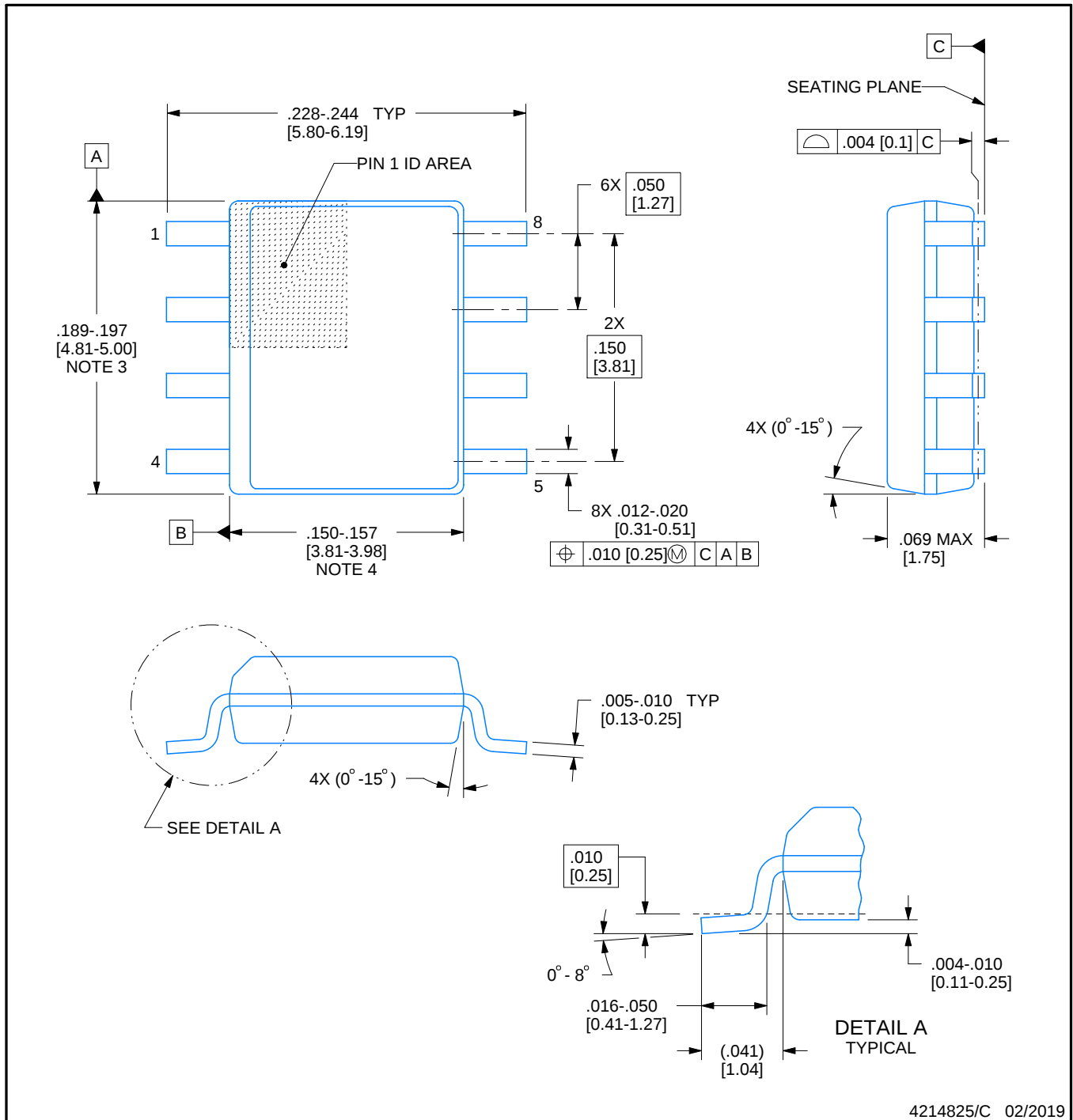


D0008A

PACKAGE OUTLINE

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



4214825/C 02/2019

NOTES:

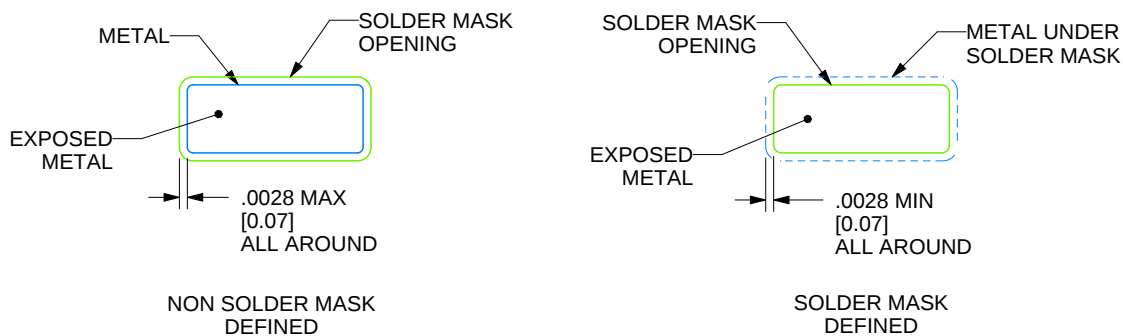
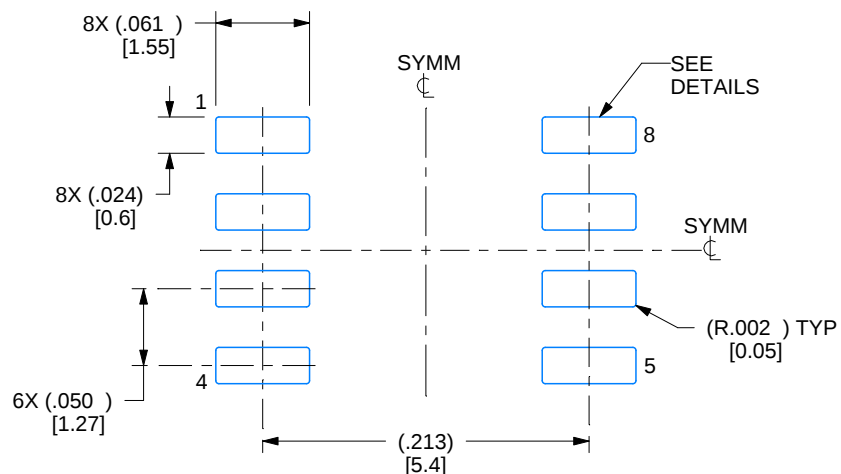
1. Linear dimensions are in inches [millimeters]. Dimensions in parenthesis are for reference only. Controlling dimensions are in inches. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate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

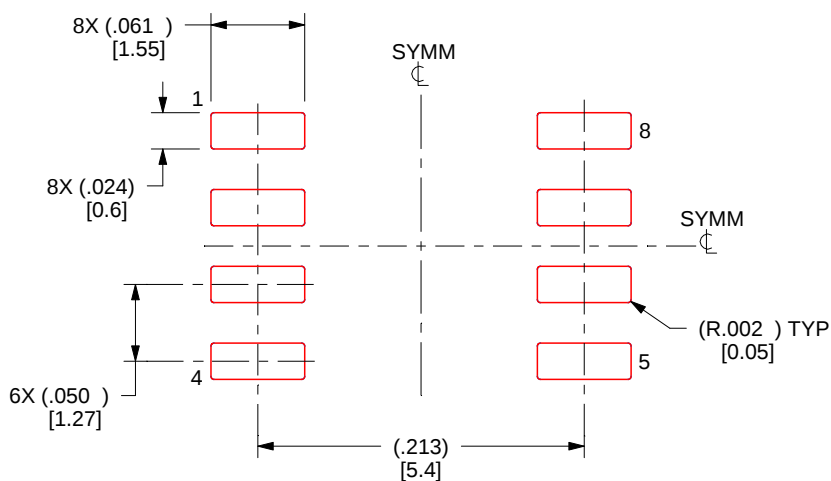
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

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

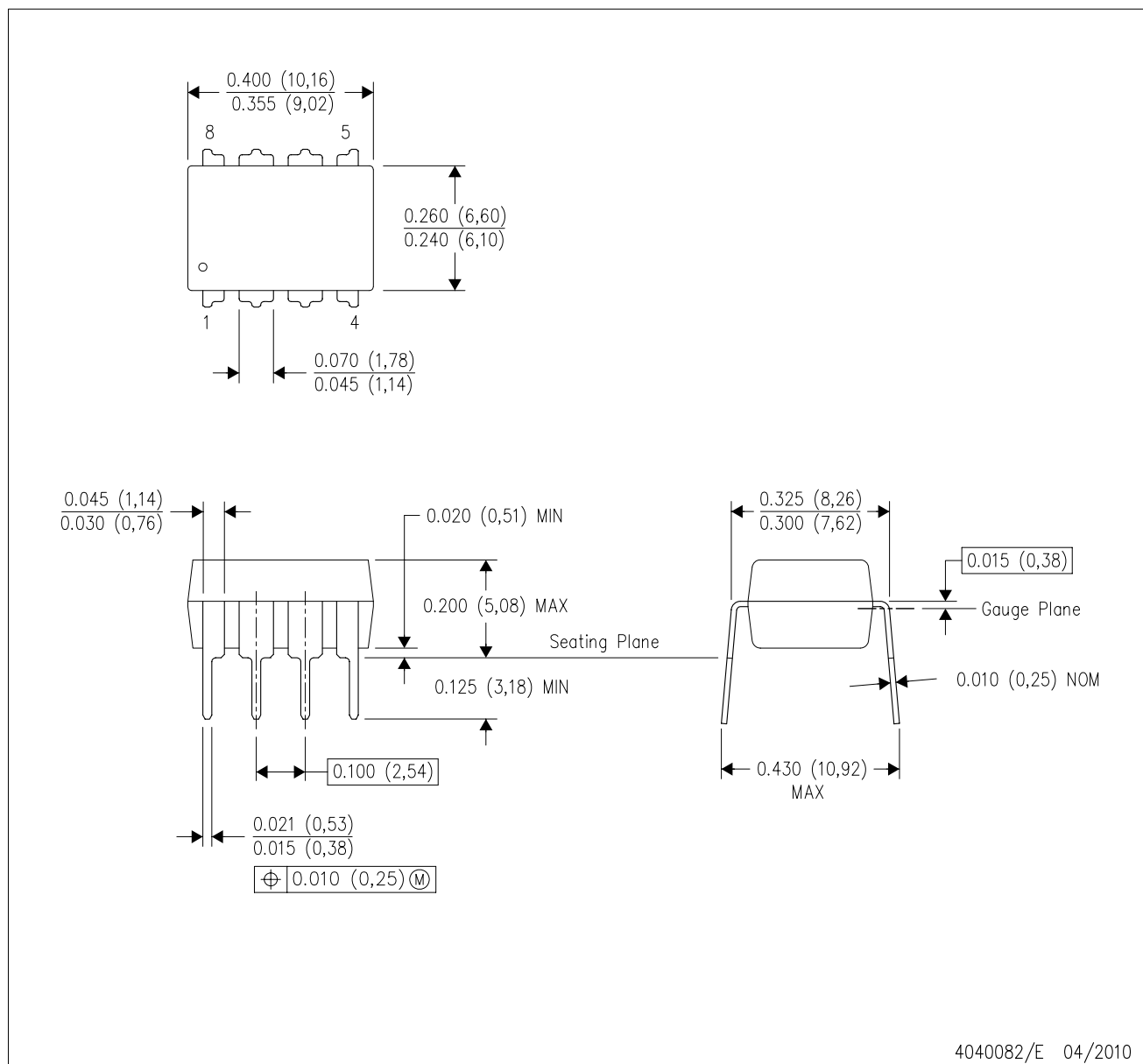
4214825/C 02/2019

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



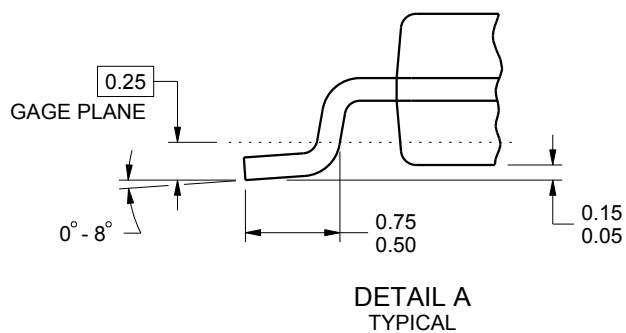
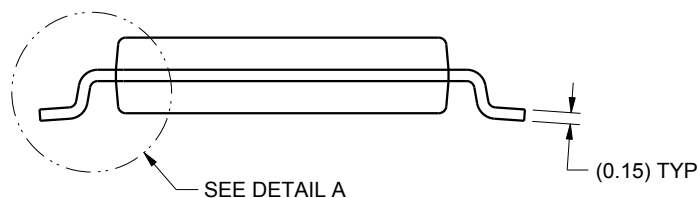
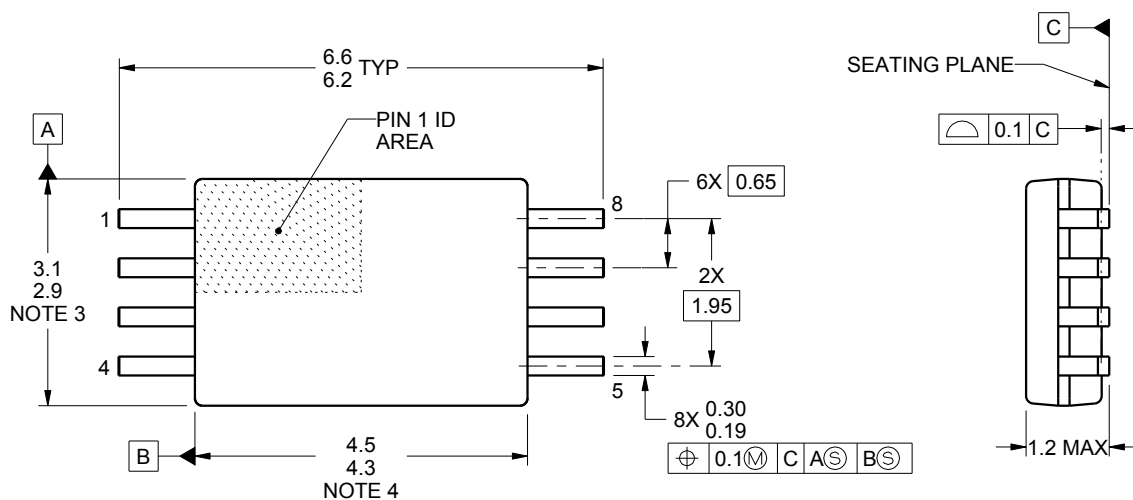
- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Falls within JEDEC MS-001 variation BA.



PACKAGE OUTLINE

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



4221848/A 02/2015

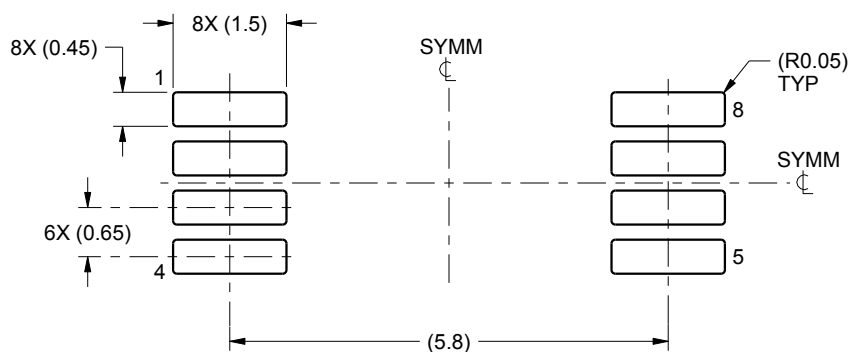
NOTES:

1. All linear dimensions are in 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. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
5. Reference JEDEC registration MO-153, variation AA.

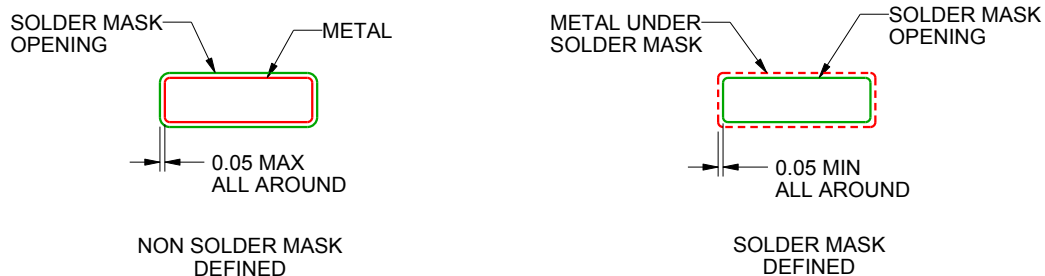
PW0008A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
SCALE:10X



SOLDER MASK DETAILS
NOT TO SCALE

4221848/A 02/2015

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

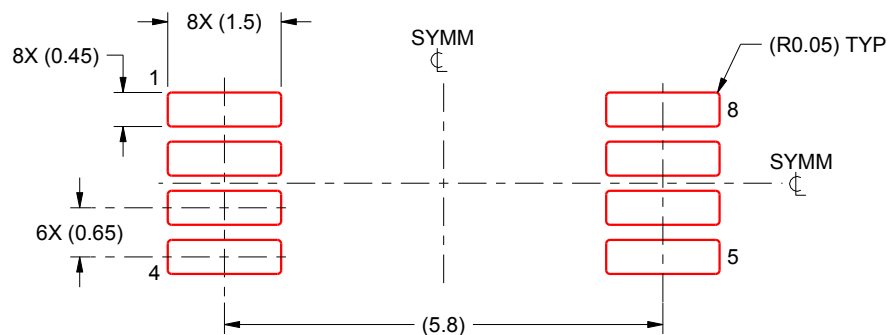
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

PW0008A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:10X

4221848/A 02/2015

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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