

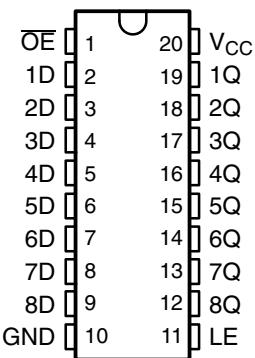
SN54ABT573, SN74ABT573A OCTAL TRANSPARENT D-TYPE LATCHES WITH 3-STATE OUTPUTS

SCBS190F – JANUARY 1991 – REVISED SEPTEMBER 2003

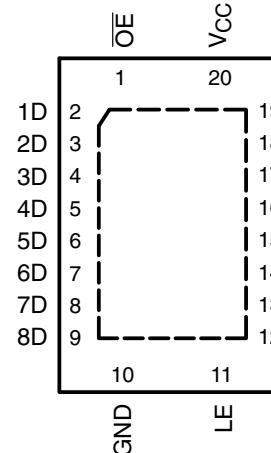
- Typical V_{OLP} (Output Ground Bounce) <1 V at $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$
- High-Drive Outputs ($-32\text{-mA } I_{OH}$, $64\text{-mA } I_{OL}$)
- I_{off} Supports Partial-Power-Down Mode Operation
- Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD 17
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)

SN54ABT573 . . . J OR W PACKAGE
SN74ABT573A . . . DB, DW, N, NS,
OR PW PACKAGE

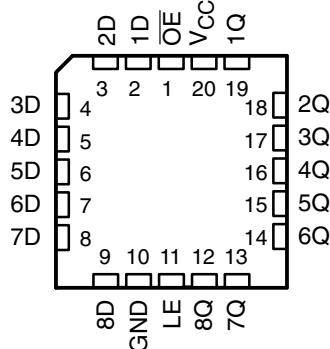
(TOP VIEW)



SN74ABT573A . . . RGY PACKAGE
(TOP VIEW)



SN54ABT573 . . . FK PACKAGE
(TOP VIEW)



description/ordering information

These 8-bit latches feature 3-state outputs designed specifically for driving highly capacitive or relatively low-impedance loads. They are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

ORDERING INFORMATION

T_A	PACKAGE [†]	ORDERABLE PART NUMBER	TOP-SIDE MARKING
$-40^\circ\text{C to } 85^\circ\text{C}$	PDIP – N	Tube	SN74ABT573AN
	QFN – RGY	Tape and reel	SN74ABT573ARGYR
	SOIC – DW	Tube	SN74ABT573ADW
		Tape and reel	SN74ABT573ADWR
	SOP – NS	Tape and reel	SN74ABT573ANSR
	SSOP – DB	Tape and reel	SN74ABT573ADBR
	TSSOP – PW	Tube	SN74ABT573APW
		Tape and reel	SN74ABT573APWR
	VFBGA – GQN	Tape and reel	SN74ABT573AGQNR
	VFBGA – ZQN (Pb-free)		SN74ABT573AZQNR
$-55^\circ\text{C to } 125^\circ\text{C}$	CDIP – J	Tube	SNJ54ABT573J
	CFP – W	Tube	SNJ54ABT573W
	LCCC – FK	Tube	SNJ54ABT573FK

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



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



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On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

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description/ordering information (continued)

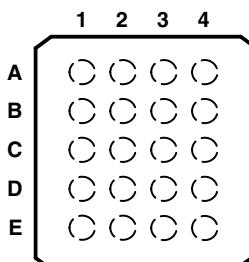
A buffered output-enable (\overline{OE}) input can be used to place the eight outputs in either a normal logic state (high or low logic levels) or the high-impedance state. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance state and increased drive provide the capability to drive bus lines without need for interface or pullup components.

\overline{OE} does not affect the internal operations of the latches. Old data can be retained or new data can be entered while the outputs are in the high-impedance state.

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

This device is fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

SN74ABT573A . . . GQN OR ZQN PACKAGE
(TOP VIEW)



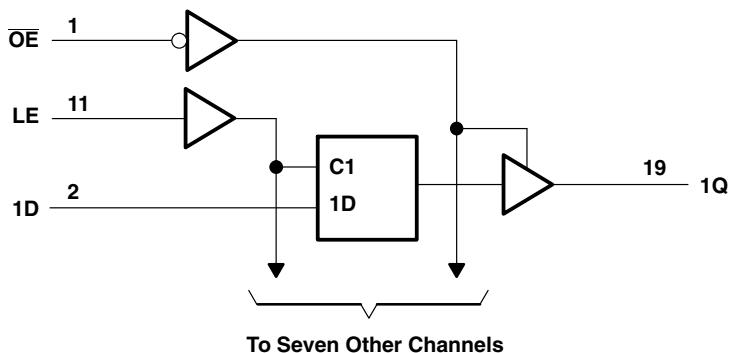
terminal assignments

	1	2	3	4
A	1D	\overline{OE}	V_{CC}	1Q
B	3D	3Q	2D	2Q
C	5D	4D	5Q	4Q
D	7D	7Q	6D	6Q
E	GND	8D	LE	8Q

FUNCTION TABLE
(each latch)

INPUTS			OUTPUT
\overline{OE}	LE	D	Q
L	H	H	H
L	H	L	L
L	L	X	Q_0
H	X	X	Z

logic diagram (positive logic)



Pin numbers shown are for the DB, DW, FK, J, N, NS, PW, RGY, and W packages.

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

[†] 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. The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
 2. The package thermal impedance is calculated in accordance with JESD 51-7.
 3. The package thermal impedance is calculated in accordance with JESD 51-5.

recommended operating conditions (see Note 4)

		SN54ABT573		SN74ABT573A		UNIT
		MIN	MAX	MIN	MAX	
V _{CC}	Supply voltage	4.5	5.5	4.5	5.5	V
V _{IH}	High-level input voltage		2		2	V
V _{IL}	Low-level input voltage			0.8		V
V _I	Input voltage	0	V _{CC}	0	V _{CC}	V
I _{OH}	High-level output current			-24		-32 mA
I _{OL}	Low-level output current			48		64 mA
Δt/ΔV	Input transition rise or fall rate	Outputs enabled		5		5 ns/V
T _A	Operating free-air temperature	-55	125	-40	85	°C

NOTE 4: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

**SN54ABT573, SN74ABT573A
OCTAL TRANSPARENT D-TYPE LATCHES
WITH 3-STATE OUTPUTS**

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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	$T_A = 25^\circ\text{C}$			SN54ABT573		SN74ABT573A		UNIT	
		MIN	TYP [†]	MAX	MIN	MAX	MIN	MAX		
V_{IK}	$V_{CC} = 4.5 \text{ V}$, $I_I = -18 \text{ mA}$				-1.2				V	
V_{OH}	$V_{CC} = 4.5 \text{ V}$, $I_{OH} = -3 \text{ mA}$	2.5			2.5	2.5			V	
	$V_{CC} = 5 \text{ V}$, $I_{OH} = -3 \text{ mA}$	3			3	3				
	$V_{CC} = 4.5 \text{ V}$	$I_{OH} = -24 \text{ mA}$	2			2				
		$I_{OH} = -32 \text{ mA}$	2*				2			
V_{OL}	$V_{CC} = 4.5 \text{ V}$	$I_{OL} = 48 \text{ mA}$	0.55			0.55			V	
		$I_{OL} = 64 \text{ mA}$	0.55*				0.55			
V_{hys}		100							mV	
I_I	$V_{CC} = 5.5 \text{ V}$, $V_I = V_{CC}$ or GND				± 1	± 1			μA	
I_{OZH}	$V_{CC} = 5.5 \text{ V}$, $V_O = 2.7 \text{ V}$				10^\ddagger	10^\ddagger			μA	
I_{OZL}	$V_{CC} = 5.5 \text{ V}$, $V_O = 0.5 \text{ V}$				-10^\ddagger	-10^\ddagger			μA	
I_{off}	$V_{CC} = 0$, V_I or $V_O \leq 4.5 \text{ V}$				± 100				μA	
I_{CEX}	$V_{CC} = 5.5 \text{ V}$, $V_O = 5.5 \text{ V}$	Outputs high	50			50	50			
I_O^\S	$V_{CC} = 5.5 \text{ V}$, $V_O = 2.5 \text{ V}$		-50	-100	-180	-50	-180	-50	-180	
I_{CC}	$V_{CC} = 5.5 \text{ V}$, $I_O = 0$, $V_I = V_{CC}$ or GND	Outputs high	1	250		250	250			
		Outputs low	24	30		30	30			
		Outputs disabled	0.5	250		250	250			
ΔI_{CC}^\P	$V_{CC} = 5.5 \text{ V}$, One input at 3.4 V, Other inputs at V_{CC} or GND				1.5	1.5			mA	
C_I	$V_I = 2.5 \text{ V}$ or 0.5 V				3.5				pF	
C_O	$V_O = 2.5 \text{ V}$ or 0.5 V				6.5				pF	

* On products compliant to MIL-PRF-38535, this parameter does not apply.

† All typical values are at $V_{CC} = 5 \text{ V}$.

‡ This data sheet limit may vary among suppliers.

§ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

¶ This is the increase in supply current for each input that is at the specified TTL voltage level, rather than V_{CC} or GND.

timing requirements over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)

		SN54ABT573				UNIT	
		$V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$		MIN	MAX		
		MIN	MAX				
t_w	Pulse duration, LE high	3.3		3.3		ns	
t_{su}	Setup time, data before LE \downarrow	High	1.9	2.5		ns	
		Low	1.5	2.5			
t_h	Hold time, data after LE \downarrow	1		2.5		ns	

**SN54ABT573, SN74ABT573A
OCTAL TRANSPARENT D-TYPE LATCHES
WITH 3-STATE OUTPUTS**

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timing requirements over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)

				SN74ABT573A			UNIT
				V _{CC} = 5 V, T _A = 25°C		MIN	MAX
				MIN	MAX		
t _w	Pulse duration, LE high				3.3	3.3	ns
t _{su}	Setup time, data before LE↓			High	1.9	1.9	ns
				Low	1.5	1.5	
t _h	Hold time, data after LE↓				1.8 [†]	1.8 [†]	ns

[†] This data-sheet limit may vary among suppliers.

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, C_L = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	SN54ABT573			UNIT	
			V _{CC} = 5 V, T _A = 25°C		MIN	MAX	
			MIN	TYP			
t _{PLH}	D	Q	1.9	3.2	5.4	1.4	6.4
t _{PHL}			2.2	4.2	5.7	1.6	6.7
t _{PLH}	LE	Q	2.2	4	6.1	2	7.1
t _{PHL}			3.2	5.2	6.7	2.8	7.5
t _{PZH}	OE	Q	1.2	3.2	4.7	0.8	6.2
t _{PZL}			2.7	4.7	6.2	2	7.2
t _{PHZ}	OE	Q	2.5	4.9	6.4	2.2	7.7
t _{PLZ}			2	4.2	6	1.4	7

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, C_L = 50 pF (unless otherwise noted) (see Figure 1)

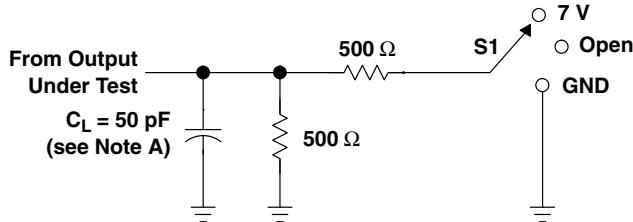
PARAMETER	FROM (INPUT)	TO (OUTPUT)	SN74ABT573A			UNIT	
			V _{CC} = 5 V, T _A = 25°C		MIN	MAX	
			MIN	TYP			
t _{PLH}	D	Q	1.9	3.2	5.4	1.9	5.9
t _{PHL}			2.2	4.2	5.7	2.2	6.2
t _{PLH}	LE	Q	2.2	4	6.1	2.2	6.6
t _{PHL}			3.2	5.2	6.7	3.2	7.2
t _{PZH}	OE	Q	1.2	3.2	4.7	1.2	5.2
t _{PZL}			2.5 [†]	4.7	6.2	2.5 [†]	6.7
t _{PHZ}	OE	Q	2.5	4.9	6.4	2.5	7.1 [†]
t _{PLZ}			2	4.2	6	2	6.5

[†] This data-sheet limit may vary among suppliers.

SN54ABT573, SN74ABT573A OCTAL TRANSPARENT D-TYPE LATCHES WITH 3-STATE OUTPUTS

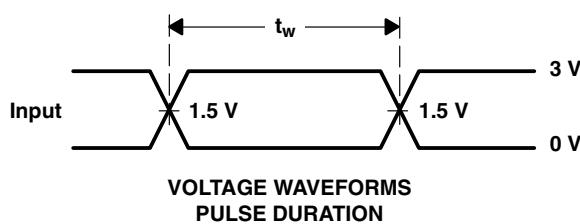
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PARAMETER MEASUREMENT INFORMATION

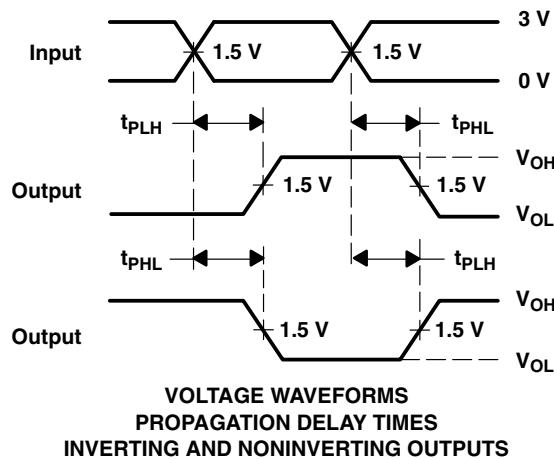
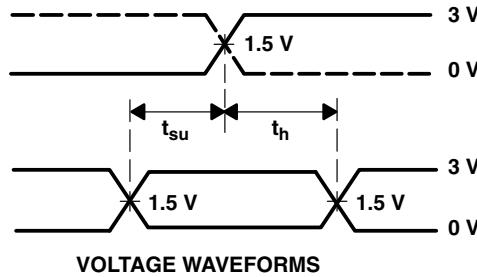


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	7 V
t_{PHZ}/t_{PZH}	Open

LOAD CIRCUIT



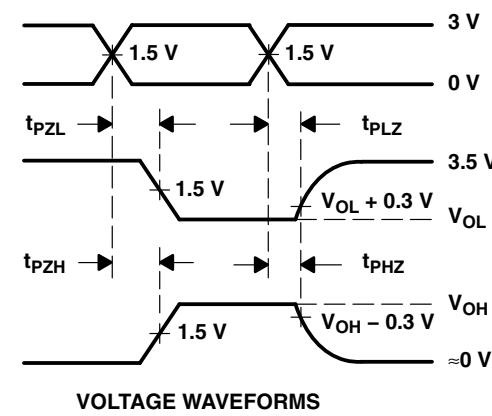
Timing Input



Output Control

Output Waveform 1
S1 at 7 V
(see Note B)

Output Waveform 2
S1 at Open
(see Note B)



NOTES: A. C_L includes probe and jig capacitance.

- B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
- C. All input pulses are supplied by generators having the following characteristics: PRR \leq 10 MHz, $Z_O = 50 \Omega$, $t_r \leq 2.5$ ns, $t_f \leq 2.5$ ns.
- D. The outputs are measured one at a time with one transition per measurement.
- E. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
5962-9321901Q2A	ACTIVE	LCCC	FK	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962- 9321901Q2A SNJ54ABT 573FK	Samples
5962-9321901QRA	ACTIVE	CDIP	J	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-9321901QR A SNJ54ABT573J	Samples
5962-9321901QSA	ACTIVE	CFP	W	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-9321901QS A SNJ54ABT573W	Samples
SN74ABT573ADBR	ACTIVE	SSOP	DB	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB573A	Samples
SN74ABT573ADW	ACTIVE	SOIC	DW	20	25	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT573A	Samples
SN74ABT573ADWR	ACTIVE	SOIC	DW	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT573A	Samples
SN74ABT573ADWRE4	ACTIVE	SOIC	DW	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT573A	Samples
SN74ABT573AN	ACTIVE	PDIP	N	20	20	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	SN74ABT573AN	Samples
SN74ABT573APW	ACTIVE	TSSOP	PW	20	70	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB573A	Samples
SN74ABT573APWR	ACTIVE	TSSOP	PW	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB573A	Samples
SN74ABT573ARGYR	ACTIVE	VQFN	RGY	20	3000	RoHS & Green	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	AB573A	Samples
SNJ54ABT573FK	ACTIVE	LCCC	FK	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962- 9321901Q2A SNJ54ABT 573FK	Samples
SNJ54ABT573J	ACTIVE	CDIP	J	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-9321901QR A SNJ54ABT573J	Samples
SNJ54ABT573W	ACTIVE	CFP	W	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-9321901QS A SNJ54ABT573W	Samples

(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) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices 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.

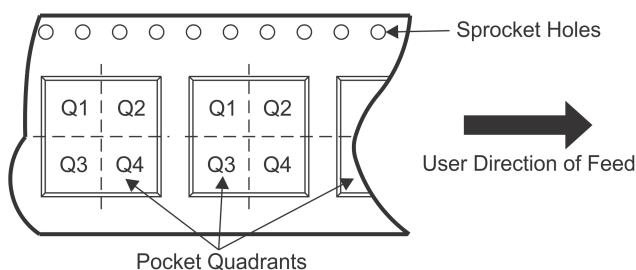
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TAPE AND REEL INFORMATION
REEL DIMENSIONS

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


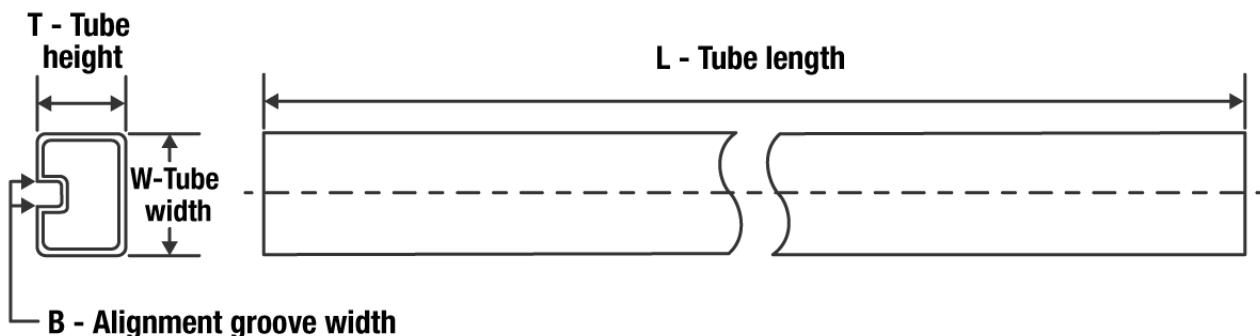
*All dimensions are nominal

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
SN74ABT573ADBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
SN74ABT573ADWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1
SN74ABT573APWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.1	1.6	8.0	16.0	Q1
SN74ABT573ARGYR	VQFN	RGY	20	3000	330.0	12.4	3.8	4.8	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)
SN74ABT573ADBR	SSOP	DB	20	2000	853.0	449.0	35.0
SN74ABT573ADWR	SOIC	DW	20	2000	367.0	367.0	45.0
SN74ABT573APWR	TSSOP	PW	20	2000	853.0	449.0	35.0
SN74ABT573ARGYR	VQFN	RGY	20	3000	853.0	449.0	35.0

TUBE


*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μ m)	B (mm)
5962-9321901Q2A	FK	LCCC	20	1	506.98	12.06	2030	NA
SN74ABT573ADW	DW	SOIC	20	25	507	12.83	5080	6.6
SN74ABT573AN	N	PDIP	20	20	506	13.97	11230	4.32
SN74ABT573APW	PW	TSSOP	20	70	530	10.2	3600	3.5
SNJ54ABT573FK	FK	LCCC	20	1	506.98	12.06	2030	NA

FK (S-CQCC-N**)

28 TERMINAL SHOWN

LEADLESS CERAMIC CHIP CARRIER



NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a metal lid.
- D. Falls within JEDEC MS-004

4040140/D 01/11

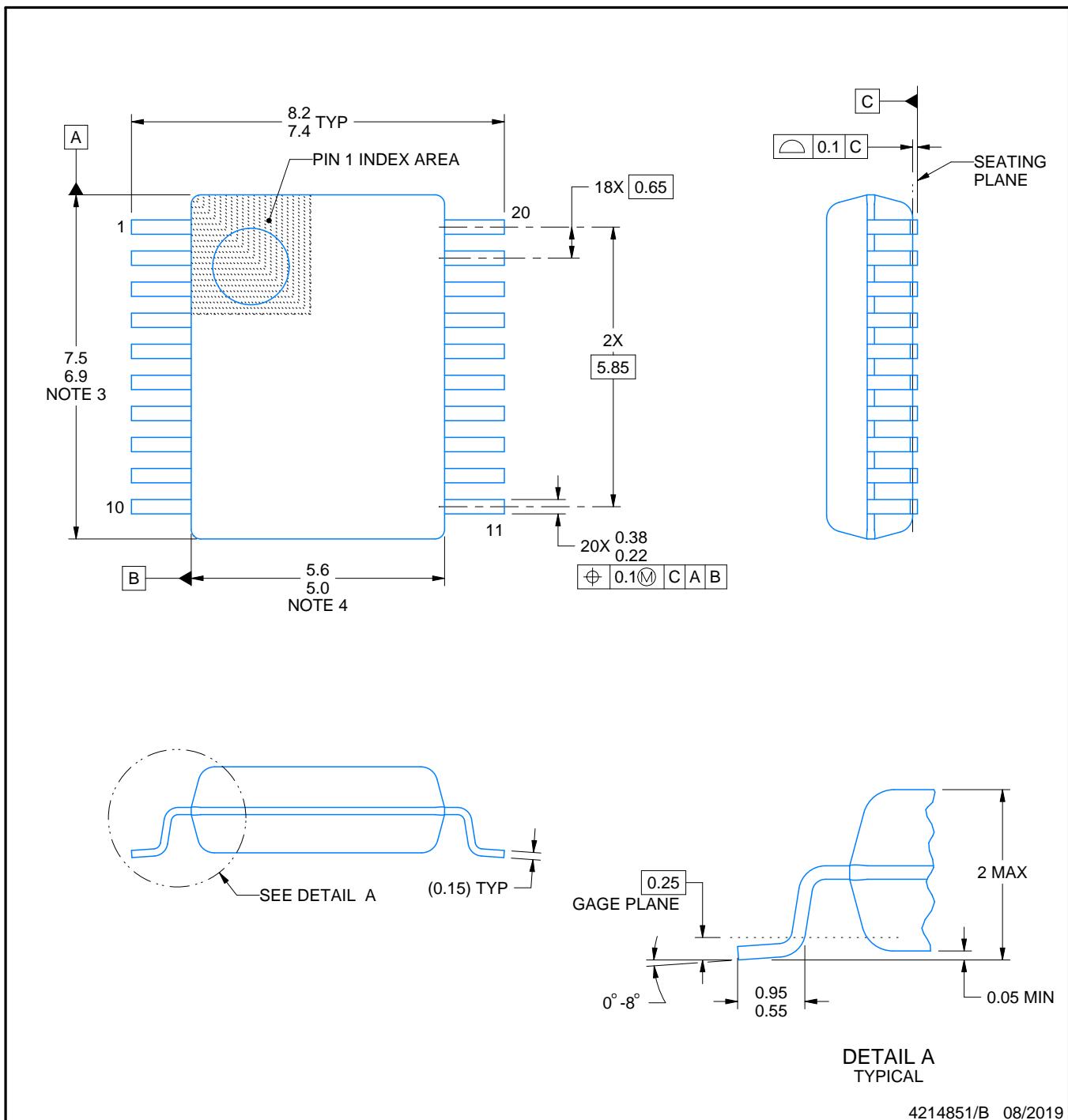
PACKAGE OUTLINE

DB0020A



SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



NOTES:

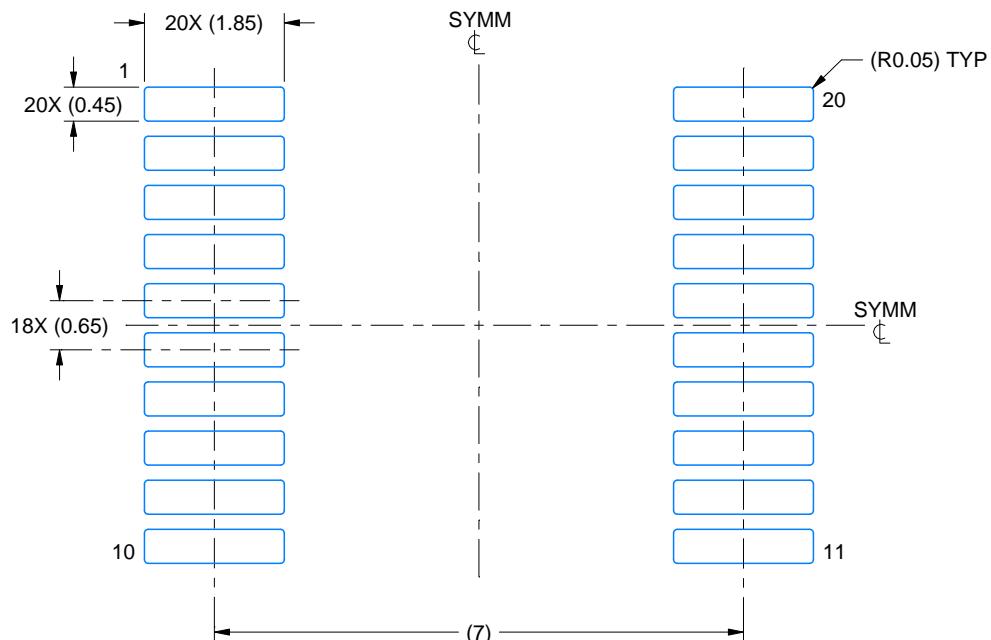
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or 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-150.

EXAMPLE BOARD LAYOUT

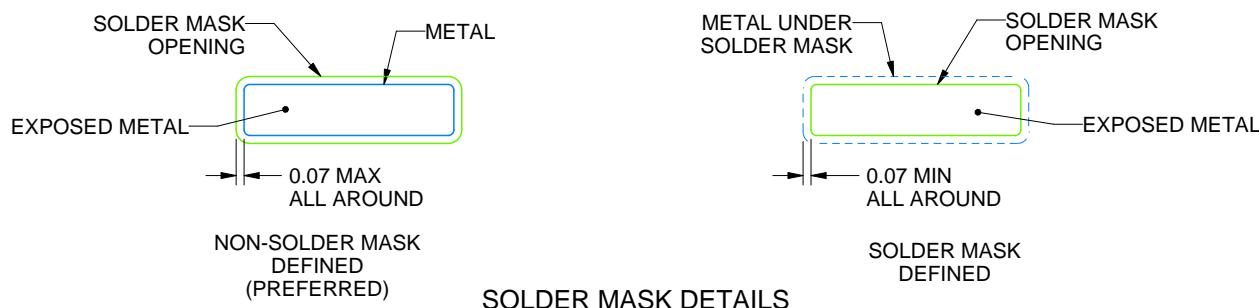
DB0020A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



SOLDER MASK DETAILS

4214851/B 08/2019

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

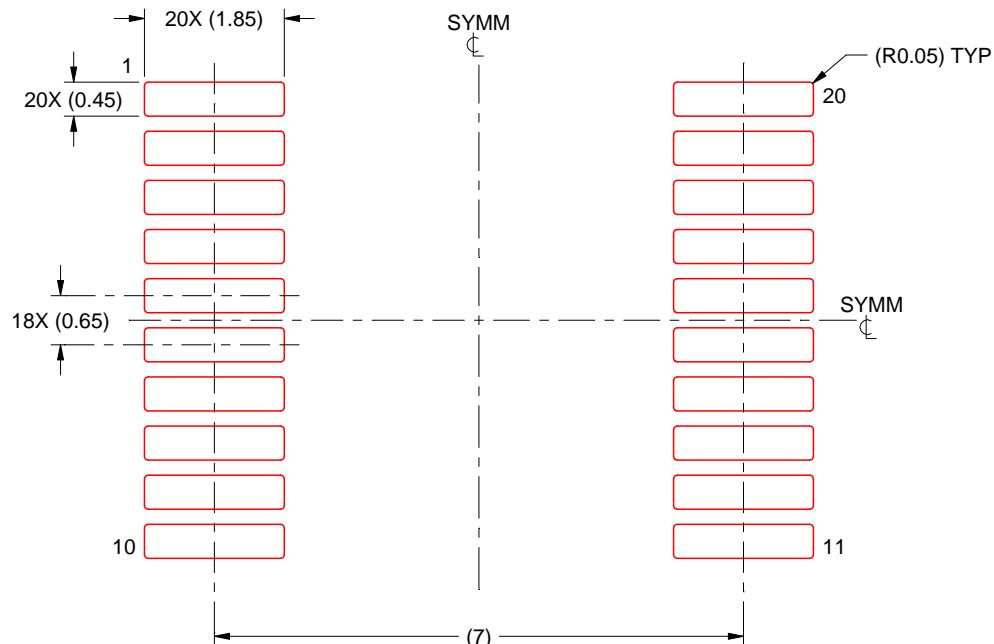
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DB0020A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



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

4214851/B 08/2019

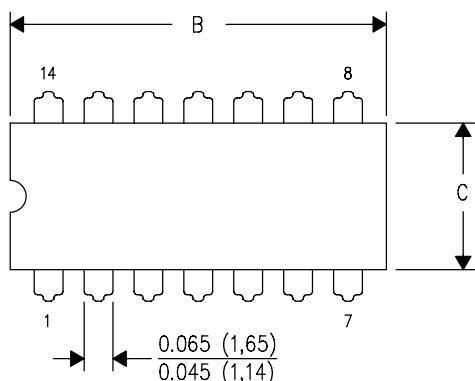
NOTES: (continued)

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.

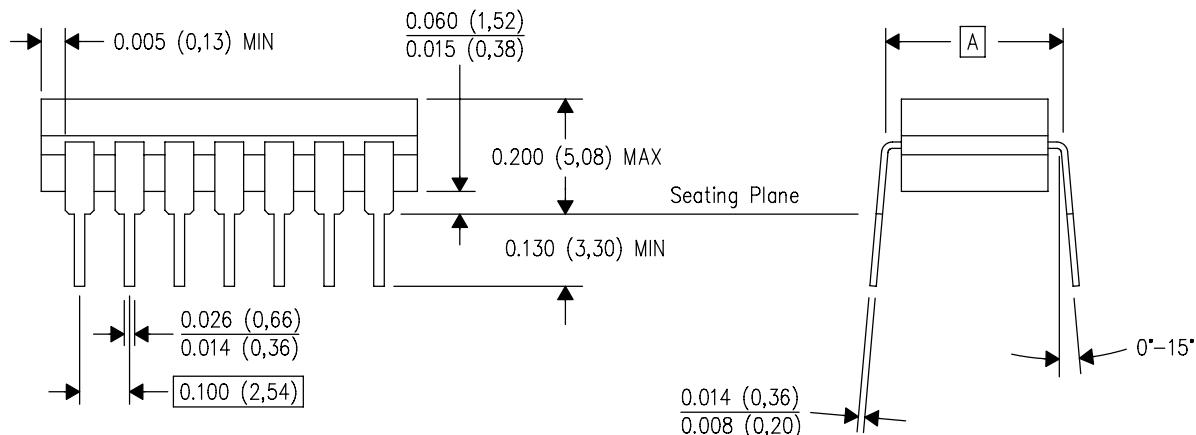
J (R-GDIP-T**)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



PINS ** DIM	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



4040083/F 03/03

NOTES: A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package is hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

GENERIC PACKAGE VIEW

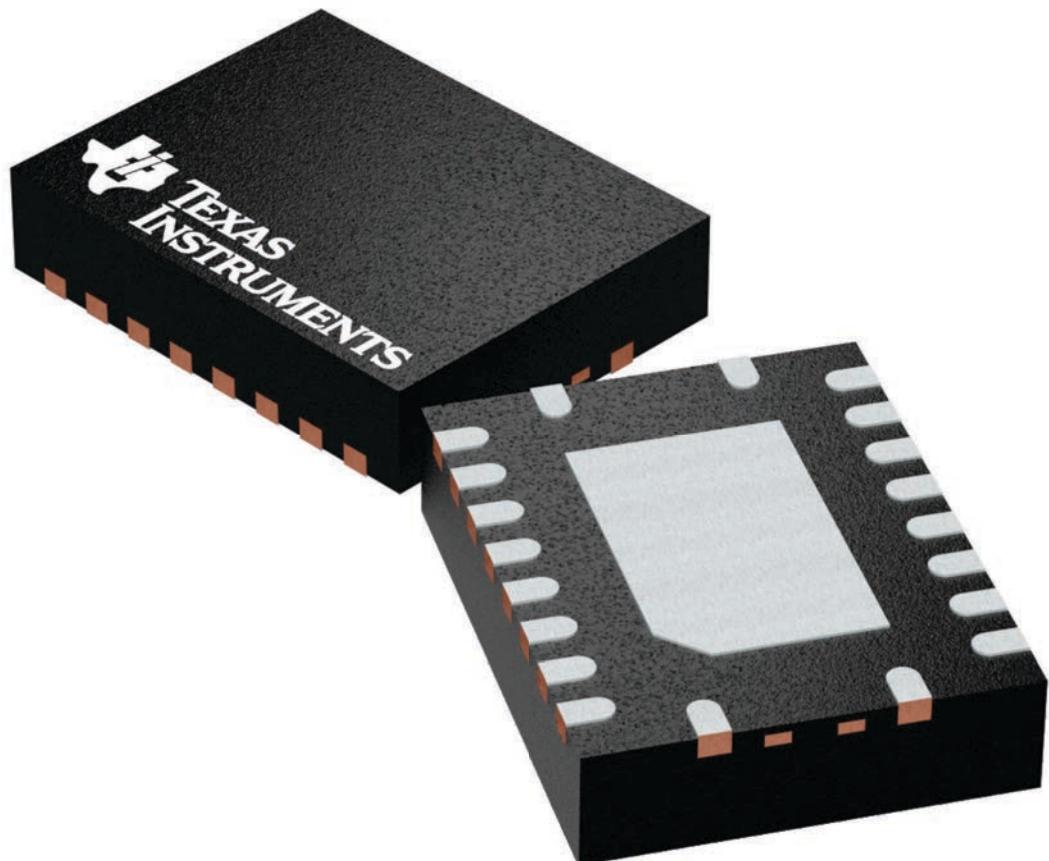
RGY 20

VQFN - 1 mm max height

3.5 x 4.5, 0.5 mm pitch

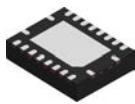
PLASTIC QUAD FGLATPACK - NO LEAD

This image is a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.



4225264/A

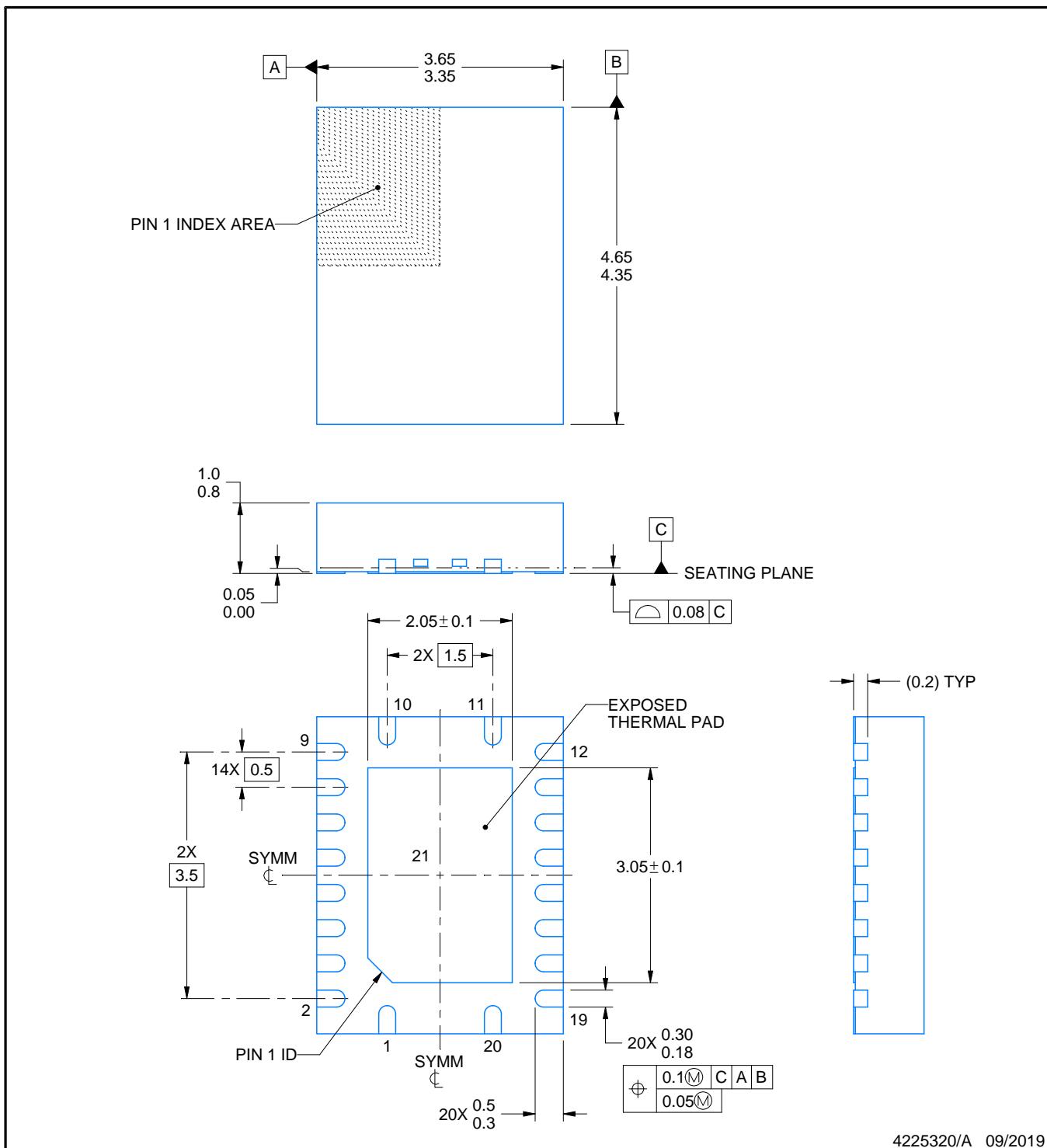
RGY0020A



PACKAGE OUTLINE

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



4225320/A 09/2019

NOTES:

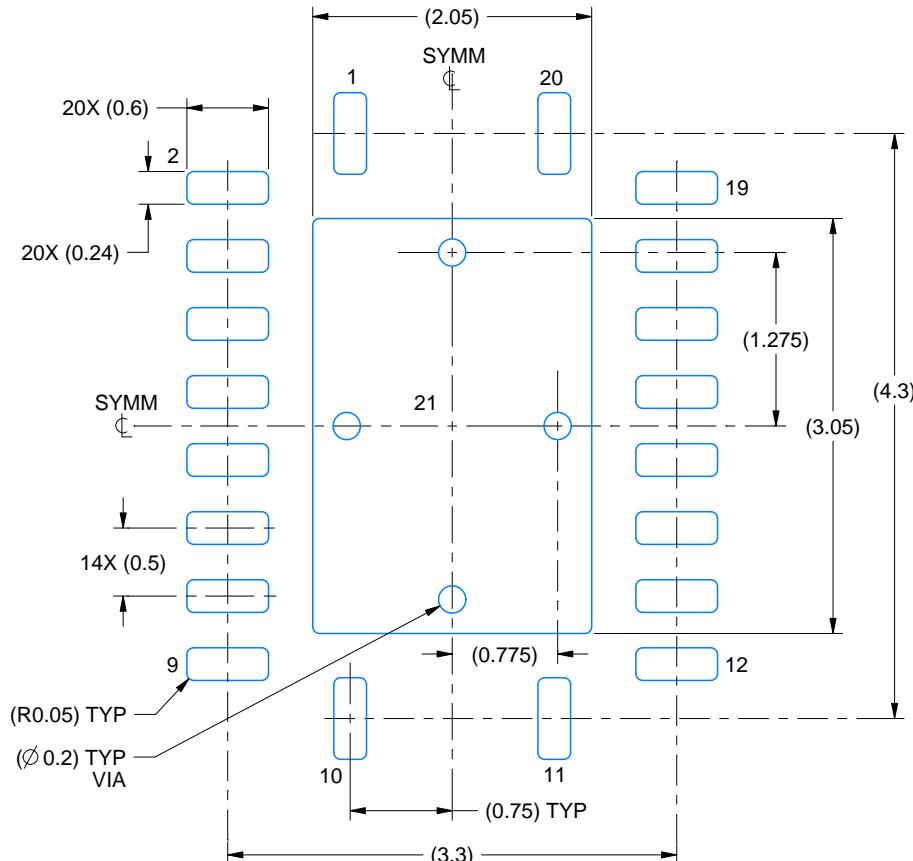
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

EXAMPLE BOARD LAYOUT

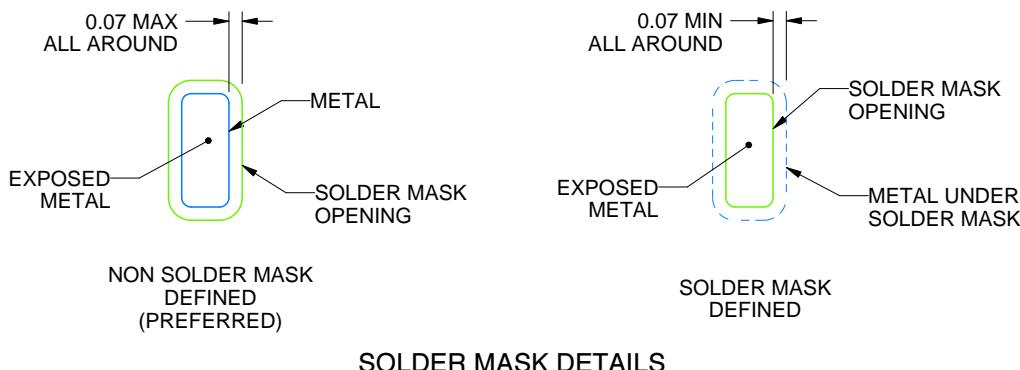
RGY0020A

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:18X



SOLDER MASK DETAILS

4225320/A 09/2019

NOTES: (continued)

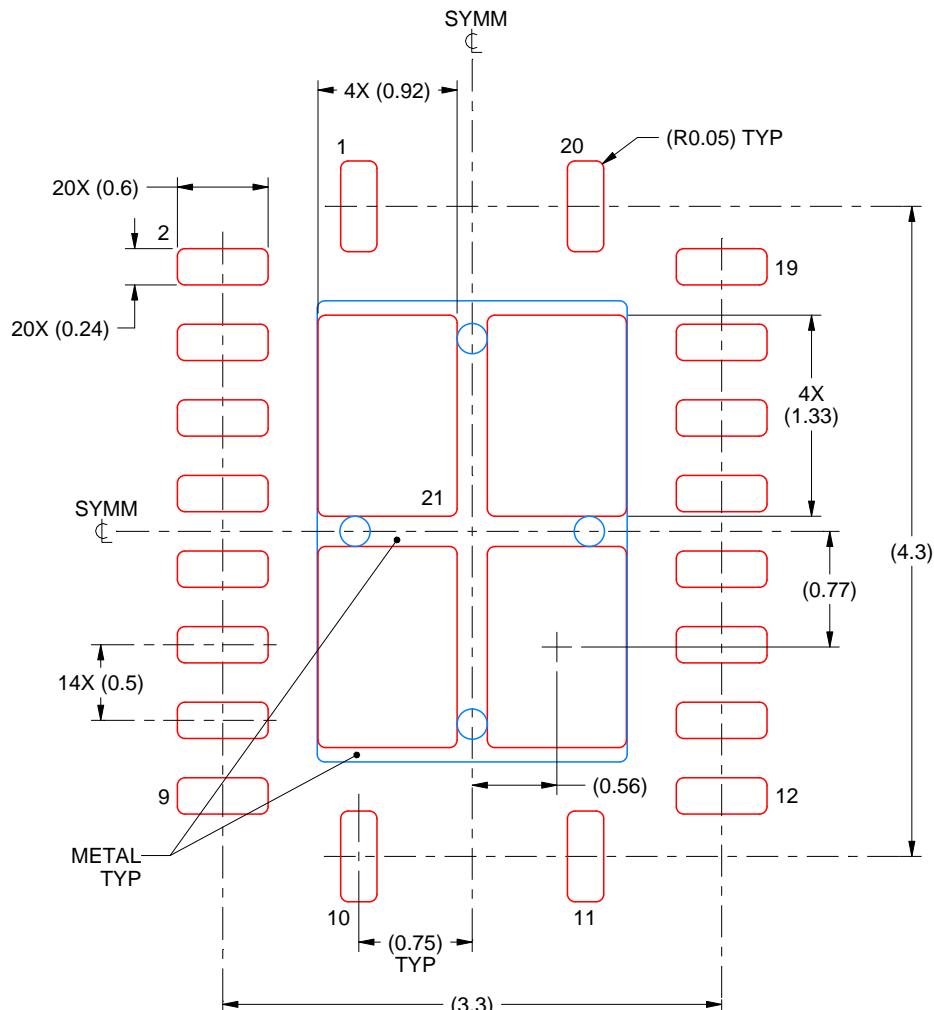
4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.

EXAMPLE STENCIL DESIGN

RGY0020A

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD 21
78% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE
SCALE:20X

4225320/A 09/2019

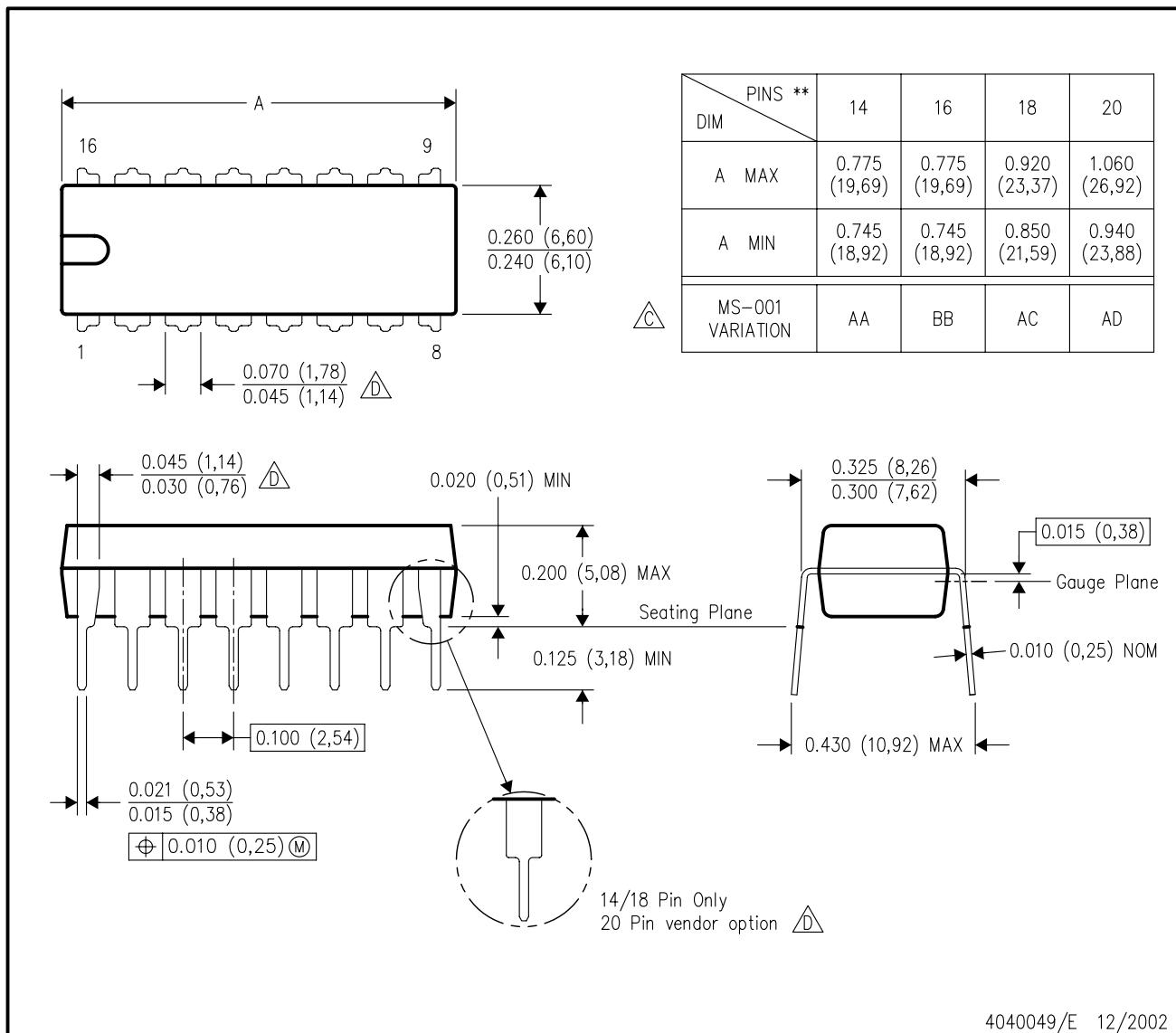
NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

N (R-PDIP-T**)

16 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE



NOTES: A. All linear dimensions are in inches (millimeters).
 B. This drawing is subject to change without notice.

△ Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).

△ The 20 pin end lead shoulder width is a vendor option, either half or full width.

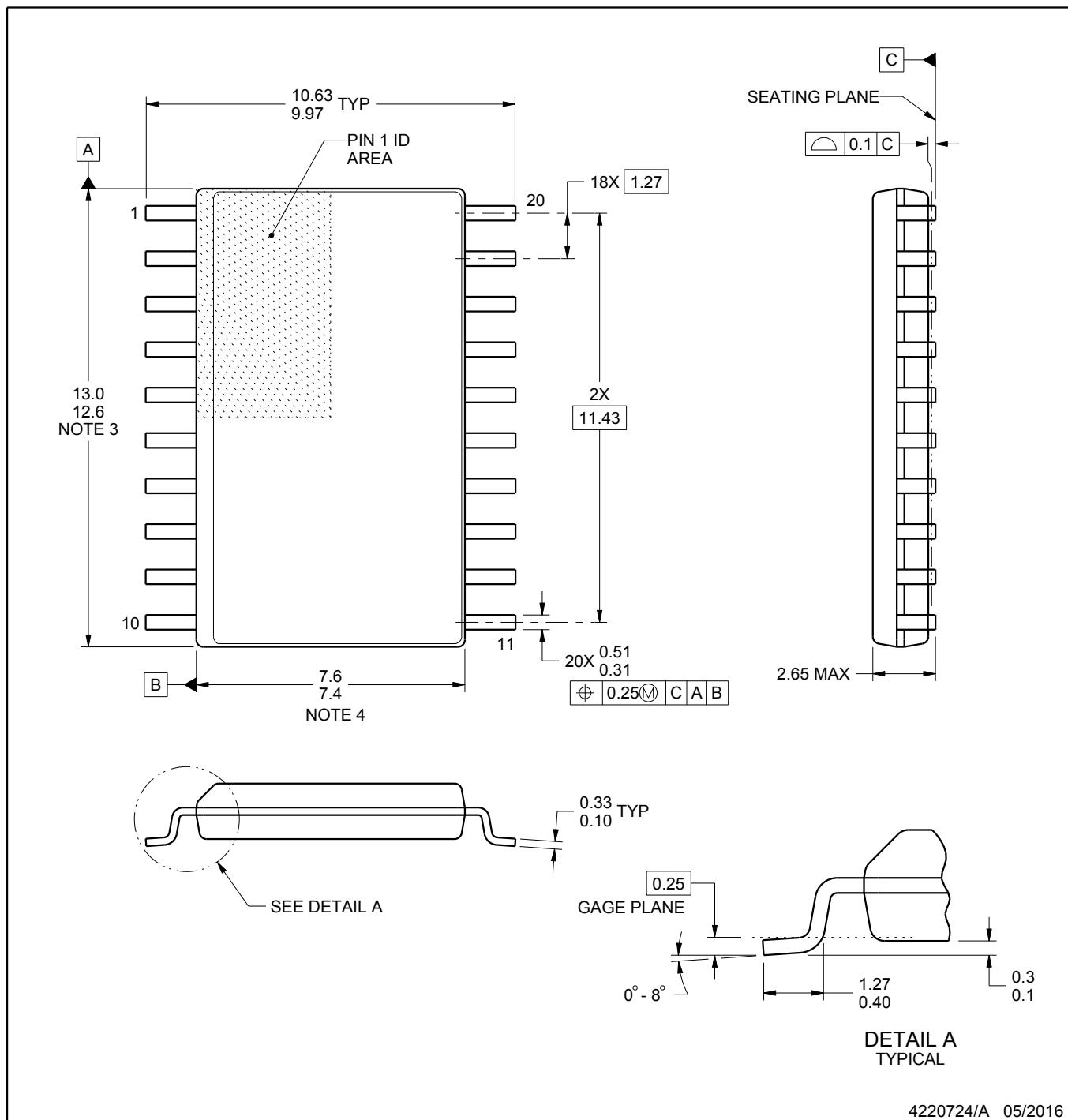


PACKAGE OUTLINE

DW0020A

SOIC - 2.65 mm max height

SOIG



NOTES:

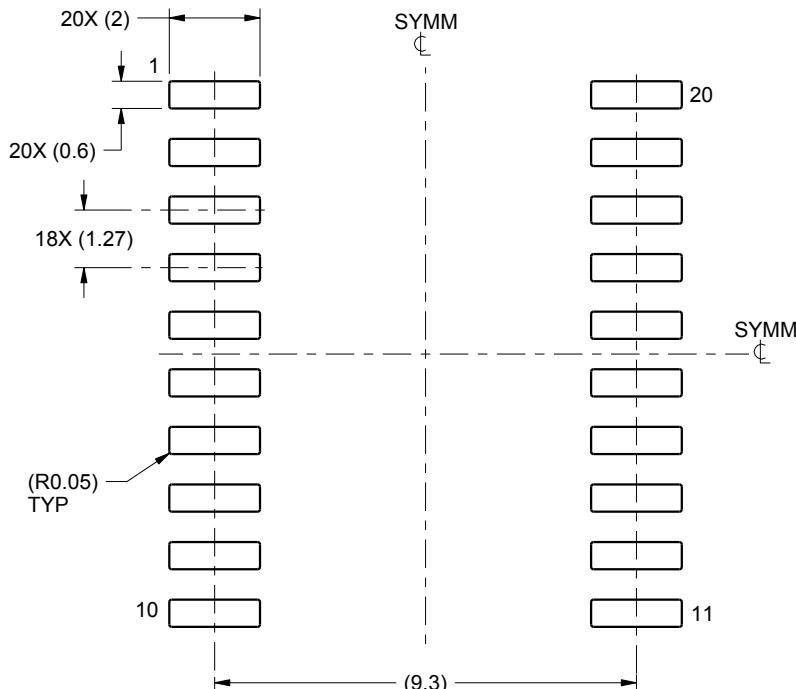
1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm per side.
5. Reference JEDEC registration MS-013.

EXAMPLE BOARD LAYOUT

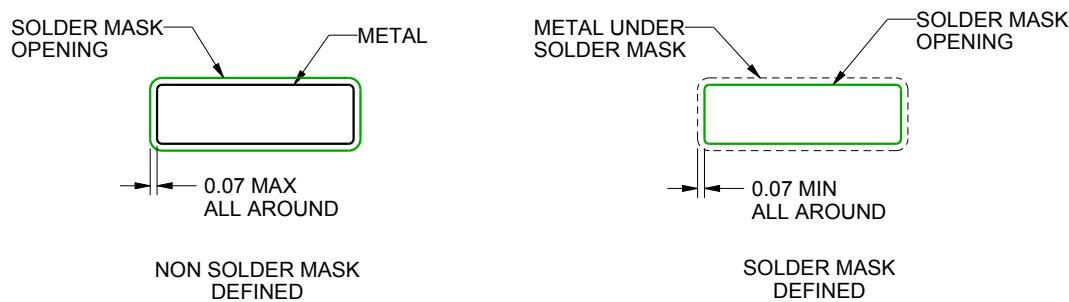
DW0020A

SOIC - 2.65 mm max height

SOIC



LAND PATTERN EXAMPLE
SCALE:6X



SOLDER MASK DETAILS

4220724/A 05/2016

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

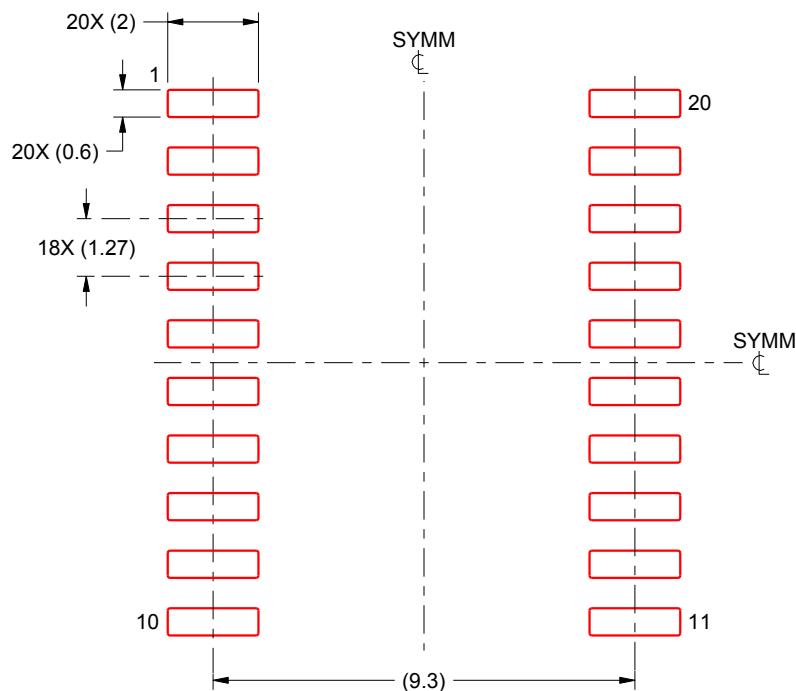
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DW0020A

SOIC - 2.65 mm max height

SOIC



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:6X

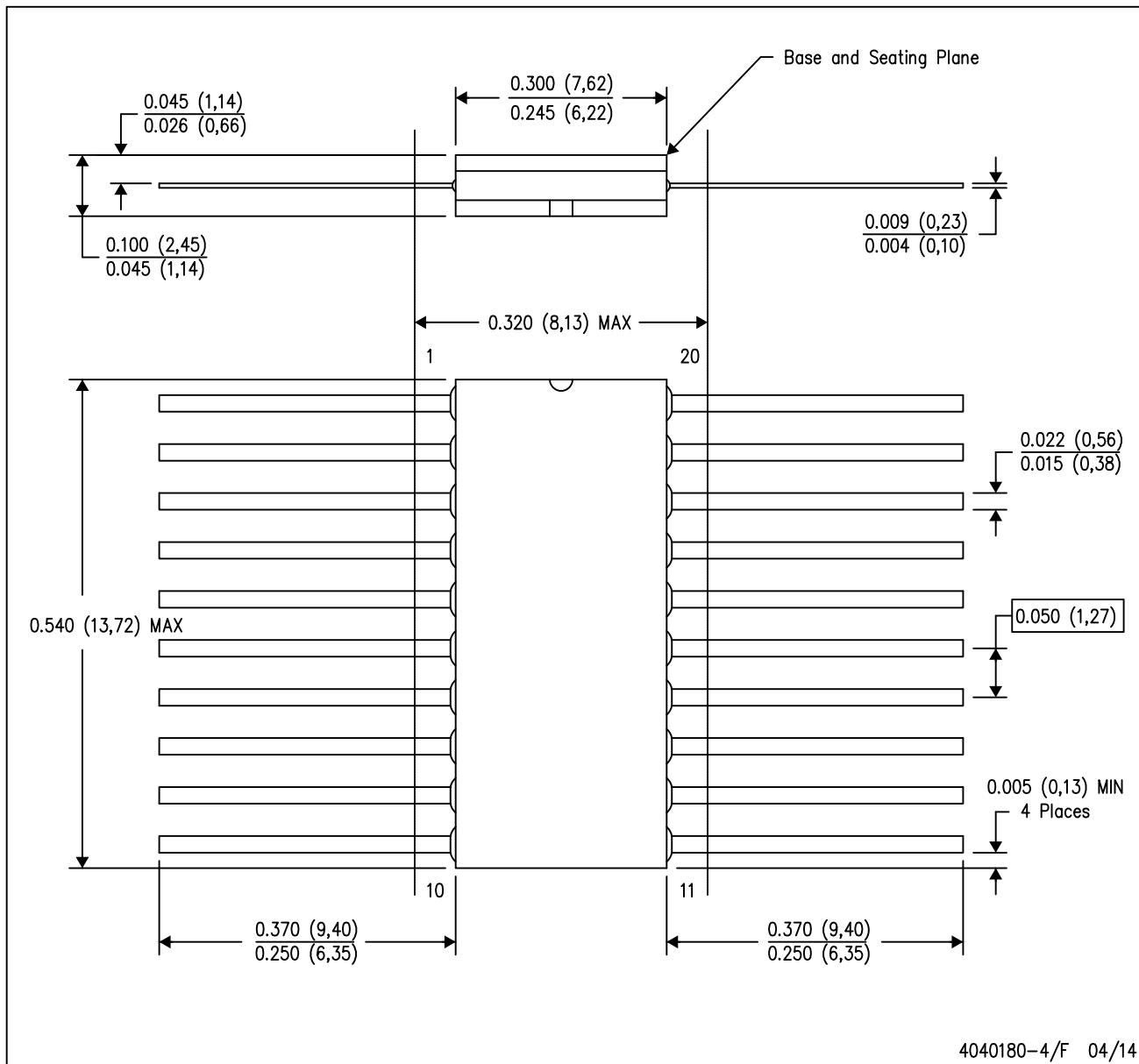
4220724/A 05/2016

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.

W (R-GDFP-F20)

CERAMIC DUAL FLATPACK



NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only.
- E. Falls within Mil-Std 1835 GDFP2-F20

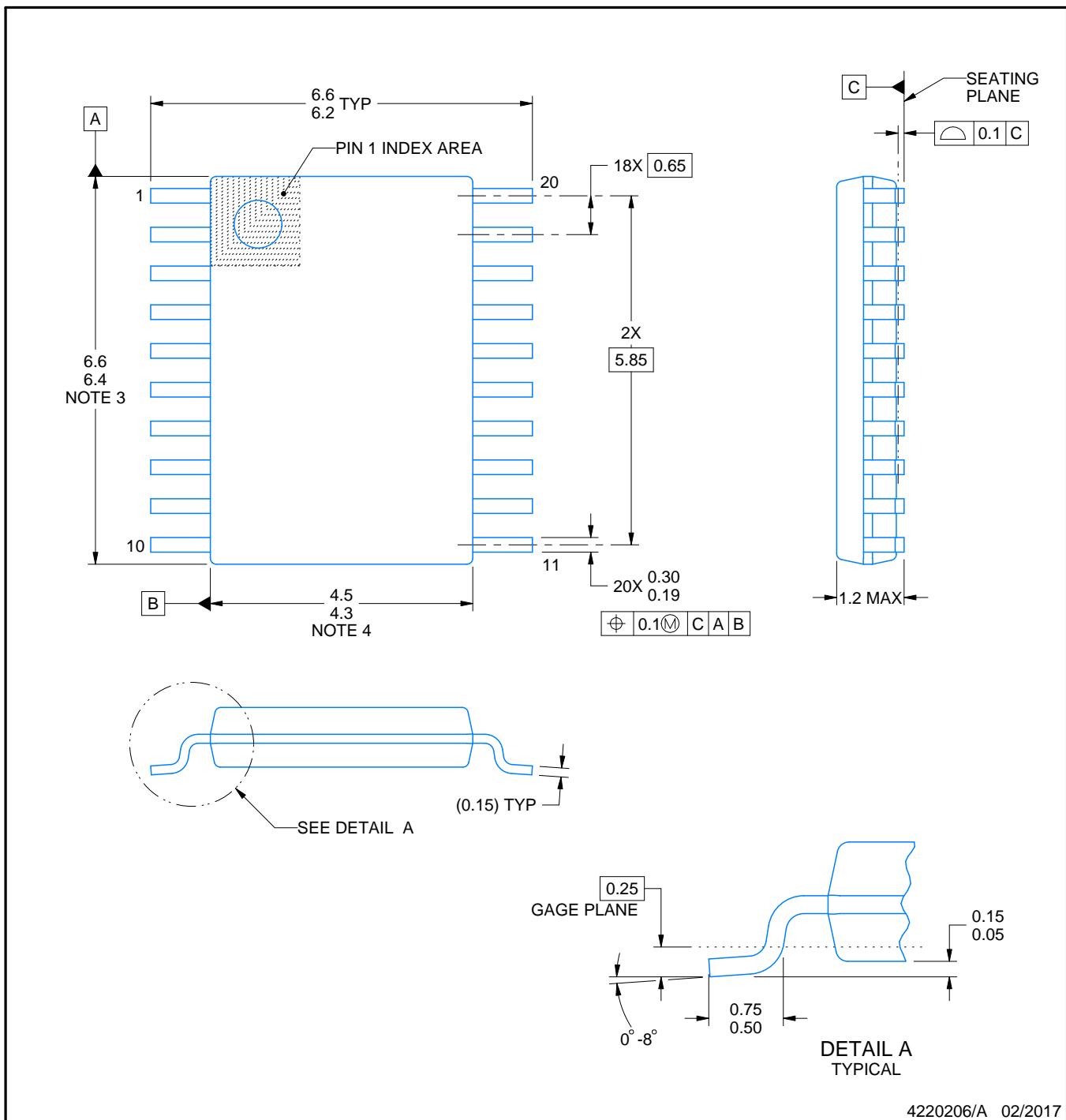
PACKAGE OUTLINE

PW0020A



TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



NOTES:

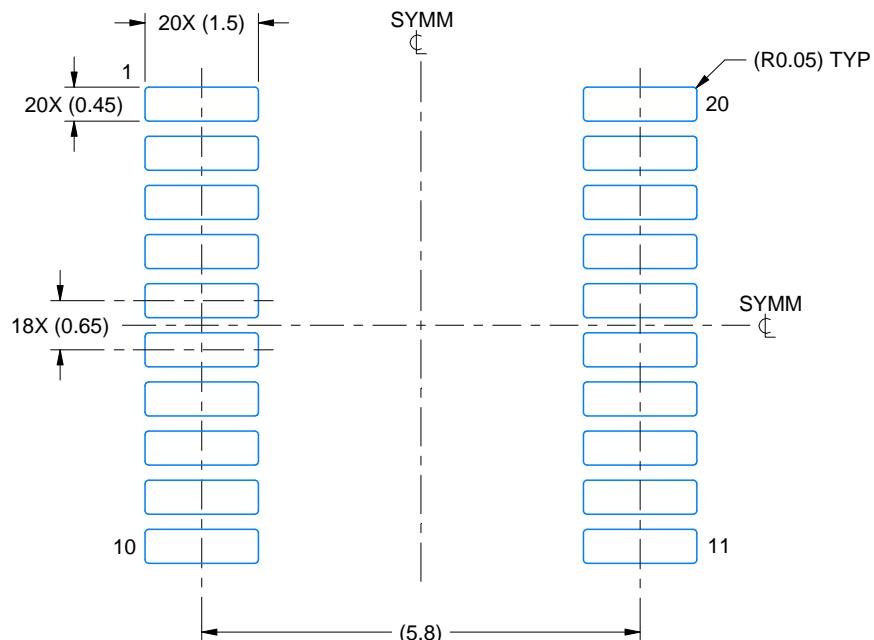
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or 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.

EXAMPLE BOARD LAYOUT

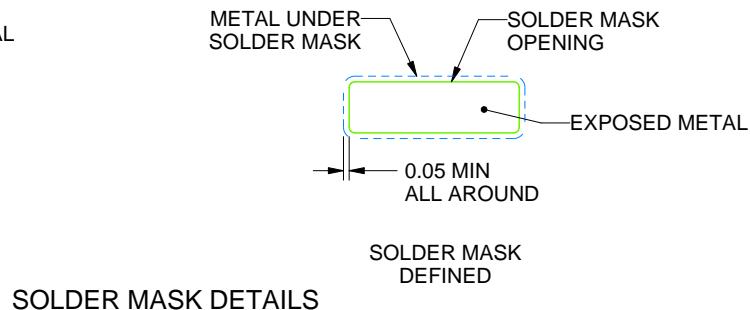
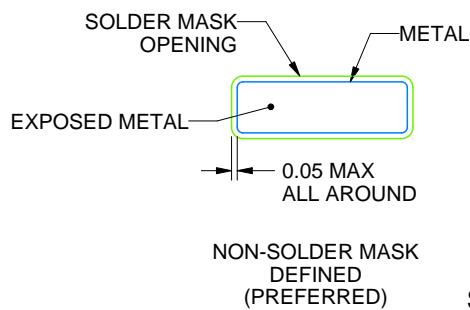
PW0020A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



4220206/A 02/2017

NOTES: (continued)

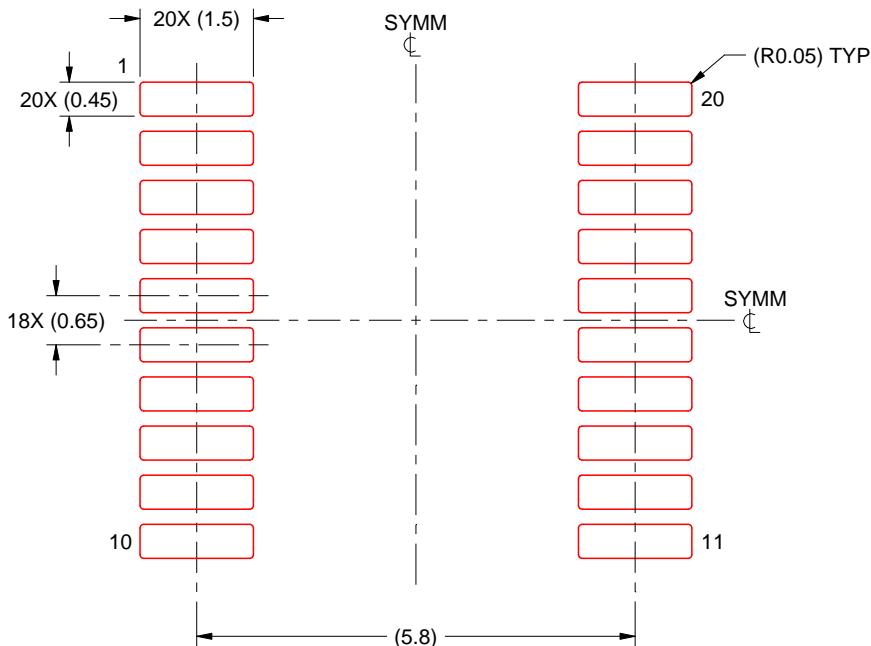
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

PW0020A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



4220206/A 02/2017

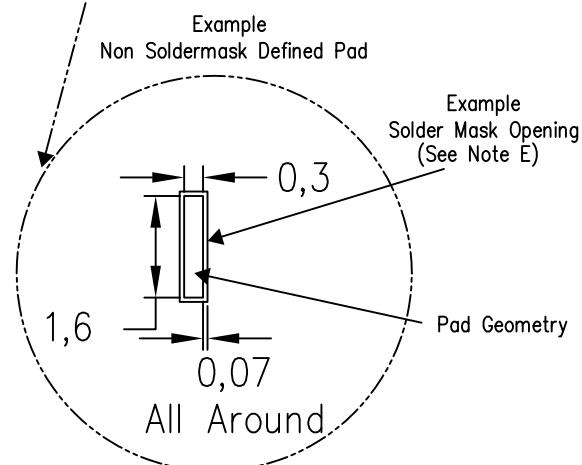
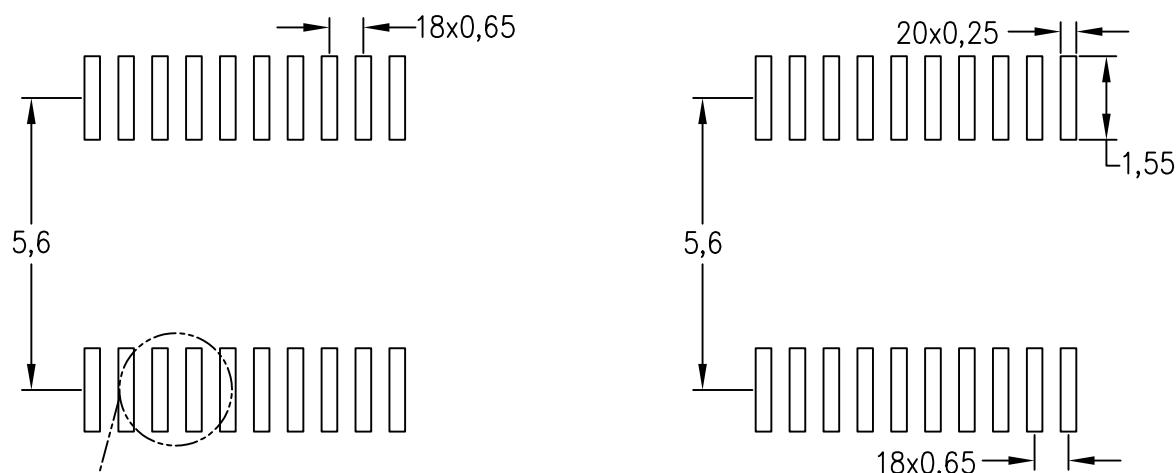
NOTES: (continued)

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.

PW (R-PDSO-G20)

PLASTIC SMALL OUTLINE

Example Board Layout

Based on a stencil thickness
of .127mm (.005inch).

4211284-5/G 08/15

NOTES:

- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- Publication IPC-7351 is recommended for alternate design.
- Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

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