SNx4AHC04 HEX INVERTERS

1 Features

- Operating range of 2 V to 5.5 V
- Latch-up performance exceeds 250 mA per JESD 17

2 Description

The 'AHC04 devices contain six independent inverters. These devices perform the Boolean function $Y = \overline{A}$.

Device Information

PART NUMBER	PACKAGE[1]	BODY SIZE[2]
SN54AHC04	J (CDIP, 14)	19.56 mm × 6.67 mm
	W (CFP, 14)	13.1 mm × 6.92 mm
	FK (LCCC, 20)	8.9 mm × 8.9 mm
SN74AHC04	N (PDIP, 14)	19.3 mm × 6.35 mm
	D (SOIC, 14)	8.65 mm × 3.91 mm
	DB (SSOP, 14)	6.20 mm × 5.30 mm
	NS (SOP, 14)	12.60 mm × 5.30 mm
	PW (TSSOP, 14)	5.00 mm × 4.40 mm
	DGV (TVSOP, 14)	3.6 mm × 4.4 mm
	RGY (VQFN, 14)	3.50 mm × 3.50 mm
	BQA (WQFN, 14)	3 mm × 2.5 mm

1. For all available packages, see the orderable addendum at the end of the data sheet.
2. The package size (length × width) is a nominal value and includes pins, where applicable.

Figure 2-1. Logic Diagram, Each Gate (Positive Logic)

Table of Contents

3 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision O (May 2023) to Revision P (June 2023)	Page
• Added BQA package to *Device Information* table	1
• Added *Device and Documentation Support* section, and *Mechanical, Packaging, and Orderable Information* section	1
• Updated thermal values for RθJA: D = 86 to 124.5, PW = 113 to 147.7, all values in °C/W	5
• Added thermal value for RθJA: BQA = 88.3, all values in °C/W	5

Changes from Revision N (May 2013) to Revision O (May 2023)	Page
• Added *Package Information* table, *Pin Functions* table, and *Thermal Information* table	1

4 Pin Configuration and Functions

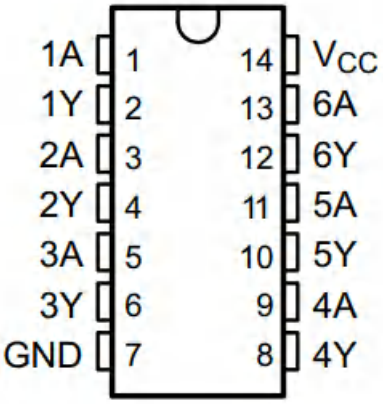


Figure 4-1. SN54AHC04 J or W Package SN74AHC04 D, DB, DGV, N, NS, or PW Package (Top View)

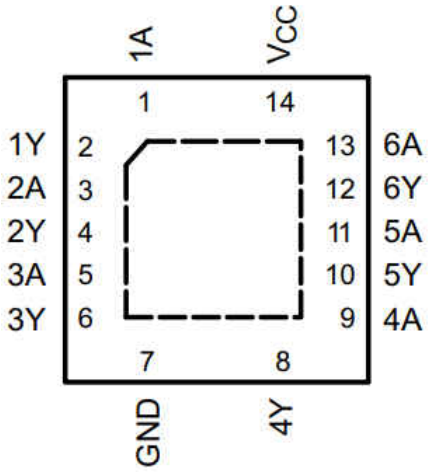


Figure 4-2. SN74AHC04 RGY or BQA Package (Top View)

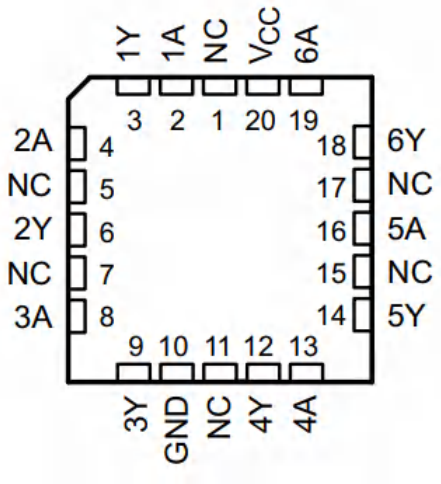


Figure 4-3. SN54AHC04 FK Package (Top View)

Table 4-1. Pin Functions

PIN					I/O	DESCRIPTION
NAME	SN74AHC04		SN54AHC04			
	D, DB, DGV, N, NS, PW	RGY, BQA	J, W	FK		
1A	1	1	1	2	I	1A Input
1Y	2	2	2	3	O	1Y Output
2A	3	3	3	4	I	2A Input
2Y	4	4	4	6	O	2Y Output
3A	5	5	5	8	I	3A Input
3Y	6	6	6	9	O	3Y Output
4A	9	9	9	13	I	4A Input
4Y	8	8	8	12	O	4Y Output
5A	11	11	11	16	I	5A Input
5Y	10	10	10	14	I	5Y Output
6A	13	13	13	19	I	6A Input
6Y	12	12	12	18	O	6Y Output
GND	7	7	7	10	—	Ground Pin
NC	—	—	—	1	—	No Connection
				5		
				7		
				11		
				15		
				17		
V_{CC}	14	14	14	20	—	Power Pin

5 Specifications

5.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)(1)

			MIN	MAX	UNIT
V_{CC}	Supply voltage range		–0.5	7	V
V_I (2)	Input voltage range		–0.5	7	V
V_O (2)	Output voltage range		–0.5	V_{CC} + 0.5	V
I_{IK}	Input clamp current	(V_I < 0)		–20	mA
I_{OK}	Output clamp current	(V_O < 0 or V_O > V_{CC})		±20	mA
I_{OK}	Continuous output current	(V_O = 0 to V_{CC})		±25	mA
	Continuous current through V_{CC} or GND			±50	mA
T_{stg}	Storage temperature range		–65	150	°C

(1) 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.
(2) The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

5.2 ESD Ratings

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins(1)	±2000	V
		Charged device model (CDM), per JEDEC specification JESD22-C101, all pins(2)	±1000	

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

5.3 Recommended Operating Conditions

			SN54AHC04		SN74AHC04		UNIT
			MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage		2	5.5	2	5.5	V
V_{IH}	High-level input voltage	V_{CC}= 2 V	1.5		1.5		V
		V_{CC}= 3V	2.1		2.1		
		V_{CC}= 5.5 V	3.85		3.85		
V_{IL}	Low-level Input voltage	V_{CC}= 2 V		0.5		0.5	V
		V_{CC}= 3 V		0.9		0.9	
		V_{CC}= 5.5 V		1.65		1.65	
V_I	Input voltage		0	5.5	0	5.5	V
V_O	Output voltage		0	V_{CC}	0	V_{CC}	V
I_{OH}	High-level output current	V_{CC}= 2 V		–50		–50	mA
		V_{CC}= 3.3 V ± 0.3 V		–4		–4	
		V_{CC}= 5 V ± 0.5 V		–8		–8	
I_{OL}	Low-level output current	V_{CC}= 2 V		50		50	mA
		V_{CC}= 3.3 V ± 0.3 V		4		4	
		V_{CC}= 5 V ± 0.5 V		8		8	
Δt/Δv	Input Transition rise or fall rate	V_{CC}= 3.3 V ± 0.3 V		100		100	ns/V
		V_{CC}= 5 V ± 0.5 V		20		20	
T_A	Operating free-air temperature		–55	125	–40	125	°C

5.4 Thermal Information

THERMAL METRIC[1]		SNx4AHC04								UNIT
		D	DB	DGV	N	NS	PW	RGY	BQA	
		14 PINS								
$R_{\theta JA}$	Junction-to-ambient thermal resistance	124.5	96	127	80	76	147.7	47	88.3	°C/W

(1) For more information about traditional and new thermal metrics, see the *IC Package Thermal Metrics* application report, (SPRA953).

5.5 Electrical Characteristics

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

PARAMETER	TEST CONDITIONS	V_{CC}	T_A = 25°C			T_A = –55°C TO 125°C		T_A = –40°C TO 85°C		T_A = –40°C TO 125°C		UNIT
						SN54AHC04		SN74AHC04		Recommended SN74AHC04		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
V_{OH}	I_{OH} = –50 µA	2 V	1.9	2		1.9		1.9		1.9		V
		3 V	2.9	3		2.9		2.9		2.9		
		4.5 V	4.4	4.5		4.4		4.4		4.4		
	I_{OH} = –4 mA	3 V	2.58			2.48		2.48		2.48		
	I_{OH} = –8 mA	4.5 V	3.94			3.8		3.8		3.8		
V_{OL}	I_{OL} = 50 µA	2 V			0.1		0.1		0.1		0.1	V
		3 V			0.1		0.1		0.1		0.1	
		4.5 V			0.1		0.1		0.1		0.1	
	I_{OH} = 4 mA	3 V			0.36		0.5		0.44		0.5	
	I_{OH} = 8 mA	4.5 V			0.36		0.5		0.44		0.5	
I_I	V_I = 5.5 V or GND	0 V to 5.5 V			±0.1		±1[(1)]		±1		±1	µA
I_{CC}	V_I = V_{CC} or GND, I_O = 0	5.5 V			2		20		20		20	µA
C_i	V_I = V_{CC} or GND	5 V		2	10				10			pF

(1) On products compliant to MIL-PRF-38535, this parameter is not production tested at V_{CC} = 0 V.

5.6 Switching Characteristics

over recommended operating free-air temperature range, V_{CC} = 3.3 V ± 0.3 V (unless otherwise noted) (see Load Circuit and Voltage Waveforms)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	T_A = 25°C		T_A = –55°C TO 125°C		T_A = –40°C TO 85°C		T_A = –40°C TO 125°C		UNIT
						SN54AHC04		SN74AHC04		Recommended SN74AHC04		
				TYP	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	C_L = 15 pF	5[(1)]	8.9[(1)]	1[(1)]	10.5[(1)]	1	10.5	1	10.5	ns
t_{PHL}				5[(1)]	8.9[(1)]	1[(1)]	10.5[(1)]	1	10.5	1	10.5	
t_{PLH}	A	Y	C_L = 50 pF	7.5	11.4	1	13	1	13	1	13	ns
t_{PHL}				7.5	11.4	1	13	1	13	1	13	

(1) On products compliant to MIL-PRF-38535, this parameter is not production tested.

5.7 Switching Characteristics, V_{CC} = 5 V ± 0.5 V

over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Load Circuit and Voltage Waveforms)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	T_A = 25°C		T_A = –55°C TO 125°C		T_A = –40°C TO 85°C		T_A = –40°C TO 125°C		UNIT
						SN54AHC04		SN74AHC04		Recommended SN74AHC04		
				TYP	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	C_L = 15 pF	3.8[1]	5.5[1]	1[1]	6.5[1]	1	6.5	1	6.5	ns
t_{PHL}				3.8[1]	5.5[1]	1[1]	6.5[1]	1	6.5	1	6.5	
t_{PLH}	A	Y	C_L = 50 pF	5.3	7.5	1	8.5	1	8.5	1	8.5	ns
t_{PHL}				5.3	7.5	1	8.5	1	8.5	1	8.5	

1. On products compliant to MIL-PRF-38535, this parameter is not production tested.

5.8 Noise Characteristics

V_{CC} = 5 V, C_L = 50 pF, T_A = 25°C(1)

PARAMETER		SN74AHC04			UNIT
		MIN	TYP	MAX	
$V_{OL(P)}$	Quiet output, maximum dynamic V_{OL}		0.4		V
$V_{OL(V)}$	Quiet output, minimum dynamic V_{OL}		–0.4		V
$V_{OH(V)}$	Quiet output, minimum dynamic V_{OH}		4.8		V
$V_{IH(D)}$	High-level dynamic input voltage	3.5			V
$V_{IL(D)}$	Low-level dynamic input voltage			1.5	V

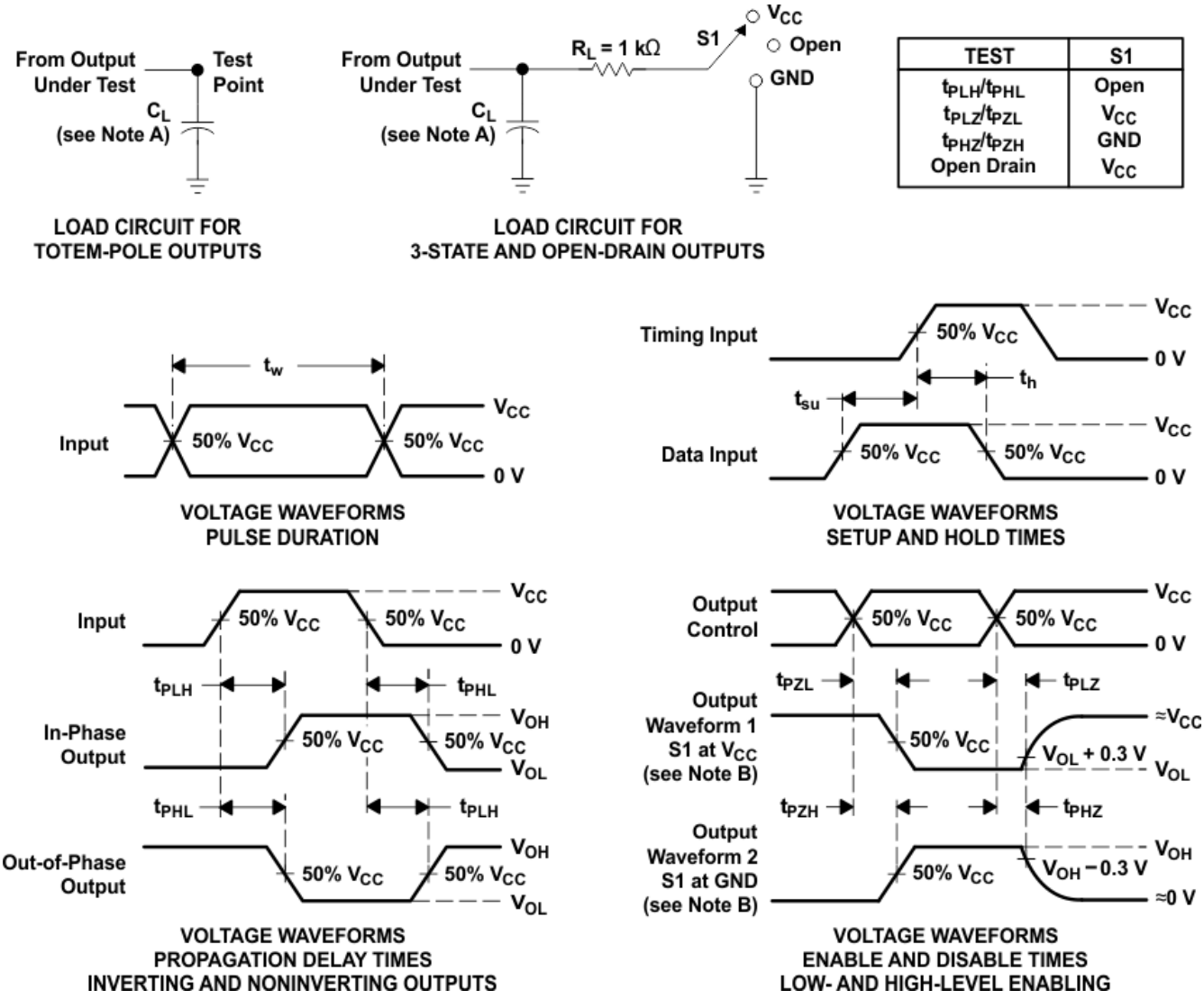
(1) Characteristics are for surface-mount packages only.

5.9 Operating Characteristics

V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance	No load,	f = 1 MHz	12	pF

6 Parameter Measurement Information



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 ≤ 1 MHz, Z_O = 50 Ω, t_r ≤ 3 ns, t_f ≤ 3 ns.
D. The outputs are measured one at a time with one input transition per measurement.
E. All parameters and waveforms are not applicable to all devices.

Figure 6-1. Load Circuit and Voltage Waveforms

7 Detailed Description

7.1 Functional Block Diagram

7.2 Device Functional Modes

Table 7-1. Function Table (Each Inverter)

INPUT A	OUTPUT Y
H	L
L	H

8 Device and Documentation Support

8.1 Documentation Support (Analog)

8.1.1 Related Documentation

The table below lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to sample or buy.

Table 8-1. Related Links

PARTS	PRODUCT FOLDER	SAMPLE & BUY	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
SN54AHC04	Click here	Click here	Click here	Click here	Click here
SN74AHC04	Click here	Click here	Click here	Click here	Click here

8.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. Click on *Subscribe to updates* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

8.3 Support Resources

TI E2E™ support forums are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's Terms of Use.

8.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.
All trademarks are the property of their respective owners.

8.5 Electrostatic Discharge Caution

This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

8.6 Glossary

TI Glossary — This glossary lists and explains terms, acronyms, and definitions.

9 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

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)
5962-9680501Q2A	Active	Production	LCCC (FK) | 20	55 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501Q2A SNJ54AHC04FK
5962-9680501QCA	Active	Production	CDIP (J) | 14	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501QCA SNJ54AHC04J
5962-9680501QDA	Active	Production	CFP (W) | 14	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501QDA SNJ54AHC04W
SN74AHC04BQAR	Active	Production	WQFN (BQA) | 14	3000 | LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	AHC04
SN74AHC04BQAR.A	Active	Production	WQFN (BQA) | 14	3000 | LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	AHC04
SN74AHC04D	Obsolete	Production	SOIC (D) | 14	-	-	Call TI	Call TI	-40 to 125	AHC04
SN74AHC04DBR	Active	Production	SSOP (DB) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA04
SN74AHC04DBR.A	Active	Production	SSOP (DB) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA04
SN74AHC04DGVR	Active	Production	TVSOP (DGV) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA04
SN74AHC04DGVR.A	Active	Production	TVSOP (DGV) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA04
SN74AHC04DR	Active	Production	SOIC (D) | 14	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC04
SN74AHC04DR.A	Active	Production	SOIC (D) | 14	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC04
SN74AHC04N	Active	Production	PDIP (N) | 14	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 125	SN74AHC04N
SN74AHC04N.A	Active	Production	PDIP (N) | 14	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 125	SN74AHC04N
SN74AHC04NSR	Active	Production	SOP (NS) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC04
SN74AHC04NSR.A	Active	Production	SOP (NS) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC04
SN74AHC04PW	Obsolete	Production	TSSOP (PW) | 14	-	-	Call TI	Call TI	-40 to 125	HA04
SN74AHC04PWR	Active	Production	TSSOP (PW) | 14	2000 | LARGE T&R	Yes	NIPDAU | SN	Level-1-260C-UNLIM	-40 to 125	HA04
SN74AHC04PWR.A	Active	Production	TSSOP (PW) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA04
SN74AHC04RGYR	Active	Production	VQFN (RGY) | 14	3000 | LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	HA04
SN74AHC04RGYR.A	Active	Production	VQFN (RGY) | 14	3000 | LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	HA04
SNJ54AHC04FK	Active	Production	LCCC (FK) | 20	55 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501Q2A SNJ54AHC04FK

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)
SNJ54AHC04FK.A	Active	Production	LCCC (FK) | 20	55 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501Q2A SNJ54AHC 04FK
SNJ54AHC04J	Active	Production	CDIP (J) | 14	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501QCA SNJ54AHC04J
SNJ54AHC04J.A	Active	Production	CDIP (J) | 14	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501QCA SNJ54AHC04J
SNJ54AHC04W	Active	Production	CFP (W) | 14	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501QDA SNJ54AHC04W
SNJ54AHC04W.A	Active	Production	CFP (W) | 14	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501QDA SNJ54AHC04W

(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.

OTHER QUALIFIED VERSIONS OF SN54AHC04, SN74AHC04 :

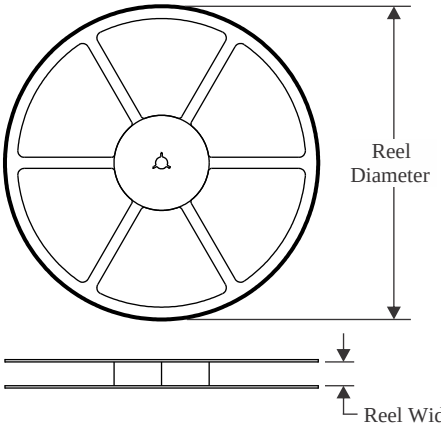
- Catalog : SN74AHC04
- Automotive : SN74AHC04-Q1, SN74AHC04-Q1
- Enhanced Product : SN74AHC04-EP, SN74AHC04-EP
- Military : SN54AHC04

NOTE: Qualified Version Definitions:

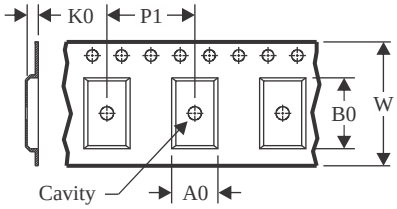
- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications
- Military - QML certified for Military and Defense Applications

TAPE AND REEL INFORMATION

REEL DIMENSIONS

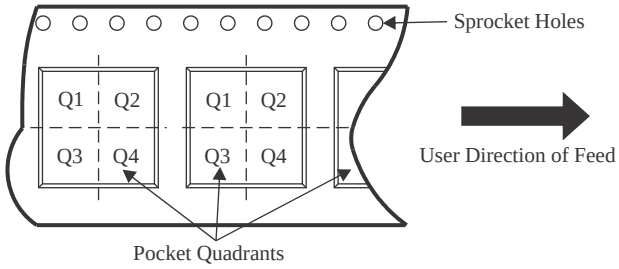


TAPE DIMENSIONS



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

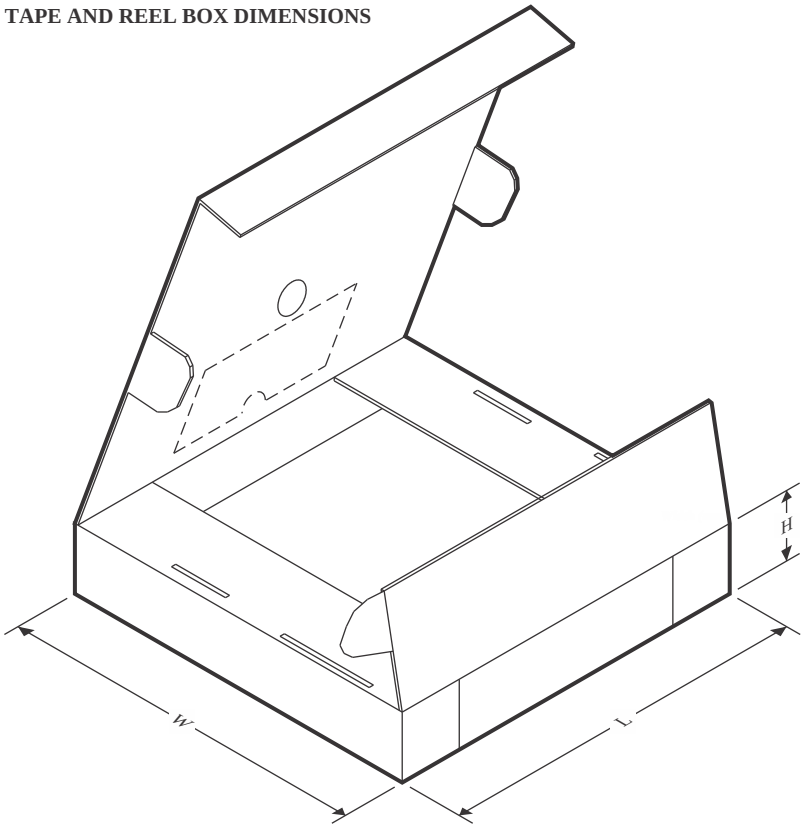
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
SN74AHC04BQAR	WQFN	BQA	14	3000	180.0	12.4	2.8	3.3	1.1	4.0	12.0	Q1
SN74AHC04DBR	SSOP	DB	14	2000	330.0	16.4	8.35	6.6	2.4	12.0	16.0	Q1
SN74AHC04DGVR	TVSOP	DGV	14	2000	330.0	12.4	6.8	4.0	1.6	8.0	12.0	Q1
SN74AHC04DR	SOIC	D	14	2500	330.0	12.4	3.75	3.75	1.15	8.0	12.0	Q1
SN74AHC04NSR	SOP	NS	14	2000	330.0	16.4	8.1	10.4	2.5	12.0	16.0	Q1
SN74AHC04PWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74AHC04RGYR	VQFN	RGY	14	3000	330.0	12.4	3.75	3.75	1.15	8.0	12.0	Q1

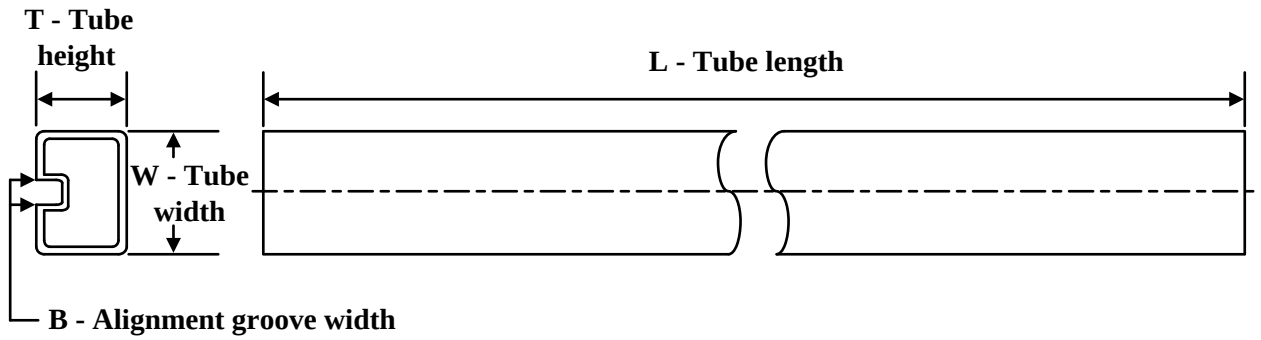
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AHC04BQAR	WQFN	BQA	14	3000	210.0	185.0	35.0
SN74AHC04DBR	SSOP	DB	14	2000	353.0	353.0	32.0
SN74AHC04DGVR	TVSOP	DGV	14	2000	353.0	353.0	32.0
SN74AHC04DR	SOIC	D	14	2500	340.5	336.1	32.0
SN74AHC04NSR	SOP	NS	14	2000	353.0	353.0	32.0
SN74AHC04PWR	TSSOP	PW	14	2000	353.0	353.0	32.0
SN74AHC04RGYR	VQFN	RGY	14	3000	353.0	353.0	32.0

TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
5962-9680501Q2A	FK	LCCC	20	55	506.98	12.06	2030	NA
5962-9680501QDA	W	CFP	14	25	506.98	26.16	6220	NA
SN74AHC04N	N	PDIP	14	25	506	13.97	11230	4.32
SN74AHC04N	N	PDIP	14	25	506	13.97	11230	4.32
SN74AHC04N.A	N	PDIP	14	25	506	13.97	11230	4.32
SN74AHC04N.A	N	PDIP	14	25	506	13.97	11230	4.32
SNJ54AHC04FK	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54AHC04FK.A	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54AHC04W	W	CFP	14	25	506.98	26.16	6220	NA
SNJ54AHC04W.A	W	CFP	14	25	506.98	26.16	6220	NA

GENERIC PACKAGE VIEW

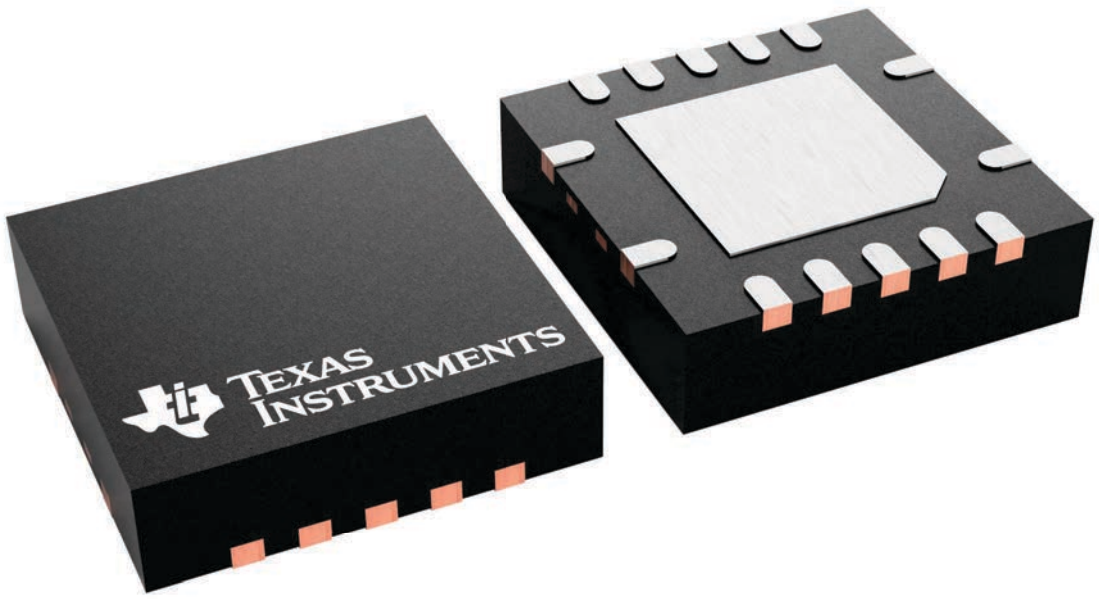
RGY 14

VQFN - 1 mm max height

3.5 x 3.5, 0.5 mm pitch

PLASTIC QUAD FLATPACK - NO LEAD

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



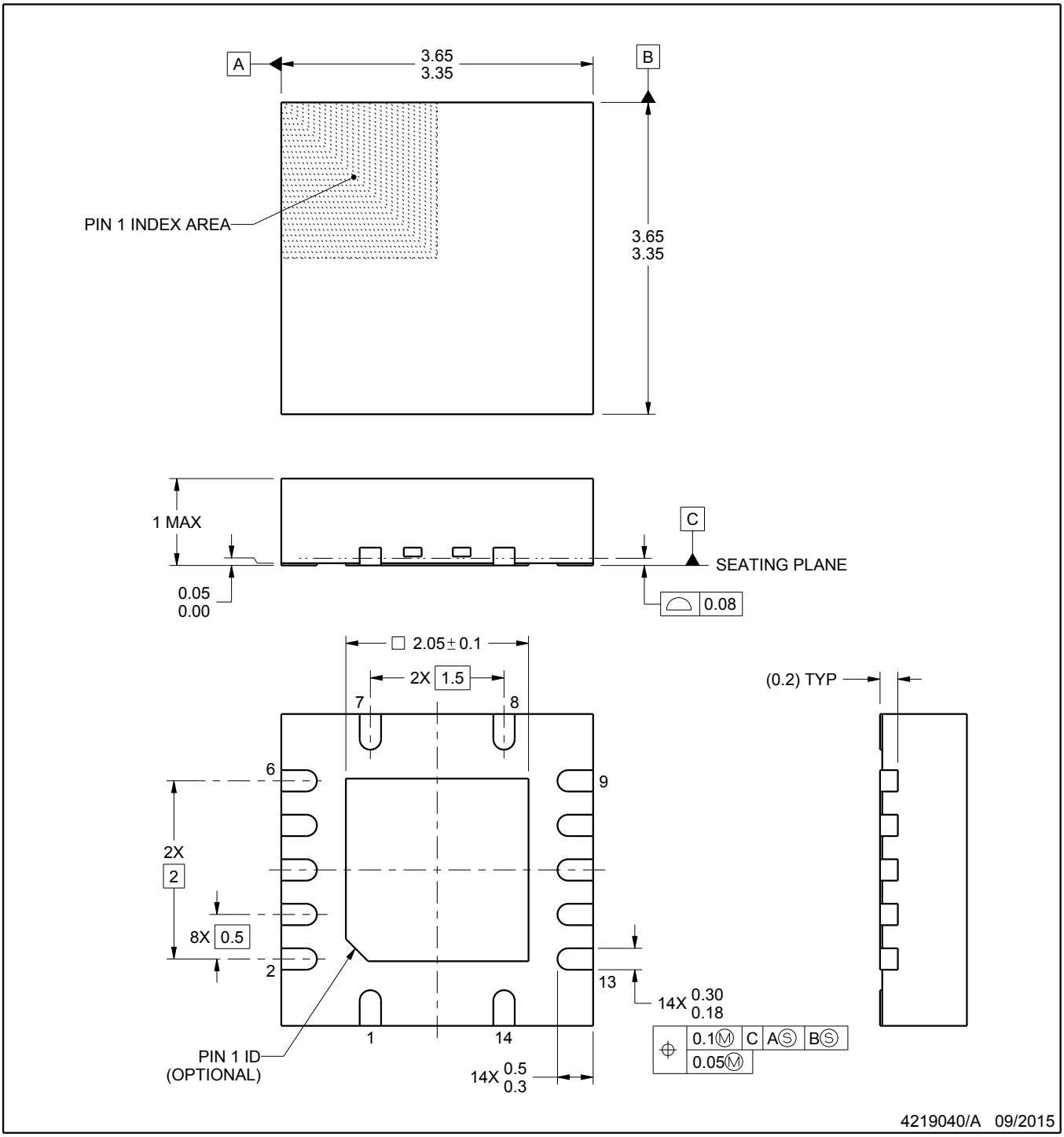
4231541/A

PACKAGE OUTLINE

RGY0014A

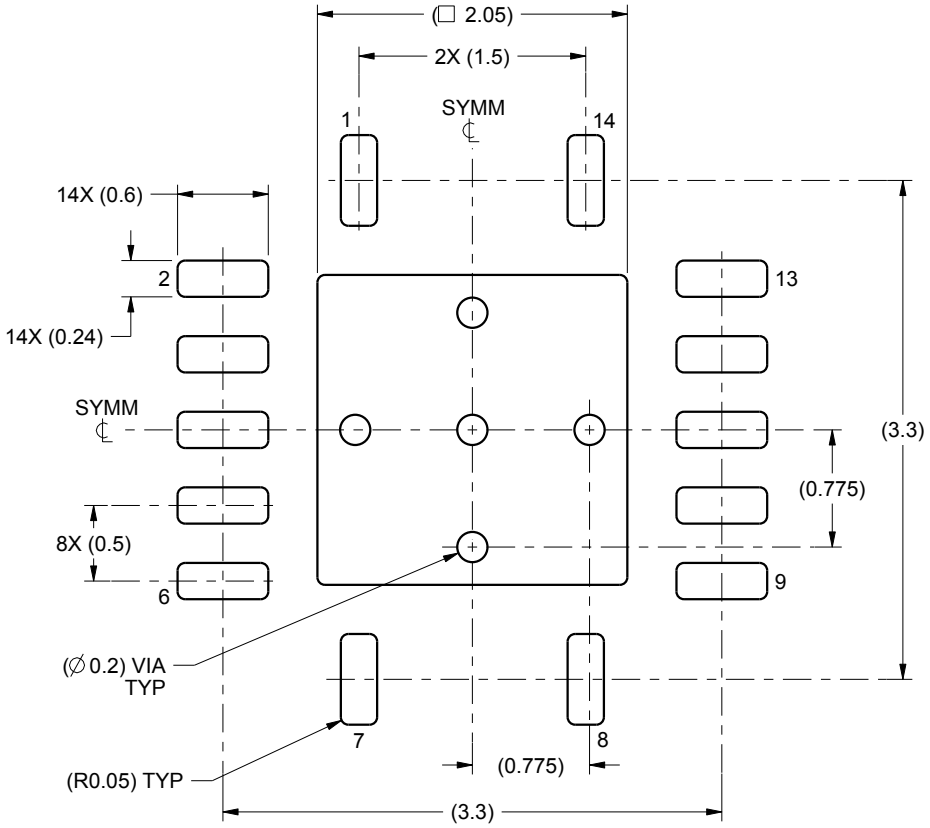
VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD

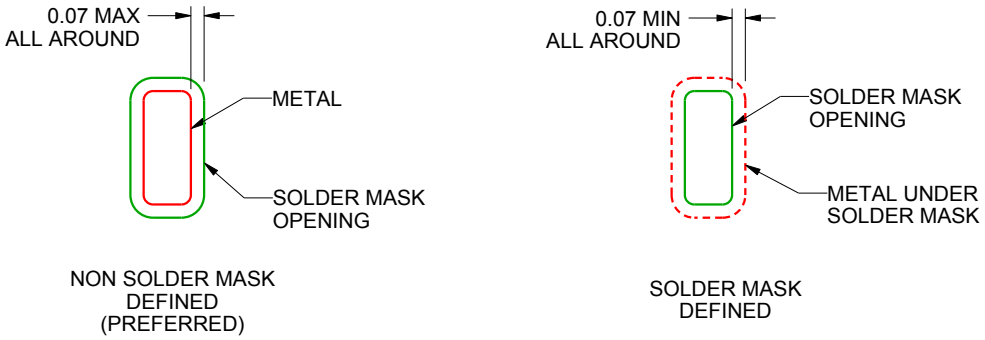


NOTES:

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.



LAND PATTERN EXAMPLE
SCALE:20X

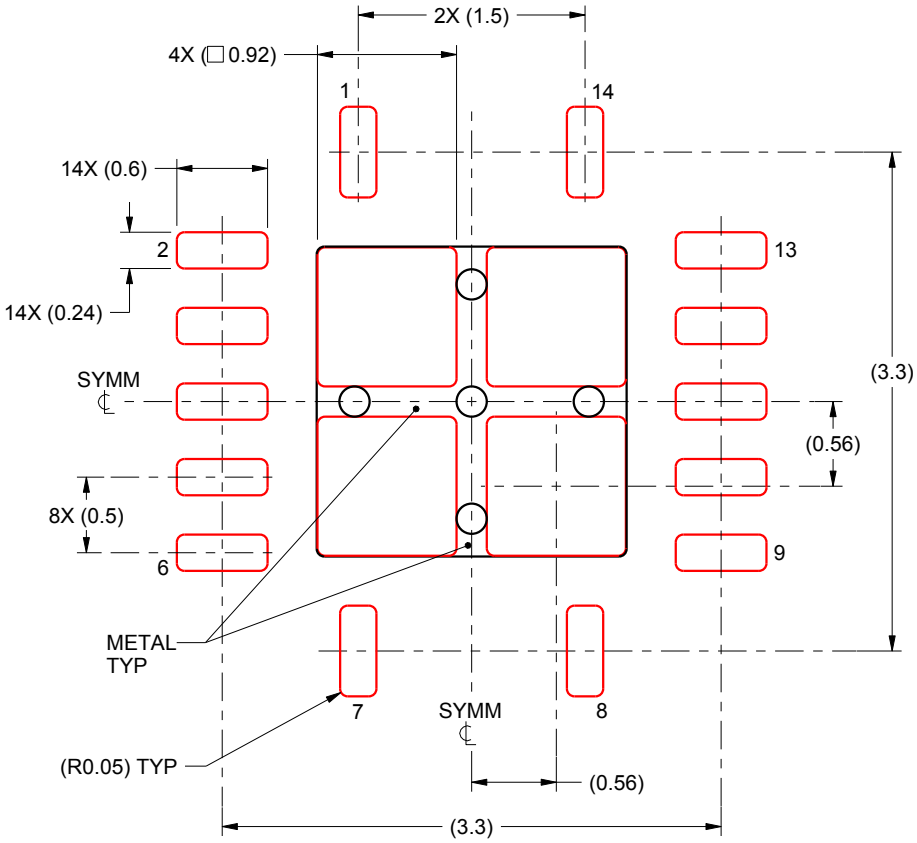


SOLDER MASK DETAILS

4219040/A 09/2015

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).



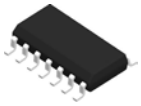
SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD
80% PRINTED SOLDER COVERAGE BY AREA
SCALE:20X

4219040/A 09/2015

NOTES: (continued)

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

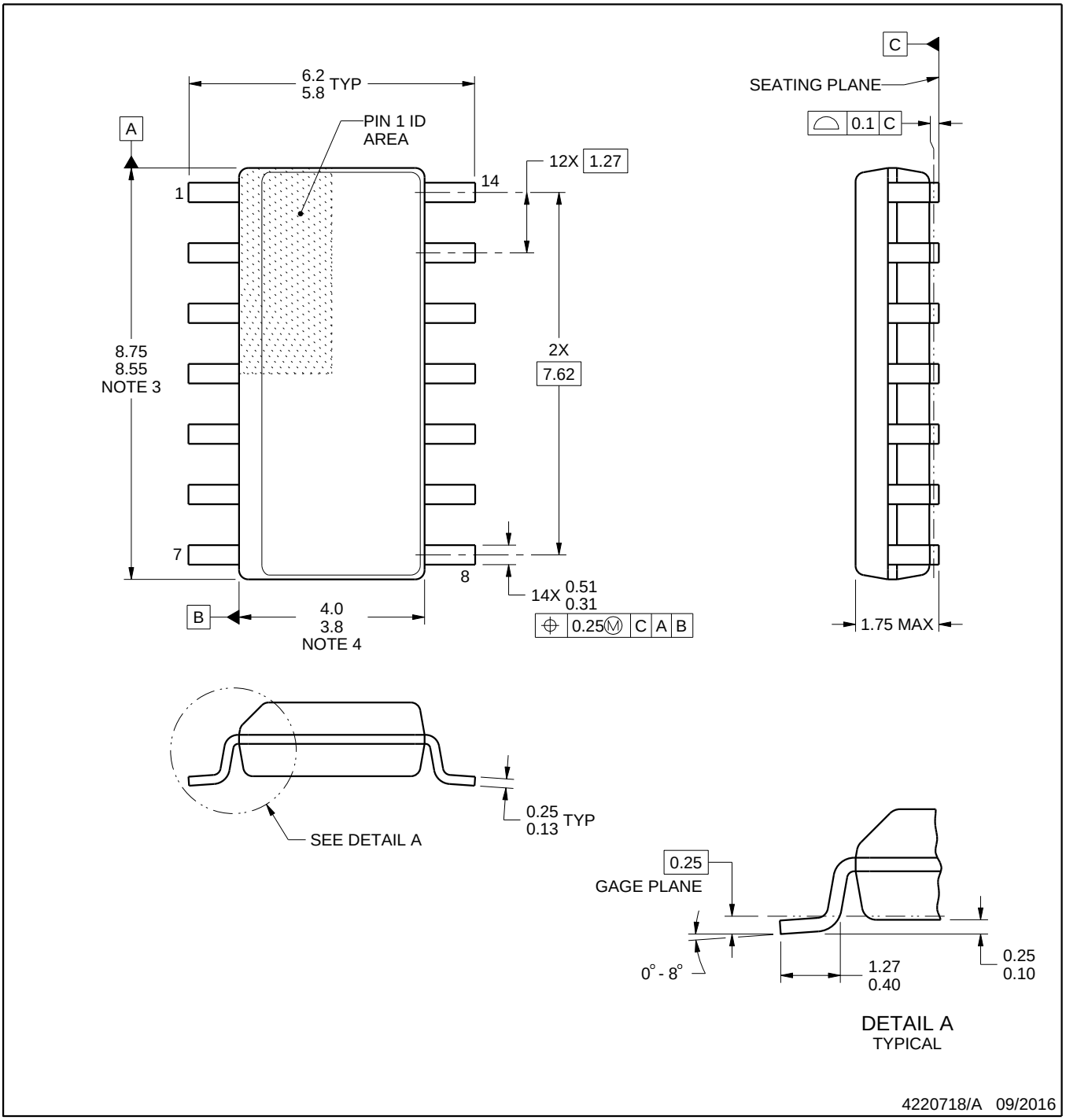


PACKAGE OUTLINE

D0014A

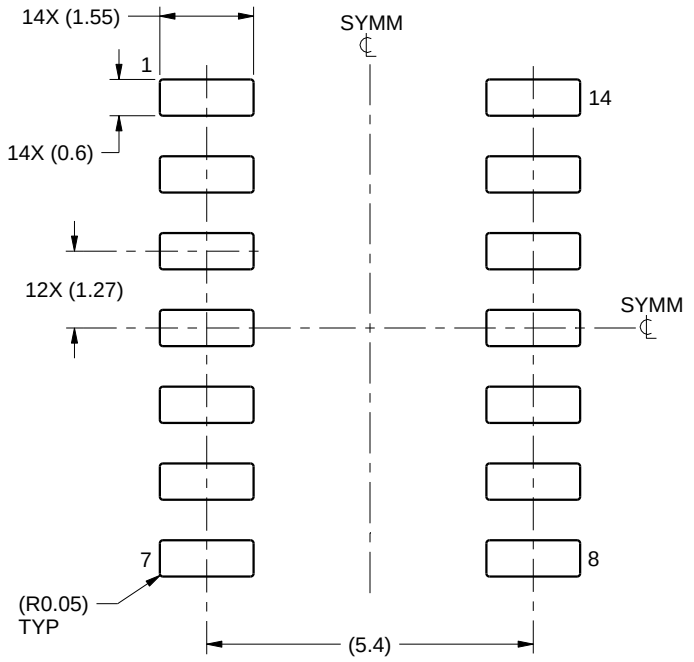
SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT

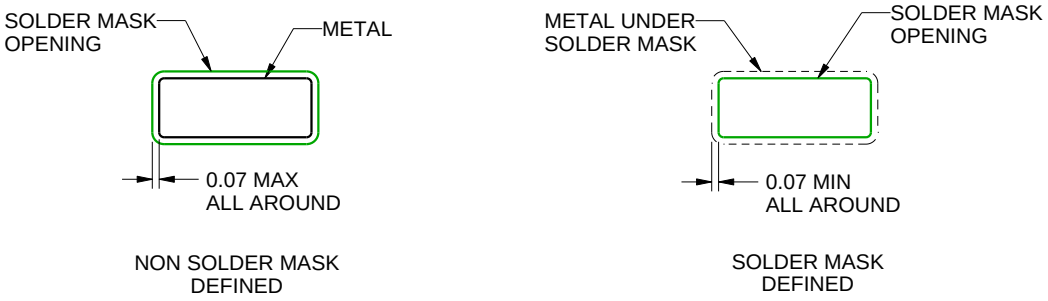


NOTES:

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-012, variation AB.



LAND PATTERN EXAMPLE
SCALE:8X



SOLDER MASK DETAILS

4220718/A 09/2016

NOTES: (continued)

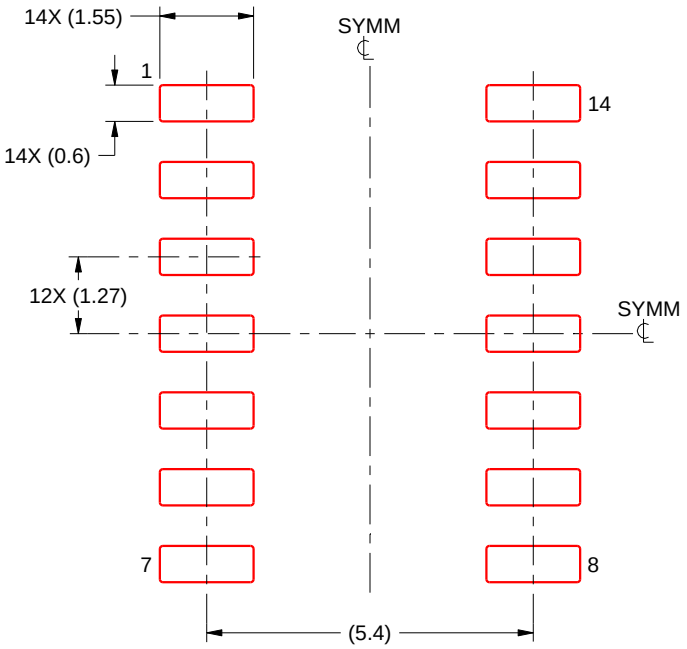
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:8X

4220718/A 09/2016

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.

GENERIC PACKAGE VIEW

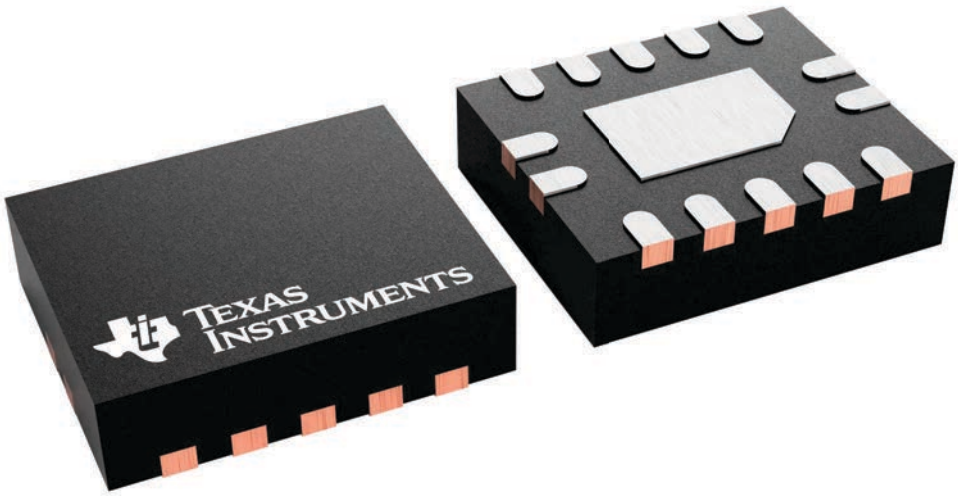
BQA 14

WQFN - 0.8 mm max height

2.5 x 3, 0.5 mm pitch

PLASTIC QUAD FLATPACK - NO LEAD

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

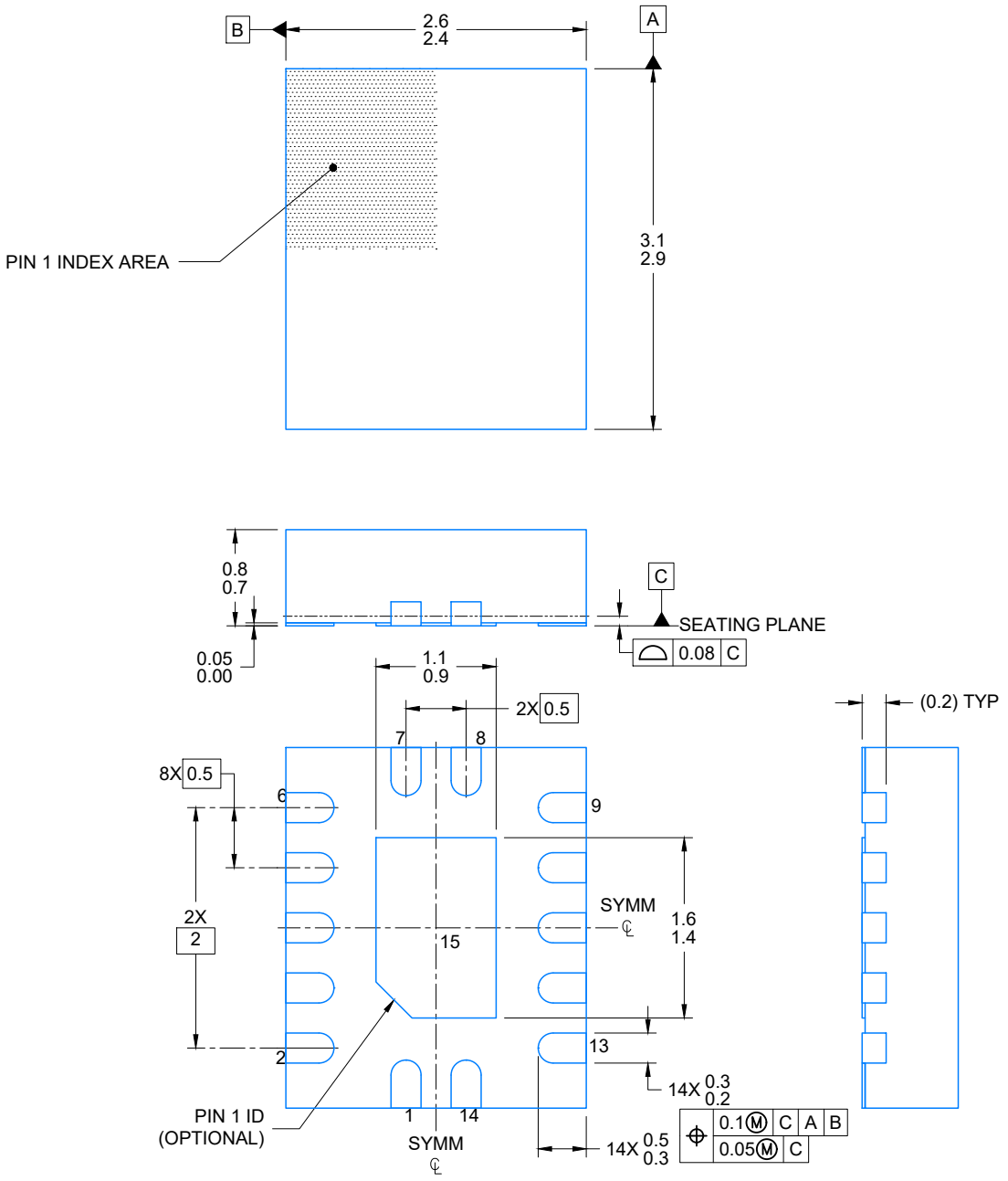


PACKAGE OUTLINE

BQA0014A

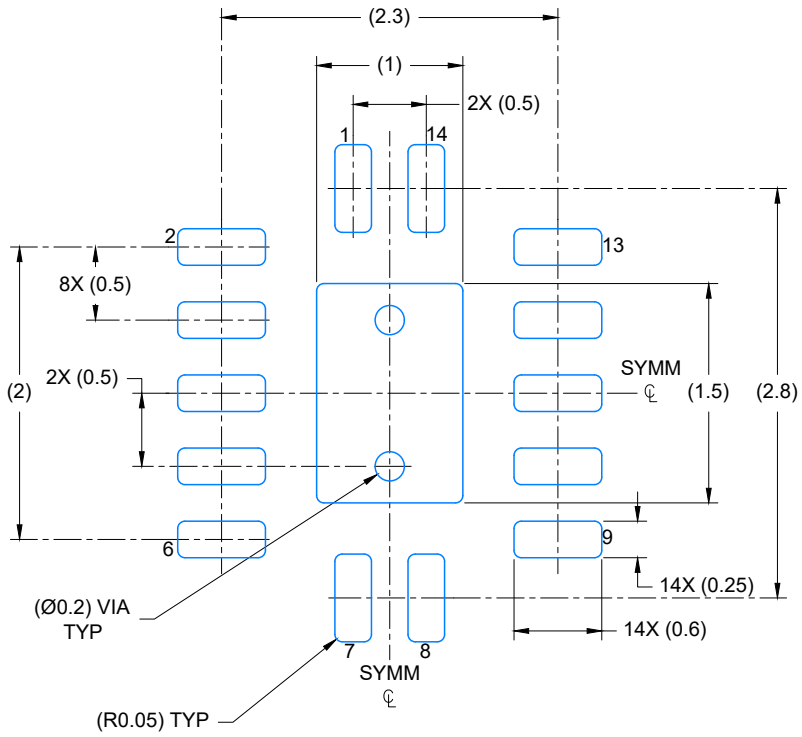
WQFN - 0.8 mm max height

PLASTIC QUAD FLAT PACK-NO LEAD

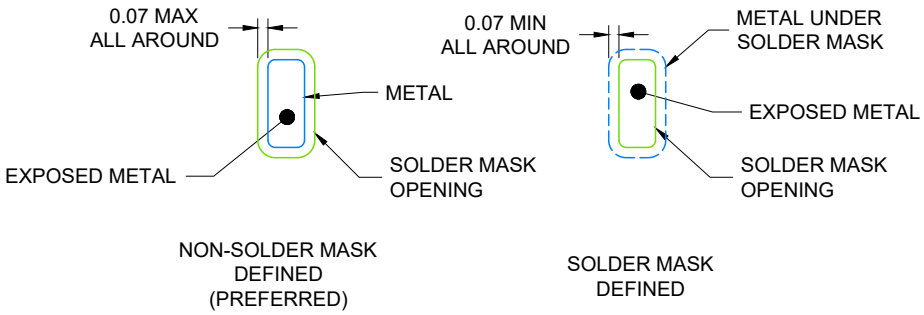


NOTES:

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 optimal thermal and mechanical performance.



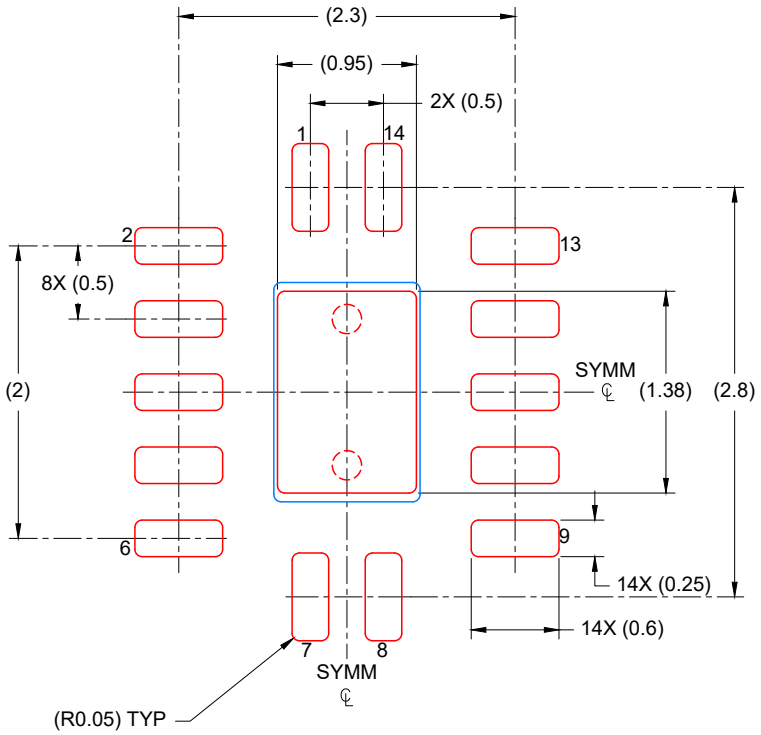
LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 20X



4224636/A 11/2018

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.



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD
88% PRINTED COVERAGE BY AREA
SCALE: 20X

4224636/A 11/2018

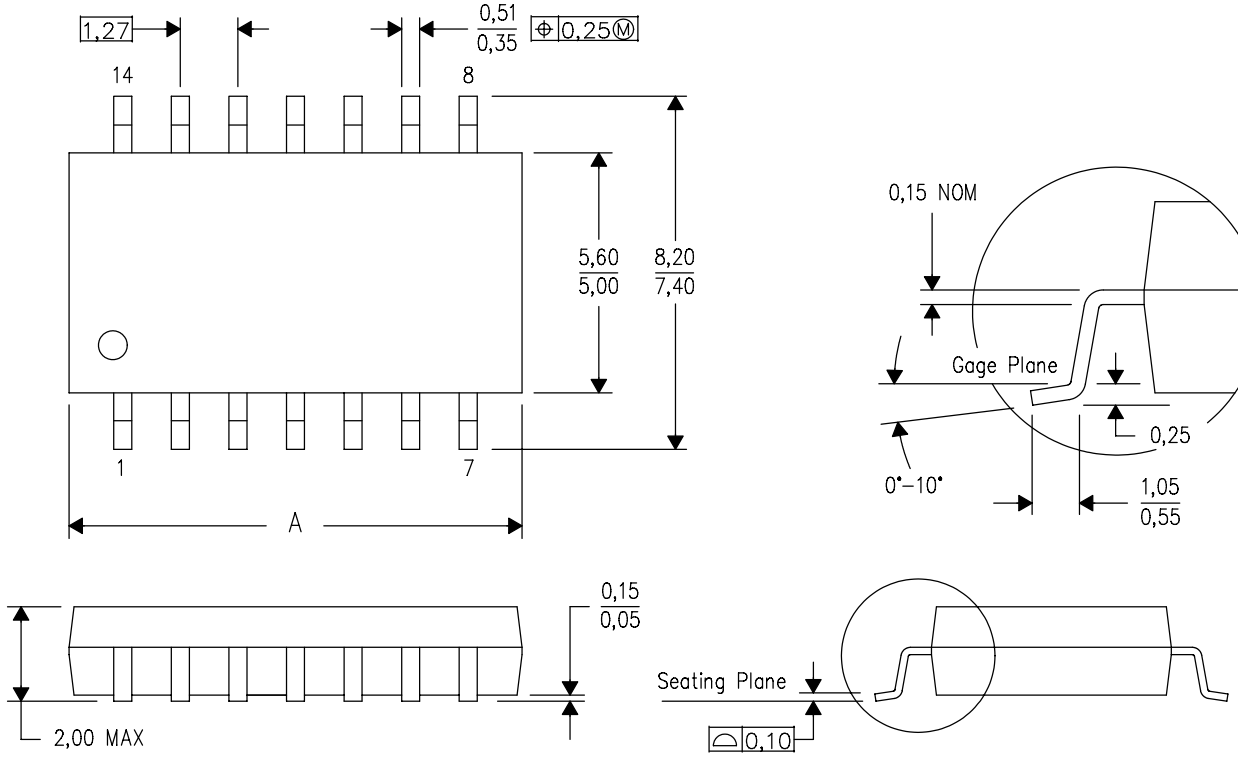
NOTES: (continued)

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

MECHANICAL DATA

NS (R-PDSO-G)** **PLASTIC SMALL-OUTLINE PACKAGE**

14-PINS SHOWN

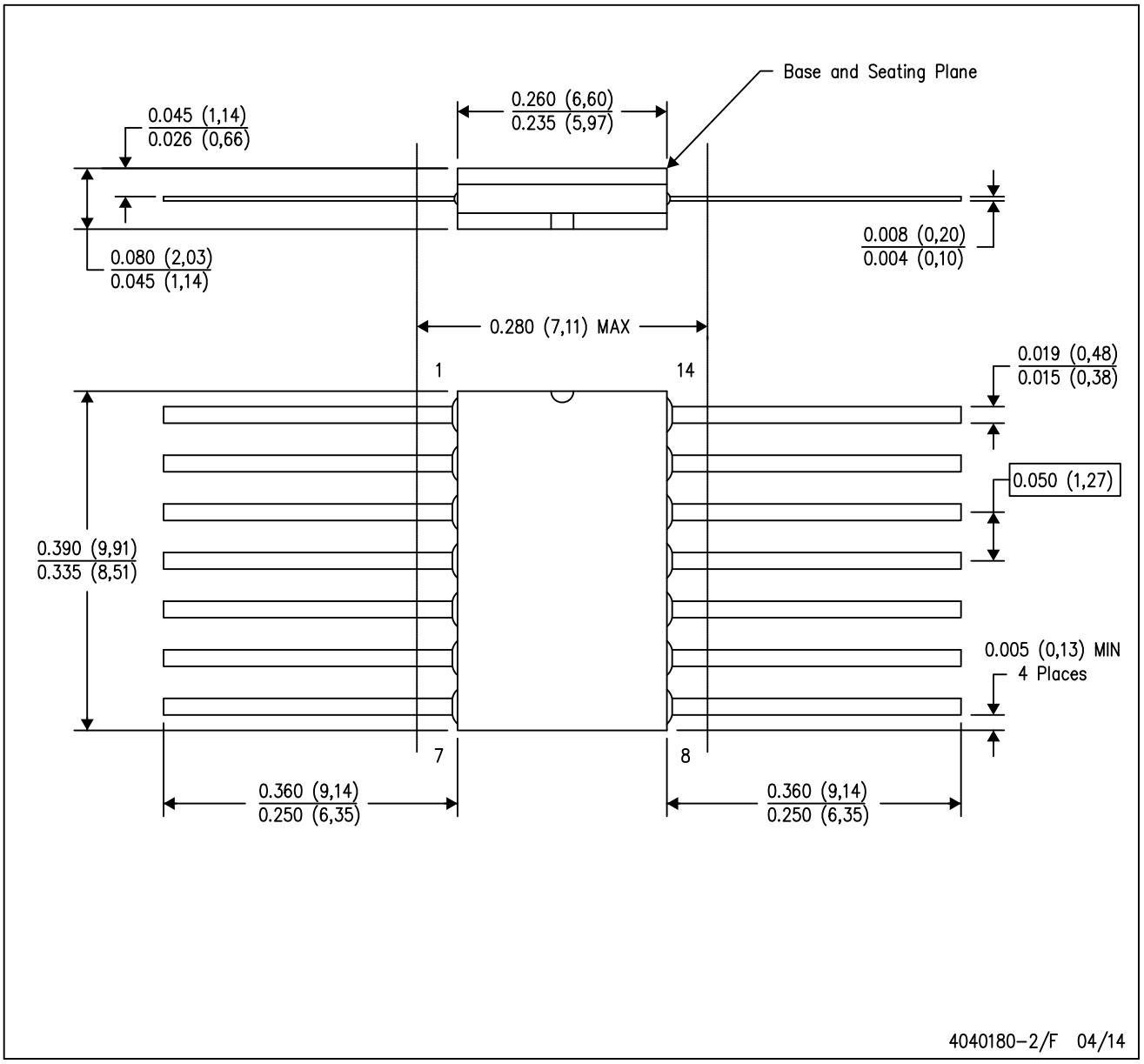


DIM \ PINS **	14	16	20	24
A MAX	10,50	10,50	12,90	15,30
A MIN	9,90	9,90	12,30	14,70

4040062/C 03/03

NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

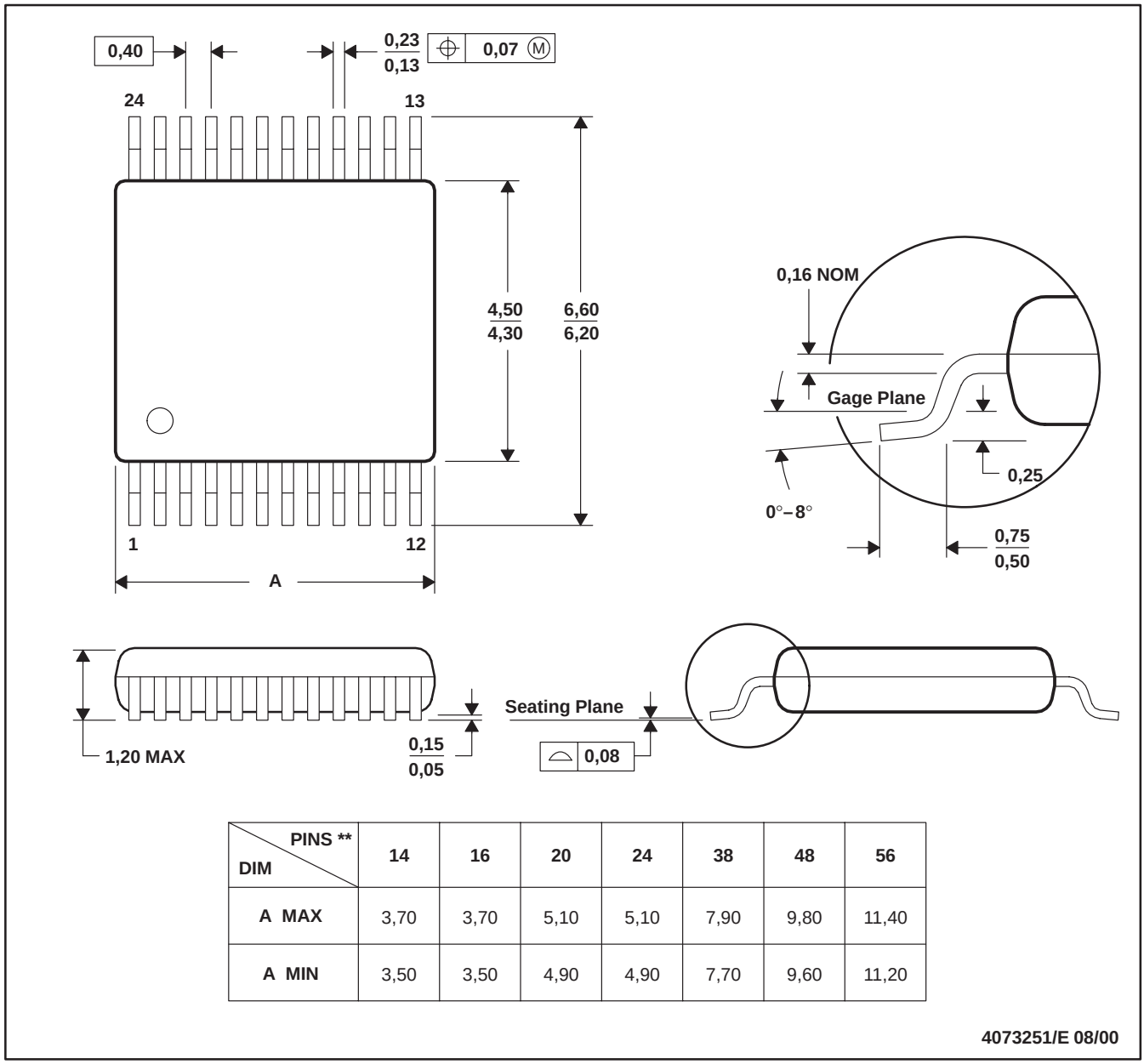
W (R–GDFP–F14) CERAMIC DUAL FLATPACK



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 GDFP1–F14

DGV (R-PDSO-G)** **PLASTIC SMALL-OUTLINE**

24 PINS SHOWN



DIM \ PINS **	14	16	20	24	38	48	56
A MAX	3,70	3,70	5,10	5,10	7,90	9,80	11,40
A MIN	3,50	3,50	4,90	4,90	7,70	9,60	11,20

4073251/E 08/00

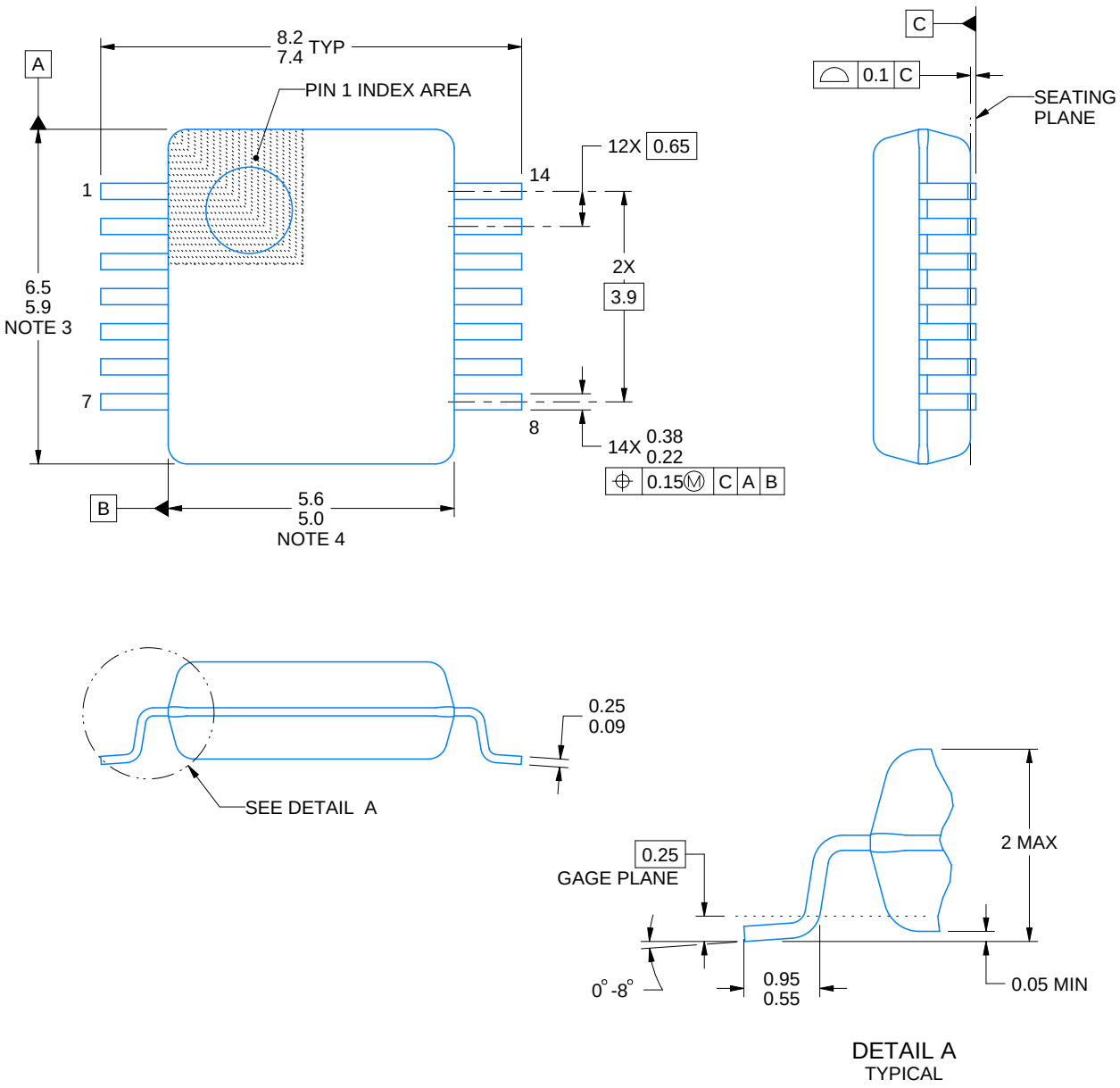
NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15 per side.
D. Falls within JEDEC: 24/48 Pins – MO-153
14/16/20/56 Pins – MO-194

PACKAGE OUTLINE

DB0014A

SSOP - 2 mm max height

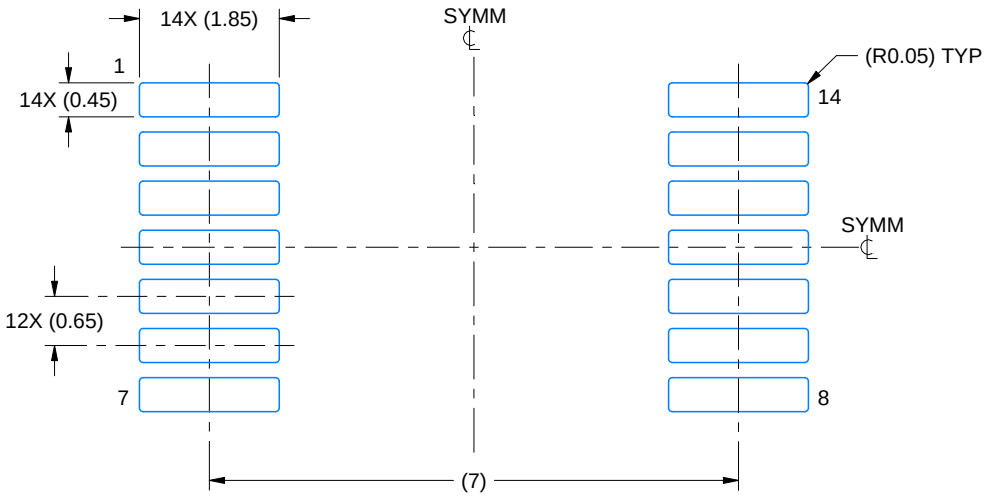
SMALL OUTLINE PACKAGE



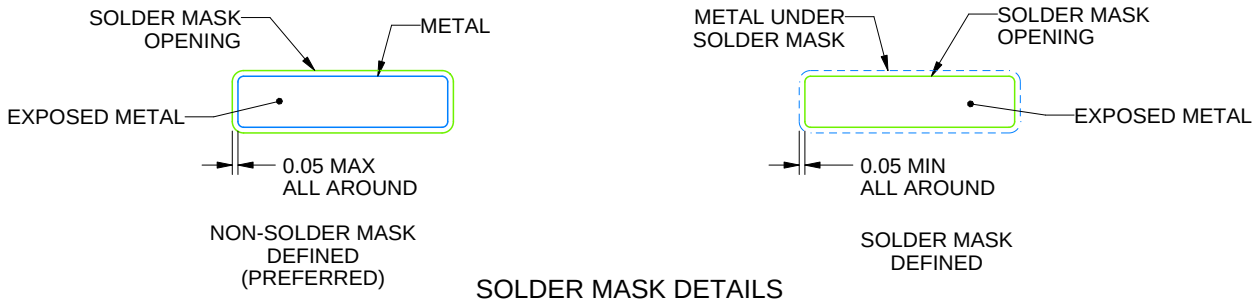
4220762/A 05/2024

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. Reference JEDEC registration MO-150.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X

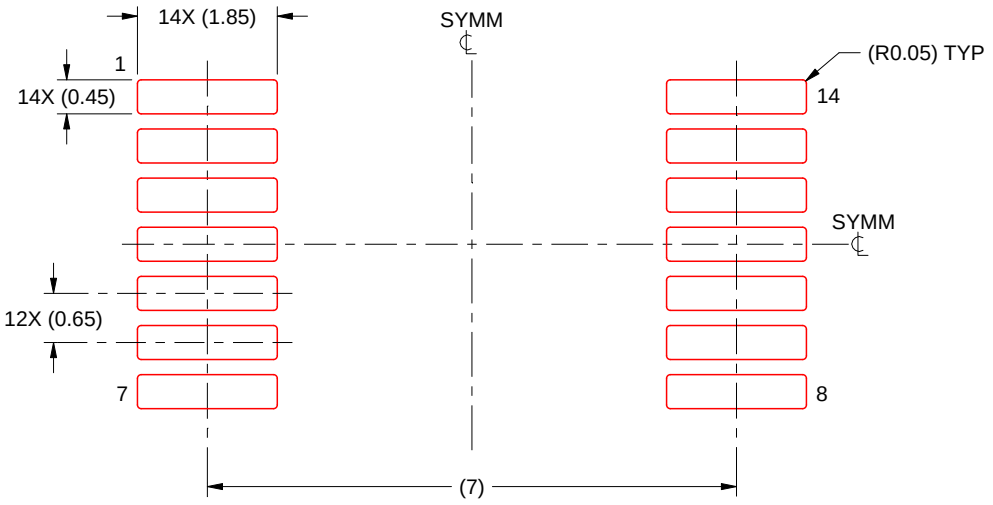


SOLDER MASK DETAILS

4220762/A 05/2024

NOTES: (continued)

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



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

4220762/A 05/2024

NOTES: (continued)

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

GENERIC PACKAGE VIEW

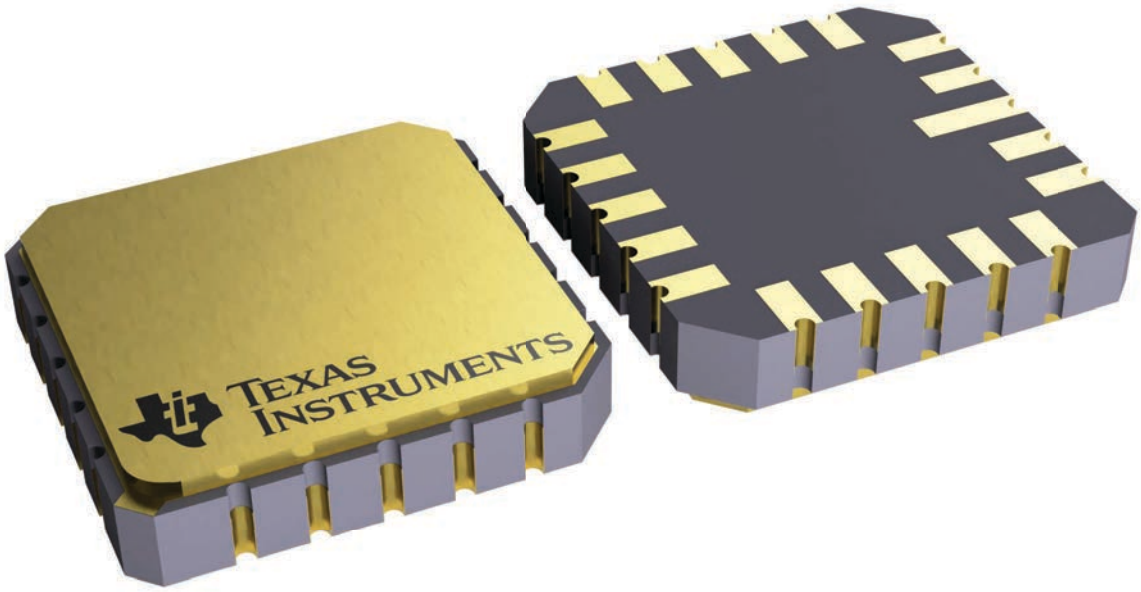
FK 20

LCCC - 2.03 mm max height

8.89 x 8.89, 1.27 mm pitch

LEADLESS CERAMIC CHIP CARRIER

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

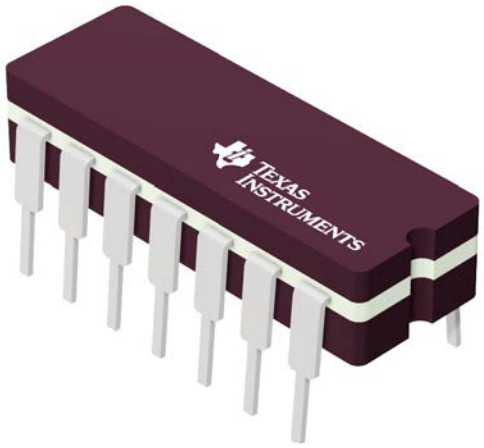


4229370VA\

GENERIC PACKAGE VIEW

J 14 CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



Images above are just a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.

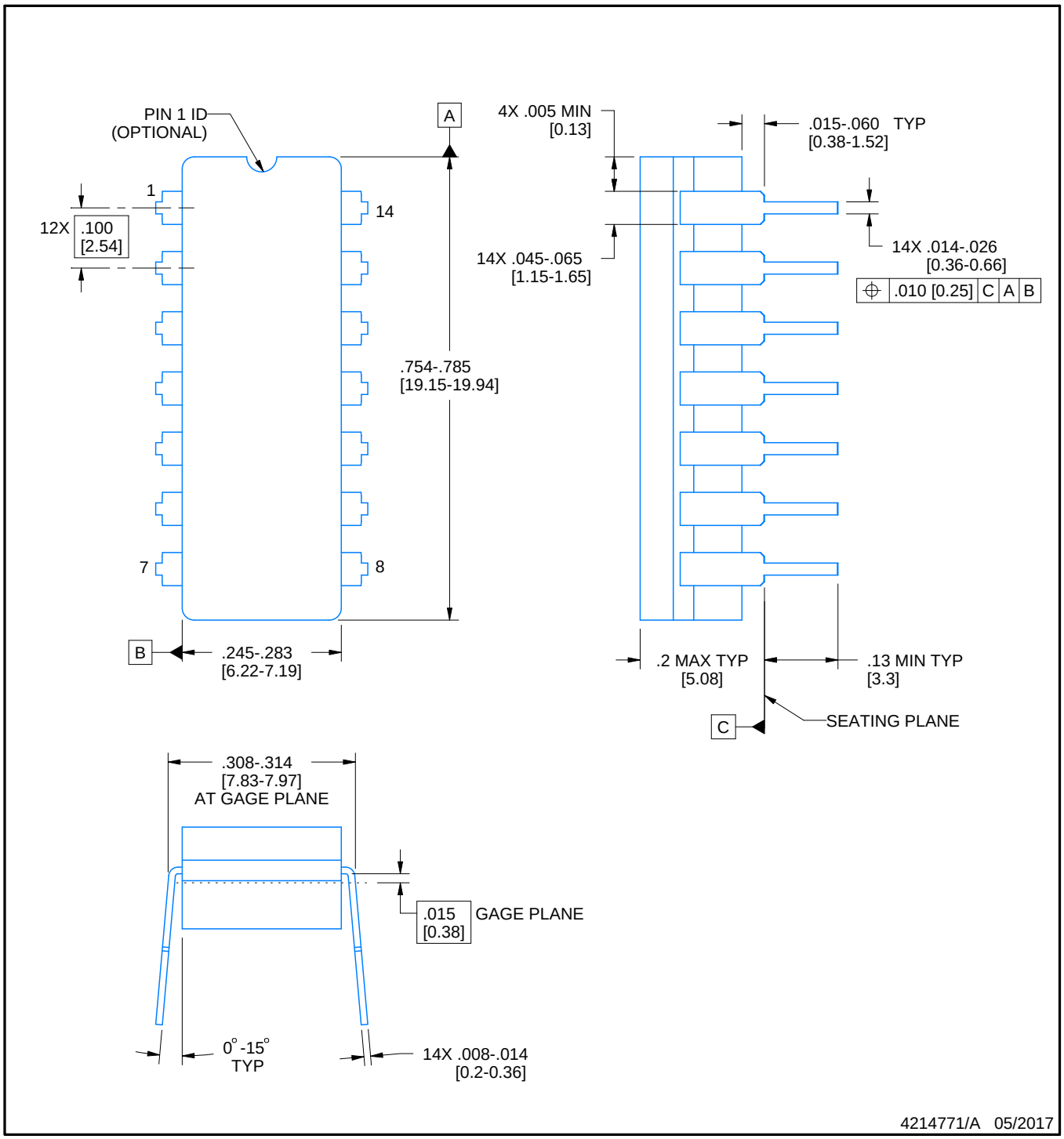
4040083-5/G

PACKAGE OUTLINE

J0014A

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



NOTES:

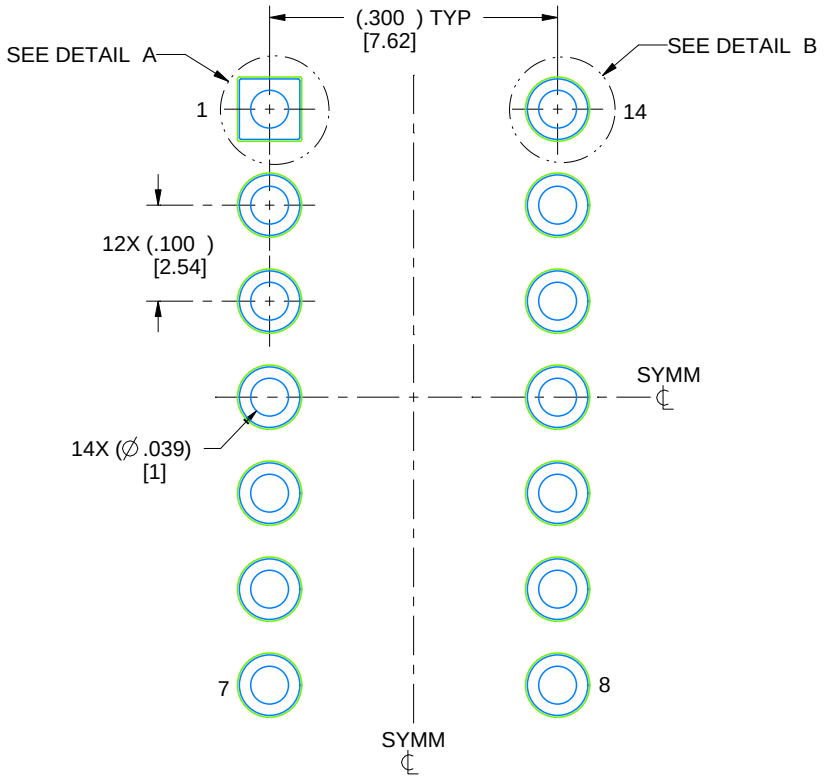
1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This package is hermitically sealed with a ceramic lid using glass frit.
4. Index point is provided on cap for terminal identification only and on press ceramic glass frit seal only.
5. Falls within MIL-STD-1835 and GDIP1-T14.

EXAMPLE BOARD LAYOUT

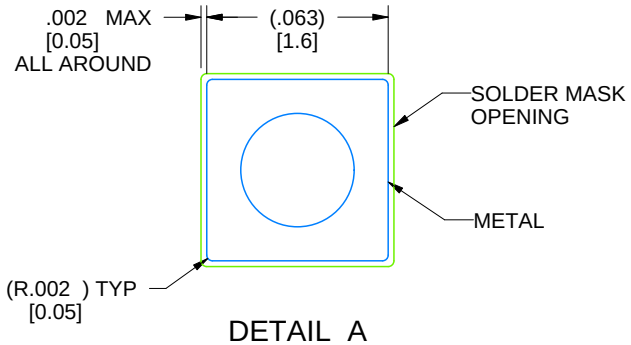
J0014A

CDIP - 5.08 mm max height

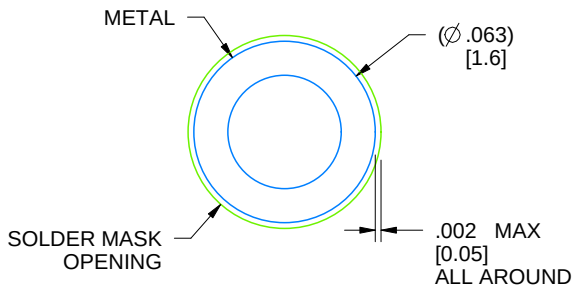
CERAMIC DUAL IN LINE PACKAGE



LAND PATTERN EXAMPLE
NON-SOLDER MASK DEFINED
SCALE: 5X



DETAIL A
SCALE: 15X



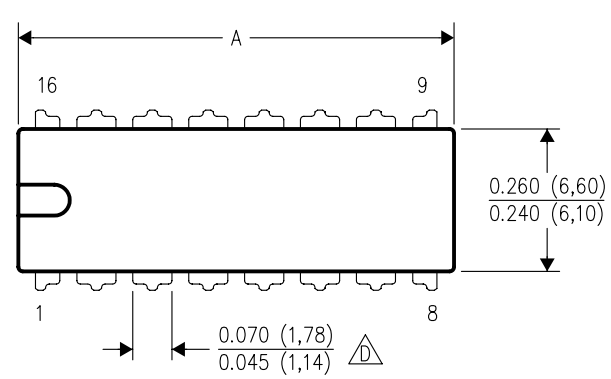
DETAIL B
13X, SCALE: 15X

4214771/A 05/2017

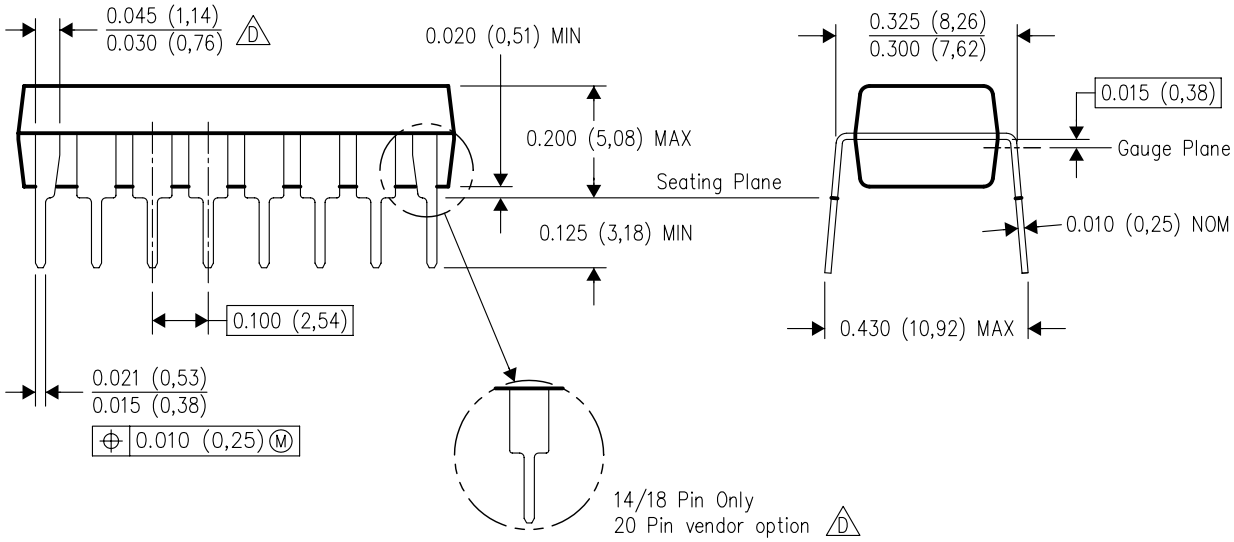
N (R–PDIP–T**)

PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN



DIM \ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS–001 VARIATION (C)	AA	BB	AC	AD



4040049/E 12/2002

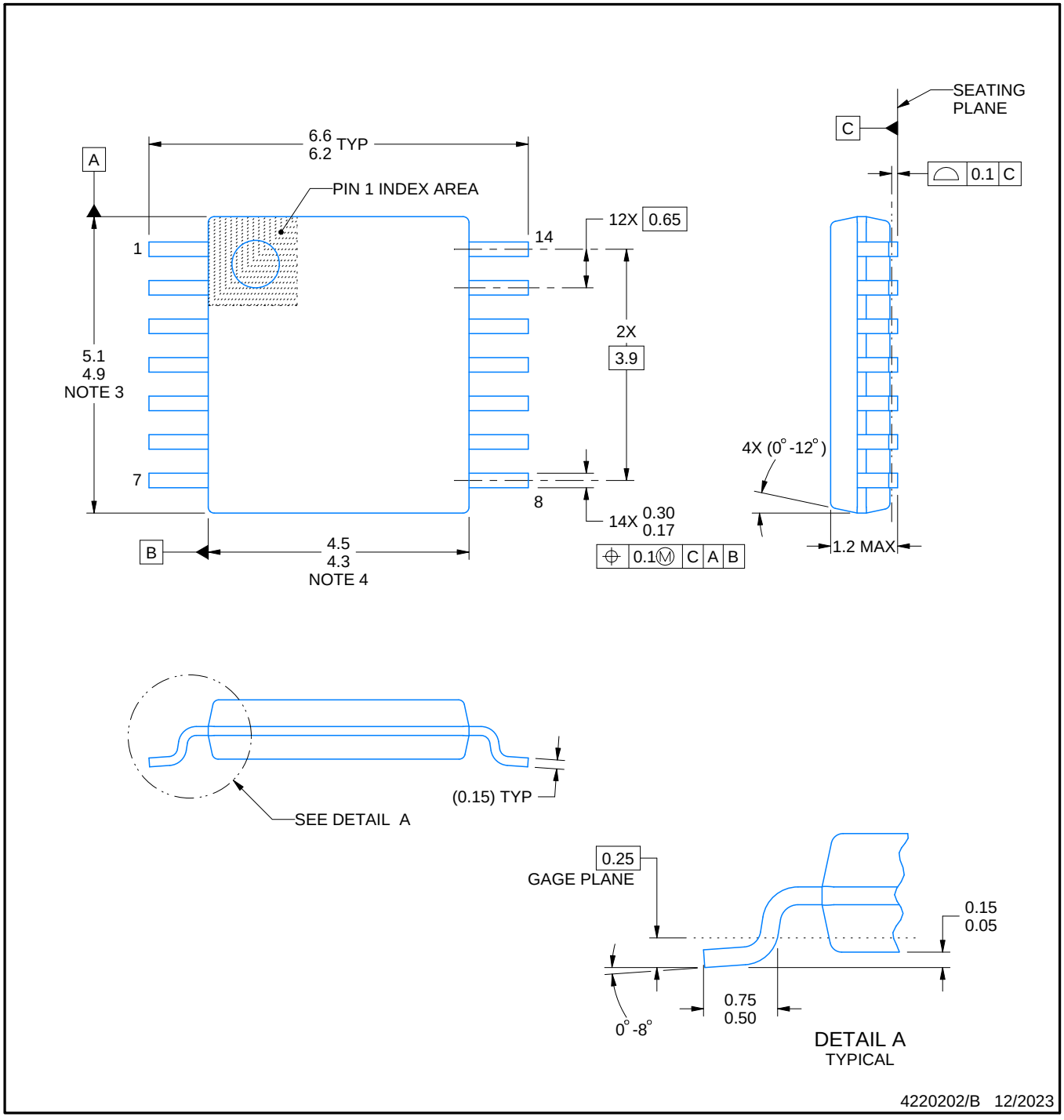
NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Falls within JEDEC MS–001, except 18 and 20 pin minimum body length (Dim A).
D. The 20 pin end lead shoulder width is a vendor option, either half or full width.

PACKAGE OUTLINE

PW0014A

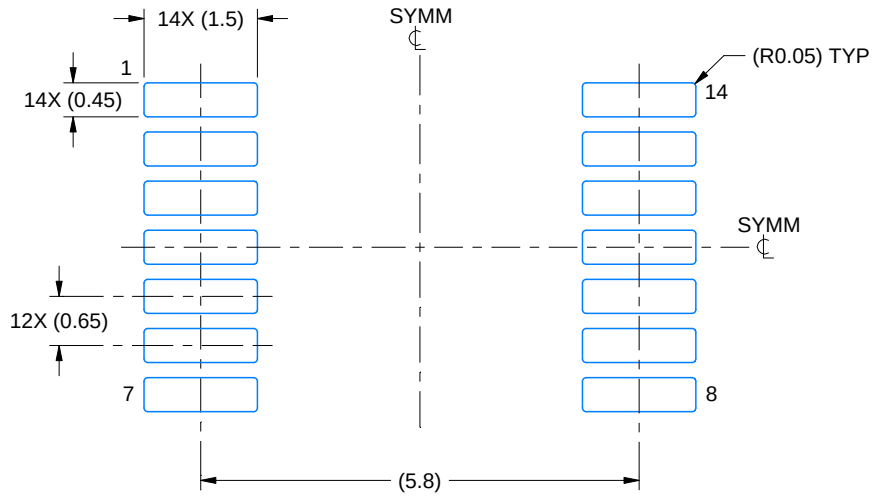
TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE

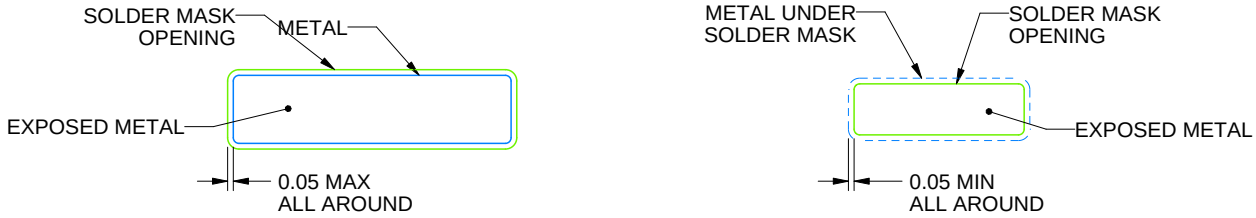


NOTES:

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.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



SOLDER MASK DETAILS

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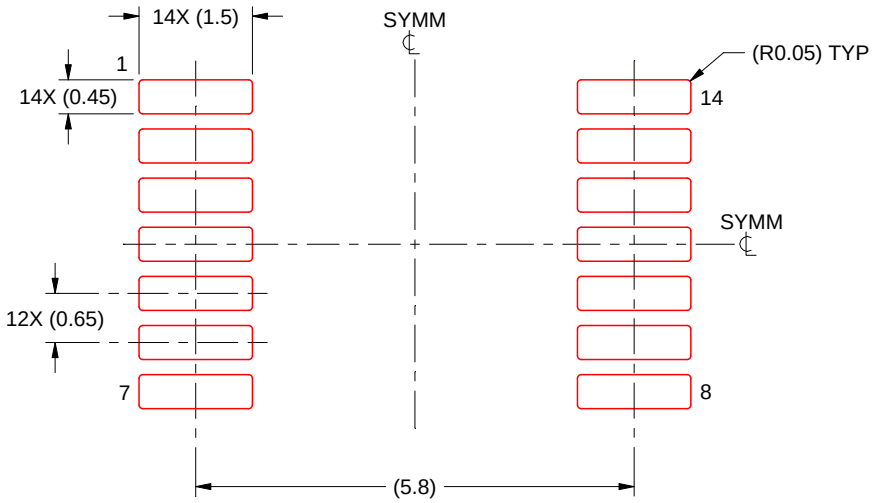
NOTES: (continued)

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



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

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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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