

SNx4AHC02 四路双输入正与非门

1 特性

- 工作电压范围为 2V 至 5.5V
- 闩锁性能超过 250mA，符合 JESD 17 规范

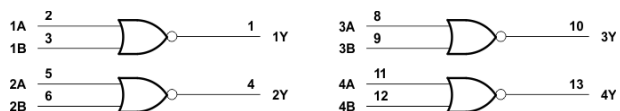
2 说明

AHC02 器件包含四个独立的双输入或非门，这些门以正逻辑执行布尔函数 $\overline{A \bullet B}$ 或 $Y = A + B$ 。

器件信息

器件型号	封装 ⁽¹⁾	封装尺寸 ⁽²⁾	封装尺寸 ⁽³⁾
SNx4AHC02	D (SOIC, 14)	8.65mm × 6mm	8.65mm × 3.9mm
	DB (SSOP, 14)	6.20mm × 7.8mm	6.20mm × 5.3mm
	DGV (TVSOP, 14)	3.60mm × 6.4mm	3.60mm × 4.4mm
	N (PDIP, 14)	19.30mm × 9.4mm	19.30mm × 6.35mm
	NS (SOP, 14)	10.2mm × 7.8mm	10.30mm × 5.3mm
	PW (SOP, 14)	5.00mm × 6.4mm	5.00mm × 4.4mm
	RGY (VQFN, 14)	3.50mm × 3.5mm	3.50mm × 3.5mm
	BQA (WQFN, 14)	3mm × 2.5mm	3mm × 2.5mm

- 更多相关信息，请参阅第 10 节。
- 封装尺寸 (长 × 宽) 为标称值，并包括引脚 (如适用)。
- 封装尺寸 (长 × 宽) 为标称值，不包括引脚。



所示引脚编号用于 D、DB、DGV、J、N、NS、PW、RGY 和 W 封装。

逻辑图 (正逻辑)



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3 Pin Configuration and Functions

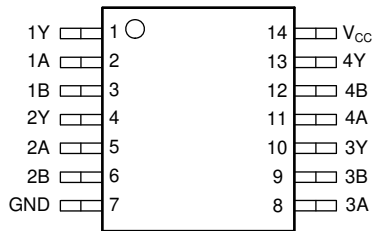


图 3-1. SN54AHC02 J or W Package, 14-Pin (Top View)
SN74AHC02 D, DB, DGV, N, NS, or PW Package, 14-Pin (Top View)

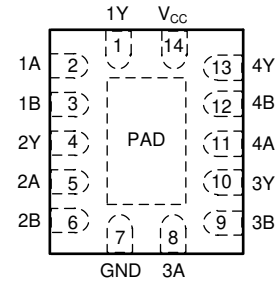


图 3-2. SN74AHC02 RGY or BQA Package, 14-Pin (Top View)

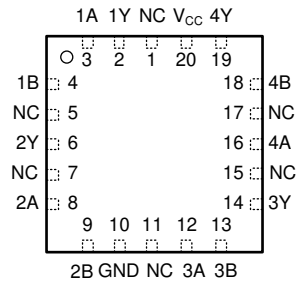


图 3-3. SN54AHC02 FK Package, 20-Pin (Top View)

表 3-1. Pin Functions

NAME	PIN			TYPE ¹	DESCRIPTION
	SN74AHC02 D, DB, DGV, N, NS, PW, RGY, BQA	SN54AHC02 J, W	FK		
1A	2	2	3	I	1A Input
1B	3	3	4	I	1B Input
1Y	1	1	2	O	1Y Output
2A	5	5	8	I	2A Input
2B	6	6	9	I	2B Input
2Y	4	4	6	O	2Y Output
3A	8	8	12	I	3A Input
3B	9	9	13	I	3B Input
3Y	10	20	14	O	3Y Output
4A	11	11	16	I	4A Input
4B	12	12	18	I	4B Input
4Y	13	13	19	O	4Y Output
GND	7	7	10	—	Ground Pin
NC	—	—	1, 5, 7, 11, 15, 17	—	No Connection
V _{CC}	14	14	20	—	Power Pin

(1) I = input, O = output

4 Specifications

4.1 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 _O	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.

4.2 ESD Ratings

			VALUE	UNIT
V _(ESD)	Electrostatic discharge	Human-body model (HBM) ⁽¹⁾	±2000	V
		Charged device model (CDM) ⁽²⁾	±1000	

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

4.3 Recommended Operating Conditions

		SN54AHC02		SN74AHC02		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} = 3 V	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

4.4 Thermal Information

THERMAL METRIC ⁽¹⁾		SN74AHC02								UNIT
		D	DB	DGV	N	NS	PW	RGY	BQA	
		14 PINS	14 PINS	14 PINS	14 PINS	14 PINS	14 PINS	14 PINS	14 PINS	
R _{θJA}	Junction-to-ambient thermal resistance	124.6	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](#).

4.5 Electrical Characteristics

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

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
						SN54AHC02		SN74AHC02		Recommended SN74AHC02		
			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		V	
		3 V			0.1		0.1		0.1			
		4.5 V			0.1		0.1		0.1			
	I _{OH} = 4 mA	3 V			0.36		0.5		0.44			
	I _{OH} = 8 mA	4.5 V			0.36		0.5		0.44			
I _I	V _I = 5.5 V or GND	0 V to 5.5 V			±0.1		±1 ⁽¹⁾		±1		μA	
I _{CC}	V _I = V _{CC} or GND, I _O = 0	5.5 V			2		20		20		μA	
C _i	V _I = V _{CC} or GND	5 V			4		10		10		pF	

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

4.6 Switching Characteristics, V_{CC} = 3.3 V ± 0.3 V

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
						SN54AHC02		SN74AHC02		Recommended SN74AHC02		
				TYP	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	A or B	Y	C _L = 15 pF	5.6 ⁽¹⁾	7.9 ⁽¹⁾	1 ⁽¹⁾	9.5 ⁽¹⁾	1	9.5	1	9.5	ns
t _{PHL}				5.6 ⁽¹⁾	7.9 ⁽¹⁾	1 ⁽¹⁾	9.5 ⁽¹⁾	1	9.5	1	9.5	
t _{PLH}	A or B	Y	C _L = 50 pF	8.1	11.4	1	13	1	13	1	13	ns
t _{PHL}				8.1	11.4	1	13	1	13	1	13	

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

4.7 Switching Characteristics, $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$

over recommended operating free-air temperature range, $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	$T_A = 25^\circ\text{C}$		$T_A = -55^\circ\text{C TO } 125^\circ\text{C}$		$T_A = -40^\circ\text{C TO } 85^\circ\text{C}$		$T_A = -40^\circ\text{C TO } 125^\circ\text{C}$		UNIT
						SN54AHC02		SN74AHC02		Recommended		
				TYP	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	$C_L = 15\text{ pF}$	3.6 ⁽¹⁾	5.5 ⁽¹⁾	1 ⁽¹⁾	6.5 ⁽¹⁾	1	6.5	1	6.5	ns
t_{PHL}				3.6 ⁽¹⁾	5.5 ⁽¹⁾	1 ⁽¹⁾	6.5 ⁽¹⁾	1	6.5	1	6.5	
t_{PLH}	A or B	Y	$C_L = 50\text{ pF}$	5.1		1	8.5	1	8.5	1	8.5	ns
t_{PHL}				5.1		1	8.5	1	8.5	1	8.5	

4.8 Noise Characteristics

$V_{CC} = 5\text{ V}$, $C_L = 50\text{ pF}$, $T_A = 25^\circ\text{C}$ ⁽¹⁾

PARAMETER		SN74AHC02		UNIT
		MIN	MAX	
$V_{OL(P)}$	Quiet output, maximum dynamic V_{OL}	0.8		V
$V_{OL(V)}$	Quiet output, minimum dynamic V_{OL}	-0.8		V
$V_{OH(V)}$	Quiet output, minimum dynamic V_{OH}	4.9		V
$V_{IH(D)}$	High-level dynamic input voltage	3.5		V
$V_{IL(D)}$	Low-level dynamic input voltage	1.5		V

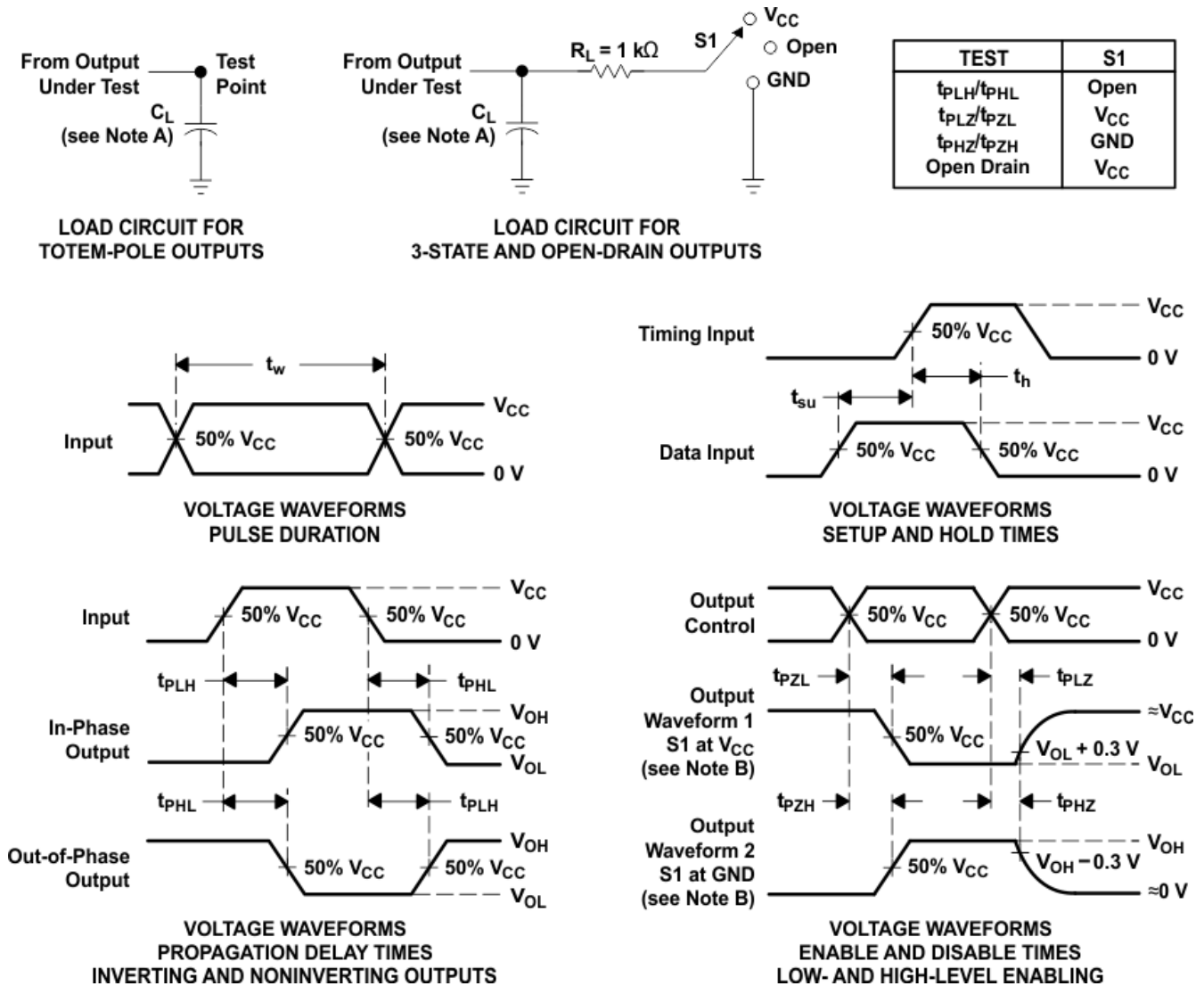
(1) Characteristics are for surface-mount packages only.

4.9 Operating Characteristics

$V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance No load, $f = 1\text{ MHz}$	15	pF

5 Parameter Measurement Information

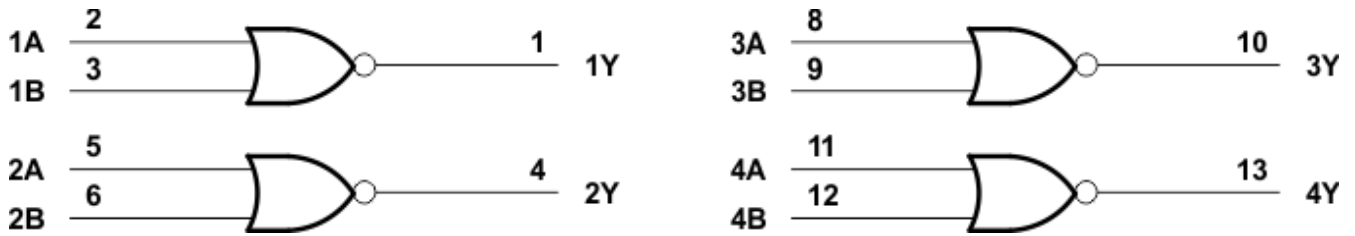


- A. C_L includes probe and jig capacitance.
- B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
- C. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1\text{ MHz}$, $Z_O = 50\ \Omega$, $t_r \leq 3\text{ ns}$, $t_f \leq 3\text{ ns}$.
- 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.

图 5-1. Load Circuit and Voltage Waveforms

6 Detailed Description

6.1 Functional Block Diagram



6.2 Device Functional Modes

表 6-1. Function Table

INPUTS ⁽¹⁾		OUTPUT Y
A	B	
H	X	L
X	H	L
L	L	H

- (1) H = High Voltage Level, L = Low Voltage Level, X = Don't Care

7 Application and Implementation

备注

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

7.1 Power Supply Recommendations

The power supply can be any voltage between the MIN and MAX supply-voltage rating located in [节 4.3](#).

The power supply can be any voltage between the minimum and maximum supply voltage rating located in the *Recommended Operating Conditions*. Each V_{CC} terminal should have a good bypass capacitor to prevent power disturbance. A $0.1\text{-}\mu\text{F}$ capacitor is recommended for this device. It is acceptable to parallel multiple bypass capacitors to reject different frequencies of noise. The $0.1\text{-}\mu\text{F}$ and $1\text{-}\mu\text{F}$ capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power terminal as possible for best results, as shown in *Layout Example*.

7.2 Layout

7.2.1 Layout Guidelines

When using multiple-input and multiple-channel logic devices, inputs must never be left floating. In many cases, functions or parts of functions of digital logic devices are unused (for example, when only two inputs of a triple-input AND gate are used or only 3 of the 4 buffer gates are used). Such unused input pins must not be left unconnected because the undefined voltages at the outside connections result in undefined operational states. All unused inputs of digital logic devices must be connected to a logic high or logic low voltage, as defined by the input voltage specifications, to prevent them from floating. The logic level that must be applied to any particular unused input depends on the function of the device. Generally, the inputs are tied to GND or V_{CC} , whichever makes more sense for the logic function or is more convenient.

7.2.2 Layout Example

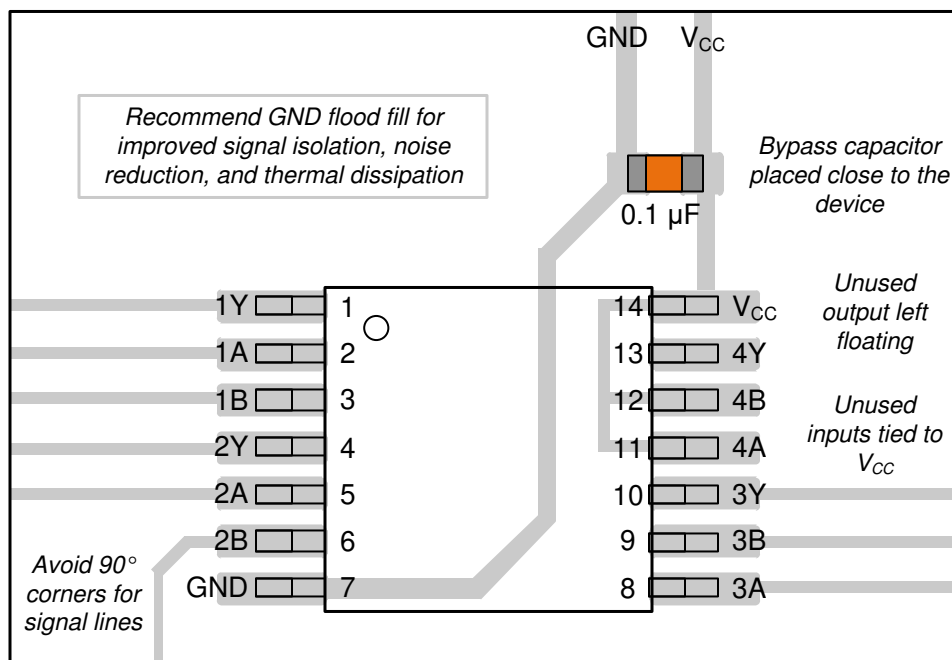


图 7-1. Example Layout for the SN74AHC02

8 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

8.1 Documentation Support

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.

表 8-1. Related Links

PARTS	PRODUCT FOLDER	SAMPLE & BUY	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
SN54AHC02	Click here	Click here	Click here	Click here	Click here
SN74AHC02	Click here	Click here	Click here	Click here	Click here

8.2 接收文档更新通知

要接收文档更新通知，请导航至 [ti.com](https://www.ti.com) 上的器件产品文件夹。点击 [通知](#) 进行注册，即可每周接收产品信息更改摘要。有关更改的详细信息，请查看任何已修订文档中包含的修订历史记录。

8.3 支持资源

[TI E2E™ 中文支持论坛](#) 是工程师的重要参考资料，可直接从专家处获得快速、经过验证的解答和设计帮助。搜索现有解答或提出自己的问题，获得所需的快速设计帮助。

链接的内容由各个贡献者“按原样”提供。这些内容并不构成 TI 技术规范，并且不一定反映 TI 的观点；请参阅 TI 的 [使用条款](#)。

8.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.

所有商标均为其各自所有者的财产。

8.5 静电放电警告



静电放电 (ESD) 会损坏这个集成电路。德州仪器 (TI) 建议通过适当的预防措施处理所有集成电路。如果不遵守正确的处理和安装程序，可能会损坏集成电路。

ESD 的损坏小至导致微小的性能降级，大至整个器件故障。精密的集成电路可能更容易受到损坏，这是因为非常细微的参数更改都可能会导致器件与其发布的规格不相符。

8.6 术语表

TI 术语表

本术语表列出并解释了术语、首字母缩略词和定义。

9 Revision History

注：以前版本的页码可能与当前版本的页码不同

Changes from Revision M (June 2023) to Revision N (February 2024)	Page
• 向 封装信息 表中添加了封装尺寸.....	1
• Updated R ^θ JA value: D = 124.5 to 124.6, all values in °C/W	5
• Added <i>Application and Implementation</i> section.....	9

Changes from Revision L (May 2013) to Revision M (June 2023)

Page

• 添加了封装信息表、引脚功能表、ESD 等级表、热信息表、器件功能模式、器件和文档支持部分以及机械、封装和可订购信息部分.....	1
• 向封装信息表中添加了 BQA 封装.....	1
• Updated thermal values for R ^θ JA: D = 86 to 124.5, PW = 113 to 147.7, all values in °C/W.....	5
• Added thermal value for R ^θ JA: BQA = 88.3, all values in °C/W.....	5

10 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)
5962-9752801Q2A	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9752801Q2A SNJ54AHC 02FK
5962-9752801QCA	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9752801QC A SNJ54AHC02J
5962-9752801QDA	Active	Production	CFP (W) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9752801QD A SNJ54AHC02W
SN74AHC02BQAR	Active	Production	WQFN (BQA) 14	3000 LARGE T&R	Yes	NIPDAU SN	Level-1-260C-UNLIM	-40 to 125	AHC02
SN74AHC02BQAR.A	Active	Production	WQFN (BQA) 14	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC02
SN74AHC02D	Obsolete	Production	SOIC (D) 14	-	-	Call TI	Call TI	-40 to 125	AHC02
SN74AHC02DBR	Active	Production	SSOP (DB) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA02
SN74AHC02DBR.A	Active	Production	SSOP (DB) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA02
SN74AHC02DGVR	Active	Production	TVSOP (DGV) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA02
SN74AHC02DGVR.A	Active	Production	TVSOP (DGV) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA02
SN74AHC02DR	Active	Production	SOIC (D) 14	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC02
SN74AHC02DR.A	Active	Production	SOIC (D) 14	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC02
SN74AHC02N	Active	Production	PDIP (N) 14	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 125	SN74AHC02N
SN74AHC02N.A	Active	Production	PDIP (N) 14	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 125	SN74AHC02N
SN74AHC02NSR	Active	Production	SOP (NS) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC02
SN74AHC02NSR.A	Active	Production	SOP (NS) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC02
SN74AHC02PW	Obsolete	Production	TSSOP (PW) 14	-	-	Call TI	Call TI	-40 to 125	HA02
SN74AHC02PWR	Active	Production	TSSOP (PW) 14	2000 LARGE T&R	Yes	NIPDAU SN	Level-1-260C-UNLIM	-40 to 125	HA02
SN74AHC02PWR.A	Active	Production	TSSOP (PW) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA02
SN74AHC02RGYR	Active	Production	VQFN (RGY) 14	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	HA02
SN74AHC02RGYR.A	Active	Production	VQFN (RGY) 14	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 125	HA02
SNJ54AHC02FK	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9752801Q2A SNJ54AHC 02FK

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)
SNJ54AHC02FK.A	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9752801Q2A SNJ54AHC 02FK
SNJ54AHC02J	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9752801QC A SNJ54AHC02J
SNJ54AHC02J.A	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9752801QC A SNJ54AHC02J
SNJ54AHC02W	Active	Production	CFP (W) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9752801QD A SNJ54AHC02W
SNJ54AHC02W.A	Active	Production	CFP (W) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9752801QD A SNJ54AHC02W

(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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In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF SN54AHC02, SN74AHC02 :

- Catalog : [SN74AHC02](#)

- Automotive : [SN74AHC02-Q1](#), [SN74AHC02-Q1](#)

- Enhanced Product : [SN74AHC02-EP](#), [SN74AHC02-EP](#)

- Military : [SN54AHC02](#)

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

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
SN74AHC02BQAR	WQFN	BQA	14	3000	177.8	12.4	2.8	3.3	1.1	4.0	12.0	Q1
SN74AHC02DBR	SSOP	DB	14	2000	330.0	16.4	8.35	6.6	2.4	12.0	16.0	Q1
SN74AHC02DGVR	TVSOP	DGV	14	2000	330.0	12.4	6.8	4.0	1.6	8.0	12.0	Q1
SN74AHC02NSR	SOP	NS	14	2000	330.0	16.4	8.1	10.4	2.5	12.0	16.0	Q1
SN74AHC02PWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74AHC02RGYR	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)
SN74AHC02BQAR	WQFN	BQA	14	3000	208.0	191.0	35.0
SN74AHC02DBR	SSOP	DB	14	2000	353.0	353.0	32.0
SN74AHC02DGVR	TVSOP	DGV	14	2000	353.0	353.0	32.0
SN74AHC02NSR	SOP	NS	14	2000	353.0	353.0	32.0
SN74AHC02PWR	TSSOP	PW	14	2000	353.0	353.0	32.0
SN74AHC02RGYR	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)
5962-9752801Q2A	FK	LCCC	20	55	506.98	12.06	2030	NA
5962-9752801QDA	W	CFP	14	25	506.98	26.16	6220	NA
SN74AHC02N	N	PDIP	14	25	506	13.97	11230	4.32
SN74AHC02N	N	PDIP	14	25	506	13.97	11230	4.32
SN74AHC02N.A	N	PDIP	14	25	506	13.97	11230	4.32
SN74AHC02N.A	N	PDIP	14	25	506	13.97	11230	4.32
SNJ54AHC02FK	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54AHC02FK.A	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54AHC02W	W	CFP	14	25	506.98	26.16	6220	NA
SNJ54AHC02W.A	W	CFP	14	25	506.98	26.16	6220	NA

GENERIC PACKAGE VIEW

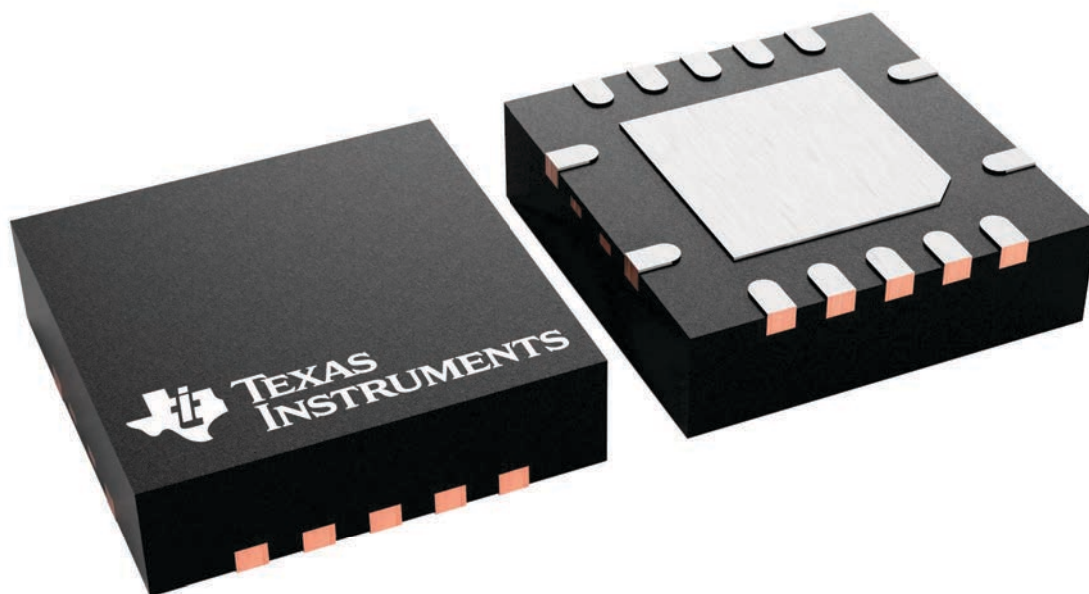
RGY 14

VQFN - 1 mm max height

3.5 x 3.5, 0.5 mm pitch

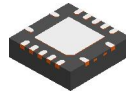
PLASTIC QUAD FLATPACK - NO LEAD

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



4231541/A

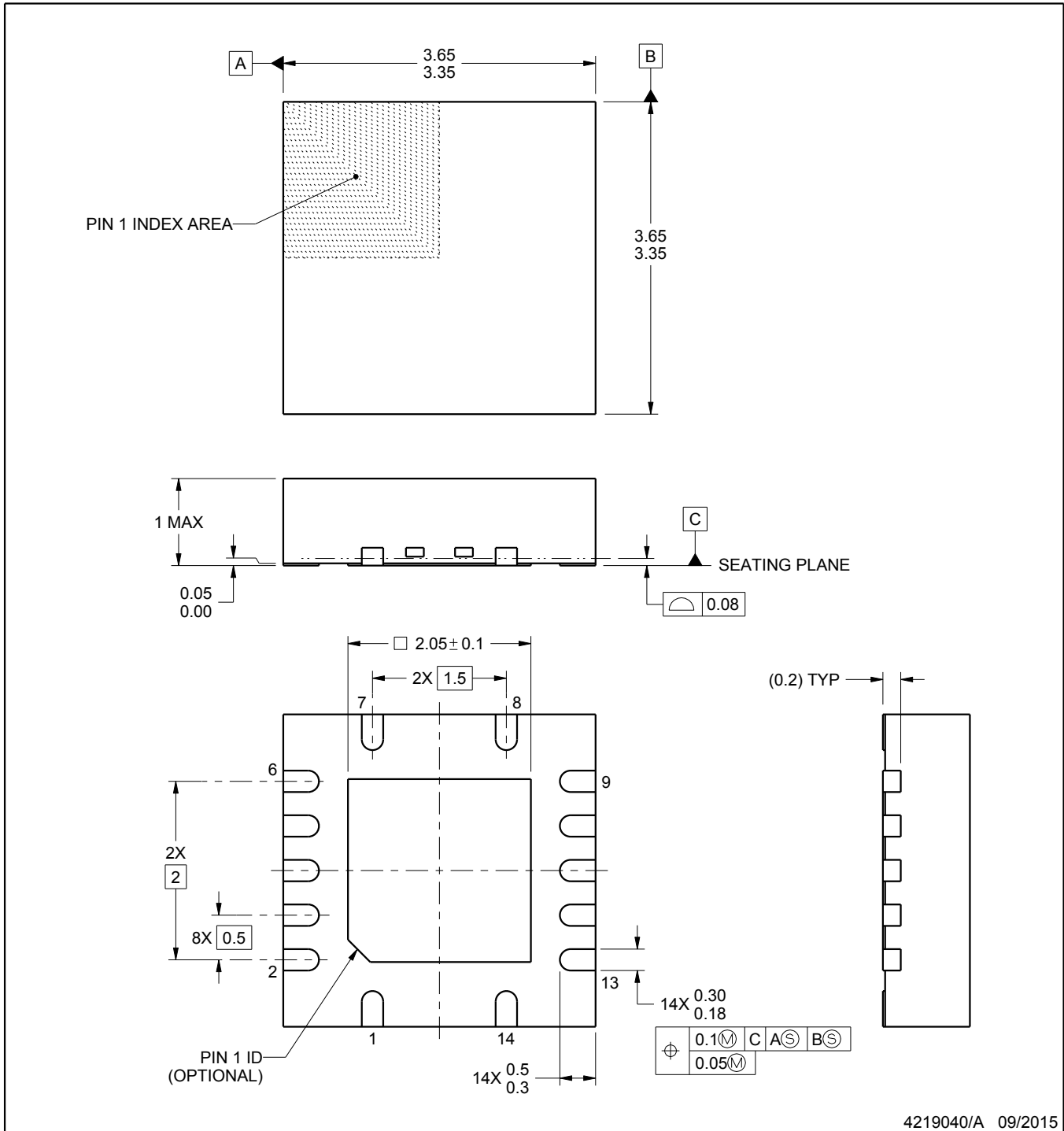
RGY0014A



PACKAGE OUTLINE

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



4219040/A 09/2015

NOTES:

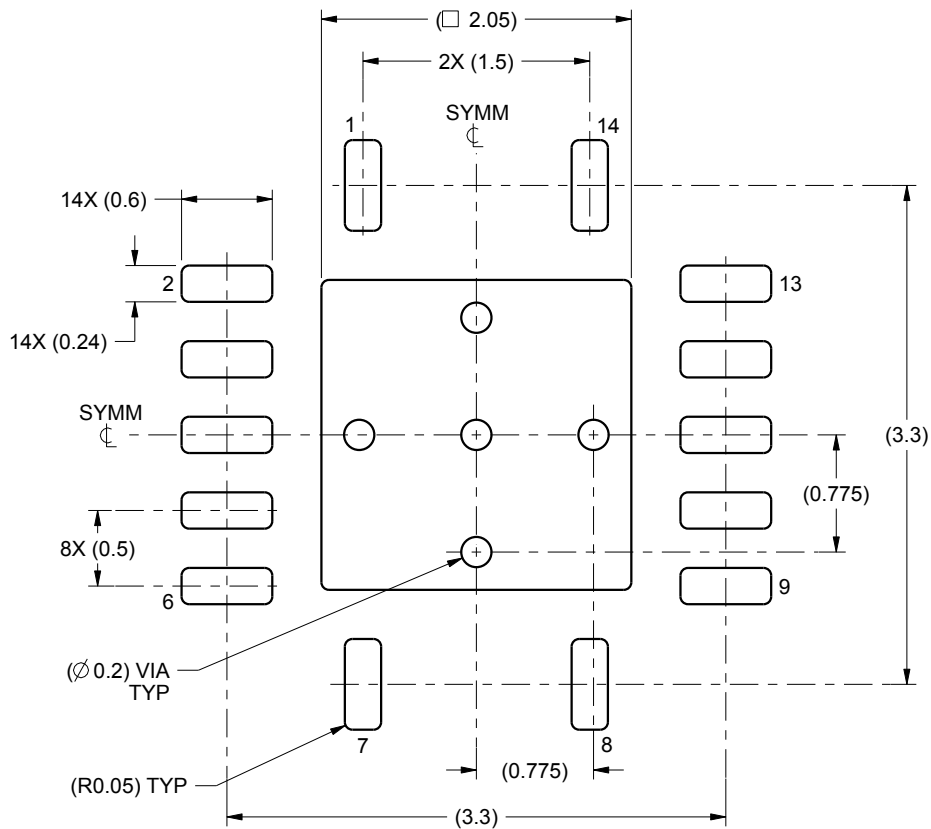
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

EXAMPLE BOARD LAYOUT

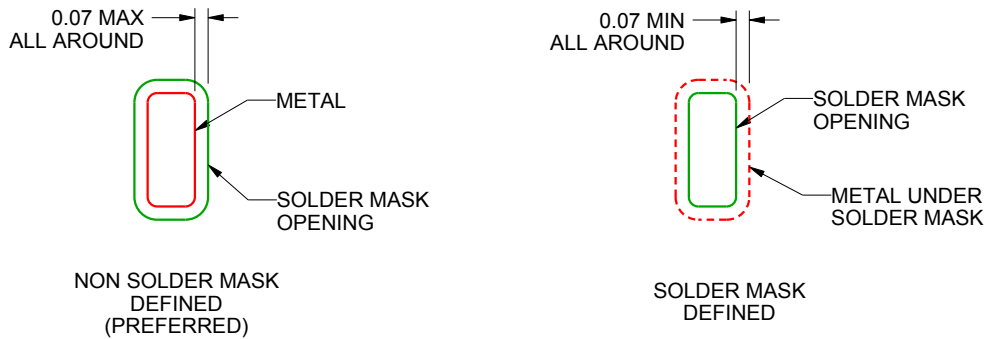
RGY0014A

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



LAND PATTERN EXAMPLE
SCALE:20X



SOLDER MASK DETAILS

4219040/A 09/2015

NOTES: (continued)

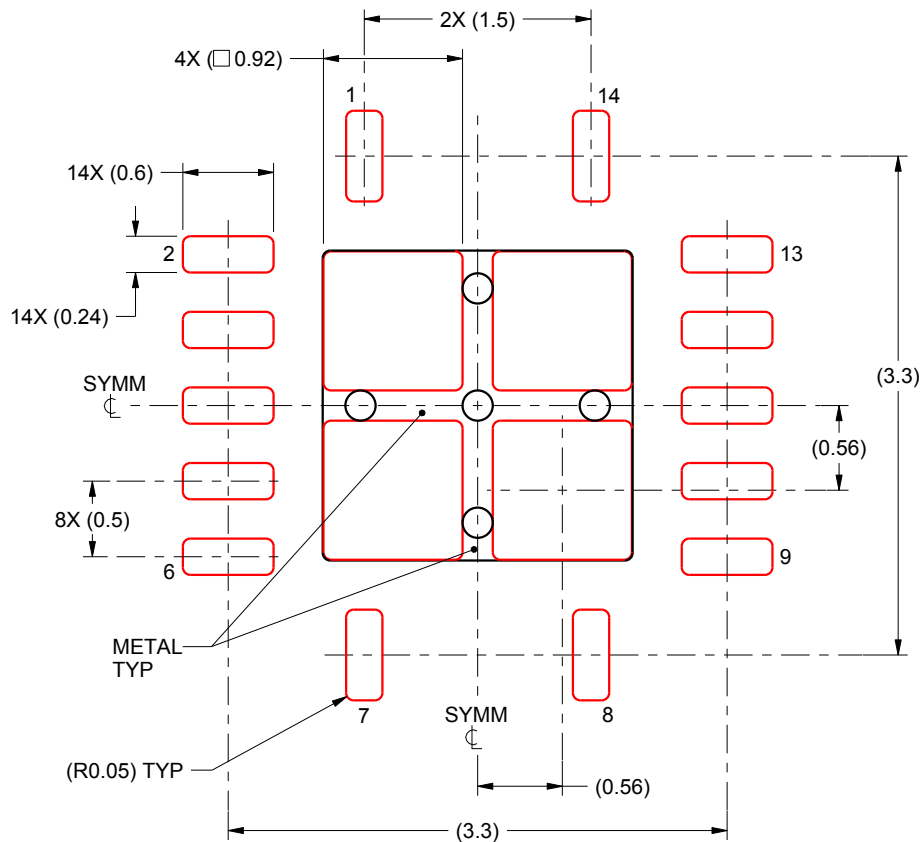
4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).

EXAMPLE STENCIL DESIGN

RGY0014A

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



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.

D0014A



PACKAGE OUTLINE

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.

EXAMPLE BOARD LAYOUT

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



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

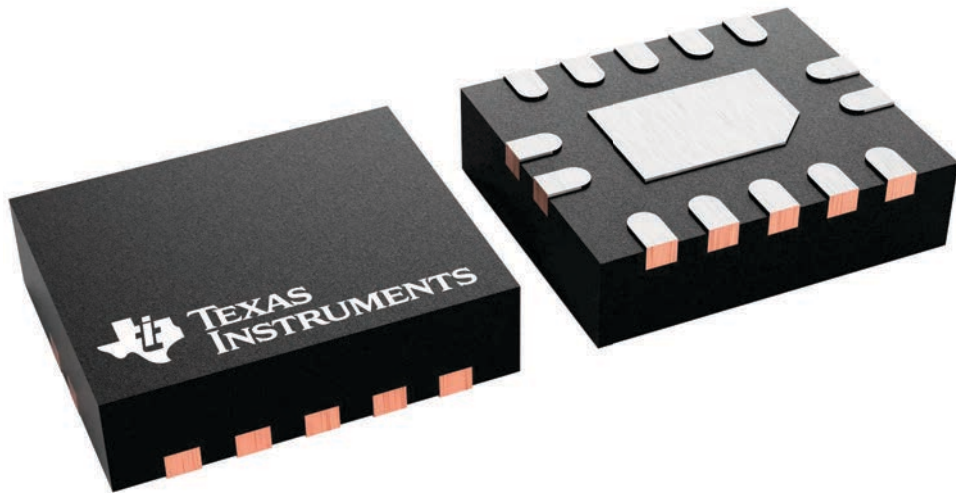
BQA 14

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.



4227145/A

EXAMPLE BOARD LAYOUT

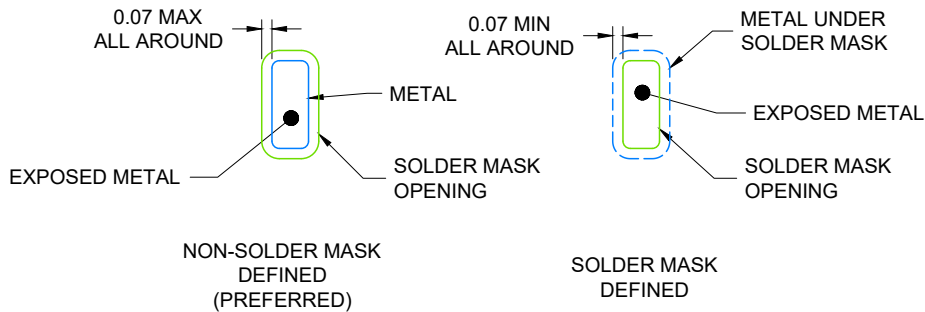
WQFN - 0.8 mm max height

BQA0014A

PLASTIC QUAD FLAT PACK-NO LEAD



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.

EXAMPLE STENCIL DESIGN

BQA0014A

WQFN - 0.8 mm max height

PLASTIC QUAD FLAT PACK-NO LEAD



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



- 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

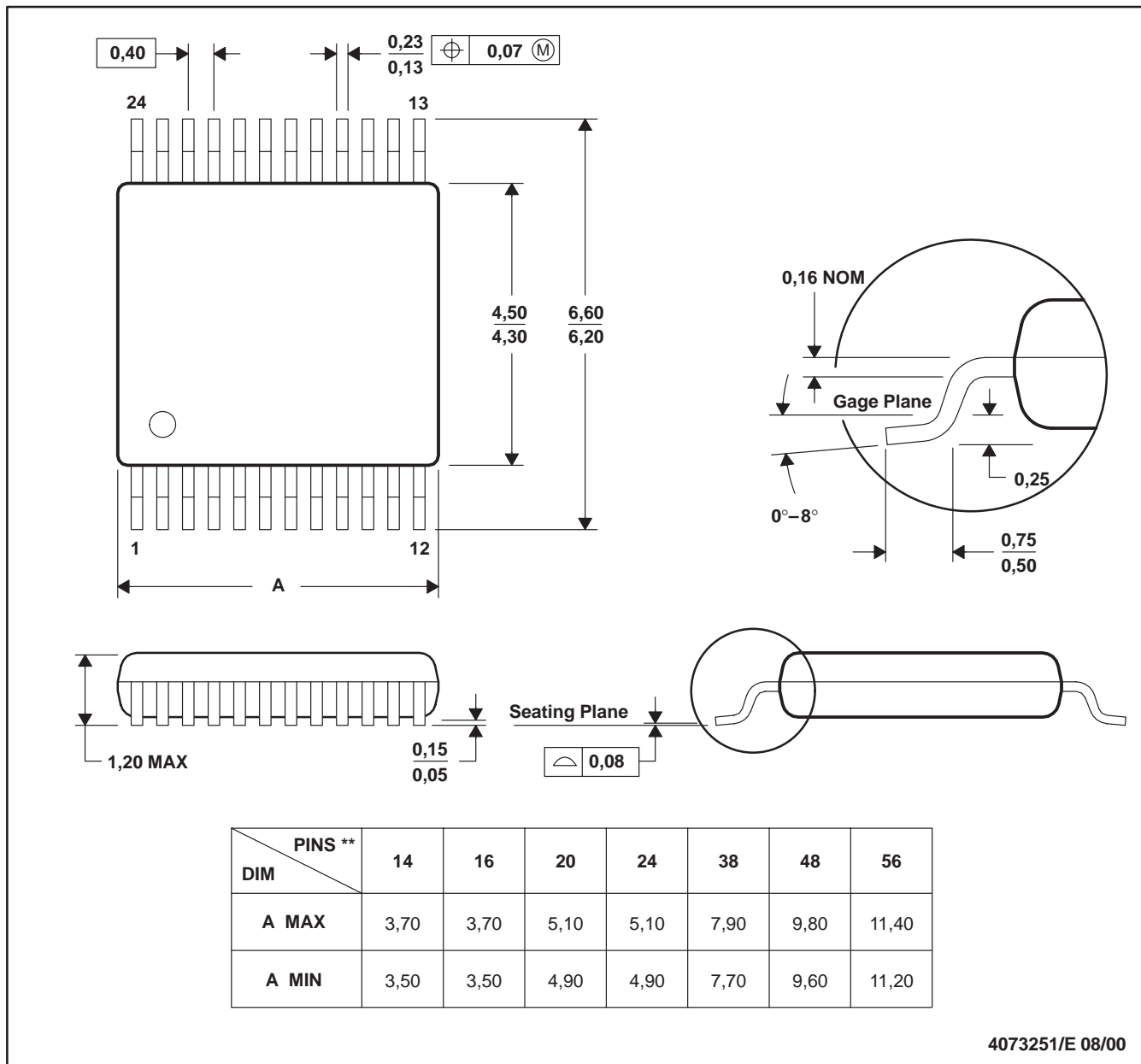


- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package can be hermetically sealed with a ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal identification only.
 - E. Falls within MIL STD 1835 GDFP1-F14

DGV (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

24 PINS SHOWN



- 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

EXAMPLE BOARD LAYOUT

DB0014A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



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.

EXAMPLE STENCIL DESIGN

DB0014A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



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

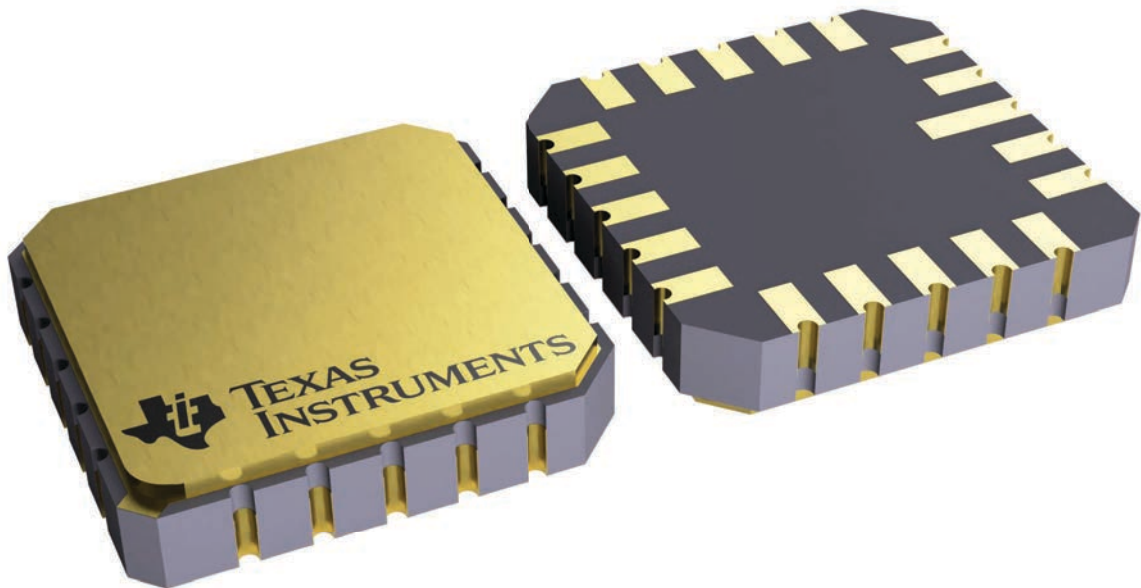
FK 20

LCCC - 2.03 mm max height

8.89 x 8.89, 1.27 mm pitch

LEADLESS CERAMIC CHIP CARRIER

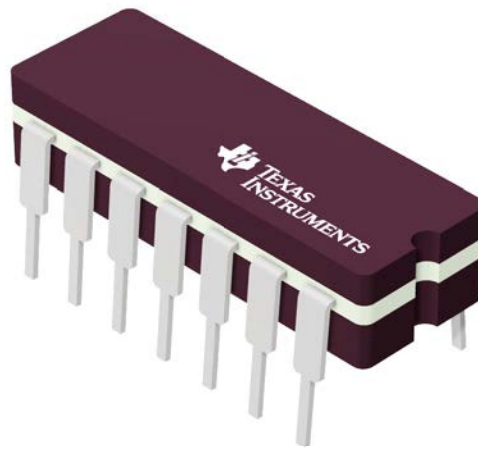
This image is a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.



4229370VA\

J 14

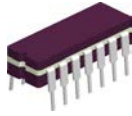
GENERIC PACKAGE VIEW
CDIP - 5.08 mm max height
CERAMIC DUAL IN LINE PACKAGE



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

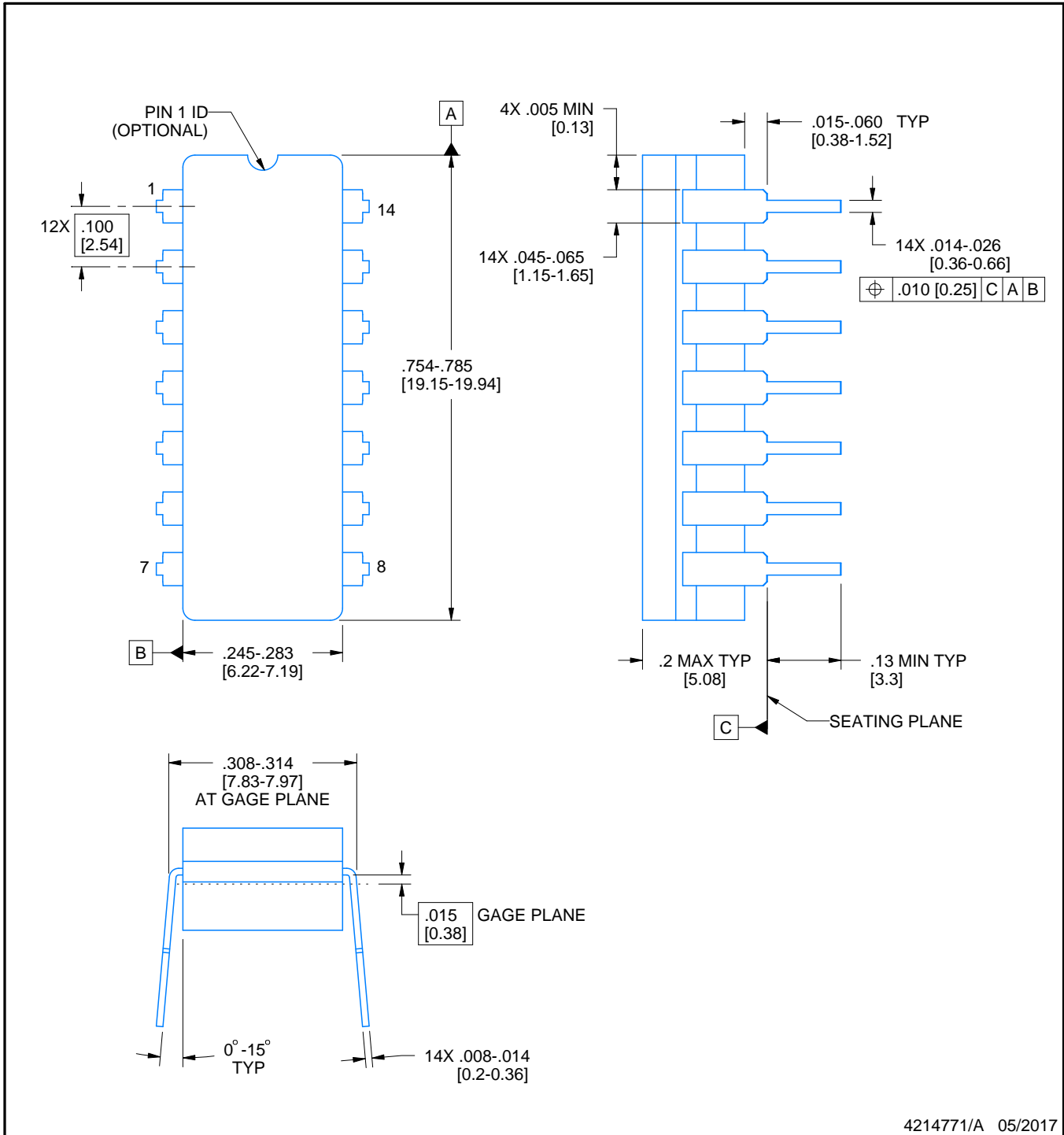
J0014A



PACKAGE OUTLINE

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



4214771/A 05/2017

NOTES:

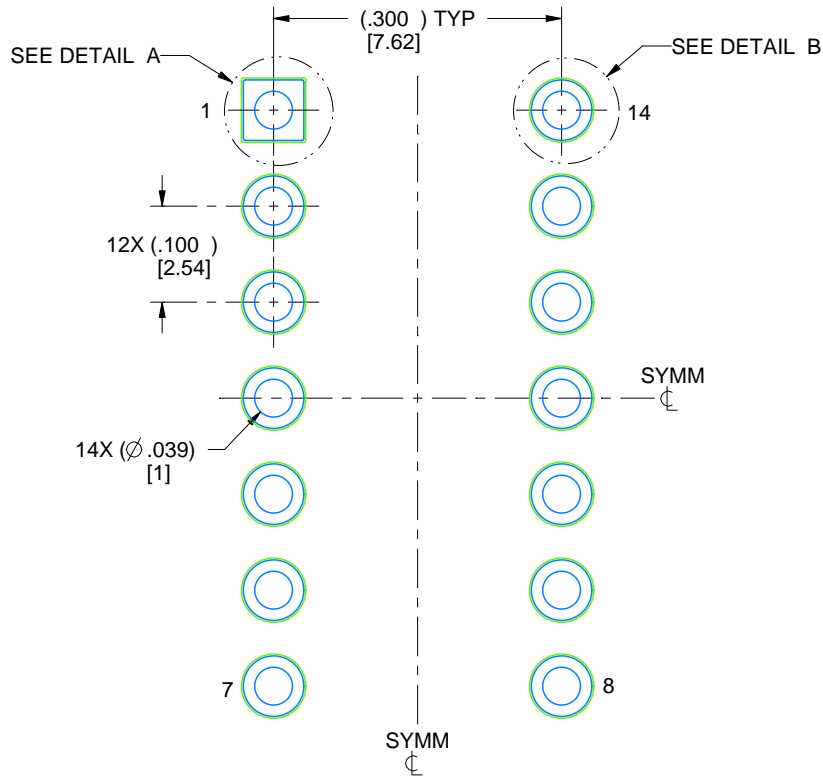
1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This package is hermetically sealed with 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

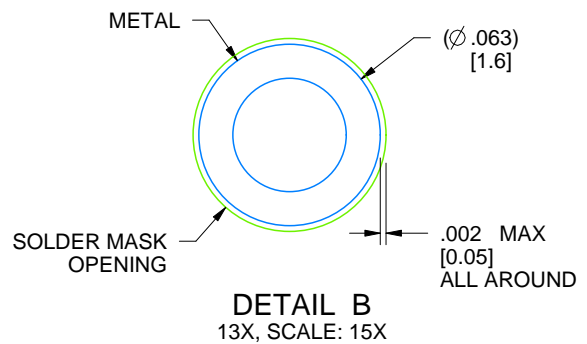
J0014A

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



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



4214771/A 05/2017

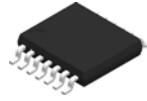
N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- 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.



4220202/B 12/2023

NOTES:

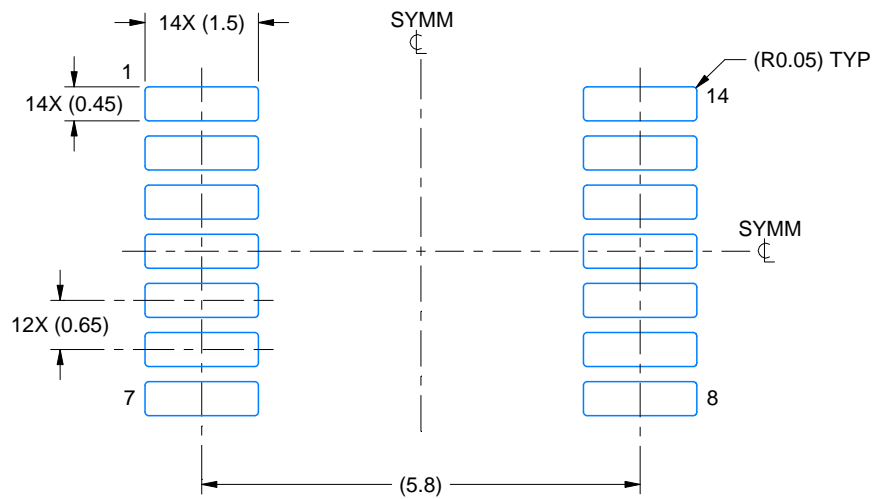
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or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

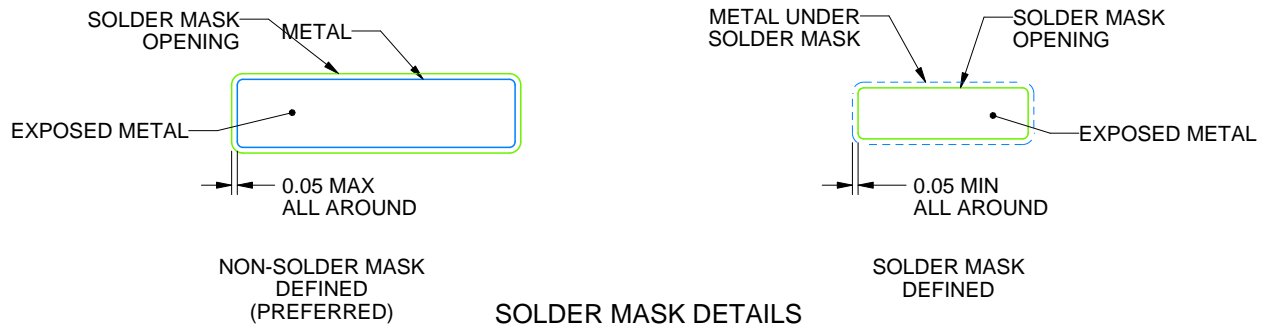
PW0014A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



4220202/B 12/2023

NOTES: (continued)

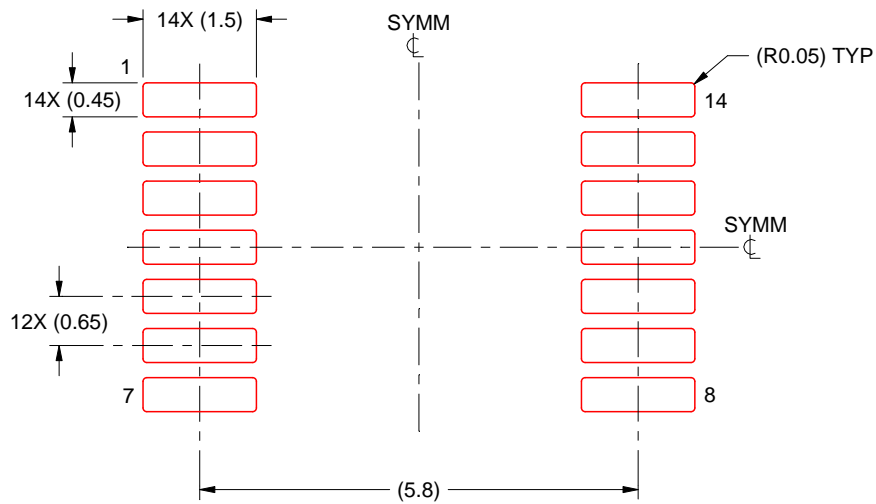
- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

PW0014A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



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

4220202/B 12/2023

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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最后更新日期：2025 年 10 月