

## SNx4AHC04 ヘキサ・インバータ

### 1 特長

- 動作範囲: 2V~5.5V
- JESD 17 準拠で 250mA 超のラッチアップ性能

### 2 概要

'AHC04 デバイスには、6 つの独立したインバータがあります。これらのデバイスはブール関数  $Y = \bar{A}$  を実行します。

#### 製品情報

部品番号	パッケージ <sup>1</sup>	本体サイズ <sup>2</sup>
SN54AHC04	J (CDIP, 14)	19.56mm × 6.67mm
	W (CFP, 14)	13.1mm × 6.92mm
	FK (LCCC, 20)	8.9mm × 8.9mm
SN74AHC04	N (PDIP, 14)	19.3mm × 6.35mm
	D (SOIC, 14)	8.65mm × 3.91mm
	DB (SSOP, 14)	6.20mm × 5.30mm
	NS (SOP, 14)	12.60mm × 5.30mm
	PW (TSSOP, 14)	5.00mm × 4.40mm
	DGV (TVSOP, 14)	3.6mm × 4.4mm
	RGY (VQFN, 14)	3.50mm × 3.50mm
BQA (WQFN, 14)	3mm × 2.5mm	

- 利用可能なすべてのパッケージについては、データシートの末尾にある注文情報を参照してください。
- パッケージ・サイズ (長さ × 幅) は公称値であり、該当する場合はピンも含まれます。



図 2-1. 各ゲートの論理図 (正論理)

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### 3 Revision History

資料番号末尾の英字は改訂を表しています。その改訂履歴は英語版に準じています。

<b>Changes from Revision O (May 2023) to Revision P (June 2023)</b>	<b>Page</b>
• 「製品情報」表に BQA パッケージを追加 .....	1
• 「デバイスおよびドキュメントのサポート」セクションと「メカニカル、パッケージ、および注文情報」セクションを追加.....	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

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<b>Changes from Revision N (May 2013) to Revision O (May 2023)</b>	<b>Page</b>
• 「パッケージ情報」表、「ピン機能」表、「熱に関する情報」表を追加 .....	1

## 4 Pin Configuration and Functions

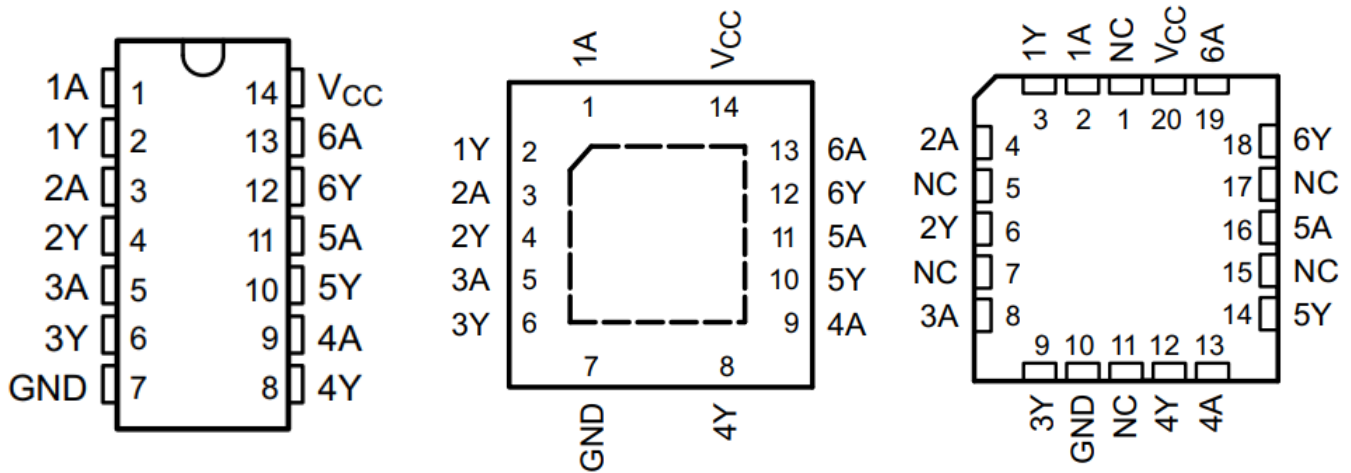


图 4-1. SN54AHC04 J 或 W Package SN74AHC04 D, DB, DGV, N, NS, 或 PW Package (Top View) 图 4-2. SN74AHC04 RGY 或 BQA Package (Top View) 图 4-3. SN54AHC04 FK Package (Top View)

表 4-1. Pin Functions

NAME	PIN				I/O	DESCRIPTION
	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		
V <sub>CC</sub>	14	14	14	20	—	Power Pin
				17		

## 5 Specifications

### 5.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)<sup>(1)</sup>

		MIN	MAX	UNIT
$V_{CC}$	Supply voltage range	-0.5	7	V
$V_I$ <sup>(2)</sup>	Input voltage range	-0.5	7	V
$V_O$ <sup>(2)</sup>	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	$(V_O < 0 \text{ or } V_O > V_{CC})$		$\pm 20$ mA
$I_{OK}$	Continuous output current	$(V_O = 0 \text{ to } V_{CC})$		$\pm 25$ mA
	Continuous current through $V_{CC}$ or GND			$\pm 50$ 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 <sup>(1)</sup>	$\pm 2000$
		Charged device model (CDM), per JEDEC specification JESD22-C101, all pins <sup>(2)</sup>	$\pm 1000$

- (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	$V_{CC} = 2 \text{ V}$		1.5		V
		$V_{CC} = 3 \text{ V}$		2.1		
		$V_{CC} = 5.5 \text{ V}$		3.85		
$V_{IL}$	Low-level Input voltage	$V_{CC} = 2 \text{ V}$		0.5	0.5	V
		$V_{CC} = 3 \text{ V}$		0.9	0.9	
		$V_{CC} = 5.5 \text{ V}$		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	$V_{CC} = 2 \text{ V}$		-50	-50	mA
		$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$		-4	-4	
		$V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$		-8	-8	
$I_{OL}$	Low-level output current	$V_{CC} = 2 \text{ V}$		50	50	mA
		$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$		4	4	
		$V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$		8	8	
$\Delta t/\Delta v$	Input Transition rise or fall rate	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$		100	100	ns/V
		$V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$		20	20	
$T_A$	Operating free-air temperature	-55	125	-40	125	°C

## 5.4 Thermal Information

THERMAL METRIC <sup>1</sup>		SNx4AHC04							UNIT	
		D	DB	DGV	N	NS	PW	RGY		BQA
		14 PINS								
R <sub>θJA</sub>	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 <sub>CC</sub>	T <sub>A</sub> = 25°C		T <sub>A</sub> = -55°C TO 125°C		T <sub>A</sub> = -40°C TO 85°C		T <sub>A</sub> = -40°C TO 125°C		UNIT
					SN54AHC04		SN74AHC04		Recommended SN74AHC04		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	MIN	
V <sub>OH</sub>	I <sub>OH</sub> = -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 <sub>OH</sub> = -4 mA	3 V	2.58		2.48		2.48		2.48		
	I <sub>OH</sub> = -8 mA	4.5 V	3.94		3.8		3.8		3.8		
V <sub>OL</sub>	I <sub>OL</sub> = 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 <sub>OH</sub> = 4 mA	3 V			0.36		0.5		0.44		
	I <sub>OH</sub> = 8 mA	4.5 V			0.36		0.5		0.44		
I <sub>I</sub>	V <sub>I</sub> = 5.5 V or GND	0 V to 5.5 V			±0.1		±1 <sup>(1)</sup>		±1		μA
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0	5.5 V			2		20		20		μA
C <sub>i</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5 V			2	10			10		pF

(1) On products compliant to MIL-PRF-38535, this parameter is not production tested at V<sub>CC</sub> = 0 V.

## 5.6 Switching Characteristics

over recommended operating free-air temperature range, V<sub>CC</sub> = 3.3 V ± 0.3 V (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	T <sub>A</sub> = 25°C		T <sub>A</sub> = -55°C TO 125°C		T <sub>A</sub> = -40°C TO 85°C		T <sub>A</sub> = -40°C TO 125°C		UNIT
						SN54AHC04		SN74AHC04		Recommended SN74AHC04		
				TYP	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A	Y	C <sub>L</sub> = 15 pF	5 <sup>(1)</sup>	8.9 <sup>(1)</sup>	1 <sup>(1)</sup>	10.5 <sup>(1)</sup>	1	10.5	1	10.5	ns
t <sub>PHL</sub>				5 <sup>(1)</sup>	8.9 <sup>(1)</sup>	1 <sup>(1)</sup>	10.5 <sup>(1)</sup>	1	10.5	1	10.5	
t <sub>PLH</sub>	A	Y	C <sub>L</sub> = 50 pF	7.5	11.4	1	13	1	13	1	13	ns
t <sub>PHL</sub>				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, $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$

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)	TEST CONDITIONS	$T_A = 25^\circ\text{C}$		$T_A = -55^\circ\text{C TO } 125^\circ\text{C}$		$T_A = -40^\circ\text{C TO } 85^\circ\text{C}$		$T_A = -40^\circ\text{C TO } 125^\circ\text{C}$		UNIT
				TYP	MAX	SN54AHC04		SN74AHC04		Recommended		
						MIN	MAX	MIN	MAX	MIN	MAX	
$t_{PLH}$	A	Y	$C_L = 15\text{ pF}$	3.8 <sup>1</sup>	5.5 <sup>1</sup>	1 <sup>1</sup>	6.5 <sup>1</sup>	1	6.5	1	6.5	ns
$t_{PHL}$				3.8 <sup>1</sup>	5.5 <sup>1</sup>	1 <sup>1</sup>	6.5 <sup>1</sup>	1	6.5	1	6.5	
$t_{PLH}$	A	Y	$C_L = 50\text{ pF}$	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

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

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

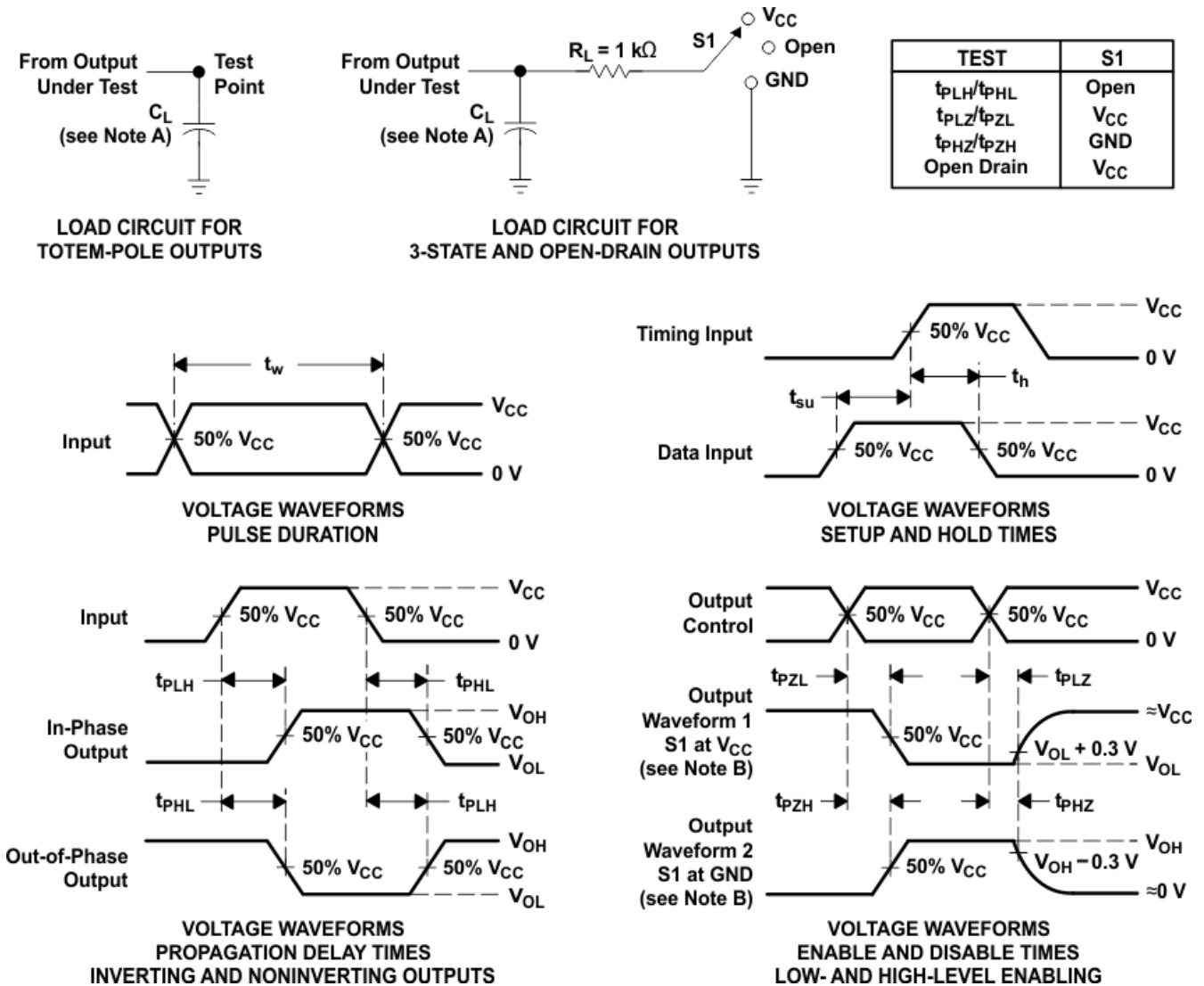
(1) Characteristics are for surface-mount packages only.

## 5.9 Operating Characteristics

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

PARAMETER		TEST CONDITIONS		TYP	UNIT
$C_{pd}$	Power dissipation capacitance	No load,	$f = 1\text{ MHz}$	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:  $PRR \leq 1$  MHz,  $Z_O = 50 \Omega$ ,  $t_r \leq 3$  ns,  $t_f \leq 3$  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

表 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.

表 8-1. Related Links

PARTS	PRODUCT FOLDER	SAMPLE & BUY	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
SN54AHC04	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>
SN74AHC04	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>

### 8.2 ドキュメントの更新通知を受け取る方法

ドキュメントの更新についての通知を受け取るには、[ti.com](#) のデバイス製品フォルダを開いてください。「更新の通知を受け取る」をクリックして登録すると、変更されたすべての製品情報に関するダイジェストを毎週受け取れます。変更の詳細については、修正されたドキュメントに含まれている改訂履歴をご覧ください。

### 8.3 サポート・リソース

**TI E2E™ サポート・フォーラム**は、エンジニアが検証済みの回答と設計に関するヒントをエキスパートから迅速かつ直接得ることができる場所です。既存の回答を検索したり、独自の質問をしたりすることで、設計に必要な支援を迅速に得ることができます。

リンクされているコンテンツは、該当する貢献者により、現状のまま提供されるものです。これらは TI の仕様を構成するものではなく、必ずしも TI の見解を反映したものではありません。TI の[使用条件](#)を参照してください。

### 8.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.

すべての商標は、それぞれの所有者に帰属します。

### 8.5 静電気放電に関する注意事項



この IC は、ESD によって破損する可能性があります。テキサス・インスツルメンツは、IC を取り扱う際には常に適切な注意を払うことを推奨します。正しい取り扱いおよび設置手順に従わない場合、デバイスを破損するおそれがあります。

ESD による破損は、わずかな性能低下からデバイスの完全な故障まで多岐にわたります。精密な IC の場合、パラメータがわずかに変化するだけで公表されている仕様から外れる可能性があるため、破損が発生しやすくなっています。

### 8.6 用語集

[テキサス・インスツルメンツ用語集](#) この用語集には、用語や略語の一覧および定義が記載されています。

## 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)
<a href="#">5962-9680501Q2A</a>	NRND	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9680501Q2A SNJ54AHC 04FK
<a href="#">5962-9680501QCA</a>	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501QC A SNJ54AHC04J
<a href="#">5962-9680501QDA</a>	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501QD A SNJ54AHC04W
<a href="#">SN74AHC04BQAR</a>	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
<a href="#">SN74AHC04D</a>	Obsolete	Production	SOIC (D)   14	-	-	Call TI	Call TI	-40 to 125	AHC04
<a href="#">SN74AHC04DBR</a>	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
<a href="#">SN74AHC04DGVR</a>	NRND	Production	TVSOP (DGV)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA04
SN74AHC04DGVR.A	NRND	Production	TVSOP (DGV)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA04
<a href="#">SN74AHC04DR</a>	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
<a href="#">SN74AHC04N</a>	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
<a href="#">SN74AHC04NSR</a>	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
<a href="#">SN74AHC04PW</a>	Obsolete	Production	TSSOP (PW)   14	-	-	Call TI	Call TI	-40 to 125	HA04
<a href="#">SN74AHC04PWR</a>	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
<a href="#">SN74AHC04RGYR</a>	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
<a href="#">SNJ54AHC04FK</a>	NRND	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9680501Q2A SNJ54AHC 04FK

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	NRND	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9680501Q2A SNJ54AHC 04FK
<a href="#">SNJ54AHC04J</a>	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501QC A SNJ54AHC04J
SNJ54AHC04J.A	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501QC A SNJ54AHC04J
<a href="#">SNJ54AHC04W</a>	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501QD A SNJ54AHC04W
SNJ54AHC04W.A	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9680501QD A 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.

**Important Information and Disclaimer:** The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

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 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**

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**

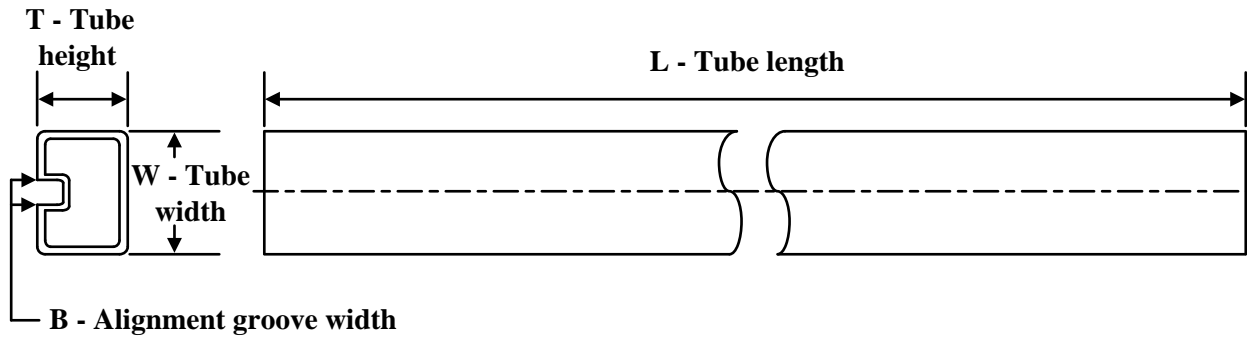

\*All dimensions are nominal

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**

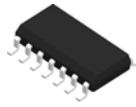

\*All dimensions are nominal

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



# D0014A

# PACKAGE OUTLINE

## SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



4220718/A 09/2016

### 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

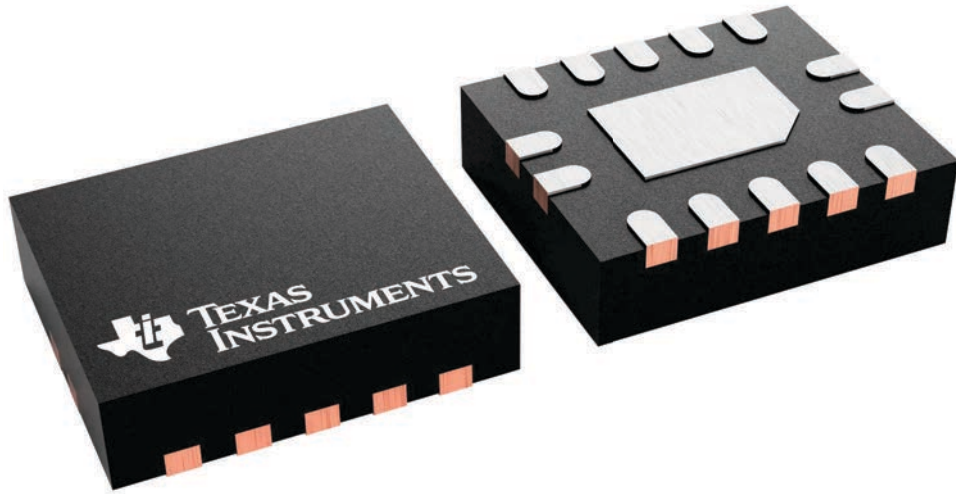
**BQA 14**

**WQFN - 0.8 mm max height**

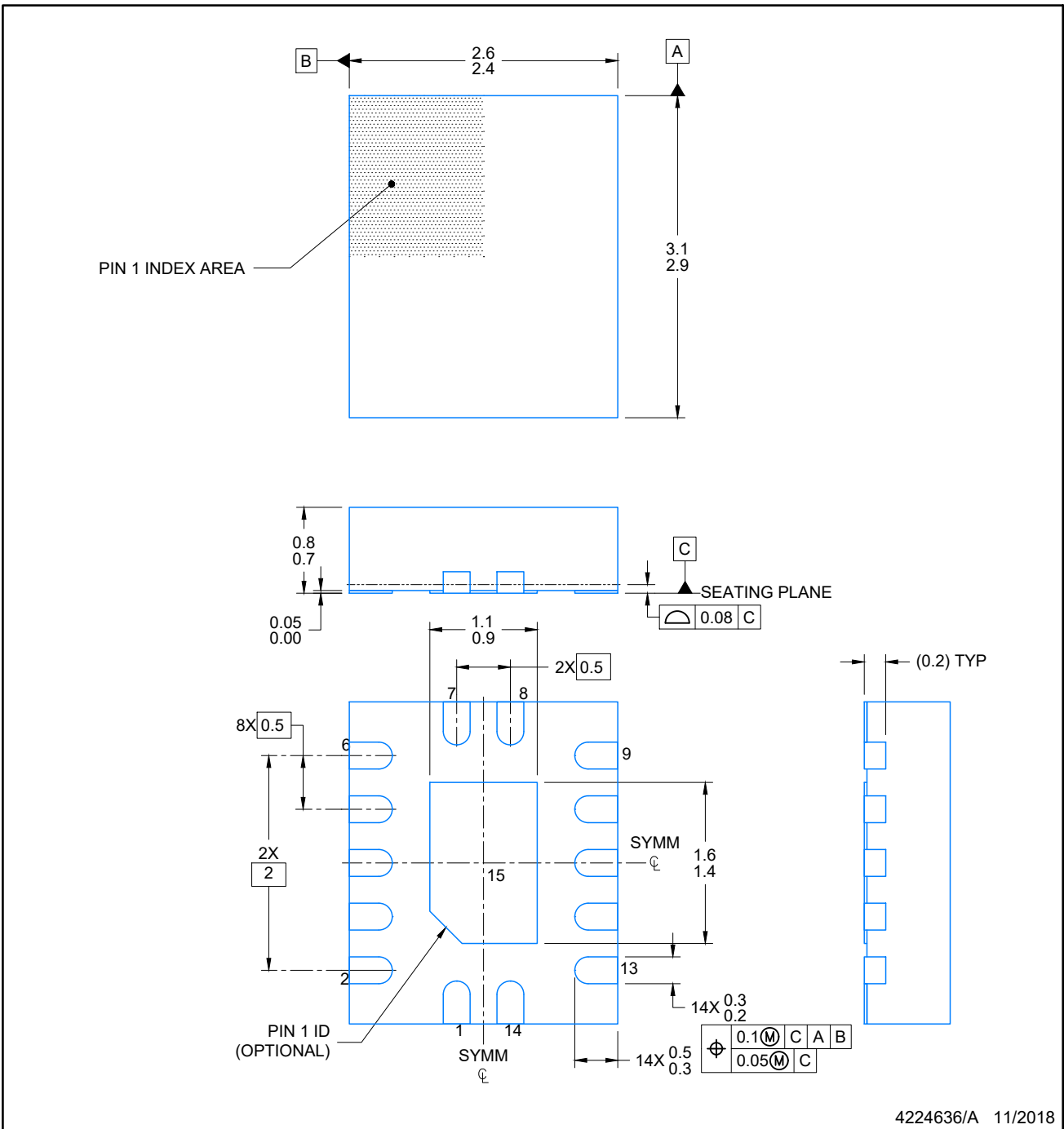
2.5 x 3, 0.5 mm pitch

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



**NOTES:**

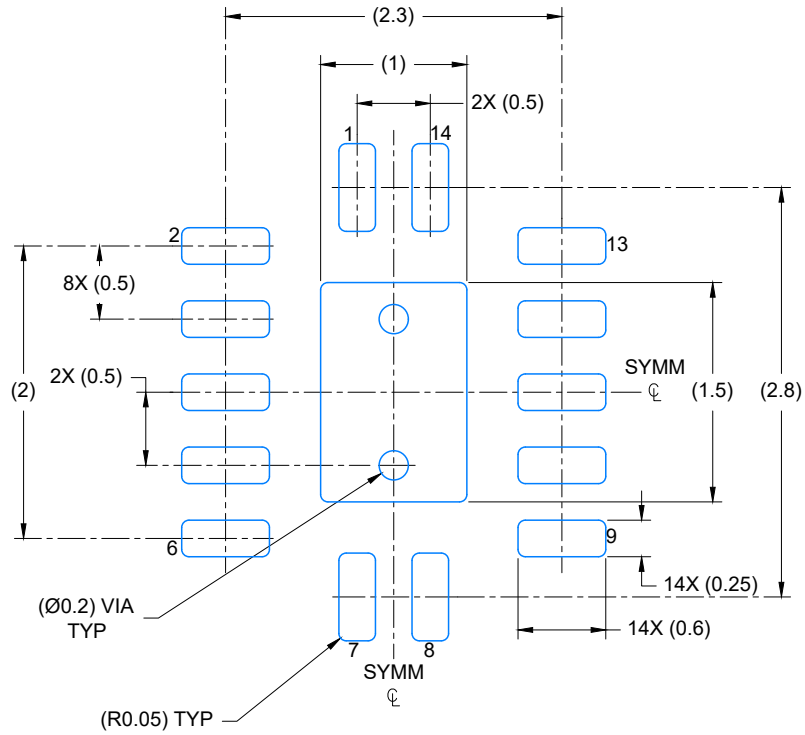
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for optimal thermal and mechanical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

# EXAMPLE BOARD LAYOUT

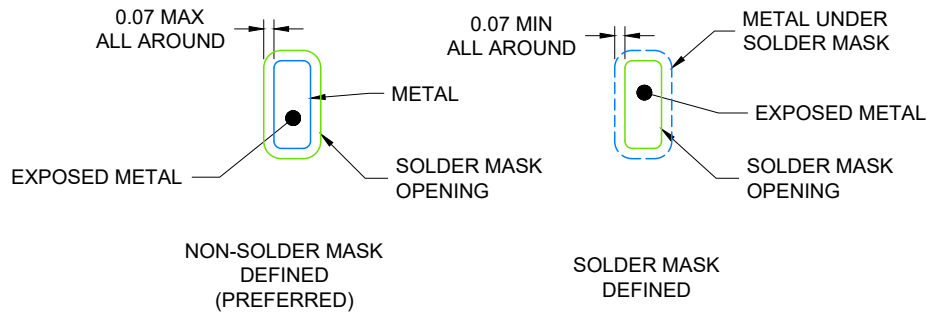
WQFN - 0.8 mm max height

BQA0014A

PLASTIC QUAD FLAT PACK-NO LEAD



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 20X



4224636/A 11/2018

NOTES: (continued)

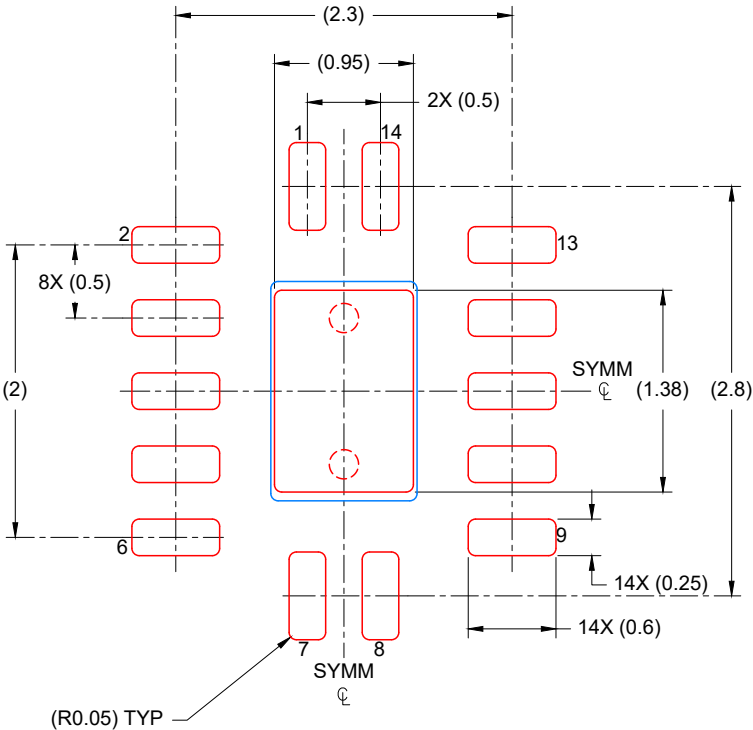
4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/slua271](http://www.ti.com/lit/slua271)).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, 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

# DB0014A



# PACKAGE OUTLINE

## 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. Reference JEDEC registration MO-150.

# 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

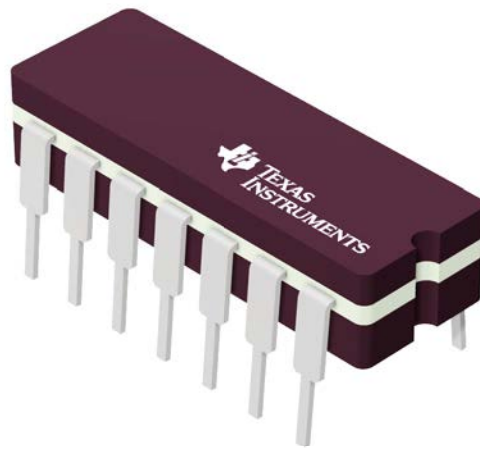
This image is a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.



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.
  - $\triangle C$  Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
  - $\triangle D$  The 20 pin end lead shoulder width is a vendor option, either half or full width.

PW0014A



**PACKAGE OUTLINE**  
**TSSOP - 1.2 mm max height**

SMALL OUTLINE PACKAGE



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)

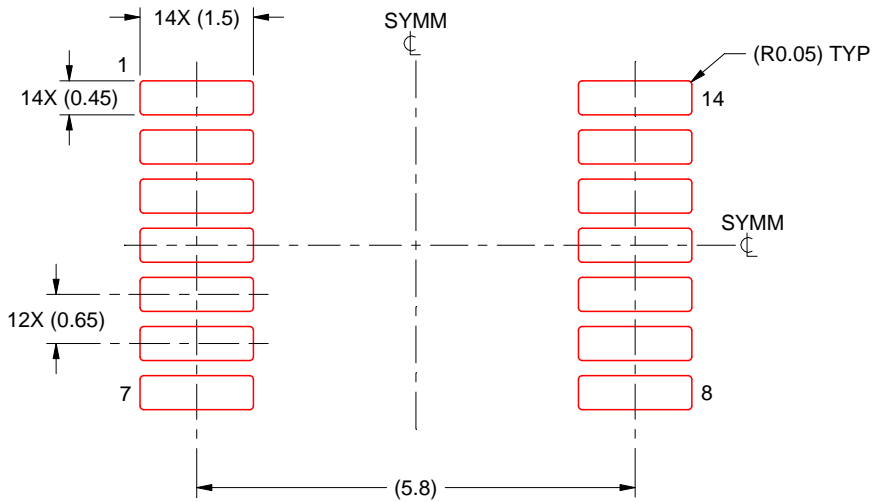
- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# 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.

## GENERIC PACKAGE VIEW

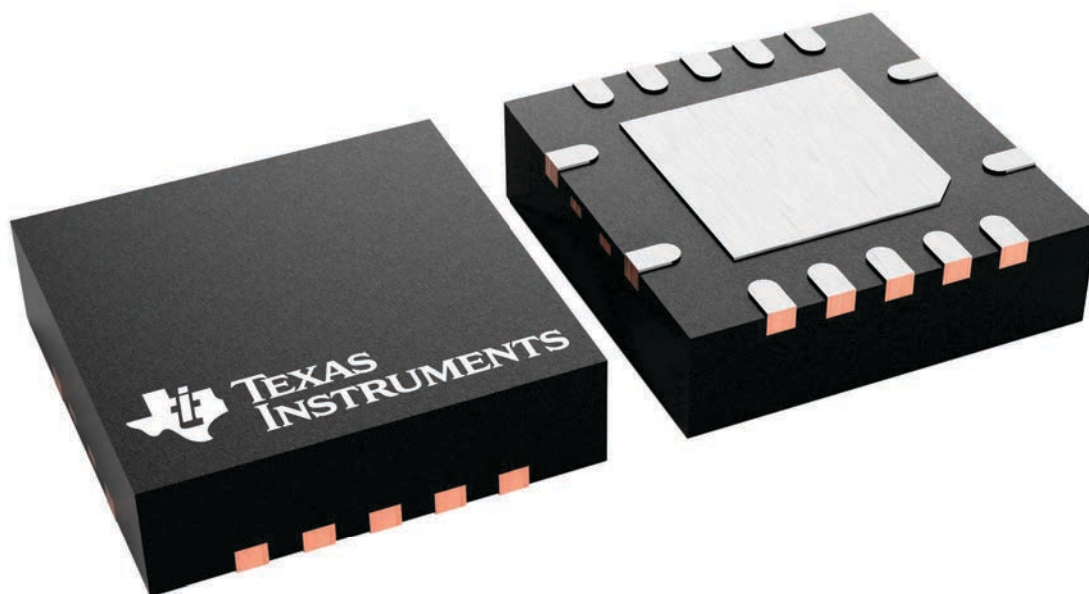
**RGY 14**

**VQFN - 1 mm max height**

3.5 x 3.5, 0.5 mm pitch

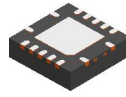
PLASTIC QUAD FLATPACK - NO LEAD

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



4231541/A

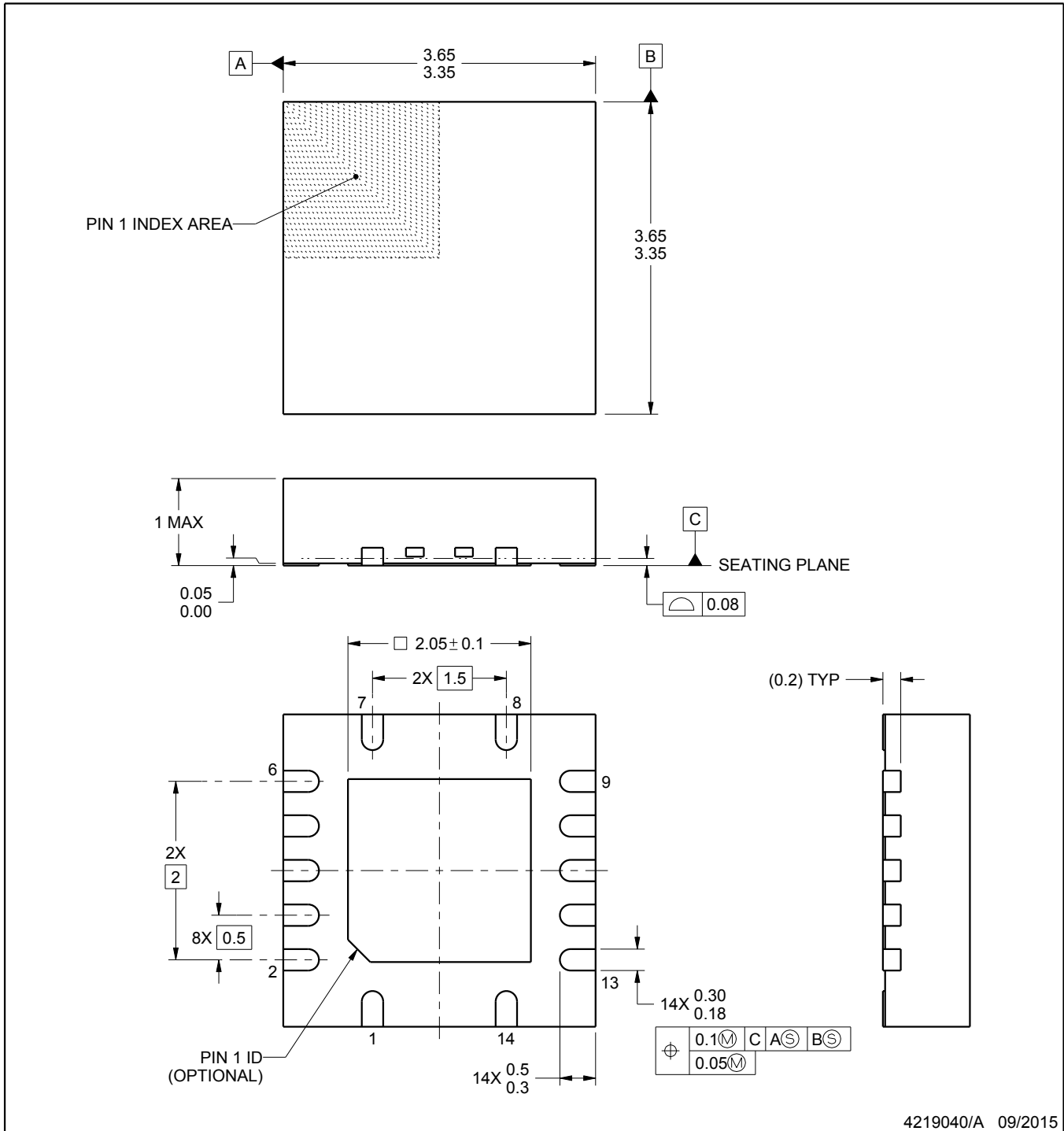
RGY0014A



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.

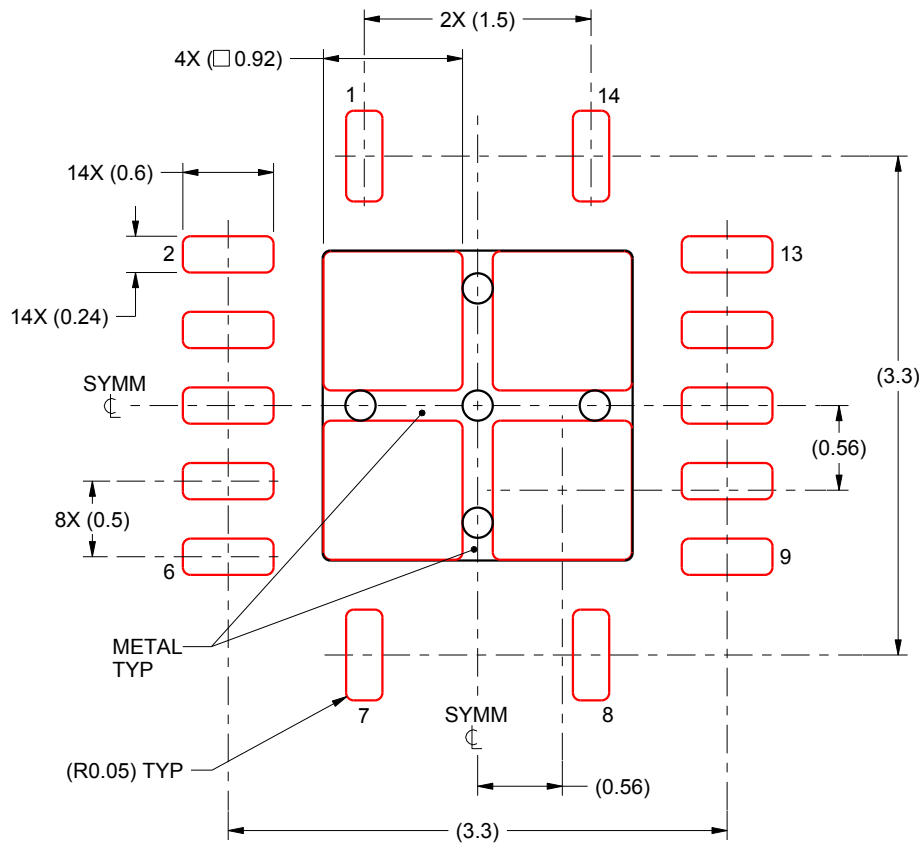


# EXAMPLE STENCIL DESIGN

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.

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最終更新日 : 2025 年 10 月