

## SNx4ACT14 Hex Schmitt-Trigger Inverter

### 1 Features

- $V_{CC}$  operation of 4.5V to 5.5V
- Inputs accept voltages to 5.5V
- Max  $t_{pd}$  of 11ns at 5V
- Inputs are TTL-voltage compatible

### 2 Applications

- Synchronize inverted clock inputs
- Debounce a switch
- Invert a digital signal

### 3 Description

These Schmitt-trigger devices contain six independent inverters.

#### Device Information

PART NUMBER	PACKAGE <sup>(1)</sup>	PACKAGE SIZE <sup>(2)</sup>	BODY SIZE <sup>(3)</sup>
SN54ACT14	J (CDIP, 14)	19.56mm × 7.9mm	19.56mm × 6.67mm
	W (CFP, 14)	9.21mm × 9.02mm	9.21mm × 6.3mm
	FK (LCCC, 20)	8.89mm × 8.89mm	8.89mm × 8.89mm
SNx4ACT14	BQA (WQFN, 14)	3mm × 2.5mm	3mm × 2.5mm
	D (SOIC, 14)	8.65mm × 6mm	8.65mm × 3.9mm
	DB (SSOP, 14)	6.2mm × 7.8mm	6.2mm × 5.3mm
	N (PDIP, 14)	19.3mm × 9.4mm	19.3mm × 6.35mm
	NS (SOP, 14)	10.2mm × 7.8mm	10.3mm × 5.3mm
	PW (TSSOP, 14)	5mm × 6.4mm	5mm × 4.4mm

- (1) For more information, see [Section 11](#)
- (2) The package size (length × width) is a nominal value and includes pins, where applicable.
- (3) The body size (length × width) is a nominal value and does not include pins.



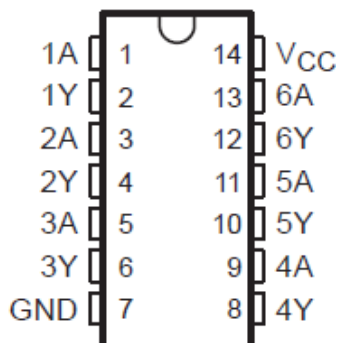
Logic Diagram (Positive Logic)



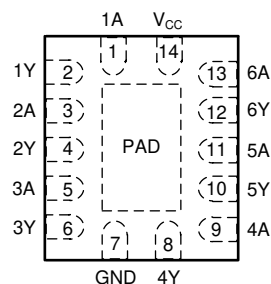
## Table of Contents

<b>1 Features</b> .....	<b>1</b>	7.4 Device Functional Modes.....	<b>9</b>
<b>2 Applications</b> .....	<b>1</b>	<b>8 Application Information Disclaimer</b> .....	<b>10</b>
<b>3 Description</b> .....	<b>1</b>	8.1 Application Information.....	10
<b>4 Pin Configuration and Functions</b> .....	<b>3</b>	8.2 Typical Application.....	10
<b>5 Specifications</b> .....	<b>5</b>	8.3 Power Supply Recommendations.....	11
5.1 Absolute Maximum Ratings.....	5	8.4 Layout.....	11
5.2 ESD Ratings.....	5	<b>9 Device and Documentation Support</b> .....	<b>12</b>
5.3 Recommended Operating Conditions.....	5	9.1 Documentation Support.....	12
5.4 Thermal Information.....	5	9.2 Receiving Notification of Documentation Updates....	12
5.5 Electrical Characteristics.....	6	9.3 Support Resources.....	12
5.6 Switching Characteristics.....	6	9.4 Trademarks.....	12
5.7 Operating Characteristics.....	6	9.5 Electrostatic Discharge Caution.....	12
<b>6 Parameter Measurement Information</b> .....	<b>7</b>	9.6 Glossary.....	12
<b>7 Detailed Description</b> .....	<b>8</b>	<b>10 Revision History</b> .....	<b>12</b>
7.1 Overview.....	8	<b>11 Mechanical, Packaging, and Orderable Information</b> .....	<b>13</b>
7.2 Functional Block Diagram.....	8		
7.3 Feature Description.....	8		

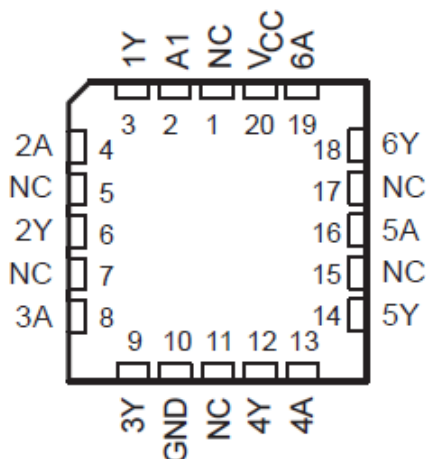
## 4 Pin Configuration and Functions



**Figure 4-1. SN54ACT14 J or W Package and SN74ACT14 D, DB, N, NS, or PW Package (Top View)**



**Figure 4-2. SN74ACT14 BQA Package, 14-Pin WQFN (Top View)**



NC – No internal connection

**Figure 4-3. SN54ACT14 FK Package (Top View)**

**Table 4-1. Pin Function**

PIN		I/O <sup>(1)</sup>	DESCRIPTION
NAME	NO.		
1A	1	Input	Channel 1, Input A
1Y	2	Output	Channel 1, Output Y
2A	3	Input	Channel 2, Input A
2Y	4	Output	Channel 2, Output Y
3A	5	Input	Channel 3, Input A
3Y	6	Output	Channel 3, Output Y
GND	7	—	Ground
4Y	8	Output	Channel 4, Output Y
4A	9	Input	Channel 4, Input A
5Y	10	Output	Channel 5, Output Y
5A	11	Input	Channel 5, Input A
6Y	12	Output	Channel 6, Output Y
6A	13	Input	Channel 6, Input A

Table 4-1. Pin Function (continued)

PIN		I/O <sup>(1)</sup>	DESCRIPTION
NAME	NO.		
V <sub>CC</sub>	14	—	Positive Supply
Thermal pad		—	Connect the GND pin to the exposed thermal pad for correct operation. Connect the thermal pad to any internal PCB ground plane using multiple vias for good thermal performance.

(1) I = input, O = output, P = power, FB = feedback, GND = ground, N/A = not applicable

## 5 Specifications

### 5.1 Absolute Maximum Ratings

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

		MIN	MAX	UNIT
$V_{CC}$	Supply voltage range	–0.5	7	V
$V_I$	Input voltage range <sup>(1)</sup>	–0.5	$V_{CC} + 0.5$	V
$V_O$	Output voltage range <sup>(1)</sup>	–0.5	$V_{CC} + 0.5$	V
$I_{IK}$	Input clamp current	$V_I < 0$ or $V_I > V_{CC}$		±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 $V_{CC}$		±50 mA
	Continuous current through $V_{CC}$ or GND			±200 mA
$T_{stg}$	Storage temperature range	–65	150	°C

(1) 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>	±1500
		Charged device model (CDM), per JEDEC specification JESD22-C101, all pins <sup>(2)</sup>	±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

		SN54ACT14		SN74ACT14		UNIT
		MIN	MAX	MIN	MAX	
$V_{CC}$	Supply voltage	4.5	5.5	4.5	5.5	V
$V_I$	Input voltage	0	$V_{CC}$	0	$V_{CC}$	V
$V_O$	Output voltage	0	$V_{CC}$	0	$V_{CC}$	V
$I_{OH}$	High-level output current		–24		–24	mA
$I_{OL}$	Low-level output current		24		24	mA
$T_A$	Operating free-air temperature	–55	125	–40	85	°C

### 5.4 Thermal Information

THERMAL METRIC <sup>(1)</sup>		SN74ACT14						UNIT
		BQA (WQFN)	D (SOIC)	DB (SSOP)	N (PDIP)	NS (SOP)	PW (TSSOP)	
		14 PINS						
R <sub>θJA</sub>	Junction-to-ambient thermal resistance	85.4	89.9	96	80	76	148	°C/W

(1) For more information about traditional and new thermal metrics, see the [Semiconductor and IC Package Thermal Metrics](#) application report.

## 5.5 Electrical Characteristics

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

PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	T <sub>A</sub> = 25°C			SN54ACT14		SN74ACT14		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V <sub>T+</sub> Positive-going threshold		4.5 V	1.2	1.5	1.9	1.2	1.9	1.2	1.9	V
		5.5 V	1.4	1.7	2.1	1.4	2.1	1.4	2.1	
V <sub>T-</sub> Negative-going threshold		4.5 V	0.5	0.9	1.2	0.5	1.2	0.5	1.2	V
		5.5 V	0.6	1	1.4	0.6	1.4	0.6	1.4	
ΔV <sub>T</sub> Hysteresis (V <sub>T+</sub> – V <sub>T-</sub> )		4.5 V	0.4	0.6	1.4	0.4	1.4	0.4	1.4	V
		5.5 V	0.4	0.6	1.5	0.4	1.5	0.4	1.5	
V <sub>OH</sub>	I <sub>OH</sub> = –50 μA	4.5 V	4.4	4.49		4.4		4.4		V
		5.5 V	5.4	5.49		5.4		5.4		
	I <sub>OH</sub> = –24 mA	4.5 V	3.86			3.7		3.76		
		5.5 V	4.86			4.7		4.76		
	I <sub>OH</sub> = –50 mA <sup>(1)</sup>	5.5 V				3.85				
	I <sub>OH</sub> = –75 mA <sup>(1)</sup>	5.5 V						3.85		
V <sub>OL</sub>	I <sub>OL</sub> = 50 μA	4.5 V		0.001	0.1		0.1		0.1	V
		5.5 V		0.001	0.1		0.1		0.1	
	I <sub>OL</sub> = 24 mA	4.5 V			0.36		0.5		0.44	
		5.5 V			0.36		0.5		0.44	
	I <sub>OL</sub> = 50 mA <sup>(1)</sup>	5.5 V				1.65				
	I <sub>OL</sub> = 75 mA <sup>(1)</sup>	5.5 V						1.65		
I <sub>I</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5.5 V			±0.1		±1		±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		40		20	μA
ΔI <sub>CC</sub> <sup>(2)</sup>	One input at 3.4 V, Other inputs at GND or V <sub>CC</sub>	5.5 V		0.6			1.6		1.5	mA
C <sub>i</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5 V		4.5						pF

(1) Not more than one output should be tested at a time, and the duration of the test should not exceed 2 ms.

(2) This is the increase in supply current for each input that is at one of the specified TTL voltage levels, rather than 0 V or V<sub>CC</sub>.

## 5.6 Switching Characteristics

over recommended operating free-air temperature range, V<sub>CC</sub> = 5 V ± 0.5 V (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

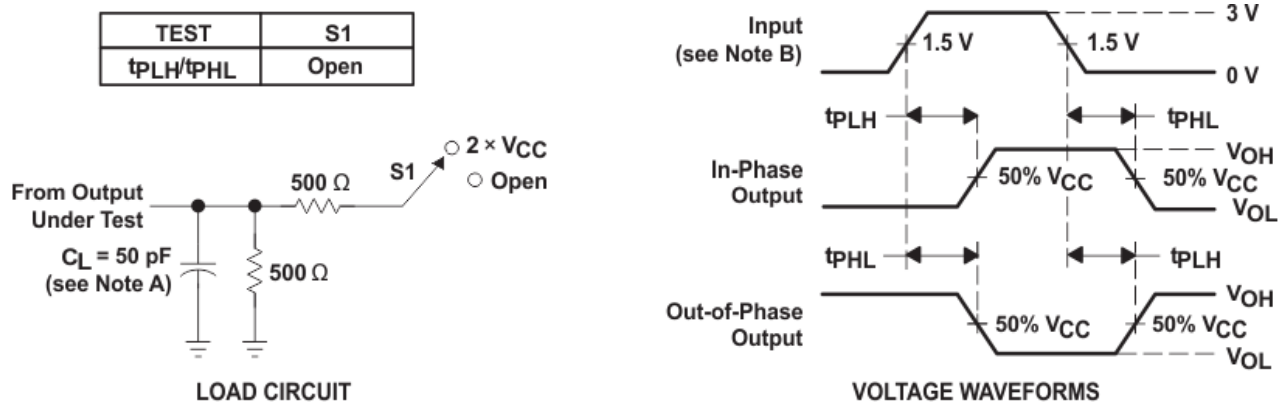
PARAMETER	FROM (INPUT)	TO (OUTPUT)	T <sub>A</sub> = 25°C		SN54ACT14		SN74ACT14		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A	Y	1.5	11.5	1	14	1	12.5	ns
t <sub>PHL</sub>			1.5	10	1	13	1	11	

## 5.7 Operating Characteristics

V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C

PARAMETER		TEST CONDITIONS		TYP	UNIT
C <sub>pd</sub>	Power dissipation capacitance	C <sub>L</sub> = 50 pF,	f = 1 MHz	20	pF

## 6 Parameter Measurement Information



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r \leq 2.5 \text{ ns}$ ,  $t_f \leq 2.5 \text{ ns}$ .  
 C. The outputs are measured one at a time, with one input transition per measurement.

**Figure 6-1. Load Circuit and Voltage Waveforms**

## 7 Detailed Description

### 7.1 Overview

These 'ACT14 devices perform the Boolean function  $Y = \overline{A}$ . Because of the Schmitt action, they have different input threshold levels for positive-going ( $V_{T+}$ ) and for negative-going ( $V_{T-}$ ) signals.

These circuits are temperature compensated and can be triggered from the slowest of input ramps and still give clean, jitter-free output signals. They also have a greater noise margin than conventional inverters.

### 7.2 Functional Block Diagram



### 7.3 Feature Description

- $V_{CC}$  is optimized at 5 V
- Allows up voltage translation from 3.3 V to 5 V
  - Inputs accept  $V_{IH}$  levels of 2 V
- Slow edge rates minimize output ringing
- Inputs are TTL-Voltage compatible

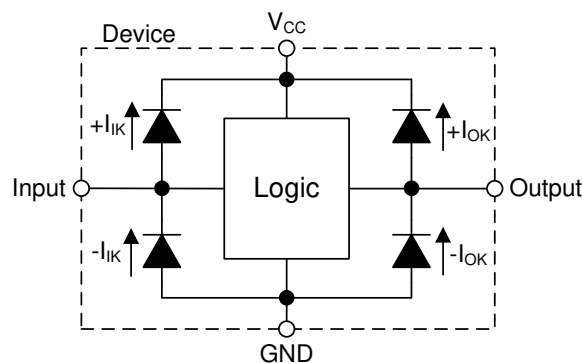
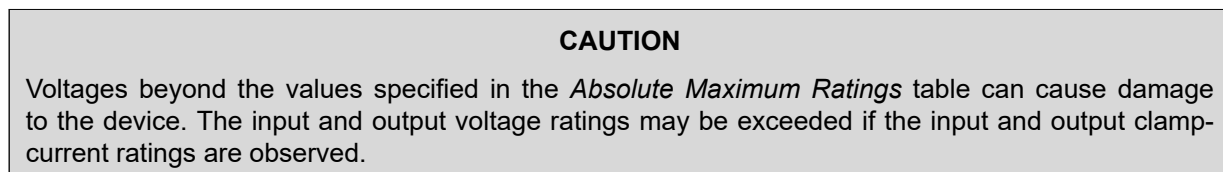
#### 7.3.1 Balanced CMOS Push-Pull Outputs

This device includes balanced CMOS push-pull outputs. The term *balanced* indicates that the device can sink and source similar currents. The drive capability of this device may create fast edges into light loads, so routing and load conditions should be considered to prevent ringing. Additionally, the outputs of this device are capable of driving larger currents than the device can sustain without being damaged. It is important to limit the output power of the device to avoid damage due to overcurrent. The electrical and thermal limits defined in the *Absolute Maximum Ratings* must be followed at all times.

Unused push-pull CMOS outputs must be left disconnected.

#### 7.3.2 Clamp Diode Structure

As shown in Figure 7-1, the inputs and outputs to this device have both positive and negative clamping diodes.



**Figure 7-1. Electrical Placement of Clamping Diodes for Each Input and Output**



## 7.4 Device Functional Modes

**Table 7-1. Function Table**

INPUT	OUTPUT
A	Y
H	L
L	H

## 8 Application Information Disclaimer

### Note

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, as well as validating and testing their design implementation to confirm system functionality.

### 8.1 Application Information

The SNx4ACT14 device is a low-drive CMOS device that can be used for a multitude of bus interface type applications where output ringing is a concern. The low drive and slow edge rates will minimize overshoot and undershoot on the outputs. The inputs are tolerant to 5.5 V at any valid  $V_{CC}$ . This feature makes it ideal for translating down to the  $V_{CC}$  level. [Switching Characteristics Comparison](#) shows the reduction in ringing compared to higher drive parts such as AC.

### 8.2 Typical Application

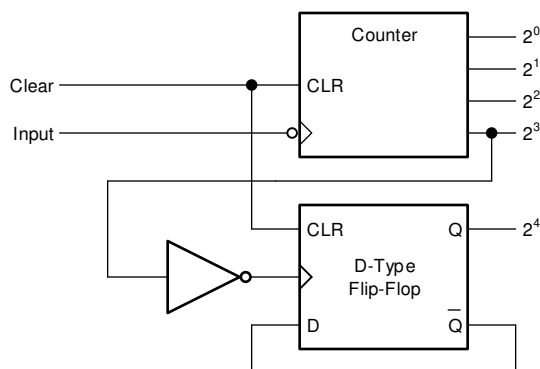


Figure 8-1. Typical application schematic

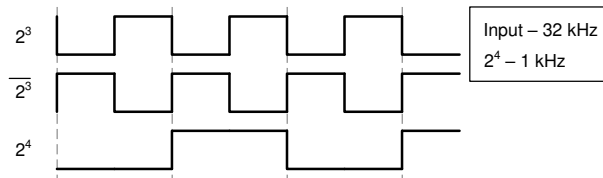
#### 8.2.1 Design Requirements

This device uses CMOS technology and has balanced output drive. Care should be taken to avoid bus contention because it can drive currents that would exceed maximum limits. The high drive will also create fast edges into light loads, so routing and load conditions should be considered to prevent ringing.

#### 8.2.2 Detailed Design Procedure

1. Recommended Input Conditions
  - For rise time and fall time specifications, see  $\Delta t/\Delta V$  in the [Section 5.3](#) table.
  - For specified High and low levels, see  $V_{IH}$  and  $V_{IL}$  in the [Section 5.3](#) table.
  - Inputs are overvoltage tolerant allowing them to go as high as 5.5 V at any valid  $V_{CC}$ .
2. Recommend Output Conditions
  - Load currents should not exceed 35 mA per output and 70 mA total for the part.
  - Outputs should not be pulled above  $V_{CC}$ .

### 8.2.3 Application Curves



**Figure 8-2. Typical application timing diagram**

### 8.3 Power Supply Recommendations

The power supply can be any voltage between the MIN and MAX supply voltage rating located in the [Section 5.3](#) table.

Each  $V_{CC}$  pin should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, 0.1  $\mu\text{F}$  is recommended. If there are multiple  $V_{CC}$  pins, 0.01  $\mu\text{F}$  or 0.022  $\mu\text{F}$  is recommended for each power pin. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. A 0.1  $\mu\text{F}$  and 1  $\mu\text{F}$  are commonly used in parallel. The bypass capacitor should be installed as close to the power pin as possible for best results.

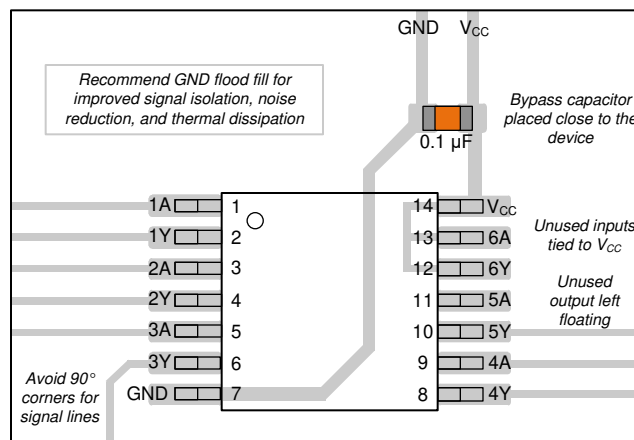
### 8.4 Layout

#### 8.4.1 Layout Guidelines

When using multiple bit logic devices, inputs should not float. In many cases, functions or parts of functions of digital logic devices are unused. Some examples are when only two inputs of a triple-input AND gate are used, or when only 3 of the 4-buffer gates are used. Such input pins should not be left unconnected because the undefined voltages at the outside connections result in undefined operational states.

Specified in [Example Diagram](#) are rules that must be observed under all circumstances. All unused inputs of digital logic devices must be connected to a high or low bias to prevent them from floating. The logic level that should be applied to any particular unused input depends on the function of the device. Generally they will be tied to GND or  $V_{CC}$ , whichever makes more sense or is more convenient. It is acceptable to float outputs unless the part is a transceiver. If the transceiver has an output enable pin, it will disable the outputs section of the part when asserted. This will not disable the input section of the I/Os so they also cannot float when disabled.

##### 8.4.1.1 Layout Example



**Figure 8-3. Example Layout for the SN74ACT14**

## 9 Device and Documentation Support

### 9.1 Documentation Support

#### 9.1.1 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 9-1. Related Links**

PARTS	PRODUCT FOLDER	SAMPLE & BUY	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
SN54ACT14	<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>
SN74ACT14	<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>

### 9.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](https://www.ti.com). Click on *Notifications* 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.

### 9.3 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](#).

### 9.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.

All trademarks are the property of their respective owners.

### 9.5 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.

### 9.6 Glossary

[TI Glossary](#) This glossary lists and explains terms, acronyms, and definitions.

## 10 Revision History

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

### Changes from Revision J (August 2024) to Revision K (November 2024) Page

- Added BQA package to *Device Information* table, *Pin Configuration and Functions* section, and *Thermal Information* table..... 1
- Added J, W, and FK packages to *Device Information* table..... 1

### Changes from Revision I (January 2023) to Revision J (August 2024) Page

- Added package size to *Device Information* table..... 1
- Updated RθJA values: D = 86 to 89.9, PW = 113 to 148, all values in °C/W..... 5
- Updated *Layout Example* ..... 11

## 11 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="#">5962-9218301M2A</a>	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9218301M2A SNJ54ACT 14FK
<a href="#">5962-9218301MCA</a>	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9218301MC A SNJ54ACT14J
<a href="#">5962-9218301MDA</a>	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9218301MD A SNJ54ACT14W
<a href="#">SN74ACT14BQAR</a>	Active	Production	WQFN (BQA)   14	3000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AD14
<a href="#">SN74ACT14D</a>	Obsolete	Production	SOIC (D)   14	-	-	Call TI	Call TI	-40 to 85	ACT14
<a href="#">SN74ACT14DBR</a>	Active	Production	SSOP (DB)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AD14
<a href="#">SN74ACT14DR</a>	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU   NIPDAU	Level-1-260C-UNLIM	-40 to 85	ACT14
<a href="#">SN74ACT14N</a>	Active	Production	PDIP (N)   14	25   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74ACT14N
<a href="#">SN74ACT14NSR</a>	Active	Production	SOP (NS)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ACT14
<a href="#">SN74ACT14PW</a>	Obsolete	Production	TSSOP (PW)   14	-	-	Call TI	Call TI	-40 to 85	AD14
<a href="#">SN74ACT14PWR</a>	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU   SN	Level-1-260C-UNLIM	-40 to 85	AD14
<a href="#">SN74ACT14PWR1G4</a>	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AD14
<a href="#">SNJ54ACT14FK</a>	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9218301M2A SNJ54ACT 14FK
<a href="#">SNJ54ACT14J</a>	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9218301MC A SNJ54ACT14J
<a href="#">SNJ54ACT14W</a>	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9218301MD A SNJ54ACT14W

<sup>(1)</sup> **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 SN54ACT14, SN74ACT14 :**

- Catalog : [SN74ACT14](#)
- Automotive : [SN74ACT14-Q1](#), [SN74ACT14-Q1](#)
- Military : [SN54ACT14](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

- Military - QML certified for Military and Defense Applications



## TAPE AND REEL INFORMATION



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74ACT14BQAR	WQFN	BQA	14	3000	180.0	12.4	2.8	3.3	1.1	4.0	12.0	Q1
SN74ACT14DBR	SSOP	DB	14	2000	330.0	16.4	8.35	6.6	2.4	12.0	16.0	Q1
SN74ACT14DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74ACT14DR	SOIC	D	14	2500	330.0	12.4	3.75	3.75	1.15	8.0	12.0	Q1
SN74ACT14DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74ACT14DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74ACT14NSR	SOP	NS	14	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
SN74ACT14PWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74ACT14PWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74ACT14PWR1G4	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74ACT14PWR1G4	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1

## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74ACT14BQAR	WQFN	BQA	14	3000	210.0	185.0	35.0
SN74ACT14DBR	SSOP	DB	14	2000	356.0	356.0	35.0
SN74ACT14DR	SOIC	D	14	2500	356.0	356.0	35.0
SN74ACT14DR	SOIC	D	14	2500	340.5	336.1	32.0
SN74ACT14DR	SOIC	D	14	2500	353.0	353.0	32.0
SN74ACT14DR	SOIC	D	14	2500	353.0	353.0	32.0
SN74ACT14NSR	SOP	NS	14	2000	356.0	356.0	35.0
SN74ACT14PWR	TSSOP	PW	14	2000	353.0	353.0	32.0
SN74ACT14PWR	TSSOP	PW	14	2000	356.0	356.0	35.0
SN74ACT14PWR1G4	TSSOP	PW	14	2000	353.0	353.0	32.0
SN74ACT14PWR1G4	TSSOP	PW	14	2000	356.0	356.0	35.0

## TUBE



\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
5962-9218301M2A	FK	LCCC	20	55	506.98	12.06	2030	NA
5962-9218301MDA	W	CFP	14	25	506.98	26.16	6220	NA
SN74ACT14N	N	PDIP	14	25	506	13.97	11230	4.32
SN74ACT14N	N	PDIP	14	25	506	13.97	11230	4.32
SNJ54ACT14FK	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54ACT14W	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:**

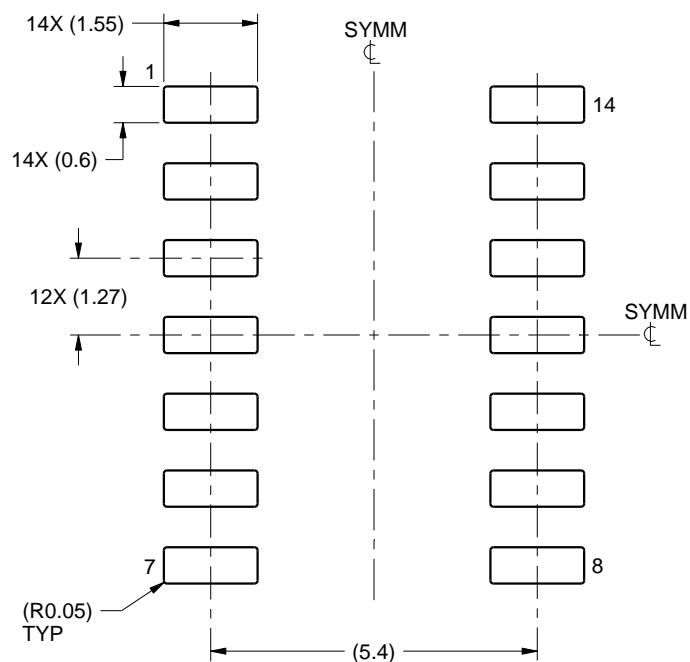
1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate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

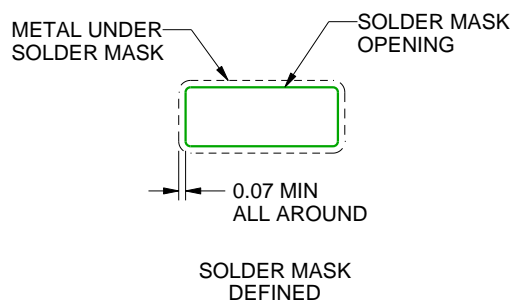
D0014A

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

### WQFN - 0.8 mm max height

The drawing illustrates the mechanical specifications of a 15-pin connector. It includes three main views: a top view, a side view, and a detail view of the pin index area.

**Top View:** Shows the overall footprint of the connector. The total width is 2.6 (2.4) and the total height is 3.1 (2.9). A shaded region in the top-left corner is labeled "PIN 1 INDEX AREA". The connector has 15 pins arranged in a 3x5 grid. The central pin (pin 15) is a different shape, labeled "PIN 1 ID (OPTIONAL)". The pins are numbered 1 through 15. The top view includes dimensions for the pin pitch (0.8, 0.7, 0.05, 0.00) and the overall dimensions (2.6, 2.4, 3.1, 2.9). It also shows a "SEATING PLANE" and a "SYMM" (Symmetry) feature.

**Side View:** Shows the profile of the connector. The total height is 0.8 (0.7). The pins are shown in a 3x5 grid. The side view includes dimensions for the pin pitch (0.8, 0.7, 0.05, 0.00) and the overall dimensions (2.6, 2.4, 3.1, 2.9). It also shows a "SEATING PLANE" and a "SYMM" (Symmetry) feature.

**Detail View:** A close-up of the pin index area. It shows the pins numbered 1 through 15. The pins are arranged in a 3x5 grid. The detail view includes dimensions for the pin pitch (0.8, 0.7, 0.05, 0.00) and the overall dimensions (2.6, 2.4, 3.1, 2.9). It also shows a "SEATING PLANE" and a "SYMM" (Symmetry) feature.

**Feature Callouts:**

- PIN 1 INDEX AREA:** Shaded region in the top-left corner of the top view.
- PIN 1 ID (OPTIONAL):** Label for the central pin (pin 15).
- SEATING PLANE:** Indicated by a dashed line and a triangle symbol.
- SYMM:** Symmetry feature, indicated by a dashed line and a triangle symbol.
- Feature Control Frames:**
  - Top view:  $\text{0.1 (M) C A B}$  and  $\text{0.05 (M) C}$
  - Side view:  $\text{0.08 C}$
  - Detail view:  $\text{0.1 (M) C A B}$  and  $\text{0.05 (M) C}$

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](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.

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

W (R-GDFP-F14)

CERAMIC DUAL FLATPACK



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



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.

# EXAMPLE BOARD LAYOUT

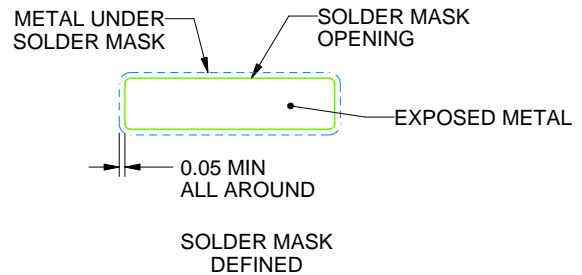
DB0014A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



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.

# 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

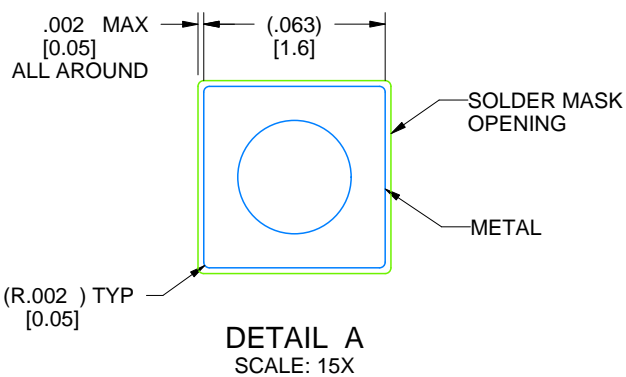
J0014A

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\*\*)

16 PINS SHOWN

## PLASTIC DUAL-IN-LINE PACKAGE



PINS **	14	16	18	20
DIM				
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	AA	BB	AC	AD



14/18 Pin Only  
20 Pin vendor option

4040049/E 12/2002

- 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.



# EXAMPLE BOARD LAYOUT

PW0014A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



SOLDER MASK DETAILS

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.

## IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on [ti.com](https://www.ti.com) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2025, Texas Instruments Incorporated