

## SNx4AC86 Quadruple 2-Input Exclusive-OR Gates

### 1 Features

- 2V to 6V  $V_{CC}$  operation
- Inputs accept voltages to 6V
- Maximum  $t_{pd}$  of 9ns at 5V

### 2 Description

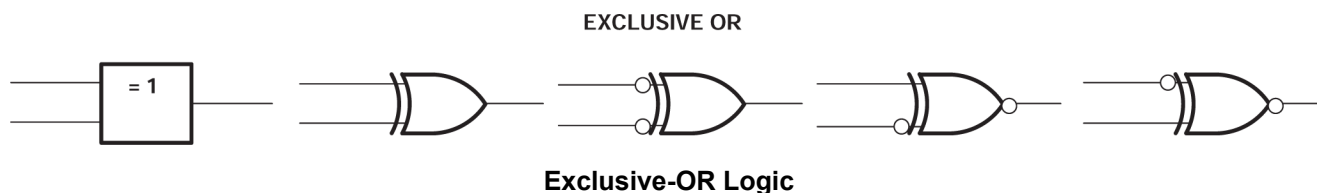
The 'AC86 devices are quadruple 2-input exclusive-OR gates. The devices perform the Boolean function  $Y = A \oplus B$  or  $Y = \bar{A}B + A\bar{B}$  in positive logic.

A common application is as a true/complement element. If one of the inputs is low, the other input is reproduced in true form at the output. If one of the inputs is high, the signal on the other input is reproduced inverted at the output.

#### Device Information

PART NUMBER	PACKAGE <sup>(1)</sup>	PACKAGE SIZE <sup>(2)</sup>	BODY SIZE <sup>(3)</sup>
SNx4AC86	DB (SSOP, 14)	6.2mm × 7.8mm	6.2mm × 5.3mm
	D (SOIC, 14)	8.65mm × 6mm	8.65mm × 3.9mm
	N (PDIP, 14)	19.3mm × 9.4mm	19.3mm × 6.35mm
	NS (SO, 14)	10.2mm × 7.8mm	10.3mm × 5.3mm
	PW (TSSOP, 14)	5mm × 6.4mm	5mm × 4.4mm
	BQA (WQFN)	3mm × 2.5mm	3mm × 2.5mm

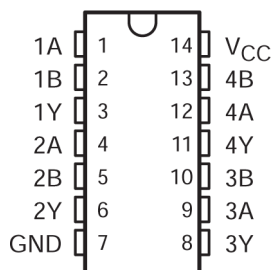
- (1) For more information, see [Section 10](#).
- (2) The package size (length × width) is a nominal value and includes pins, where applicable.
- (3) The body size (length × width) is a nominal value and does not include pins.



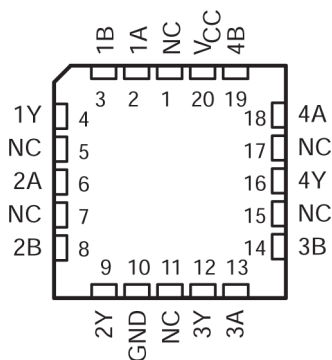
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## 3 Pin Configuration and Functions

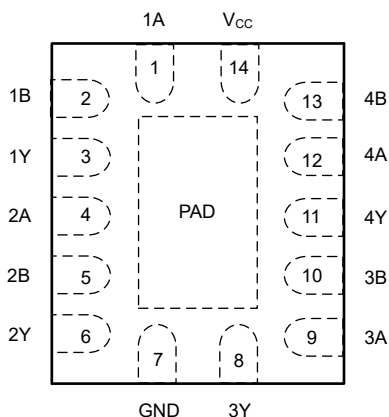


**Figure 3-1. SN54AC86 J or W Package; SN74AC86 D, DB, N, NS, or PW Package (Top View)**



NC – No internal connection

**Figure 3-2. SN54AC86 FK Package (Top View)**



**Figure 3-3. BQA Package (Top View)**

**Table 3-1. Pin Functions**

NAME	PIN		I/O	DESCRIPTION
	BQA, D, N, NS, PW, J, or W	FK		
1A	1	2	Input	Channel 1, Input A
1B	2	3	Input	Channel 1, Input B
1Y	3	4	Output	Channel 1, Output Y
2A	4	6	Input	Channel 2, Input A
2B	5	8	Input	Channel 2, Input B
2Y	6	9	Output	Channel 2, Output Y
GND	7	10	—	Ground
3Y	8	12	Output	Channel 3, Output Y
3A	9	13	Input	Channel 3, Input A
3B	10	14	Input	Channel 3, Input B
4Y	11	16	Output	Channel 4, Output Y
4A	12	18	Input	Channel 4, Input A
4B	13	19	Input	Channel 4, Input B
V <sub>CC</sub>	14	20	—	Positive Supply
NC	—	1, 5, 7, 11, 15, 17	—	Not internally connected

Table 3-1. Pin Functions (continued)

PIN			I/O	DESCRIPTION
NAME	BQA, D, N, NS, PW, J, or W	FK		
Thermal Pad <sup>(1)</sup>			—	The thermal pad can be connected to GND or left floating. Do not connect to any other signal or supply.

(1) BQA Package only

## 4 Specifications

### 4.1 Absolute Maximum Ratings

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

		MIN	MAX	UNIT
V <sub>CC</sub>	Supply voltage range	−0.5	7	V
V <sub>I</sub> <sup>(2)</sup>	Input voltage range	−0.5	V <sub>CC</sub> + 0.5	V
V <sub>O</sub> <sup>(2)</sup>	Output voltage range	−0.5	V <sub>CC</sub> + 0.5	V
I <sub>IK</sub>	Input clamp current	(V <sub>I</sub> < 0 or V <sub>I</sub> > V <sub>CC</sub> )		±20 mA
I <sub>OK</sub>	Output clamp current	(V <sub>O</sub> < 0 or V <sub>O</sub> > V <sub>CC</sub> )		±20 mA
I <sub>O</sub>	Continuous output current	(V <sub>O</sub> = 0 to V <sub>CC</sub> )		±50 mA
T <sub>stg</sub>	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 Recommended Operating Conditions

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

			SN54AC86		SN74AC86		UNIT
			MIN	MAX	MIN	MAX	
V <sub>CC</sub>	Supply voltage		2	6	2	6	V
V <sub>IH</sub>	High-level input voltage	V <sub>CC</sub> = 3V	2.1		2.1		V
		V <sub>CC</sub> = 4.5V	1.15		1.15		
		V <sub>CC</sub> = 5.5V	1.85		1.85		
V <sub>IL</sub>	Low-level input voltage	V <sub>CC</sub> = 3V		0.9		0.9	V
		V <sub>CC</sub> = 4.5V		1.35		1.35	
		V <sub>CC</sub> = 5.5V		1.65		1.65	
V <sub>I</sub>	Input voltage		0	V <sub>CC</sub>	0	V <sub>CC</sub>	V
V <sub>O</sub>	Output voltage		0	V <sub>CC</sub>	0	V <sub>CC</sub>	V
I <sub>OH</sub>	High-level output current	V <sub>CC</sub> = 3V		−12		−12	mA
		V <sub>CC</sub> = 4.5V		−24		−24	
		V <sub>CC</sub> = 5.5V		−24		−24	
I <sub>OL</sub>	Low-level output current	V <sub>CC</sub> = 3V		12		12	mA
		V <sub>CC</sub> = 4.5V		24		24	
		V <sub>CC</sub> = 5.5V		24		24	
Δt/Δv	Input transition rise or fall rate			8		8	ns/V
T <sub>A</sub>	Operating free-air temperature		−55	125	−40	85	°C

- (1) All unused inputs of the device must be held at V<sub>CC</sub> or GND to ensure proper device operation. Refer to [Implications of Slow or Floating CMOS Inputs](#) application note.

### 4.3 Thermal Information

THERMAL METRIC <sup>(1)</sup>		SNx4AC86						
		BQA (WQFN)	D (SOIC)	DB (SSOP)	N (PDIP)	NS (SOP)	PW (TSSOP)	UNIT
		14 PINS						
R <sub>θJA</sub>	Junction-to-ambient thermal resistance	91.3	119.9	96	80	76	145.7	°C/W

THERMAL METRIC <sup>(1)</sup>		SNx4AC86						
		BQA (WQFN)	D (SOIC)	DB (SSOP)	N (PDIP)	NS (SOP)	PW (TSSOP)	UNIT
		14 PINS						
R <sub>θJC(top)</sub>	Junction-to-case (top) thermal resistance	99.4	—	—	—	—	—	°C/W
R <sub>θJB</sub>	Junction-to-board thermal resistance	61.0	—	—	—	—	—	°C/W
ψ <sub>JT</sub>	Junction-to-top characterization parameter	14.5	—	—	—	—	—	°C/W
ψ <sub>JB</sub>	Junction-to-board characterization parameter	60.8	—	—	—	—	—	°C/W
R <sub>θJC(bot)</sub>	Junction-to-case (bottom) thermal resistance	37.0	—	—	—	—	—	°C/W

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

## 4.4 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			SN54AC86		SN74AC86		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V <sub>OH</sub>	I <sub>OH</sub> = -50μA		3V	2.9			2.9		2.9		V
			4.5V	4.4			4.4		4.4		
			5.5V	5.4			5.4		5.4		
	I <sub>OH</sub> = -12mA		3V	2.56			2.4		2.46		
	I <sub>OH</sub> = -24mA		4.5V	3.86			3.7		3.76		
			5.5V	4.86			4.7		4.76		
	I <sub>OH</sub> = -50mA <sup>(1)</sup>		5.5V				3.85				
	I <sub>OH</sub> = -75mA <sup>(1)</sup>		5.5V						3.85		
V <sub>OL</sub>	I <sub>OL</sub> = 50μA		3V	0.002    0.1			0.1		0.1		V
			4.5V	0.001    0.1			0.1		0.1		
			5.5V	0.001    0.1			0.1		0.1		
	I <sub>OL</sub> = 12mA		3V	0.36			0.5		0.44		
	I <sub>OL</sub> = 24mA		4.5V	0.36			0.5		0.44		
			5.5V	0.36			0.5		0.44		
	I <sub>OL</sub> = 50mA <sup>(1)</sup>		5.5V				1.65				
	I <sub>OL</sub> = 75mA <sup>(1)</sup>		5.5V						1.65		
	I <sub>I</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND		5.5V	±0.1			±1		±1	
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND,    I <sub>O</sub> = 0		5.5V	2			40		20		μA
C <sub>i</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND		5V	2.6							pF

(1) Not more than one output should be tested at a time, and the duration of the test should not exceed 10ms.

## 4.5 Switching Characteristics, $V_{CC} = 3.3\text{V} \pm 0.3\text{V}$

over recommended operating free-air temperature range,  $V_{CC} = 3.3\text{V} \pm 0.3\text{V}$  (unless otherwise noted) (see [Load Circuit and Voltage Waveforms](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			SN54AC86		SN74AC86		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
$t_{PLH}$	A or B	Y	2	6.5	11.5	1	14	1.5	12.5	ns
$t_{PHL}$			2	6	11.5	1	14	1.5	12.5	

## 4.6 Switching Characteristics, $V_{CC} = 5V \pm 0.5V$

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

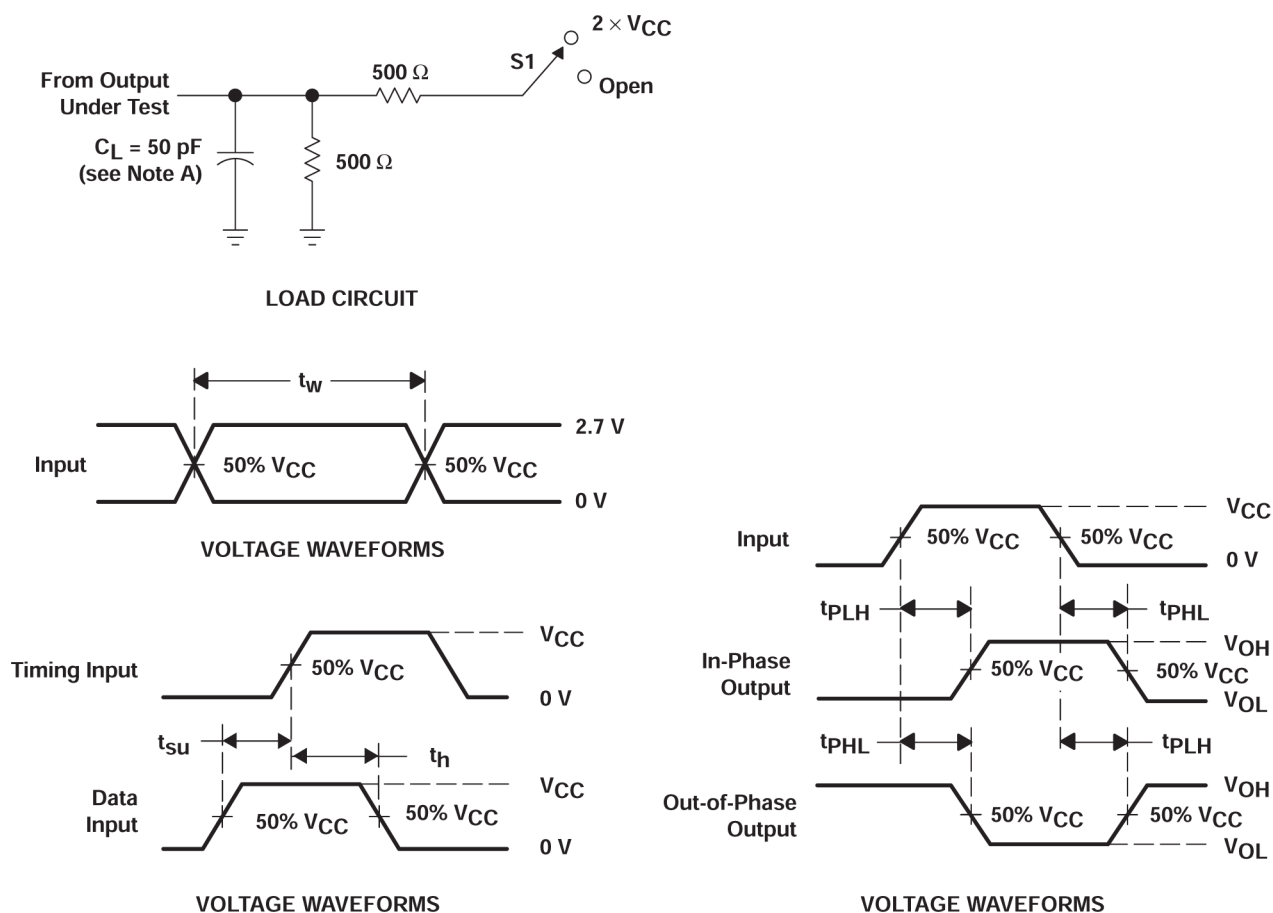
PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ C$			SN54AC86		SN74AC86		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
$t_{PLH}$	A or B	Y	1.5	4.5	8.5	1	10	1	9	ns
$t_{PHL}$			1.5	4.5	8.5	1	10	1	9.5	

## 4.7 Operating Characteristics

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

PARAMETER		TEST CONDITIONS		TYP	UNIT
$C_{pd}$	Power dissipation capacitance	$C_L = 50pF$ ,	$f = 1MHz$	25	pF

## 5 Parameter Measurement Information



- 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 5-1. Load Circuit and Voltage Waveforms**

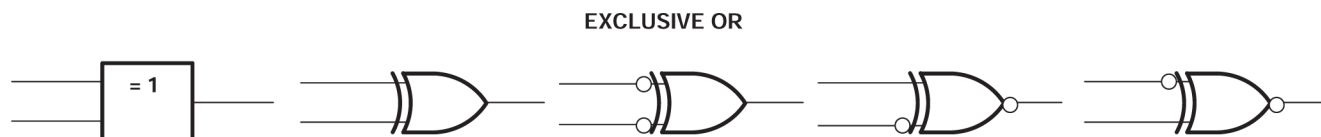
TEST	S1
$t_{PLH}/t_{PHL}$	Open



## 6 Detailed Description

### 6.1 Functional Block Diagram

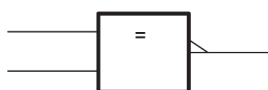
An exclusive-OR gate has many applications, some of which can be represented better by alternative logic symbols.



**Figure 6-1. Exclusive-OR Logic**

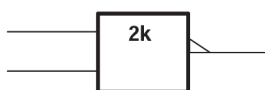
These five equivalent exclusive-OR symbols are valid for an 'AC86 gate in positive logic; negation may be shown at any two ports.

#### LOGIC-IDENTITY ELEMENT



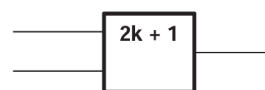
The output is active (low) if all inputs stand at the same logic level (i.e.,  $A = B$ ).

#### EVEN-PARITY ELEMENT



The output is active (low) if an even number of inputs (i.e., 0 or 2) are active.

#### ODD-PARITY ELEMENT



The output is active (high) if an odd number of inputs (i.e., only 1 of the 2) are active.

### 6.2 Device Functional Modes

**Table 6-1. Function Table  
(Each Gate)**

INPUTS		OUTPUT Y
A	B	
L	L	L
L	H	H
H	L	H
H	H	L

## 7 Application and Implementation

### 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.

### 7.1 Power Supply Recommendations

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 bypass capacitor to prevent power disturbance. A  $0.1\mu\text{F}$  capacitor is recommended for this device. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. The  $0.1\mu\text{F}$  and  $1\mu\text{F}$  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 [Figure 7-1](#).

### 7.2 Layout

#### 7.2.1 Layout Guidelines

When using multiple-input and multiple-channel logic devices inputs must not ever 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. 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

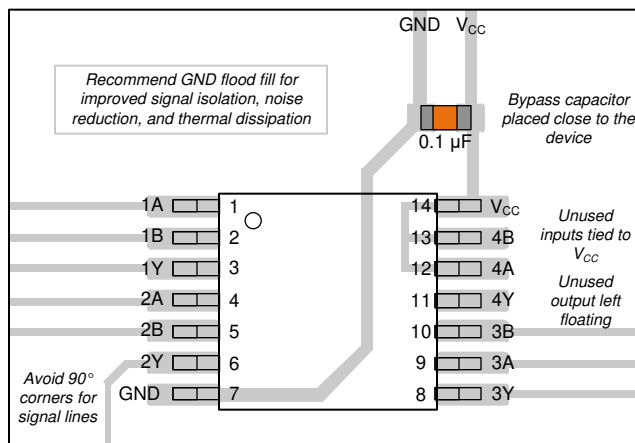


Figure 7-1. Example Layout for the SN74AC86

## 8 Device and Documentation Support

### 8.1 Documentation Support

#### 8.1.1 Related Links

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.

PARTS	PRODUCT FOLDER	SAMPLE & BUY	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
SN54AC86	<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>
SN74AC86	<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 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [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.

### 8.3 Support Resources

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

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

### 8.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.

All trademarks are the property of their respective owners.

### 8.5 Electrostatic Discharge Caution



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

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

### 8.6 Glossary

[TI Glossary](#)

This glossary lists and explains terms, acronyms, and definitions.

## 9 Revision History

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

Changes from Revision D (July 2024) to Revision E (April 2025)	Page
• Added BQA Package.....	3
• Added BQA thermal information.....	5

Changes from Revision C (October 2003) to Revision D (July 2024)	Page
• Added <i>Device Information</i> table, <i>Pin Functions</i> table, <i>Thermal Information</i> table, <i>Device Functional Modes</i> , <i>Application and Implementation</i> section, <i>Device and Documentation Support</i> section, and <i>Mechanical, Packaging, and Orderable Information</i> section .....	1
• Updated RθJA values: D = 86 to 119.9, PW = 113 to 145.7, 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)
<a href="#">5962-89550012A</a>	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 89550012A SNJ54AC 86FK
<a href="#">5962-8955001CA</a>	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8955001CA SNJ54AC86J
<a href="#">5962-8955001DA</a>	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8955001DA SNJ54AC86W
<a href="#">SN74AC86BQAR</a>	Active	Production	WQFN (BQA)   14	3000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC86
SN74AC86BQAR.A	Active	Production	WQFN (BQA)   14	3000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC86
<a href="#">SN74AC86D</a>	Obsolete	Production	SOIC (D)   14	-	-	Call TI	Call TI	-40 to 85	AC86
<a href="#">SN74AC86DBR</a>	Active	Production	SSOP (DB)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC86
SN74AC86DBR.A	Active	Production	SSOP (DB)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC86
<a href="#">SN74AC86DR</a>	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU   NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC86
SN74AC86DR.A	Active	Production	SOIC (D)   14	2500   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC86
<a href="#">SN74AC86N</a>	Active	Production	PDIP (N)   14	25   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74AC86N
SN74AC86N.A	Active	Production	PDIP (N)   14	25   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74AC86N
<a href="#">SN74AC86NSR</a>	Active	Production	SOP (NS)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC86
SN74AC86NSR.A	Active	Production	SOP (NS)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC86
<a href="#">SN74AC86PW</a>	Obsolete	Production	TSSOP (PW)   14	-	-	Call TI	Call TI	-40 to 85	AC86
<a href="#">SN74AC86PWR</a>	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU   SN	Level-1-260C-UNLIM	-40 to 85	AC86
SN74AC86PWR.A	Active	Production	TSSOP (PW)   14	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC86
<a href="#">SNJ54AC86FK</a>	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 89550012A SNJ54AC 86FK
SNJ54AC86FK.A	Active	Production	LCCC (FK)   20	55   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 89550012A SNJ54AC 86FK
<a href="#">SNJ54AC86J</a>	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8955001CA SNJ54AC86J

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)
SNJ54AC86J.A	Active	Production	CDIP (J)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8955001CA SNJ54AC86J
<a href="#">SNJ54AC86W</a>	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8955001DA SNJ54AC86W
SNJ54AC86W.A	Active	Production	CFP (W)   14	25   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8955001DA SNJ54AC86W

(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 SN54AC86, SN74AC86 :**

- Catalog : [SN74AC86](#)
- Automotive : [SN74AC86-Q1](#), [SN74AC86-Q1](#)
- Military : [SN54AC86](#)

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
SN74AC86BQAR	WQFN	BQA	14	3000	180.0	12.4	2.8	3.3	1.1	4.0	12.0	Q1
SN74AC86DBR	SSOP	DB	14	2000	330.0	16.4	8.35	6.6	2.4	12.0	16.0	Q1
SN74AC86DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74AC86NSR	SOP	NS	14	2000	330.0	16.4	8.1	10.4	2.5	12.0	16.0	Q1
SN74AC86PWR	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)
SN74AC86BQAR	WQFN	BQA	14	3000	210.0	185.0	35.0
SN74AC86DBR	SSOP	DB	14	2000	353.0	353.0	32.0
SN74AC86DR	SOIC	D	14	2500	353.0	353.0	32.0
SN74AC86NSR	SOP	NS	14	2000	353.0	353.0	32.0
SN74AC86PWR	TSSOP	PW	14	2000	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)
5962-89550012A	FK	LCCC	20	55	506.98	12.06	2030	NA
5962-8955001DA	W	CFP	14	25	506.98	26.16	6220	NA
SN74AC86N	N	PDIP	14	25	506	13.97	11230	4.32
SN74AC86N	N	PDIP	14	25	506	13.97	11230	4.32
SN74AC86N.A	N	PDIP	14	25	506	13.97	11230	4.32
SN74AC86N.A	N	PDIP	14	25	506	13.97	11230	4.32
SNJ54AC86FK	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54AC86FK.A	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54AC86W	W	CFP	14	25	506.98	26.16	6220	NA
SNJ54AC86W.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.

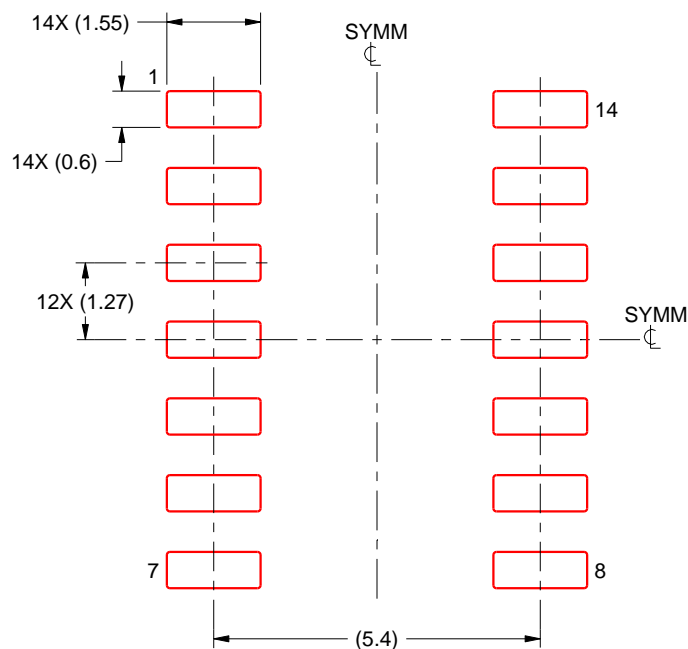
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

## 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

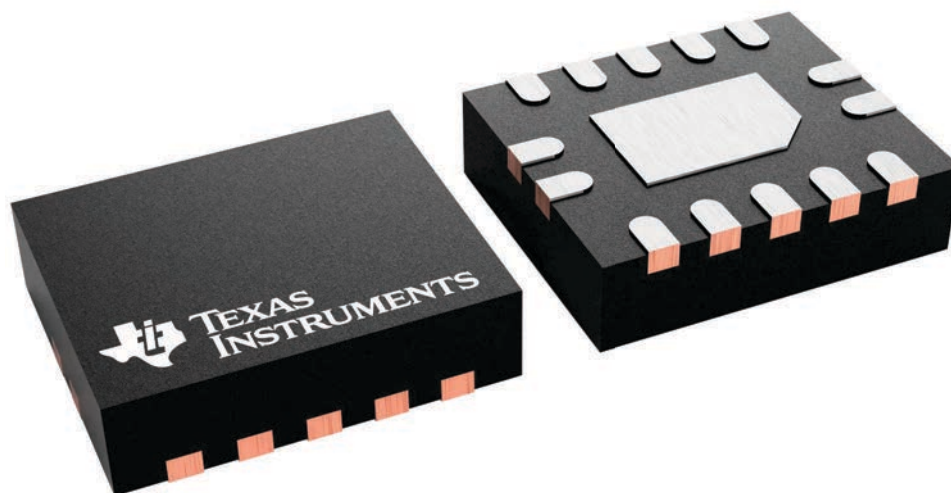
**BQA 14**

**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.







LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 20X



4224636/A 11/2018

NOTES: (continued)

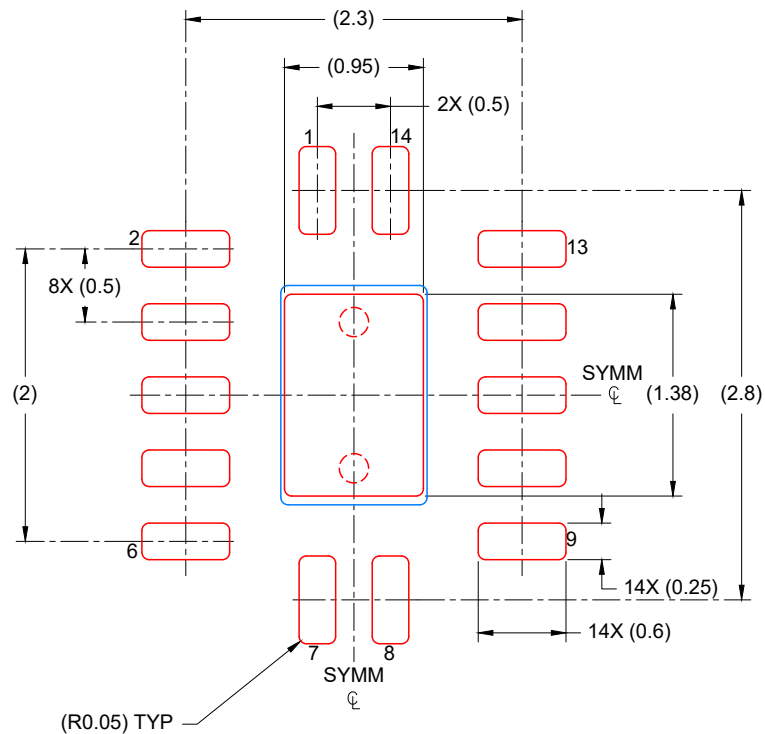
4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/sluea271](http://www.ti.com/lit/sluea271)).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, 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:
- 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





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 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.



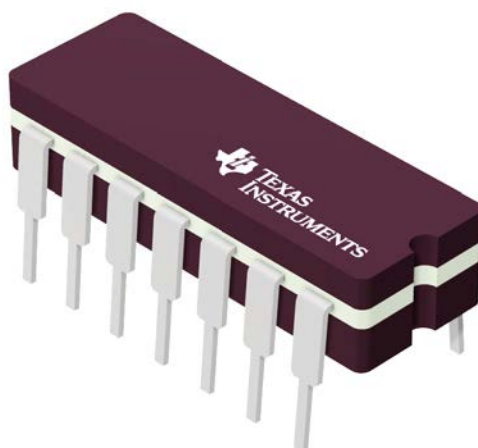
4229370VA\

**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

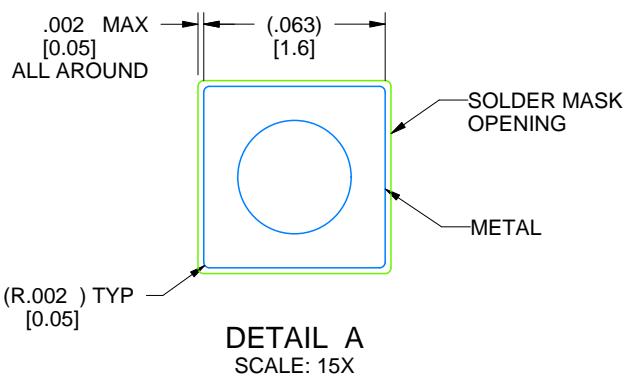
J0014A

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



4040049/E 12/2002

NOTES:

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

**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



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.

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