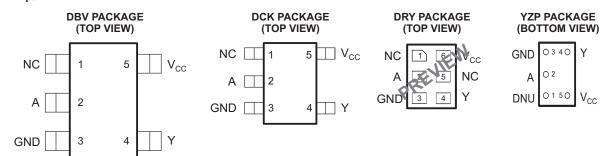


FEATURES

- Available in the Texas Instruments NanoFree[™] Package
- Optimized for 1.8-V Operation and Is 3.6-V I/O **Tolerant to Support Mixed-Mode Signal** Operation
- Ioff Supports Partial-Power-Down Mode Operation
- Sub-1-V Operable
- Max t_{nd} of 2.5 ns at 1.8 V

- Low Power Consumption, 10-µA Max I_{CC}
- ±8-mA Output Drive at 1.8 V
- Latch-Up Performance Exceeds 100 mA Per JESD 78. Class II
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)



See mechanical drawings for dimensions. DNU - Do not use NC - No internal connection

DESCRIPTION/ORDERING INFORMATION

This single Schmitt-trigger inverter is operational at 0.8-V to 2.7-V V_{CC}, but is designed specifically for 1.65-V to 1.95-V V_{CC} operation.

The SN74AUC1G14 contains one inverter and performs the Boolean function $Y = \overline{A}$. The device functions as an independent inverter, but because of Schmitt action, it may have different input threshold levels for positive-going (V_{T_+}) and negative-going (V_{T_-}) signals.

NanoFree™ package technology is a major breakthrough in IC packaging concepts, using the die as the package.

This device is fully specified for partial-power-down applications using I_{off}. The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

For more information about AUC Little Logic devices, please refer to the TI application report, Applications of Texas Instruments AUC Sub-1-V Little Logic Devices, literature number SCEA027.



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SN74AUC1G14 SINGLE SCHMITT-TRIGGER INVERTER

ORDERING INFORMATION

T _A	PACKAGE ⁽¹⁾⁽²⁾		ORDERABLE PART NUMBER	TOP-SIDE MARKING ⁽³⁾
	NanoFree™ – WCSP (DSBGA) 0.23-mm Large Bump – YZP (Pb-free)	Reel of 3000	SN74AUC1G14YZPR	UF_
–40°C to 85°C	SON – DRY	Reel of 5000	SN74AUC1G14DRYR	PREVIEW
	SOT (SOT-23) – DBV	Reel of 3000	SN74AUC1G14DBVR	U14_
	SOT (SC-70) – DCK	Reel of 3000	SN74AUC1G14DCKR	UF_

(1) Package drawings, thermal data, and symbolization are available at www.ti.com/packaging.

(2) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at www.ti.com.

DBV/DCK/DRY: The actual top-side marking has one additional character that designates the assembly/test site. (3) YZP: The actual top-side marking has three preceding characters to denote year, month, and sequence code, and one following character to designate the assembly/test site. Pin 1 identifier indicates solder-bump composition (1 = SnPb, • = Pb-free).

FUNCTION TABLE

INPUT A	OUTPUT Y
Н	L
L	н

LOGIC DIAGRAM (POSITIVE LOGIC)



Absolute Maximum Ratings⁽¹⁾

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

			MIN	MAX	UNIT
V _{CC}	Supply voltage range		-0.5	3.6	V
VI	Input voltage range ⁽²⁾		-0.5	3.6	V
Vo	Voltage range applied to any output in the	high-impedance or power-off state ⁽²⁾	-0.5	3.6	V
Vo	Output voltage range ⁽²⁾		-0.5	V _{CC} + 0.5	V
I _{IK}	Input clamp current	V ₁ < 0		-50	mA
I _{OK}	Output clamp current	V _O < 0		-50	mA
lo	Continuous output current			±20	mA
	Continuous current through V_{CC} or GND			±100	mA
		DBV package		206	
0	Package thermal impedance ⁽³⁾	DCK package		252	°C/W
θ_{JA}	Package inernial impedance.	DRY package		234	-C/W
		YZP package		132	
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.

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

(3) The package thermal impedance is calculated in accordance with JESD 51-7.

Recommended Operating Conditions⁽¹⁾

			MIN	MAX	UNIT
V _{CC}	Supply voltage		0.8	2.7	V
VI	Input voltage		0	3.6	V
Vo	Output voltage		0	V _{CC}	V
		$V_{CC} = 0.8 V$		-0.7	
		V _{CC} = 1.1 V		-3	
I _{OH}	High-level output current	V _{CC} = 1.4 V		-5	mA
		V _{CC} = 1.65 V		-8	
		V _{CC} = 2.3 V		-9	
		V _{CC} = 0.8 V		0.7	
		V _{CC} = 1.1 V		3	
I _{OL}	Low-level output current	V _{CC} = 1.4 V		5	mA
		V _{CC} = 1.65 V		8	
		V _{CC} = 2.3 V		9	
T _A	Operating free-air temperature		-40	85	°C

(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, Implications of Slow or Floating CMOS Inputs, literature number SCBA004.

SN74AUC1G14 SINGLE SCHMITT-TRIGGER INVERTER

SCES3750-SEPTEMBER 2001-REVISED AUGUST 2007

TEXAS INSTRUMENTS www.ti.com

Electrical Characteristics

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

PARAMETER	TEST CONDITIONS	V _{cc}	MIN	TYP ⁽¹⁾	MAX	UNIT	
		0.8 V		0.5			
V _{T+}		1.1 V	0.51		0.86		
Positive-going input		1.4 V	0.65		1	V	
threshold voltage		1.65 V	0.79		1.16		
		2.3 V	1.11		1.56		
		0.8 V		0.3			
V _{T-}		1.1 V	0.22		0.53		
Negative-going input		1.4 V	0.3		0.58	V	
threshold voltage		1.65 V	0.39		0.62		
		2.3 V	0.58		0.87		
		0.8 V		0.21			
ΔV _T		1.1 V	0.25		0.38		
Hysteresis		1.4 V	0.31		0.5	V	
$(V_{T+}-V_{T-})$		1.65 V	0.37		0.62		
		2.3 V	0.48		0.77		
	I _{OH} = -100 μA	0.8 V to 2.7 V	V _{CC} – 0.1				
	I _{OH} = -0.7 mA	0.8 V		0.55			
M	$I_{OH} = -3 \text{ mA}$	1.1 V	0.8			V	
V _{OH}	$I_{OH} = -5 \text{ mA}$	1.4 V	1				
	$I_{OH} = -8 \text{ mA}$	1.65 V	1.2				
	$I_{OH} = -9 \text{ mA}$	2.3 V	1.8				
	I _{OL} = 100 μA	0.8 V to 2.7 V			0.2		
	I _{OL} = 0.7 mA	0.8 V		0.25			
M	I _{OL} = 3 mA	1.1 V			0.3	V	
V _{OL}	I _{OL} = 5 mA	1.4 V			0.4	V	
	I _{OL} = 8 mA	1.65 V			0.45		
	I _{OL} = 9 mA	2.3 V			0.6		
I _I A input	$V_{I} = V_{CC} \text{ or } GND$	0 to 2.7 V			±5	μA	
l _{off}	$V_{\rm I}$ or $V_{\rm O}$ = 2.7 V	0			±10	μA	
I _{CC}	$V_{I} = V_{CC} \text{ or } GND, \qquad I_{O} = 0$	0.8 V to 2.7 V			10	μA	
C _i	$V_1 = V_{CC}$ or GND	2.5 V		3.5		pF	

(1) All typical values are at $T_A = 25^{\circ}C$.

Switching Characteristics

over recommended operating free-air temperature range, $C_L = 15 \text{ pF}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)		V _{CC} = 0.8 V	$V_{CC} = 0.8 V \qquad \begin{array}{c} V_{CC} = 1.2 V \\ \pm 0.1 V \end{array}$		V_{CC} = 1.5 V ± 0.1 V		V _{CC} = 1.8 V ± 0.15 V			$\begin{array}{c} V_{CC} \texttt{= 2.5 V} \\ \pm \texttt{0.2 V} \end{array}$		UNIT
			TYP	MIN	MAX	MIN	MAX	MIN	TYP	MAX	MIN	MAX	
t _{pd}	А	Y	5.8	0.7	4	0.6	2.3	0.5	1.2	1.9	0.5	1.6	ns



Switching Characteristics

over recommended operating free-air temperature range, $C_L = 30 \text{ pF}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)		_c = 1.8 0.15 V		V _{CC} = ± 0.	UNIT	
	(INFOT)	(001201)	MIN	TYP	MAX	MIN	MAX	
t _{pd}	А	Y	0.7	1.6	2.5	0.5	2.5	ns

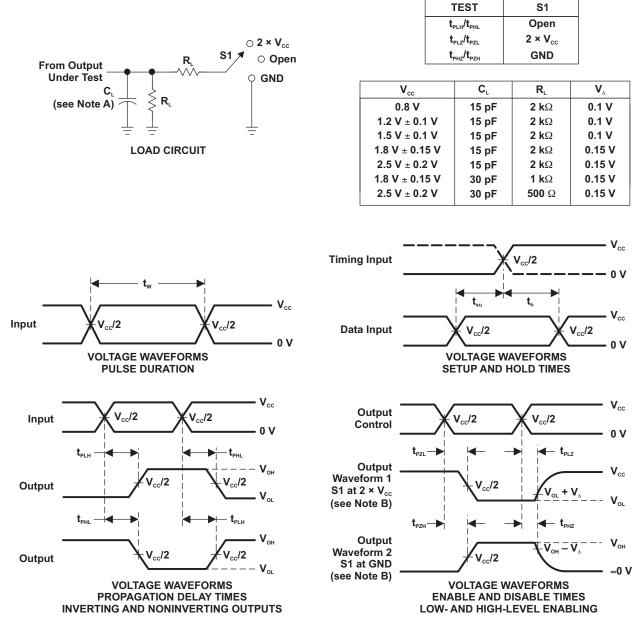
Operating Characteristics

 $T_A = 25^{\circ}C$

	PARAMETER	TEST CONDITIONS	V _{CC} = 0.8 V TYP	V _{CC} = 1.2 V TYP	V _{CC} = 1.5 V TYP	V _{CC} = 1.8 V TYP	V _{CC} = 2.5 V TYP	UNIT
C _{pd}	Power dissipation capacitance	f = 10 MHz	14	15	15	16	19	pF

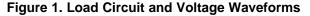


PARAMETER MEASUREMENT INFORMATION



NOTES: 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 10 MHz, Z_o = 50 Ω,
- slew rate \geq 1 V/ns.
- D. The outputs are measured one at a time, with one transition per measurement.
- E. $t_{_{PLZ}}$ and $\dot{t}_{_{PHZ}}$ are the same as $t_{_{dis}}$.
- F. $t_{\mbox{\tiny PZL}}$ and $t_{\mbox{\tiny PZH}}$ are the same as $t_{\mbox{\tiny en}}.$
- G. t_{PIH} and t_{PHI} are the same as t_{od} .



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PACKAGING INFORMATION

RUMENTS

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SN74AUC1G14DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUC1G14DBVRE4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUC1G14DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUC1G14DCKR	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUC1G14DCKRE4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUC1G14DCKRG4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUC1G14YZPR	ACTIVE	DSBGA	YZP	5	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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OTHER QUALIFIED VERSIONS OF SN74AUC1G14 :

Enhanced Product: SN74AUC1G14-EP

NOTE: Qualified Version Definitions:

• Enhanced Product - Supports Defense, Aerospace and Medical Applications

PACKAGE MATERIALS INFORMATION

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TAPE AND REEL INFORMATION

REEL DIMENSIONS

Texas Instruments





TAPE AND REEL INFORMATION

TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

*All dimensions are nominal												
Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74AUC1G14DBVR	SOT-23	DBV	5	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
SN74AUC1G14DCKR	SC70	DCK	5	3000	178.0	9.0	2.4	2.5	1.2	4.0	8.0	Q3
SN74AUC1G14YZPR	DSBGA	YZP	5	3000	178.0	9.2	1.02	1.52	0.63	4.0	8.0	Q1

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PACKAGE MATERIALS INFORMATION

6-Sep-2012



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AUC1G14DBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
SN74AUC1G14DCKR	SC70	DCK	5	3000	180.0	180.0	18.0
SN74AUC1G14YZPR	DSBGA	YZP	5	3000	220.0	220.0	35.0

DBV (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE



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. Mold flash and protrusion shall not exceed 0.15 per side.

D. Falls within JEDEC MO-178 Variation AA.



DBV (R-PDSO-G5)

PLASTIC SMALL OUTLINE



NOTES:

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

- C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
- D. Publication IPC-7351 is recommended for alternate designs.
- E. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.



DCK (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE



- 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. Mold flash and protrusion shall not exceed 0.15 per side.
 - D. Falls within JEDEC MO-203 variation AA.



LAND PATTERN DATA



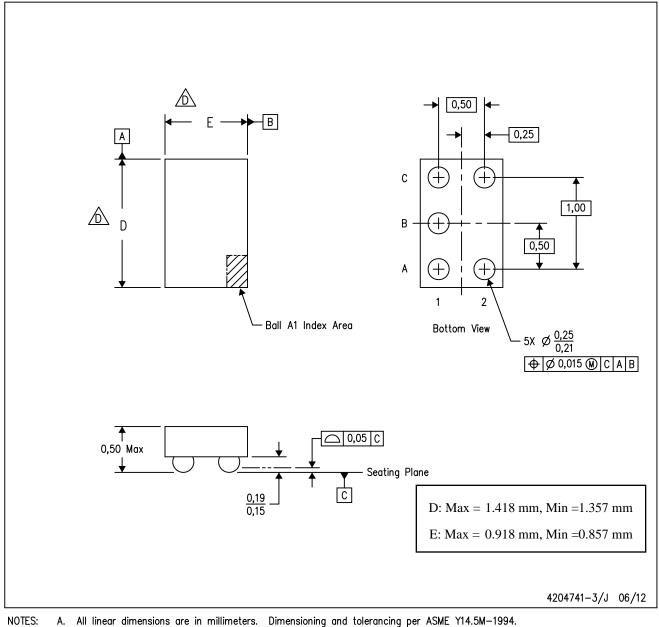
NOTES:

- A. All linear dimensions are in millimeters.B. This drawing is subject to change without notice.
- C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
- D. Publication IPC-7351 is recommended for alternate designs.
- E. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.



YZP (R-XBGA-N5)

DIE-SIZE BALL GRID ARRAY



- Α. B. This drawing is subject to change without notice.
- C. NanoFree™ package configuration.
- The package size (Dimension D and E) of a particular device is specified in the device Product Data Sheet version of this drawing, in case it cannot be found in the product data sheet please contact a local TI representative. E. This package is a Pb-free solder ball design. Refer to the 5 YEP package (drawing 4204725) for tin-lead (SnPb).

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