

www.ti.com

SN74AHCT1G14

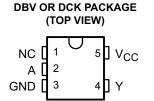
SCLS322P - MARCH 1996 - REVISED JUNE 2013

SINGLE SCHMITT-TRIGGER INVERTER GATE

Check for Samples: SN74AHCT1G14

FEATURES

- Operating Range 4.5-V to 5.5-V
- Max t_{pd} of 8 ns at 5-V
- Low Power Consumption, 10-µA Max I_{CC}
- ±8-mA Output Drive at 5-V
- Inputs Are TTL-Voltage Compatible
- Latch-Up Performance Exceeds 250 mA Per JESD 17



NC – No internal connection See mechanical drawings for dimensions.

DESCRIPTION

description/ordering information The SN74AHCT1G14 contains a single inverter gate. The device performs the Boolean function $Y = \overline{A}$.

The device functions as an independent inverter gate, but because of the Schmitt action, gates may have different input threshold levels for positive- (V_{T+}) and negative-going (V_{T-}) signals.

FUNCTION TABLE							
INPUTS OUTPUT							
Α	Y						
Н	L						
L	Н						

LOGIC DIAGRAM (POSITIVE LOGIC)





Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

SN74AHCT1G14

SCLS322P-MARCH 1996-REVISED JUNE 2013

NSTRUMENTS

EXAS

www.ti.com

ABSOLUTE MAXIMUM RATINGS

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

			VALUE	UNIT
Supply voltage range, V _{CC}		-0.5 to 7	V	
Input voltage range, VI ⁽²⁾			-0.5 to 7	V
Output voltage range, VO ⁽²⁾			–0.5 to V _{CC} + 0.5	V
Input clamp current, I_{IK} (V _I < 0)		-20	mA	
Output clamp current, I_{OK} (V_O < 0 or V_O >		±20	mA	
Continuous output current, $I_O (V_O = 0 \text{ to } V$	cc)		±25	mA
Continuous current through V_{CC} or GND			±50	mA
Declare thermal impedance $0^{(3)}$	DBV package		206	0CAM
Package thermal impedance, $\theta_{JA}^{(3)}$	DCK package	DCK package		°C/W
Storage temperature range, T _{stg}		-65 to 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.

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

RECOMMENDED OPERATING CONDITIONS⁽¹⁾

		MIN	MAX	UNIT
V _{CC}	Supply voltage	4.5	5.5	V
VI	Input voltage	0	5.5	V
Vo	Output voltage	0	V _{CC}	V
I _{OH}	High-level output current		-8	mA
I _{OL}	Low-level output current		8	mA
T _A	Operating free-air temperature	-40	125	°C

 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.



ELECTRICAL CHARACTERISTICS

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

								Recomm		
PARAMETER	TEST CONDITIONS	V _{cc}	T _A = 25°C			T _A = -40°C to 85°C		T _A = -40 125	UNIT	
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V _{T+}		4.5 V	0.9		2	0.9		0.9	2.0	
Positive-going input threshold voltage		5.5 V	1.1		2	1.1		1.1	2.0	V
V _{T-}		4.5 V	0.5		1.6	0.5		0.5	1.6	
Negative-going input threshold votlage		5.5 V	0.6		1.5	0.6		0.6	1.5	V
ΔV_T		4.5 V	0.4		1.4	0.4		0.4	1.4	
Hysteresis (V _{T+} – V _{T-})		5.5 V	0.5		1.6	0.4		0.5	1.6	V
V	I _{OH} = -50 mA	4.5 V	4.4	4.5		4.4		4.4		V
V _{OH}	$I_{OH} = -8 \text{ mA}$	4.3 V	3.94			3.88		3.7		v
M	I _{OL} = 50 mA	4.5 V			0.1		0.1		0.1	V
V _{OL}	I _{OL} = 8 mA	4.3 V			0.36		0.44		0.55	V
lı	$V_1 = 5.5 V \text{ or GND}$	0 V to 5.5 V			±0.1		±1		±1	μA
I _{CC}		5.5 V			1		10		10	μA
Ci	$V_I = V_{CC}$ or GND	5 V		2	10		10		10	pF

SWITCHING CHARACTERISTICS

over recommended operating free-air temperature range, $V_{CC} = 5 V \pm 0.5 V$ (unless otherwise noted) (see Figure 1)

						т 4	0°C to	Recom	nended											
PARAMETER	FROM (INPUT)	TO (OUTPUT)	OUTPUT CAPACITANCE	T _A = 2	T _A = 25°C		0°C to °C	T _A = -4 125	l0°C to 5°C	UNIT										
				TYP	MAX	MIN	MAX	MIN	MAX											
t _{PLH}	٥	~		4	7	1	8	1	9	20										
t _{PHL}	A	Ť	T	T		T	• CL = 15 p	CL = 15 pr	CL = 15 pr	0L = 15 pr	C _L = 15 pF	$C_{L} = 13 \text{ pr}$	$C_L = 15 \text{ pr}$	4	7	1	8	1	9	ns
t _{PLH}	A	~	$C_{1} = 50 \text{ pF}$	5.5	8	1	9	1	10	20										
t _{PHL}	A	T	$O_L = 50 \text{ pr}$	5.5	8	1	9	1	10	ns										

OPERATING CHARACTERISTICS

 $V_{CC} = 5 \text{ V}, \text{ } \text{T}_{A} = 25^{\circ}\text{C}$

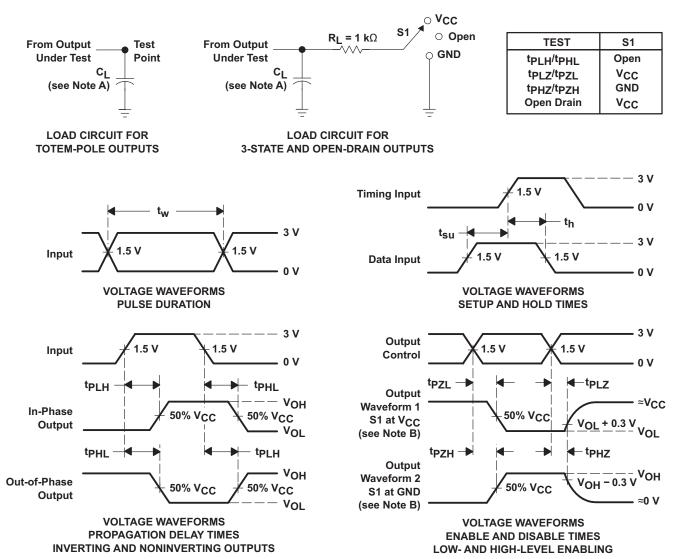
	PARAMETER	TEST C	ONDITIONS	TYP	UNIT
C _{pd}	Power dissipation capacitance	No load,	f = 1 MHz	12	pF

SN74AHCT1G14 SCLS322P – MARCH 1996 – REVISED JUNE 2013

www.ti.com

ISTRUMENTS

FXAS



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 ≤ 1 MHz, Z_0 = 50 Ω , t_r ≤ 3 ns, t_f ≤ 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 1. Load Circuit and Voltage Waveforms

4



SCLS322P - MARCH 1996 - REVISED JUNE 2013

REVISION HISTORY

CI	hanges from Revision O (January 2003) to Revision P Pa	ge
•	Changed document format from Quicksilver to DocZone.	. 1
•	Extended operating temperature range to 125°C	. 2



29-May-2013

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
74AHCT1G14DBVRE4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(B142 ~ B143 ~ B14G ~ B14J ~ B14L ~ B14S)	Samples
74AHCT1G14DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(B142 ~ B143 ~ B14G ~ B14J ~ B14L ~ B14S)	Samples
74AHCT1G14DBVTE4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(B143 ~ B14G ~ B14L ~ B14S)	Samples
74AHCT1G14DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(B143 ~ B14G ~ B14L ~ B14S)	Samples
74AHCT1G14DCKRE4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(BF3 ~ BFG ~ BFJ ~ BFL ~ BFS)	Samples
74AHCT1G14DCKTE4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(BF3 ~ BFG ~ BFL ~ BFS)	Samples
74AHCT1G14DCKTG4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(BF3 ~ BFG ~ BFL ~ BFS)	Samples
SN74AHCT1G14DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(B142 ~ B143 ~ B14G ~ B14J ~ B14L ~ B14S)	Samples
SN74AHCT1G14DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(B143 ~ B14G ~ B14L ~ B14S)	Samples
SN74AHCT1G14DCKR	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(BF3 ~ BFG ~ BFJ ~ BFL ~ BFS)	Samples
SN74AHCT1G14DCKRG4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(BF3 ~ BFG ~ BFJ ~ BFL ~ BFS)	Samples
SN74AHCT1G14DCKT	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(BF3 ~ BFG ~ BFL ~ BFS)	Samples

⁽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.



PACKAGE OPTION ADDENDUM

29-May-2013

(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.

⁽⁴⁾ There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(⁵⁾ Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device 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.

PACKAGE MATERIALS INFORMATION

www.ti.com

Texas Instruments

TAPE AND REEL INFORMATION





QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



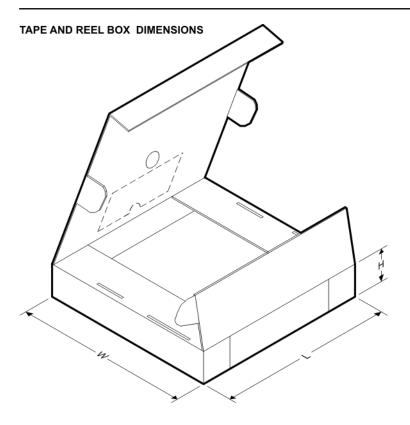
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74AHCT1G14DBVR	SOT-23	DBV	5	3000	178.0	9.2	3.3	3.2	1.55	4.0	8.0	Q3
SN74AHCT1G14DBVR	SOT-23	DBV	5	3000	180.0	8.4	3.23	3.17	1.37	4.0	8.0	Q3
SN74AHCT1G14DBVR	SOT-23	DBV	5	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
SN74AHCT1G14DBVR	SOT-23	DBV	5	3000	180.0	9.2	3.17	3.23	1.37	4.0	8.0	Q3
SN74AHCT1G14DBVT	SOT-23	DBV	5	250	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
SN74AHCT1G14DBVT	SOT-23	DBV	5	250	178.0	9.2	3.3	3.2	1.55	4.0	8.0	Q3
SN74AHCT1G14DCKR	SC70	DCK	5	3000	178.0	9.2	2.4	2.4	1.22	4.0	8.0	Q3
SN74AHCT1G14DCKR	SC70	DCK	5	3000	180.0	9.2	2.3	2.55	1.2	4.0	8.0	Q3
SN74AHCT1G14DCKR	SC70	DCK	5	3000	178.0	9.0	2.4	2.5	1.2	4.0	8.0	Q3
SN74AHCT1G14DCKT	SC70	DCK	5	250	180.0	9.2	2.3	2.55	1.2	4.0	8.0	Q3
SN74AHCT1G14DCKT	SC70	DCK	5	250	178.0	9.0	2.4	2.5	1.2	4.0	8.0	Q3
SN74AHCT1G14DCKT	SC70	DCK	5	250	178.0	9.2	2.4	2.4	1.22	4.0	8.0	Q3

TEXAS INSTRUMENTS

www.ti.com

PACKAGE MATERIALS INFORMATION

28-Jun-2013



*All dimensions are nominal							
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AHCT1G14DBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
SN74AHCT1G14DBVR	SOT-23	DBV	5	3000	202.0	201.0	28.0
SN74AHCT1G14DBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
SN74AHCT1G14DBVR	SOT-23	DBV	5	3000	205.0	200.0	33.0
SN74AHCT1G14DBVT	SOT-23	DBV	5	250	180.0	180.0	18.0
SN74AHCT1G14DBVT	SOT-23	DBV	5	250	180.0	180.0	18.0
SN74AHCT1G14DCKR	SC70	DCK	5	3000	180.0	180.0	18.0
SN74AHCT1G14DCKR	SC70	DCK	5	3000	205.0	200.0	33.0
SN74AHCT1G14DCKR	SC70	DCK	5	3000	180.0	180.0	18.0
SN74AHCT1G14DCKT	SC70	DCK	5	250	205.0	200.0	33.0
SN74AHCT1G14DCKT	SC70	DCK	5	250	180.0	180.0	18.0
SN74AHCT1G14DCKT	SC70	DCK	5	250	180.0	180.0	18.0

DBV (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE



- A. All linear dimensions are in millimeters.
 - This drawing is subject to change without notice. Β.
 - Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side. C.
 - 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.



IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as "components") are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have *not* been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products		Applications	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	TI E2E Community	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconne	ectivity	

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265 Copyright © 2013, Texas Instruments Incorporated

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Texas Instruments:

SN74AHCT1G14DBVRSN74AHCT1G14DCKRSN74AHCT1G14DCKRG4SN74AHCT1G14DBVTSN74AHCT1G14DCKT74AHCT1G14DCKTG474AHCT1G14DBVRE474AHCT1G14DBVRG474AHCT1G14DBVTE474AHCT1G14DCKRE474AHCT1G14DCKTE474AHCT1G14DBVTG4