

UT54ACS14/UT54ACTS14

Hex Inverting Schmitt Triggers

January, 2018

Datasheet

www.cobham.com/HiRel



The most important thing we build is trust

FEATURES

- 0.6μ CRH CMOS process
 - Latchup immune
- High speed
- Low power consumption
- Single 5 volt supply
- Available QML Q or V processes
- 14-lead flatpack
- UT54ACS14 - SMD 5962-96524
- UT54ACTS14 - SMD 5962-96525

DESCRIPTION

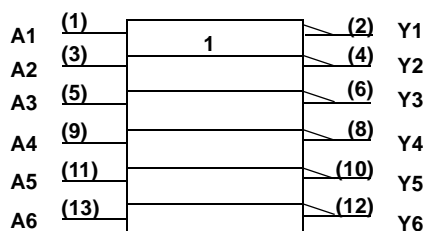
The UT54ACS14 and the UT54ACTS14 are hex inverters. The circuits perform the Boolean function $Y = \bar{A}$.

The devices are characterized over full military temperature range of -55°C to +125°C.

FUNCTION TABLE

INPUT	OUTPUT
A	Y
H	L
L	H

LOGIC SYMBOL

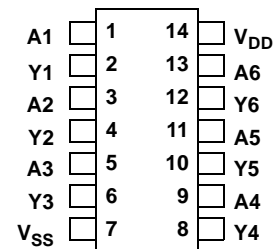


Note:

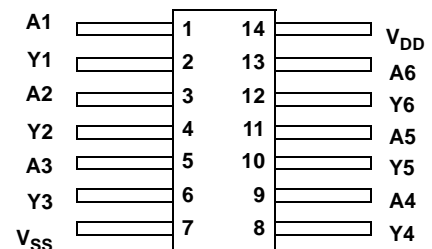
1. Logic symbol in accordance with ANSI/IEEE standard 91-1984 and IEC Publication 617-12.

PINOUTS

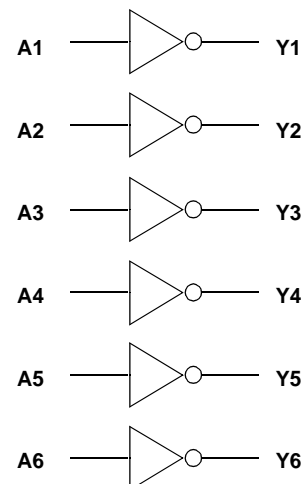
14-Pin DIP
Top View



14-Lead Flatpack
Top View



LOGIC DIAGRAM



OPERATIONAL ENVIRONMENT¹

PARAMETER	LIMIT	UNITS
Total Dose	5.0E5	rads(Si)
SEU Threshold ²	80	MeV-cm ² /mg
SEL Threshold	120	MeV-cm ² /mg
Neutron Fluence	1.0E14	n/cm ²

Notes:

1. Logic will not latchup during radiation exposure within the limits defined in the table.
2. Device storage elements are immune to SEU affects.

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	LIMIT	UNITS
V _{DD}	Supply voltage	-0.3 to 7.0	V
V _{I/O}	Voltage any pin	-.3 to V _{DD} +.3	V
T _{STG}	Storage Temperature range	-65 to +150	°C
T _J	Maximum junction temperature	+175	°C
T _{LS}	Lead temperature (soldering 5 seconds)	+300	°C
Θ _{JC}	Thermal resistance junction to case	15.0 (ACS) 15.5 (ACTS)	°C/W
I _I	DC input current	±10	mA
P _D	Maximum power dissipation	1	W

Note:

1. Stresses outside the listed absolute maximum ratings may cause permanent damage to the device. This is a stress rating only, functional operation of the device at these or any other conditions beyond limits indicated in the operational sections is not recommended. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMIT	UNITS
V _{DD}	Supply voltage	4.5 to 5.5	V
V _{IN}	Input voltage any pin	0 to V _{DD}	V
T _C	Temperature range	-55 to + 125	°C

DC ELECTRICAL CHARACTERISTICS ⁷

($V_{DD} = 5.0V \pm 10\%$; $V_{SS} = 0V$ ⁶, $-55^{\circ}C < T_C < +125^{\circ}C$); Unless otherwise noted, T_C is per the temperature range ordered.

SYMBOL	PARAMETER		CONDITION	MIN	MAX	UNIT
V_{T+}	Schmitt Trigger, positive going ¹ threshold ACTS ACS				2.25 .7 V_{DD}	V
V_{T-}	Schmitt Trigger, negative going ¹ threshold ACTS ACS			0.5 .3 V_{DD}		V
V_H	Schmitt Trigger, typical range of hysteresis ² ACTS ACS			0.4 0.6	1.5 1.5	V
I_{IN}	Input leakage current ACTS/ACS		$V_{IN} = V_{DD}$ or V_{SS}	-1	1	μA
V_{OL}	Low-level output voltage ³ ACTS ACS		$I_{OL} = 8.0mA$ $I_{OL} = 100\mu A$		0.40 0.25	V
V_{OH}	High-level output voltage ³ ACTS ACS		$I_{OH} = -8.0mA$ $I_{OH} = -100\mu A$.7 V_{DD} $V_{DD}-0.25$		V
I_{OS}	Short-circuit output current ^{2,4} ACTS/ACS		$V_O = V_{DD}$ and V_{SS}	-200	200	mA
I_{OL}	Output current ¹⁰ (Sink)		$V_{IN} = V_{DD}$ or V_{SS} $V_{OL} = 0.4V$	8		mA
I_{OH}	Output current ¹⁰ (Source)		$V_{IN} = V_{DD}$ or V_{SS} $V_{OH} = V_{DD} - 0.4V$	-8		mA
P_{total}	Power dissipation ^{2, 8, 9} ACTS ACS		$C_L = 50pF$		1.9 1.8	mW/ MHz
I_{DDQ}	Quiescent Supply Current	Pre-Rad	$V_{IN} = V_{DD}$ or V_{SS}		10	μA
		Post-Rad Device Type 01	$V_{DD} = V_{DD} MAX$		50	
ΔI_{DDQ}	Quiescent Supply Current Delta ACTS		For input under test $V_{IN} = V_{DD} - 2.1V$ For all other inputs $V_{IN} = V_{DD}$ or V_{SS} $V_{DD} = 5.5V$		3.1	mA
C_{IN}	Input capacitance ⁵		$f = 1MHz @ 0V$		15	pF
C_{OUT}	Output capacitance ⁵		$f = 1MHz @ 0V$		15	pF

Notes:

- Functional tests are conducted in accordance with MIL-STD-883 with the following input test conditions: $V_{IH} = V_{IH}(min) + 20\%$, -0% ; $V_{IL} = V_{IL}(max) + 0\%$, -50% , as specified herein, for TTL, CMOS, or Schmitt compatible inputs. Devices may be tested using any input voltage within the above specified range, but are guaranteed to $V_{IH}(min)$ and $V_{IL}(max)$.
- Supplied as a design limit but not guaranteed or tested.

3. Per MIL-PRF-38535, for current density $\leq 5.0E5$ amps/cm², the maximum product of load capacitance (per output buffer) times frequency should not exceed 3,765 pF/MHz.
4. Not more than one output may be shorted at a time for maximum duration of one second.
5. Capacitance measured for initial qualification and when design changes may affect the value. Capacitance is measured between the designated terminal and V_{SS} at frequency of 1MHz and a signal amplitude of 50mV rms maximum.
6. Maximum allowable relative shift equals 50mV.
7. Device type 01 is only offered with a TID tolerance guarantee of 1E5 rads(Si), 3E5 rads(Si), and 5E5 rads(Si), and is tested in accordance with MIL-STD-883 Test Method 1019 Condition A.
8. Power does not include power contribution of any TTL output sink current.
9. Power dissipation specified per switching output.
10. This value is guaranteed based on characterization data, but not tested.

AC ELECTRICAL CHARACTERISTICS ²

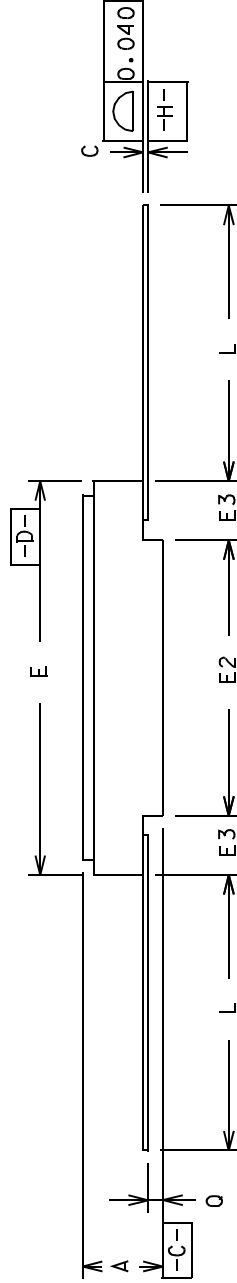
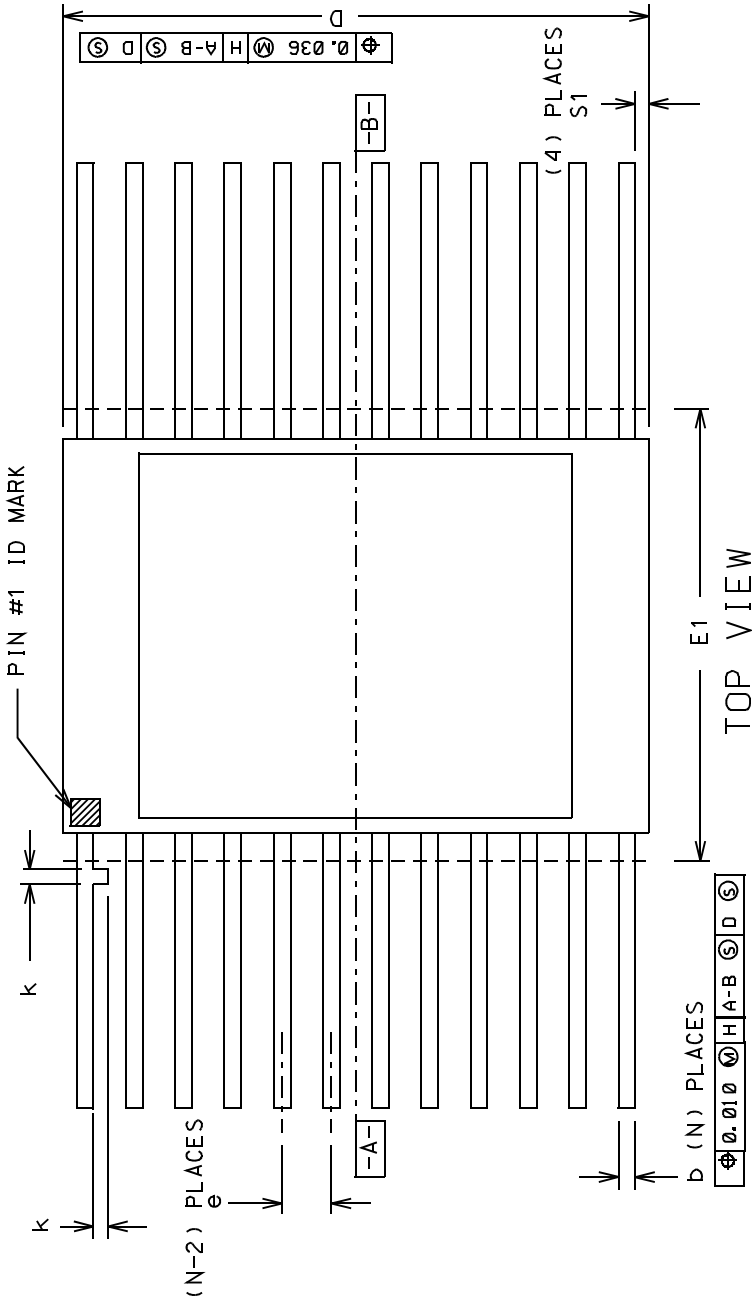
($V_{DD} = 5.0V \pm 10\%$; $V_{SS} = 0V$, $-55^{\circ}C < T_C < +125^{\circ}C$); Unless otherwise noted, T_c is per the temperature range ordered.

SYMBOL	PARAMETER	MINIMUM	MAXIMUM	UNIT
t_{PHL}	Input to Yn			ns
	ACS	2	14	
	ACTS	2	12	
t_{PLH}	Input to Yn			ns
	ACS	2	13	
	ACTS	2	9	

Notes:

1. Maximum allowable relative shift equals 50mV.
2. Device type 01 is only offered with a TID tolerance guarantee of 1E5 rads(Si), 3E5 rads(Si), and 5E5 rads(Si), and is tested in accordance with MIL-STD-883 Test Method 1019 Condition A.

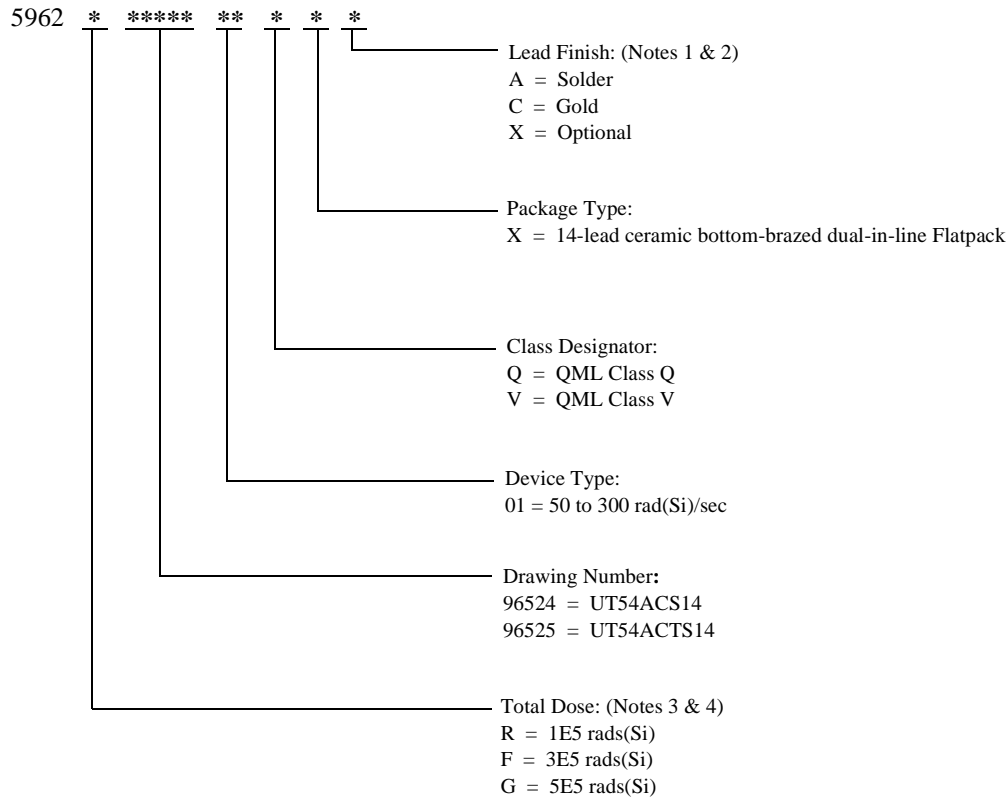
PACKAGES



DIMENSION SYMBOLS

PKG CONFIG	LEAD COUNT	MIL-STD 1835 DWG CONF B	A	b	c	D	E	E1	E2	E3	e	k	L	0	S1
-03	14	F-2A	0.115 0.045	0.022 0.015	0.009 0.004	0.390 -----	0.260 0.235	0.290 -----	0.130 -----	0.030 -----	0.050 BSC	0.015 0.008	0.370 0.270	0.045 0.026	0.005 -----
-04	16	F-5A	0.115 0.045	0.022 0.015	0.009 0.004	0.440 -----	0.285 0.245	0.315 -----	0.130 -----	0.030 -----	0.050 BSC	0.015 0.008	0.370 0.250	0.045 0.026	0.005 -----
-05	20	F-9A	0.115 0.045	0.022 0.015	0.009 0.004	0.540 -----	0.300 0.245	0.330 -----	0.130 -----	0.030 -----	0.050 BSC	0.015 0.008	0.370 0.250	0.045 0.026	0.000 -----

UT54ACS14/UT54ACTS14: SMD



Notes:

1. Lead finish (A,C, or X) must be specified.
2. If an "X" is specified when ordering, part marking will match the lead finish and will be either "A" (solder) or "C" (gold).
3. Total dose radiation must be specified when ordering. QML Q and QML V not available without radiation hardening. For prototype inquiries, contact factory.
4. Device type 01 is only offered with a TID tolerance guarantee of 1E5 rads(Si), 3E5 rads(Si), and 5E5 rads(Si), and is tested in accordance with MIL-STD-883 Test Method 1019 Condition A.

Aeroflex Colorado Springs - Datasheet Definition

Advanced Datasheet - Product In Development

Preliminary Datasheet - Shipping Prototype

Datasheet - Shipping QML & Reduced Hi-Rel

The following United States (U.S.) Department of Commerce statement shall be applicable if these commodities, technology, or software are exported from the U.S.: These commodities, technology, or software were exported from the United States in accordance with the Export Administration Regulations. Divison contrary to the U.S. law is prohibited.

Cobham Semiconductor Solutions
4350 Centennial Blvd
Colorado Springs, CO 80907

COBHAM

E: info-ams@aeroflex.com
T: 800 645 8862

Aeroflex Colorado Springs Inc., dba Cobham Semiconductor Solutions, reserves the right to make changes to any products and services described herein at any time without notice. Consult Aeroflex or an authorized sales representative to verify that the information in this data sheet is current before using this product. Aeroflex does not assume any responsibility or liability arising out of the application or use of any product or service described herein, except as expressly agreed to in writing by Aeroflex; nor does the purchase, lease, or use of a product or service from Aeroflex convey a license under any patent rights, copyrights, trademark rights, or any other of the intellectual rights of Aeroflex or of third parties.

DATA SHEET REVISION HISTORY

Revision Date	Description of Change	Author
10-17	Page 3 edited IDDQ and PTOTAL Page 5 edited AC Electricals Applied new Cobham Data Sheet template to the document.	RT
1-18	Updates to reflect current SMD	RT