

# Single Schmitt-Trigger Inverter

## MC74VHC1G14, MC74VHC1GT14

The MC74VHC1G14 / MC74VHC1GT14 is a single Schmitt-Trigger Inverter in tiny footprint packages. The MC74VHC1G14 has CMOS-level input thresholds while the MC74VHC1GT14 has TTL-level input thresholds.

The internal circuit is composed of three stages, including a buffered output which provides high noise immunity and stable output.

The input structures provide protection when voltages up to 5.5 V are applied, regardless of the supply voltage. This allows the device to be used to interface 5 V circuits to 3 V circuits. Some output structures also provide protection when  $V_{CC} = 0$  V and when the output voltage exceeds  $V_{CC}$ . These input and output structures help prevent device destruction caused by supply voltage – input/output voltage mismatch, battery backup, hot insertion, etc.

### Features

- Designed for 2.0 V to 5.5 V  $V_{CC}$  Operation
- 4.0 ns  $t_{PD}$  at 5 V (typ)
- Inputs/Outputs Over-Voltage Tolerant up to 5.5 V
- $I_{OFF}$  Supports Partial Power Down Protection
- Source/Sink 8 mA at 3.0 V
- Available in SC-88A, SC-74A, TSOP-5, SOT-953 and UDFN6 Packages
- Chip Complexity < 100 FETs
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

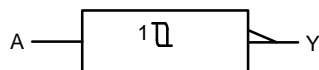

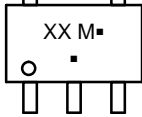

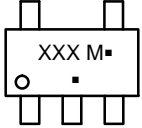

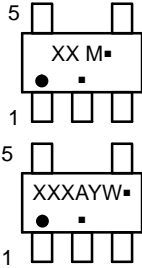

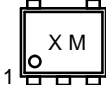








Figure 1. Logic Symbol

### MARKING DIAGRAMS

	<b>SC-88A</b> DF SUFFIX CASE 419A	
	<b>SC-74A</b> DBV SUFFIX CASE 318BQ	
	<b>TSOP-5</b> DT SUFFIX CASE 483	
	<b>SOT-953</b> P5 SUFFIX CASE 527AE	
	<b>UDFN6</b> 1.45 x 1.0 CASE 517AQ	
	<b>UDFN6</b> 1.2 x 1.0 CASE 517AA	
	<b>UDFN6</b> 1.0 x 1.0 CASE 517BX	

XX = Specific Device Code  
M = Date Code\*  
▪ = Pb-Free Package

(Note: Microdot may be in either location)  
\*Date Code orientation and/or position may vary depending upon manufacturing location.

### ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 7 of this data sheet.

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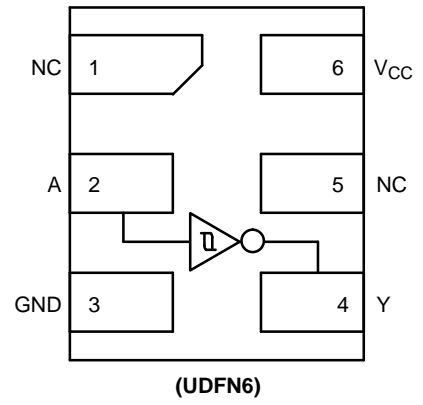
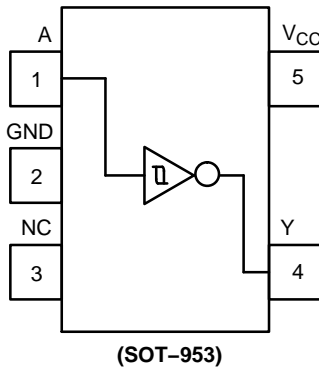
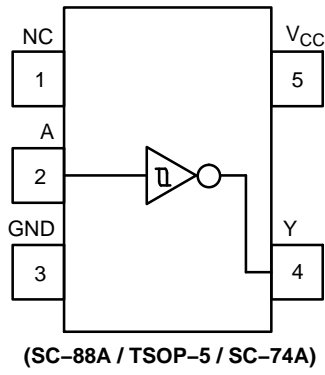


Figure 2. Pinout (Top View)

## PIN ASSIGNMENT

(SC-88A / TSOP-5 / SC-74A)

Pin	Function
1	NC
2	A
3	GND
4	Y
5	V <sub>CC</sub>

## PIN ASSIGNMENT (SOT-953)

Pin	Function
1	A
2	GND
3	NC
4	Y
5	V <sub>CC</sub>

## PIN ASSIGNMENT (UDFN)

Pin	Function
1	NC
2	A
3	GND
4	Y
5	NC
6	V <sub>CC</sub>

## FUNCTION TABLE

A Input	Y Output
L	H
H	L

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## MAXIMUM RATINGS

Symbol	Characteristics		Value	Unit	
$V_{CC}$	DC Supply Voltage TSOP-5, SC-88A (NLV) SC-74A, SC-88A, UDFN6, SOT-953		-0.5 to +7.0 -0.5 to +6.5	V	
$V_{IN}$	DC Input Voltage TSOP-5, SC-88A (NLV) SC-74A, SC-88A, UDFN6, SOT-953		-0.5 to +7.0 -0.5 to +6.5	V	
$V_{OUT}$	DC Output Voltage (NLV)	1Gxx	-0.5 to $V_{CC} + 0.5$	V	
		1GTxx	Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode ( $V_{CC} = 0$ V)		-0.5 to $V_{CC} + 0.5$ -0.5 to +7.0 -0.5 to +7.0
	DC Output Voltage	Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode ( $V_{CC} = 0$ V)	-0.5 to $V_{CC} + 0.5$ -0.5 to +6.5 -0.5 to +6.5	V	
$I_{IK}$	DC Input Diode Current $V_{IN} < GND$		-20	mA	
$I_{OK}$	DC Output Diode Current (NLV)	1Gxx	$V_{OUT} > V_{CC}$ , $V_{OUT} < GND$	$\pm 20$	mA
		1GTxx	$V_{OUT} < GND$	-20	
	DC Output Diode Current	$V_{OUT} < GND$	-20	mA	
$I_{OUT}$	DC Output Source/Sink Current		$\pm 25$	mA	
$I_{CC}$ or $I_{GND}$	DC Supply Current per Supply Pin or Ground Pin		$\pm 50$	mA	
$T_{STG}$	Storage Temperature Range		-65 to +150	$^{\circ}C$	
$T_L$	Lead Temperature, 1 mm from Case for 10 secs		260	$^{\circ}C$	
$T_J$	Junction Temperature Under Bias		+150	$^{\circ}C$	
$\theta_{JA}$	Thermal Resistance (Note 2)	SC-88A SC-74A SOT-953 UDFN6	377 320 254 154	$^{\circ}C/W$	
$P_D$	Power Dissipation in Still Air	SC-88A SC-74A SOT-953 UDFN6	332 390 491 812	mW	
MSL	Moisture Sensitivity		Level 1	-	
$F_R$	Flammability Rating	Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in	-	
$V_{ESD}$	ESD Withstand Voltage (Note 3)	Human Body Model Charged Device Model	2000 1000	V	
$I_{Latchup}$	Latchup Performance (Note 4)		$\pm 100$	mA	

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Applicable to devices with outputs that may be tri-stated.
2. Measured with minimum pad spacing on an FR4 board, using 10mm-by-1inch, 2 ounce copper trace no air flow per JESD51-7.
3. HBM tested to ANSI/ESDA/JEDEC JS-001-2017. CDM tested to EIA/JESD22-C101-F. JEDEC recommends that ESD qualification to EIA/JESD22-A115-A (Machine Model) be discontinued per JEDEC/JEP172A.
4. Tested to EIA/JESD78 Class II.

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## RECOMMENDED OPERATING CONDITIONS

Symbol	Characteristics		Min	Max	Unit
V <sub>CC</sub>	Positive DC Supply Voltage		2.0	5.5	V
V <sub>IN</sub>	DC Input Voltage		0	5.5	V
V <sub>OUT</sub>	DC Output Voltage (NLV)	1Gxx	0	V <sub>CC</sub>	V
		1GTxx	Active-Mode (High or Low State) Tri-State Mode (Note 5) Power-Down Mode (V <sub>CC</sub> = 0 V)	0 0 0	
	DC Output Voltage	Active-Mode (High or Low State) Tri-State Mode (Note 5) Power-Down Mode (V <sub>CC</sub> = 0 V)	0 0 0	V <sub>CC</sub> 5.5 5.5	V
T <sub>A</sub>	Operating Temperature Range		-55	+125	°C
t <sub>r</sub> , t <sub>f</sub>	Input Rise and Fall Time		TSOP-5, SC-88A (NLV) V <sub>CC</sub> = 3.0 V to 3.6 V V <sub>CC</sub> = 4.5 V to 5.5 V		ns/V
			0 0	No Limit No Limit	
t <sub>r</sub> , t <sub>f</sub>	Input Rise and Fall Time		SC-74A, SC-88A, UDFN6, SOT-953 V <sub>CC</sub> = 2.0 V V <sub>CC</sub> = 2.3 V to 2.7 V V <sub>CC</sub> = 3.0 V to 3.6 V V <sub>CC</sub> = 4.5 V to 5.5 V		ns/V
			0	No Limit	
			0	No Limit	
			0	No Limit	
			0	No Limit	

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

5. Applicable to devices with outputs that may be tri-stated.

## DC ELECTRICAL CHARACTERISTICS (MC74VHC1G14)

Symbol	Parameter	Test Conditions	V <sub>CC</sub> (V)	T <sub>A</sub> = 25°C			-40°C ≤ T <sub>A</sub> ≤ 85°C		-55°C ≤ T <sub>A</sub> ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
V <sub>T+</sub>	Positive Input Threshold Voltage (NLV)		3.0	1.2	2.0	2.2	-	2.2	-	2.2	V
			4.5	1.75	3.0	3.15	-	3.15	-	3.15	
			5.5	2.15	3.6	3.85	-	3.85	-	3.85	
V <sub>T-</sub>	Negative Input Threshold Voltage (NLV)		3.0	0.9	1.5	1.9	0.9	-	0.9	-	V
			4.5	1.35	2.3	2.75	1.35	-	1.35	-	
			5.5	1.65	2.9	3.35	1.65	-	1.65	-	
V <sub>H</sub>	Hysteresis Voltage		3.0	0.30	0.57	1.20	0.30	1.20	0.30	1.20	V
			4.5	0.40	0.67	1.40	0.40	1.40	0.40	1.40	
			5.5	0.50	0.74	1.60	0.50	1.60	0.50	1.60	
V <sub>OH</sub>	High-Level Output Voltage	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> I <sub>OH</sub> = -50 μA I <sub>OH</sub> = -50 μA I <sub>OH</sub> = -50 μA I <sub>OH</sub> = -4 mA I <sub>OH</sub> = -8 mA	2.0	1.9	2.0	-	1.9	-	1.9	-	V
			3.0	2.9	3.0	-	2.9	-	2.9	-	
			4.5	4.4	4.5	-	4.4	-	4.4	-	
			3.0	2.58	-	-	2.48	-	2.34	-	
			4.5	3.94	-	-	3.80	-	3.66	-	
V <sub>OL</sub>	Low-Level Output Voltage	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> I <sub>OL</sub> = 50 μA I <sub>OL</sub> = 50 μA I <sub>OL</sub> = 50 μA I <sub>OL</sub> = 4 mA I <sub>OL</sub> = 8 mA	2.0	-	0.0	0.1	-	0.1	-	0.1	V
			3.0	-	0.0	0.1	-	0.1	-	0.1	
			4.5	-	0.0	0.1	-	0.1	-	0.1	
			3.0	-	-	0.36	-	0.44	-	0.52	
			4.5	-	-	0.36	-	0.44	-	0.52	
I <sub>IN</sub>	Input Leakage Current	V <sub>IN</sub> = 5.5 V or GND	2.0 to 5.5	-	-	±0.1	-	±1.0	-	±1.0	μA
I <sub>OFF</sub>	Power Off Leakage Current (NLV)	V <sub>IN</sub> = 5.5 V	0.0	-	-	1.0	-	10	-	10	μA
	Power Off Leakage Current	V <sub>IN</sub> = 5.5 V or V <sub>OUT</sub> = 5.5 V	0.0	-	-	1.0	-	10	-	10	μA
I <sub>CC</sub>	Quiescent Supply Current	V <sub>IN</sub> = V <sub>CC</sub> or GND	5.5	-	-	1.0	-	20	-	40	μA

# MC74VHC1G14, MC74VHC1GT14

## DC ELECTRICAL CHARACTERISTICS (MC74VHC1GT14)

Symbol	Parameter	Test Conditions	V <sub>CC</sub> (V)	T <sub>A</sub> = 25°C			-40°C ≤ T <sub>A</sub> ≤ 85°C		-55°C ≤ T <sub>A</sub> ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
V <sub>T+</sub>	Positive Input Threshold Voltage (NLV)		3.0	1.2	1.4	1.6	–	1.6	–	1.6	V
			4.5	1.58	1.74	2.0	–	2.0	–	2.0	
			5.5	1.79	1.94	2.1	–	2.1	–	2.1	
	Positive Input Threshold Voltage		3.0	–	1.4	1.6	–	1.6	–	1.6	V
			4.5	–	1.74	2.0	–	2.0	–	2.0	
			5.5	–	1.94	2.1	–	2.1	–	2.1	
V <sub>T-</sub>	Negative Input Threshold Voltage (NLV)		3.0	0.35	0.76	0.93	0.35	–	0.35	–	V
			4.5	0.5	1.01	1.18	0.5	–	0.5	–	
			5.5	0.6	1.13	1.29	0.6	–	0.6	–	
	Negative Input Threshold Voltage		3.0	0.35	0.76	–	0.35	–	0.35	–	V
			4.5	0.5	1.01	–	0.5	–	0.5	–	
			5.5	0.6	1.13	–	0.6	–	0.6	–	
V <sub>H</sub>	Hysteresis Voltage		3.0	0.30	0.64	1.20	0.30	1.20	0.30	1.20	V
			4.5	0.40	0.73	1.40	0.40	1.40	0.40	1.40	
			5.5	0.50	0.81	1.60	0.50	1.60	0.50	1.60	
V <sub>OH</sub>	High-Level Output Voltage	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> I <sub>OH</sub> = -50 μA	2.0	1.9	2.0	–	1.9	–	1.9	–	V
		I <sub>OH</sub> = -50 μA	3.0	2.9	3.0	–	2.9	–	2.9	–	
		I <sub>OH</sub> = -50 μA	4.5	4.4	4.5	–	4.4	–	4.4	–	
		I <sub>OH</sub> = -4 mA	3.0	2.58	–	–	2.48	–	2.34	–	
		I <sub>OH</sub> = -8 mA	4.5	3.94	–	–	3.80	–	3.66	–	
V <sub>OL</sub>	Low-Level Output Voltage	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> I <sub>OL</sub> = 50 μA	2.0	–	0.0	0.1	–	0.1	–	0.1	V
		I <sub>OL</sub> = 50 μA	3.0	–	0.0	0.1	–	0.1	–	0.1	
		I <sub>OL</sub> = 50 μA	4.5	–	0.0	0.1	–	0.1	–	0.1	
		I <sub>OL</sub> = 4 mA	3.0	–	–	0.36	–	0.44	–	0.52	
		I <sub>OL</sub> = 8 mA	4.5	–	–	0.36	–	0.44	–	0.52	
I <sub>IN</sub>	Input Leakage Current	V <sub>IN</sub> = 5.5 V or GND	2.0 to 5.5	–	–	±0.1	–	±1.0	–	±1.0	μA
I <sub>OFF</sub>	Power Off Leakage Current	V <sub>IN</sub> = 5.5 V or V <sub>OUT</sub> = 5.5 V	0	–	–	1.0	–	10	–	10	μA
I <sub>CC</sub>	Quiescent Supply Current	V <sub>IN</sub> = V <sub>CC</sub> or GND	5.5	–	–	1.0	–	20	–	40	μA
I <sub>CCCT</sub>	Increase in Quiescent Supply Current per Input Pin	One Input: V <sub>IN</sub> = 3.4 V; Other Input at V <sub>CC</sub> or GND	5.5	–	–	1.35	–	1.5	–	1.65	mA

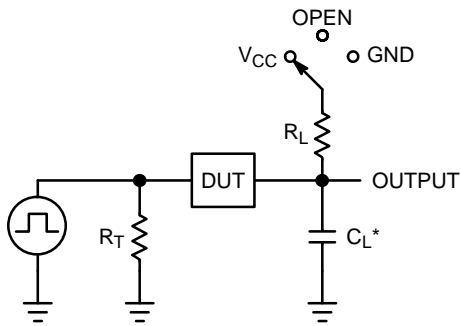
## AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V <sub>CC</sub> (V)	T <sub>A</sub> = 25°C			-40°C ≤ T <sub>A</sub> ≤ 85°C		-55°C ≤ T <sub>A</sub> ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t <sub>PLH</sub> , t <sub>PHL</sub>	Propagation Delay, A to Y (Figures 3 and 4)	C <sub>L</sub> = 15 pF	3.0 to 3.6	–	7.0	12.8	–	15.0	–	17.0	ns
		C <sub>L</sub> = 50 pF		–	8.5	16.3	–	18.5	–	20.5	
		C <sub>L</sub> = 15 pF	4.5 to 5.5	–	4.0	8.6	–	10.0	–	11.5	
		C <sub>L</sub> = 50 pF		–	5.5	10.6	–	12.0	–	13.5	
C <sub>IN</sub>	Input Capacitance			–	4.0	10	–	10	–	10	pF
C <sub>OUT</sub>	Output Capacitance	Output in High Impedance State		–	6.0	–	–	–	–	–	pF

C <sub>PD</sub>	Power Dissipation Capacitance (Note 6)	<b>Typical @ 25°C, V<sub>CC</sub> = 5.0 V</b>	pF
		8.0	

6. C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation: I<sub>CC(OPR)</sub> = C<sub>PD</sub> • V<sub>CC</sub> • f<sub>in</sub> + I<sub>CC</sub>. C<sub>PD</sub> is used to determine the no-load dynamic power consumption; P<sub>D</sub> = C<sub>PD</sub> • V<sub>CC</sub><sup>2</sup> • f<sub>in</sub> + I<sub>CC</sub> • V<sub>CC</sub>.

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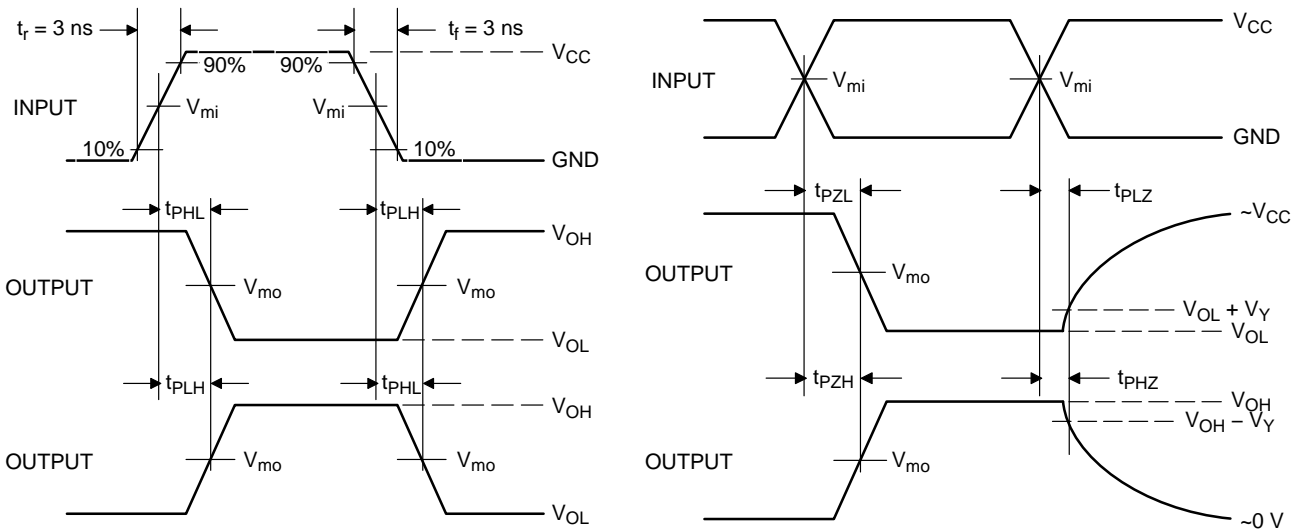


$C_L$  includes probe and jig capacitance  
 $R_T$  is  $Z_{OUT}$  of pulse generator (typically 50  $\Omega$ )  
 $f = 1$  MHz

**Figure 3. Test Circuit**

Test	Switch Position	$C_L$ , pF	$R_L$ , $\Omega$
$t_{PLH} / t_{PHL}$	Open	See AC Characteristics Table	X
$t_{PLZ} / t_{PZL}$	$V_{CC}$		1 k
$t_{PHZ} / t_{PZH}$	GND		1 k

X = Don't Care



**Figure 4. Switching Waveforms**

$V_{CC}$ , V	$V_{mi}$ , V	$V_{mo}$ , V		$V_Y$ , V
		$t_{PLH}$ , $t_{PHL}$	$t_{PZL}$ , $t_{PLZ}$ , $t_{PZH}$ , $t_{PHZ}$	
3.0 to 3.6	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	0.3
4.5 to 5.5	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	0.3

# MC74VHC1G14, MC74VHC1GT14

## ORDERING INFORMATION

Device	Packages	Specific Device Code	Pin 1 Orientation (See below)	Shipping†
MC74VHC1G14DFT1G	SC-88A	VA	Q2	3000 / Tape & Reel
MC74VHC1G14DFT2G	SC-88A	VA	Q4	3000 / Tape & Reel
MC74VHC1G14DFT2G-F22038**	SC-88A	VA	Q4	3000 / Tape & Reel
NLVVHC1G14DFT1G*	SC-88A	VA	Q2	3000 / Tape & Reel
NLVVHC1G14DFT2G*	SC-88A	VA	Q4	3000 / Tape & Reel
M74VHC1GT14DFT1G	SC-88A	VC	Q2	3000 / Tape & Reel
M74VHC1GT14DFT1G-L22038**	SC-88A	VC	Q2	3000 / Tape & Reel
M74VHC1GT14DFT2G	SC-88A	VC	Q4	3000 / Tape & Reel
M74VHC1GT14DFT2G-L22038**	SC-88A	VC	Q4	3000 / Tape & Reel
NLVVHC1GT14DFT1G*	SC-88A	VC	Q2	3000 / Tape & Reel
NLVVHC1GT14DFT2G*	SC-88A	VC	Q4	3000 / Tape & Reel
MC74VHC1G14DBVT1G	SC-74A	VA	Q4	3000 / Tape & Reel
MC74VHC1GT14DBVT1G	SC-74A	VC	Q4	3000 / Tape & Reel
MC74VHC1G14DTT1G**	TSOP-5	VA	Q4	3000 / Tape & Reel
NLVVHC1G14DTT1G*	TSOP-5	VA	Q4	3000 / Tape & Reel
M74VHC1GT14DTT1G**	TSOP-5	VC	Q4	3000 / Tape & Reel
MC74VHC1G14P5T5G	SOT-953	R	Q2	8000 / Tape & Reel
MC74VHC1G14P5T5G-L22088**	SOT-953	R	Q2	8000 / Tape & Reel
MC74VHC1GT14P5T5G (In Development)	SOT-953	TBD	Q2	8000 / Tape & Reel
MC74VHC1G14MU1TCG (In Development)	UDFN6, 1.45 x 1.0, 0.5P	TBD	Q4	3000 / Tape & Reel
MC74VHC1GT14MU1TCG	UDFN6, 1.45 x 1.0, 0.5P	Q	Q4	3000 / Tape & Reel
MC74VHC1G14MU2TCG (In Development)	UDFN6, 1.2 x 1.0, 0.4P	P	Q4	3000 / Tape & Reel
MC74VHC1GT14MU2TCG	UDFN6, 1.2 x 1.0, 0.4P	M	Q4	3000 / Tape & Reel
MC74VHC1G14MU3TCG (In Development)	UDFN6, 1.0 x 1.0, 0.35	TBD	Q4	3000 / Tape & Reel
MC74VHC1GT14MU3TCG	UDFN6, 1.0 x 1.0, 0.35	M	Q4	3000 / Tape & Reel

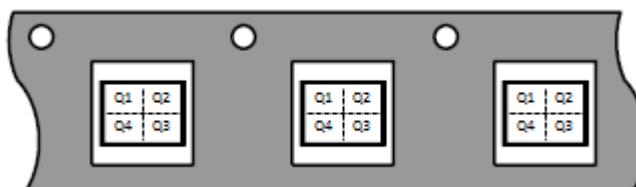
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

\*NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.

\*\*Please refer to NLV specifications for this device.

### Pin 1 Orientation in Tape and Reel

Direction of Feed



# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®



SCALE 2:1

### SC-74A CASE 318BQ ISSUE B

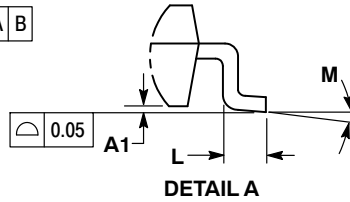
DATE 18 JAN 2018



TOP VIEW



SIDE VIEW



DETAIL A



END VIEW

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE.

DIM	MILLIMETERS	
	MIN	MAX
A	0.90	1.10
A1	0.01	0.10
b	0.25	0.50
c	0.10	0.26
D	2.85	3.15
E	2.50	3.00
E1	1.35	1.65
e	0.95 BSC	
L	0.20	0.60
M	0°	10°

### RECOMMENDED SOLDERING FOOTPRINT\*



### GENERIC MARKING DIAGRAM\*



- XXX = Specific Device Code
- M = Date Code
- = Pb-Free Package

(Note: Microdot may be in either location)

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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<b>DESCRIPTION:</b>	<b>SC-74A</b>	<b>PAGE 1 OF 1</b>

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# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®



SCALE 2:1

SC-88A (SC-70-5/SOT-353)  
CASE 419A-02  
ISSUE L

DATE 17 JAN 2013



### SOLDER FOOTPRINT



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419A-01 OBSOLETE. NEW STANDARD 419A-02.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	---	0.004	---	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20

### GENERIC MARKING DIAGRAM\*



- XXX = Specific Device Code
- M = Date Code
- = Pb-Free Package

(Note: Microdot may be in either location)

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.

- |  |  |  |  |  |
|--|--|--|--|--|
| <p>STYLE 1:<br/>PIN 1. BASE<br/>2. EMITTER<br/>3. BASE<br/>4. COLLECTOR<br/>5. COLLECTOR</p>                   | <p>STYLE 2:<br/>PIN 1. ANODE<br/>2. EMITTER<br/>3. BASE<br/>4. COLLECTOR<br/>5. CATHODE</p>  | <p>STYLE 3:<br/>PIN 1. ANODE 1<br/>2. N/C<br/>3. ANODE 2<br/>4. CATHODE 2<br/>5. CATHODE 1</p> | <p>STYLE 4:<br/>PIN 1. SOURCE 1<br/>2. DRAIN 1/2<br/>3. SOURCE 1<br/>4. GATE 1<br/>5. GATE 2</p> | <p>STYLE 5:<br/>PIN 1. CATHODE<br/>2. COMMON ANODE<br/>3. CATHODE 2<br/>4. CATHODE 3<br/>5. CATHODE 4</p>  |
| <p>STYLE 6:<br/>PIN 1. EMITTER 2<br/>2. BASE 2<br/>3. EMITTER 1<br/>4. COLLECTOR<br/>5. COLLECTOR 2/BASE 1</p> | <p>STYLE 7:<br/>PIN 1. BASE<br/>2. EMITTER<br/>3. BASE<br/>4. COLLECTOR<br/>5. COLLECTOR</p> | <p>STYLE 8:<br/>PIN 1. CATHODE<br/>2. COLLECTOR<br/>3. N/C<br/>4. BASE<br/>5. EMITTER</p>      | <p>STYLE 9:<br/>PIN 1. ANODE<br/>2. CATHODE<br/>3. ANODE<br/>4. ANODE<br/>5. ANODE</p>           | <p>Note: Please refer to datasheet for style callout. If style type is not called out in the datasheet refer to the device datasheet pinout or pin assignment.</p> |

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DESCRIPTION:	SC-88A (SC-70-5/SOT-353)	PAGE 1 OF 1

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# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®



SCALE 2:1

### TSOP-5 CASE 483 ISSUE N

DATE 12 AUG 2020



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE. DIMENSION A.
5. OPTIONAL CONSTRUCTION: AN ADDITIONAL TRIMMED LEAD IS ALLOWED IN THIS LOCATION. TRIMMED LEAD NOT TO EXTEND MORE THAN 0.2 FROM BODY.

DIM	MILLIMETERS	
	MIN	MAX
A	2.85	3.15
B	1.35	1.65
C	0.90	1.10
D	0.25	0.50
G	0.95 BSC	
H	0.01	0.10
J	0.10	0.26
K	0.20	0.60
M	0°	10°
S	2.50	3.00

#### SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

#### GENERIC MARKING DIAGRAM\*



- XXX = Specific Device Code  
 A = Assembly Location  
 Y = Year  
 W = Work Week  
 ■ = Pb-Free Package
- XXX = Specific Device Code  
 M = Date Code  
 ■ = Pb-Free Package

(Note: Microdot may be in either location)

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present.

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DESCRIPTION:	TSOP-5	PAGE 1 OF 1

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# MECHANICAL CASE OUTLINE

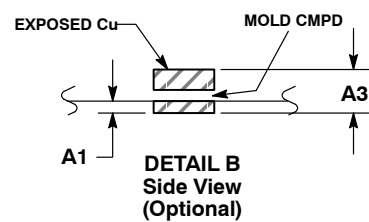
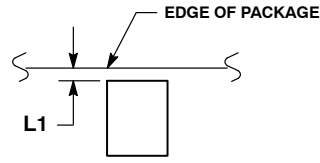
## PACKAGE DIMENSIONS

ON Semiconductor®



UDFN6, 1.2x1.0, 0.4P  
CASE 517AA-01  
ISSUE D

DATE 03 SEP 2010



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
  2. CONTROLLING DIMENSION: MILLIMETERS.
  3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 mm FROM TERMINAL.
  4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

MILLIMETERS		
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.127	REF
b	0.15	0.25
D	1.20	BSC
E	1.00	BSC
e	0.40	BSC
L	0.30	0.40
L1	0.00	0.15
L2	0.40	0.50

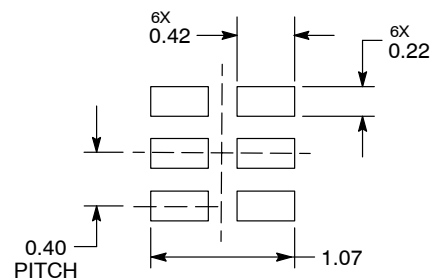
### GENERIC MARKING DIAGRAM\*



X = Specific Device Code  
M = Date Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.

### MOUNTING FOOTPRINT\*



DIMENSIONS: MILLIMETERS

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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<b>DESCRIPTION:</b>	<b>6 PIN UDFN, 1.2X1.0, 0.4P</b>	<b>PAGE 1 OF 1</b>

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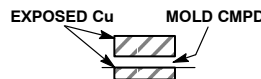
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



SCALE 4:1

UDFN6, 1.45x1.0, 0.5P  
CASE 517AQ  
ISSUE O

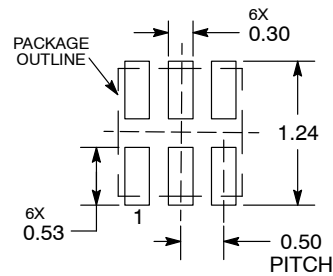
DATE 15 MAY 2008



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
  2. CONTROLLING DIMENSION: MILLIMETERS.
  3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.

MILLIMETERS		
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A2	0.07	REF
b	0.20	0.30
D	1.45	BSC
E	1.00	BSC
e	0.50	BSC
L	0.30	0.40
L1	---	0.15

### MOUNTING FOOTPRINT



DIMENSIONS: MILLIMETERS

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

### GENERIC MARKING DIAGRAM\*



X = Specific Device Code  
M = Date Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.

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# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



UDFN6, 1x1, 0.35P  
CASE 517BX  
ISSUE O

SCALE 4:1

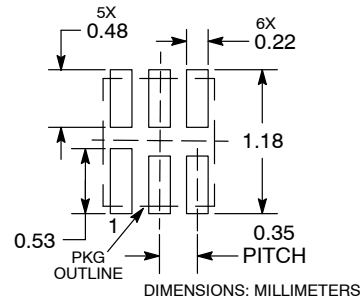
DATE 18 MAY 2011



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
  2. CONTROLLING DIMENSION: MILLIMETERS.
  3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.20 MM FROM TERMINAL TIP.
  4. PACKAGE DIMENSIONS EXCLUSIVE OF BURRS AND MOLD FLASH.

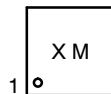
MILLIMETERS		
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.13	REF
b	0.12	0.22
D	1.00	BSC
E	1.00	BSC
e	0.35	BSC
L	0.25	0.35
L1	0.30	0.40

### RECOMMENDED SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

### GENERIC MARKING DIAGRAM\*



X = Specific Device Code  
M = Date Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®



SCALE 4:1

**SOT-953**  
CASE 527AE  
ISSUE E

DATE 02 AUG 2011



TOP VIEW

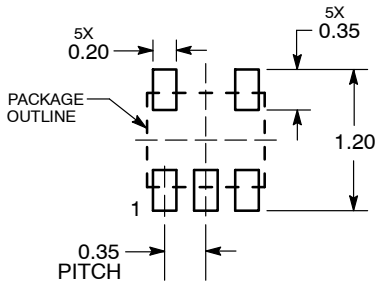


SIDE VIEW



BOTTOM VIEW

### SOLDERING FOOTPRINT\*



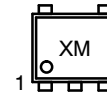
DIMENSIONS: MILLIMETERS

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.34	0.37	0.40
b	0.10	0.15	0.20
C	0.07	0.12	0.17
D	0.95	1.00	1.05
E	0.75	0.80	0.85
e	0.35 BSC		
H <sub>E</sub>	0.95	1.00	1.05
L	0.175 REF		
L2	0.05	0.10	0.15
L3	---	---	0.15

### GENERIC MARKING DIAGRAM\*



X = Specific Device Code  
M = Month Code

\*This information is generic. Please refer to device data sheet for actual part marking.  
Pb-Free indicator, "G" or microdot "▪", may or may not be present.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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<b>DESCRIPTION:</b>	<b>SOT-953</b>	<b>PAGE 1 OF 1</b>

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