TECH PUBLIC
台舟电子

MC74VHC1G14 Series

SINGLE SCHMITT-TRIGGER INVERTER

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Features

- Operation Voltage Range: 1.65V ~ 5.5V
- Power Down Protection
- ±24mA Output Drive (VCC=3.0V)
- Low Power Consumption, 10-μA Max ICC
- ESD Protection Exceeds JESD 22
  -2000-V Human-Body Model (A114-A)
  - 200-V Machine Model (A115-A)
  -1000-V Charged-Device Model (C101)

Applications

- AV Receiver
- Audio Dock:Portable
- Blu-ray Player and Home Theater
- Embedded PC
- Personal Digital Assistant(PDA)
- Power:Telecom/Server AC/DC Supply:Single Controller:Analog and Digital

General Description

The MC74VHC1G14 is a single Schmitt-trigger inverter, it provides the function $Y=\overline{A}$.
The device have different input threshold levels for positive going (VT+) and negative-going (VT-) signals because of the Schmitt-trigger action in the input.

Logic Diagram

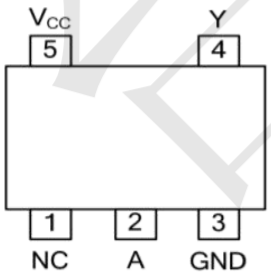
Logic symbol

IEC logic symbol

Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION
MC74VHC1G14DTT1G-TP	SOT23-5	Tape and Reel,3000
MC74VHC1G14DFT1G-TP	SOT353	Tape and Reel,3000

Pin Configuratio



SOT23-5
SOT353

Function Table

INPUT(A)	OUTPUT(Y)
L	H
H	L

Note:H: HIGH voltage level;L: LOW voltage level.

Absolute Maximum Ratings

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +6.5	V
Input Voltage	V_{IN}		-0.5 ~ +6.5	V
Output Voltage	V_{OUT}	Output in the Power-off state	-0.5 ~ +6.5	V
		Output in the High or Low state	-0.5 ~ $V_{CC+0.5}$	V
VCC or GND Current	I_{CC}	Output in the Power-off state	±100	mA
Continuous Output Current	I_{OUT}	V_{OUT}=0~V_{CC}	±50	mA
Input Clamp Current	I_{IK}	V_{IN}<0	-50	mA
Output Clamp Current	I_{OK}	V_{OUT}<0	-50	mA
Storage Temperature Range	T_{STG}		-65 ~ +150	℃
Junction to Ambient	θ_{JA}	SOT-23-5	230	℃/W
		SOT353	280	℃/W

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

Recommended Operating Conditions

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65	--	5.5	V
		Data retention only	1.5	--	--	V
Input Voltage	V_{IN}		0	--	5.5	V
Output Voltage	V_{OUT}	High or low state	0	--	VCC	V
Operating Temperature	T_A		-40	--	125	℃

Electrical Characteristics (unless otherwise specified)

PARAMETER	SYMBOL	TEST Conditions	TA =25°C			TA =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Positive-Going Input Threshold Voltage	V_{T+}	VCC=1.65V	0.79	--	1.16	0.76	--	1.16	V
		VCC=2.3V	1.11	--	1.56	1.07	--	1.56	V
		VCC=3V	1.5	--	1.87	1.47	--	1.87	V
		VCC=4.5V	2.16	--	2.74	2.13	--	2.74	V
		VCC=5.5V	2.61	--	3.33	2.58	--	3.33	V
Negative-Going Input Threshold Voltage	V_{T-}	V_{CC}=1.65V	0.39	--	0.62	0.39	--	0.65	V
		V_{CC}=2.3V	0.58	--	0.87	0.58	--	0.9	V
		V_{CC}=2.7V	0.84	--	1.14	0.84	--	1.17	V
		V_{CC}=4.5V	1.41	--	1.79	1.41	--	1.82	V
		V_{CC}=5.5V	1.87	--	2.29	1.87	--	2.31	V
Hysteresis Voltage (V_{T+}-V_{T-})	$\triangle V_T$	V_{CC}=1.65V	0.37	--	0.62	0.3	--	0.62	V
		V_{CC}=2.3V	0.48	--	0.77	0.42	--	0.77	V
		V_{CC}=2.7V	0.56	--	0.87	0.5	--	0.87	V
		V_{CC}=4.5V	0.71	--	1.04	0.65	--	1.04	V
		V_{CC}=5.5V	0.71	--	1.11	0.65	--	1.11	V
High-Level Output Voltage	V_{OH}	V_{CC}=1.65 ~ 5.5V, I_{OH}=-100μA	V_{CC}-0.1	--	--	V_{CC}-0.1	--	--	V
		V_{CC}=1.65V, I_{OH}=-4mA	1.2	1.54	--	0.95	--	--	V
		V_{CC}=2.3V, I_{OH}=-8mA	1.9	2.15	--	1.7	--	--	V
		V_{CC}=2.7V,I_{OH}=-16mA	2.2	2.5	--	1.9	--	--	V
		V_{CC}=3.0V,I_{OH}=-24mA	2.3	2.62	--	2.0	--	--	V
		V_{CC}=4.5V, I_{OH}=-32mA	3.8	4.11	--	3.4	--	--	V
Low-Level Output Voltage	V_{OL}	V_{CC}=1.65 ~ 5.5V, I_{OL}=100μA	--	--	0.1	--	--	0.1	V
		V_{CC}=1.65V, I_{OL}=4mA	--	0.07	0.45	--	--	0.7	V
		V_{CC}=2.3V, I_{OL}=8mA	--	0.12	0.3	--	--	0.45	V
		V_{CC}=2.7V,I_{OH}=16mA	--	0.17	0.4	--	--	0.6	V
		V_{CC}=3.0V,I_{OH}=24mA	--	0.33	0.55	--	--	0.8	V
		V_{CC}=4.5V, I_{OH}=32mA	--	0.39	0.55	--	--	0.8	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0 ~ 5.5V, V_{IN}=5.5V or GND	--	±0.1	±5	--	--	±5	uA
Power OFF Leakage Current	I_{OFF}	V_{CC}=0V, V_{IN} or V_{OUT}=5.5V	--	±0.1	±10	--	--	±10	uA
Quiescent Supply Current	I_Q	VCC=1.65 ~ 5.5V, VIN=VCC or GND, IOUT=0A	--	0.1	10	--	--	10	uA
Additional Quiescent Supply ent Per Input Pin	ΔI_Q	V_{CC}=3 ~ 5.5V, One input at V_{CC}-0.6V, Other inputs at V_{CC} or GND	--	5	500	--	--	500	uA

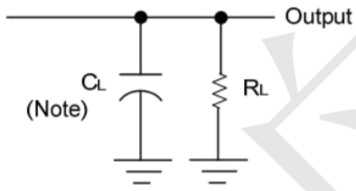
OPERATING CHARACTERISTICS (f=10MHz, TA =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
Input Capacitance	C_I	V_{CC}=3.3V, V_{IN}=V_{CC} or GND	--	5	--	pF
Power Dissipation Capacitance	C_{PD}	V_{CC}=3.3V, V_{IN}=GND or V_{CC}	--	15.4	--	pF

SWITCHING CHARACTERISTICS (TA =25°C , unless otherwise specified)

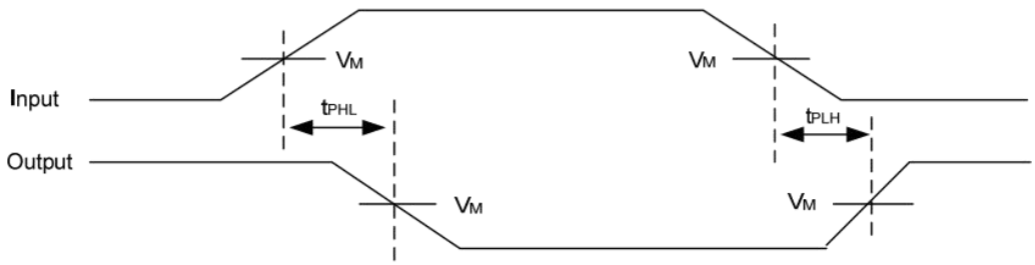
PARAMETER	SYMBOL	TEST Conditions	TA =25°C			TA =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A or B) to output(Y)	t_{PLH} / t_{PHL}	V_{CC}=1.65~1.95V,C_L=30 pF, R_L=1K	1	8	13	--	--	15	nS
		V_{CC}=2.3~2.7V,C_L=30 pF, R_L=500 Ω	0.7	5	9	--	--	11	nS
		V_{CC}=2.7V, C_L=50pF, R_L=500Ω	0.7	5	8	--	--	10	nS
		V_{CC}=3.0~3.6V, C_L=50pF, R_L=500Ω	0.7	4.5	7	--	--	9	nS
		V_{CC}=4.5~5.5V, C_L=50pF, R_L=500Ω	0.7	4	6	--	--	8	nS

TEST CIRCUIT AND WAVEFORMS



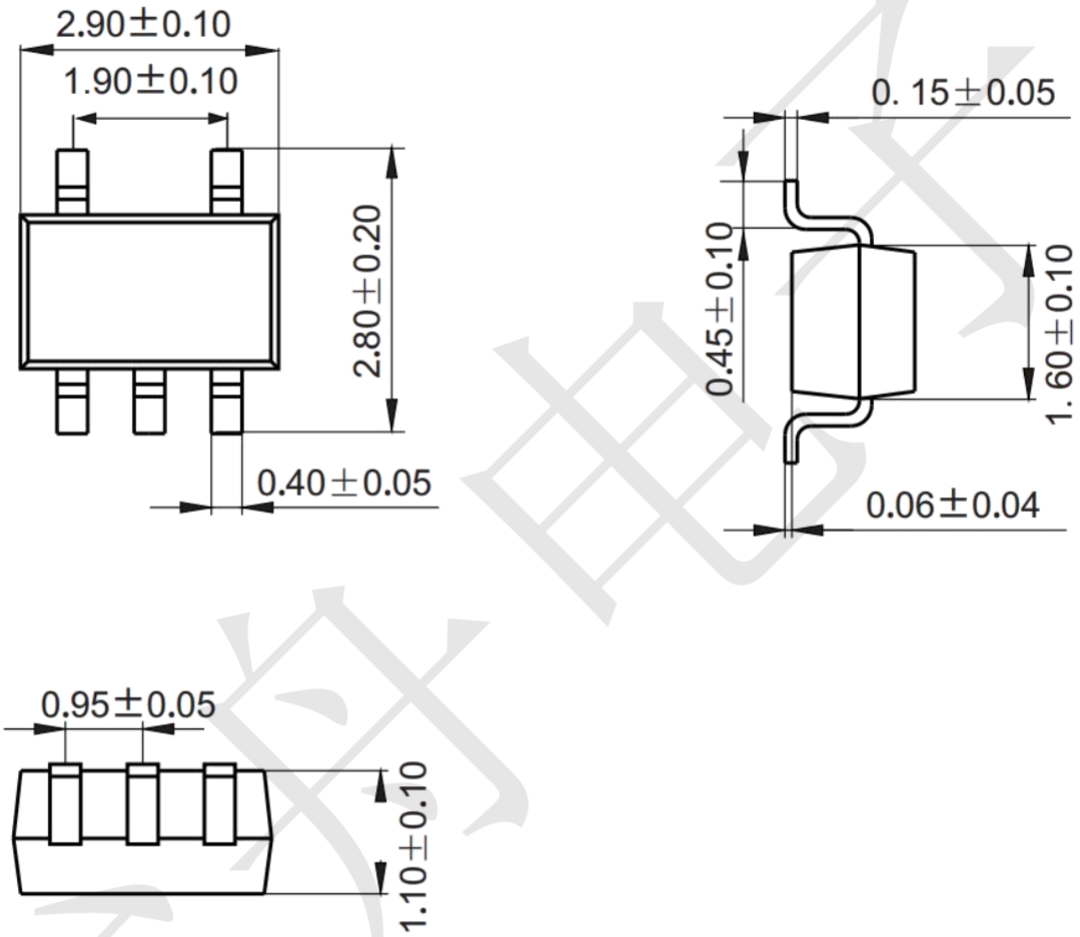
Note: C_L includes probe and jig capacitance.

V_{CC}	V_{IN}	t_R, t_F	V_M	C_L	R_L
1.65V~1.95V	V_{CC}	≤2ns	$\frac{V_{CC}}{2}$	30pF	1kΩ
2.3V~2.7V	V_{CC}	≤2ns	$\frac{V_{CC}}{2}$	30pF	500Ω
2.7V	2.7V	≤2.5ns	1.5V	50pF	500Ω
3.0V~3.6V	2.7V	≤2.5ns	1.5V	50pF	500Ω
4.5V~5.5V	V_{CC}	≤2.5ns	$\frac{V_{CC}}{2}$	50pF	500Ω

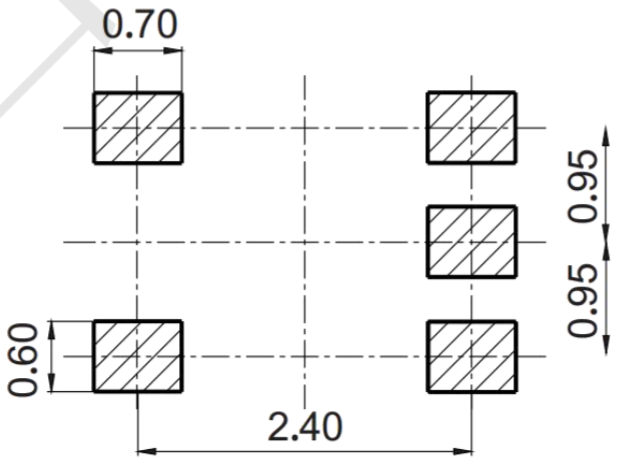


Package informantion

SOT23-5 (Unit: mm)

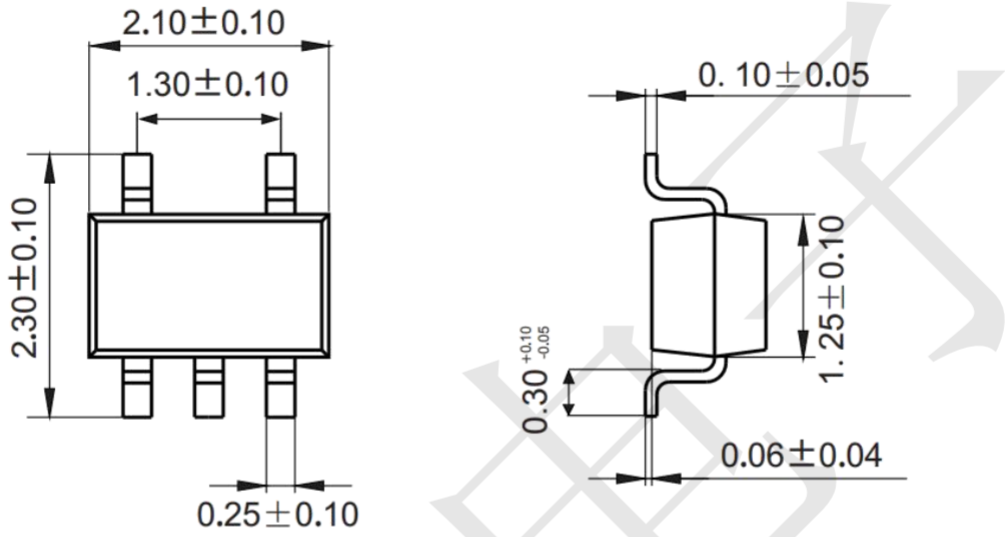


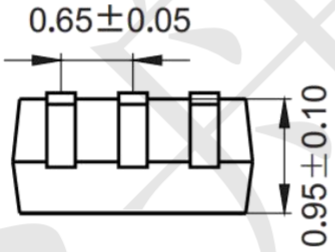
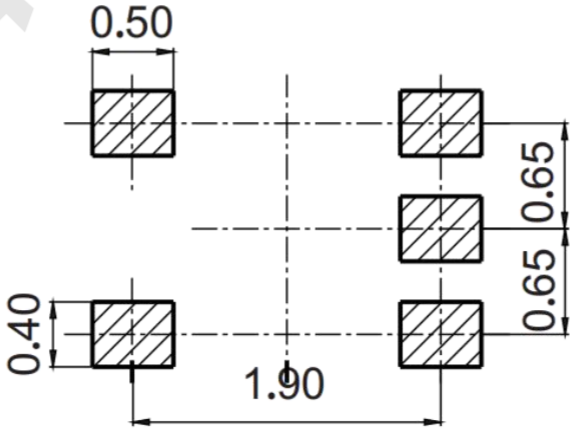
Mounting Pad Layout (unit: mm)



Package information

SOT353 (Unit: mm)





Mounting Pad Layout (unit: mm)