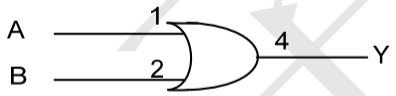
MC74VHC1G32 Series

2-INPUT NAND GATE

DESCRIPTION

The MC74VHC1G32 is a single 2-input positive-or gate, which provides the function Y=A+B in positive logic.

LOGIC DIAGRAM



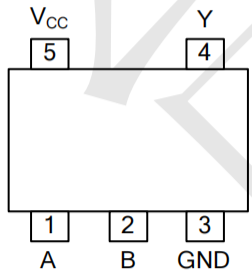
FEATURES

* Operate from 2V to 5.5V
* Max t_{PD} of 5.5ns at 5V

Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION
MC74VHC1G32DTT1G-TP	SOT23-5	Tape and Reel,3000
MC74VHC1G32DFT1G-TP	SOT353	Tape and Reel,3000

PIN CONFIGURATION



SOT23-5/
SOT353

FUNCTION TABLE

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

H = High voltage level ; L = Low voltage level ; X = Don't care

ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER		SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage		V_{CC}		-0.5 ~ 7	V
Input Voltage		V_{IN}		-0.5 ~ 7	V
Output Voltage		V_{OUT}		-0.5 ~ V_{CC} +0.5	V
V_{CC} or GND Current		I_{CC}		±50	mA
Output Current		I_{OUT}	V_{OUT}=0 ~ V_{CC}	±25	mA
Input Clamp Current		I_{IK}	V_{IN}<0	-20	mA
Output Clamp Current		I_{OK}	V_{OUT}<0 or V_{OUT}>V_{CC}	±20	mA
Power Dissipation	SOT23-5	P_D		300	mW
	SOT-353			250	mW
Storage Temperature		T_{STG}		-65 ~ +150	°C

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}		2		5.5	V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}	High or low state	0		V_{CC}	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	V_{CC}=3.3V±0.3V			100	ns/V
		V_{CC}=5.0V±0.5V			20	ns/V
Operating Temperature	T_A		-40		+125	°C

ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	V_{CC}=2.0V	1.5			V
		V_{CC}=3.0V	2.1			V
		V_{CC}=5.5V	3.85			V
Low-Level Input Voltage	V_{IL}	V_{CC}=2.0V			0.5	V
		V_{CC}=3.0V			0.9	V
		V_{CC}=5.5V			1.65	V
High-Level Output Voltage	V_{OH}	V_{CC}=2.0V, I_{OH}=-50μA	1.9	2.0		V
		V_{CC}=3.0V, I_{OH}=-50μA	2.9	3.0		V
		V_{CC}=4.5V, I_{OH}=-50μA	4.4	4.5		V
		V_{CC}=3.0V, I_{OH}=-4mA	2.58			V
		V_{CC}=4.5V, I_{OH}=-8mA	3.94			V
Low-Level Output Voltage	V_{OL}	V_{CC}=2.0V, I_{OL}=50μA			0.1	V
		V_{CC}=3.0V, I_{OL}=50μA			0.1	V
		V_{CC}=4.5V, I_{OL}=50μA			0.1	V
		V_{CC}=3.0V, I_{OL}=4mA			0.36	V
		V_{CC}=4.5V, I_{OL}=8mA			0.36	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0~5.5V, V_{IN}=5.5V or GND			±0.1	μA
Quiescent Supply Current	I_Q	V_{CC}=5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0A			1	μA
Input Capacitance	C_I	V_{CC}=5.0V, V_{IN}=V_{CC} or GND		2	10	pF

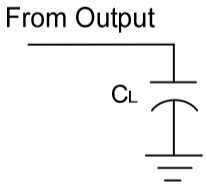
DYNAMIC CHARACTERISTICS (T_A=25°C, Input: $_R$, t_F≤3ns; P_{RR}≤1MHz)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay Time Input (A or B) to Output (Y)	t_{PLH}	V_{CC}=3.3V±0.3V, C_L=15pF		5.5	7.9	ns
	t_{PHL}			5.5	7.9	
	t_{PLH}	V_{CC}=3.3V±0.3V, C_L=50pF		8	12	
	t_{PHL}			8	12	
Propagation Delay Time Input (A or B) to Output (Y)	t_{PLH}	V_{CC}=5V±0.5V, C_L=15pF		3.8	5.5	ns
	t_{PHL}			3.8	5.5	
	t_{PLH}	V_{CC}=5V±0.5V, C_L=50pF		5.3	7.5	
	t_{PHL}			5.3	7.5	

OPERATING CHARACTERISTICS(T_A=25°C, unless otherwise specified)

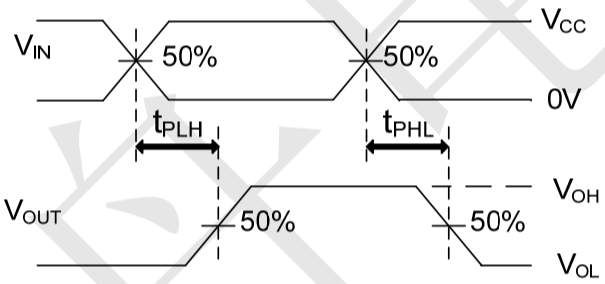
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No load, V_{CC}=5V, f=1MHz		14		pF

TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

SETUP TIME AND HOLD TIME



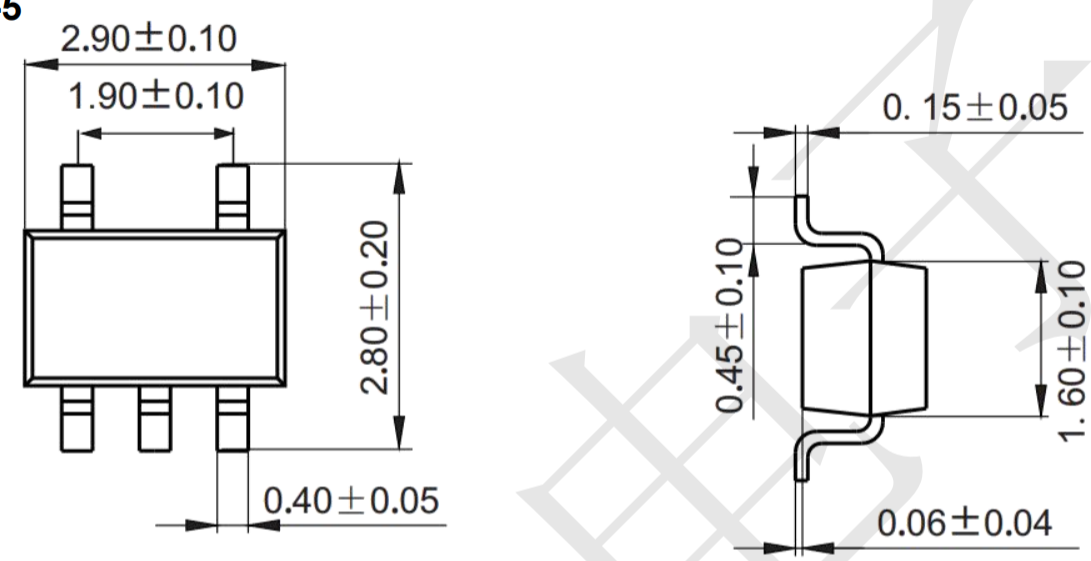
PROPAGATION DELAY TIMES

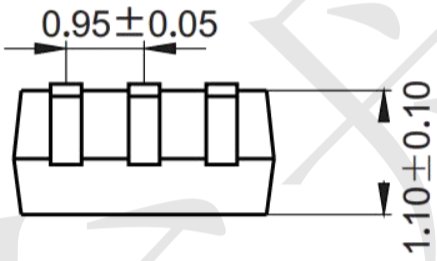
Note: C_L includes probe and jig capacitance.

$P_{RR} \leqq 1MHz$, $Z_O = 50\Omega$, $t_R \leqq 3ns$, $t_F \leqq 3ns$

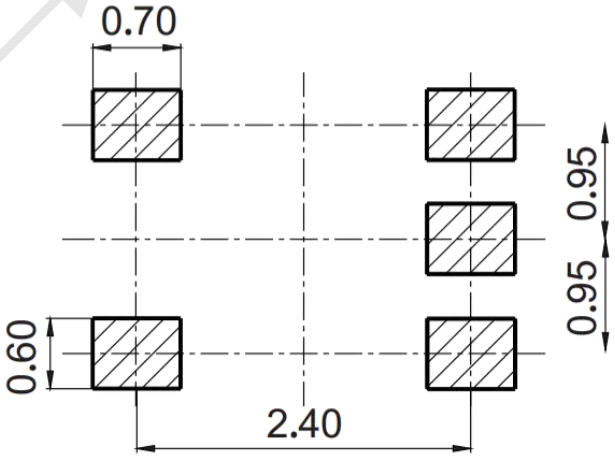
Package information (Unit: mm)

SOT23-5



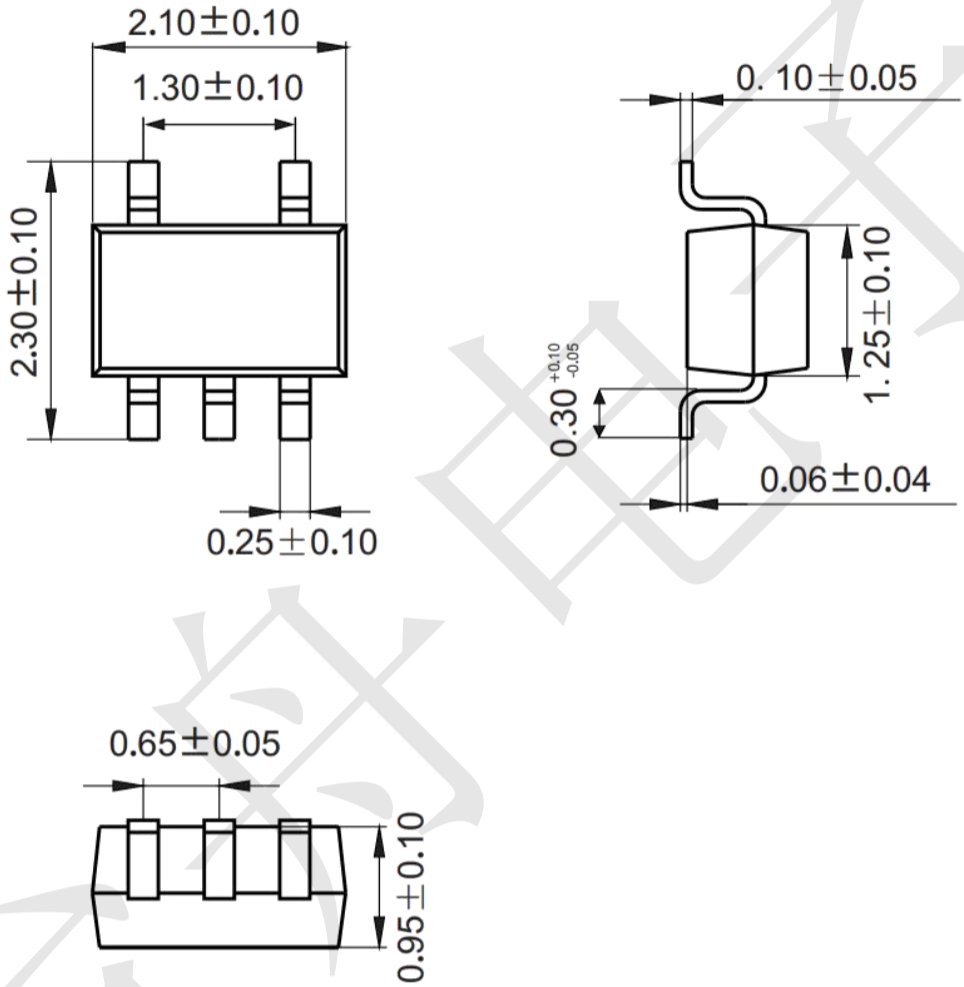
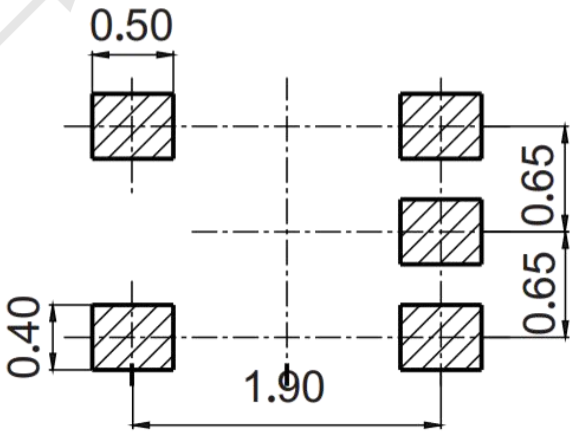


Mounting Pad Layout (Unit: mm)



Package information (Unit: mm)

SOT353



Mounting Pad Layout (Unit: mm)