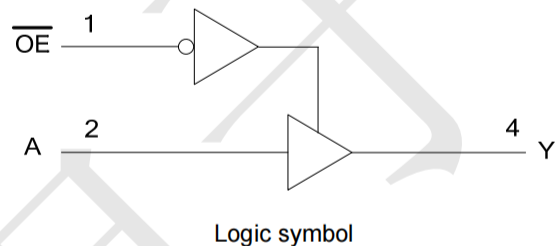


DESCRIPTION

The MC74VHC1G125 is a single bus buffer gate/line driver with 3-state output. When $\overline{OE}$ is high, the Y output are in a high-impedance state. When $\overline{OE}$ is low, the device passes noninverted data from the A input to the Y output.

To ensure the high-impedance state during power up or power down, $\overline{OE}$ should be tied to V_{CC} through a pull-up resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

LOGIC DIAGRAM



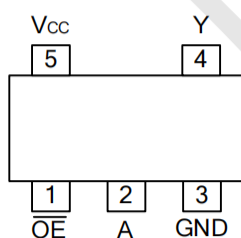
FEATURES

- * Wide supply voltage range from 2V to 5.5V
- * Max t_{PD} of 6 ns from A to Y at 5V
- * Low power consumption, $I_{CC} = 1\mu A$ (Max) at 5.5V
- * $\pm 8mA$ output driver at 5V

Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION
MC74VHC1G125DTT1G-TP	SOT23-5	Tape and Reel,3000
MC74VHC1G125DFT1G-TP	SOT353	Tape and Reel,3000

PIN CONFIGURATION



SOT23-5/
SOT353

FUNCTION TABLE

INPUT		OUTPUT
$\overline{OE}$	A	Y
L	H	H
L	L	L
H	X	Z

ABSOLUTE MAXIMUM RATING (unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage Range	V_{CC}	-0.5~7	V
Input Voltage Range	V_{IN}	-0.5~7	V
Output Voltage Range	V_{OUT}	-0.5~ V_{CC} +0.5	V
Input Clamp Current ($V_{IN} < 0$)	I_{IK}	-20	mA
Output Clamp Current ($V_{OUT} < 0$, or $V_{OUT} > V_{CC}$)	I_{OK}	±20	mA
Output Current	I_{OUT}	±25	mA
V_{CC} or GND Current	I_{CC}	±50	mA
Storage Temperature	T_{STG}	-65 ~ +150	°C

Notes: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2. 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.

THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT23-5	θ_{JA}	280	°C/W
	SOT-353		350	

RECOMMENDED OPERATING COMDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2		5.5	V
High-Level Input Voltage	V_{IH}	$V_{CC} = 2V$	1.5			V
		$V_{CC} = 3V$	2.1			
		$V_{CC} = 5.5V$	3.85			
Low-Level Input Voltage	V_{IL}	$V_{CC} = 2V$			0.5	V
		$V_{CC} = 3V$			0.9	
		$V_{CC} = 5.5V$			1.65	
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	V
High-Level Output Current	I_{OH}	$V_{CC} = 2V$			-50	μA
		$V_{CC} = 3.3 \pm 0.3V$			-4	mA
		$V_{CC} = 5 \pm 0.5V$			-8	
Low-Level Output Current	I_{OL}	$V_{CC} = 2V$			50	μA
		$V_{CC} = 3.3 \pm 0.3V$			4	mA
		$V_{CC} = 5 \pm 0.5V$			8	
Input Transition Rise or Fall Rate	$\Delta t / \Delta V$	$V_{CC} = 3.3 \pm 0.3V$			100	ns/V
		$V_{CC} = 5 \pm 0.5V$			20	
Operating Temperature	T_A		-40		125	°C

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V_{OH}	$V_{CC} = 2\text{V}, I_{OH} = -50\ \mu\text{A}$	1.9	2		V
		$V_{CC} = 3\text{V}, I_{OH} = -50\ \mu\text{A}$	2.9	3		
		$V_{CC} = 4.5\text{V}, I_{OH} = -50\ \mu\text{A}$	4.4	4.5		
		$V_{CC} = 3\text{V}, I_{OH} = -4\ \text{mA}$	2.58			
		$V_{CC} = 4.5\text{V}, I_{OH} = -8\ \text{mA}$	3.94			
Low-Level Output Voltage	V_{OL}	$V_{CC} = 2\text{V}, I_{OL} = 50\ \mu\text{A}$			0.1	V
		$V_{CC} = 3\text{V}, I_{OL} = 50\ \mu\text{A}$			0.1	
		$V_{CC} = 4.5\text{V}, I_{OL} = 50\ \mu\text{A}$			0.1	
		$V_{CC} = 3\text{V}, I_{OL} = 4\ \text{mA}$			0.36	
		$V_{CC} = 4.5\text{V}, I_{OL} = 8\ \text{mA}$			0.36	
Input Leakage Current (A or $\overline{OE}$ input)	$I_{(LEAK)}$	$V_{CC} = 0\text{ to }5.5\text{V}, V_{IN} = 5.5\text{V or GND}$			± 0.1	μA
High-Impedance State Current	I_{OZ}	$V_{CC} = 5.5\text{V}, V_{IN} = V_{CC}\text{ or GND}$			± 0.25	μA
Quiescent Supply Current	I_{CC}	$V_{CC} = 5.5\text{V}, V_{IN} = V_{CC}\text{ or GND}, I_{OUT} = 0$			1	μA
Input Capacitance	C_{IN}	$V_{CC} = 5\text{V}, V_{IN} = V_{CC}\text{ or GND}$		4	10	pF
Output Capacitance	C_{OUT}	$V_{CC} = 5\text{V}, V_O = V_{CC}\text{ or GND}$		10		pF

SWITCHING CHARACTERISTICS ($V_{CC} = 3.3\text{V} \pm 0.3\text{V}, T_A = 25^\circ\text{C}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input A to output Y, t_{PD}	t_{PLH}	$C_L = 15\text{pF}, R_L = 1\text{k}\Omega$		5.6	8	ns
		$C_L = 50\text{pF}, R_L = 1\text{k}\Omega$		8.1	11.5	
	t_{PHL}	$C_L = 15\text{pF}, R_L = 1\text{k}\Omega$		5.6	8	ns
		$C_L = 50\text{pF}, R_L = 1\text{k}\Omega$		8.1	11.5	
Propagation delay from input $\overline{OE}$ to output Y, t_{EN}	t_{PZH}	$C_L = 15\text{pF}, R_L = 1\text{k}\Omega$		5.4	8	ns
		$C_L = 50\text{pF}, R_L = 1\text{k}\Omega$		7.9	11.5	
	t_{PZL}	$C_L = 15\text{pF}, R_L = 1\text{k}\Omega$		5.4	8	ns
		$C_L = 50\text{pF}, R_L = 1\text{k}\Omega$		7.9	11.5	
Propagation delay from input $\overline{OE}$ to output Y, t_{DIS}	t_{PHZ}	$C_L = 15\text{pF}, R_L = 1\text{k}\Omega$		7	9.7	ns
		$C_L = 50\text{pF}, R_L = 1\text{k}\Omega$		9.5	13.2	
	t_{PLZ}	$C_L = 15\text{pF}, R_L = 1\text{k}\Omega$		7	9.7	ns
		$C_L = 50\text{pF}, R_L = 1\text{k}\Omega$		9.5	13.2	

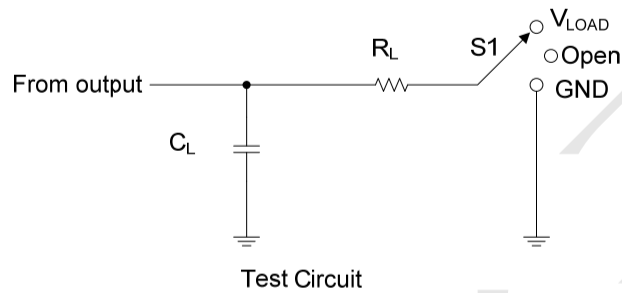
SWITCHING CHARACTERISTICS ($V_{CC} = 5\text{V} \pm 0.5\text{V}, T_A = 25^\circ\text{C}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input A to output Y, t_{PD}	t_{PLH}	$C_L = 15\text{pF}, R_L = 1\text{k}\Omega$		3.8	5.5	ns
		$C_L = 50\text{pF}, R_L = 1\text{k}\Omega$		5.3	7.5	
	t_{PHL}	$C_L = 15\text{pF}, R_L = 1\text{k}\Omega$		3.8	5.5	ns
		$C_L = 50\text{pF}, R_L = 1\text{k}\Omega$		5.3	7.5	
Output enable time from input $\overline{OE}$ to output Y, t_{EN}	t_{PZH}	$C_L = 15\text{pF}, R_L = 1\text{k}\Omega$		3.6	5.1	ns
		$C_L = 50\text{pF}, R_L = 1\text{k}\Omega$		5.1	7.1	
	t_{PZL}	$C_L = 15\text{pF}, R_L = 1\text{k}\Omega$		3.6	5.1	ns
		$C_L = 50\text{pF}, R_L = 1\text{k}\Omega$		5.1	7.1	
Output disable time from input $\overline{OE}$ to output Y, t_{DIS}	t_{PHZ}	$C_L = 15\text{pF}, R_L = 1\text{k}\Omega$		4.6	6.8	ns
		$C_L = 50\text{pF}, R_L = 1\text{k}\Omega$		6.1	8.8	
	t_{PLZ}	$C_L = 15\text{pF}, R_L = 1\text{k}\Omega$		4.6	6.8	ns
		$C_L = 50\text{pF}, R_L = 1\text{k}\Omega$		6.1	8.8	

OPERATING CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

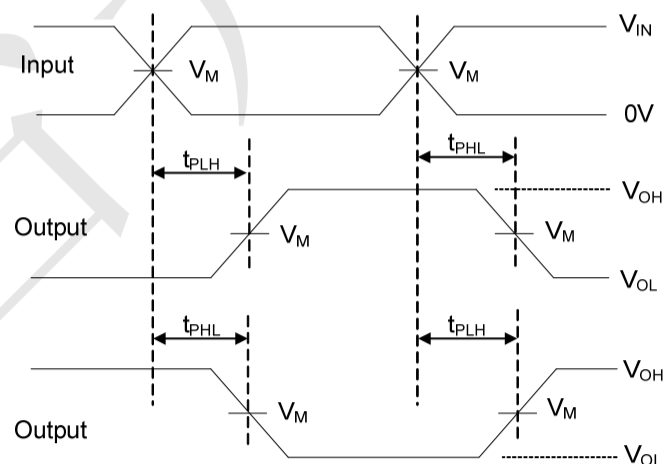
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power dissipation capacitance	C_{PD}	$V_{CC} = 5\text{V}, f = 1\text{MHz}, \text{No load}$		14		pF

TEST CIRCUIT AND WAVEFORMS



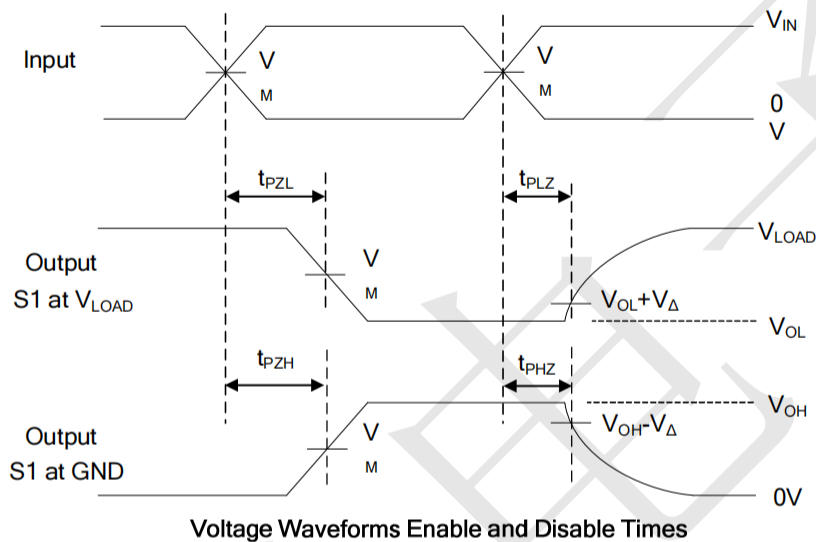
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

V_{CC}	Input		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_{IN}	t_R, t_F					
$3.3V \pm 0.3V$	V_{CC}	$\leq 3ns$	$V_{CC}/2$	V_{CC}	15pF	1k Ω	0.3V
					50pF		
$5V \pm 0.5V$	V_{CC}	$\leq 3ns$	$V_{CC}/2$	V_{CC}	15pF	1k Ω	0.5V
					50pF		



Voltage Waveforms Propagation Delay Times

TEST CIRCUIT AND WAVEFORMS(Cont.)

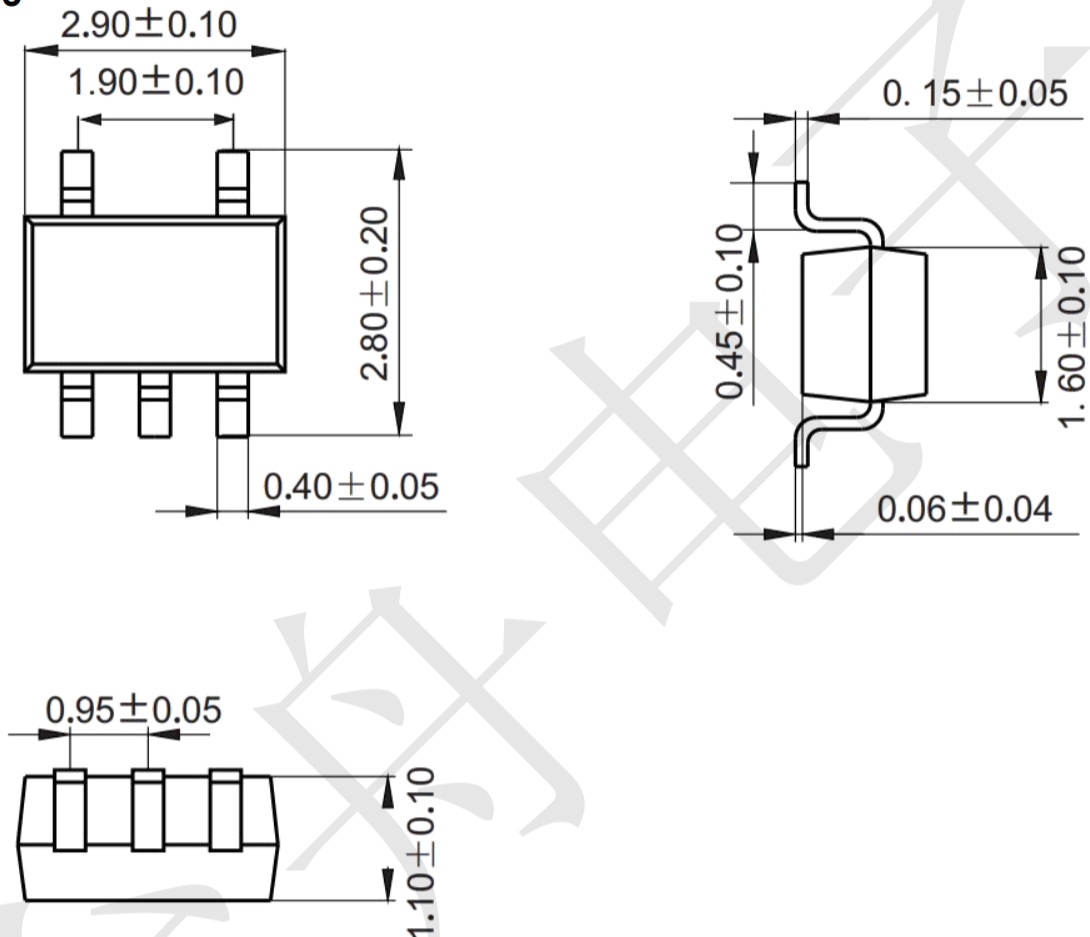


Notes: 1. C_L includes probe and jig capacitance.

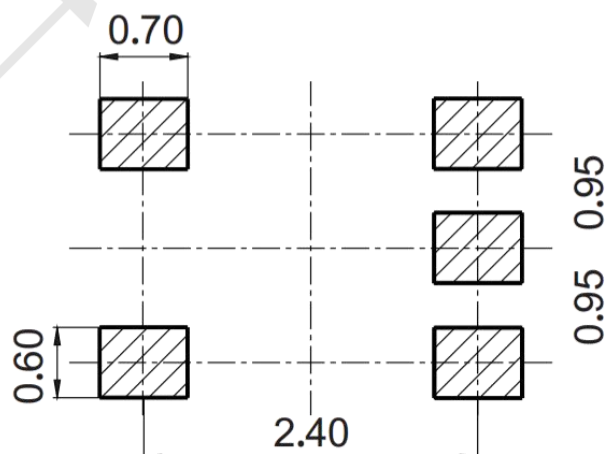
2. All input pulses are supplied by generators having the following characteristics: $P_{RR} \leq 1\text{MHz}$, $Z_O = 50\Omega$.

Package information (Unit: mm)

SOT23-5

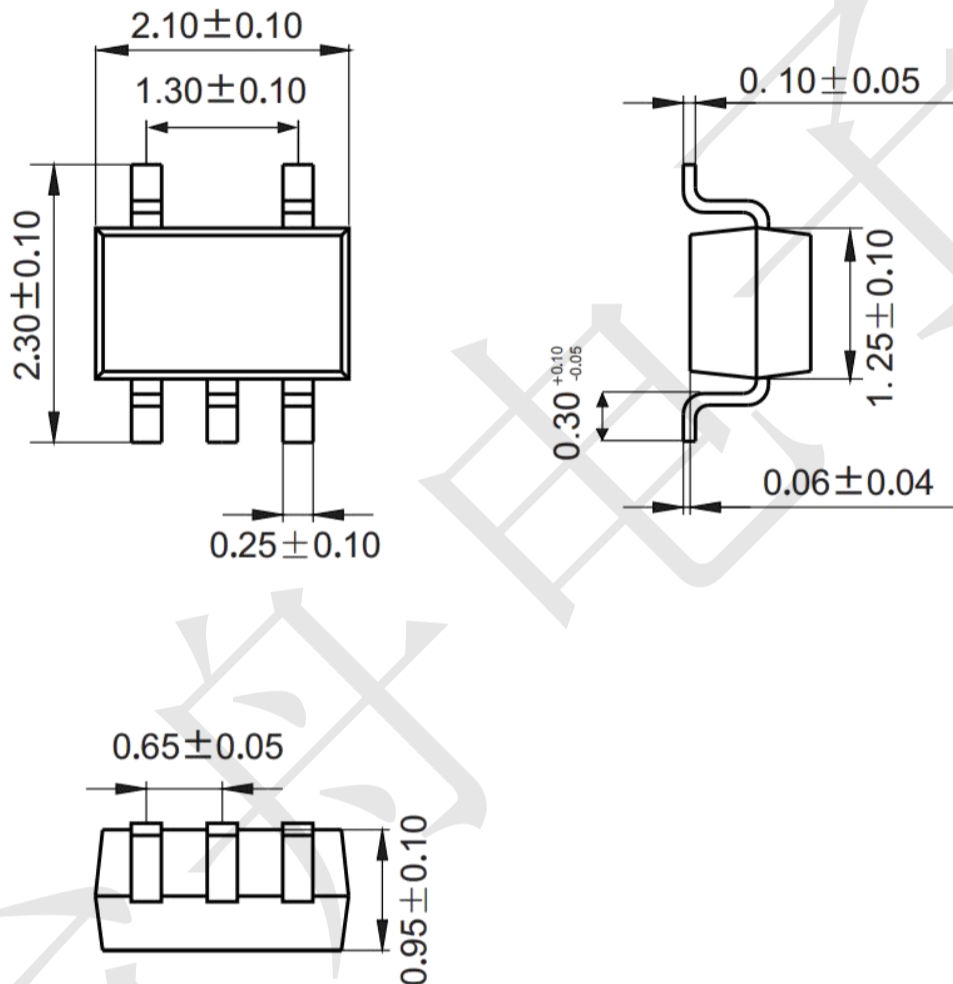


Mounting Pad Layout (Unit: mm)



Package information (Unit: mm)

SOT353



Mounting Pad Layout (Unit: mm)

