

## Features

- Operate from 1.6V to 5.5V
- Low Power Current:  $I_{CC}=10\mu A$  (Max.)
- $\pm 8mA$  Output Drive ( $V_{CC}=5.0V$ )
- Power Down Protection
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 200-V Machine Model (A115-A)
  - 1000-V Charged-Device Model (C101)

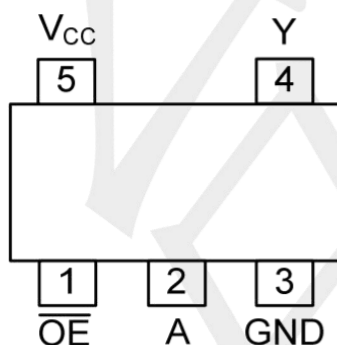
## General Description

The TP74LV1T125 is a single, level translating buffer driver with 3-state output. The 3-state output is controlled by the output enable input (OE). A HIGH-level at OE causes the output to assume a high-impedance OFF-state. The output level is referenced to the supply voltage and supports 1.8V, 2.5V, 3.3V and 5.0V CMOS levels. The low threshold inputs support 1.8V input logic at  $V_{CC} = 3.3V$  and can be used in 1.8V to 3.3V level up translation. In addition, the 5V tolerant input pins enable down translation (3.3V to 2.5V output at  $V_{CC} = 2.5V$ ).

## Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION
TP74LV1T125S5	SOT23-5	Tape and Reel,3000
TP74LV1T125C5	SOT353	Tape and Reel,3000

## Pin Configuratio

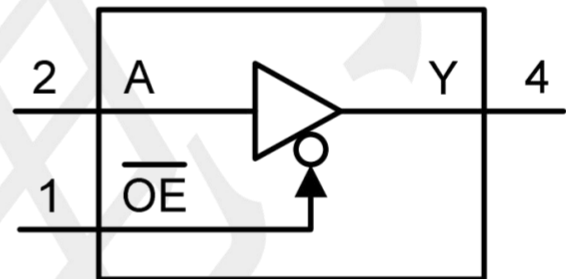


SOT23-5 / SOT353

## 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
- Solid State Drive(SSD): Client and Enterprise
- Wireless Headset, Keyboard, and Mouse

## Logic Diagram



Logic Symbol

## Function Table

INPUT (Lower Level Input)		OUTPUT ( $V_{CC}$ CMOS)
$\overline{OE}$ (Note 3)	A	Y
L	H	H
L	L	L
H	X	Z

### Notes:

1. H = HIGH Voltage Level; L = LOW Voltage Level; X = Do not care; Z = high-impedance.
2. H = Driving High; L = Driving Low; Z = High-Impedance State.
3. Not recommend to float  $\overline{OE}$  pin for signal oscillation.

## Absolute Maximum Ratings

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	$V_{CC}$		-0.5 ~ 7	V
Input Voltage (Note 2)	$V_{IN}$		-0.5 ~ 7	V
Output Voltage (Note 2)	$V_{OUT}$	Output in the high-impedance or power-off state	-0.5 ~ 4.6	V
		Output in the high or low state	-0.5 ~ $V_{CC}+0.5$	V
Continuous Output Current	$I_{OUT}$		$\pm 25$	mA
Continuous current through		$V_{CC}$ or GND	$\pm 50$	mA
Input Clamp Current	$I_{IK}$	$V_{IN} < 0$	-20	mA
Output Clamp Current	$I_{OK}$	$V_{OUT} < 0$ or $V_{OUT} > V_{CC}$	$\pm 20$	mA
Storage Temperature Range	$T_{STG}$		-65 ~ +150	°C

### Notes:

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

## Recommended Operating Conditions

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$	Operating	1.6	--	5.5	V
Input Voltage	$V_{IN}$		0	--	5.5	V
Output Voltage	$V_{OUT}$		0	--	$V_{CC}$	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=1.8V$	--	--	20	ns/V
		$V_{CC}=3.3V$ or $2.5V$	--	--	20	ns/V
		$V_{CC}=5V$	--	--	20	ns/V
Operating Temperature	$T_A$		-40	--	+125	°C

## STATIC CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
High-Level Input Voltage	V <sub>IH</sub>	V <sub>CC</sub> =1.65V~1.8V	0.95	--	--	V	
		V <sub>CC</sub> =2.0V	0.99	--	--	V	
		V <sub>CC</sub> =2.25V~2.5V	1.145	--	--	V	
		V <sub>CC</sub> =2.75V	1.22	--	--	V	
		V <sub>CC</sub> =3V~3.3V	1.37	--	--	V	
		V <sub>CC</sub> =3.6V	1.47	--	--	V	
		V <sub>CC</sub> =4.5V~5.0V	2.02	--	--	V	
		V <sub>CC</sub> =5.5V	2.1	--	--	V	
Low-Level Input Voltage	V <sub>IL</sub>	V <sub>CC</sub> =1.65V~2V	--	--	0.57	V	
		V <sub>CC</sub> =2.25V~2.75V	--	--	0.75	V	
		V <sub>CC</sub> =3V~3.6V	--	--	0.8	V	
		V <sub>CC</sub> =4.5V~5.5V	--	--	0.8	V	
High-Level Output Voltage	V <sub>OH</sub>	V <sub>CC</sub> =1.65V ~ 5.5V, I <sub>OH</sub> =-20μA	V <sub>CC</sub> -0.1	--	--	V	
		V <sub>CC</sub> =1.65V	I <sub>OH</sub> =-2mA	1.28	--	--	V
		V <sub>CC</sub> =1.8V		1.5	--	--	V
		V <sub>CC</sub> =2.3V, I <sub>OH</sub> =-3mA	2	--	--	V	
		V <sub>CC</sub> =2.5V, I <sub>OH</sub> =-3mA	2.25	--	--	V	
		V <sub>CC</sub> =3V	I <sub>OH</sub> =-3mA	2.78	--	--	V
		I <sub>OH</sub> =-5.5mA		2.6	--	--	V
		V <sub>CC</sub> =3.3V, I <sub>OH</sub> =-5.5mA	2.9	--	--	V	
		V <sub>CC</sub> =4.5V	I <sub>OH</sub> =-4mA	4.2	--	--	V
		I <sub>OH</sub> =-8mA		4.1	--	--	V
V <sub>CC</sub> =5V, I <sub>OH</sub> =-8mA	4.6	--	--	V			
Low-Level Output Voltage	V <sub>OL</sub>	V <sub>CC</sub> =1.65V ~ 5.5V, I <sub>OL</sub> =20μA	--	--	0.1	V	
		V <sub>CC</sub> =1.65V, I <sub>OL</sub> =2mA	--	--	0.2	V	
		V <sub>CC</sub> =2.3V, I <sub>OL</sub> =3mA	--	--	0.15	V	
		V <sub>CC</sub> =3V	I <sub>OL</sub> =3mA	--	--	0.11	V
		I <sub>OL</sub> =5.5mA		--	--	0.21	V
		V <sub>CC</sub> =4.5V	I <sub>OL</sub> =4mA	--	--	0.15	V
		I <sub>OL</sub> =8mA		--	--	0.3	V

## STATIC CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
A Input Leakage Current	$I_{I(LEAK)}$	A Input $V_{CC} = 0V, 1.8V, 2.5V, 3.3V, 5.5V,$ $V_{IN} = 0V$ or $V_{CC}$	--	--	0.1	$\mu A$	
Quiescent Supply Current	$I_Q$	$V_{CC} = 1.8V, 2.5V, 3.3V, 5V, V_{IN} = 0V$ or $V_{CC}, I_O = 0$ ; Open on loading	--	--	1.0	$\mu A$	
Additional Quiescent Supply Current	$I_Q$	$V_{CC} = 5.5V$ , one input at 0.3V or 3.4V, other inputs at 0 or $V_{CC}, I_O = 0$	--	--	1.35	mA	
		$V_{CC} = 1.8V$ , one input at 0.3V or 1.1V, other inputs at 0 or $V_{CC}, I_O = 0$	--	--	10	$\mu A$	
Input Capacitance	$C_{IN}$	$V_{CC} = 3.3V, V_{IN} = V_{CC}$ or GND	--	2.0	--	pF	
Output Capacitance	$C_{OUT}$	$V_{CC} = 3.3V, V_{OUT} = V_{CC}$ or GND	--	2.5	--	pF	
Power Dissipation Capacitance	$C_{PD}$	f=1MHz and 10MHz	$V_{CC} = 1.8V \pm 0.15V$	--	14	--	pF
			$V_{CC} = 2.5V \pm 0.2V$	--	14	--	pF
			$V_{CC} = 3.3V \pm 0.3V$	--	14	--	pF
			$V_{CC} = 5V \pm 0.5V$	--	14	--	pF

## THERMAL DATA

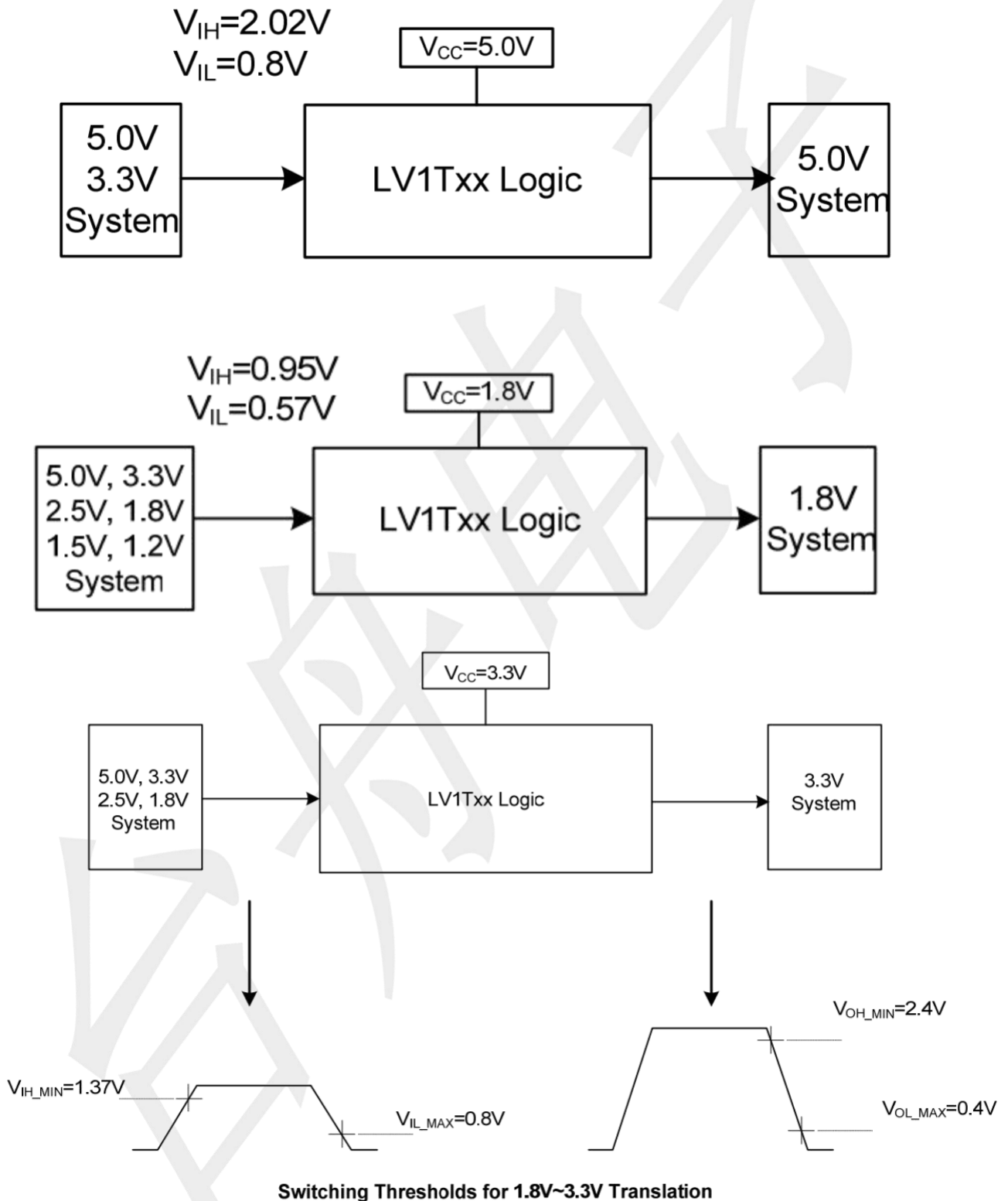
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-25	230	$^{\circ}C/W$
	SOT-353	350	$^{\circ}C/W$

## DYNAMIC CHARACTERISTICS

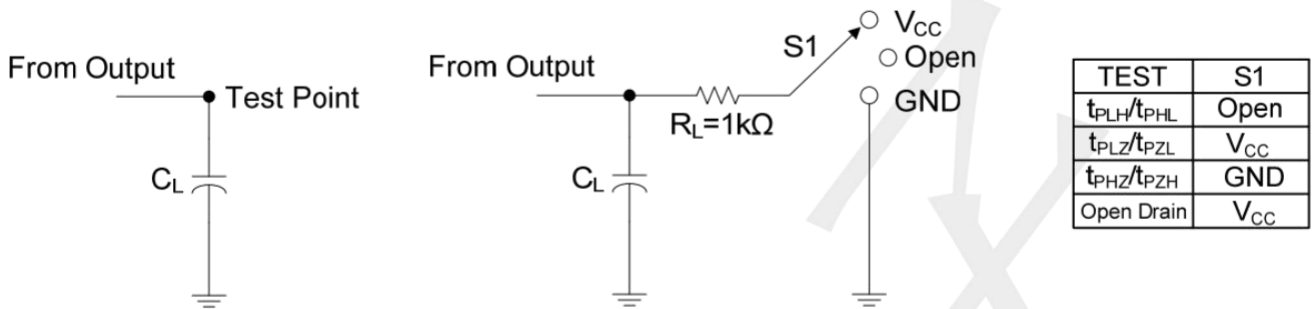
( $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input (Any In) to output(Y)	$t_{PLH}/t_{PHL}$	$C_L=15\text{pF}$	$V_{CC}=1.8\text{V}$	--	10.5	13	ns
			$V_{CC}=2.5\text{V}$	--	5.8	8.5	ns
			$V_{CC}=3.3\text{V}$	--	4.0	7.0	ns
			$V_{CC}=5\text{V}$	--	2.7	5.5	ns
		$C_L=30\text{pF}$	$V_{CC}=1.8\text{V}$	--	12	14.5	ns
			$V_{CC}=2.5\text{V}$	--	6.5	9.5	ns
			$V_{CC}=3.3\text{V}$	--	4.9	8.0	ns
			$V_{CC}=5\text{V}$	--	3.0	6.5	ns
Propagation delay from input (OE) to output(Y)	$t_{PZH}/t_{PZL}$	$C_L=15\text{pF}$	$V_{CC}=1.8\text{V}$	--	9.0	12	ns
			$V_{CC}=2.5\text{V}$	--	5.5	8.0	ns
			$V_{CC}=3.3\text{V}$	--	4.0	6.5	ns
			$V_{CC}=5\text{V}$	--	3.0	5.0	ns
		$C_L=30\text{pF}$	$V_{CC}=1.8\text{V}$	--	12.5	15	ns
			$V_{CC}=2.5\text{V}$	--	7.0	10	ns
			$V_{CC}=3.3\text{V}$	--	5.0	8.0	ns
			$V_{CC}=5\text{V}$	--	4.3	6.5	ns
Propagation delay from input (OE) to output(Y)	$t_{PHZ}/t_{PLZ}$	$C_L=15\text{pF}$	$V_{CC}=1.8\text{V}$	--	8.0	10	ns
			$V_{CC}=2.5\text{V}$	--	5.0	11	ns
			$V_{CC}=3.3\text{V}$	--	4.5	7.0	ns
			$V_{CC}=5\text{V}$	--	4.2	6.5	ns
		$C_L=30\text{pF}$	$V_{CC}=1.8\text{V}$	--	8.5	11	ns
			$V_{CC}=2.5\text{V}$	--	6.0	9.0	ns
			$V_{CC}=3.3\text{V}$	--	5.0	8.0	ns
			$V_{CC}=5\text{V}$	--	4.8	8.0	ns

## TYPICAL DESIGN EXAMPLES

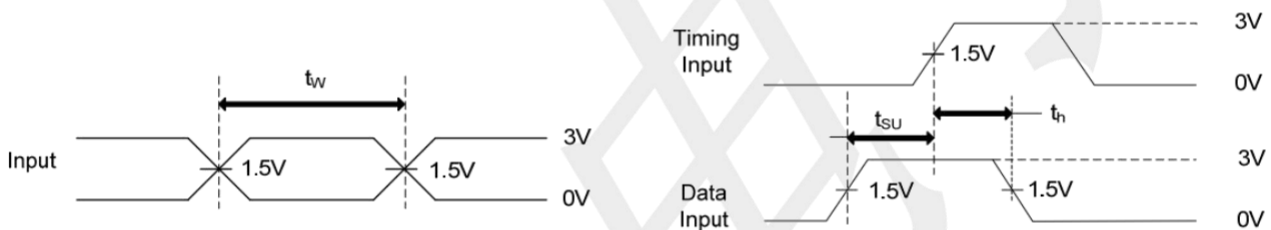


## TEST CIRCUIT AND WAVEFORMS



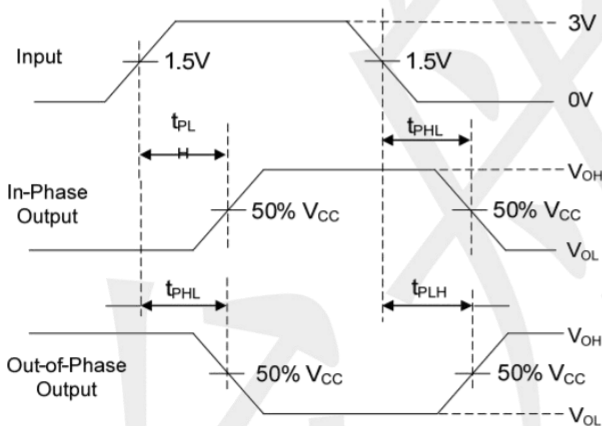
LOAD CIRCUIT FOR TOTEM-POLE OUTPUTS

LOAD CIRCUIT FOR 3-STATE AND OPEN-DRAIN OUTPUTS

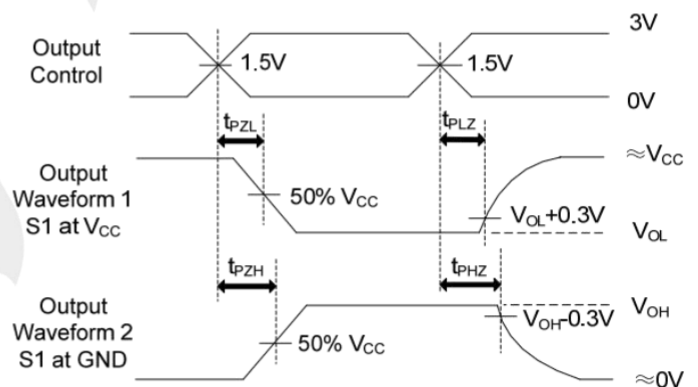


PULSE DURATION

SETUP AND HOLD TIMES



PROPAGATION DELAY TIMES



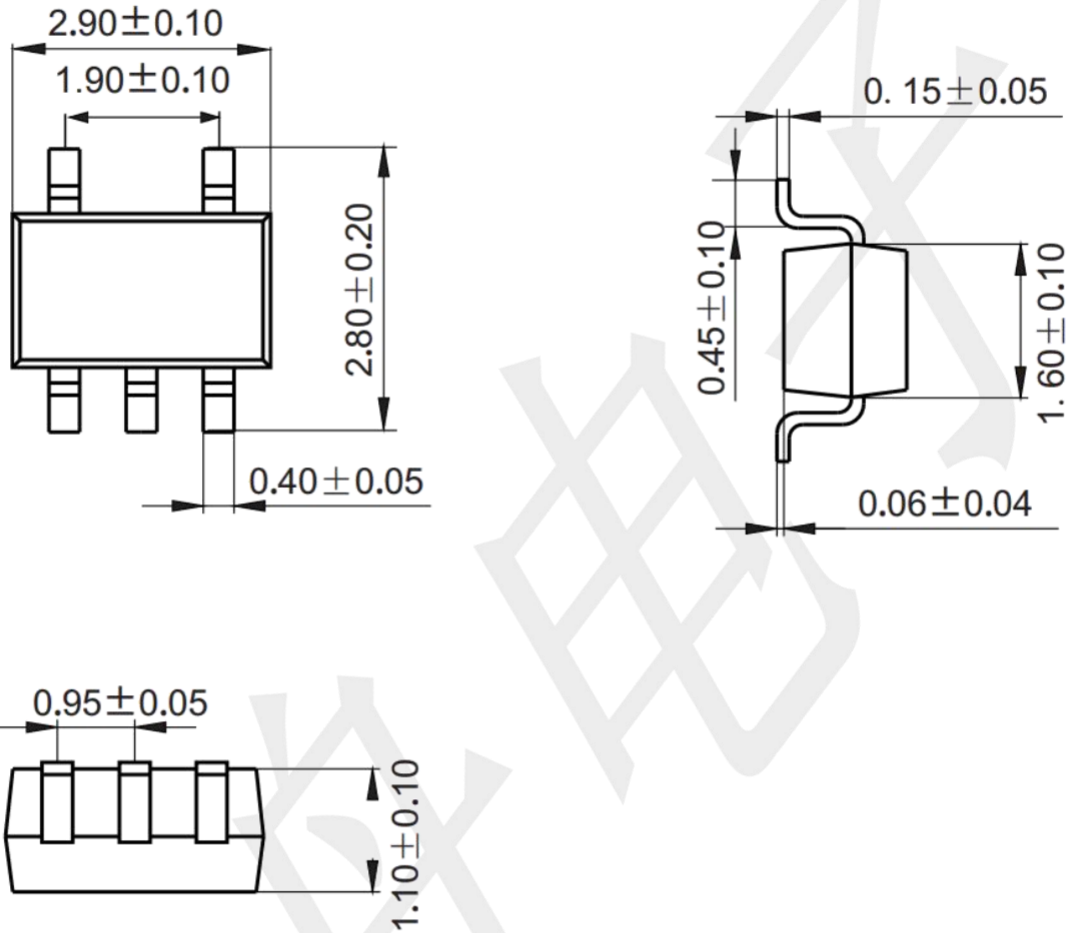
ENABLE AND DISABLE TIMES

### Notes:

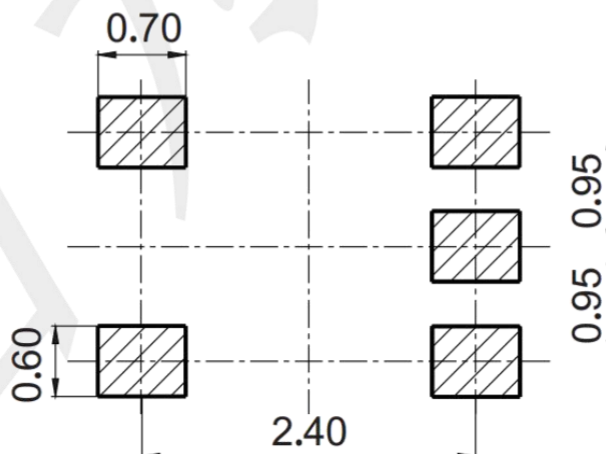
1. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1\text{MHz}$ ,  $ZO=50\Omega$ ,  $tr \leq 3\text{ns}$ .
2. The outputs are measured one at a time, with one transition per measurement.

**Package information (Unit: mm)**

SOT23-5



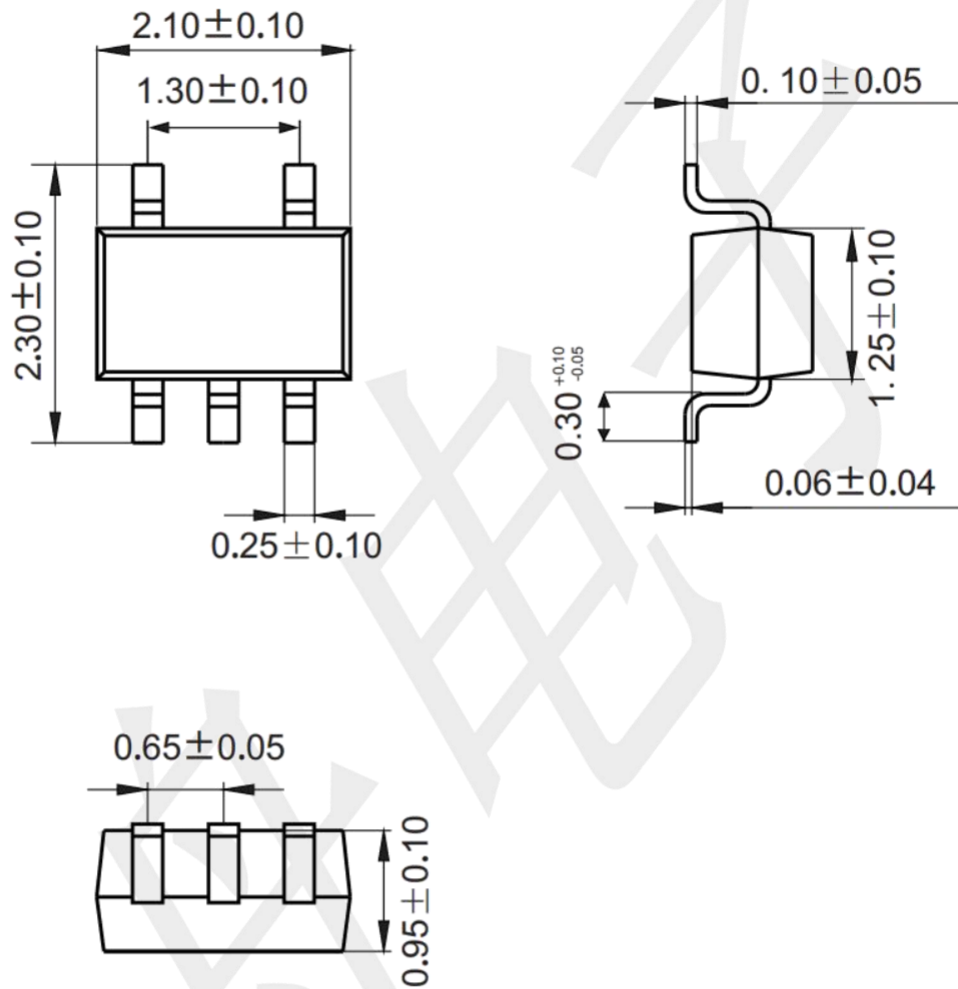
**Mounting Pad Layout (unit: mm)**





## Package information (Unit: mm)

SOT353



## Mounting Pad Layout (unit: mm)

