

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)

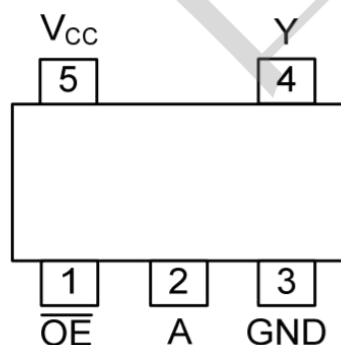
General Description

The SN74LV1T125DCKR-TP 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
SN74LV1T125DCKR-TP	SOT353	Tape and Reel, 3000

Pin Configuration

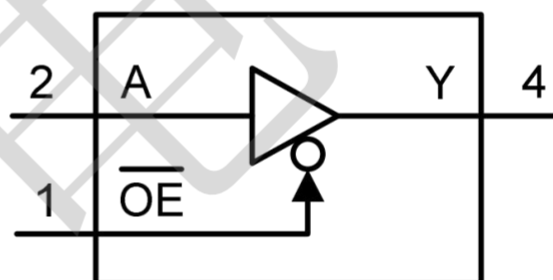


SOT353

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}		±25	mA
Continuous current through		V_{CC} or GND	±50	mA
Input Clamp Current	I_{IK}	$V_{IN} < 0$	-20	mA
Output Clamp Current	I_{OK}	$V_{OUT} < 0$ or $V_{OUT} > V_{CC}$	±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_A=25°C, unless otherwise specified)

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

STATIC CHARACTERISTICS (Cont.)

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

THERMAL DATA

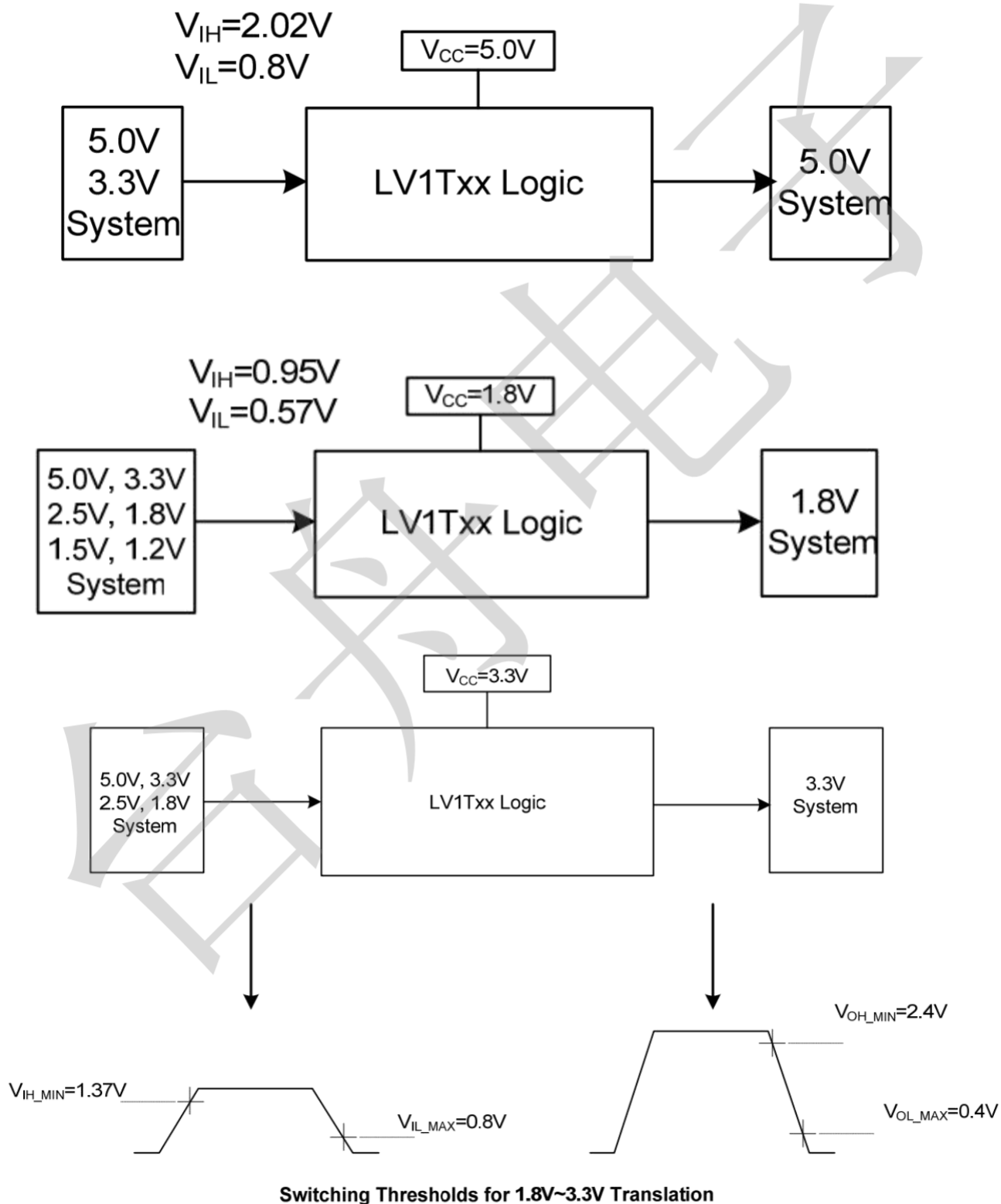
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-353 θ_{JA}	350	$^{\circ}C/W$

DYNAMIC CHARACTERISTICS

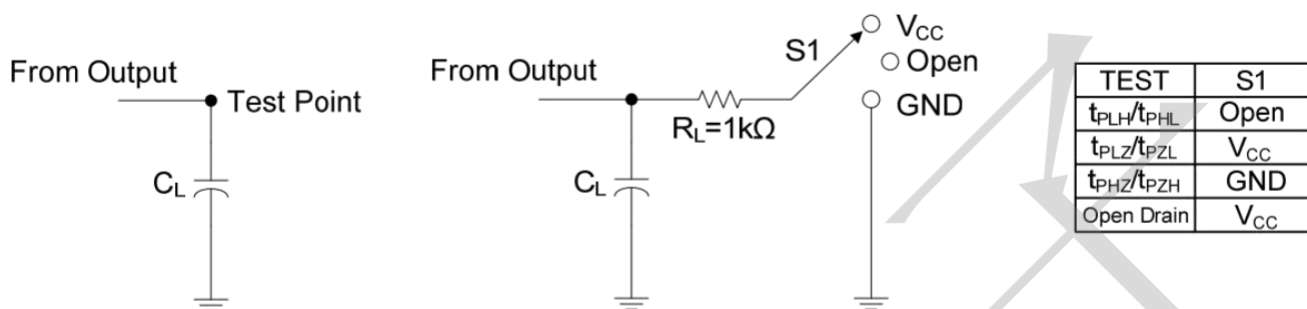
(T_A=25°C, unless otherwise specified)

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

TYPICAL DESIGN EXAMPLES

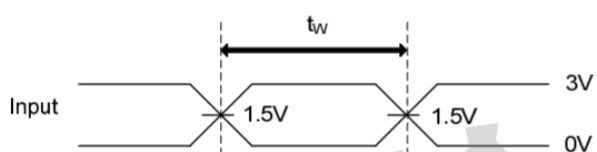


TEST CIRCUIT AND WAVEFORMS

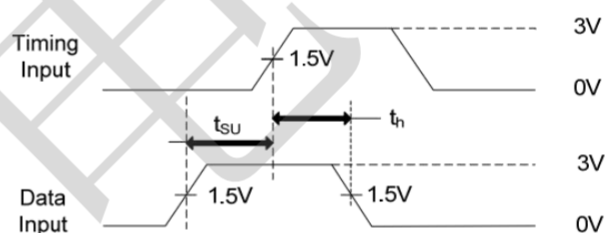


LOAD CIRCUIT FOR TOTEM-POLE OUTPUTS

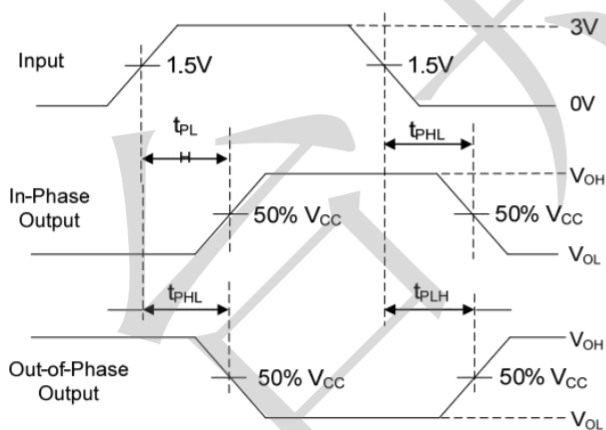
LOAD CIRCUIT FOR 3-STATE AND OPEN-DRAIN OUTPUTS



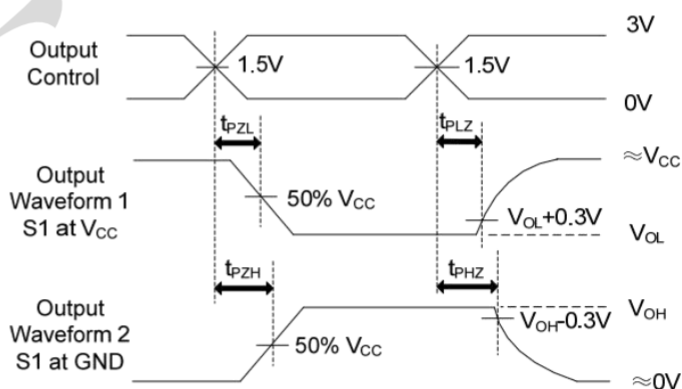
PULSE DURATION



SETUP AND HOLD TIMES



PROPAGATION DELAY TIMES



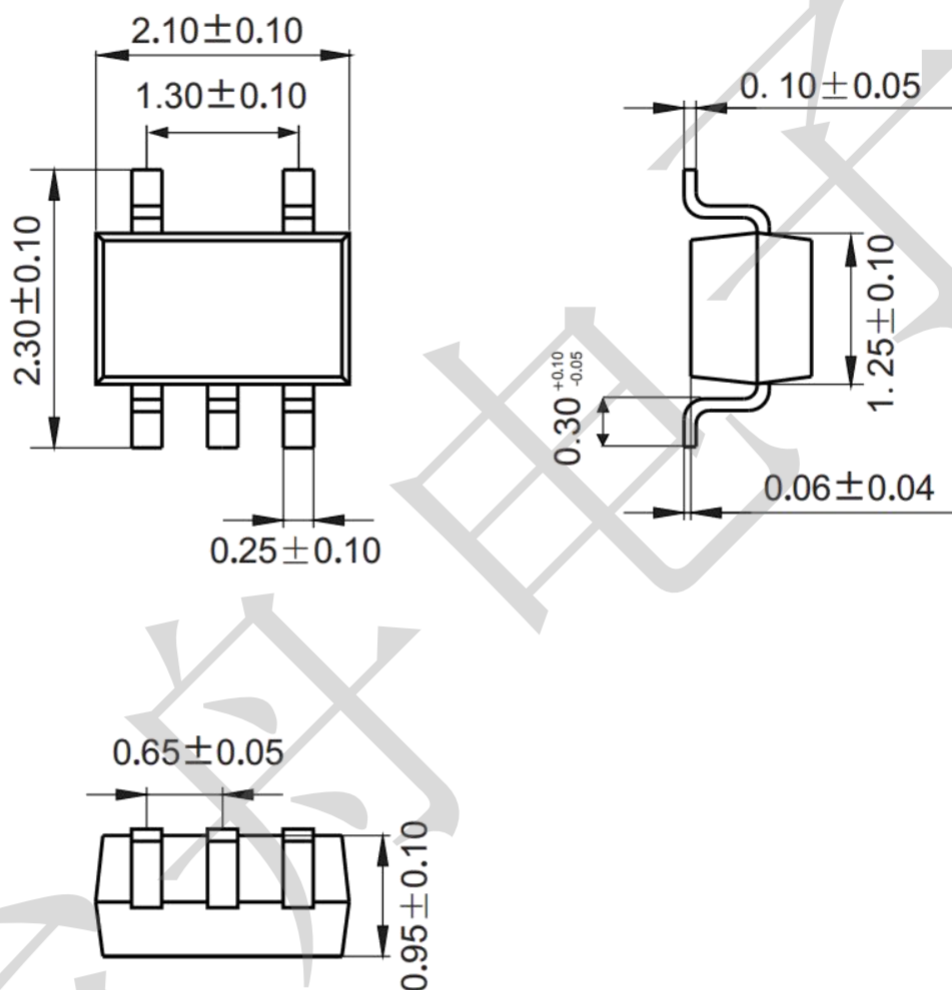
ENABLE AND DISABLE TIMES

Notes:

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

Package information (Unit: mm)

SOT353



Mounting Pad Layout (unit: mm)

