

Features

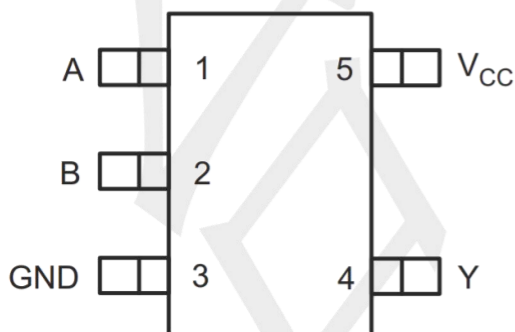
- Single supply voltage translator at 1.8V, 2.5V, 3.3V and 5.0V
- Low Power Current: $I_{CC}=10\mu A$ (Max.)
- $\pm 8mA$ Output Drive ($V_{CC}=5.0V$)
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)

General Description

SN74LV1T08DBVR-TP is a low voltage CMOS gate logic that operates at a wider voltage range for industrial, portable, telecom, and automotive applications. The output level is referenced to the supply voltage and is able to support 1.8V, 2.5V, 3.3V, 5V CMOS levels.

The input is designed with a lower threshold circuit to match 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 (e.g. 3.3V to 2.5V output at $V_{CC}=2.5V$). The wide V_{CC} range of 1.8V to 5.5V allows generation of desired output levels to connect to controllers or processors.

Pin Configuratio



SOT23-5

Applications

- Portable applications
- PC and notebooks
- Industrial controller
- Telecom

Logic Diagram



Function Table

INPUT (Lower Level Input)		OUTPUT (V_{CC} CMOS)
A	B	Y
H	H	H
L	X	L
X	L	L

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

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$, unless otherwise specified) (Note 2)

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	VCC		-0.5 ~ 7	V
Input Voltage (Note 2)	VIN		-0.5 ~ 7	V
Output Voltage (Note 2)	VOUT	Output HIGH or LOW state	-0.5 ~ VCC+0.5	V
		Output in power-off state	-0.5 ~ 4.6	V
Continuous Output Current			±25	mA
Continuous current through VCC or GND			±50	mA
Input Clamp Current	I _{IK}	V _{IN} <0	-20	mA
Output Clamp Current	I _{OK}	VOUT<0 or VOUT >VCC	±20	mA
Load Temperature(soldering , 10sec)	T _L		217	°C
Junction Temperature	T _J		+150	°C
Storage Temperature Range	TSTG		-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	VCC	Operating	1.6	--	5.5	V
Input Voltage	VIN		0	--	5.5	V
Output Voltage	VOUT		0	--	VCC	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	VCC=1.8V	--	--	20	ns/V
		VCC=3.3V or 2.5V	--	--	20	ns/V
		VCC=5V	--	--	20	ns/V
Operating Temperature	T _A		-40	--	+125	°C

THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT23-5 θ _{JA}	230	°C/W

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	0.94	--	--	V
		V _{CC} = 2.0V~2.5V	1.02	--	--	V
		V _{CC} = 2.75V~3.3V	1.21	--	--	V
		V _{CC} = 3.6V	1.47	--	--	V
		V _{CC} = 4.5V~5.5V	2.02	--	--	V
Low-Level Input Voltage	V _{IL}	V _{CC} = 1.65V~2V	--	--	0.58	V
		V _{CC} = 2.25V~2.75V	--	--	0.75	V
		V _{CC} = 3V~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	1.28	--	--	V
		V _{CC} = 1.8V	1.5	--	--	V
		I _{OH} = -2mA	2	--	--	V
		V _{CC} = 2.3V	2	--	--	V
		I _{OH} = -2.3mA	2	--	--	V
		V _{CC} = 2.5V, I _{OH} = -3mA	2.25	--	--	V
		V _{CC} = 3V	2.78	--	--	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} = 1.9mA	--	--	0.2	V
		V _{CC} = 2.3V	--	--	0.1	V
		V _{CC} = 3V	--	--	0.1	V
		V _{CC} = 4.5V	--	--	0.15	V
		V _{CC} = 5V, I _{OL} = -8mA	4.6	--	--	V
Input Leakage Current	I _{I(LEAK)}	V _{CC} = 0V, 1.8V, 2.5V, 3.3V, 5.5V, V _{IN} = 0V or V _{CC}	--	--	0.12	μA
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	μA
Additional Quiescent Supply Current	ΔI _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} or GND	--	2	--	pF
Output Capacitance	C _{OUT}	V _{CC} = 3.3V, V _{OUT} = V _{CC} or GND	--	2.5	--	pF

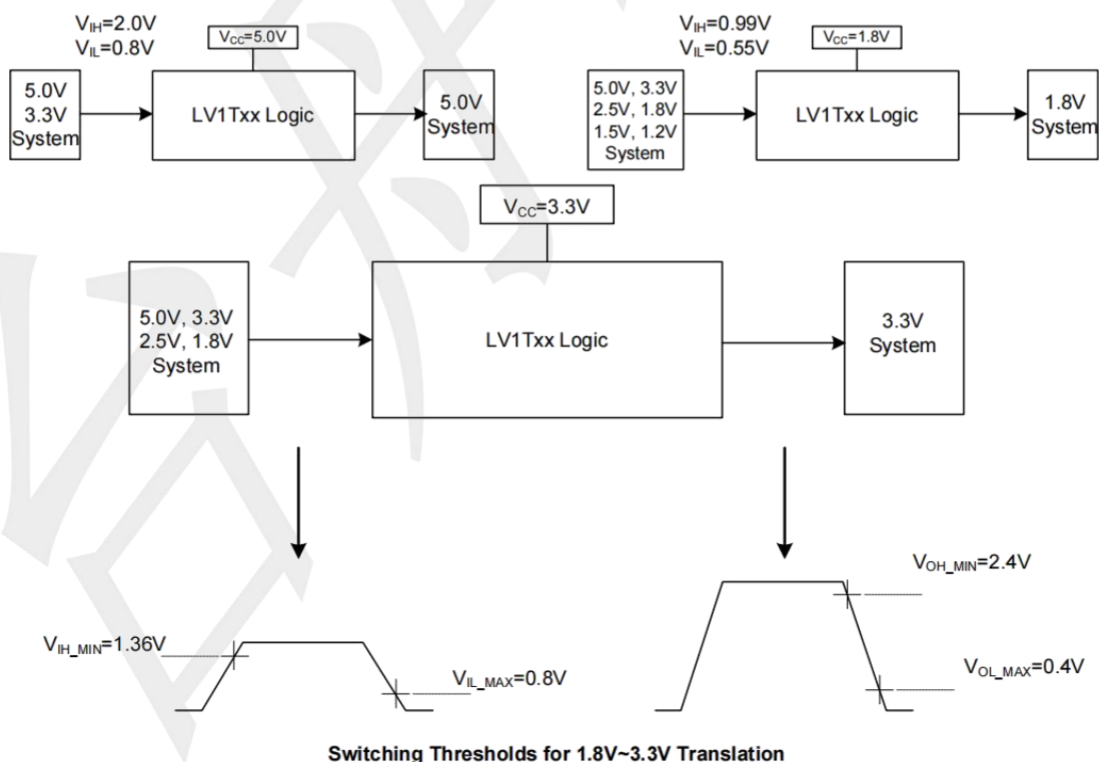
DYNAMIC CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Propagation delay from input (Any In) to output(Y)	t _{PLH} /t _{PHL}	C _L =15pF	V _{CC} =1.8V	--	10.5	11	ns
			V _{CC} =2.5V	--	6	6.5	ns
			V _{CC} =3.3V	--	4.8	6	ns
			V _{CC} =5V	--	4	6	ns
		C _L =30pF	V _{CC} =1.8V	--	12	13	ns
			V _{CC} =2.5V	--	6.5	7.5	ns
			V _{CC} =3.3V	--	5	7	ns
			V _{CC} =5V	--	5.5	7	ns

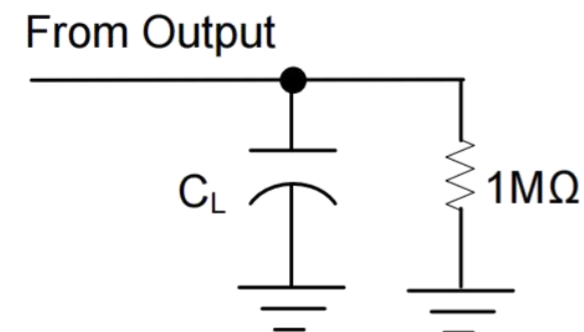
OPERATING CHARACTERISTICS ($f=1\text{MHz}$ & 10MHz , $T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	$V_{CC}=1.8\text{V}\pm 0.15\text{V}$	--	10	--	pF
		$V_{CC}=2.5\text{V}\pm 0.2\text{V}$	--	10	--	pF
		$V_{CC}=3.3\text{V}\pm 0.3\text{V}$	--	10	--	pF
		$V_{CC}=5\text{V}\pm 0.5\text{V}$	--	10	--	pF

TYPICAL DESIGN EXAMPLES

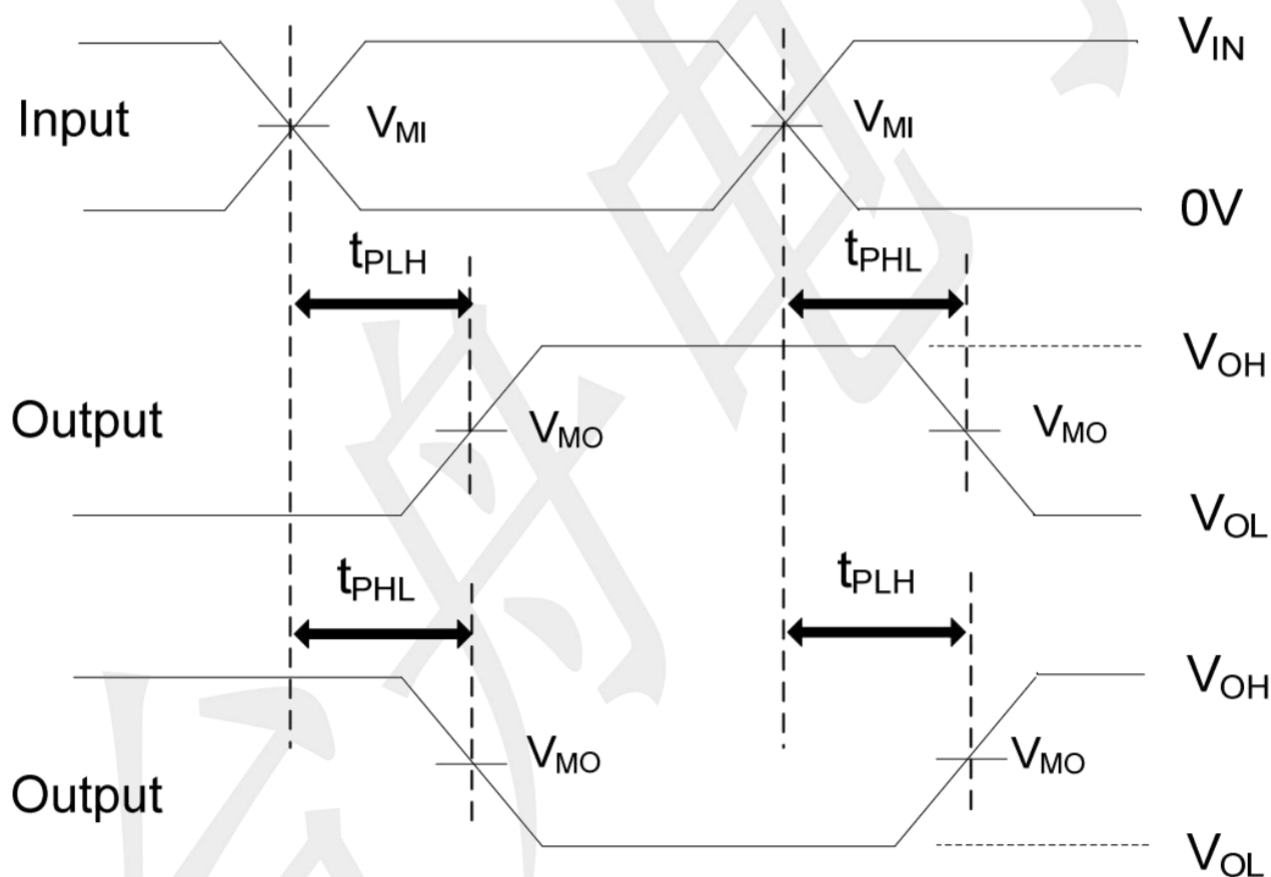


TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

	$V_{CC}=1.8V\sim 5V$
C_L	15, 30pF
V_{MI}	$V_I/2$
V_{MO}	$V_{CC}/2$

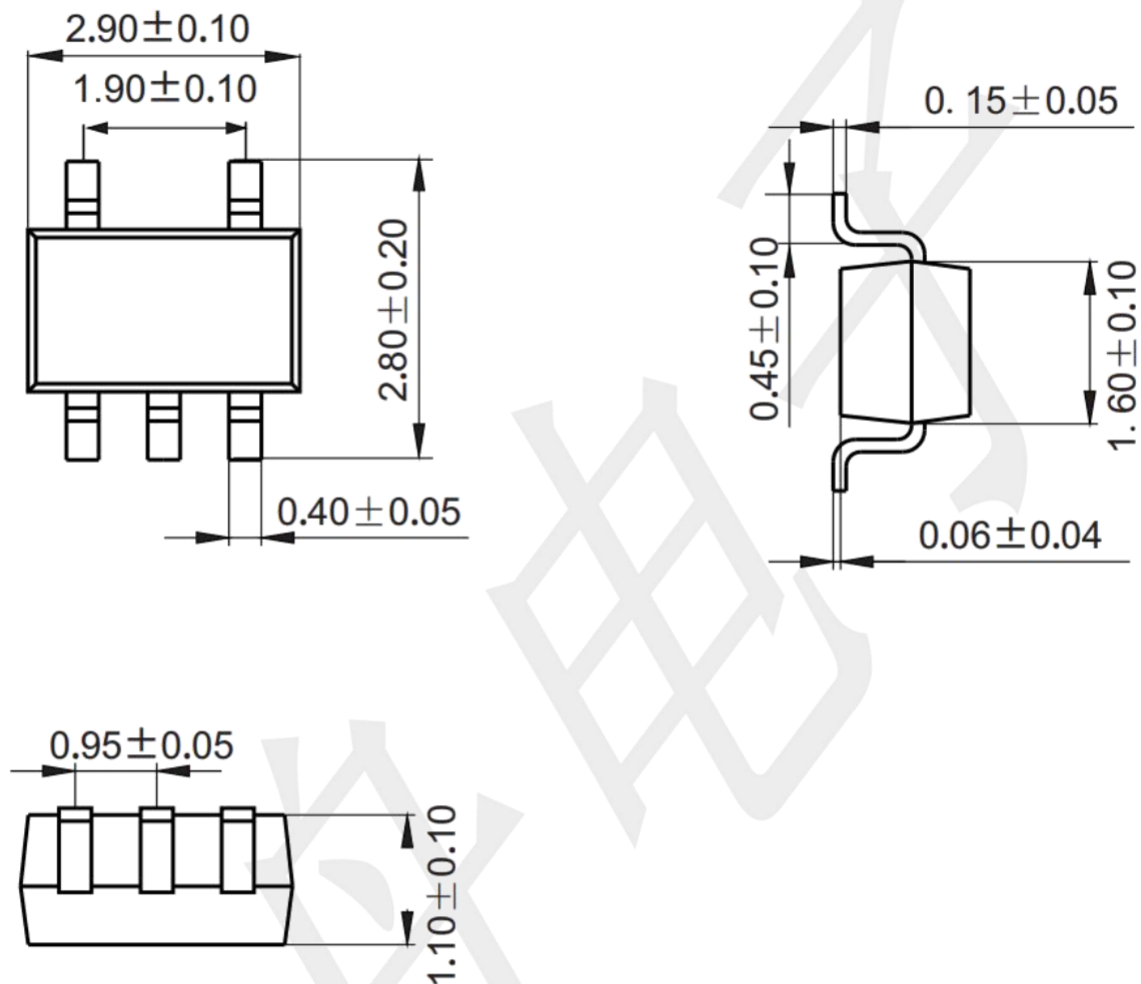


PROPAGATION DELAY TIMES

- Notes: 1. All input pulses are supplied by generators having the following characteristics: PRR $\leq 10\text{MHz}$, ZO=50W, slew rate $\geq 1\text{V/ns}$.
2. The outputs are measured one at a time, with one transition per measurement.

Package information

SOT23-5 (Unit: mm)



Mounting Pad Layout (unit: mm)

