

### Features

- Operate from 2V to 5.5V
- Inputs Accept Voltages To 5.5V
- High Noise Immunity
- Low Power Dissipation
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 1000-V Charged-Device Model (C101)

### General Description

The TC7SH34 is a single buffer, it provides the function  $Y = A$ . This device has power-down protective circuit, preventing device destruction when it is powered down.

### 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

### Logic Diagram



Logic Symbol

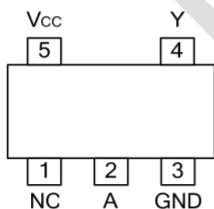


IEC Logic Symbol

### Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION
TC7SH34F-TP	SOT23-5	Tape and Reel,3000
TC7SH34FU-TP	SOT353	Tape and Reel,3000

### Pin Configuratio



SOT23-5

SOT353

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

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

### Absolute Maximum Ratings

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>		-0.5 ~ +6.5	V
Input Voltage	V <sub>IN</sub>		-0.5 ~ +6.5	V
Output Voltage	V <sub>OUT</sub>	Output in the Power-off state	-0.5 ~ +6.5	V
		Output in the High or Low state	-0.5 ~ V <sub>CC</sub> +0.5	V
V <sub>CC</sub> or GND Current	I <sub>CC</sub>	Output in the Power-off state	±100	mA
Continuous Output Current	I <sub>OUT</sub>	V <sub>OUT</sub> =0~V <sub>CC</sub>	±50	mA
Input Clamp Current	I <sub>IK</sub>	V <sub>IN</sub> <0	-50	mA
Output Clamp Current	I <sub>OK</sub>	V <sub>OUT</sub> <0	-50	mA
Storage Temperature Range	T <sub>STG</sub>		-65 ~ +150	°C
Junction to Ambient	θ <sub>JA</sub>	SOT-23-5	230	°C/W
		SOT353	280	°C/W

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.

### SWITCHING CHARACTERISTICS (TA =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Propagation delay from input (A) to output(Y)	t <sub>PLH</sub> / t <sub>PHL</sub>	V <sub>CC</sub> =2±0.15V	C <sub>L</sub> =15pF, R <sub>L</sub> =1MΩ	2	--	9.9	ns
		V <sub>CC</sub> =2.5±0.2V		1.5	--	6	ns
		V <sub>CC</sub> =3.3±0.3V		1	--	3.5	ns
		V <sub>CC</sub> =5±0.5V		1	--	2.9	ns
Propagation delay from input (A) to output(Y)	t <sub>PLH</sub> / t <sub>PHL</sub>	V <sub>CC</sub> =2±0.15V, R <sub>L</sub> =1KΩ	C <sub>L</sub> =30pF	3.2	--	8.6	ns
		V <sub>CC</sub> =2.5±0.2V, R <sub>L</sub> =500Ω		1.5	--	4.4	ns
		V <sub>CC</sub> =3.3±0.3V	C <sub>L</sub> =50pF, R <sub>L</sub> =500Ω	1.5	--	4.1	ns
		V <sub>CC</sub> =5±0.5V		1	--	3.2	ns

### Electrical Characteristics ( unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	$V_{IH}$	$V_{CC}=2V$	$0.65 \times V_{CC}$	--	--	V
		$V_{CC}=2.3V \sim 2.7V$	1.7	--	--	V
		$V_{CC}=3V \sim 3.6V$	2	--	--	V
		$V_{CC}=4.5V \sim 5.5V$	$0.7 \times V_{CC}$	--	--	V
Low-Level Input Voltage	$V_{IL}$	$V_{CC}=2V$	--	--	$0.35 \times V_{CC}$	V
		$V_{CC}=2.3V \sim 2.7V$	--	--	0.7	V
		$V_{CC}=3V \sim 3.6V$	--	--	0.8	V
		$V_{CC}=4.5V \sim 5.5V$	--	--	$0.3 \times V_{CC}$	V
High-Level Output Voltage	$V_{OH}$	$V_{CC}=2 \sim 5.5V, I_{OH}=-100\mu A$	$V_{CC}-0.1$	--	--	V
		$V_{CC}=2V, I_{OH}=-4mA$	1.2	--	--	V
		$V_{CC}=2.3V, I_{OH}=-8mA$	1.9	--	--	V
		$V_{CC}=3.0V, I_{OH}=-16mA$	2.4	--	--	V
		$V_{CC}=3.0V, I_{OH}=-24mA$	2.3	--	--	V
		$V_{CC}=4.5V, I_{OH}=-32mA$	3.8	--	--	V
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=2 \sim 5.5V, I_{OL}=100\mu A$	--	--	0.1	V
		$V_{CC}=2V, I_{OL}=4mA$	--	--	0.45	V
		$V_{CC}=2.3V, I_{OL}=8mA$	--	--	0.3	V
		$V_{CC}=3.0V, I_{OL}=16mA$	--	--	0.4	V
		$V_{CC}=3.0V, I_{OL}=24mA$	--	--	0.55	V
		$V_{CC}=4.5V, I_{OL}=32mA$	--	--	0.55	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{IN}=5.5V$ or GND, $V_{CC}=0 \sim 5.5V$	--	--	$\pm 1$	$\mu A$
Power OFF Leakage Current	$I_{OFF}$	$V_{IN}$ or $V_{OUT}=5.5V, V_{CC}=0V$	--	--	$\pm 10$	$\mu A$
Quiescent Supply Current	$I_Q$	$V_{IN}=5.5V$ or GND, $I_{OUT}=0, V_{CC}=1.65 \sim 5.5V$	--	--	10	$\mu A$
Additional Quiescent Supply Current Per Input Pin	$\Delta I_Q$	$V_{CC}=3 \sim 5.5V$ , One input at $V_{CC}-0.6V$ , Other inputs at $V_{CC}$ or GND	--	--	500	$\mu A$
Input Capacitance	$C_{IN}$	$V_{CC}=3.3V, V_{IN}=V_{CC}$ or GND	--	3.5	--	pF

### Recommended Operating Conditions

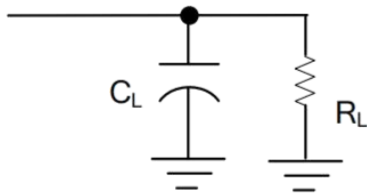
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$	Operating	2	--	5.5	V
		Data retention only	1.8	--	--	V
Input Voltage	$V_{IN}$		0	--	5.5	V
Output Voltage	$V_{OUT}$	High or low state	0	--	$V_{CC}$	V
High-Level Output Current	$I_{OH}$	$V_{CC}=2V$	--	--	-4	mA
		$V_{CC}=2.3V$	--	--	-8	mA
		$V_{CC}=3V$	--	--	-16	mA
		$V_{CC}=3V$	--	--	-24	mA
		$V_{CC}=4.5V$	--	--	-32	mA
Low-Level Output Current	$I_{OL}$	$V_{CC}=2V$	--	--	4	mA
		$V_{CC}=2.3V$	--	--	8	mA
		$V_{CC}=3V$	--	--	16	mA
		$V_{CC}=3V$	--	--	24	mA
		$V_{CC}=4.5V$	--	--	32	mA
Input Transition Rise or Fall Rate	$t_R / t_F$	$V_{CC}=2V\pm 0.15V, 2.5V\pm 0.2V$	--	--	20	ns/V
		$V_{CC}=3.3V\pm 0.3V$	--	--	10	ns/V
		$V_{CC}=5V\pm 0.5V$	--	--	10	ns/V
Operating Temperature	$T_A$		-40	--	+125	°C

### OPERATING CHARACTERISTICS (f=10MHz, $T_A = 25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Power Dissipation Capacitance	$C_{PD}$	$V_{CC}=2V$	f=10MHz	--	16	--	pF
		$V_{CC}=2.5V$		--	16	--	pF
		$V_{CC}=3.3V$		--	16	--	pF
		$V_{CC}=5V$		--	18	--	pF

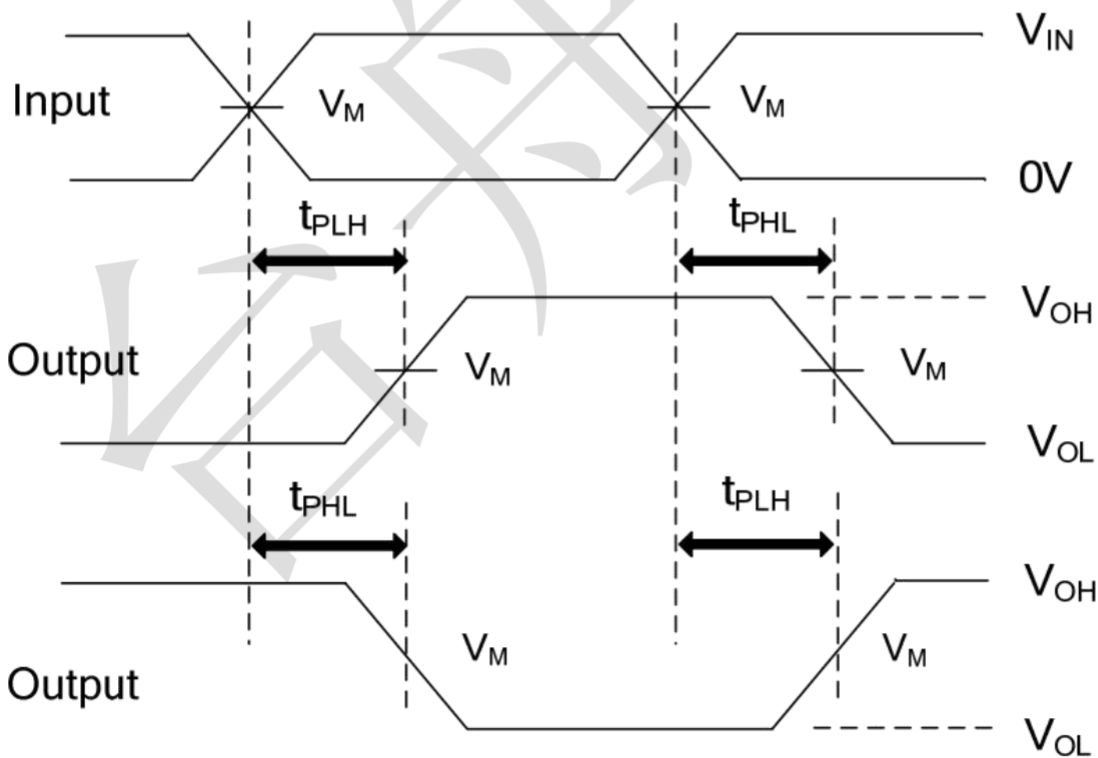
### TEST CIRCUIT AND WAVEFORMS

From Output



TEST CIRCUIT

$V_{CC}$	INPUTS		$V_M$	$C_L$	$R_L$
	$V_{IN}$	$t_R, t_F$			
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	15pF	1M $\Omega$
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	15pF	1M $\Omega$
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	15pF	1M $\Omega$
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	15pF	1M $\Omega$

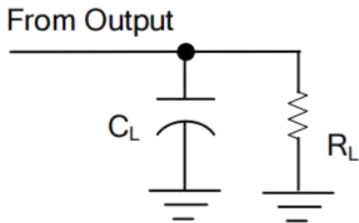


### PROPAGATION DELAY TIMES

Note:  $C_L$  includes probe and jig capacitance.

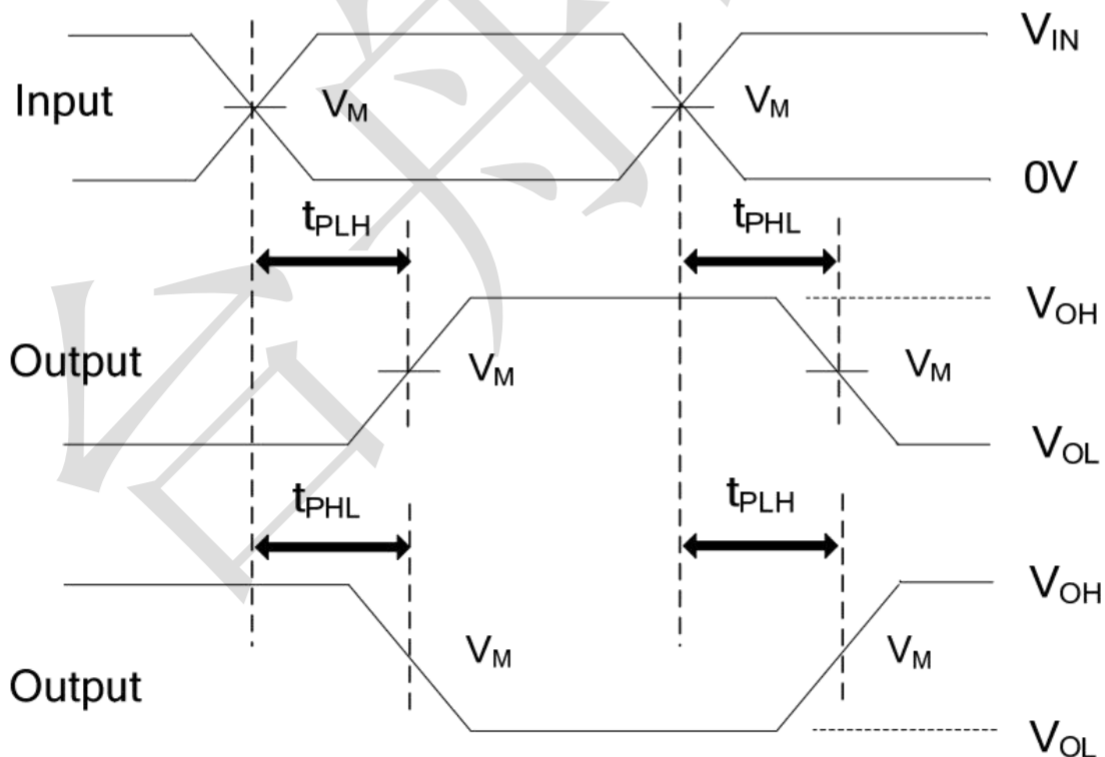
All input pulses are supplied by generators having the following characteristics: PRR  $\leq 10MHz$ ,  $Z_O = 50\Omega$ .

### TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

$V_{CC}$	INPUTS		$V_M$	$C_L$	$R_L$
	$V_{IN}$	$t_R, t_F$			
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	30pF	1K $\Omega$
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	30pF	500 $\Omega$
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	50pF	500 $\Omega$
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	50pF	500 $\Omega$



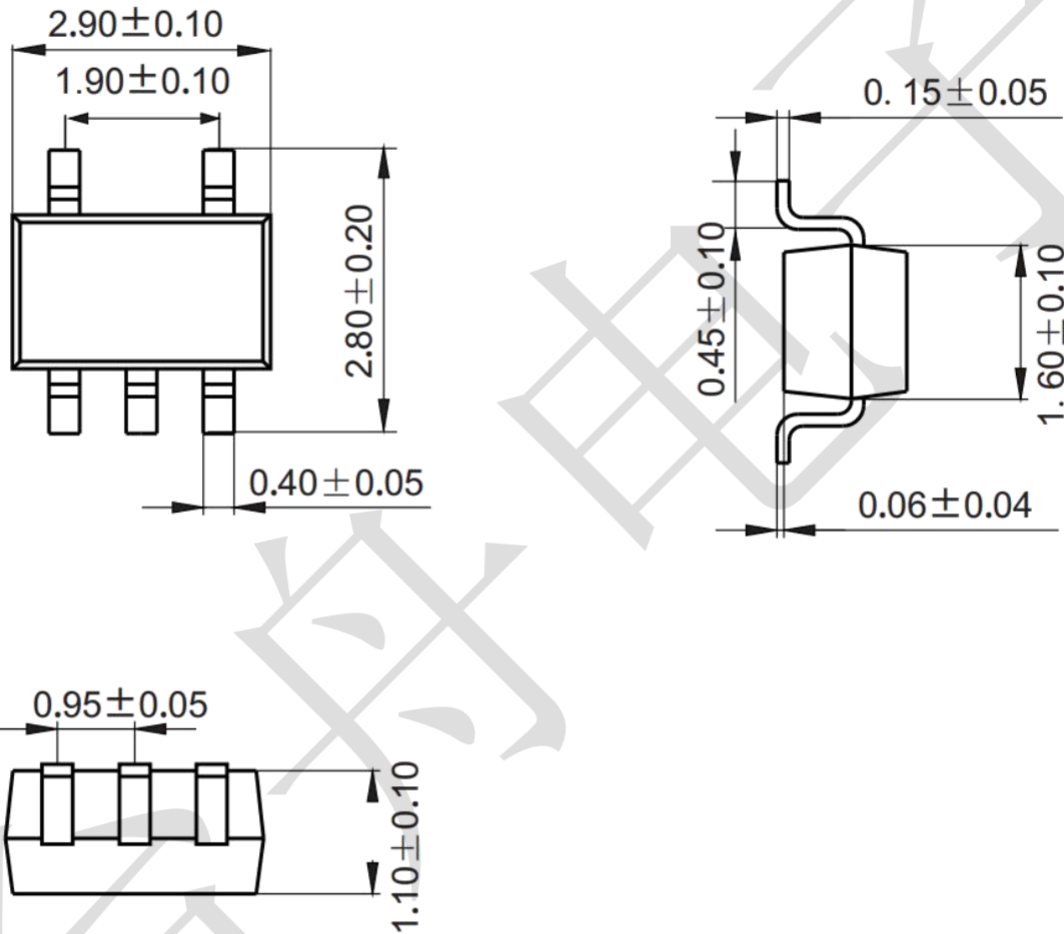
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Note:  $C_L$  includes probe and jig capacitance.

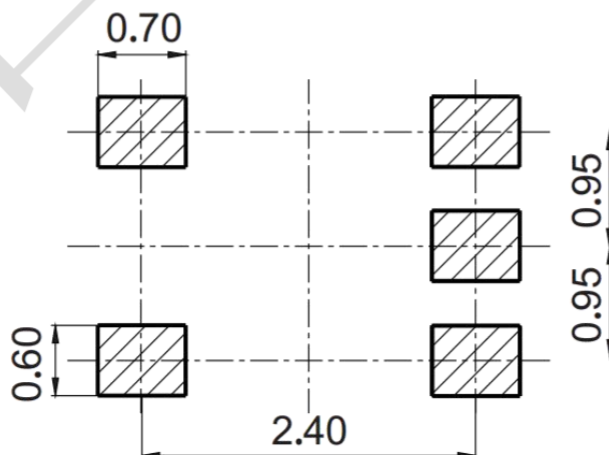
All input pulses are supplied by generators having the following characteristics:  $PRR \leq 10MHz$ ,  $Z_O = 50\Omega$ .

### Package information

SOT23-5 (Unit: mm)

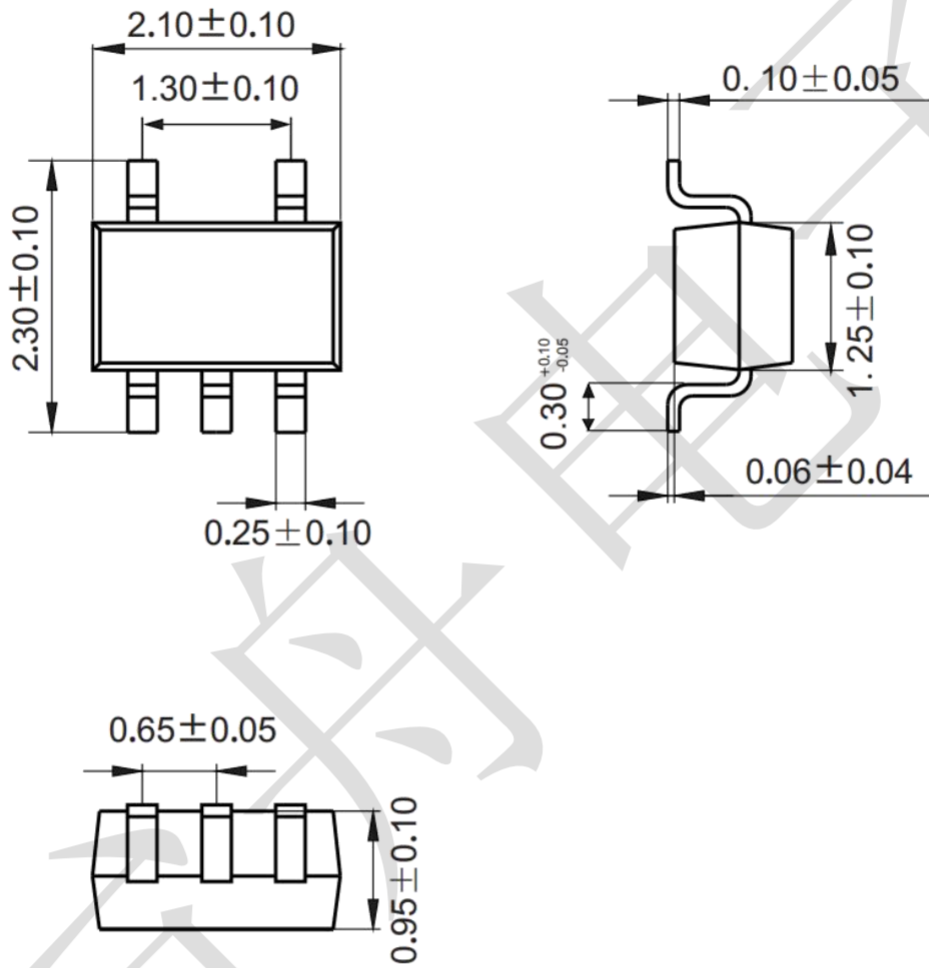


### Mounting Pad Layout (unit: mm)



### Package information

SOT353 (Unit: mm)



### Mounting Pad Layout (unit: mm)

