

TOSHIBA**TC7S32F/FU**

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC7S32F, TC7S32FU**2-INPUT OR GATE**

The TC7S32 is a high speed C²MOS 2-INPUT OR GATE fabricated with silicon gate C²MOS technology. It achieves high speed operation similar to equivalent LSTTL while maintaining the C²MOS low power dissipation.

The internal circuit is composed of 2 stages including buffer output, which enables high noise immunity and stable output.

All inputs are equipped with protection circuits against static discharge or transient excess voltage.

Output currents are 1/2 compared to TC74HC series models.

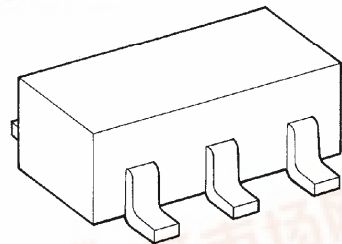
FEATURES

- High Speed $t_{pd} = 7\text{ns}$ (Typ.) at $V_{CC} = 5\text{V}$
- Low Power Dissipation $I_{CC} = 1\mu\text{A}$ (Max.) at $T_a = 25^\circ\text{C}$
- High Noise Immunity $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (Min.)
- Output Drive Capability 5 LSTTL Loads
- Symmetrical Output Impedance ... $|I_{OH}| = I_{OL} = 2\text{mA}$ (Min.)
- Balanced Propagation Delays $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range ... $V_{CC}(\text{opr}) = 2 \sim 6\text{V}$

MAXIMUM RATINGS

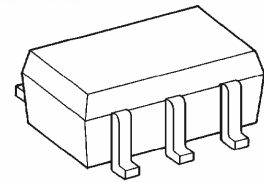
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage Range	V_{CC}	$-0.5 \sim 7$	V
DC Input Voltage	V_{IN}	$-0.5 \sim V_{CC} + 0.5$	V
DC Output Voltage	V_{OUT}	$-0.5 \sim V_{CC} + 0.5$	V
Input Diode Current	I_{IK}	± 20	mA
Output Diode Current	I_{OK}	± 20	mA
DC Output Current	I_{OUT}	± 12.5	mA
DC V_{CC} /Ground Current	I_{CC}	± 25	mA
Power Dissipation	P_D	200	mW
Storage Temperature	T_{stg}	$-65 \sim 150$	$^\circ\text{C}$
Lead Temperature (10s)	T_L	260	$^\circ\text{C}$

TC7S32F



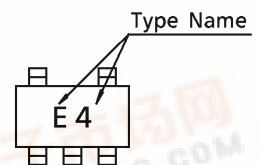
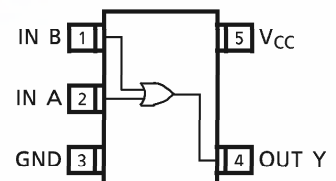
SSOP5-P-0.95

TC7S32FU

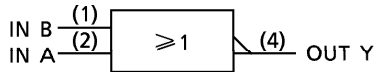


SSOP5-P-0.65A

Weight SSOP5-P-0.95 : 0.016g (Typ.)
SSOP5-P-0.65A : 0.006g (Typ.)

MARKING**PIN ASSIGNMENT (TOP VIEW)**

LOGIC DIAGRAM



RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	2~6	V
Input Voltage	V_{IN}	0~ V_{CC}	V
Output Voltage	V_{OUT}	0~ V_{CC}	V
Operating Temperature	T_{opr}	-40~85	°C
Input Rise and Fall Time	t_r, t_f	0~1000 ($V_{CC} = 2.0V$) 0~500 ($V_{CC} = 4.5V$) 0~400 ($V_{CC} = 6.0V$)	ns

DC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	TEST CONDITION		V _{CC}	Ta = 25°C			Ta = - 40~85°C		UNIT
					MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Input Voltage	V _{IH}	—		2.0 4.5 6.0	1.5 3.15 4.2	— — —	— — —	1.5 3.15 4.2	— — —	V
Low-Level Input Voltage	V _{IL}	—		2.0 4.5 6.0	— — —	— — —	0.5 1.35 1.8	— — —	0.5 1.35 1.8	V
High-Level Output Voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = - 20 μA	2.0	1.9	2.0	—	1.9	—	V
				4.5	4.4	4.5	—	4.4	—	
				6.0	5.9	6.0	—	5.9	—	
			I _{OH} = - 2mA I _{OH} = - 2.6mA		4.5 6.0	4.18 5.68	4.31 5.80	— —	4.13 5.63	
Low-Level Output Voltage	V _{OL}	V _{IN} = V _{IL}	I _{OL} = 20 μA	2.0	—	0.0	0.1	—	0.1	V
				4.5	—	0.0	0.1	—	0.1	
				6.0	—	0.0	0.1	—	0.1	
			I _{OL} = 2mA I _{OL} = 2.6mA		4.5 6.0	— —	0.17 0.18	0.26 0.26	— —	
Input Leakage Current	I _{IN}	V _{IN} = V _{CC} or GND		6.0	—	—	± 0.1	—	± 1.0	μA
Quiescent Supply Current	I _{CC}	V _{IN} = V _{CC} or GND		6.0	—	—	1.0	—	10.0	μA

Output currents are 1/2 compared to TC74HC series models.

AC ELECTRICAL CHARACTERISTICS ($C_L = 15\text{pF}$, Input $t_r = t_f = 6\text{ns}$, $V_{CC} = 5\text{V}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	Ta = 25°C			UNIT
			MIN.	TYP.	MAX.	
Output Transition Time	t_{TLH} t_{THL}	—	—	5	10	ns
Propagation Delay Time	t_{pLH} t_{pHL}	—	—	7	15	ns

AC ELECTRICAL CHARACTERISTICS ($C_L = 50\text{pF}$, Input $t_r = t_f = 6\text{ns}$)

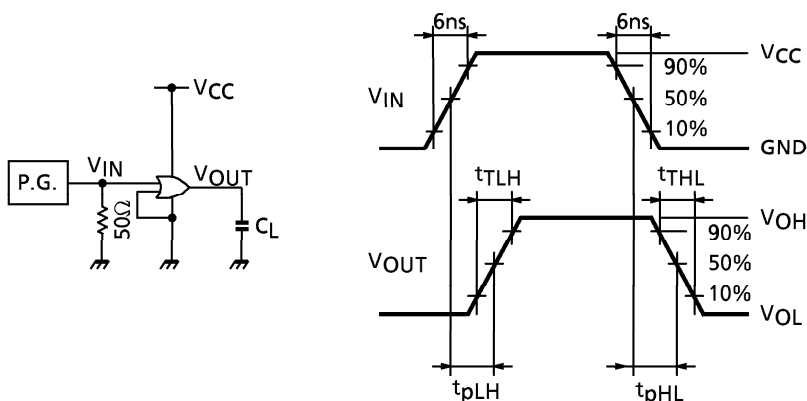
CHARACTERISTIC	SYMBOL	TEST CONDITION	V _{CC}	Ta = 25°C			Ta = - 40~85°C		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	
Output Transition Time	t _{TLH} t _{THL}	—	2.0	—	50	125	—	155	ns
			4.5	—	14	25	—	31	
			6.0	—	12	21	—	26	
Propagation Delay Time	t _{pLH} t _{pHL}	—	2.0	—	48	100	—	125	ns
			4.5	—	12	20	—	25	
			6.0	—	9	17	—	21	
Input Capacitance	C _{IN}	—		—	5	10	—	10	pF
Power Dissipation Capacitance	C _{PD}	(Note 1)		—	10	—	—	—	

Note 1 : C_{PD} defined as the value of internal equivalent capacitance of IC which is calculated from the operating current consumption without load (refer to Test Circuit).

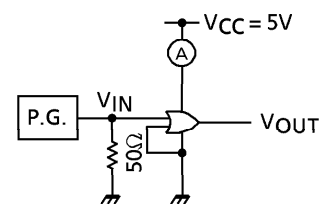
Average operating current can be obtained by the equation hereunder.

$$I_{CC}(\text{opr}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

SWITCHING CHARACTERISTICS TEST CIRCUIT



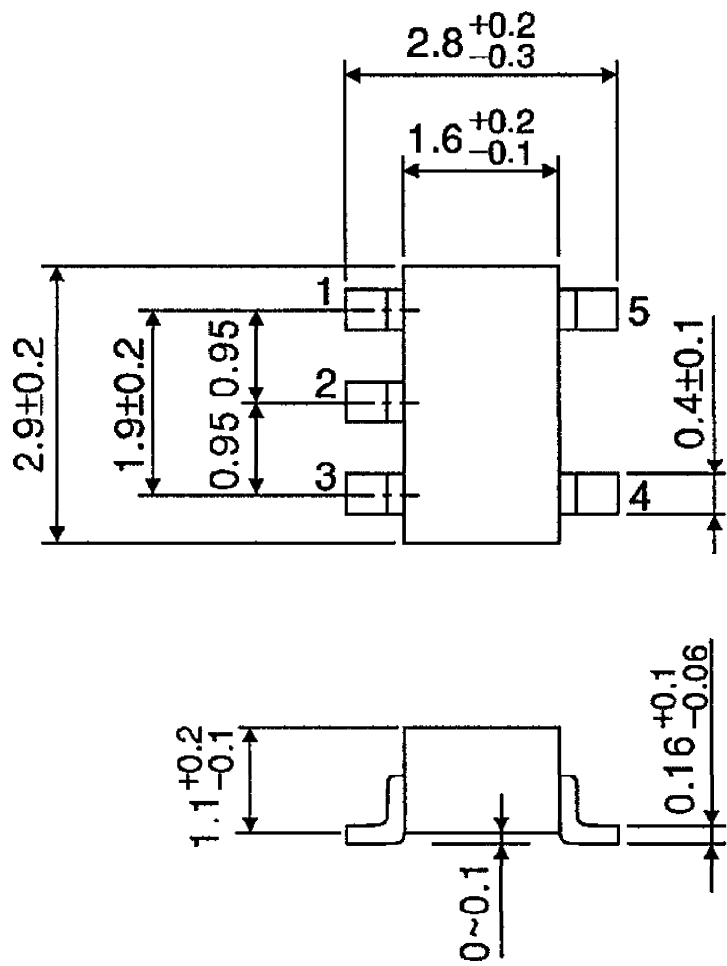
$I_{CC}(\text{opr})$ TEST CIRCUIT



Input waveform is the same as that in case of switching characteristics test.

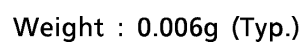
PACKAGE DIMENSIONS
SSOP5-P-0.95

Unit : mm



Weight : 0.016g (Typ.)

Unit : mm



RESTRICTIONS ON PRODUCT USE

000707EBA

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