TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

# TC7SET32F, TC7SET32FU

### 2-INPUT OR GATE

#### **Features**

• High speed :  $t_{pd} = 4.2 \text{ ns (typ.)}$ 

at  $V_{CC} = 5 \text{ V}$ ,  $C_L = 15 \text{pF}$ 

Low power dissipation : I<sub>CC</sub> = 2 μA (max) at Ta = 25°C

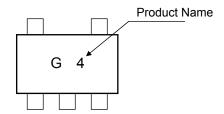
Compatible with TTL outputs : V<sub>IL</sub>=0.8V (max)

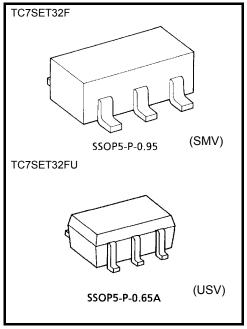
V<sub>IH</sub>=2.0V (min)

5.5-V tolerant II inputs.

Balanced propagation Delays : t<sub>pLH</sub>≒t<sub>pHL</sub>

### Marking





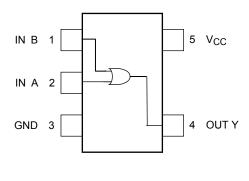
Weight

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

### **Absolute Maximum Ratings (Ta = 25°C)**

Characteristics	Symbol	Rating	Unit
Supply voltage	V <sub>CC</sub>	-0.5 to 7.0	V
DC input voltage	V <sub>IN</sub>	-0.5 to 7.0	V
DC output voltage	V <sub>OUT</sub>	-0.5 to V <sub>CC</sub> + 0.5	V
Input diode current	lıĸ	-20	mA
Output diode current	I <sub>OK</sub>	±20 (Note 1)	mA
DC output current	lout	±25	mA
DC V <sub>CC</sub> /ground current	Icc	±50	mA
Power dissipation	PD	200	mW
Storage temperature	T <sub>stg</sub>	-65 to 150	°C
Lead temperature (10 s)	TL	260	°C

# Pin Assignment (top view)



Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: V<sub>OUT</sub> < GND, V<sub>OUT</sub> > V<sub>CC</sub>

# IEC Logic Symbol



### **Truth Table**

Α	В	Υ
L	L	L
L	Н	Н
Н	L	Н
Н	Н	Н

# **Operating Ranges**

Characteristics	Symbol	Rating	Unit
Supply voltage	V <sub>CC</sub>	4.5 to 5.5	V
Input voltage	V <sub>IN</sub>	0 to 5.5	V
Output voltage	V <sub>OUT</sub>	0 to V <sub>CC</sub>	٧
Operating temperature	T <sub>opr</sub>	-40 to 85	°C
Input rise and fall time	dt/dv	0 to 20	ns/V

### **Electrical Characteristics**

### **DC Characteristics**

		Test Condition			Ta = 25°C			Ta = -40 to 85°C		
Characteristics Symbol	V <sub>CC</sub> (V)			Min	Тур.	Max	Min	Max	Unit	
High-level input voltage	V <sub>IH</sub>		4.5 to 5.5	2.0	_	_	2.0		٧	
Low-level input voltage	V <sub>IL</sub>		4.5 to 5.5	_	_	0.8	_	0.8	V	
High-level	V	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -50 μA	4.5	4.4	4.5	_	4.4	_	٧
output voltage	V <sub>OH</sub>		$I_{OH} = -8 \text{ mA}$	4.5	3.94	_	_	3.80	_	
Low-level output voltage	V <sub>IN</sub> = V <sub>IL</sub>	$I_{OL} = 50 \mu A$	4.5	_	0.0	0.10	_	0.10	V	
	- OL	I III III	$I_{OL} = 8 \text{ mA}$	4.5		_	0.36	_	0.44	-
Input leakage current	I <sub>IN</sub>	V <sub>IN</sub> = 5.5 V c	0 to 5.5	_	_	±0.1	_	±1.0	μА	
	Icc	V <sub>IN</sub> = V <sub>CC</sub> or	5.5	_	_	2.0	_	20.0	μА	
Quiescent supply current	ICCT	PER INPUT OTHER INP	5.5		_	1.35	_	1.50	mA	



### AC Characteristics (input: $t_r = t_f = 3 \text{ ns}$ )

Characteristics	Symbol		Test Condition		Ta = 25°C			Ta = -40 to 85°C		Unit
	Symbol	V <sub>CC</sub> (V)	C <sub>L (</sub> pF)	Min	Тур.	Max	Min	Max	Offic	
Propagation delay time	t <sub>PLH</sub>	5.0 ± 0.5	15	_	4.2	6.2	1.0	7.1	ns	
	t <sub>PHL</sub>		3.0 ± 0.5	50	_	6.5	9.0	1.0	10.3	113
Input capacitance	C <sub>IN</sub>				_	4	10	_	10	pF
Power dissipation capacitance	C <sub>PD</sub>		(Note 2)		_	17	_	_	_	pF

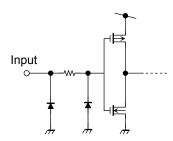
Note 2: C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

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Average operating current can be obtained by the equation:

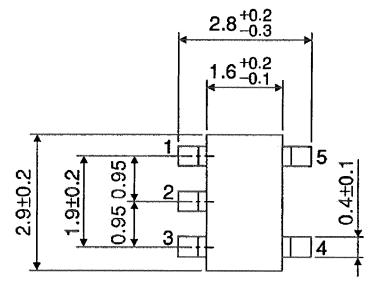
$$I_{CC\;(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

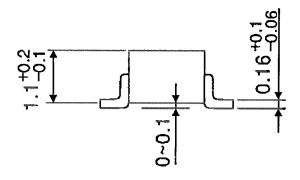
# **Input Equivalent Circuit**



# **Package Dimensions**

SSOP5-P-0.95 Unit: mm



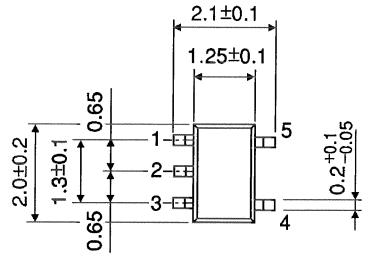


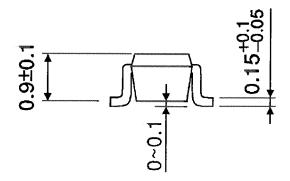
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Weight: 0.016 g (typ.)

# **Package Dimensions**

SSOP5-P-0.65A Unit: mm





Weight: 0.006 g (typ.)

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