TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TC7SH86FE

Exclusive OR Gate

Features

• Super high speed operation :tpD = 4.8 ns (typ.)

$$@V_{CC} = 5 V$$

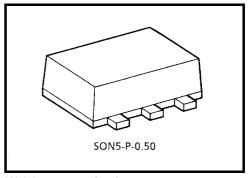
• Low power dissipation : $I_{CC} = 2 \mu A$ (Max.)

$$@$$
 Ta = 25°C

• High noise immunity: V_{NIH} = V_{NIH}

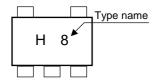
• 5.5V tolerant input.

• Wide operation voltage range : VCC (opr) = 2~5.5 V

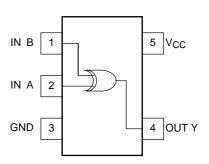


Weight: 0.003 g (typ.)

Marking



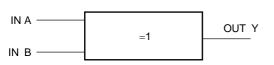
Pin Assignment (top view)



Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V _{CC}	-0.5~7	V
DC input voltage	V _{IN}	-0.5~7	V
DC output voltage	V _{OUT}	-0.5~V _{CC} + 0.5	V
Input diode current	l _{IK}	-20	mA
Output diode current	lok	±20	mA
DC output current	lout	±25	mA
DC V _{CC} /ground current	Icc	±50	mA
Power dissipation	PD	150	mW
Storage temperature	T _{stg}	-65~150	°C

Logic Diagram



Truth Table

Α	В	Υ
L	L	L
L	Н	Н
Н	L	Н
Н	Н	L

Recommended Operating Conditions

Characteristics	Symbol	Rating	Unit	
Supply voltage	V _{CC}	2~5.5	V	
Input voltage	V _{IN}	0~5.5	V	
Output voltage	V _{OUT}	0~ V _{CC}	V	
Operating temperature	T _{opr}	-40~85	°C	
Input rise and fall time	dt/dv	0~100 (V_{CC} = 3.3 V \pm 0.3 V)	ns/V	
	ui/uv	0~20 (V_{CC} = 5 V ± 0.5 V)		

Electrical Characteristics

DC Characteristics

Characteristics Symbol		Test	Toct Condition			Ta = 25°C			Ta = -40~85°C		Unit
		Circuit			V _{CC} (V)	Min	Тур.	Max	Min	Max	Unit
High-level input VIH —		_		2.0	1.5	_	_	1.5	_	V	
	_			3.0~5.5	V _{CC} × 0.7	_	_	V _{CC} × 0.7	_		
Low lovel input					2.0	_	_	0.5	_	0.5	
Low-level input voltage V _{IL} —	_	_		3.0~5.5	_	_	V _{CC} × 0.3	_	V _{CC} × 0.3	V	
					2.0	1.9	2.0	_	1.9	_	
High-level output voltage	_	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -50 μA	3.0	2.9	3.0	_	2.9	_	V	
				4.5	4.4	4.5	_	4.4	_		
			$I_{OH} = -4 \text{ mA}$	3.0	2.58		_	2.48	_		
				$I_{OH} = -8 \text{ mA}$	4.5	3.94		_	3.80	_	
Low-level output voltage VoL —			I _{OL} = 50 μA	2.0	_	0	0.1	_	0.1	٧	
				3.0	_	0	0.1	_	0.1		
	_	$V_{IN} = V_{IH}$		4.5	_	0	0.1	_	0.1		
			I _{OL} = 4 mA	3.0	_		0.36	_	0.44		
				I _{OL} = 8 mA	4.5	—	_	0.36	_	0.44	
Input leakage current	I _{IN}	_	V _{IN} = 5.5 V or GND		0~5.5	_	١	±0.1	_	±1.0	μА
Quiescent supply current	Icc	_	V _{IN} = V _{CC} o	or GND	5.5	_	_	2.0	_	20.0	μА



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

Characteristics	Symbol	Test Condition			Ta = 25°C			Ta = -40~85°C		Unit
			V _{CC} (V)	C _{L (} pF)	Min	Тур.	Max	Min	Max	Offic
Propagation delay time	^t PLH ^t PHL		3.3 ± 0.3	15	_	7.0	11.0	1.0	13.0	ns
				50	_	9.5	14.5	1.0	16.5	
				15	_	4.8	6.8	1.0	8.0	
		5.0 ± 0.5	50	_	6.3	8.8	1.0	10.0		
Input capacitance	C _{IN}				_	4	10	_	10	pF
Power dissipation capacitance	C _{PD}		(Note)		_	18	_	_	_	pF

Note: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation.

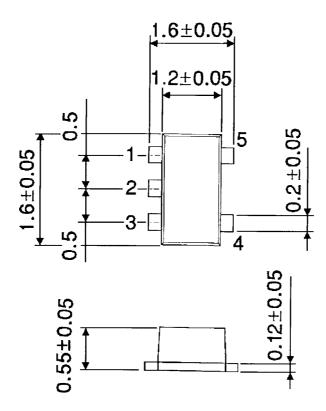
$$I_{CC (opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

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Package Dimensions

SON5-P-0.50 Unit: mm



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Weight: 0.003 g (typ.)

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