

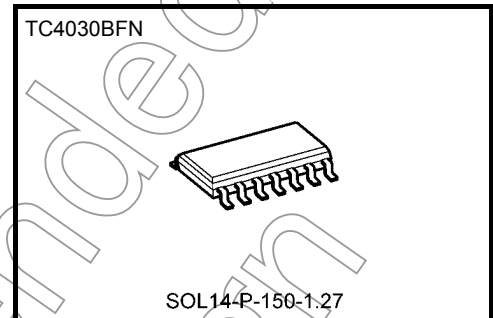
TC4030BFN

TC4030B Quad Exclusive-OR Gate

TC4030B contains four circuits of exclusive OR gates. Since the buffers of two stage inverters are provided for all the outputs, the input/output voltage characteristic has been improved and the noise immunity has been also improved. And increase of transmission time due to load capacity increase is kept minimum.

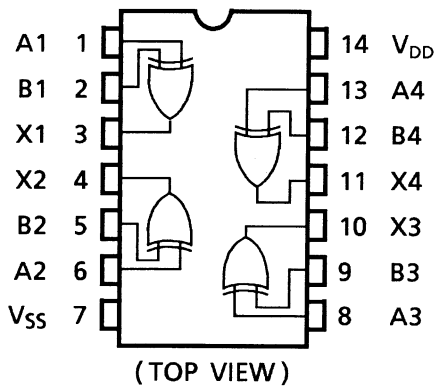
Wide variety of applicaitons are offered, such as digital comparators and parity circuits.

Note: xxxFN (JEDEC SOP) is not available in Japan.



Weight
SOL14-P-150-1.27 : 0.12 g (typ.)

Pin Assignment

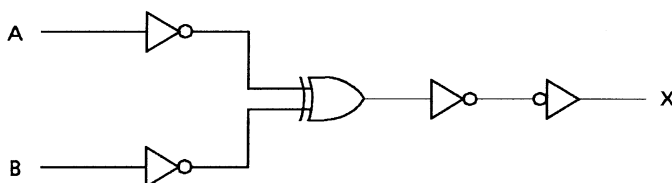


Truth Table

Inputs		Output
A	B	X
L	L	L
L	H	H
H	L	H
H	H	L

Circuit Diagram

1/4 TC4030B



Absolute Maximum Ratings (Note)

Characteristics	Symbol	Rating	Unit
DC supply voltage	V_{DD}	$V_{SS} - 0.5$ to $V_{SS} + 20$	V
Input voltage	V_{IN}	$V_{SS} - 0.5$ to $V_{DD} + 0.5$	V
Output voltage	V_{OUT}	$V_{SS} - 0.5$ to $V_{DD} + 0.5$	V
DC input current	I_{IN}	± 10	mA
Power dissipation	P_D	180	mW
Operating temperature range	T_{opr}	-40 to 85	°C
Storage temperature range	T_{stg}	-65 to 150	°C

Note: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

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.).

Operating Ranges ($V_{SS} = 0$ V) (Note)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
DC supply voltage	V_{DD}	—	3	—	18	V
Input voltage	V_{IN}	—	0	—	V_{DD}	V

Note: The operating ranges must be maintained to ensure the normal operation of the device.
Unused inputs must be tied to either V_{DD} or V_{SS} .

Static Electrical Characteristics ($V_{SS} = 0\text{ V}$)

Characteristics		Sym- bol	Test Condition	-40°C			25°C			85°C		Unit
				V_{DD} (V)	Min	Max	Min	Typ.	Max	Min	Max	
High-level output voltage		V_{OH}	$ I_{OUT} < 1\text{ }\mu\text{A}$ $V_{IN} = V_{SS}, V_{DD}$	5	4.95	—	4.95	5.00	—	4.95	—	V
				10	9.95	—	9.95	10.00	—	9.95	—	
				15	14.95	—	14.95	15.00	—	14.95	—	
Low-level output voltage		V_{OL}	$ I_{OUT} < 1\text{ }\mu\text{A}$ $V_{IN} = V_{SS}, V_{DD}$	5	—	0.05	—	0.00	0.05	—	0.05	V
				10	—	0.05	—	0.00	0.05	—	0.05	
				15	—	0.05	—	0.00	0.05	—	0.05	
Output high current		I_{OH}	$V_{OH} = 4.6\text{ V}$	5	-0.61	—	-0.51	-1.0	—	-0.42	—	mA
			$V_{OH} = 2.5\text{ V}$	5	-2.50	—	-2.10	-4.0	—	-1.70	—	
			$V_{OH} = 9.5\text{ V}$	10	-1.50	—	-1.30	-2.2	—	-1.10	—	
			$V_{OH} = 13.5\text{ V}$	15	-4.00	—	-3.40	-9.0	—	-2.80	—	
			$V_{IN} = V_{SS}, V_{DD}$									
Output low current		I_{OL}	$V_{OL} = 0.4\text{ V}$	5	0.61	—	0.51	1.2	—	0.42	—	mA
			$V_{OL} = 0.5\text{ V}$	10	1.50	—	1.30	3.2	—	1.10	—	
			$V_{OL} = 1.5\text{ V}$	15	4.00	—	3.40	12.0	—	2.80	—	
			$V_{IN} = V_{SS}, V_{DD}$									
Input high voltage		V_{IH}	$V_{OUT} = 0.5\text{ V}, 4.5\text{ V}$	5	3.5	—	3.5	2.75	—	3.5	—	V
			$V_{OUT} = 1.0\text{ V}, 9.0\text{ V}$	10	7.0	—	7.0	5.50	—	7.0	—	
			$V_{OUT} = 1.5\text{ V}, 13.5\text{ V}$	15	11.0	—	11.0	8.25	—	11.0	—	
			$ I_{OUT} < 1\text{ }\mu\text{A}$									
Input low voltage		V_{IL}	$V_{OUT} = 0.5\text{ V}, 4.5\text{ V}$	5	—	1.5	—	2.25	1.5	—	1.5	V
			$V_{OUT} = 1.0\text{ V}, 9.0\text{ V}$	10	—	3.0	—	4.50	3.0	—	3.0	
			$V_{OUT} = 1.5\text{ V}, 13.5\text{ V}$	15	—	4.0	—	6.75	4.0	—	4.0	
			$ I_{OUT} < 1\text{ }\mu\text{A}$									
Input current	"H" level	I_{IH}	$V_{IH} = 18\text{ V}$	18	—	0.1	—	10^{-5}	0.1	—	1.0	μA
	"L" level	I_{IL}	$V_{IL} = 0\text{ V}$	18	—	-0.1	—	-10^{-5}	-0.1	—	-1.0	
Quiescent supply current		I_{DD}	$V_{IN} = V_{SS}, V_{DD}$ (Note)	5	—	1	—	0.001	1	—	7.5	μA
				10	—	2	—	0.001	2	—	15.0	
				15	—	4	—	0.002	4	—	30.0	

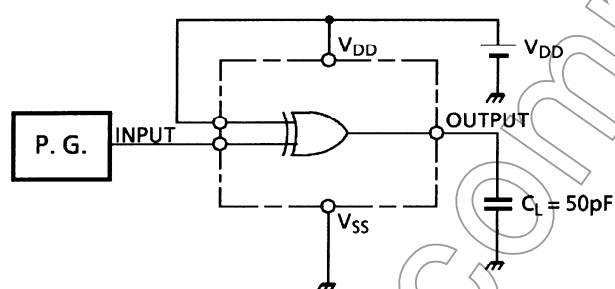
Note: All valid input combinations.

Dynamic Electrical Characteristics (Ta = 25°C, VSS = 0 V, CL = 50 pF)

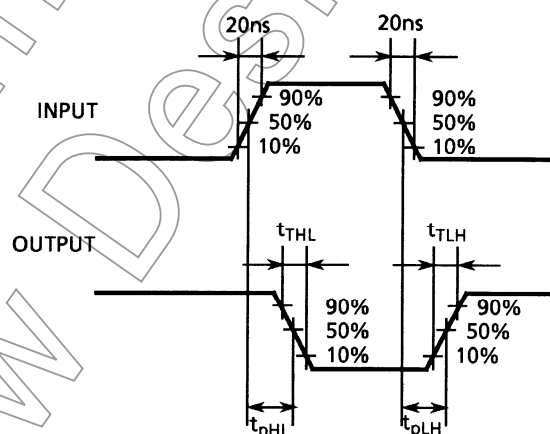
Characteristics	Symbol	Test Condition	VDD (V)	Min	Typ.	Max	Unit
Output transition time (low to high)	t_{TLH}	—	5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Output transition time (high to low)	t_{THL}	—	5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Propagation delay time	t_{pLH} t_{pHL}	—	5	—	90	280	ns
			10	—	45	130	
			15	—	35	100	
Input capacitance	C_{IN}	—	—	—	5	7.5	pF

Circuit and Waveform for Measurement of Dynamic Characteristics

Circuit



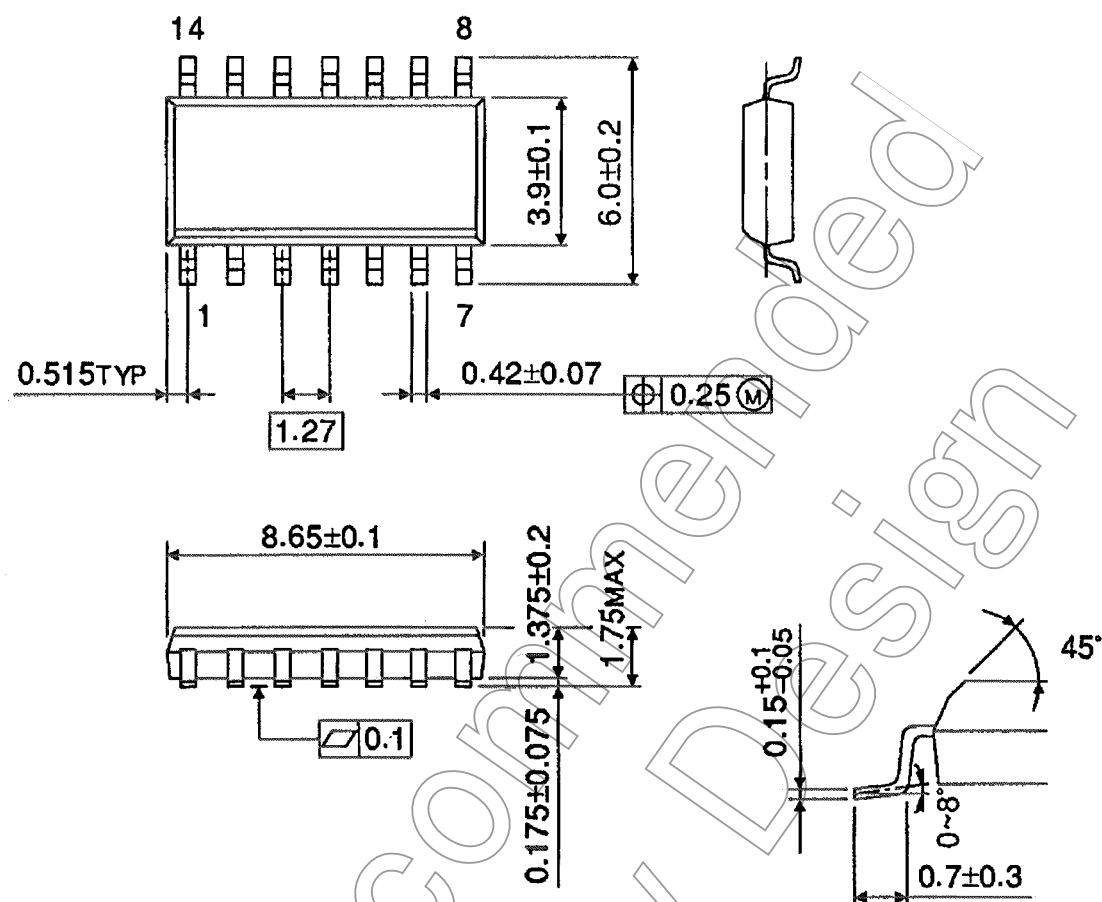
Waveform



Package Dimensions (Note)

SOL14-P-150-1.27

Unit : mm



Note: This package is not available in Japan.

Weight: 0.12 g (typ.)

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