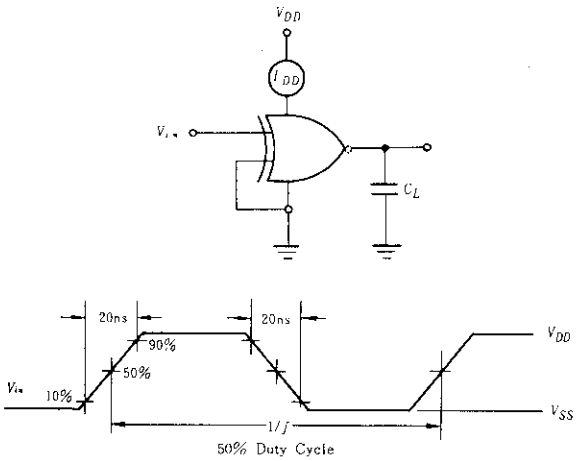
HD14070B, HD14077B

Quadruple Exclusive-OR Gate·····HD14070B
Quadruple Exclusive-NOR Gate·····HD14077B

■ FEATURES

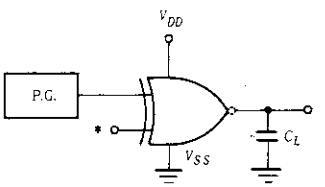
- Quiescent Current = 0.5nA typ/pkg @5V
- Noise Immunity = 45% of V_{DD} typ
- Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range
- Pin-for Pin Replacements for CD4070B/77B and MC14070B/77B Series

■ POWER DISSIPATION TEST CIRCUIT AND WAVEFORM

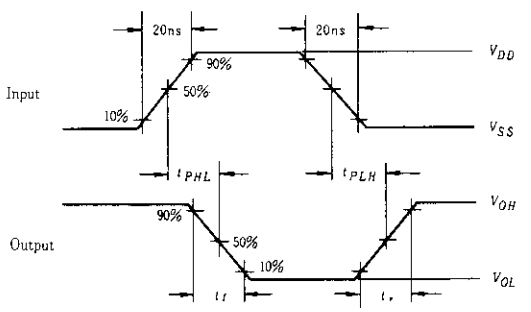


50% Duty Cycle

■ SWITCHING TIME TEST CIRCUIT

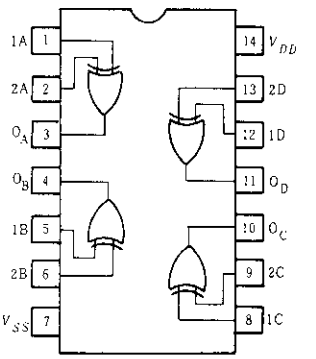


* Connect unused input to V_{DD} for HD14070B, to V_{SS} for HD14077B



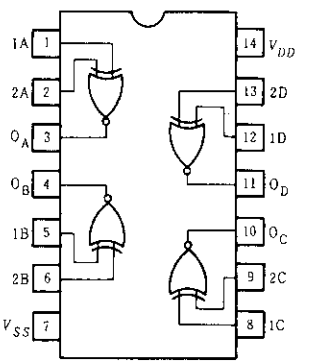
■ PIN ARRANGEMENT

● HD14070B



(Top View)

● HD14077B



(Top View)

■ ELECTRICAL CHARACTERISTICS

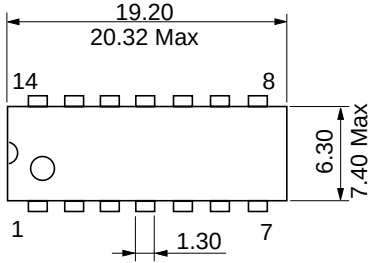
Characteristic	Symbol	V_{DD}(V)	Test Conditions	−40°C min	−40°C max	25°C min	25°C typ	25°C max	85°C min	85°C max	Unit
Output Voltage	V_{OL}	5.0	$V_{in}=V_{DD}$ or 0	—	0.05	—	0	0.05	—	0.05	V
		10		—	0.05	—	0	0.05	—	0.05	
		15		—	0.05	—	0	0.05	—	0.05	
	V_{OH}	5.0	$V_{in}=0$ or V_{DD}	4.95	—	4.95	5.0	—	4.95	—	V
		10		9.95	—	9.95	10	—	9.95	—	
		15		14.95	—	14.95	15	—	14.95	—	
Input Voltage	V_{IL}	5.0	$V_{out}=4.5$ or 0.5V	—	1.5	—	2.25	1.5	—	1.5	V
		10	$V_{out}=9.0$ or 1.0V	—	3.0	—	4.50	3.0	—	3.0	
		15	$V_{out}=13.5$ or 1.5V	—	4.0	—	6.75	4.0	—	4.0	
	V_{IH}	5.0	$V_{out}=0.5$ or 4.5V	3.5	—	3.5	2.75	—	3.5	—	V
		10	$V_{out}=1.0$ or 9.0V	7.0	—	7.0	5.50	—	7.0	—	
		15	$V_{out}=1.5$ or 13.5V	11.0	—	11.0	8.25	—	11.0	—	
Output Drive Current	I_{OH}	5.0	$V_{OH}=2.5$V	−2.5	—	−2.1	−4.2	—	−1.7	—	mA
		5.0	$V_{OH}=4.6$V	−0.52	—	−0.44	−0.88	—	−0.36	—	
		10	$V_{OH}=9.5$V	−1.3	—	−1.1	−2.25	—	−0.9	—	
		15	$V_{OH}=13.5$V	−3.6	—	−3.0	−8.8	—	−2.4	—	
	I_{OL}	5.0	$V_{OL}=0.4$V	0.52	—	0.44	0.88	—	0.36	—	mA
		10	$V_{OL}=0.5$V	1.3	—	1.1	2.25	—	0.9	—	
		15	$V_{OL}=1.5$V	3.6	—	3.0	8.8	—	2.4	—	
Input Current	I_{in}	15		—	±0.3	—	±0.00001	±0.3	—	±1.0	μA
Input Capacitance	C_{in}		$V_{in}=0$	—	—	—	5.0	7.5	—	—	pF
Quiescent Current	I_{DD}	5.0	Zero Signal, per Ppckage	—	1.0	—	0.0005	1.0	—	7.5	μA
		10		—	2.0	—	0.0010	2.0	—	15	
		15		—	4.0	—	0.0015	4.0	—	30	
Total Supply Current*	I_T	5.0	Dynamic+I_{DD}, per Gate, $C_L=50$pF, $f=1$kHz	—	—	—	0.3	—	—	—	μA
		10		—	—	—	0.6	—	—	—	
		15		—	—	—	0.9	—	—	—	

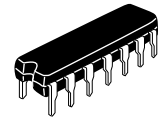
* To calculate total supply current at frequency other than 1kHz.
@ $V_{DD}=5.0$V $I_T=(0.3\,\mu A/kHz)f+I_{DD}$ @ $V_{DD}=10$V $I_T=(0.6\,\mu A/kHz)f+I_{DD}$ @ $V_{DD}=15$V $I_T=(0.9\,\mu A/kHz)f+I_{DD}$

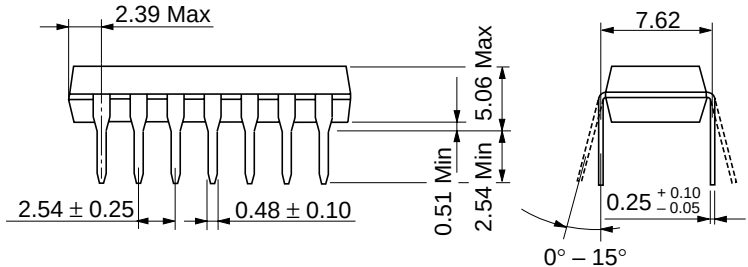
■ SWITCHING CHARACTERISTICS ($C_L=50$pF, $Ta=25$°C)

Characteristic	Symbol	V_{DD}(V)	−40°C min	−40°C max	25°C min	25°C typ	25°C max	85°C min	85°C max	Unit
Output Rise and Fall Time	t_r	5.0	—	—	—	100	200	—	—	ns
		10	—	—	—	50	100	—	—	
		15	—	—	—	40	80	—	—	
	t_f	5.0	—	—	—	100	200	—	—	ns
		10	—	—	—	50	100	—	—	
		15	—	—	—	40	80	—	—	
Propagation Delay Time	t_{PLH}	5.0	—	—	—	175	350	—	—	ns
		10	—	—	—	75	150	—	—	
		15	—	—	—	50	100	—	—	
	t_{PHL}	5.0	—	—	—	175	350	—	—	ns
		10	—	—	—	75	150	—	—	
		15	—	—	—	50	100	—	—	

Unit: mm

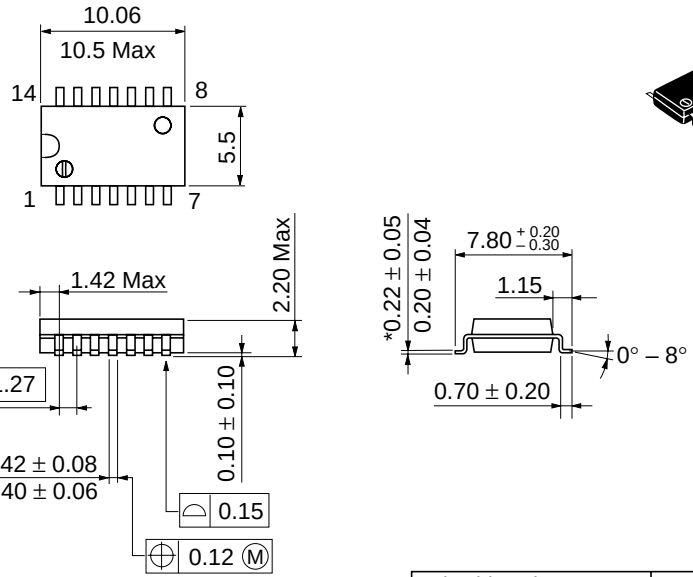


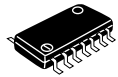




Hitachi Code	DP-14
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.97 g

Unit: mm

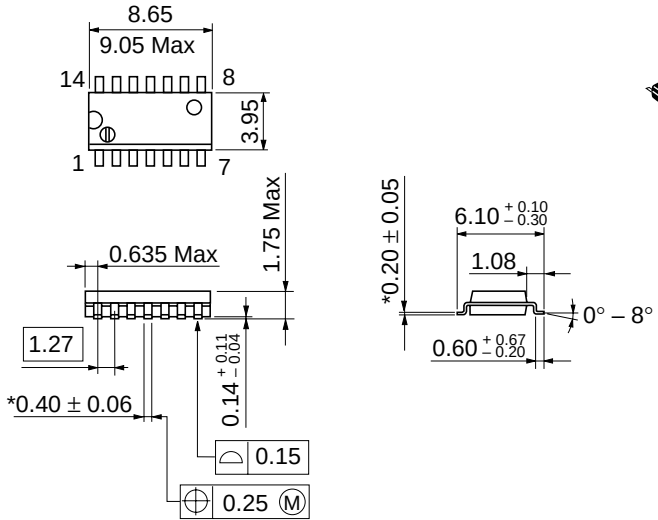




Hitachi Code	FP-14DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.23 g

*Dimension including the plating thickness
Base material dimension

Unit: mm



Hitachi Code	FP-14DN
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.13 g

*Pd plating

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