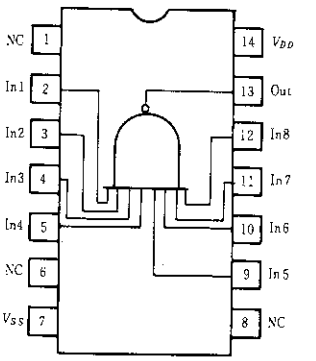
HD14068B

8-input NAND Gate

■ FEATURES

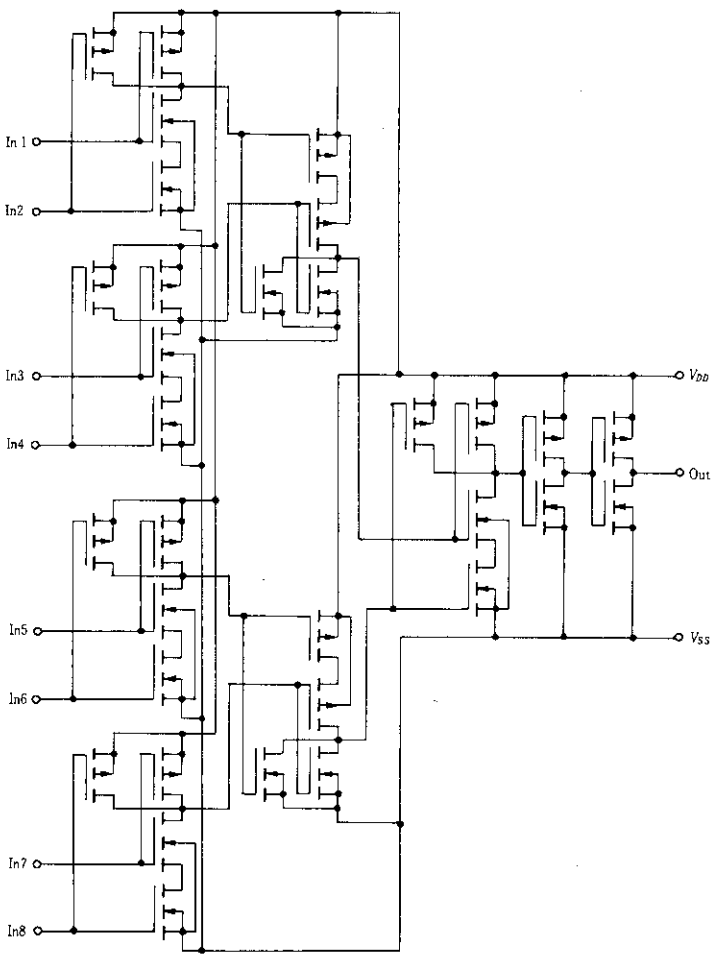
- Quiescent Current = 0.5nA typ/pkg @5V
- Noise Immunity = 45% of V_{DD} typ
- Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range
- Pin-for Pin Replacements for CD4068B and MC14068B Series

■ PIN ARRANGEMENT



(Top View)

■ CIRCUIT SCHEMATIC



■ ELECTRICAL CHARACTERISTICS

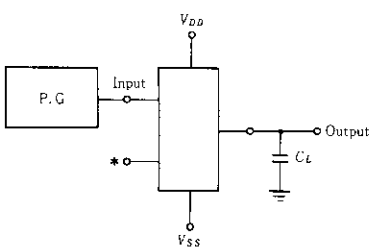
Characteristic	Symbol	V_{DD}(V)	Test Conditions	−40℃ min	−40℃ max	25℃ min	25℃ typ	25℃ max	85℃ min	85℃ max	Unit
Output Voltage	V_{OL}	5.0	$V_{in}=V_{DD}$	—	0.05	—	0	0.05	—	0.05	V
		10		—	0.05	—	0	0.05	—	0.05	
		15		—	0.05	—	0	0.05	—	0.05	
	V_{OH}	5.0	$V_{in}=0$	4.95	—	4.95	5.0	—	4.95	—	V
		10		9.95	—	9.95	10	—	9.95	—	
		15		14.95	—	14.95	15	—	14.95	—	
Input Voltage	V_{IL}	5.0	$V_{out}=4.5$V	—	1.5	—	2.25	1.5	—	1.5	V
		10	$V_{out}=9.0$V	—	3.0	—	4.50	3.0	—	3.0	
		15	$V_{out}=13.5$V	—	4.0	—	6.75	4.0	—	4.0	
	V_{IH}	5.0	$V_{out}=0.5$V	3.5	—	3.5	2.75	—	3.5	—	V
		10	$V_{out}=1.0$V	7.0	—	7.0	5.50	—	7.0	—	
		15	$V_{out}=1.5$V	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 Package	—	1.0	—	0.0005	1.0	—	7.5	μA
		10		—	2.0	—	0.0010	2.0	—	15.0	
		15		—	4.0	—	0.0015	4.0	—	30.0	
Total Supply Current*	I_T	5.0	Dynamic+I_{DD}, $C_L=50$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}=5.0V $I_T=(0.3\,\mu A/kHz)f+I_{DD}$ @V_{DD}=10V $I_T=(0.6\,\mu A/kHz:f+I_{DD}$ @V_{DD}=15V $I_T=(0.9\,\mu A/kHz:f+I_{DD}$

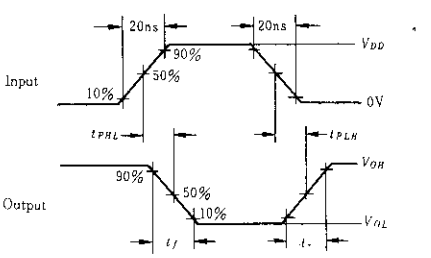
■ SWITCHING CHARACTERISTICS ($C_L=50$pF, $Ta=25$℃)

Characteristic	Symbol	V_{DD} (V)	min	typ	max	Unit
Output Rise Time	t_r	5.0	—	100	200	ns
		10	—	50	100	
		15	—	40	80	
Output Fall Time	t_f	5.0	—	100	200	ns
		10	—	50	100	
		15	—	40	80	
Propagation Delay Time	t_{PLH}	5.0	—	200	400	ns
		10	—	80	160	
		15	—	60	120	
	t_{PHL}	5.0	—	200	400	ns
		10	—	80	160	
		15	—	60	120	

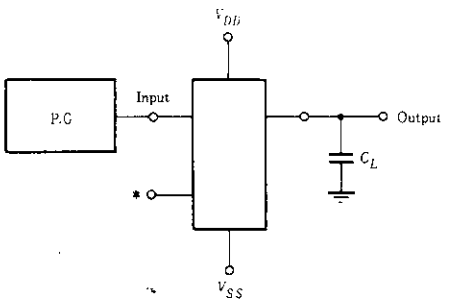
■ SWITCHING TIME TEST CIRCUIT

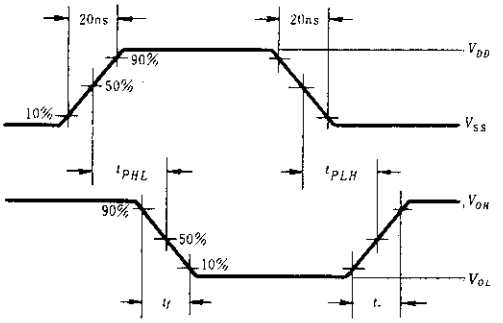


* : All unused inputs of AND, NAND gates must be connected to V_{DD}.



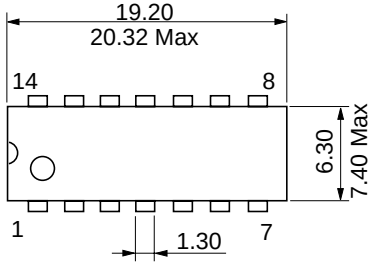
■ SWITCHING TIME TEST CIRCUIT

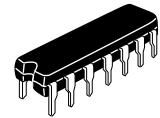


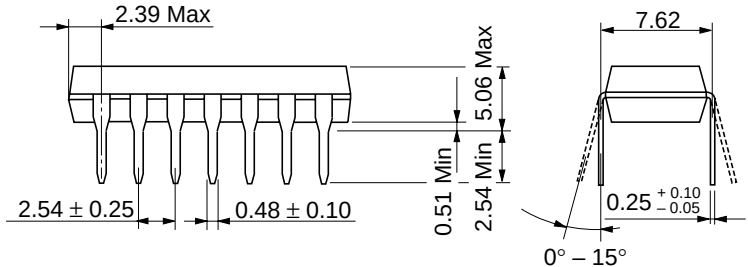


* All unused inputs of AND, NAND gates must be connected to V_{DD}.

Unit: mm

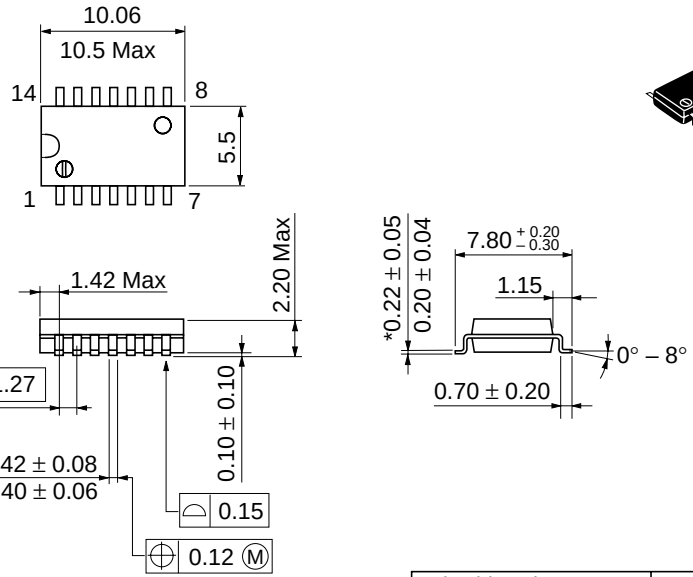


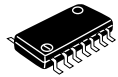




Hitachi Code	DP-14
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.97 g

Unit: mm

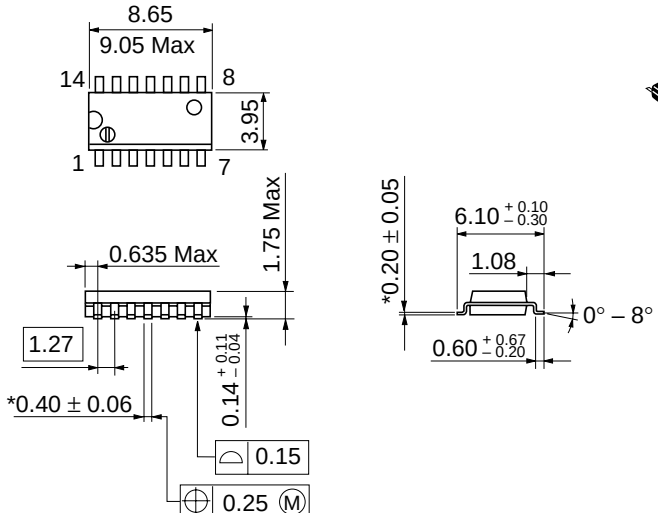




Hitachi Code	FP-14DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.23 g

*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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