

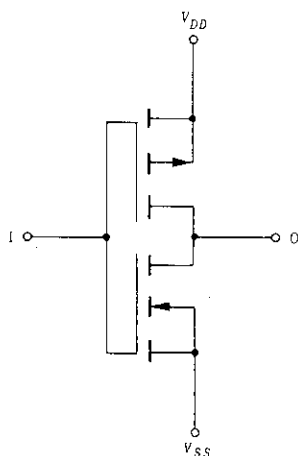
HD14069UB

Hex Inverter

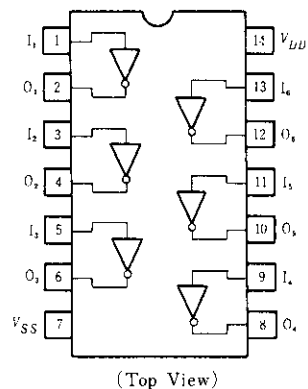
■ FEATURES

- 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 CD4069B and MC14069B Series

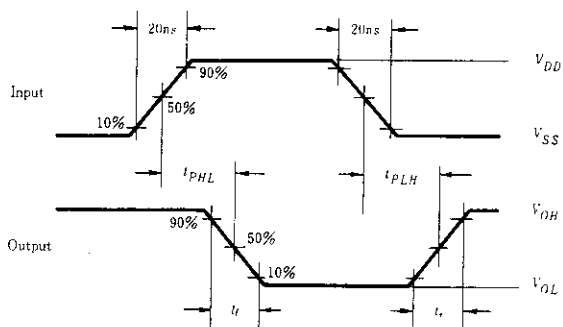
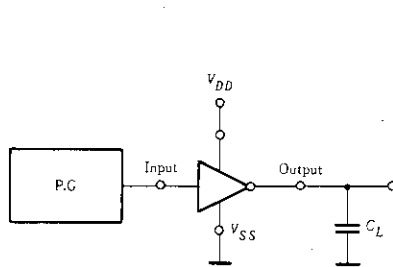
■ CIRCUIT SCHEMATIC (1/6)



■ PIN ARRANGEMENT



■ SWITCHING TIME TEST CIRCUIT



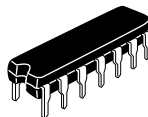
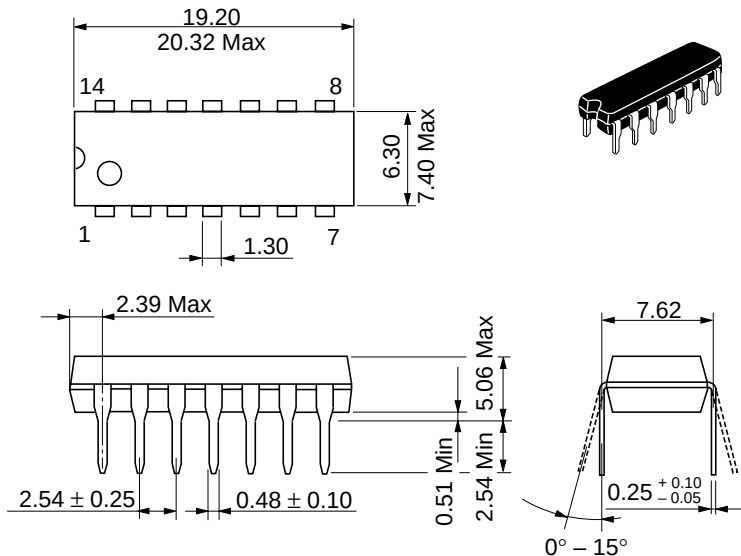
■ ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	$V_{DD}(V)$	Test Conditions	-40°C		25°C			85°C		Unit
				min	max	min	typ	max	min	max	
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	$V_{out} = 4.5V$	—	1.0	—	2.25	1.0	—	1.0	V
		10	$V_{out} = 9.0V$	—	2.0	—	4.50	2.0	—	2.0	
		15	$V_{out} = 13.5V$	—	2.5	—	6.75	2.5	—	2.5	
	V_{IH}	5.0	$V_{out} = 0.5V$	4.0	—	4.0	2.75	—	4.0	—	V
		10	$V_{out} = 1.0V$	8.0	—	8.0	5.50	—	8.0	—	
		15	$V_{out} = 1.5V$	12.5	—	12.5	8.25	—	12.5	—	
Output Drive Current	I_{OH}	5.0	$V_{OH} = 2.5V$	-2.5	—	-2.1	-4.2	—	-1.7	—	mA
		5.0	$V_{OH} = 4.6V$	-0.52	—	-0.44	-0.88	—	-0.36	—	
		10	$V_{OH} = 9.5V$	-1.3	—	-1.1	-2.25	—	-0.9	—	
		15	$V_{OH} = 13.5V$	-3.6	—	-3.0	-8.8	—	-2.4	—	
	I_{OL}	5.0	$V_{OL} = 0.4V$	0.52	—	0.44	0.88	—	0.36	—	mA
		10	$V_{OL} = 0.5V$	1.3	—	1.1	2.25	—	0.9	—	
		15	$V_{OL} = 1.5V$	3.6	—	3.0	8.8	—	2.4	—	
Input Current	I_{in}	15		—	± 0.3	—	± 0.0001	± 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} , per Gate, $C_L = 50pF$, $f = 1kHz$	—	—	—	0.3	—	—	—	μA
		10		—	—	—	0.6	—	—	—	
		15		—	—	—	0.9	—	—	—	

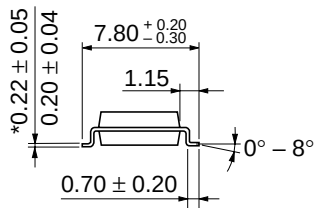
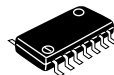
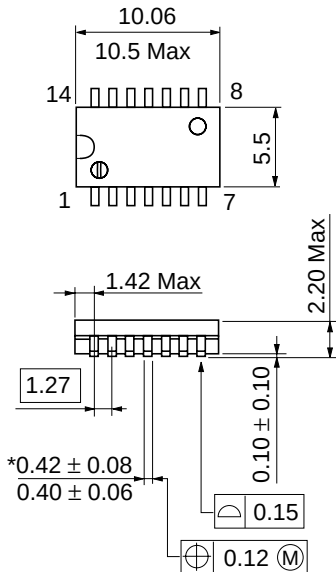
* To calculate total supply current at frequency other than 1kHz.

 $\approx V_{DD} = 5.0V \quad I_T = 0.3\mu A/kHz \cdot f + I_{DD}/6 \quad \approx V_{DD} = 10V \quad I_T = 0.6\mu A/kHz \cdot f + I_{DD}/6 \quad \approx V_{DD} = 15V \quad I_T = 0.9\mu A/kHz \cdot f + I_{DD}/6$
■ SWITCHING CHARACTERISTICS ($C_L = 50pF$, $T_a = 25^\circ C$)

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	—	65	125	ns
		10	—	40	80	
		15	—	30	60	
	t_{PHL}	5.0	—	65	125	ns
		10	—	40	80	
		15	—	30	60	

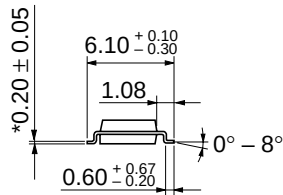
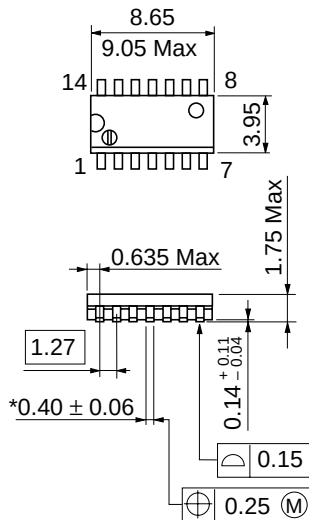


Hitachi Code	DP-14
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.97 g



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

*Dimension including the plating thickness
Base material dimension



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

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