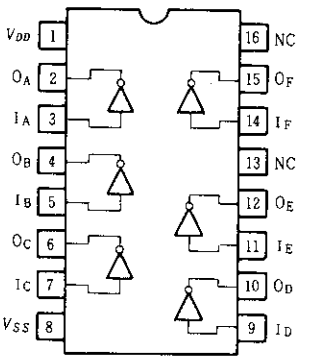
HD14049UB

Hex Inverter/Buffer

The HD14049UB hex inverter/buffer finds primary use where low power dissipation and/or high noise immunity is desired. This device provides logic-level conversion using only one supply voltage, V_{CC}. The input-signal high level (V_{IH}) can exceed the V_{CC} supply voltage for logic-level conversions. Two TTL Loads can be driven when the devices are used as CMOS-to-TTL converters (V_{CC} = 5V, $V_{OL} \leqq 0.4V$, $I_{OL} \geqq 3.2mA$).

■ PIN ARRANGEMENT

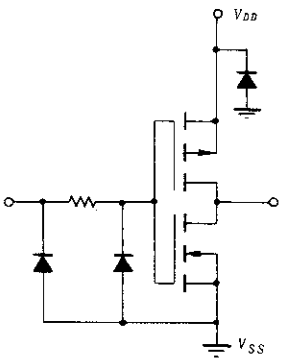


(Top View)

■ FEATURES

- High Source and Sink Current
- High-to-Low Level Converter
- Quiescent Current =2nA/pkg typ. @5V
- Supply Voltage Range = 3 to 18V
- Pin-for-Pin Replacement for MC14049UB

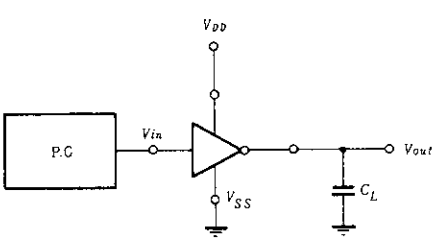
■ CIRCUIT SCHEMATIC (1/6)

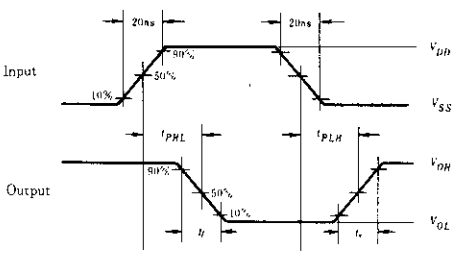


■ MAXIMUM RATINGS (Voltages referenced to V_{SS})

Characteristic	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	−0.5~+18	V
Input Voltage	V_{in}	−0.5~+18	V
DC Current Drain per Input Pin	I_{in}	10	mA
DC Current Drain per Output Pin	I_{out}	45	mA
Operating Temperature Range	T_A	−40~+85	°C
Storage Temperature Range	T_{stg}	−65~+150	°C
Power Dissipation	P_D	300	mW

■ SWITCHING TIME TEST CIRCUIT





■ 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	$V_{out}=4.5V$	—	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	$V_{OH}=2.5V$	−1.5	—	−1.25	−2.5	—	−1.0	—	mA
		10	$V_{OH}=9.5V$	−1.5	—	−1.25	−2.5	—	−1.0	—	
		15	$V_{OH}=13.5V$	−4.5	—	−3.75	−10	—	−3.0	—	
	I_{OL}	5.0	$V_{OL}=0.4V$	3.6	—	3.2	6.0	—	2.5	—	mA
		10	$V_{OL}=0.5V$	9.6	—	8.0	16	—	6.6	—	
		15	$V_{OL}=1.5V$	28	—	24	40	—	19	—	
Input Current	I_{in}	15		—	±0.3	—	±0.00001	±0.3	—	±1.0	μA
Input Capacitance	C_{in}	—	$V_{in}=0$	—	—	—	10	15	—	—	pF
Quiescent Current	I_{DD}	5.0	Zero Signal, per Package	—	4.0	—	0.002	4.0	—	30	μA
		10		—	8.0	—	0.004	8.0	—	60	
		15		—	16	—	0.006	16	—	120	
Total Supply Current*	I_T	5.0	Dynamic÷I_{DD}, per Gate $C_L=50pF$, $f=1kHz$	—	—	—	1.77	—	—	—	μA
		10		—	—	—	3.54	—	—	—	
		15		—	—	—	5.31	—	—	—	

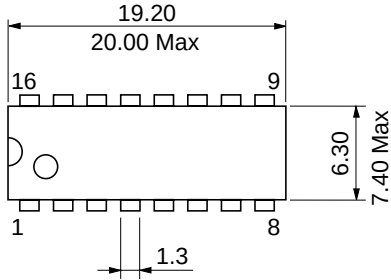
* To calculate total supply current at frequency other than 1kHz.

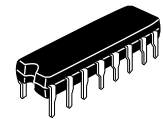
@ $V_{DD}=5.0V$ $I_T=(1.77\mu A/kHz)f+I_{DD}$ @ $V_{DD}=10V$ $I_T=(3.54\mu A/kHz)f+I_{DD}$ @ $V_{DD}=15V$ $I_T=(5.31\mu A/kHz)f+I_{DD}$

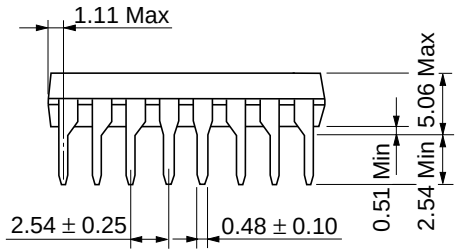
■ SWITCHING CHARACTERISTICS ($C_L=50pF$, $Ta=25℃$)

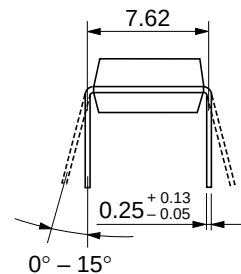
Characteristic	Symbol	V_{DD}(V)	min	typ	max	Unit
Output Rise Time	t_r	5.0	—	100	200	ns
		10	—	50	100	
		15	—	40	80	
Output Fall Time	t_f	5.0	—	40	80	ns
		10	—	20	40	
		15	—	15	30	
Propagation Delay Time	t_{PLH}	5.0	—	80	160	ns
		10	—	40	80	
		15	—	30	60	
	t_{PHL}	5.0	—	30	60	ns
		10	—	20	40	
		15	—	15	30	

Unit: mm



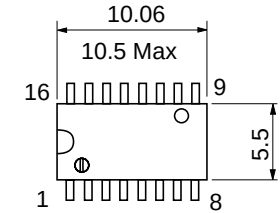


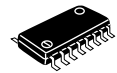


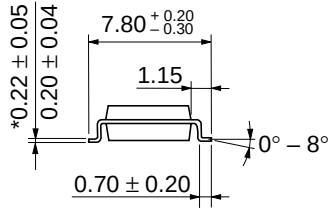


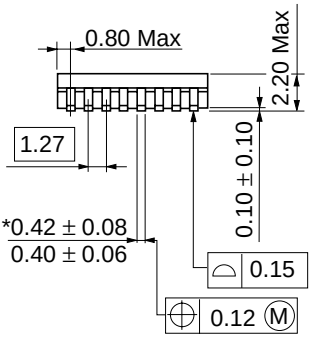
Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g

Unit: mm





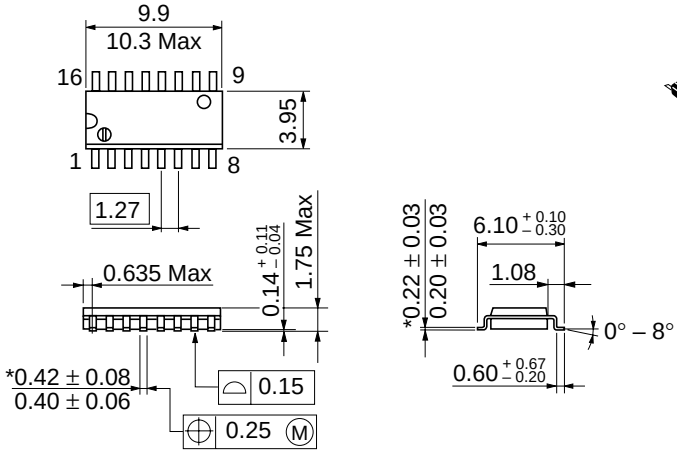


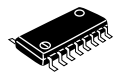


*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-16DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.24 g

Unit: mm





Hitachi Code	FP-16DN
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.15 g

*Dimension including the plating thickness
Base material dimension

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