HD14050B

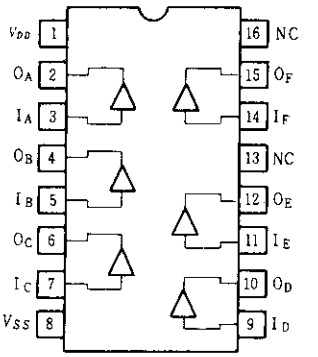
Hex Buffer

The HD14050B noninverting hex buffer finds primary use where low power dissipation and/or high noise immunity is desired. This devices 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, $V_{OL} \leqq 0.4V$, $I_{OL} \geqq 3.2mA$).

■ FEATURES

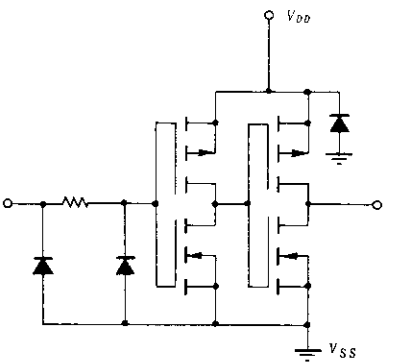
- High Source and Sink Currents
- High-to-Low Level Converter
- Quiescent Current = 2nA/pkg typ. @5V
- Supply Voltage Range = 3 to 18V
- Pin-for-Pin Replacement for MC14050B

■ PIN ARRANGEMENT



(Top View)

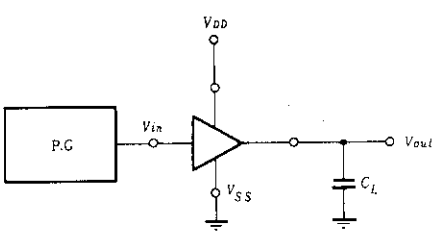
■ CIRCUIT SCHEMATIC (1/6)

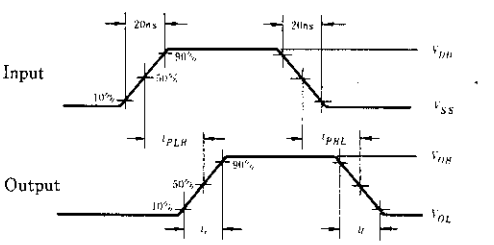


■ MAXIMUM RATINGS (Voltages referenced to V_{SS})

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	℃
Storage Temperature Ranga	T_{stg}	−65~+150	℃
Power Dissipation	P_D	300	mW

■ SWITCHING TIME TEST CIRCUIT





■ 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} = 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} = 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} = 0.5V	—	1.5	—	2.25	1.5	—	1.5	V
		10	V_{out} = 1.0V	—	3.0	—	4.50	3.0	—	3.0	
		15	V_{out} = 1.5V	—	4.0	—	6.75	4.0	—	4.0	
	V_{IH}	5.0	V_{out} = 4.5V	3.5	—	3.5	2.75	—	3.5	—	V
		10	V_{out} = 9.0V	7.0	—	7.0	5.50	—	7.0	—	
		15	V_{out} = 13.5V	11.0	—	11.0	8.25	—	11.0	—	
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 = 1 kHz	—	—	—	1.77	—	—	—	μA
		10		—	—	—	3.54	—	—	—	
		15		—	—	—	5.31	—	—	—	

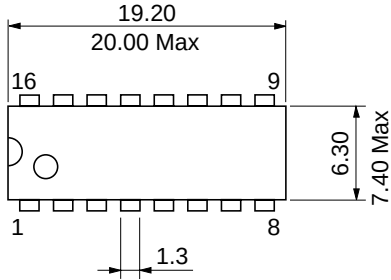
* To calculate total supply current at frequency other than 1kHz.

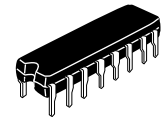
@ V_{DD} = 5.0V I_T = (1.77μA/kHz) f + I_{DD} @ V_{DD} = 10V I_T = (3.54μA/kHz) f + I_{DD} @ V_{DD} = 15V I_T = (5.31μA/kHz) f + I_{DD}

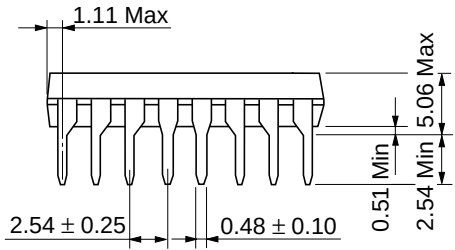
■ SWITCHING CHARACTERISTICS (C_L = 50pF, Ta = 25°C)

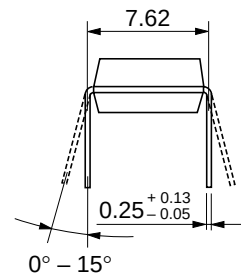
Characteristic	Symbol	V_{DD}(V)	min	typ	max	Unit
Output Rise Time	t_r	5.0	—	100	200	ns
		10	—	50	100	
		15	—	40	80	
Output Fall Time	t_f	5.0	—	40	80	ns
		10	—	20	40	
		15	—	15	30	
Propagation Delay Time	t_{PLH}	5.0	—	80	160	ns
		10	—	40	80	
		15	—	30	60	
	t_{PHL}	5.0	—	60	100	ns
		10	—	30	50	
		15	—	20	35	

Unit: mm



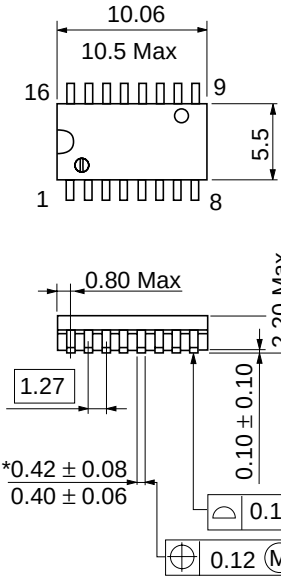


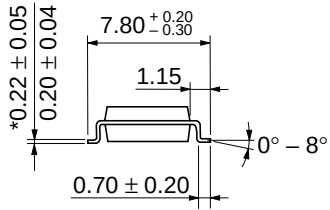


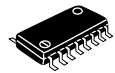


Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g

Unit: mm



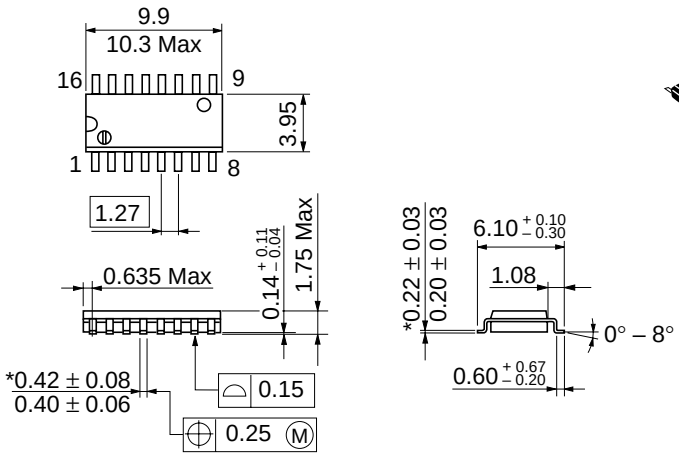




*Dimension including the plating thickness
Base material dimension

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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