

# HD14050B

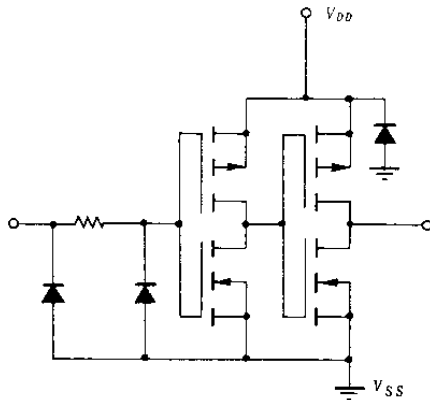
## Hex Buffer

The HD14050B noninverting hex 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 ( $V_{CC} = 5V, V_{OL} \leq 0.4V, I_{OL} \geq 3.2mA$ ).

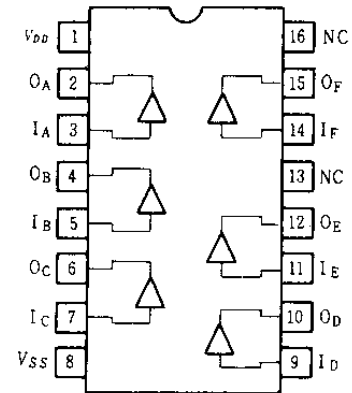
### FEATURES

- 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

### CIRCUIT SCHEMATIC (1/6)



### PIN ARRANGEMENT

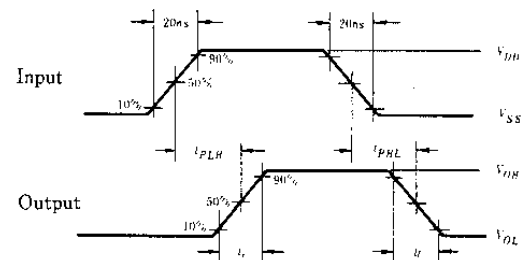
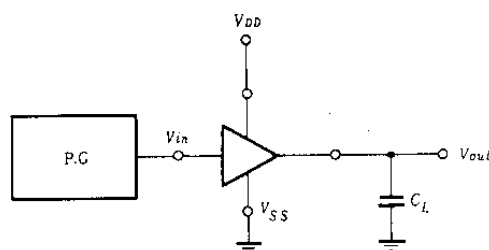


(Top View)

### 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 <sub>DD</sub> (V)	Test Conditions	-40°C		25°C			85°C		Unit
				min	max	min	typ	max	min	max	
Output Voltage	V <sub>OL</sub>	5.0	V <sub>in</sub> = 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 <sub>OH</sub>	5.0	V <sub>in</sub> = V <sub>DD</sub>	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 <sub>IL</sub>	5.0	V <sub>out</sub> = 0.5V	-	1.5	-	2.25	1.5	-	1.5	V
		10	V <sub>out</sub> = 1.0V	-	3.0	-	4.50	3.0	-	3.0	
		15	V <sub>out</sub> = 1.5V	-	4.0	-	6.75	4.0	-	4.0	
	V <sub>IH</sub>	5.0	V <sub>out</sub> = 4.5V	3.5	-	3.5	2.75	-	3.5	-	V
		10	V <sub>out</sub> = 9.0V	7.0	-	7.0	5.50	-	7.0	-	
		15	V <sub>out</sub> = 13.5V	11.0	-	11.0	8.25	-	11.0	-	
Output Drive Current	I <sub>OH</sub>	5.0	V <sub>OH</sub> = 2.5V	-1.5	-	-1.25	-2.5	-	-1.0	-	mA
		10	V <sub>OH</sub> = 9.5V	-1.5	-	-1.25	-2.5	-	-1.0	-	
		15	V <sub>OH</sub> = 13.5V	-4.5	-	-3.75	-10	-	-3.0	-	
	I <sub>OL</sub>	5.0	V <sub>OL</sub> = 0.4V	3.6	-	3.2	6.0	-	2.5	-	mA
		10	V <sub>OL</sub> = 0.5V	9.6	-	8.0	16	-	6.6	-	
		15	V <sub>OL</sub> = 1.5V	28	-	24	40	-	19	-	
Input Current	I <sub>in</sub>	15		-	±0.3	-	±0.00001	±0.3	-	±1.0	μA
Input Capacitance	C <sub>in</sub>	-	V <sub>in</sub> = 0	-	-	-	10	15	-	-	pF
Quiescent Current	I <sub>DD</sub>	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 <sub>T</sub>	5.0	Dynamic + I <sub>DD</sub> , per Gate C <sub>L</sub> = 50pF, f = 1 kHz	-	-	-	1.77	-	-	-	μA
		10		-	-	-	3.54	-	-	-	
		15		-	-	-	5.31	-	-	-	

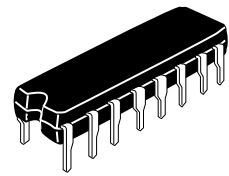
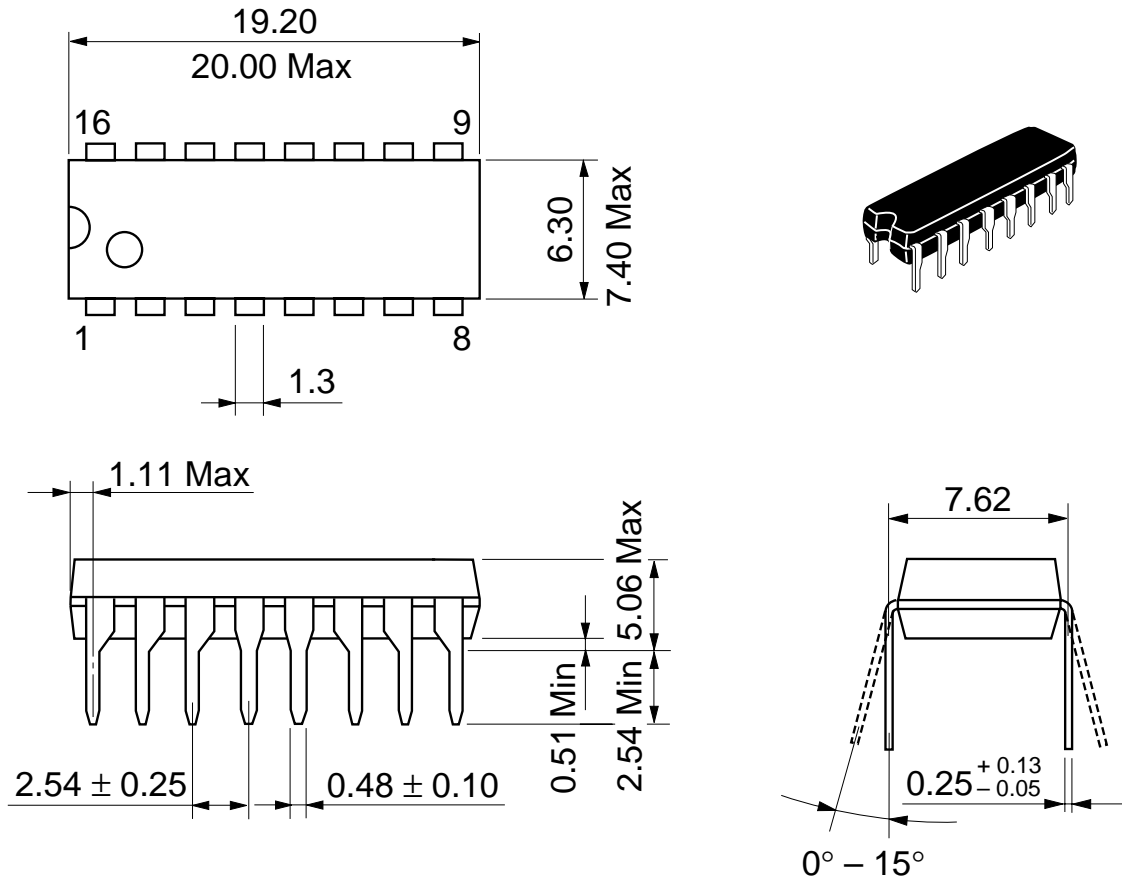
\* To calculate total supply current at frequency other than 1kHz.

Ⓢ V<sub>DD</sub> = 5.0V I<sub>T</sub> = (1.77 μA/kHz)f + I<sub>DD</sub>    Ⓢ V<sub>DD</sub> = 10V I<sub>T</sub> = (3.54 μA/kHz)f + I<sub>DD</sub>    Ⓢ V<sub>DD</sub> = 15V I<sub>T</sub> = (5.31 μA/kHz)f + I<sub>DD</sub>

■ SWITCHING CHARACTERISTICS (C<sub>L</sub> = 50pF, T<sub>a</sub> = 25°C)

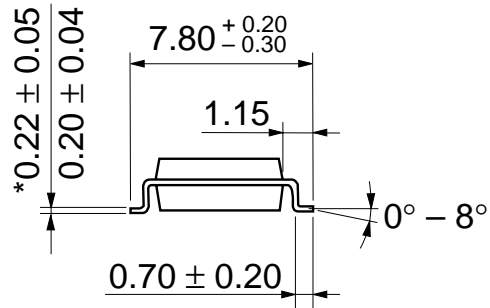
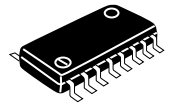
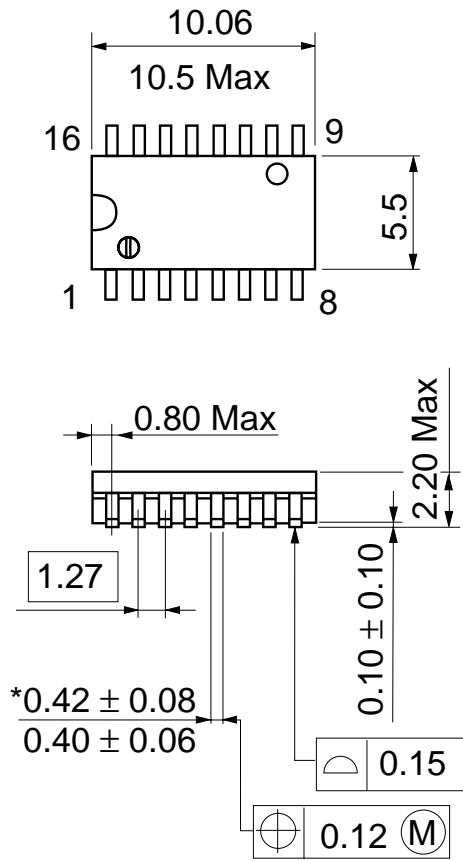
Characteristic	Symbol	V <sub>DD</sub> (V)	min	typ	max	Unit
Output Rise Time	t <sub>r</sub>	5.0	-	100	200	ns
		10	-	50	100	
		15	-	40	80	
Output Fall Time	t <sub>f</sub>	5.0	-	40	80	ns
		10	-	20	40	
		15	-	15	30	
Propagation Delay Time	t <sub>PLH</sub>	5.0	-	80	160	ns
		10	-	40	80	
		15	-	30	60	
	t <sub>PHL</sub>	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

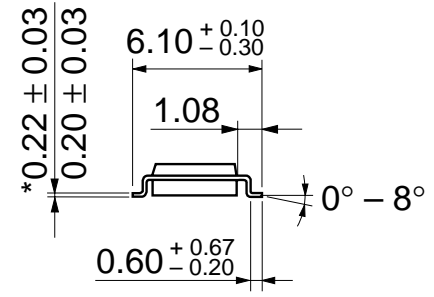
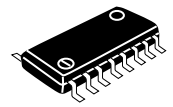
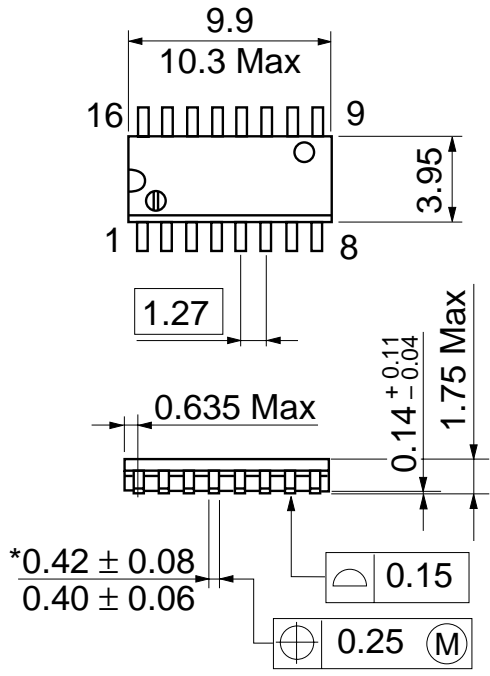
Unit: mm



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

\*Dimension including the plating thickness  
 Base material dimension

Unit: mm



\*Dimension including the plating thickness  
 Base material dimension

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

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