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# HD74HC4066

Quad Analog Switches/Quad Multiplexers

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## Description

This switch has low “on” resistance and low “off” leakage. It is a bidirectional switch, thus any analog input may be used as an output and vice-versa. Also the HD74HC4066 switch contains linearization circuitry which lowers the “on” resistance and increases switch linearity. The HD74HC4066 device allows control of up to 12 V (peak) analog signals with digital control signals of the same range. Each switch has its own control input which disables each switch when low.

## Features

- High Speed Operation
- Wide Operating Voltage
- Low Quiescent Supply Current

## Function Table

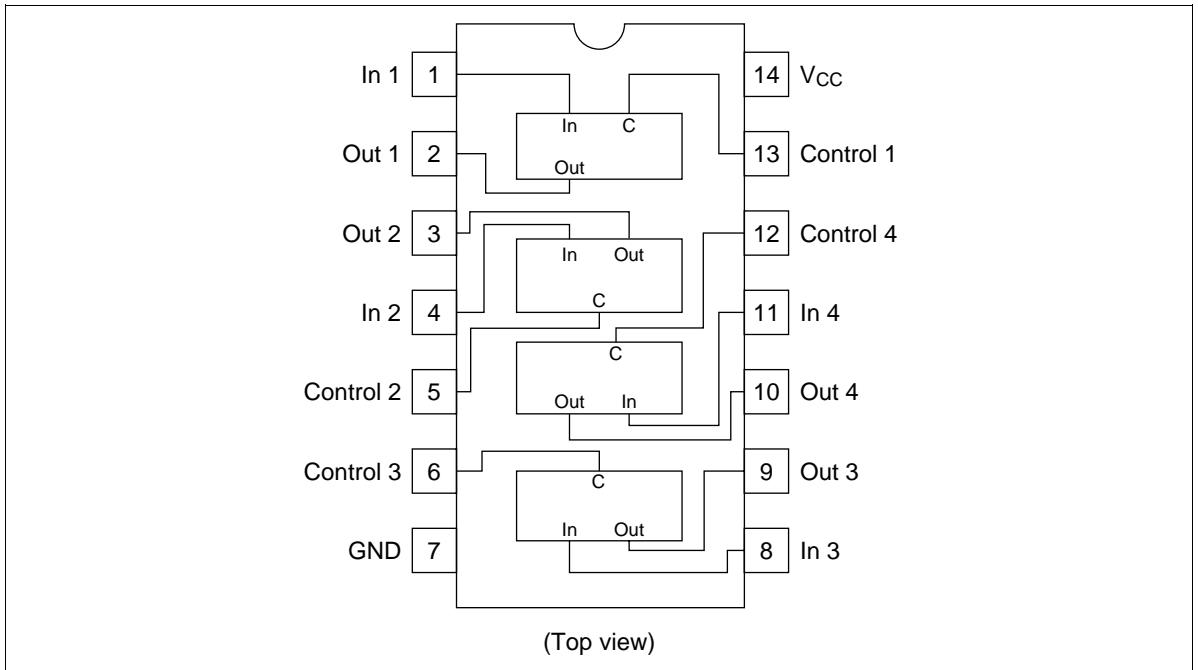
Control	Switch
L	OFF
H	ON

$GND \leq V_{in} \leq V_{CC}$

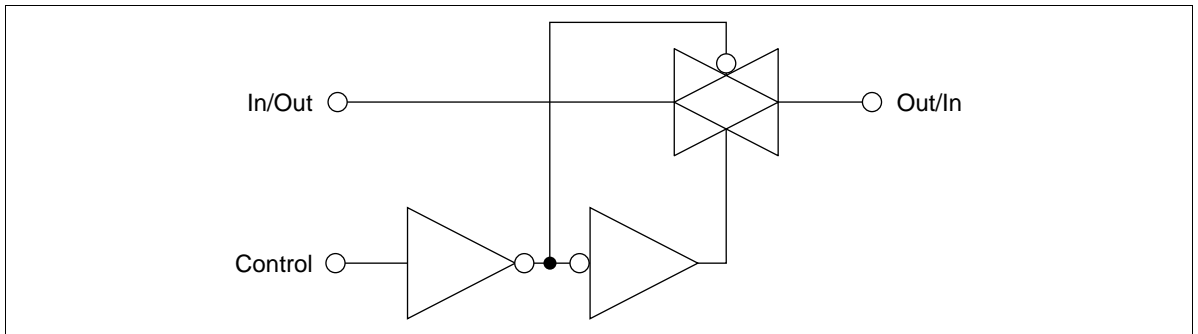
$GND \leq V_{out} \leq V_{CC}$

# HD74HC4066

## Pin Arrangement



## Logic Diagram (1/4)



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**Absolute Maximum Ratings**

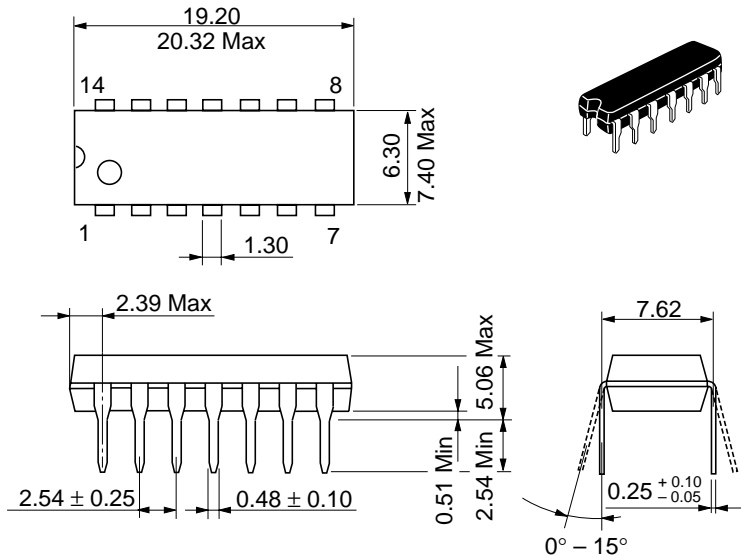
<b>Item</b>	<b>Symbol</b>	<b>Rating</b>	<b>Unit</b>	
Supply voltage	$V_{CC}$	-0.5 to +7.0	V	
Control input voltage	$V_{IN}$	-0.5 to $V_{CC} + 0.5$	V	
Switch I/O voltage	$V_{I/O}$	-0.5 to $V_{CC} + 0.5$	V	
Supply current	( $V_{CC}$ )	$I_{CC}$	+50	mA
	(GND)	$I_{GND}$	-50	mA
Switch I/O current (per pin)	$I_{I/O}$	$\pm 25$	mA	
Control input diode current	$I_{IK}$	$\pm 20$	mA	
Switch I/O diode current	$I_{IOK}$	$\pm 20$	mA	
Power dissipation	$P_T$	500	mW	
Storage temperature range	$T_{stg}$	-65 to +150	°C	

## DC Characteristics

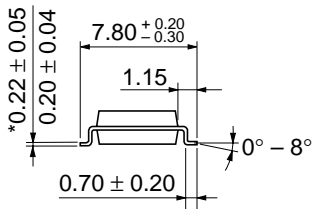
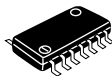
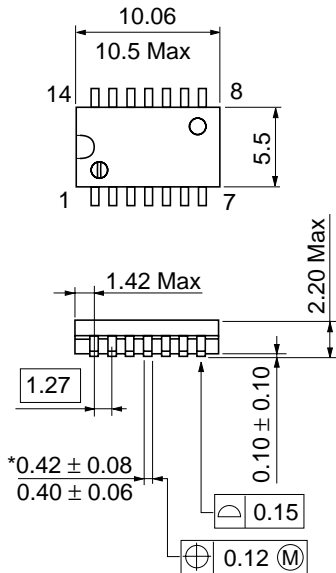
Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Control input voltage	V <sub>IH</sub>	2.0	1.5	—	—	1.5	—	V	
		4.5	3.15	—	—	3.15	—		
		6.0	4.2	—	—	4.2	—		
	V <sub>IL</sub>	2.0	—	—	0.5	—	0.5	V	
		4.5	—	—	1.35	—	1.35		
		6.0	—	—	1.8	—	1.8		
“ON” resistance	R <sub>ON</sub>	2.0	—	2000	5000	—	6250	Ω	V <sub>C</sub> = V <sub>IH</sub>
		4.5	—	100	200	—	250		V <sub>in</sub> = 0 to V <sub>CC</sub>
		6.0	—	60	170	—	210		lin/out = 1 mA
ΔON resistance between any two channels	ΔR <sub>ON</sub>	2.0	—	50	—	—	—	Ω	V <sub>C</sub> = V <sub>IH</sub> , lin/out = 1 mA
		4.5	—	3	—	—	—		between any two
		6.0	—	2	—	—	—		channels
OFF channel leakage current (switch off)	I <sub>S(OFF)</sub>	6.0	—	—	±0.1	—	±1.0	μA	V <sub>C</sub> = V <sub>IL</sub> V <sub>IN</sub> = V <sub>CC</sub> , V <sub>out</sub> = GND or, V <sub>in</sub> = GND, V <sub>out</sub> = V <sub>CC</sub>
OFF channel leakage current (switch on)	I <sub>S(ON)</sub>	6.0	—	—	±0.1	—	±1.0	μA	V <sub>C</sub> = V <sub>IH</sub> V <sub>in</sub> = V <sub>CC</sub> or GND
Control input current	I <sub>in</sub>	6.0	—	—	±0.1	—	±1.0	μA	V <sub>in</sub> = V <sub>CC</sub> or GND
Quiescent supply current	I <sub>CC</sub>	6.0	—	—	1.0	—	10.0	μA	V <sub>in</sub> = V <sub>CC</sub> or GND

**AC Characteristics** ( $C_L = 50$  pF, Input  $t_r = t_f = 6$  ns)

Item	Symbol	$V_{CC}$ (V)	$T_a = 25^\circ\text{C}$			$T_a = -40$ to $+85^\circ\text{C}$		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Propagation delay time	$t_{PLH}$	2.0	—	—	50	—	65	ns	$R_L = 10$ k $\Omega$
	$t_{PHT}$	4.5	—	4	10	—	13		
		6.0	—	—	9	—	11		
Output enable time	$t_{ZH}$	2.0	—	—	115	—	145	ns	$R_L = 1$ k $\Omega$
		4.5	—	10	23	—	29		
		6.0	—	—	20	—	25		
Output disable time	$t_{LZ}$	2.0	—	—	115	—	145	ns	$R_L = 1$ k $\Omega$
	$t_{HZ}$	4.5	—	14	23	—	29		
		6.0	—	—	20	—	25		
Sine wave distortion		4.5	—	0.05	—	—	—	%	$R_L = 10$ k $\Omega$ , $C_L = 50$ pF, $f_{IN} = 1$ kHz
Band width (-3 dB)		4.5	—	30	—	—	—	MHz	$R_L = 600$ $\Omega$ , $C_L = 50$ pF, $20 \log_{10} V_{out}/V_{in} = -3$ dB
Feedthrough attenuation		4.5	—	-50	—	—	—	dB	$R_L = 600$ $\Omega$ , $C_L = 50$ pF, $f_{IN} = 1$ MHz
Cross talk between control input to signal I/O		2.0	—	25	—	—	—	mA	$R_L = 600$ $\Omega$ , $C_L = 50$ pF, $f_{IN} = 1$ MHz
		4.5	—	60	—	—	—		
		6.0	—	75	—	—	—		
Cross talk between any two switches		4.5	—	-50	—	—	—	dB	$R_L = 600$ $\Omega$ , $C_L = 50$ pF, $f_{IN} = 1$ MHz
Maximum control frequency		2.0	—	20	—	—	—	MHz	$R_L = 1$ k $\Omega$ , $C_L = 15$ pF, $V_{out} = 1/2 (V_{CC})$
		4.5	—	30	—	—	—		
		6.0	—	30	—	—	—		
Control input capacitance	$C_{in}$		—	5	10	—	10	pF	
Switch I/O capacitance	$C_{in/out}$		—	6	—	—	—	pF	
Feed through capacitance	$C_{in/out}$		—	0.5	—	—	—	pF	
Power dissipation capacitance	$C_{PD}$		—	13	—	—	—	pF	

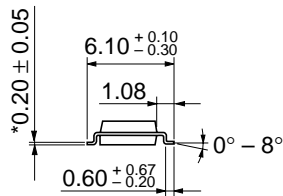
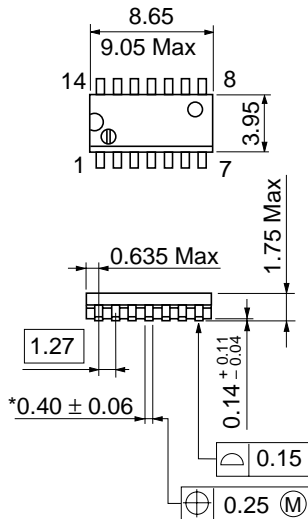


Hitachi Code	DP-14
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.97 g



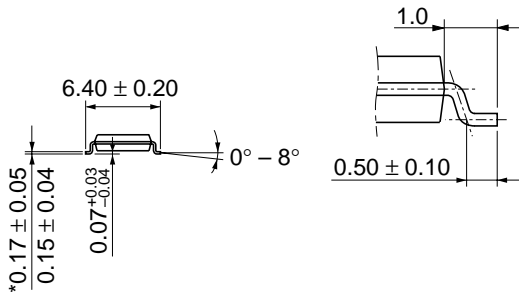
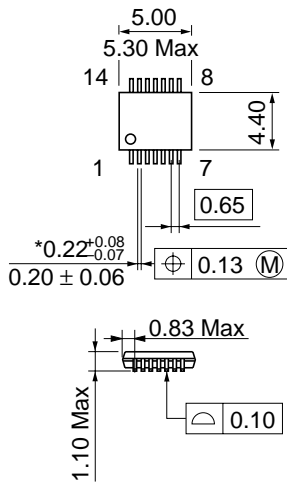
Hitachi Code	FP-14DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.23 g

\*Dimension including the plating thickness  
Base material dimension



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





\*Dimension including the plating thickness  
 Base material dimension

Hitachi Code	TTP-14D
JEDEC	—
EIAJ	—
Weight (reference value)	0.05 g

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