HD74HC4066

Quad Analog Switches/Quad Multiplexers

HITACHI

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

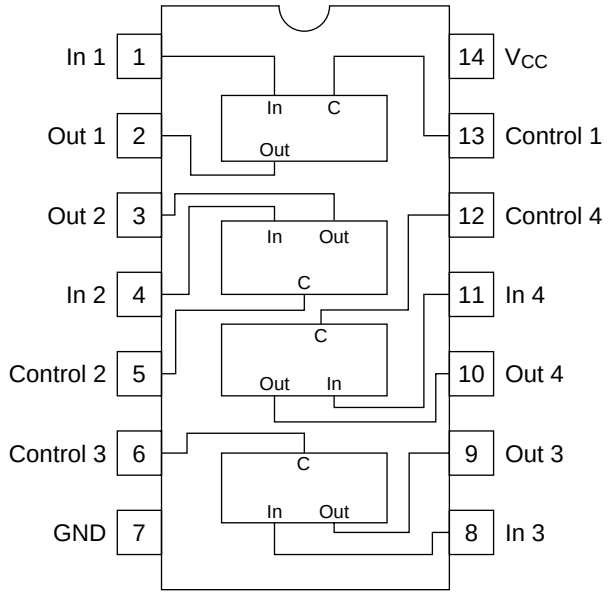
Function Table

Control	Switch
L	OFF
H	ON

$GND \leq Vin \leq V_{CC}$
$GND \leq Vout \leq V_{CC}$

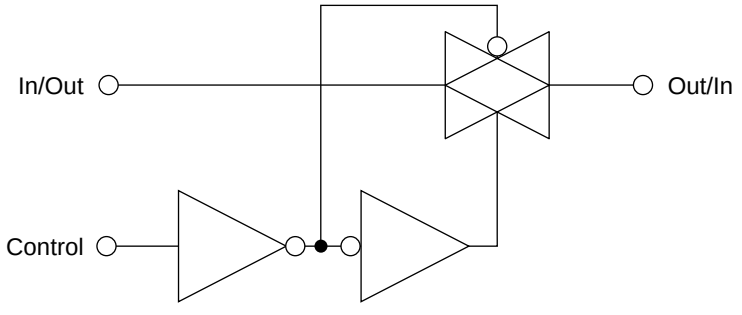
Hitachi semiconductor

Pin Arrangement



(Top view)

Logic Diagram (1/4)



Absolute Maximum Ratings

Item		Symbol	Rating	Unit
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)		$I_{I/O}$	±25	mA
Control input diode current		I_{IK}	±20	mA
Switch I/O diode current		I_{IOK}	±20	mA
Power dissipation		P_T	500	mW
Storage temperature range		Tstg	–65 to +150	°C

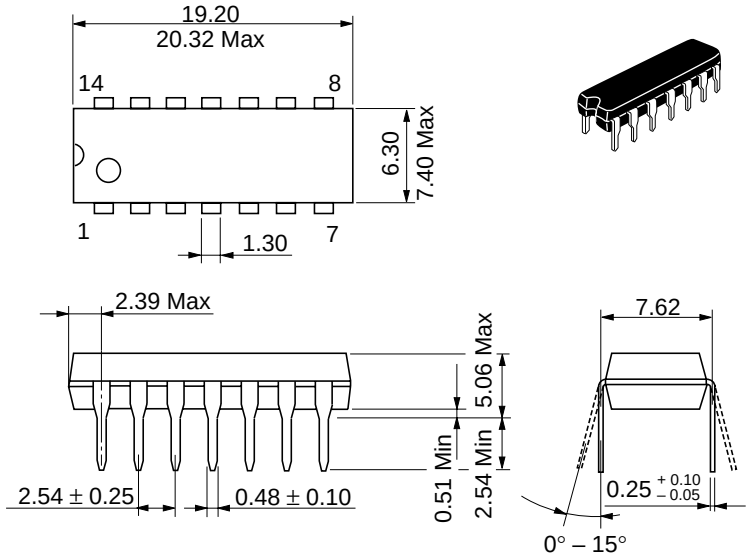
DC Characteristics

Item	Symbol	V_{CC} (V)	Ta = 25°C Min	Typ	Max	Ta = –40 to +85°C Min	Max	Unit	Test Conditions
Control input voltage	V_{IH}	2.0	1.5	—	—	1.5	—	V	
		4.5	3.15	—	—	3.15	—		
		6.0	4.2	—	—	4.2	—		
	V_{IL}	2.0	—	—	0.5	—	0.5	V	
		4.5	—	—	1.35	—	1.35		
		6.0	—	—	1.8	—	1.8		
"ON" resistance	R_{ON}	2.0	—	2000	5000	—	6250	Ω	$V_C = V_{IH}$
		4.5	—	100	200	—	250		Vin = 0 to V_{CC}
		6.0	—	60	170	—	210		Iin/out = 1 mA
ΔON resistance between any two channels	ΔR_{ON}	2.0	—	50	—	—	—	Ω	$V_C = V_{IH}$, Iin/out = 1 mA between any two channels
		4.5	—	3	—	—	—		
		6.0	—	2	—	—	—		
OFF channel leakage current (switch off)	$I_{S(OFF)}$	6.0	—	—	±0.1	—	±1.0	μA	$V_C = V_{IL}$ $V_{IN} = V_{CC}$, Vout = GND or, Vin = GND, Vout = V_{CC}
OFF channel leakage current (switch on)	$I_{S(ON)}$	6.0	—	—	±0.1	—	±1.0	μA	$V_C = V_{IH}$ Vin = V_{CC} or GND
Control input current	Iin	6.0	—	—	±0.1	—	±1.0	μA	Vin = V_{CC} or GND
Quiescent supply current	I_{CC}	6.0	—	—	1.0	—	10.0	μA	Vin = V_{CC} or GND

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

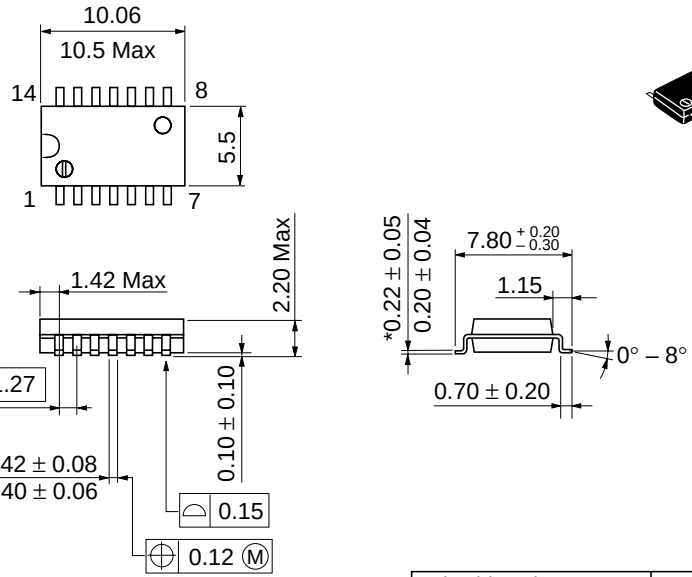
			Ta = 25°C			Ta = –40 to +85°C			
Item	**Symbol**	**V_{cc} (V)**	**Min**	**Typ**	**Max**	**Min**	**Max**	**Unit**	**Test Conditions**
Propagation delay time	t_{PLH}	2.0	—	—	50	—	65	ns	R_L = 10 kΩ
	t_{PHT}	4.5	—	4	10	—	13		
		6.0	—	—	9	—	11		
Output enable time	t_{ZH}	2.0	—	—	115	—	145	ns	R_L = 1 kΩ
	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

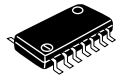
Unit: mm



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

Unit: mm

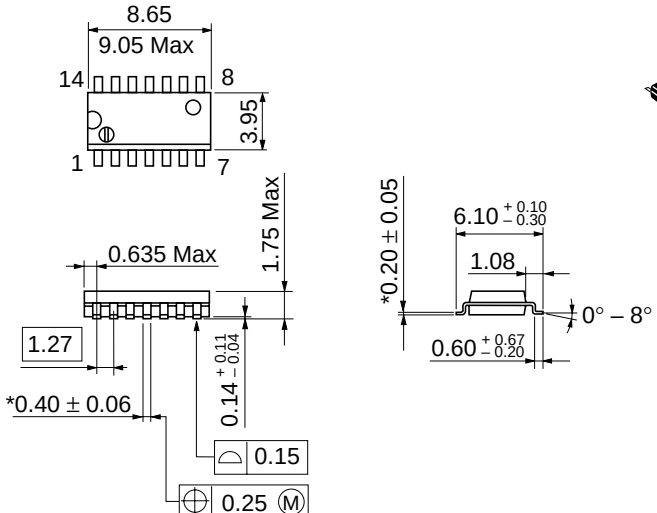




Hitachi Code	FP-14DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.23 g

*Dimension including the plating thickness
Base material dimension

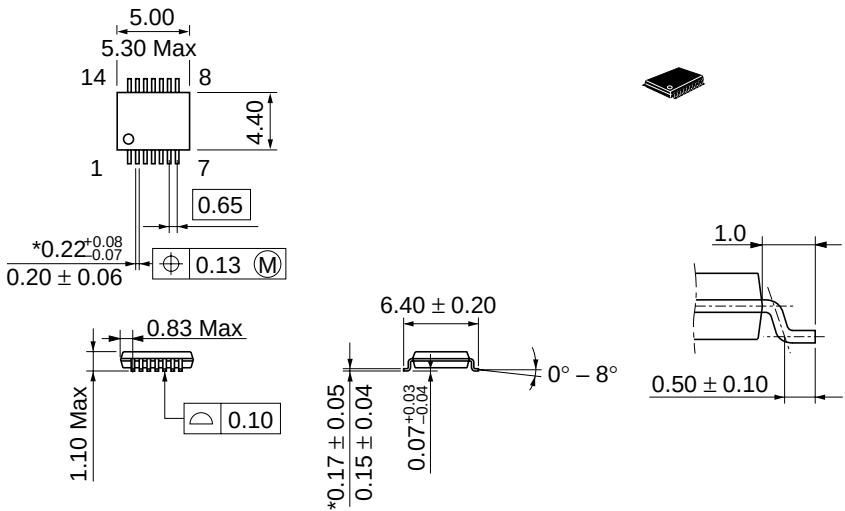
Unit: mm



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

*Pd plating

Unit: mm



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

*Dimension including the plating thickness
Base material dimension

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