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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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HD74HC4066

Quad Analog Switches/Quad Multiplexers



ADE-205-538 (Z)
1st. Edition
Sep. 2000

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

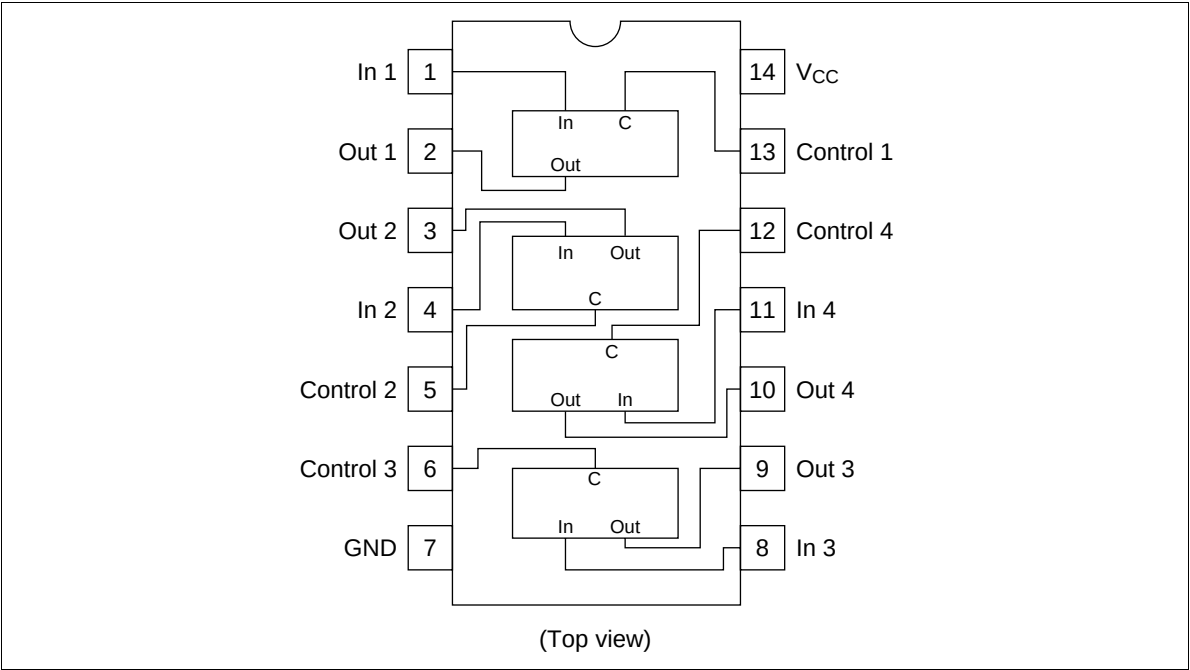
- High Speed Operation
- Wide Operating Voltage
- Low Quiescent Supply Current

Function Table

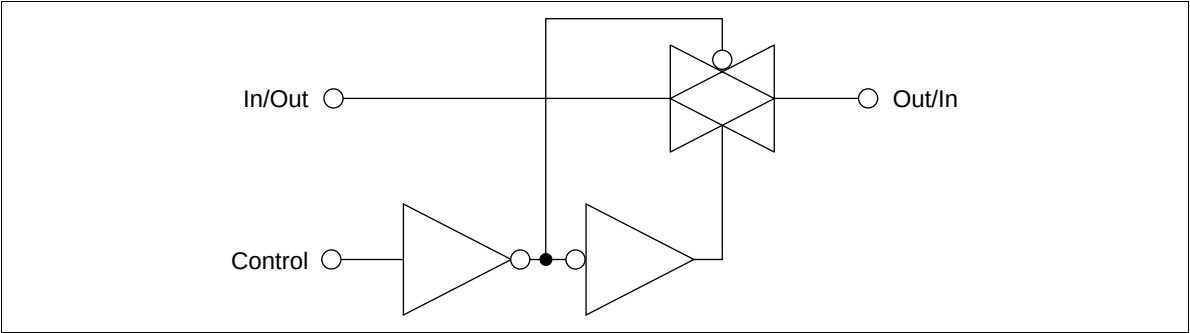
Control	Switch
L	OFF
H	ON

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

Pin Arrangement



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

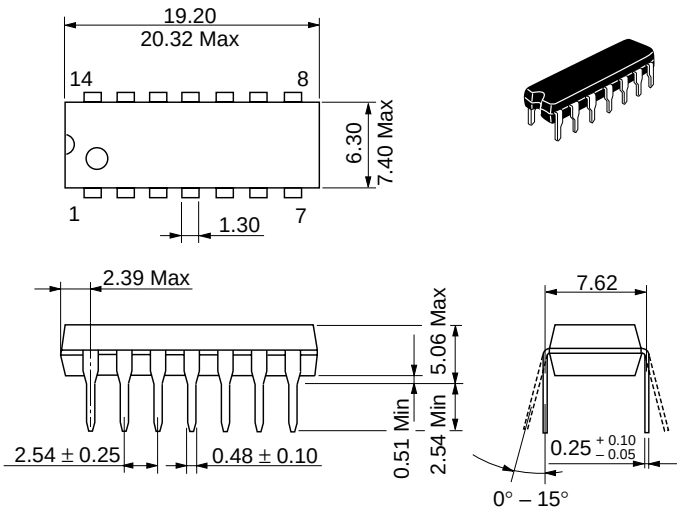
Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = −40 to +85°C		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Control input voltage	V _{IH}	2.0	1.5	—	—	1.5	—	V	
		4.5	3.15	—	—	3.15	—		
		6.0	4.2	—	—	4.2	—		
	V _{IL}	2.0	—	—	0.5	—	0.5	V	
		4.5	—	—	1.35	—	1.35		
		6.0	—	—	1.8	—	1.8		
“ON” resistance	R _{ON}	2.0	—	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
		4.5	—	3	—	—	—		between any two
		6.0	—	2	—	—	—		channels
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	I _{in}	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)

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 Ω
	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 Ω
		4.5	—	10	23	—	29		
		6.0	—	—	20	—	25		
Output disable time	t_{LZ}	2.0	—	—	115	—	145	ns	$R_L = 1$ k Ω
	t_{HZ}	4.5	—	14	23	—	29		
		6.0	—	—	20	—	25		
Sine wave distortion		4.5	—	0.05	—	—	—	%	$R_L = 10$ k Ω , $C_L = 50$ pF, $f_{IN} = 1$ kHz
Band width (–3 dB)		4.5	—	30	—	—	—	MHz	$R_L = 600$ Ω , $C_L = 50$ pF, $20 \log_{10} V_{out}/V_{in} = -3$ dB
Feedthrough attenuation		4.5	—	–50	—	—	—	dB	$R_L = 600$ Ω , $C_L = 50$ pF, $f_{IN} = 1$ MHz
Cross talk between control input to signal I/O		2.0	—	25	—	—	—	mA	$R_L = 600$ Ω , $C_L = 50$ pF, $f_{IN} = 1$ MHz
		4.5	—	60	—	—	—		
		6.0	—	75	—	—	—		
Cross talk between any two switches		4.5	—	–50	—	—	—	dB	$R_L = 600$ Ω , $C_L = 50$ pF, $f_{IN} = 1$ MHz
Maximum control frequency		2.0	—	20	—	—	—	MHz	$R_L = 1$ k Ω , $C_L = 15$ 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	

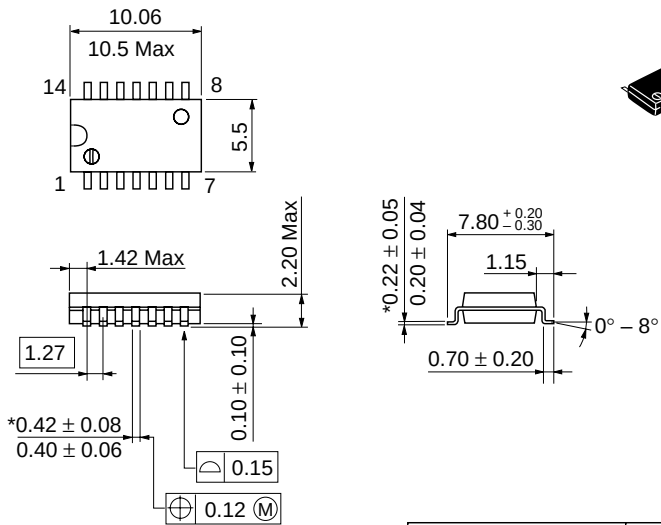
Package Dimensions

Unit: mm



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

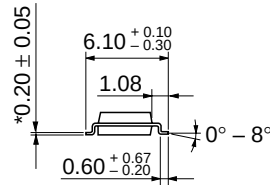
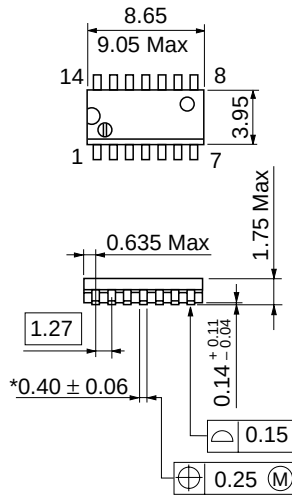
Unit: mm



*Dimension including the plating thickness
Base material dimension

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

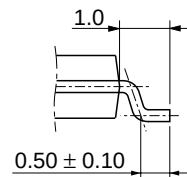
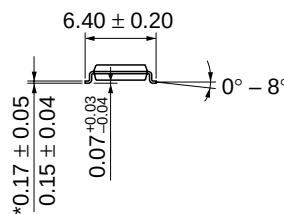
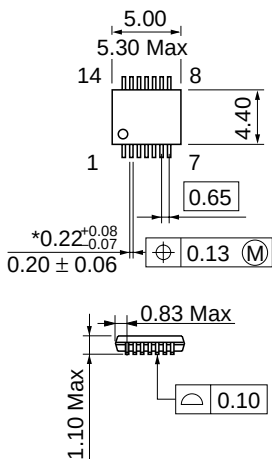
Unit: mm



*Pd plating

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

Unit: mm



*Dimension including the plating thickness
Base material dimension

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

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HITACHI

Hitachi, Ltd.

Semiconductor & Integrated Circuits.

Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL	NorthAmerica	:	http://semiconductor.hitachi.com/
	Europe	:	http://www.hitachi-eu.com/hel/ecg
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For further information write to:Hitachi Semiconductor
(America) Inc.179 East Tasman Drive,
San Jose, CA 95134

Tel: <1> (408) 433-1990

Fax: <1> (408) 433-0223

Hitachi Europe GmbH
Electronic Components GroupDornacher Straße 3
D-85622 Feldkirchen, Munich

Germany

Tel: <49> (89) 9 9180-0

Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.
Electronic Components Group.

Whitebrook Park

Lower Cookham Road

Maidenhead

Berkshire SL6 8YA, United Kingdom

Tel: <44> (1628) 585000

Fax: <44> (1628) 585160

Hitachi Asia Ltd.

Hitachi Tower

16 Collyer Quay #20-00,

Singapore 049318

Tel: <65>-538-6533/538-8577

Fax: <65>-538-6933/538-3877

URL: <http://www.hitachi.com.sg>

Hitachi Asia Ltd.

(Taipei Branch Office)

4/F, No. 167, Tun Hwa North Road,

Hung-Kuo Building,

Taipei (105), Taiwan

Tel: <886>-(2)-2718-3666

Fax: <886>-(2)-2718-8180

Telex: 23222 HAS-TP

URL: <http://www.hitachi.com.tw>

Hitachi Asia (Hong Kong) Ltd.

Group III (Electronic Components)

7/F., North Tower,

World Finance Centre,

Harbour City, Canton Road

Tsim Sha Tsui, Kowloon,

Hong Kong

Tel: <852>-(2)-735-9218

Fax: <852>-(2)-730-0281

URL: <http://www.hitachi.com.hk>