HD14066B

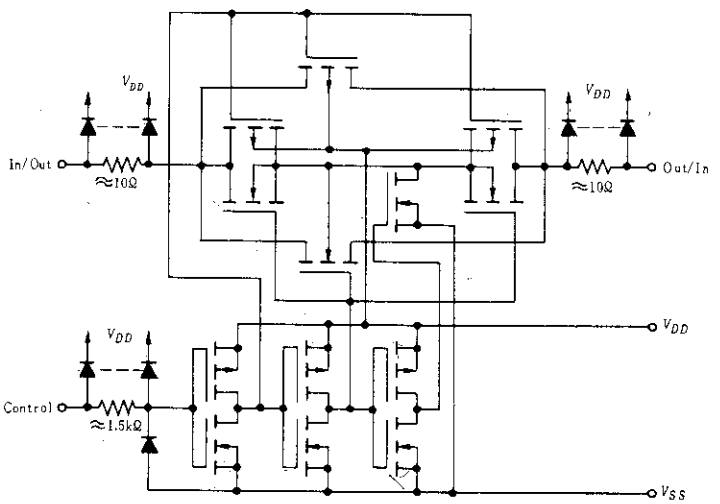
Quadruple Analog Switch/Quadruple Multiplexer

The HD14066B consists of four independent switches capable of controlling either digital or analog signals. This quad bilateral switch is useful in signal gating, chopper, modulator, demodulator and CMOS logic implementation. The HD14066B is designed to be pin-for-pin compatible with the HD14016B, but has much lower ON resistance. Input voltage swings as large as the full supply voltage can be controlled via each independent control input.

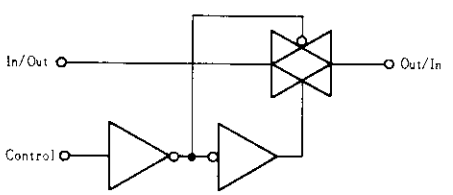
■ FEATURES

- High On/Off Output Voltage Ratio = 65dB typ.
- Quiescent Current = 0.5nA/pkg typ. @5V
- Low Crosstalk Between Switches = 50dB typ. @8MHz
- Supply Voltage Range = 3 to 18V
- Linearized Transfer Characteristics, $\Delta R_{ON} < 60\Omega$ for Vin = V_{DD} to V_{SS} (at 15V)
- Pin-for-Pin Replacement for CD4016/66B and MC14016/66B

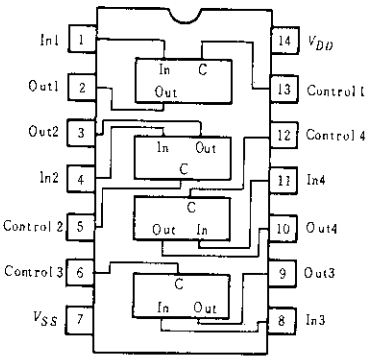
■ CIRCUIT SCHEMATIC (1/4)



■ LOGIC DIAGRAM (1/4)



■ PIN ARRANGEMENT



(Top View)

■ TRUTH TABLE

Control	Switch
0	OFF
1	ON

$V_{SS} \leqq V_{in} \leqq V_{DD}$

$V_{SS} \leqq V_{out} \leqq V_{DD}$

Vcontrol	V_{in} to V_{out} Resistance
V_{SS}	$>10^9\,\Omega$ typ
V_{DD}	$3\times10^2\,\Omega$ typ

■ ELECTRICAL CHARACTERISTICS

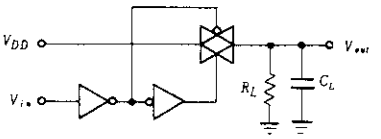
Characteristic	Symbol	V_{DD}(V)	Test Conditions		−40°C min	−40°C max	25°C min	25°C typ	25°C max	85°C min	85°C max	Unit
Input Voltage	V_{IL}	5.0	R_L=10kΩ SW入力=V_{DD}	V_O=0.5V	−	1.5	−	2.25	1.5	−	1.5	V
		10		V_O=1.0V	−	3.0	−	4.50	3.0	−	3.0	
		15		V_O=1.5V	−	3.75	−	6.75	3.75	−	3.75	
	V_{IH}	5.0	R_L=10kΩ SW入力=V_{DD}	V_O=1.0V	3.5	−	3.5	2.75	−	3.5	−	V
		10		V_O=1.0V	7.0	−	7.0	5.50	−	7.0	−	
		15		V_O=1.5V	11.25	−	11.25	8.25	−	11.25	−	
Input Current	I_{in}	15			−	±0.3	−	±0.00001	±0.3	−	±1.0	μA
Input Capacitance: Control	C_{in}		V_{in}=0		−	−	−	5.0	−	−	−	pF
Input Capacitance: Switch Input					−	−	−	8.0	−	−	−	
Output Capacitance	C_{out}	10			−	−	−	8.0	−	−	−	pF
Feedthrough Capacitance	C_{in-out}	10			−	−	−	0.5	−	−	−	pF
Quiescent Current	I_Q	5.0	Zero Signal, per Package		−	1.0	−	0.0005	1.0	−	7.5	μA
		10			−	2.0	−	0.0010	2.0	−	15	
		15			−	4.0	−	0.0015	4.0	−	30	
ON Resistance	R_{ON}	5.0			−	880	−	250	1050	−	1200	Ω
		10			−	450	−	120	500	−	520	
		15			−	250	−	80	280	−	300	
△ON Resistance Between Any Two Channels	$\triangle R_{ON}$	5.0			−	−	−	25	−	−	−	Ω
		10			−	−	−	10	−	−	−	
		15			−	−	−	5.0	−	−	−	
Input/Output Leakage Current		15			−	±300	−	±0.01	±300	−	±1000	nA

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

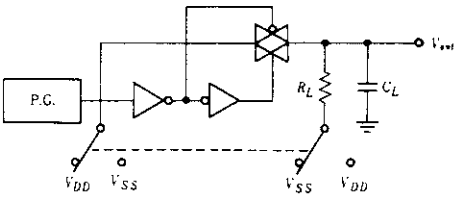
Characteristic	Symbol	V_{DD}(V)	Test Conditions	typ	max	Unit
Propagation Delay Time	t_{PLH}, t_{PHL}	5.0	R_L=10kΩ, V_{SS}=0	20	45	ns
		10		10	30	
		15		7.0	20	
Output Disable Time	t_{HZ}	5.0	R_L=1kΩ, V_{SS}=0	35	100	ns
		10		30	90	
		15		25	75	
	t_{LZ}	5.0		30	90	ns
		10		25	75	
		15		20	60	
Output Enable Time	t_{ZH}	5.0	R_L=1kΩ, V_{SS}=0	60	180	ns
		10		20	60	
		15		15	45	
	t_{ZL}	5.0		60	180	ns
		10		16	50	
		15		14	40	
Sine Wave(Distortion) (V_{SS}=−5V)		5.0	V_{in}=1.77V, R_L=10kΩ, f=1kHz	0.1	−	%
Bandwidth(Switch ON) (V_{SS}=−5V)		5.0	R_L=1kΩ, $20\log_{10}\frac{V_{out}}{V_{in}}$=−3dB	65	−	MHz
Feedthrough(Switch OFF) (V_{SS}=−5V)		5.0	R_L=1kΩ, $20\log_{10}\frac{V_{out}}{V_{in}}$=−50dB	1.0	−	MHz
Crosstalk(Switch A ON, Switch B OFF)(V_{SS}=−5V)		5.0	R_L=1kΩ, $20\log_{10}\frac{V_{out(B)}}{V_{in(A)}}$=−50dB	8.0	−	MHz
Crosstalk(Control Input-Signal Output)(V_{SS}=−5V)		5.0		50	−	mV
Maximum Control Freguency		5.0	V_{SS}=0, $20\log_{10}\frac{V_{out}}{V_{in}}$=−6dB	6.0	−	MHz
		10		8.0	−	
		15		8.5	−	

■ DC CHARACTERISTIC TEST CIRCUIT

1. Input Voltage

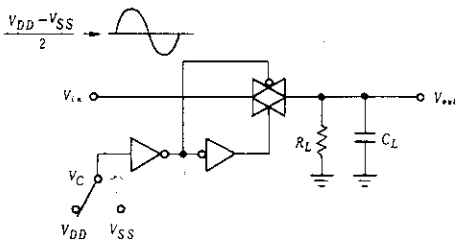


2. Propagation Delay Time

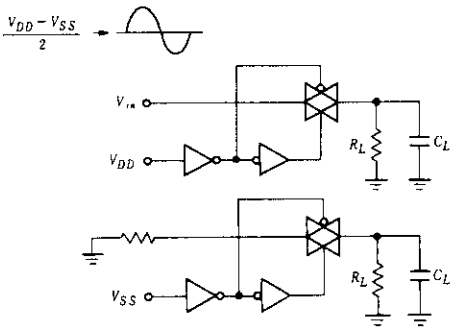


3. Bandwidth, Feedthrough

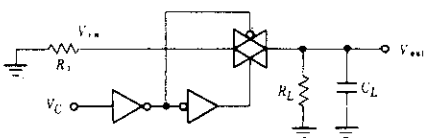
$V_C = V_{DD}$ for Bandwidth Test
$V_C = V_{SS}$ for Feedthrough Test



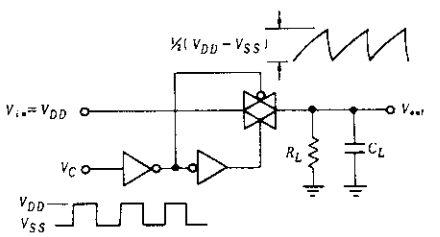
4. Crosstalk



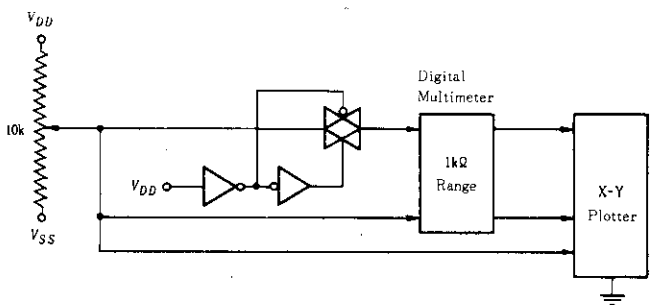
5. Crosstalk



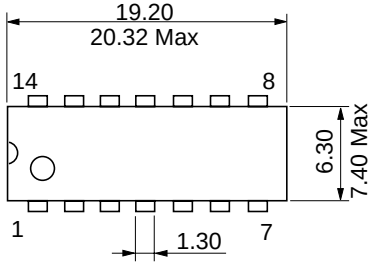
6. Maximum Control Frequency

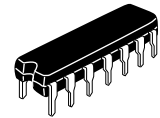


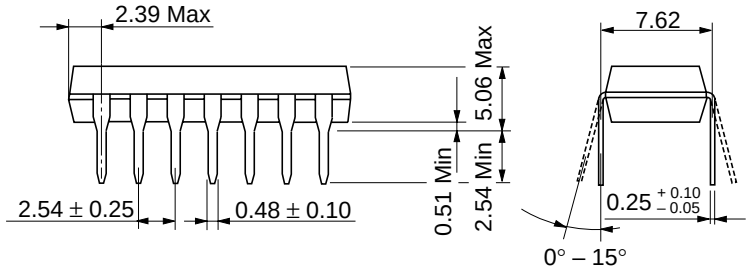
7. ON Resistance



Unit: mm

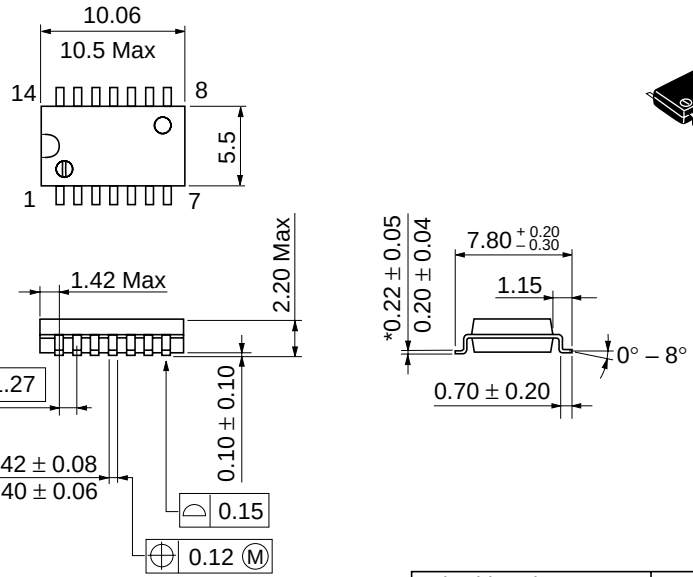


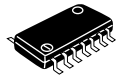




Hitachi Code	DP-14
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.97 g

Unit: mm

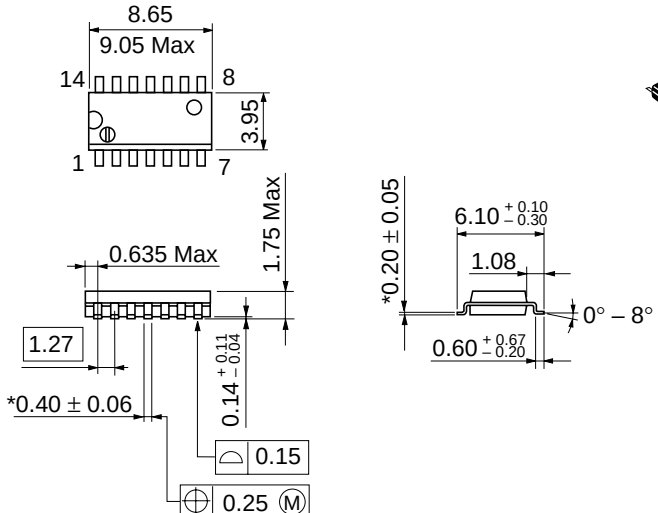




Hitachi Code	FP-14DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.23 g

*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

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