

# HD14066B

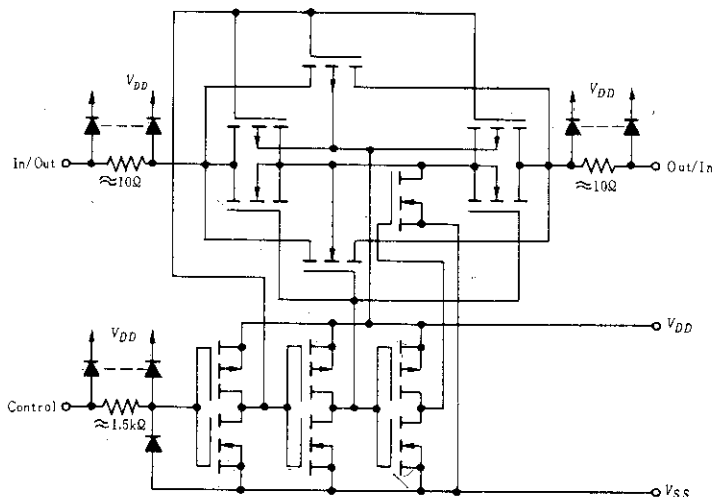
## Quadruple Analog Switch/Quadruple Multiplexer

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.

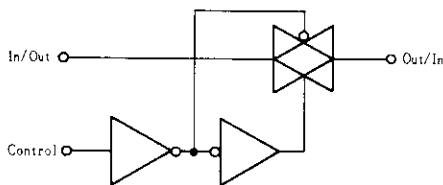
### FEATURES

- 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  $V_{in} = V_{DD}$  to  $V_{SS}$  (at 15V)
- Pin-for-Pin Replacement for CD4016/66B and MC14016/66B

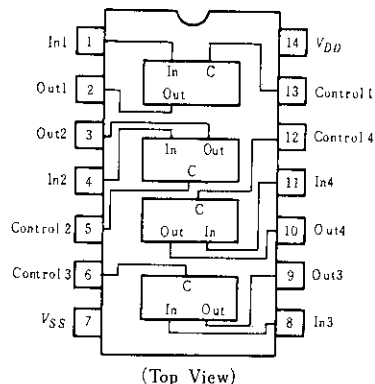
### CIRCUIT SCHEMATIC (1/4)



### LOGIC DIAGRAM (1/4)



### PIN ARRANGEMENT



### TRUTH TABLE

Control	Switch
0	OFF
1	ON

$V_{SS} \leq V_{in} \leq V_{DD}$   
 $V_{SS} \leq V_{out} \leq V_{DD}$

Vcontrol	$V_{in}$ to $V_{out}$ Resistance
$V_{SS}$	$> 10^7 \Omega$ typ
$V_{DD}$	$3 \times 10^2 \Omega$ typ

## ELECTRICAL CHARACTERISTICS

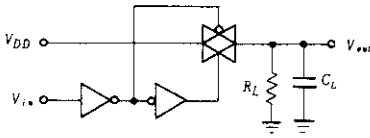
Characteristic	Symbol	$V_{DD}(V)$	Test Conditions	-40°C		25°C			85°C		Unit	
				min	max	min	typ	max	min	max		
Input Voltage	$V_{IL}$	5.0	$R_L=10\text{ k}\Omega$ $SW$ 入力= $V_{DD}$	$V_O=0.5\text{ V}$	—	1.5	—	2.25	1.5	—	1.5	V
		10		$V_O=1.0\text{ V}$	—	3.0	—	4.50	3.0	—	3.0	
		15		$V_O=1.5\text{ V}$	—	3.75	—	6.75	3.75	—	3.75	
	$V_{IH}$	5.0	$R_L=10\text{ k}\Omega$ $SW$ 入力= $V_{DD}$	$V_O=1.0\text{ V}$	3.5	—	3.5	2.75	—	3.5	—	V
		10		$V_O=1.0\text{ V}$	7.0	—	7.0	5.50	—	7.0	—	
		15		$V_O=1.5\text{ V}$	11.25	—	11.25	8.25	—	11.25	—	
Input Current	$I_{in}$	15		—	$\pm 0.3$	—	$\pm 0.0001$	$\pm 0.3$	—	$\pm 1.0$	$\mu\text{ A}$	
Input Capacitance	Control	$C_{in}$	$V_{in}=0$	—	—	—	5.0	—	—	—	pF	
	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	$\mu\text{ A}$	
		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	$\Omega$	
		10		—	450	—	120	500	—	520		
		15		—	250	—	80	280	—	300		
$\Delta$ ON Resistance Between Any Two Channels	$\Delta R_{ON}$	5.0		—	—	—	25	—	—	—	$\Omega$	
		10		—	—	—	10	—	—	—		
		15		—	—	—	5.0	—	—	—		
Input/Output Leakage Current		15		—	$\pm 300$	—	$\pm 0.01$	$\pm 300$	—	$\pm 1000$	nA	

## SWITCHING CHARACTERISTICS ( $C_L=50\text{ pF}$ , $T_a=25^\circ\text{ C}$ )

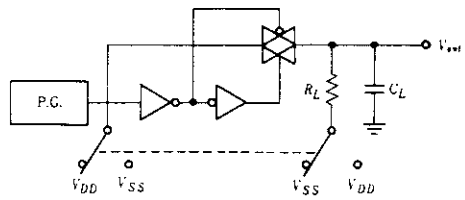
Characteristic	Symbol	$V_{DD}(V)$	Test Conditions	typ	max	Unit
Propagation Delay Time	$t_{PLH}$ , $t_{PHL}$	5.0	$R_L=10\text{ k}\Omega$ , $V_{SS}=0$	20	45	ns
		10		10	30	
		15		7.0	20	
Output Disable Time	$t_{HZ}$	5.0	$R_L=1\text{ k}\Omega$ , $V_{SS}=0$	35	100	ns
		10		30	90	
		15		25	75	
	$t_{LZ}$	5.0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

■ DC CHARACTERISTIC TEST CIRCUIT

1. Input Voltage

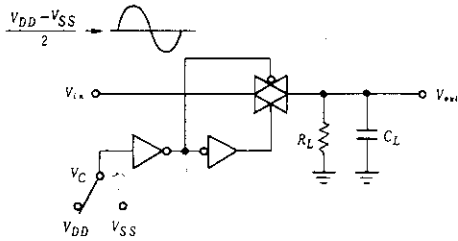


2. Propagation Delay Time



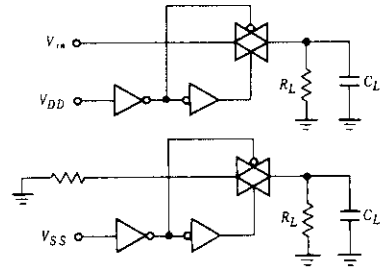
3. Bandwidth, Feedthrough

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

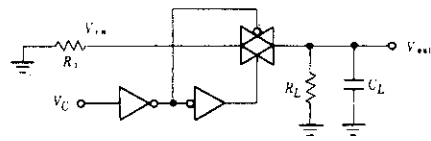


4. Crosstalk

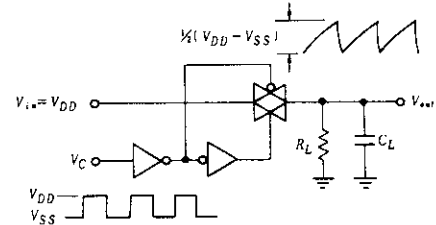
$$\frac{V_{DD} - V_{SS}}{2}$$



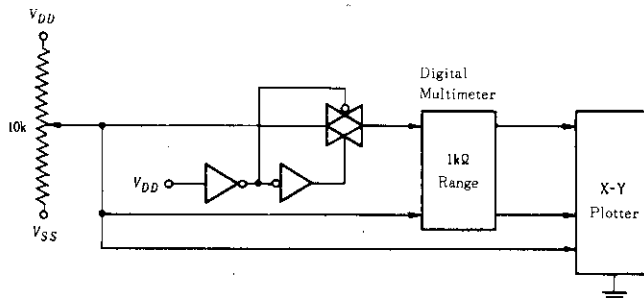
5. Crosstalk

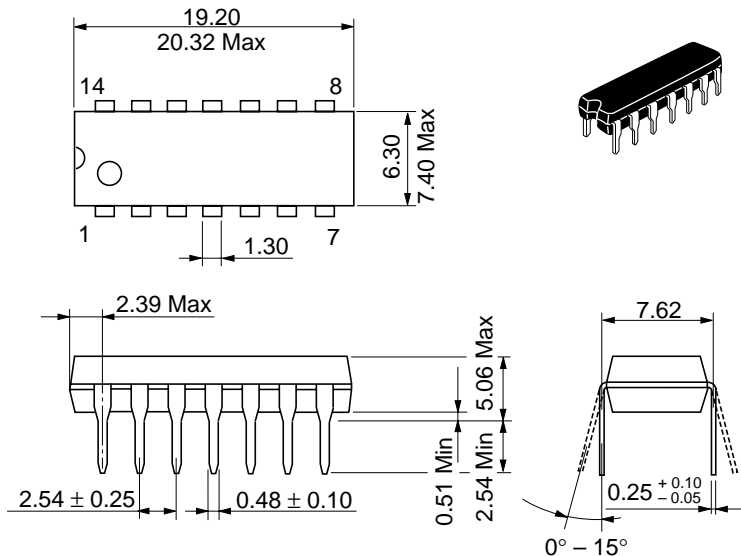


6. Maximum Control Frequency

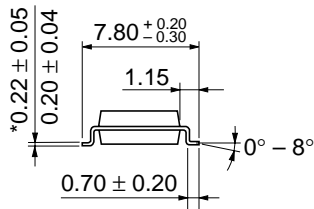


7. ON Resistance





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



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