

CD54HC4051/3A CD54HCT4051/3A

Switching Speed (Limits with black dots (•) are tested 100%.)

SWITCHING CHARACTERISTICS ($C_L = 50$ pF, Input $t_r = t_f = 6$ ns)

CHARACTERISTIC	SYMBOL	V_{EE}	V_{CC} V	25°C				-55°C to +125°C				UNITS
				HC		HCT		54HC		54HCT		
				Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Propagation Delay Switch In to Out	t_{PLH} t_{PHL}	0	2	—	60	—	—	—	90	—	—	ns
		0	4.5	—	12	—	12	—	18	—	18	
		0	6	—	10	—	—	—	15	—	—	
Maximum Switch Turn "Off" Delay from S or \bar{E} to Switch Output	t_{PHZ} t_{PLZ}	-4.5	4.5	—	8	—	8	—	12	—	12	ns
		0	2	—	225	—	—	—	340	—	—	
		0	4.5	—	45•	—	45•	—	68•	—	68•	
Maximum Switch Turn "On" Delay from S or E to Switch Output	t_{PZL} t_{PZH}	0	6	—	38	—	—	—	57	—	—	ns
		0	2	—	225	—	—	—	340	—	—	
		0	4.5	—	45•	—	55•	—	68•	—	83•	
Input Capacitance	C_i	-4.5	4.5	—	32	—	32	—	48	—	48	pF
		0	2	—	225	—	—	—	340	—	—	
		0	6	—	38	—	—	—	57	—	—	

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Burn-In Test-Circuit Connections (Use Static II for /3A burn-in and Dynamic for Life Test.)

Static	STATIC BURN-IN I			STATIC BURN-IN II		
	OPEN	GROUND	V_{CC} (6V)	OPEN	GROUND	V_{CC} (6V)
CD54HC/HCT4051	3	1,2,4-6,7*,8*,9-15	16	3	7*,8*	1,2,4-6,9-16
Dynamic	OPEN	GROUND	$1/2 V_{CC}$ (3V)	V_{CC} (6V)	OSCILLATOR	
CD54HC/HCT4051	—	4-6,7*,8*,9,12,14	3	1,2,13,15,16	50 kHz	25 kHz

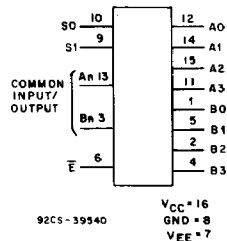
NOTE: Each pin except V_{CC} and Gnd will have a resistor of 2k-47k ohms.
Connect pins marked (*) without using a resistor.

CD54HC4052/3A CD54HCT4052/3A

Dual 4-Channel Analog Multiplexer/Demultiplexer

RCA CD54HC4052 and CD54HCT4052 are digitally controlled analog switches which utilize silicon-gate CMOS technology to achieve operating speeds similar to LSTTL with the low power consumption of standard CMOS integrated circuits.

These analog multiplexers/demultiplexers control analog voltages that may vary across the voltage supply range (i.e., V_{CC} to V_{EE}). They are bidirectional switches thus allowing any analog input to be used as an output and visa-versa. The switches have low "on" resistance and low "off" leakages. In addition, these devices have an enable control which, when high, disables all switches to their "off" state.



FUNCTIONAL DIAGRAM

Package Specifications

See Section 11, Fig. 11

CD54HC4052/3A CD54HCT4052/3A

Static Electrical Characteristics (Limits with black dots (•) are tested 100%) — Complete Specification

CHARACTERISTIC	CD54HC4052								CD54HCT4052								UNITS				
	TEST CONDITIONS				LIMITS				TEST CONDITIONS				LIMITS								
	V _{IS} V	V _I V	V _{EE} V	V _{CC} V	+25° C			-55/ +125° C			V _{IS} V	V _I V	V _{EE} V	V _{CC} V	+25° C			-55/ +125° C			
					Min.	Typ.	Max.	Min.	Max.	Min.					Typ.	Max.		Min.	Max.		
High-Level Input Voltage V _{IH}				2	1.5	—	—	1.5	—				4.5	to	2•	—	—	2•	—	V	
				4.5	3.15•	—	—	3.15•	—				5.5								
				6	4.2	—	—	4.2	—												
Low-Level Input Voltage V _{IL}				2	—	—	0.5	—	0.5				4.5	to	—	—	0.8•	—	0.8•	V	
				4.5	—	—	1.35•	—	1.35•				5.5								
				6	—	—	1.8	—	1.8												
"On" Resistance I _O = 1 mA R _{ON}	V _{CC} or V _{EE}	V _{IL} or V _{IH}	0	4.5	—	70	160	—	240	Same as HC	Same as HC	0	4.5	—	70	160	—	240	Ω		
			0	6	—	60	140	—	210			—	—	—	—	—	—				
	-4.5	4.5	—	40	120	—	180	-4.5	4.5			—	40	120	—	180					
	0	4.5	—	90	180•	—	270•	0	4.5			—	90	180•	—	270•					
	0	6	—	80	160	—	240	—	—			—	—	—	—	—					
	-4.5	4.5	—	45	130•	—	195•	-4.5	4.5			—	45	130•	—	195•					
Max. "On" Resistance Between Any Two Channels ΔR _{ON}			0	4.5	—	10	—	—				0	4.5	—	10	—	—		Ω		
			0	6	—	8.5	—	—				—	—	—	—	—	—				
			-4.5	4.5	—	5	—	—				-4.5	4.5	—	5	—	—				
Switch On/Off Leakage Current I _{IZ} 4 Channels	For Switch OFF: When V _{IS} =V _{CC} , V _{OS} =V _{EE} , When V _{IS} =V _{EE} , V _{OS} =V _{CC} For Switch ON: All Applicable Combinations of V _{IS} & V _{OS} Voltage Levels	V _{IL} or V _{IH}	0	6	—	—	±0.1•	—	±1•	Same as HC	Same as HC	0	6	—	—	±0.1•	—	±1•	μA		
			-5	5	—	—	±0.2•	—	±2•			-5	5	—	—	±0.2•	—	±2•			
Control Input Leakage Current I _{IL}	—	V _{CC} or Gnd	0	6	—	—	±0.1•	—	±1•	—	**	5.5	—	—	±0.1•	—	±1•	μA			
Quiescent Device Current I _{CC} I _O = 0	When V _{IS} = V _{EE} , V _{OS} = V _{CC} When V _{IS} = V _{CC} , V _{OS} = V _{EE}	V _{CC} or Gnd	0	6	—	—	8•	—	160•	Same as HC	Same as HC	0	5.5	—	—	8•	—	160•	μA		
			-5	5	—	—	16•	—	320•			-4.5	5.5	—	—	16•	—	320•			
Additional Quiescent Device Current per Input Pin: 1 Unit Load ΔI _{CC} *											V _{CC} -2.1	4.5 to 5.5	—	100	360	—	490	μA			

*For dual-supply systems theoretical worst case (V_I = 2.4 V, V_{CC} = 5.5 V) specifications is 1.8 mA.

**Any voltage between V_{CC} and Gnd.

HCT INPUT LOADING TABLE

INPUT	UNIT LOAD*
All	0.4

*Unit load is ΔI_{CC} limit specified in Static Characteristics Chart, e.g., 360 μA max. @ 25° C.

CD54HC4052/3A CD54HCT4052/3A

Switching Speed

(Limits with black dots (•) are tested 100%.)

SWITCHING CHARACTERISTICS ($C_L = 50$ pF, Input $t_r, t_f = 6$ ns)

CHARACTERISTIC	SYMBOL	V_{EE}	V_{CC} V	25°C				-55°C to +125°C				UNITS
				HC		HCT		54HC		54HCT		
				Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Propagation Delay Switch In to Out	t_{PLH} t_{PHL}	0	2	—	60	—	—	—	90	—	—	ns
		0	4.5	—	12	—	12	—	18	—	18	
		0	6	—	10	—	—	—	15	—	—	
Maximum Switch Turn "Off" Delay from S or \bar{E} to Switch Output	t_{PHZ} t_{PLZ}	-4.5	4.5	—	8	—	8	—	12	—	12	ns
		0	2	—	250	—	—	—	375	—	—	
		0	4.5	—	50•	—	50•	—	75•	—	75•	
Maximum Switch Turn "Off" Delay from S or E to Switch Output	t_{PZL} t_{PZH}	0	2	—	325	—	—	—	490	—	—	ns
		0	4.5	—	65•	—	70•	—	98•	—	105•	
		0	6	—	55	—	—	—	83	—	—	
Input Capacitance	C_i	-4.5	4.5	—	46	—	48	—	69	—	72	pF
		—	—	—	10	—	10	—	10	—	10	
		—	—	—	—	—	—	—	—	—	—	

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Burn-In Test-Circuit Connections

(Use Static II for /3A burn-in and Dynamic for Life Test.)

Static	STATIC BURN-IN I			STATIC BURN-IN II		
	OPEN	GROUND	V_{CC} (6V)	OPEN	GROUND	V_{CC} (6V)
CD54HC/HCT4052	3,13	1,2,4-6,7*,8*,9-12 14,15	16	3,13	7*,8*	1,2,4-6,9-12,14-16
Dynamic	OPEN	GROUND	$1/2 V_{CC}$ (3V)	V_{CC} (6V)	OSCILLATOR	
CD54HC/HCT4052	—	4-6,7*,8*, 12,15	3,13	1,2,11,14, 16	50 kHz	25 kHz
					10	9

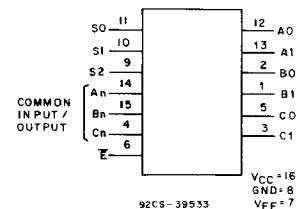
NOTE: Each pin except V_{CC} and Gnd will have a resistor of 2k-47k ohms.
Connect pins marked (*) without using a resistor.

CD54HC4053/3A CD54HCT4053/3A

Triple 2-Channel Analog Multiplexer/Demultiplexer

The RCA CD54HC4053 and CD54HCT4053 are digitally controlled analog switches which utilize silicon-gate CMOS technology to achieve operating speeds similar to LSTTL with the low power consumption of standard CMOS integrated circuits.

These analog multiplexers/demultiplexers control analog voltages that may vary across the voltage supply range (i.e., V_{CC} to V_{EE}). They are bidirectional switches thus allowing any analog input to be used as an output and visa-versa. The switches have low "on" resistance and low "off" leakages. In addition, these devices have an enable control which, when high, disables all switches to their "off" state.



Package Specifications

See Section 11, Fig. 11

FUNCTIONAL DIAGRAM