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

CHARACTERISTICS		TEST CONDITIONS HC/HCT V_{DD}	V_O	I_O	V_{CC} or GND	V_{IN} HC V_{IL} or V_{IH}	V_{IN} HCT V_{IL} or V_{IH}	LIMITS MIN.	LIMITS MAX.	UNITS
Quiescent Device Current I_{CC}	25°C	6	—	—	6, 0	—	—	—	2•	μA
	−55°C / +125°C	6	—	—	6, 0	—	—	—	40•	μA

The complete Static Electrical Test specification consists of the above by-type Static Tests combined with the Standard Static tests in the beginning of this section.

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_{CC} V	25°C HC Min.	25°C HC Max.	−55°C to +125°C 54HC Min.	−55°C to +125°C 54HC Max.	UNITS
Propagation Delay nA to nȲ	t_{PLH} t_{PHL}	2	—	85	—	130	ns
		4.5	—	17•	—	26•	ns
		6	—	14	—	22	ns
Transition Time	t_{TLH} t_{THL}	2	—	75	—	110	ns
		4.5	—	15	—	22	ns
		6	—	13	—	19	ns
Input Capacitance	C_I	—	—	10	—	10	pF

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

Static	STATIC BURN-IN I OPEN	STATIC BURN-IN I GROUND	STATIC BURN-IN I V_{CC} (6V)	STATIC BURN-IN II OPEN	STATIC BURN-IN II GROUND	STATIC BURN-IN II V_{CC} (6V)
CD54HC4050	2,4,6,10,12, 13,15,16	3,5,7-9,11,14	1*	2,4,6,10,12, 13,15,16	8	1*,3,5,7,9,11,14
Dynamic	**OPEN**	**GROUND**	**1/2 V_{CC} (3V)**	**V_{CC} (6V)**	**OSCILLATOR 50 kHz**	**OSCILLATOR 25 kHz**
CD54HC4050	13	8	2,4,6,10,12,15	1*,16	3,5,7,9,11,14	—

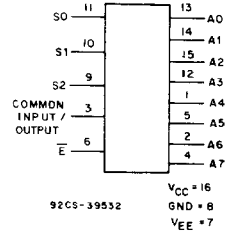
NOTE: Each pin except V_{CC} and Gnd will have a resistor of 2k-47k ohms.
Connect pins marked (*) without using a resistor.

8-Channel Analog Multiplexer/Demultiplexer

CD54HC4051/3A CD54HCT4051/3A

The RCA CD54HC4051 and CD54HCT4051 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

CD54HC4051/3A
CD54HCT4051/3A

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

CHARACTERISTIC	CD54HC4051 TEST CONDITIONS V_{IS} V	V_I V	V_{EE} V	V_{CC} V	LIMITS +25°C Min.	Typ.	Max.	-55/+125°C Min.	Max.	CD54HCT4051 TEST CONDITIONS V_{IS} V	V_I V	V_{EE} V	V_{CC} V	LIMITS +25°C Min.	Typ.	Max.	-55/+125°C Min.	Max.	UNITS
High-Level Input Voltage V_{IH}				2	1.5	—	—	1.5	—				4.5 to 5.5	2•	—	—	2•	—	V
				4.5	3.15•	—	—	3.15•	—										
				6	4.2	—	—	4.2	—										
Low-Level Input Voltage V_{IL}				2	—	—	0.5	—	0.5				4.5 to 5.5	—	—	0.8•	—	0.8•	V
				4.5	—	—	1.35•	—	1.35•										
				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			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	
	V_{CC} to V_{EE}		0	4.5	—	90	180•	—	270•			0	4.5	—	90	180•	—	270•	Ω
			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} 8 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	—	—	±0.2•	—	±2•	Same as HC	Same as HC	0	6	—	—	±0.2•	—	±2•	μA
			-5	5	—	—	±0.4•	—	±4•			-5	5	—	—	±0.4•	—	±4•	
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	0.5

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

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}	25°C				-55°C to +125°C				UNITS
				HC		HCT		54HC		54HCT		
			V	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Propagation Delay		0	2	—	60	—	—	—	90	—	—	ns
Switch In to Out	t_{PLH}	0	4.5	—	12	—	12	—	18	—	18	
	t_{PHL}	0	6	—	10	—	—	—	15	—	—	
		-4.5	4.5	—	8	—	8	—	12	—	12	
Maximum Switch		0	2	—	225	—	—	—	340	—	—	
Turn "Off" Delay	t_{PHZ}	0	4.5	—	45•	—	45•	—	68•	—	68•	
from S or $\overline{E}$ to	t_{PLZ}	0	6	—	38	—	—	—	57	—	—	
Switch Output		-4.5	4.5	—	32	—	32	—	48	—	48	
Maximum Switch		0	2	—	225	—	—	—	340	—	—	
Turn "On" Delay	t_{PZL}	0	4.5	—	45•	—	55•	—	68•	—	83•	
from S or E to	t_{PZH}	0	6	—	38	—	—	—	57	—	—	
Switch Output		-4.5	4.5	—	32	—	39	—	48	—	59	
Input Capacitance	C_I	—	—	—	10	—	10	—	10	—	10	pF

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 50 kHz**	**OSCILLATOR 25 kHz**
CD54HC/HCT4051	—	4-6,7*,8*,9, 12,14	3	1,2,13,15, 16	11	10

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

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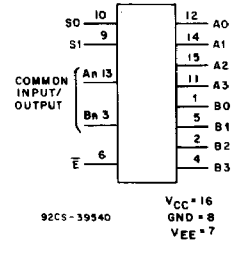
CD54HC4052/3A
CD54HCT4052/3A

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