

**CD54HC648/3A**  
**CD54HCT648/3A**

T-46-09-09  
T-52-31

**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				-55°C to +125°C				UNITS
			HC		HCT		54HC		54HCT		
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Propagation Delay		2	—	240	—	—	—	360	—	—	ns
Store A data to B bus		4.5	—	48•	—	54•	—	72•	—	81•	
Store B data to A bus		6	—	41	—	—	—	61	—	—	
A data to B bus	$t_{PLH}$ $t_{PHL}$	2	—	150	—	—	—	225	—	—	
B data to A bus		4.5	—	30•	—	37•	—	45•	—	56•	
		6	—	26	—	—	—	38	—	—	
Select to Data		2	—	190	—	—	—	285	—	—	
		4.5	—	38•	—	46•	—	57•	—	69•	
		6	—	32	—	—	—	48	—	—	
3-State Disabling Time	$t_{PLZ}$ $t_{PHZ}$	2	—	175	—	—	—	265	—	—	
Bus to Output or		4.5	—	35•	—	35•	—	53•	—	53•	
Register to Output		6	—	30	—	—	—	45	—	—	
3-State Enabling Time	$t_{PZL}$ $t_{PZH}$	2	—	175	—	—	—	265	—	—	
Bus to Output or		4.5	—	35•	—	45•	—	53•	—	68•	
Register to Output		6	—	30	—	—	—	45	—	—	
Output Transition Time	$t_{TLH}$ $t_{THL}$	2	—	60	—	—	—	90	—	—	
		4.5	—	12	—	12	—	18	—	18	
		6	—	10	—	—	—	15	—	—	
Input Capacitance	$C_i$	—	—	10	—	10	—	10	—	10	pF
3-State Output Capacitance	$C_o$	—	—	20	—	20	—	20	—	20	



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

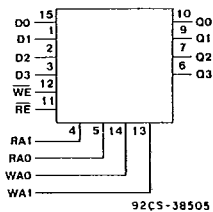
Static	STATIC BURN-IN I			STATIC BURN-IN II		
	OPEN	GROUND	$V_{CC}$ (6V)	OPEN	GROUND	$V_{CC}$ (6V)
CD54HC/HCT648	4-11	1-3,12-23	24	—	12	1-11,13-24
Dynamic	OPEN	GROUND	1/2 $V_{CC}$ (3V)	$V_{CC}$ (6V)	OSCILLATOR	
CD54HC/HCT648	—	1-3,12,21,22	4-11	24	50 kHz	25 kHz
					23	13-20

NOTE: Each pin except  $V_{CC}$  and Gnd will have a resistor of 2k-47k ohms.

**4 x 4 Register File, 3-State**

**CD54HC670/3A**  
**CD54HCT670/3A**

The RCA CD54HC670 and CD54HCT670 are 16-bit register files organized as 4 words x 4 bits each. Read and write address and enable inputs allow simultaneous writing into one location while reading another. Four data inputs are provided to store the 4-bit word. The write address inputs (WAO and WA1) determine the location of the stored word in the register. When write enable ( $\overline{WE}$ ) is low the word is entered into the address location and it remains transparent to the data. The outputs will reflect the true form of the input data. When ( $\overline{WE}$ ) is high data and address inputs are inhibited. Data acquisition from the four registers is made possible by the read address inputs (RA1 and RA0). The addressed word appears at the output when the read enable ( $\overline{RE}$ ) is low. The output is in the high impedance state when the ( $\overline{RE}$ ) is high. Outputs can be tied together to increase the word capacity to 512 x 4 bits.



FUNCTIONAL DIAGRAM

**Package Specifications**  
See Section 11, Fig. 11

**CD54HC670/3A**  
**CD54HCT670/3A**

T-46-09-09  
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**Static Electrical Characteristics** (Limits with black dots (•) are tested 100%)

CHARACTERISTICS	TEST CONDITIONS								UNITS	
	HC/HCT				V <sub>IN</sub>		LIMITS			
	V <sub>DD</sub>	V <sub>O</sub>	I <sub>O</sub>	V <sub>CC</sub> or GND	HC V <sub>IL</sub> or V <sub>IH</sub>	HCT V <sub>IL</sub> or V <sub>IH</sub>	MIN.	MAX.		
Quiescent	25°C	6	—	—	6, 0	—	—	—	8•	μA
Device Current	-55°C	6	—	—	6, 0	—	—	—	160•	
I <sub>CC</sub>	+125°C	6	—	—	6, 0	—	—	—	160•	

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.

**HCT INPUT LOADING TABLE**

INPUT	UNIT LOAD*
WE	0.3
WA0	0.2
WA1	0.4
RE	1.5
DATA	0.15
RA0	0.4
RA1	0.7

\*Unit load is ΔI<sub>CC</sub> limit specified in Static Characteristics Chart, e.g., 360 μA max. @ 25°C.

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

**SWITCHING CHARACTERISTICS** (C<sub>L</sub> = 50 pF, Input t<sub>r</sub>, t<sub>f</sub> = 6 ns)

CHARACTERISTIC	SYMBOL	V <sub>CC</sub> V	25°C				-55°C to +125°C				UNITS
			HC		HCT		54HC		54HCT		
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
Propagation Delay Reading any word	t <sub>PLH</sub>	2	—	195	—	—	—	295	—	—	ns
		4.5	—	39	—	40	—	59	—	60	
		6	—	33	—	—	—	50	—	—	
Write Enable to Output	t <sub>PHL</sub>	2	—	250	—	—	—	375	—	—	
		4.5	—	50•	—	50•	—	75•	—	75•	
		6	—	43	—	—	—	64	—	—	
Data to Output	t <sub>PHL</sub>	2	—	256	—	—	—	375	—	—	
		4.5	—	50	—	50	—	75	—	75	
		6	—	43	—	—	—	64	—	—	
Output Disable Time	t <sub>PLZ</sub> t <sub>PHZ</sub>	2	—	150	—	—	—	225	—	—	
		4.5	—	30•	—	35•	—	45•	—	53•	
		6	—	26	—	—	—	38	—	—	
Output Enable Time	t <sub>PZL</sub> t <sub>PZH</sub>	2	—	150	—	—	—	225	—	—	
		4.5	—	30•	—	38•	—	45•	—	57•	
		6	—	26	—	—	—	38	—	—	
Output Transition Time	t <sub>TLH</sub> t <sub>THL</sub>	2	—	75	—	—	—	110	—	—	
		4.5	—	15	—	15	—	22	—	22	
		6	—	13	—	—	—	19	—	—	
Input Capacitance	C <sub>i</sub>	—	—	10	—	10	—	10	—	10	pF
3-State Output Capacitance	C <sub>o</sub>	—	—	20	—	20	—	20	—	20	

**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 <sub>CC</sub> (6V)	OPEN	GROUND	V <sub>CC</sub> (6V)
CD54HC/HCT670	6,7,9,10	1-5,8,11-15	16	6,7,9,10	8	1-5,11-16
Dynamic	OPEN	GROUND	1/2 V <sub>CC</sub> (3V)	V <sub>CC</sub> (6V)	OSCILLATOR	
CD54HC/HCT670	—	8,11,12	6,7,9,10	16	50 kHz	25 kHz
					1-3,5,14,15	4,13

NOTE: Each pin except V<sub>CC</sub> and Gnd will have a resistor of 2k-47k ohms.