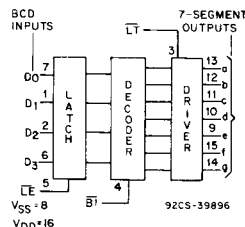


CD54HC4511/3A CD54HCT4511/3A BCD-to-7-Segment Latch/Decoder/Driver

The RCA CD54HC4511 and CD54HCT4511 are BCD-to-7-segment latch/decoder/drivers having four address inputs (D₀-D₃), active "Low" blanking and lamp test inputs, and a latch enable input which, when "High", enables the latches to store the BCD inputs. When latch enable is "Low", the latches are disabled, making the outputs transparent to the BCD inputs.

These devices have standard-size output transistors but are capable of sourcing (at standard V_{OH} levels) up to 7.5 mA at 4.5 V. The HC types can supply up to 10 mA at 6 V.



FUNCTIONAL DIAGRAM

Package Specifications

See Section 11, Fig. 11

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

CHARACTERISTIC	CD54HC4511								CD54HCT4511								UNITS
	TEST CONDITIONS			LIMITS					TEST CONDITIONS		LIMITS						
	V _I V	I _O mA	V _{CC} V	+25° C			-55/ +125° C		V _I 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						V	
			4.5	3.15•	—	—	3.15•	—	—	to 5.5	2•	—	—	2•	—		
			6	4.2	—	—	4.2	—									
Low-Level Input Voltage V _{IL}			2	—	—	0.5	—	0.5	—	4.5						V	
			4.5	—	—	1.35•	—	1.35•	—	to 5.5	—	—	0.8•	—	0.8•		
			6	—	—	1.8	—	1.8	—								
High-Level Output Voltage V _{OH}	V _{IL}	-0.02	2	1.9	—	—	1.9	—	V _{IL}	4.5	4.4•	—	—	4.4•	—	V	
	or		4.5	4.4•	—	—	4.4•	—	or		4.4•	—	—	4.4•	—		
	CMOS Loads	V _{IH}	6	5.9	—	—	5.9	—	V _{IH}								
	TTL Loads	V _{IL}							V _{IL}	4.5	3.98•	—	—	3.7•	—		
Non-Standard Output	or	-7.5	4.5	3.98•	—	—	3.7•	—	or	4.5	3.98•	—	—	3.7•	—		
	V _{IH}	-10	6	5.48	—	—	5.2	—	V _{IH}								
Low-Level Output Voltage V _{OL}	V _{IL}	0.02	2	—	—	0.1	—	0.1	V _{IL}	4.5	—	—	0.1•	—	0.1•	V	
	or		4.5	—	—	0.1•	—	0.1•	or		—	—	0.1•	—	0.1•		
	CMOS Loads	V _{IH}	6	—	—	0.1	—	0.1	V _{IH}								
TTL Loads	V _{IL}								V _{IL}	4.5	—	—	0.26•	—	0.4•		
	or	4	4.5	—	—	0.26•	—	0.4•	or	4.5	—	—	0.26•	—	0.4•		
	V _{IH}	5.2	6	—	—	0.26	—	0.4	V _{IH}								
Input Leakage Current I _I	V _{CC} or Gnd		6	—	—	±0.1•	—	±1•	Any Voltage Between V _{CC} & Gnd	5.5	—	—	±0.1•	—	±1•	μA	
Quiescent Device Current I _{CC}	V _{CC} or Gnd	0	6	—	—	8•	—	160•	V _{CC} or Gnd	5.5	—	—	8•	—	160•	μA	
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) specification is 1.8 mA.

CD54HC4511/3A

CD54HCT4511/3A

HCT INPUT LOADING TABLE

INPUT	UNIT LOAD*
\overline{LT} , \overline{LE}	1.5
\overline{BI} , Dn	0.3

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

Switching Speed

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

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

CHARACTERISTIC	SYMBOL	TEST CONDITIONS V_{cc} V	LIMITS								UNITS	
			25° C				-55° C to +125° C					
			HC		HCT		54HC		54HCT			
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
Propagation Delay Dn to Output	t_{PLH} t_{PHL}	2	—	300	—	—	—	—	450	—	—	ns
		4.5	—	60•	—	60•	—	90•	—	90•	—	
		6	—	51	—	—	—	77	—	—	—	
\overline{LE} to Output		2	—	270	—	—	—	405	—	—	—	
		4.5	—	54•	—	54•	—	81•	—	81•	—	
		6	—	46	—	—	—	69	—	—	—	
\overline{BI} to Output		2	—	220	—	—	—	330	—	—	—	
		4.5	—	44•	—	44•	—	66•	—	66•	—	
		6	—	37	—	—	—	56	—	—	—	
\overline{LT} to Output		2	—	160	—	—	—	240	—	—	—	
		4.5	—	32	—	33	—	48	—	50	—	
		6	—	27	—	—	—	41	—	—	—	
Transition Time	t_{THL}	2	—	75	—	—	—	110	—	—	pF	
	t_{TLH}	4.5	—	15	—	15	—	22	—	22		
		6	—	13	—	—	—	19	—	—		
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/HCT4511	9-15	1-8	16	9-15	8	1-7,16
Dynamic	OPEN	GROUND	1/2 V_{cc} (3V)	V_{cc} (6V)	OSCILLATOR	
CD54HC/HCT4511	9-15	5,8	—	3,4,16	50 kHz 1,2,7	25 kHz 6

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