



Die Datasheet, Logic Gate Device

74HC4040

12-STAGE BINARY RIPPLE COUNTER

Die Source:



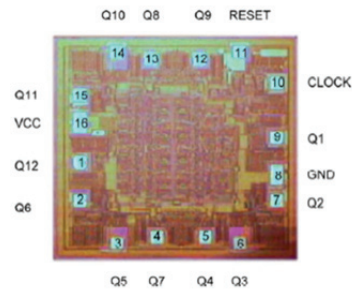
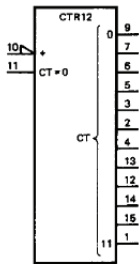
71 mils x 68 mils x 14 mils

Backside : Silicon
Topside Metal: Aluminum

General Description:

The 74HC4040 is a member of the Industries 74xxx series of Logic devices. The 74HC4040 is a device description which contains a 12-stage binary ripple counter.

IEEE / IEC LOGIC SYMBOL



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	CONDITIONS	LIMIT	UNITS
Supply Voltage	V _{CC}		-0.5 to +7.0	V
DC Input Diode Current	I _{IK}	V _I = -0.5V	-20.0	mA
		V _I = V _{CC} + 0.5V	20.0	mA
DC Input Voltage	V _I		-0.5 to V _{CC} + 0.5	V
DC Output Diode Current	I _{OK}	V _O = -0.5V	-20.0	mA
		V _O = V _{CC} + 0.5V	20.0	mA
DC Output Voltage	V _O		-0.5 to V _{CC} + 0.5	V
DC Output Source or Sink Current	I _O		±25.0	mA
DC VCC Current	I _{CC}		+50	mA
DC GND Current	I _{DD}		-50.0	mA
Storage Temp	T _{STG}		-65.0 to +150	°C
Max Junction Temp	T _J		150.0	°C

RECOMMENDED OPERATING CONDITIONS

PARAMETER	TECH	SYMBOL	LIMIT	UNITS
Supply Voltage	HC	V _{CC}	2.0 to 6.0	V
Input Voltage		V _I	0 to V _{CC}	V
Output Voltage		V _O	0 to V _{CC}	V
Operating Temperature		T _A	-40 to +85	°C
Minimum Input Rise & Fall times (@5.0V ± 0.5V)	HC	ΔT/ΔV	500	ns/V
				ns/V

DC ELECTRICAL CHARACTERISTICS

PARAMETER	TECH	SYMBOL	VCC (V)	CONDITIONS	Guaranteed Limits		UNITS	NOTE
					Min@25C	Min@85C		
Minimum HIGH level Input Voltage	HC	V _{IH}	2.0		1.50	1.50	V	
			4.5		3.15	3.15		
			6.0		4.20	4.20		
Maximum LOW level Input Voltage	HC	V _{IL}	2.0		0.50	0.50	V	
			4.0		1.35	1.35		
			4.5		1.80	1.80		
Minimum HIGH level Output Voltage	HC	V _{OH}	2.0	I _{OUT} = -20uA	1.90	1.90	V	
			4.5		4.40	4.40		
			6.0		5.90	5.90		
	HC	V _{OH}	4.5	V _{IN} = V _{IL} or V _{IH} , I _{OL} = -4mA	3.98	3.84	V	
			6.0	V _{IN} = V _{IL} or V _{IH} , I _{OL} = -5.2mA	5.48	5.34		



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DC ELECTRICAL CHARACTERISTICS - CONT'D

PARAMETER	TECH	SYMBOL	VCC (V)	CONDITIONS	Guarenteed Limits		UNITS	NOTE
					Min@25C	Min@85C		
Maximum LOW level Output Voltage	HC	V _{OL}	2.0	I _{OUT} = 20uA	0.1	0.1	V	
			4.5		0.1	0.1		
			6.0		0.1	0.1		
	HC	V _{OL}	4.5	V _{IN} = V _{IL} or V _{IH} , I _O = 4mA	0.36	0.44	V	
			6.0	V _{IN} = V _{IL} or V _{IH} , I _O = 5.2mA	0.36	0.44		
	Maximum Input Leakage Current	HC	I _{IN}	6.0	V _I = V _{CC} or GND	±0.1	±1.0	uA
3-State Output OFF Current	HC	I _{OZ}	6.0	V _I = V _{IH} or V _{IL} , V _O = V _{CC} or GND	--	±5.0	uA	
Maximum Quiescent Supply Current	HC	I _{CC}	6.0	V _{IN} = V _{CC} or GND	--	20	uA	

AC ELECTRICAL CHARACTERISTICS

PARAMETER	TECH	SYMBOL	VCC (V)	CONDITIONS	Guarenteed Limits		Guarenteed Limits		UNITS
					Min@25C	Max@25C	Min@85C	Max@85C	
Propagation Delay, CP\ to Q0	HC	t _{PLH}	2.0	GND = 0V, tr = tf = 6ns, CL = 50pF	--	150.0	--	190.0	ns
			4.5		--	30.0	--	38.0	
			6.0		--	26.0	--	33.0	
	HC	t _{PHL}	2.0	GND = 0V, tr = tf = 6ns, CL = 50pF	--	150.0	--	190.0	ns
			4.5		--	30.0	--	38.0	
			6.0		--	26.0	--	33.0	
Propagation Delay, Qn to Qn + 1	HC	t _{PLH}	2.0	GND = 0V, tr = tf = 6ns, CL = 50pF	--	100.0	--	125.0	ns
			4.5		--	20.0	--	25.0	
			6.0		--	17.0	--	21.0	
	HC	t _{PHL}	2.0	GND = 0V, tr = tf = 6ns, CL = 50pF	--	100.0	--	125.0	ns
			4.5		--	20.0	--	25.0	
			6.0		--	17.0	--	21.0	
Propagation Delay, MR to Qn	HC	t _{PHL}	2.0	GND = 0V, tr = tf = 6ns, CL = 50pF	--	185.0	--	230.0	ns
			4.5		--	37.0	--	46.0	
			6.0		--	31.0	--	39.0	



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AC ELECTRICAL CHARACTERISTICS - CONT'D											
PARAMETER	TECH	SYMBOL	VCC (V)	CONDITIONS	Guarenteed Limits		Guarenteed Limits		UNITS		
					Min@25C	Max@25C	Min@85C	Max@85C			
Output Transition Time	HC	tTLH	2.0	GND = 0V, tr = tf = 6ns, CL = 50pF	--	75.0	--	95.0	ns		
			4.5		--	15.0	--	19.0			
			6.0		--	13.0	--	16.0			
	HC	tTHL	2.0		--	75.0	--	95.0			
			4.5		--	15.0	--	19.0			
			6.0		--	13.0	--	16.0			
Clock Pulse Width, HIGH or LOW	HC	tW	2.0	GND = 0V, tr = tf = 6ns, CL = 50pF	80.0	--	100.0	--	ns		
			4.5		16.0	--	20.0	--			
			6.0		14.0	--	16.0	--			
Master Reset Pulse Width, HIGH	HC	tW	2.0		GND = 0V, tr = tf = 6ns, CL = 50pF	80.0	--	100.0		--	ns
			4.5			16.0	--	20.0		--	
			6.0			14.0	--	16.0		--	
Removal Time, MR to CP\	HC	tREM	2.0	GND = 0V, tr = tf = 6ns, CL = 50pF		50.0	--	65.0	--	ns	
			4.5			10.0	--	13.0	--		
			6.0			9.0	--	11.0	--		
Maximum Clock Pusle Frequency	HC	fMAX	2.0		GND = 0V, tr = tf = 6ns, CL = 50pF	6.0	--	4.8	--		MHz
			4.5			30.0	--	24.0	--		
			6.0			35.0	--	28.0	--		