Die Datasheet, Logic Gate Device 74HC4040

12-STAGE BINARY RIPPLE COUNTER

Die Source:

FAIRCHILD

71 mils x 68 mils x 14 mils

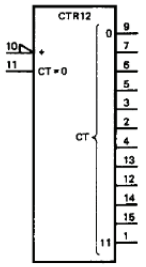
Backside : Silicon

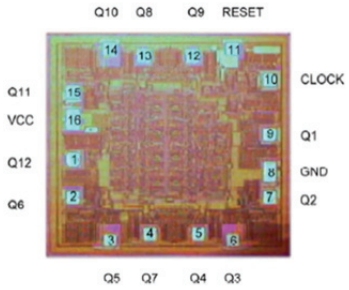
Topside Metal: Aluminum

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
				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	HC	ΔT/ΔV	500	ns/V
(@5.0V ± 0.5V)				ns/V

DC ELECTRICAL CHARACTERISTICS

PARAMETER	TECH	SYMBOL	VCC (V)	CONDITIONS	Guarenteed Limits Min@25C	Guarenteed Limits Min@85C	UNITS	NOTE
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		

DC ELECTRICAL CHARACTERISTICS - CONT'D

PARAMETER	TECH	SYMBOL	VCC (V)	CONDITIONS	Guarenteed Limits Min@25C	Guarenteed Limits Min@85C	UNITS	NOTE
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}					V	
			4.5	$V_{IN} = V_{IL}$ or V_{IH}, I_O= 4mA	0.36	0.44		
			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 = VCC 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 Min@25C	Guarenteed Limits Max@25C	Guarenteed Limits Min@85C	Guarenteed Limits Max@85C	UNITS
Propagation Delay, CP\ to Q0	HC	tPLH	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	tPHL	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	tPLH	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	tPHL	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	tPHL	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	

AC ELECTRICAL CHARACTERISTICS - CONT'D

PARAMETER	TECH	SYMBOL	VCC (V)	CONDITIONS	Guarenteed Limits Min@25C	Guarenteed Limits Max@25C	Guarenteed Limits Min@85C	Guarenteed Limits Max@85C	UNITS
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	GND = 0V, tr = tf = 6ns, CL = 50pF	- -	75.0	- -	95.0	ns
			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	- -	