

M74HCT574

OCTAL D-TYPE FLIP FLOP WITH 3 STATE OUTPUT NON INVERTING

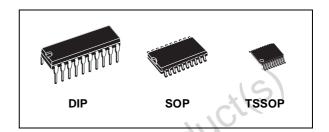
- HIGH SPEED:
 - $f_{MAX} = 50MHz$ (TYP.) at $V_{CC} = 4.5V$
- LOW POWER DISSIPATION: $I_{CC} = 4\mu A(MAX.)$ at $T_A=25^{\circ}C$
- COMPATIBLE WITH TTL OUTPUTS : V_{IH} = 2V (MIN.) V_{IL} = 0.8V (MAX)
- SYMMETRICAL OUTPUT IMPEDANCE: |I_{OH}| = I_{OL} = 6mA (MIN)
- BALANCED PROPAGATION DELAYS: tplh ≅ tphl
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 574



The M74HCT574 is an high speed CMOS OCTAL D-TYPE FLIP FLOP WITH 3-STATE OUTPUTS INVERTING fabricated with sub-micron silicon gate C²MOS technology.

This 8 bit D-TYPE FLIP FLOP is controlled <u>by</u> a clock input (CK) and an output enable input (OE). On the positive transition of the clock, the Q outputs will be set to the logic state that were setup at the D inputs.

While the \overline{OE} input is at low level, the eight outputs will be in a normal logic state (high or low logic level) and while \overline{OE} is in high level the outputs will be in a high impedance state.



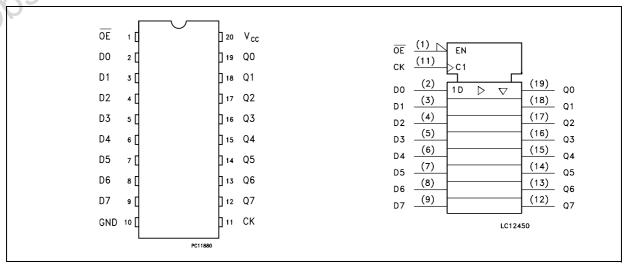
ORDER CODES

PACKAGE	TUBE	T & R
DIP	M74HCT574B1R	
SOP	M74HCT574M1R	M74HCT574RM13TR
TSSOP		M74HCT574TTR

The output control does not affect the internal operation of flip-flops; that is, the old data can be retained or the new data can be entered even while the outputs are off.

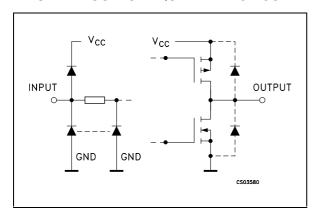
All inputs are equipped with protection circuits against static discharge and transient excess voltage.

PIN CONNECTION AND IEC LOGIC SYMBOLS



August 2001 1/11

INPUT AND OUTPUT EQUIVALENT CIRCUIT



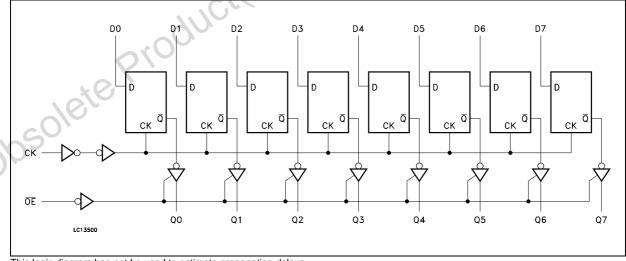
PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1	OE	3 State Output Enable Input (Active LOW)
2, 3, 4, 5, 6, 7, 8, 9	D0 to D7	Data Inputs
12, 13, 14, 15, 16, 17, 18, 19	Q7 to Q0	3 State Outputs
11	CK	Clock Input (LOW to HIGH, edge triggered)
10	GND	Ground (0V)
20	V _{CC}	Positive Supply Voltage

TRUTH TABLE

	INPUTS	ОИТРИТ			
ŌĒ	СК	D	Q		
Н	X	X	Z		
L	7	X	NO CHANGE		
L		CO,T	L		
L	J (Н	Н		

LOGIC DIAGRAM



This logic diagram has not be used to estimate propagation delays

X: Don't Care Z: High Impedance

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CC}	Supply Voltage	-0.5 to +7	V
V _I	DC Input Voltage	-0.5 to V _{CC} + 0.5	V
V _O	DC Output Voltage	-0.5 to V _{CC} + 0.5	V
I _{IK}	DC Input Diode Current	± 20	mA
I _{OK}	DC Output Diode Current	± 20	mA
I _O	DC Output Current	± 35	mA
I _{CC} or I _{GND}	DC V _{CC} or Ground Current	± 70	mA
P_{D}	Power Dissipation	500(*)	mW
T _{stg}	Storage Temperature	-65 to +150	°C
T_L	Lead Temperature (10 sec)	300	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied
(*) 500mW at 65 °C; derate to 300mW by 10mW/°C from 65°C to 85°C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V _{CC}	Supply Voltage	4.5 to 5.5	V
VI	Input Voltage	0 to V _{CC}	V
V _O	Output Voltage	0 to V _{CC}	V
T _{op}	Operating Temperature	-55 to 125	°C
t _r , t _f	Input Rise and Fall Time (V _{CC} = 4.5 to 5.5V)	0 to 500	ns
Obsole	ate Producties		

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DC SPECIFICATIONS

Symbol V _{IH}	Parameter	Test Condition			Value						
Vıu	Parameter	V _{CC}		Т	_A = 25°	С	-40 to	85°C	-55 to	125°C	Uni
Vı⊔		(V)		Min.	Тур.	Max.	Min.	Max.	Min.	Max.	
	High Level Input Voltage	4.5 to 5.5		2.0			2.0		2.0		V
	Low Level Input Voltage	4.5 to 5.5				0.8		0.8		0.8	٧
	High Level Output Voltage	4.5	I _O =-20 μA I _O =-6.0 mA	4.4 4.18	4.5 4.31		4.4 4.13		4.4 4.10	5	V
	Low Level Output Voltage	4.5	I _O =20 μA I _O =6.0 mA		0.0	0.1 0.26		0.1	\C	0.1	V
	Input Leakage Current	5.5	$V_I = V_{CC}$ or GND			± 0.1	~ \sqrt	±1		± 1	μΑ
02	High Impedance Output Leakage Current	5.5	$V_I = V_{IH} \text{ or } V_{IL}$ $V_O = V_{CC} \text{ or GND}$			± 0.5		± 5		± 10	μΑ
	Quiescent Supply Current	5.5	$V_I = V_{CC}$ or GND		O_{I_k}	4		40		80	μA
	Additional Worst Case Supply Current	5.5	Per Input pin $V_I = 0.5V$ or $V_I = 2.4V$ Other Inputs at V_{CC} or GND $I_O = 0$	03		2.0		2.9		3.0	m <i>i</i>

AC ELECTRICAL CHARACTERISTICS ($C_L = 50 \text{ pF}$, Input $t_r = t_f = 6 \text{ns}$)

		٦	Test Co	ondition	Value												
Symbol	Parameter	v _{cc}	CL		T _A = 25°C			-40 to 85°C		-55 to 125°C		Unit					
		(V)	(pF)		Min.	Тур.	Max.	Min.	Max.	Min.	Max.						
t _{TLH} t _{THL}	Output Transition Time	4.5	50			7	12		15		18	ns					
t _{PLH} t _{PHL}	Propagation Delay		50			20	30		38		45						
	Time	4.5	150			24	36		45		54	ns					
t _{PZL} t _{PZH}	High Impedance		50	_		19	30		38		45						
	Output Enable Time	4.5	150	$R_L = 1 K\Omega$		23	36		45		54	ns					
t _{PLZ} t _{PHZ}	High Impedance Output Disable Time	4.5	50	$R_L = 1 \text{ K}\Omega$		19	30		38	10	45	ns					
f _{MAX}	Maximum Clock Frequency	4.5	50		31	50		25	O_O	21		ns					
t _{W(H)}	Minimum Pulse	4.5	5 0			8	15		19		22	20					
t _{W(H)}	Width (CK)	4.5	50	50	50	50	50	50			0	13		19		22	ns
t _s	Minimum Set-up Time	4.5	50			7	15		19		22	ns					
t _h	Minimum Hold Time	4.5	50		10°5		0		0		0	ns					

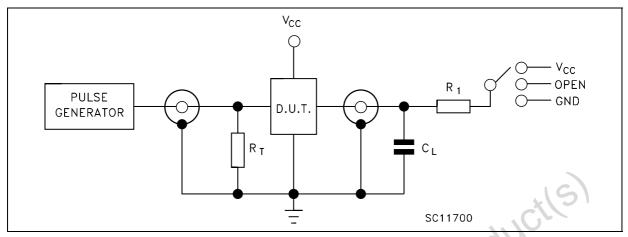
CAPACITIVE CHARACTERISTICS

		Test Condition		Value							
Symbol	Parameter	V _{CC}	5	Т	A = 25°	С	-40 to	85°C	-55 to	125°C	Unit
	.0	(V)		Min.	Тур.	Max.	Min.	Max.	Min.	Max.	
C _{IN}	Input Capacitance				5	10		10		10	pF
C _{OUT}	Output Capacitance				10						pF
C _{PD}	Power Dissipation Capacitance (note 1)				63						pF

¹⁾ C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/8$ (per Flip-Flop)

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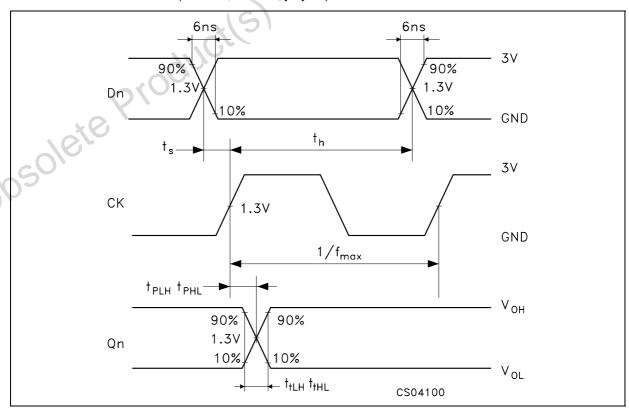
TEST CIRCUIT



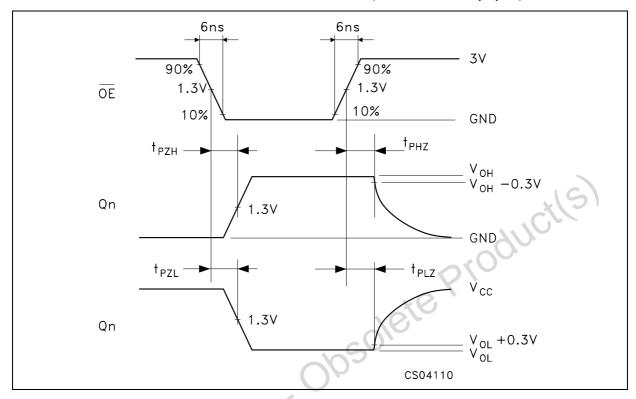
	TEST	SWITCH
t _{PLH} , t _{PHL}		Open
t_{PZL}, t_{PLZ}	A. C.	V _{CC}
t _{PZH} , t _{PHZ}	1870	GND

 $C_L = 50 pF/150 pF$ or equivalent (includes jig and probe capacitance) $R_1 = 1 K \Omega$ or equivalent $R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

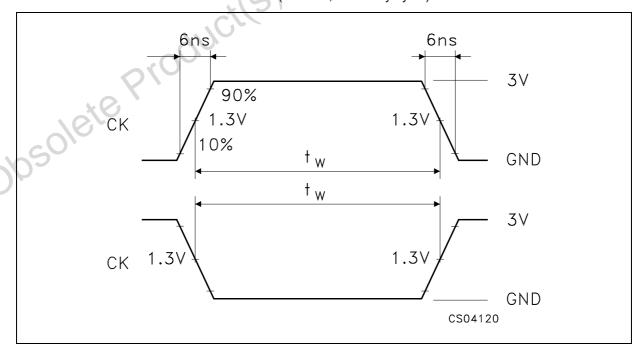
WAVEFORM 1: CK TO Qn PROPAGATION DELAYS, CK MAXIMUM FREQUENCY, Dn TO CK SETUP AND HOLD TIMES (f=1MHz; 50% duty cycle)



WAVEFORM 2: OUTPUT ENABLE AND DISABLE TIMES (f=1MHz; 50% duty cycle)

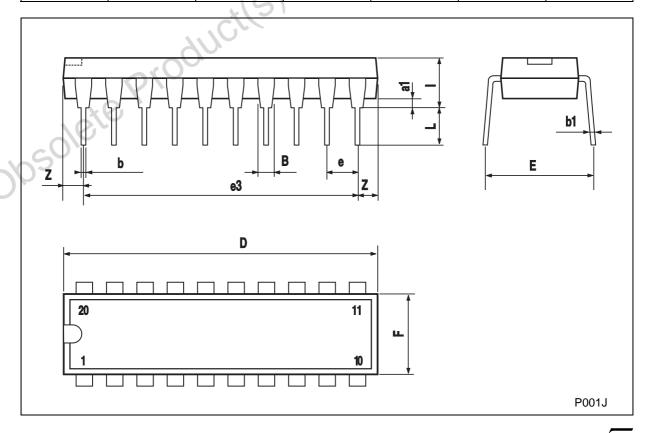


WAVEFORM 3: MINIMUM PULSE WIDTH (f=1MHz; 50% duty cycle)



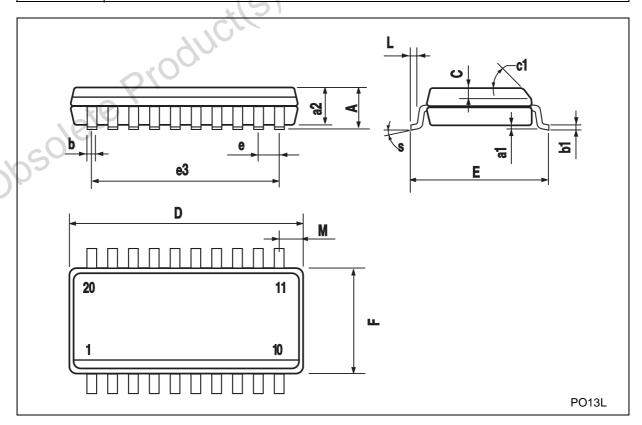
Plastic DIP-20 (0.25) MECHANICAL DATA

DIM		mm.		inch				
DIM.	MIN.	TYP	MAX.	MIN.	TYP.	MAX.		
a1	0.254			0.010				
В	1.39		1.65	0.055		0.065		
b		0.45			0.018			
b1		0.25			0.010	19		
D			25.4		.(1.000		
E		8.5			0.335			
е		2.54			0.100			
e3		22.86		201	0.900			
F			7.1	76/		0.280		
I			3.93	0.		0.155		
L		3.3	Oh		0.130			
Z			1.34			0.053		



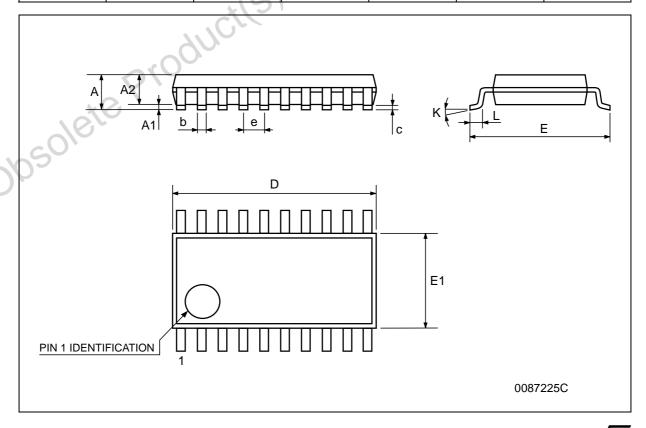
SO-20 MECHANICAL DATA

DIM.		mm.		inch			
DINI.	MIN.	TYP	MAX.	MIN.	TYP.	MAX.	
А			2.65			0.104	
a1	0.1		0.2	0.004		0.008	
a2			2.45			0.096	
b	0.35		0.49	0.014		0.019	
b1	0.23		0.32	0.009		0.012	
С		0.5			0.020	4/21	
c1			45° (1	typ.)	111	5	
D	12.60		13.00	0.496	1000	0.512	
Е	10.00		10.65	0.393		0.419	
е		1.27		40.	0.050		
e3		11.43		16/	0.450		
F	7.40		7.60	0.291		0.300	
L	0.50		1.27	0.020		0.050	
М			0.75			0.029	
S			8° (m	ax.)		1	



TSSOP20 MECHANICAL DATA

DIM.		mm.			inch	
DIWI.	MIN.	ТҮР	MAX.	MIN.	TYP.	MAX.
А			1.2			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.8	1	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
С	0.09		0.20	0.004	401	0.0089
D	6.4	6.5	6.6	0.252	0.256	0.260
E	6.2	6.4	6.6	0.244	0.252	0.260
E1	4.3	4.4	4.48	0.169	0.173	0.176
е		0.65 BSC	-105	0,	0.0256 BSC	
K	0°		8°	0°		8°
L	0.45	0.60	0.75	0.018	0.024	0.030





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