

# TC40H273P/F

C<sup>2</sup>MOS DIGITAL INTEGRATED CIRCUIT  
SILICON MONOLITHIC

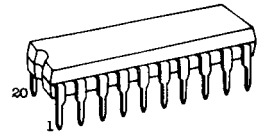
## TC40H273 OCTAL D-TYPE FLIP-FLOP

The TC40H273 is octal D-type flip-flop having common CLOCK terminal and CLEAR terminal.

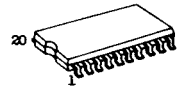
CLEAR input is active at "L" level, and all outputs at this time go to "L" level regardless of the other inputs.

When CLEAR input is at "H" level, DATA is transmitted to the output as it is, at the rising edge of CLOCK.

The function and pin assignment of this flip-flop are the same as those of the 74LS273.



DIP20 (3D20A-P)



MFP20 (F20GA-P)

### MAXIMUM RATINGS

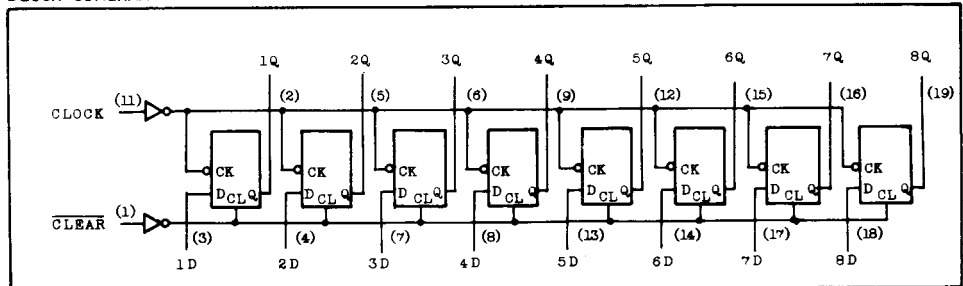
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V <sub>DD</sub>	V <sub>SS</sub> -0.5 ~ V <sub>SS</sub> +10	V
Input Voltage	V <sub>IN</sub>	V <sub>SS</sub> -0.5 ~ V <sub>DD</sub> +0.5	V
Output Voltage	V <sub>OUT</sub>	V <sub>SS</sub> -0.5 ~ V <sub>DD</sub> +0.5	V
Input Current	I <sub>IN</sub>	±10	mA
Power Dissipation	P <sub>D</sub>	300 (DIP) / 180 (MFP)	mW
Storage Temperature	T <sub>stg</sub>	-65 ~ 150	°C
Lead Temp./Time	T <sub>sol</sub>	260°C · 10 sec	

### TRUTH TABLE

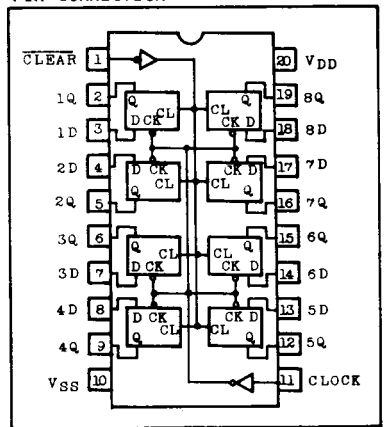
INPUTS			OUTPUT
CLEAR	CLOCK	DATA	Q
L	*	*	L
H	↑	H	H
H	↑	L	L
H	L	*	Q <sub>0</sub>

\* = Don't Care

### BLOCK DIAGRAM



### PIN CONNECTION



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RECOMMENDED OPERATING CONDITIONS ( $V_{SS}=0.0V$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V_{DD}$	-	2.0	-	8.0	V
Input Voltage	$V_{IN}$	-	0	-	$V_{DD}$	V
Operating Temperature	$T_{opr}$	-	-40	-	85	°C

ELECTRICAL CHARACTERISTICS ( $V_{SS}=0.0V$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	$V_{DD}$ (V)	-40°C		25°C			85°C		UNIT
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.	
High Level Output Voltage	$V_{OH}$	$ I_{OUT}  < 1\mu A$ $V_{IN}=V_{SS}, V_{DD}$	5	4.95	-	4.95	5.0	-	4.95	-	V
Low Level Output Voltage	$V_{OL}$	$ I_{OUT}  < 1\mu A$ $V_{IN}=V_{SS}, V_{DD}$	5	-	0.05	-	0.0	0.05	-	0.05	V
High Level Output Current	$I_{OH}$	$V_{OH}=4.6V$ $V_{IN}=V_{SS}, V_{DD}$	5	-0.52	-	-0.44	-	-	-0.36	-	mA
Low Level Output Current	$I_{OL}$	$V_{OL}=0.4V$ $V_{IN}=V_{SS}, V_{DD}$	5	1.4	-	1.1	-	-	0.8	-	mA
Input Voltage	"H" Level $V_{IH}$	$ I_{OUT}  < 1\mu A$ $V_{OUT}=0.5V$ $V_{OUT}=4.5V$	5	4.0	-	4.0	-	-	4.0	-	V
	"L" Level $V_{IL}$		5	-	1.0	-	-	1.0	-	1.0	
Input Current "H" Level	$I_{IH}$	$V_{IH}=8.0V$	8	-	0.3	-	$10^{-5}$	0.3	-	1.0	$\mu A$
Input Current "L" Level	$I_{IL}$	$V_{IL}=0.0V$	8	-	-0.3	-	$-10^{-5}$	-0.3	-	-1.0	$\mu A$
Quiescent Supply Current	$I_{DD}$	$*V_{IN}=V_{SS}, V_{DD}$	5	-	12.5	-	$10^{-3}$	12.5	-	75	$\mu A$

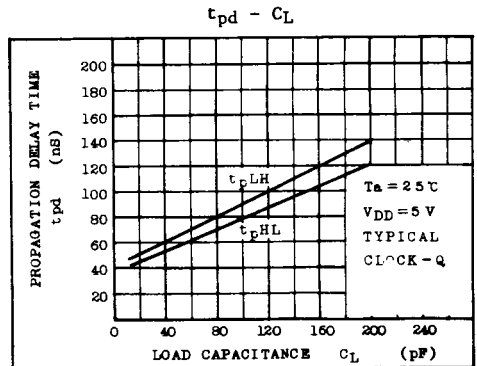
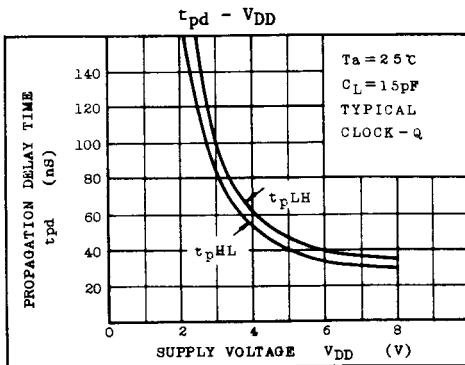
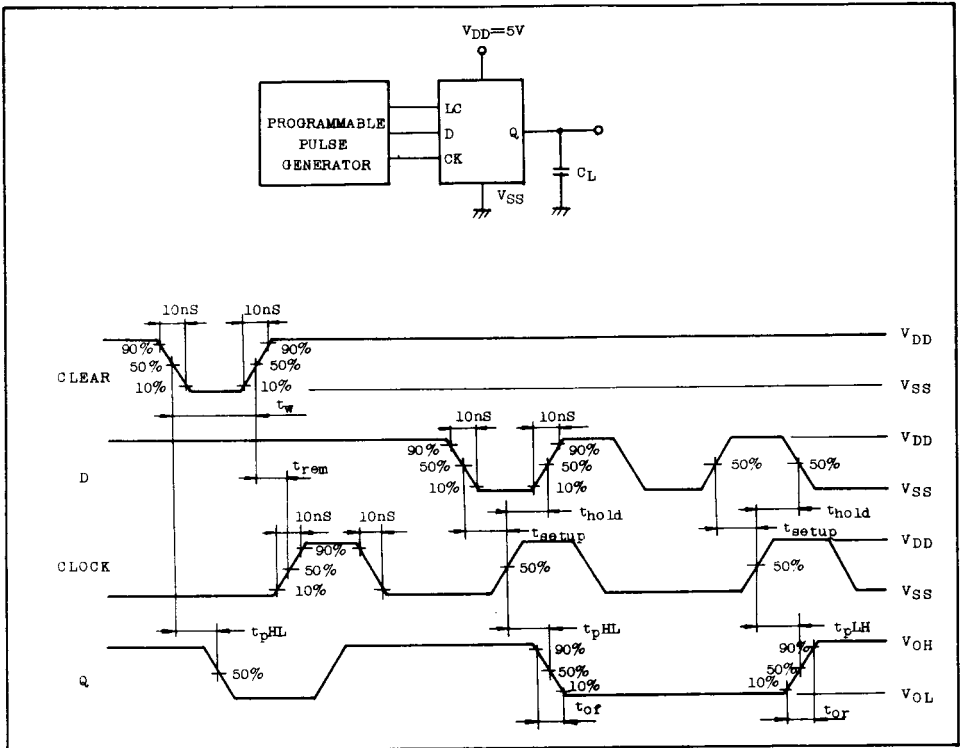
\* All valid input combinations.

SWITCHING CHARACTERISTICS ( $T_a=25^\circ C$ ,  $V_{SS}=0V$ ,  $V_{DD}=5V$ ,  $C_L=15pF$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Rise Time	$t_{or}$		-	20	35	ns
Output Fall Time	$t_{of}$		-	15	30	
Propagation Delay Time	Low-High	$t_{pLH}$		45	68	ns
	High-Low	$t_{pHL}$		40	60	
	High-Low	$t_{pHL}$	CLOCK-Q		48	
Maximum Clock Frequency	$f_{max\phi}$		10	20	-	MHz
Minimum Clear Pulse Width	$t_w$	CLEAR	-	25	44	ns
Maximum Clock Rise/Fall Time	$t_{r\phi}, t_{f\phi}$		1	-	-	$\mu s$
Minimum Data Set up Time	$t_{set-up}$		-	-	25	ns
Minimum Data Hold Time	$t_{hold}$		-	-	15	ns
Minimum Clear Remove Time	$t_{rem}$		-	13	25	ns
Input Capacitance	$C_{IN}$		-	5	-	pF

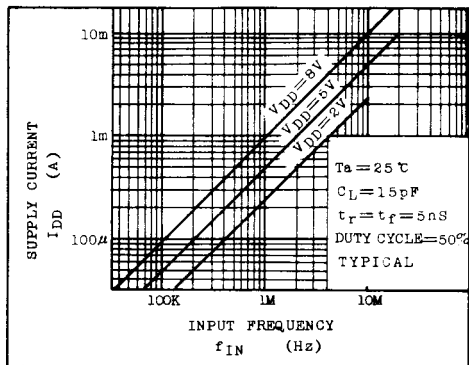
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## SWITCHING TIME TEST WAVEFORM

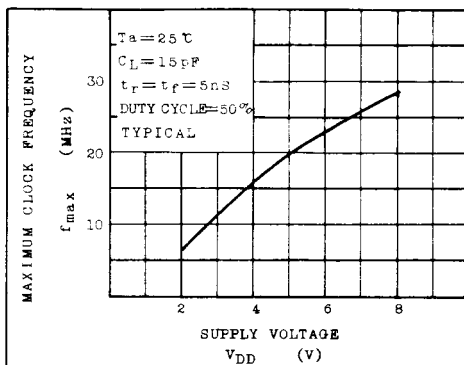


# TC40H273P/F

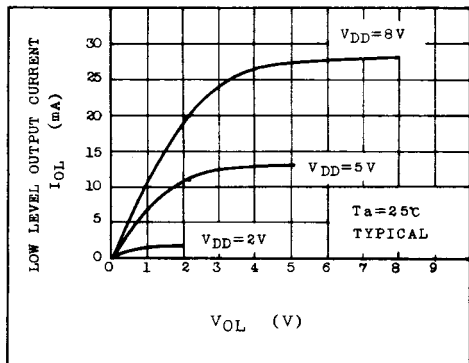
$I_{DD} - f_{IN}$



$f_{max} - V_{DD}$



$I_{OL} - V_{OL}$



$I_{OH} - (V_{DD} - V_{OH})$

