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Absolute Maximum Ratings (Note 1)

Supply Voltage	7V
Input Voltage	7V
Storage Temperature Range	-65°C to 150°C

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device can not be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Flat Package

1Q 2Q ENABLE 1-2 GND NC 3Q 4Q

14 13 12 11 10 9 8

1 2 3 4 5 6 7

1D 2D ENABLE VCC 3D 4D NC

3-4

54LS77 (W) 74LS77 (W)

(Each Latch)

Inputs		Outputs
D	G	Q
L	H	L
H	H	H
X	L	Q ₀

H = High Level, L = Low Level, X = Don't Care
 Q_0 = The Level of Q Before the High-to-Low Transition of G

The diagram shows a logic circuit for a D-type flip-flop. It consists of two NAND gates, one NOR gate, and an inverter. The 'DATA' input is connected to the top input of the first NAND gate and the top input of the second NAND gate. The 'ENABLE' input is connected to the bottom input of both NAND gates. The output of the first NAND gate is connected to the top input of the NOR gate. The output of the second NAND gate is connected to the bottom input of the NOR gate and also to an inverter. The output of the inverter is connected to the output of the first NAND gate, forming a cross-coupled feedback loop. The output of the NOR gate is labeled 'Q' and is also connected to the output of the inverter, forming a second cross-coupled feedback loop. The output of the inverter is also labeled 'TO OTHER LATCH'.

TL/F/6376-2

Recommended Operating Conditions

Sym	Parameter	DM54LS77			DM74LS77			Units
		Min	Nom	Max	Min	Nom	Max	
V _{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH}	High Level Input Voltage	2			2			V
V _{IL}	Low Level Input Voltage			0.7			0.8	V
I _{OH}	High Level Output Current			-0.4			-0.4	mA
I _{OL}	Low Level Output Current			4			8	mA
t _w	Enable Pulse Width	20			20			ns
t _{su}	Setup Time	20			20			ns
t _H	Hold Time	0			0			ns
T _A	Free Air Operating Temperature	-55		125	0		70	°C

Electrical Characteristics over recommended operating free air temperature (unless otherwise noted)

Sym	Parameter	Conditions	Min	Typ (Note 1)	Max	Units
V _I	Input Clamp Voltage	V _{CC} = Min, I _I = -18 mA			-1.5	V
V _{OH}	High Level Output Voltage	V _{CC} = Min I _{OH} = Max V _{IL} = Max V _{IH} = Min	DM54	2.5	3.4	V
			DM74	2.7	3.4	
V _{OL}	Low Level Output Voltage	V _{CC} = Min I _{OL} = Max V _{IL} = Max V _{IH} = Min	DM54		0.25	V
			DM74		0.35	
		I _{OL} = 4 mA V _{CC} = Min	DM74		0.25	
I _I	Input Current @ Max Input Voltage	V _{CC} = Max V _I = 7V	D Input		0.1	mA
			G Input		0.4	
I _{IH}	High Level Input Current	V _{CC} = Max V _I = 2.7V	D Input		20	μA
			G Input		80	
I _{IL}	Low Level Input Current	V _{CC} = Max V _I = 0.4V	D Input		-0.4	mA
			G Input		-1.6	
I _{OS}	Short Circuit Output Current	V _{CC} = Max (Note 2)	DM54	-20	-100	mA
			DM74	-20	-100	
I _{CC}	Supply Current	V _{CC} = Max (Note 3)		6.9	13	mA

Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Note 3: I_{CC} is measured with all outputs open and all inputs grounded.

Switching Characteristics at $V_{CC} = 5V$ and $T_A = 25^\circ C$ (See Section 1 for Test Waveforms and Output Load)

Parameter	From (Input) To (Output)	R _L = 2 kΩ						Units
		C _L = 15 pF			C _L = 50 pF			
		Min	Typ	Max	Min	Typ	Max	
t _{PLH} Propagation Delay Time Low to High Level Output	D to Q		15	27		19	30	ns
t _{PHL} Propagation Delay Time High to Low Level Output	D to Q		9	17		14	25	ns
t _{PLH} Propagation Delay Time Low to High Level Output	G to Q		15	27		19	30	ns
t _{PHL} Propagation Delay Time High to Low Level Output	G to Q		17	25		20	30	ns