National Semiconductor

54LS379/DM74LS379
Quad Parallel Register with Enable

General Description

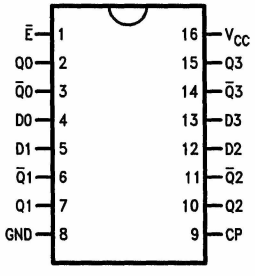
The LS379 is a 4-bit register with buffered common Enable. This device is similar to the LS175 but features the common Enable rather than common Master Reset.

Features

- Edge-triggered D-type inputs
- Buffered positive edge-triggered clock
- Buffered common enable input
- True and complement outputs

Connection Diagram

Dual-In-Line Package



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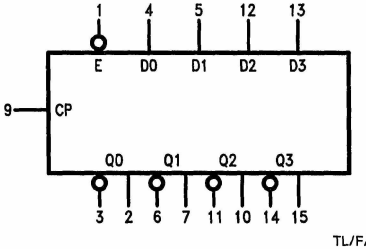
Order Number 54LS379DMQB, 54LS379FMQB, 54LS379LMQB, DM74LS379M or DM74LS379N
See NS Package Number E20A, J16A, M16A, N16E or W16A

Logic Symbol



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V_{CC} = Pin 16
GND = Pin 8

Pin Names	Description
$\overline{E}$	Enable Input (Active LOW)
D0–D3	Data Inputs
CP	Clock Pulse Input (Active Rising Edge)
Q0–Q3	Flip-Flop Outputs
$\overline{Q}0$–$\overline{Q}3$	Complement Outputs

Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	
54LS	−55°C to +125°C
DM74LS	0°C to +70°C
Storage Temperature Range	−65°C to +150°C

Note: *The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot 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.*

Recommended Operating Conditions

Symbol	Parameter	54LS379			DM74LS379			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_A	Free Air Operating Temperature	−55		125	0		70	°C
$t_s(H)$ $t_s(L)$	Setup Time HIGH or LOW Dn to CP	20			20			ns
$t_h(H)$ $t_h(L)$	Hold Time HIGH or LOW Dn to CP	5			5			ns
$t_s(H)$ $t_s(L)$	Setup Time HIGH or LOW $\overline{E}$ to CP	25			25			ns
$t_h(H)$ $t_h(L)$	Hold Time HIGH or LOW $\overline{E}$ to CP	5			5			ns
$t_w(L)$	CP Pulse Width LOW	17			17			ns

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

Symbol	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	54LS	2.5			V
			DM74	2.7			
V_{OL}	Low Level Output Voltage	V_{CC} Min, I_{OL} = Max, V_{IH} = Min	54LS			0.4	V
			DM74			0.5	
		I_{OL} = 4 mA, V_{CC} = Min	DM74			0.4	
I_I	Input Current @ Max Input Voltage	V_{CC} = Max, V_I = 10V				0.1	mA
I_{IH}	High Level Input Current	V_{CC} = Max, V_I = 2.7V				20	μA
I_{IL}	Low Level Input Current	V_{CC} = Max, V_I = 0.4V				−0.4	mA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 2)	54LS	−20		−100	mA
			DM74	−20		−100	
I_{CC}	Supply Current	V_{CC} = Max				18	mA

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

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

Switching Characteristics

V_{CC} = +5.0V, T_A = +25°C (See Section 1 for test waveforms and output load)

Symbol	Parameter	R_L = 2 kΩ, C_L = 15 pF		Units
		Min	Max	
f_{max}	Maximum Clock Frequency	30		MHz
t_{PLH} t_{PHL}	Propagation Delay CP to Qn		27 27	ns

Functional Description

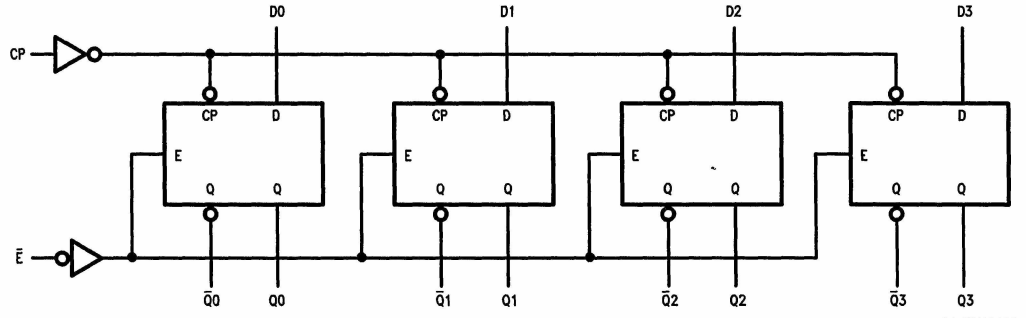
The LS379 consists of four edge-triggered D-type flip-flops with individual D inputs and Q and $\overline{Q}$ outputs. The Clock (CP) and Enable ($\overline{E}$) inputs are common to all flip-flops. When the $\overline{E}$ input is HIGH, the register will retain the present data independent of the CP input. The Dn and $\overline{E}$ inputs can change when the clock is in either state, provided that the recommended setup and hold times are observed.

Truth Table

Inputs			Outputs	
$\overline{E}$	CP	Dn	Qn	$\overline{Q}$n
H	↑	X	No Change	No Change
L	↑	H	H	L
L	↑	L	L	H

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial

Logic Diagram



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