National Semiconductor

DM54LS380/74LS380 Multifunction Octal Register

General Description

The 'LS380 is an 8-bit synchronous register with parallel load, load complement, preset, clear, and hold capacity. Four control inputs ($\overline{LD}$, POL, $\overline{CLR}$, $\overline{PR}$) provide one of four operations which occur synchronously on the rising edge of the clock (CK). The LS380 combines the features of the LS374, LS377, LS273 and LS534 into a single 300 mil wide package.

The LOAD operation loads the inputs (D_7–D_0) into the output register (Q_7–Q_0), when POL is HIGH, or loads the compliment of the inputs when POL is LOW. The CLEAR operation resets the output register to all LOWs. The PRESET operation presets the output register to all HIGHs. The HOLD operation holds the previous value regardless of clock transitions. CLEAR overrides PRESET, PRESET overrides LOAD, and LOAD overrides HOLD.

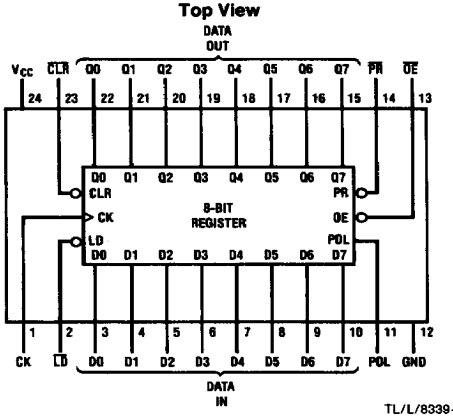
The output register (Q_7–Q_0) is enabled when $\overline{OE}$ is LOW, and disabled (HI–Z) when $\overline{OE}$ is HIGH. The output drivers will sink the 24 mA required for many bus interface standards.

Features/Benefits

- Octal Register for general purposes interfacing applications
- 8 bits match byte boundaries
- Bus-structured pinout
- 24-pin SKINNYDIP saves space
- TRI-STATE® outputs
- Low current PNP inputs reduce loading

Connection Diagram

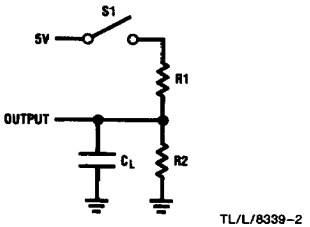
Top View



TL/L/8339–1

Order Number DM54LS380J, DM74LS380J or DM74LS380N
See NS Package Number J24F or N24C

Standard Test Load



TL/L/8339–2

Function Table

$\overline{OC}$	CLK	$\overline{CLR}$	$\overline{PR}$	$\overline{LD}$	POL	D7–D0	Q7–Q0	Operation
H	X	X	X	X	X	X	Z	HI–Z
L	↑	L	X	X	X	X	L	CLEAR
L	↑	H	L	X	X	X	H	PRESET
L	↑	H	H	H	X	X	Q	HOLD
L	↑	H	H	L	H	D	D	LOAD true
L	↑	H	H	L	L	D	$\overline{D}$	LOAD comp

Absolute Maximum Ratings

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

Supply Voltage V_{CC}	7V
Input Voltage	5.5V
Off-State Output Voltage	5.5V
Storage Temperature	−65° to +150°C

Operating Conditions

Symbol	Parameter		Military			Commercial			Units
			Min	Typ	Max	Min	Typ	Max	
V_{CC}	Supply Voltage		4.5	5	5.5	4.75	5	5.25	V
T_A	Operating Free-Air Temperature		−55		125*	0		75	°C
t_w	Width of Clock	High	40			40			ns
		Low	35			35			
t_{SU}	Set-Up Time		60			50			ns
t_h	Hold Time		0	−15		0	−15		

*Case temperature

Electrical Characteristics Over Operating Conditions

Symbol	Parameter	Test Conditions			Min	Typ†	Max	Units
V_{IL}	Low-Level Input Voltage						0.8	V
V_{IH}	High-Level Input Voltage				2			V
V_{IC}	Input Clamp Voltage	V_{CC} = MIN	I_I = −18 mA				−1.5	V
I_{IL}	Low-Level Input Current	V_{CC} = MAX	V_I = 0.4V				−0.25	mA
I_{IH}	High-Level Input Current	V_{CC} = MAX	V_I = 2.4V				25	μA
I_I	Maximum Input Current	V_{CC} = MAX	V_I = 5.5V				1	mA
V_{OL}	Low-Level Output Voltage	V_{CC} = MIN, V_{IL} = 0.8V, V_{IH} = 2V	MIL	I_{OL} = 12 mA			0.5	V
			COM	I_{OL} = 24 mA				
V_{OH}	High-Level Output Voltage	V_{CC} = MIN, V_{IL} = 0.8V, V_{IH} = 2V	MIL	I_{OH} = −2 mA	2.4			V
			COM	I_{OH} = −3.2 mA				
I_{OZL}	Off-State Output Current	V_{CC} = MAX, V_{IL} = 0.8V, V_{IH} = 2V		V_O = 0.4V			−100	μA
I_{OZH}				V_O = 2.4V			100	μA
I_{OS}	Output Short-Circuit Current*	V_{CC} = 5.0V		V_O = 0V	−30		−130	mA
I_{CC}	Supply Current	V_{CC} = MAX				120	180	mA

* No more than one output should be shorted at a time and duration of the short-circuit should not exceed one second

† All typical values are at V_{CC} = 5V, T_A = 25°C

Switching Characteristics Over Operating Conditions

Symbol	Parameter	Test Conditions (See Test Load)	Military			Commercial			Units
			Min	Typ	Max	Min	Typ	Max	
f_{MAX}	Maximum Clock Frequency	C_L = 50 pF, R_1 = 200Ω, R_2 = 390Ω	10.5			12.5			MHz
t_{PD}	Clock to Q			20	35		20	30	ns
t_{PZX}	Output Enable Delay			35	55		35	45	ns
t_{PXZ}	Output Disable Delay			35	55		35	45	ns

Logic Diagram