HD74HC589 ● 8-bit Serial or Parallel-input/Serial-output Shift Register (with 3-state outputs)

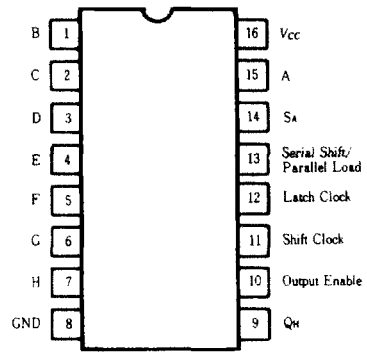
The HD74HC589 is similar in function to the HD74HC597, which is not a 3-state device.

This device consists of an 8-bit storage latch which feeds parallel data to an 8-bit shift register. Data can also be loaded serially (see Function Table). The shift register output, O_H, is a three-state output, allowing this device to be used in bus-oriented systems.

■ FEATURES

- High Speed Operation: t_{pd} (Shift Clock to Q_H)=15ns typ. (C_L=50pF)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage: V_{cc}=2~6V
- Low Input Current: 1μA max.
- Low Quiescent Supply Current: I_{cc} (static)=4μA max. (Ta=25°C)

■ PIN ARRANGEMENT

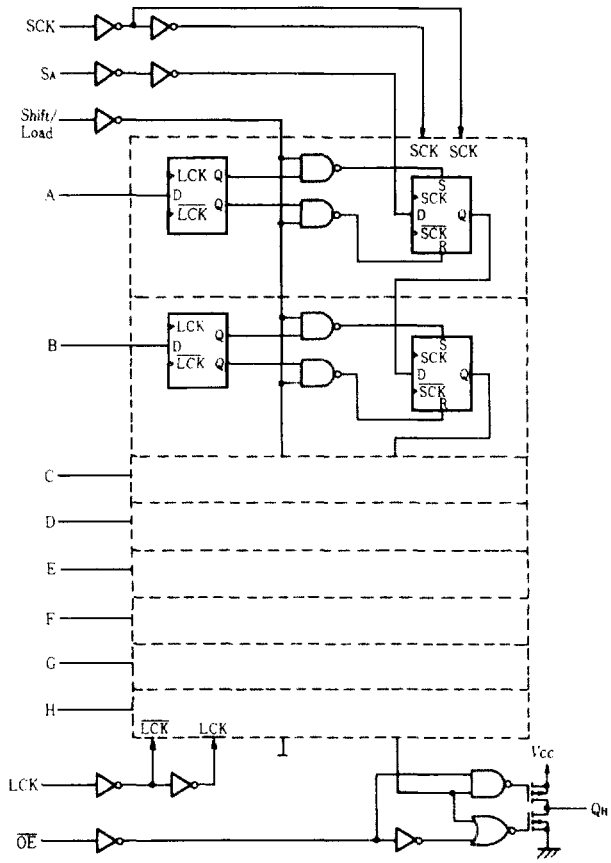


(Top View)

■ FUNCTION TABLE

Latch Clock LCK	Shift Clock SCK	Serial Shift/ Parallel Load	Output Enable $\overline{OE}$	Function
⌐‾	×	×	×	Data are loaded into input latches
⌐‾	×	L	L	Data are loaded from input into shift registers
×	×	L	L	Data are transfered from input latches to shift registers
L,H, ↘	L,H, ↘	×	H	Outputs are disabled
×	⌐‾	H	L	Serial Shift $Q_n = Q_{n-1}$. Q_0 = SER

■ LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Supply Voltage Range	V_{CC}	−0.5～+7.0	V
Input Voltage	V_{IN}	−0.5～V_{CC}+0.5	V
Output Voltage	V_{OUT}	−0.5～V_{CC}+0.5	V
Output Current	I_{OUT}	±35	mA
DC Current Drain per V_{CC}, GND	I_{CC}, I_{GND}	±75	mA
DC Input Diode Current	I_{IK}	±20	mA
DC Output Diode Current	I_{OK}	±20	mA
Power Dissipation per Package	P_T	500	mW
Storage Temperature	T_{stg}	−65～+150	°C

■ DC CHARACTERISTICS

Item	Symbol	V_{CC}(V)	Test Conditions		Ta=25°C min	Ta=25°C typ	Ta=25°C max	Ta=−40～+85°C min	Ta=−40～+85°C max	Unit
Input Voltage	V_{IH}	2.0			1.5	—	—	1.5	—	V
		4.5			3.15	—	—	3.15	—	
		6.0			4.2	—	—	4.2	—	
	V_{IL}	2.0			—	—	0.5	—	0.5	V
		4.5			—	—	1.35	—	1.35	
		6.0			—	—	1.8	—	1.8	
Output Voltage	V_{OH}	2.0	V_{in}=V_{IH} or V_{IL}	I_{OH}=−20μA	1.9	2.0	—	1.9	—	V
		4.5			4.4	4.5	—	4.4	—	
		6.0			5.9	6.0	—	5.9	—	
		4.5		I_{OH}=−6mA	4.18	—	—	4.13	—	
		6.0		I_{OH}=−7.8mA	5.68	—	—	5.63	—	
	V_{OL}	2.0	V_{in}=V_{IH} or V_{IL}	I_{OL}=20μA	—	0.0	0.1	—	0.1	V
		4.5			—	0.0	0.1	—	0.1	
		6.0			—	0.0	0.1	—	0.1	
		4.5		I_{OL}=6mA	—	—	0.26	—	0.33	
		6.0		I_{OL}=7.8mA	—	—	0.26	—	0.33	
Off-state output current	I_{OZ}	6.0	V_{in}=V_{IH} or V_{IL}, V_{out}=V_{CC} or GND		—	—	±0.5	—	±5.0	μA
Input Current	I_{in}	6.0	V_{in}=V_{CC} or GND		—	—	±0.1	—	±1.0	μA
Quiescent Supply Current	I_{CC}	6.0	V_{in}=V_{CC} or GND, I_{out}=0μA		—	—	4.0	—	40	μA

■ AC CHARACTERISTICS (C_L=50pF, Input t_r=t_f=6ns)

Item	Symbol	V_{CC}(V)	Test Conditions	Ta=25°C min.	Ta=25°C typ.	Ta=25°C max.	Ta=−40~+85°C min.	Ta=−40~+85°C max.	Unit
Maximum Clock Frequency	f_{max}	2.0		—	—	5	—	4	MHz
		4.5		—	—	27	—	21	
		6.0		—	—	32	—	25	
Propagation Delay Time	t_{PLH} t_{PHL}	2.0	Latch Clock to Q_H	—	—	200	—	250	ns
		4.5		—	20	40	—	50	
		6.0		—	—	34	—	43	
	t_{PLH} t_{PHL}	2.0	Shift Clock to Q_H	—	—	175	—	220	ns
		4.5		—	15	35	—	44	
		6.0		—	—	30	—	37	
	t_{PLH} t_{PHL}	2.0	Serial Shift/Parallel Load to Q_H	—	—	175	—	220	ns
		4.5		—	16	35	—	44	
		6.0		—	—	30	—	37	
Output Enable Time	t_{ZL} t_{ZH}	2.0		—	—	150	—	190	ns
		4.5		—	9	30	—	38	
		6.0		—	—	26	—	33	
Output Disable Time	t_{LZ} t_{HZ}	2.0		—	—	150	—	190	ns
		4.5		—	14	30	—	38	
		6.0		—	—	26	—	33	
Pulse Width	t_w	2.0		80	—	—	100	—	ns
		4.5		16	8	—	20	—	
		6.0		14	—	—	17	—	
Setup Time	t_{rs}	2.0	Data to Latch Clock	100	—	—	125	—	ns
		4.5		20	1	—	25	—	
		6.0		17	—	—	21	—	
	t_{ss}	2.0	S_A to Shift Clock	100	—	—	125	—	ns
		4.5		20	—	—	25	—	
		6.0		17	—	—	21	—	
	t_{sw}	2.0	Serial Shift/Parallel Load to Shift Clock	100	—	—	125	—	ns
		4.5		20	—	—	25	—	
		6.0		17	—	—	21	—	
Hold Time	t_h	2.0	Latch Clock to Data	5	—	—	5	—	ns
		4.5		5	0	—	5	—	
		6.0		5	—	—	5	—	
	t_h	2.0	Shift Clock to S_A	5	—	—	5	—	ns
		4.5		5	—	—	5	—	
		6.0		5	—	—	5	—	
	t_h	2.0	Shift Clock to Serial Shift/Parallel Load	5	—	—	5	—	ns
		4.5		5	—	—	5	—	
		6.0		5	—	—	5	—	
Output Rise/Fall Time	t_{TLH} t_{THL}	2.0		—	—	75	—	95	ns
		4.5		—	5	15	—	19	
		6.0		—	—	13	—	16	
Input Capacitance	C_{in}	—		—	5	10	—	10	pF