

SN54LS396, SN74LS396 OCTAL STORAGE REGISTERS

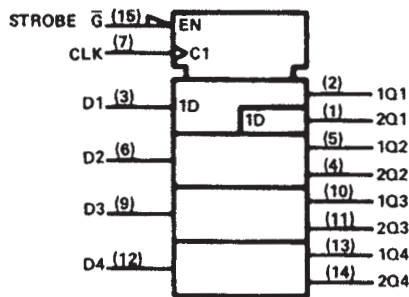
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- Parallel Access
- Typical Propagation Delay Time . . . 20 ns
- Typical Power Dissipation . . . 120 mW
- Applications:
 N-Bit Storage Files
 Hex/BCD Serial-To-Parallel Converters

description

These octal registers are organized as two 4-bit bytes of storage. Upon application of a positive-going clock signal, the information stored in byte 1 is transferred into byte 2 as a new 4-bit byte is loaded into the byte 1 location via the four data lines. The full 8-bit word is available at the outputs after two clock cycles. Both the clock and the strobe lines are fully buffered.

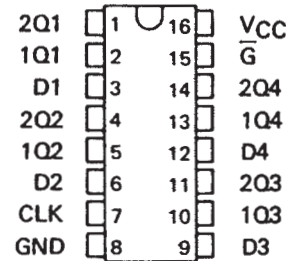
logic symbol†



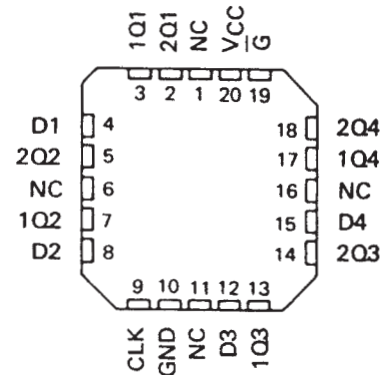
†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.

Pin numbers shown are for D, J, N, and W packages.

SN54LS396 . . . J OR W PACKAGE
SN74LS396 . . . D OR N PACKAGE
(TOP VIEW)



SN54LS396 . . . FK PACKAGE
(TOP VIEW)



NC - No internal connection

FUNCTION TABLE

INPUTS						OUTPUTS							
STROBE $\overline{G}$	CLOCK	DATA				BYTE 1				BYTE 2			
		D1	D2	D3	D4	1Q1	1Q2	1Q3	1Q4	2Q1	2Q2	2Q3	2Q4
H	X	X	X	X	X	L	L	L	L	L	L	L	L
L	↑	a	b	c	d	a	b	c	d	1Q1 _n	1Q2 _n	1Q3 _n	1Q4 _n

H = high level (steady state), L = low level (steady state), X = irrelevant (any input, including transitions)

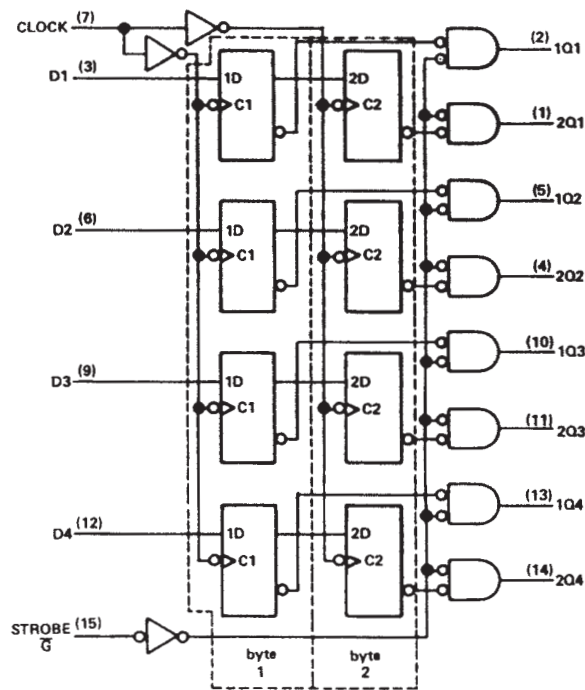
↑ = transition from low to high level

1Q1_n, 1Q2_n, 1Q3_n, 1Q4_n = the level of 1Q1, 1Q2, 1Q3, and 1Q4, respectively, before the most recent ↑ transition of the clock.

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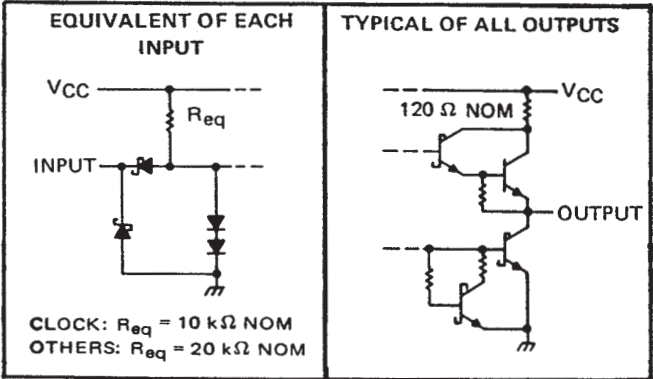
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logic diagram (positive logic)



Pin numbers shown are for D, J, N, and W packages.

schematics of inputs and outputs



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage	7 V
Operating free-air temperature range: SN54LS396	−55°C to 125°C
SN74LS396	0°C to 70°C
Storage temperature range	−65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

recommended operating conditions

	SN54LS396			SN74LS396			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}			−400			−400	μA
Low-level output current, I_{OL}			4			8	mA
Clock frequency, f_{clock}	0		30	0		30	MHz
Width of clock pulse, t_w	20			20			ns
Setup time, t_{su}	20			20			ns
Hold time, t_h	5			5			ns
Operating free-air temperature, T_A	−55		125	0		70	°C

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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER			TEST CONDITIONS†		SN54LS396			SN74LS396			UNIT
					MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V _{IH}	High-level input voltage				2			2			V
V _{IL}	Low-level input voltage				0.7			0.8			V
V _{IK}	Input clamp voltage		V _{CC} = MIN, I _I = −18 mA		−1.5			−1.5			V
V _{OH}	High-level output voltage		V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = MAX, I _{OH} = −400 μA		2.5 3.4			2.7 3.4			V
V _{OL}	Low-level output voltage		V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = MAX	I _{OL} = 4 mA	0.25 0.4			0.25 0.4			V
				I _{OL} = 8 mA				0.35 0.5			
I _I	Input current at maximum input voltage	Clock input	V _{CC} = MAX, V _I = 7 V		0.2			0.2			mA
		Other inputs			0.1			0.1			
I _{IH}	High-level input current	Clock input	V _{CC} = MAX, V _I = 2.7 V		40			40			μA
		Other inputs			20			20			
I _{IL}	Low-level input current	Clock input	V _{CC} = MAX, V _I = 0.4 V		−0.8			−0.8			mA
		Other inputs			−0.4			−0.4			
I _{OS}	Short-circuit output current§		V _{CC} = MAX		−20 −100			−20 −100			mA
I _{CC}	Supply current		V _{CC} = MAX, See Note 2		24 40			24 40			mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

§ Not more than one output should be shorted at a time and duration of the short-circuit should not exceed one second.

NOTE 2: I_{CC} is measured with 4.5 V applied to all inputs and all outputs open.

switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output from clock	$C_L = 15 \text{ pF},$ $R_L = 2 \text{ k}\Omega,$ See Note 3		20	30	ns
t_{PHL}	Propagation delay time, high-to-low-level output from clock			20	30	
t_{PLH}	Propagation delay time, low-to-high-level output from strobe			20	30	ns
t_{PHL}	Propagation delay time, high-to-low-level output from strobe			20	30	

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

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