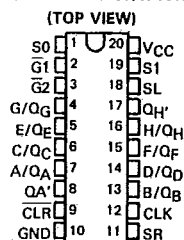


SN54LS323, SN74LS323 8-BIT UNIVERSAL SHIFT/STORAGE REGISTERS

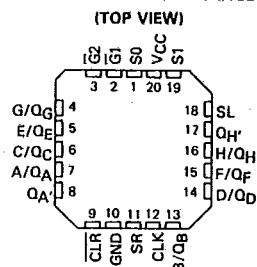
OCTOBER 1976 - REVISED MARCH 1988

- Multiplexed Inputs/Outputs Provide Improved Bit Density
- Four Modes of Operation:
Hold (Store) Shift Left
Shift Right Load Data
- Operates with Outputs Enabled or at High Z
- 3-State Outputs Drive Bus Lines Directly
- Can Be Cascaded for N-Bit Word Lengths
- Typical Power Dissipation . . . 175 mW
- Exceptionally Stable Shift (Clock) Frequency . . . 25 MHz
- Applications:
Stacked or Push-Down Registers,
Buffer Storage, and
Accumulator Registers
- SN54LS299 and SN74LS299 Are Similar But Have Direct Overriding Clear

SN54LS323 . . . J OR W PACKAGE
SN74LS323 . . . DW OR N PACKAGE



SN54LS323 . . . FK PACKAGE



2

TTL Devices

description

These Low-Power Schottky eight-bit universal registers feature multiplexed inputs/outputs to achieve full eight-bit data handling in a single 20-pin package. Two function-select inputs and two output-control inputs can be used to choose the modes of operation listed in the function table. Synchronous parallel loading is accomplished by taking both function-select lines, S0 and S1, high. This places the three-state outputs in a high-impedance state, which permits data that is applied on the input/output lines to be clocked into the register. Reading out of the register can be accomplished while the outputs are enabled in any mode. The clear function is synchronous, and a low level at the clear input clears the register on the next low-to-high transition of the clock.

FUNCTION TABLE

MODE	INPUTS						INPUTS/OUTPUTS								OUTPUTS			
	CLR	FUNCTION SELECT		OUTPUT CONTROL		CLK	SERIAL		A/Q _A	B/Q _B	C/Q _C	D/Q _D	E/Q _E	F/Q _F	G/Q _G	H/Q _H	Q _A [†]	Q _H [†]
		S1	S0	G1 [†]	G2 [†]		SL	SR										
Clear	L	X	L	L	L	L	X	X	L	L	L	L	L	L	L	L	L	L
	L	L	X	L	L	L	X	X	L	L	L	L	L	L	L	L	L	L
	L	H	H	X	X	L	X	X	X	X	X	X	X	X	X	X	L	L
Hold	H	L	L	L	L	X	X	X	Q _{A0}	Q _{B0}	Q _{C0}	Q _{D0}	Q _{E0}	Q _{F0}	Q _{G0}	Q _{H0}	Q _{A0}	Q _{H0}
	H	X	X	L	L	L	X	X	Q _{A0}	Q _{B0}	Q _{C0}	Q _{D0}	Q _{E0}	Q _{F0}	Q _{G0}	Q _{H0}	Q _{A0}	Q _{H0}
Shift Right	H	L	H	L	L	L	X	H	H	Q _{A_n}	Q _{B_n}	Q _{C_n}	Q _{D_n}	Q _{E_n}	Q _{F_n}	Q _{G_n}	H	Q _{G_n}
	H	L	H	L	L	L	X	L	L	Q _{A_n}	Q _{B_n}	Q _{C_n}	Q _{D_n}	Q _{E_n}	Q _{F_n}	Q _{G_n}	L	Q _{G_n}
Shift Left	H	H	L	L	L	L	H	X	Q _{B_n}	Q _{C_n}	Q _{D_n}	Q _{E_n}	Q _{F_n}	Q _{G_n}	Q _{H_n}	H	Q _{B_n}	H
	H	H	L	L	L	L	L	X	Q _{B_n}	Q _{C_n}	Q _{D_n}	Q _{E_n}	Q _{F_n}	Q _{G_n}	Q _{H_n}	L	Q _{B_n}	L
Load	H	H	H	X	X	L	X	X	a	b	c	d	e	f	g	h	a	h
†When one or both output controls are high the eight input/output terminals are disabled to the high-impedance state; however, sequential operation or clearing of the register is not affected.																		

†When one or both output controls are high the eight input/output terminals are disabled to the high-impedance state; however, sequential operation or clearing of the register is not affected.

a . . . h - the level of the steady-state input at inputs A through H, respectively. These data are loaded into the flip flops while the flip flop outputs are isolated from the input/output terminals.

NOTICE

SEE ORDER OF DATA FOR ERRATA INFORMATION

PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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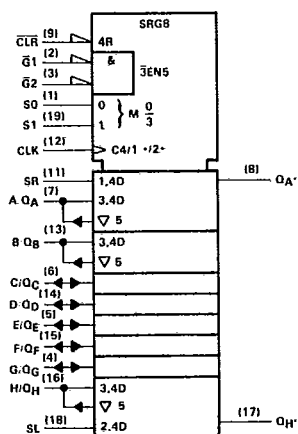
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SN54LS323, SN74LS323
8-BIT UNIVERSAL SHIFT/STORAGE REGISTERS

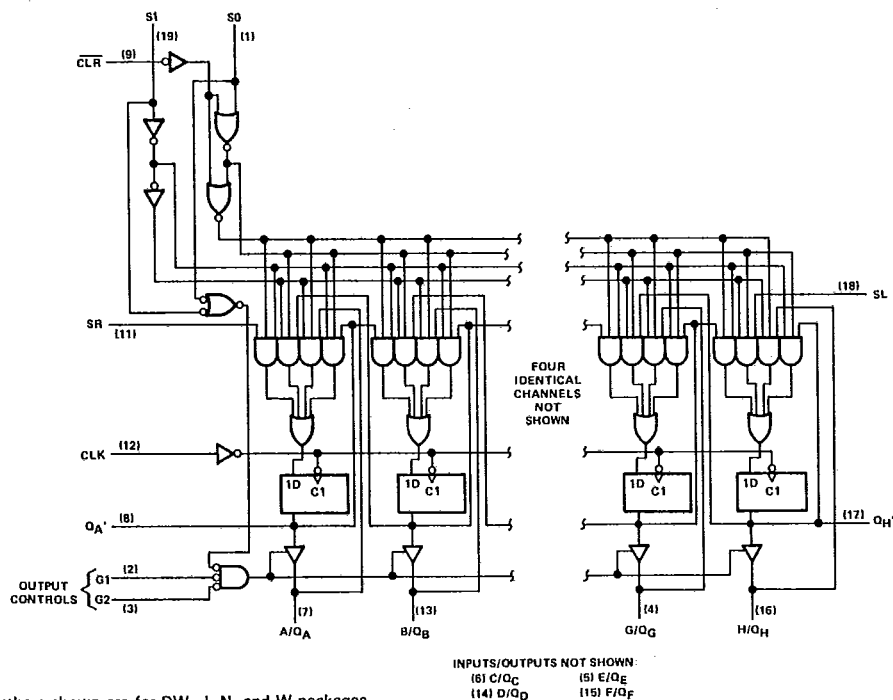
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logic symbol†



†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.
 Pin numbers shown are for DW, J, N, and W packages.

logic diagram (positive logic)



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

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SN54LS323, SN74LS323
8-BIT UNIVERSAL SHIFT/STORAGE REGISTERS

TEXAS INSTR (LOGIC)

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schematics of inputs and outputs, absolute maximum ratings, recommended operating conditions, and electrical characteristics

Same as SN54LS299 and SN74LS299, except t_{SU} (Clear Inactive) does not apply.

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

PARAMETER†	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
f_{max}			See Note 1	25	35		MHz
t_{PLH}	CLK	Q_A' or Q_H'	$C_L = 15\text{ pF}$, $R_L = 2\text{ k}\Omega$		22	33	ns
t_{PHL}					26	39	
t_{PLH}	CLK	Q_A thru Q_H	$C_L = 45\text{ pF}$, $R_L = 665\ \Omega$		17	25	ns
t_{PHL}					25	39	
t_{PZH}	\bar{G}_1, \bar{G}_2	Q_A thru Q_H	$C_L = 45\text{ pF}$, $R_L = 665\ \Omega$		14	21	ns
t_{PZL}					20	30	
t_{PHZ}	\bar{G}_1, \bar{G}_2	Q_A thru Q_H	$C_L = 5\text{ pF}$, $R_L = 665\ \Omega$		10	20	ns
t_{PLZ}					10	15	

† f_{max} = maximum clock frequency

t_{PLH} = Propagation delay time, low-to-high-level output

t_{PHL} = Propagation delay time, high-to-low-level output

t_{PZH} = Output enable time to high level

t_{PZL} = Output enable time to low level

t_{PHZ} = Output disable time from high level

t_{PLZ} = Output disable time from low level

NOTE 1: For testing f_{max} , all outputs are loaded simultaneously, each with C_L and R_L as specified for the propagation times.

Load circuits and voltage waveforms are shown in Section 1.

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TTL Devices

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