

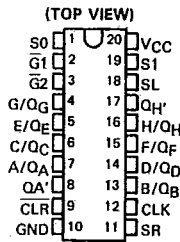
**SN54LS323, SN74LS323**  
**8-BIT UNIVERSAL SHIFT/STORAGE REGISTERS**

T-46-09-05

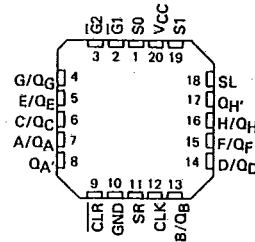
OCTOBER 1976 - REVISED MARCH 1988

- 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  
 (TOP VIEW)



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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 SL SR	A/OA	B/OB	C/QC	D/OD	E/OE	F/OF	G/OG	H/OH	QA	QH	
		S1	S0	G1†	G2†													
Clear	L	X	L	L	L	f	X	X	L	L	L	L	L	L	L	L	L	
	L	L	X	L	L	f	X	X	L	L	L	L	L	L	L	L	L	
	L	H	H	X	X	f	X	X	X	X	X	X	X	X	X	X	X	
Hold	H	L	L	L	L	X	X	X	QA0	QB0	QC0	QD0	QE0	QF0	QG0	QH0	QA0	QH0
	H	X	X	L	L	L	X	X	QA0	QB0	QC0	QD0	QE0	QF0	QG0	QH0	QA0	QH0
Shift Right	H	L	H	L	L	f	X	H	HA	HB	HC	HD	HE	HF	HG	HH	HA	HH
	H	L	H	L	L	f	X	L	HA	HB	HC	HD	HE	HF	HG	HH	HA	HH
Shift Left	H	H	L	L	L	f	H	X	HA	HB	HC	HD	HE	HF	HG	HH	HA	HH
	H	H	L	L	L	f	L	X	HA	HB	HC	HD	HE	HF	HG	HH	HA	HH
Load	H	H	H	X	X	f	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.

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.



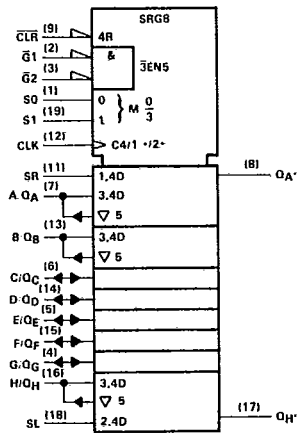
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SN54LS323, SN74LS323  
8-BIT UNIVERSAL SHIFT/STORAGE REGISTERS

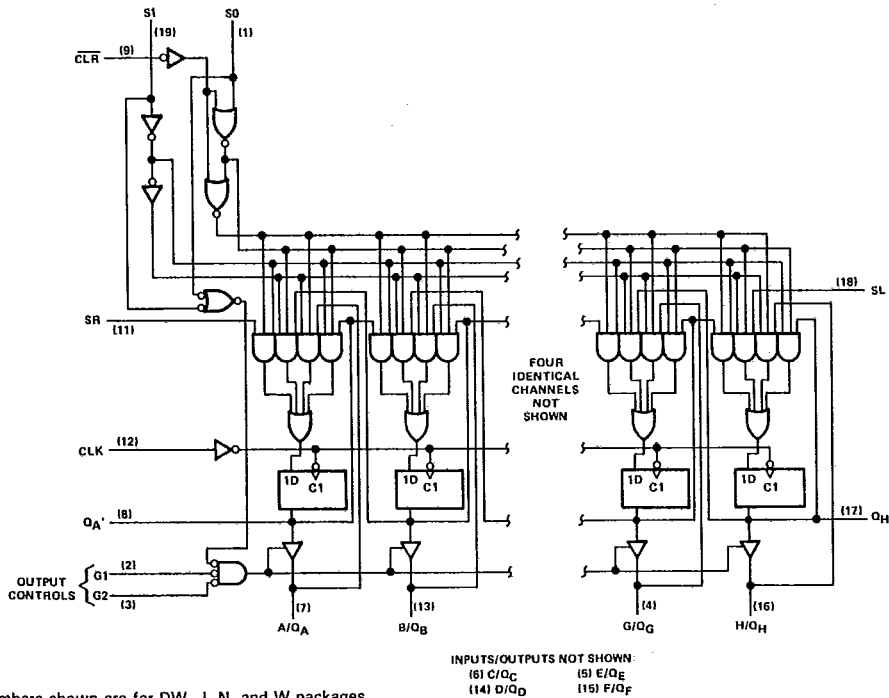
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logic symbol†



†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.

INPUTS/OUTPUTS NOT SHOWN:  
(6) C/OC (5) E/OE  
(14) D/OD (15) F/OF

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TEXAS INSTRUMENTS

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

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 $Q_H'$	$C_L = 15 pF$ , $R_L = 2 k\Omega$		22	33	ns
$t_{PHL}$					26	39	
$t_{PLH}$	CLK	$Q_A$ thru $Q_H$	$C_L = 45 pF$ , $R_L = 665 \Omega$		17	25	ns
$t_{PHL}$					25	39	
$t_{PZH}$	$\bar{G}_1, \bar{G}_2$	$Q_A$ thru $Q_H$	$C_L = 45 pF$ , $R_L = 665 \Omega$		14	21	ns
$t_{PZL}$					20	30	
$t_{PHZ}$	$\bar{G}_1, \bar{G}_2$	$Q_A$ thru $Q_H$	$C_L = 5 pF$ , $R_L = 665 \Omega$		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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