

SN54259, SN54LS259B, SN74259, SN74LS259B 8-BIT ADDRESSABLE LATCHES

SDLS086 – DECEMBER 1983 – REVISED MARCH 1988

- 8-Bit Parallel-Out Storage Register Performs Serial-to-Parallel Conversion with Storage
- Asynchronous Parallel Clear
- Active High Decoder
- Enable/Disable Input Simplified Expansion
- Expandable for N-Bit Applications
- Four District Functional Modes
- Package Options Include Ceramic Chip Carriers and Flat Packages in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

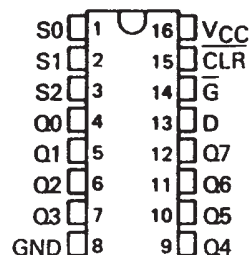
description

These 8-bit addressable latches are designed for general purpose storage applications in digital systems. Specific uses include working registers, serial-holding registers, and active-high decoders or demultiplexers. They are multifunctional devices capable of storing single-line data in eight addressable latches, and being a 1-of-8 decoder or demultiplexer with active-high outputs.

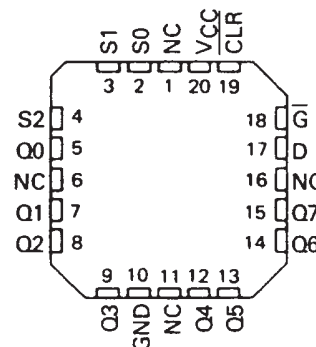
Four distinct modes of operation are selectable by controlling the clear (CLR) and enable (G) inputs as enumerated in the function table. In the addressable-latch mode, data at the data-in terminal is written into the addressed latch. The addressed latch will follow the data input with all unaddressed latches remaining in their previous states. In the memory mode, all latches remain in their previous states and are unaffected by the data or address inputs. To eliminate the possibility of entering erroneous data in the latches, enable $\bar{G}$ should be held high (inactive) while the address lines are changing. In the 1-of-8 decoding or demultiplexing mode, the addressed output will follow the level of the D input with all other outputs low. In the clear mode, all outputs are low and unaffected by the address and data inputs.

The SN54259 and SN54LS259B are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74259 and SN74LS259B are characterized for operation from 0°C to 70°C .

SN54259, SN54LS259B . . . J OR W PACKAGE
SN74259 . . . N PACKAGE
SN74LS259B . . . D OR N PACKAGE
(TOP VIEW)

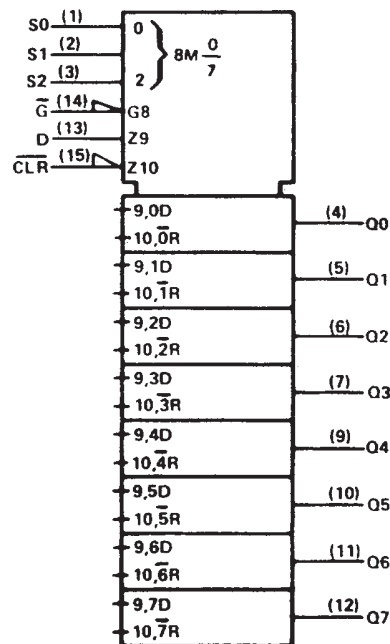


SN54LS259B . . . FK PACKAGE
(TOP VIEW)



NC - No internal connection

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.

PRODUCTION DATA information is 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.

**TEXAS
INSTRUMENTS**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 1988, Texas Instruments Incorporated

SN54259, SN54LS259B, SN74259, SN74LS259B
8-BIT ADDRESSABLE LATCHES

SDLS086 – DECEMBER 1983 – REVISED MARCH 1988

FUNCTION TABLE

INPUTS		OUTPUT OF ADDRESSED LATCH	EACH OTHER OUTPUT	FUNCTION
CLR	$\overline{G}$			
H	L	D	Q_{i0}	Addressable Latch
H	H	Q_{i0}	Q_{i0}	Memory
L	L	D	L	8-Line Demultiplexer
L	H	L	L	Clear

H $\equiv$ high level, L $\equiv$ low level

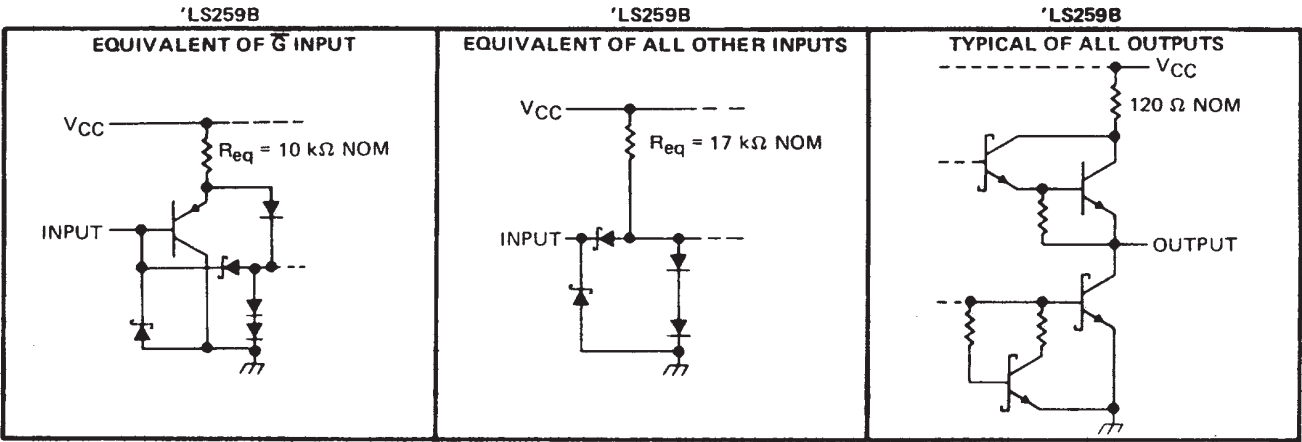
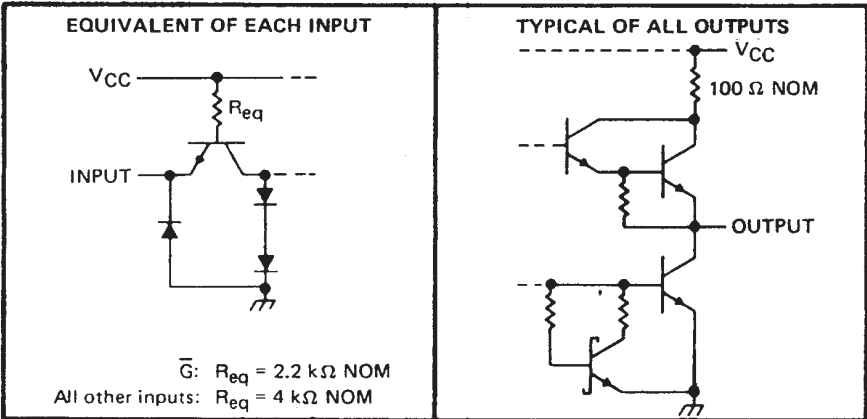
D $\equiv$ the level at the data input

Q_{i0} $\equiv$ the level of Q_i ($i = 0, 1, \dots, 7$, as appropriate) before the indicated steady-state input conditions were established.

LATCH SELECTION TABLE

SELECT INPUTS			LATCH ADDRESSED
S2	S1	S0	
L	L	L	0
L	L	H	1
L	H	L	2
L	H	H	3
H	L	L	4
H	L	H	5
H	H	L	6
H	H	H	7

schematic of inputs and outputs '259



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

Supply voltage (see Note 1)	7 V
Input voltage: SN54259, SN74259	5.5 V
SN54LS259B, SN74LS259B	7 V
Operating free-air temperature range: SN54259, SN54LS259B	-55°C to 125°C
SN74259, SN74LS259B	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

		SN54259			SN74259			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}				-800			-800	μ A
Low-level output current, I_{OL}				16			16	mA
Width of clear or enable pulse, t_w		15			15			ns
Setup time, t_{su}	Data	15 $\uparrow$			15 $\uparrow$			ns
	Address	5 $\uparrow$			5 $\uparrow$			
Hold time, t_h	Data	0 $\uparrow$			0 $\uparrow$			ns
	Address	20 $\uparrow$			20 $\uparrow$			
Operating free-air temperature, T_A		-55	125		0	70		$^{\circ}$ C

$\uparrow$ The arrow indicates that the rising edge of the enable pulse is used for reference.

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

PARAMETER		TEST CONDITIONS $\dagger$	SN54259			SN74259			UNIT
			MIN	TYP $\ddagger$	MAX	MIN	TYP $\ddagger$	MAX	
V_{IH}	High-level input voltage		2			2			V
V_{IL}	Low-level input voltage				0.8			0.8	V
V_{IK}	Input clamp voltage	$V_{CC} = \text{MIN}, I_I = 12 \text{ mA}$			-1.5			-1.5	V
V_{OH}	High-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OH} = -800 \mu\text{A}$	2.4	3.4		2.4	3.4		V
V_{OL}	Low-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OL} = 16 \text{ mA}$		0.2	0.4		0.2	0.4	V
I_I	Input current at maximum input voltage	$V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$			1			1	mA
I_{IH}	High-level input current	$\overline{G}$			80			80	μ A
		Other inputs			40			40	
I_{IL}	Low-level input current	$\overline{G}$			-3.2			-3.2	mA
		Other inputs			-1.6			-1.6	
I_{OS}	Short-circuit output current $\S$	$V_{CC} = \text{MAX}$	-18		-57	-18		-57	mA
I_{CC}	Supply current	$V_{CC} = \text{MAX},$ See Note 2		60	90		60	90	mA

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

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

$\S$ Not more than one output should be shorted at a time.

NOTE 2: I_{CC} is measured with the inputs grounded and the outputs open.

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PHL}	CLR	Any Q	C _L = 15 pF, R _L = 400 Ω, See Note 3		16	25	ns
t _{PLH}	Data	Any Q			14	24	ns
t _{PHL}					11	20	
t _{PLH}	Address	Any Q			15	28	ns
t _{PHL}					17	28	
t _{PLH}	G̅	Any Q			12	20	ns
t _{PHL}					11	20	

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

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

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

SN54LS259B, SN74LS259B 8-BIT ADDRESSABLE LATCHES

SDLS086 – DECEMBER 1983 – REVISED MARCH 1988

recommended operating conditions

		SN54LS259B			SN74LS259B			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC}	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH}	High-level input voltage	2			2			V
V _{IL}	Low-level input voltage			0.7			0.8	V
I _{OH}	High-level output current			− 0.4			− 0.4	mA
I _{OL}	Low-level output current			4			8	mA
t _w	Pulse duration	$\overline{G}$ low		17	17		ns	
		$\overline{CLR}$ low		10	10			
t _{su}	Set up time	Data before $\overline{G} \uparrow$		20	20		ns	
		Address before $\overline{G} \uparrow$		17	17			
		Address before $\overline{G} \downarrow$		0	0			
t _h	Hold time	Data after $\overline{G} \uparrow$		0	0		ns	
		Address after $\overline{G} \uparrow$		0	0			
T _A	Operating free-air temperature	− 55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS†		SN54LS259B		SN74LS259B		UNIT
			MIN	TYP	MAX	MIN	
V _{IK}	V _{CC} = MIN, I _I = − 18 mA		− 1.5		− 1.5		V
V _{OH}	V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = MAX, I _{OH} = − 0.4 mA		2.5	3.4	2.7	3.4	V
V _{OL}	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	V _{CC} = MAX, V _I = 7 V		0.1		0.1		mA
I _{IH}	V _{CC} = MAX, V _I = 2.7 V		20		20		μA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V		− 0.4		− 0.4		mA
I _{OS§}	V _{CC} = MAX		− 20	− 100	− 20	− 100	mA
I _{CC}	V _{CC} = MAX, See Note 2		27	36	22	36	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 short-circuit should not exceed one second.

NOTE 2: I_{CC} is measured with the inputs grounded and the outputs open.

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PHL}	CL _R	Any Q	C _L = 15 pF, R _L = 2 kΩ, See Note 3	12	18		ns
t _{PLH}	Data	Any Q		19	30		ns
t _{PHL}				13	20		
t _{PLH}	Address	Any Q		17	27		ns
t _{PHL}				14	20		
t _{PLH}	G	Any Q		15	24		ns
t _{PHL}				15	24		

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

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

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



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.