

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

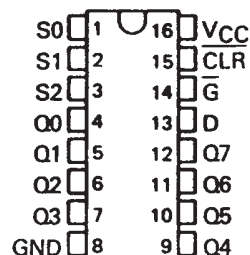
description

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.

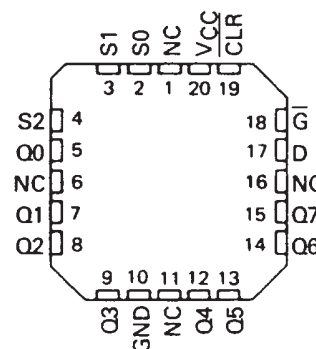
Four distinct modes of operation are selectable by controlling the clear (CLR) and enable (G) inputs as enumerated in the function table. In the addressable-latch mode, data at the data-in terminal is written into the addressed latch. The addressed latch will follow the data input with all unaddressed 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)

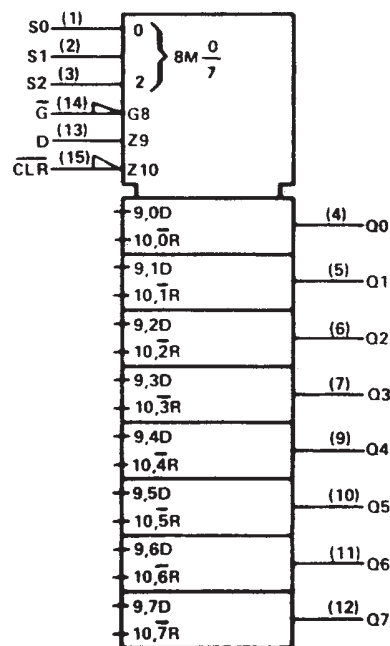


SN54LS259B . . . FK PACKAGE
(TOP VIEW)



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

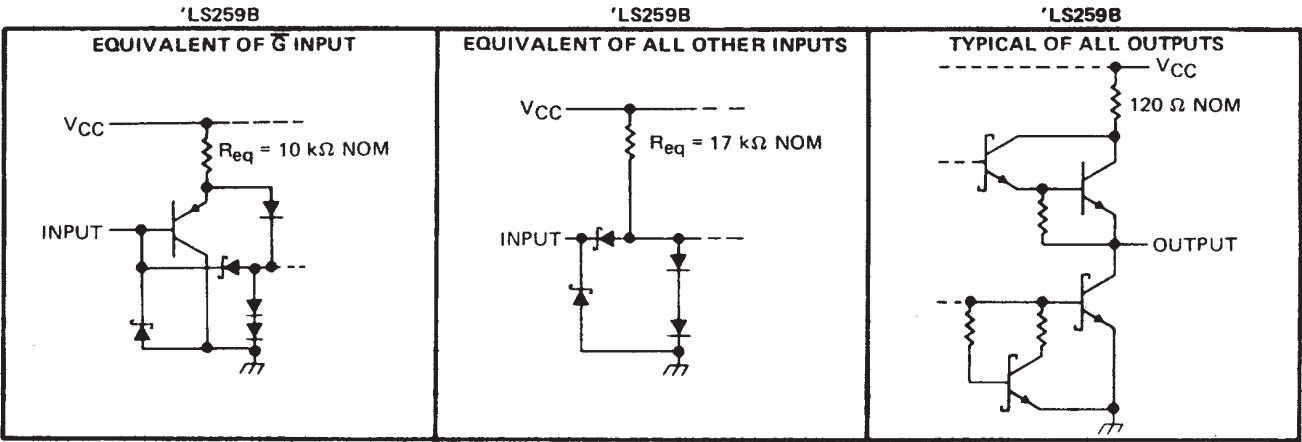
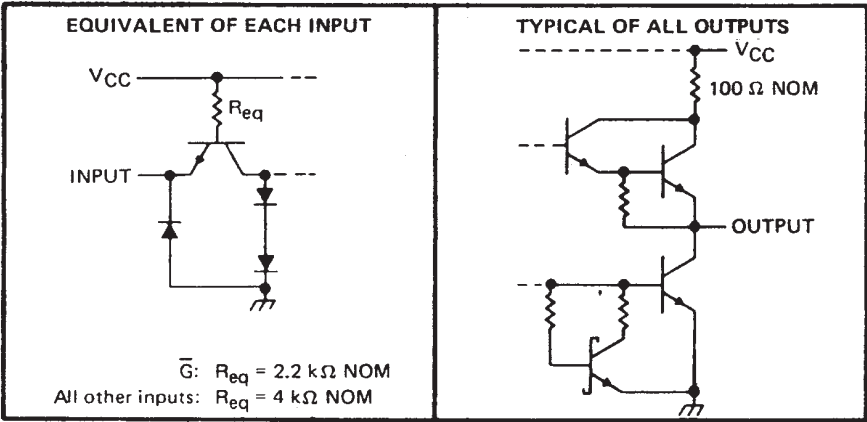
D \equiv the level at the data input

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.



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

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}	G	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}	CLR	Any Q	C _L = 15 pF, See Note 3 R _L = 2 kΩ,	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

TAPE AND REEL INFORMATION


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LS259BDR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LS259BDR	SOIC	D	16	2500	333.2	345.9	28.6

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

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

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		Applications	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DLP® Products	www.dlp.com	Communications and Telecom	www.ti.com/communications
DSP	dsp.ti.com	Computers and Peripherals	www.ti.com/computers
Clocks and Timers	www.ti.com/clocks	Consumer Electronics	www.ti.com/consumer-apps
Interface	interface.ti.com	Energy	www.ti.com/energy
Logic	logic.ti.com	Industrial	www.ti.com/industrial
Power Mgmt	power.ti.com	Medical	www.ti.com/medical
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
RFID	www.ti-rfid.com	Space, Avionics & Defense	www.ti.com/space-avionics-defense
RF/IF and ZigBee® Solutions	www.ti.com/lprf	Video and Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless-apps