National Semiconductor

May 1989

54LS279/DM54LS279/DM74LS279 Quad $\overline{S}$-$\overline{R}$ Latches

General Description

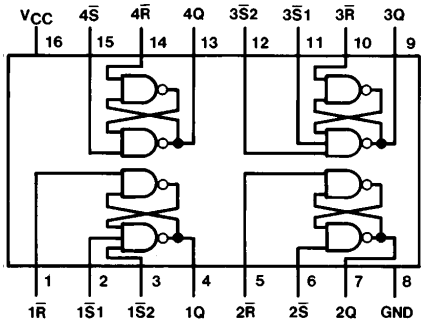
The 'LS279 consists of four individual and independent Set-Reset Latches with active low inputs. Two of the four latches have an additonal $\overline{S}$ input ANDed with the primary $\overline{S}$ input. A low on any $\overline{S}$ input while the $\overline{R}$ input is high will be stored in the latch and appear on the corresponding Q output as a high. A low on the $\overline{R}$ input while the $\overline{S}$ input is high will clear the Q output to a low. Simultaneous transistion of the $\overline{R}$ and $\overline{S}$ inputs from low to high will cause the Q output to be indeterminate. Both inputs are voltage level triggered and are not affected by transition time of the input data.

Features

- Alternate military/aerospace device (54LS279) is available. Contact a National Semiconductor Sales Office/ Distributor for specifications.

Connection Diagram

Dual-In-Line Package



TL/F/6420–1

Order Number 54LS279DMQB, 54LS279FMQB, 54LS279LMQB, DM54LS279J, DM74LS279M or DM74LS279N
See NS Package Number E20A, J16A, M16A, N16E or W16A

Function Table

Inputs		Output
$\overline{S}$(1)	$\overline{R}$	Q
L	L	H*
L	H	H
H	L	L
H	H	Q_0

H = High Level

L = Low Level

Q_0 = The Level of Q before the indicated input conditions were established.

*This output level is pseudo stable; that is, it may not persist when the $\overline{S}$ and $\overline{R}$ inputs return to their inactive (high) level.

Note 1: For latches with double $\overline{S}$ inputs:

H = both $\overline{S}$ inputs high

L = one or both $\overline{S}$ inputs low

Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	
DM54LS and 54LS	−55°C to +125°C
DM74LS	0°C to +70°C
Storage Temperature Range	−65°C to +150°C

Note: *The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.*

Recommended Operating Conditions

Symbol	Parameter	DM54LS279			DM74LS279			Units
		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_A	Free Air Operating Temperature	−55		125	0		70	°C

Electrical Characteristics over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions		Min	Typ (Note 1)	Max	Units
V_I	Input Clamp Voltage	V_{CC} = Min, I_I = −18 mA				−1.5	V
V_{OH}	High Level Output Voltage	V_{CC} = Min, I_{OH} = Max, V_{IL} = Max, V_{IH} = Min	DM54	2.5	3.5		V
			DM74	2.7	3.5		
V_{OL}	Low Level Output Voltage	V_{CC} = Min, I_{OL} = Max, V_{IL} = Max, V_{IH} = Min	DM54		0.25	0.4	V
			DM74		0.35	0.5	
		I_{OL} = 4 mA, V_{CC} = Min	DM74		0.25	0.4	
I_I	Input Current @ Max Input Voltage	V_{CC} = Max, V_I = 7V				0.1	mA
I_{IH}	High Level Input Current	V_{CC} = Max, V_I = 2.7V				20	μA
I_{IL}	Low Level Input Current	V_{CC} = Max, V_I = 0.4V				−0.4	mA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 2)	DM54	−20		−100	mA
			DM74	−20		−100	
I_{CC}	Supply Current	V_{CC} = Max (Note 3)			3.8	7	mA

Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

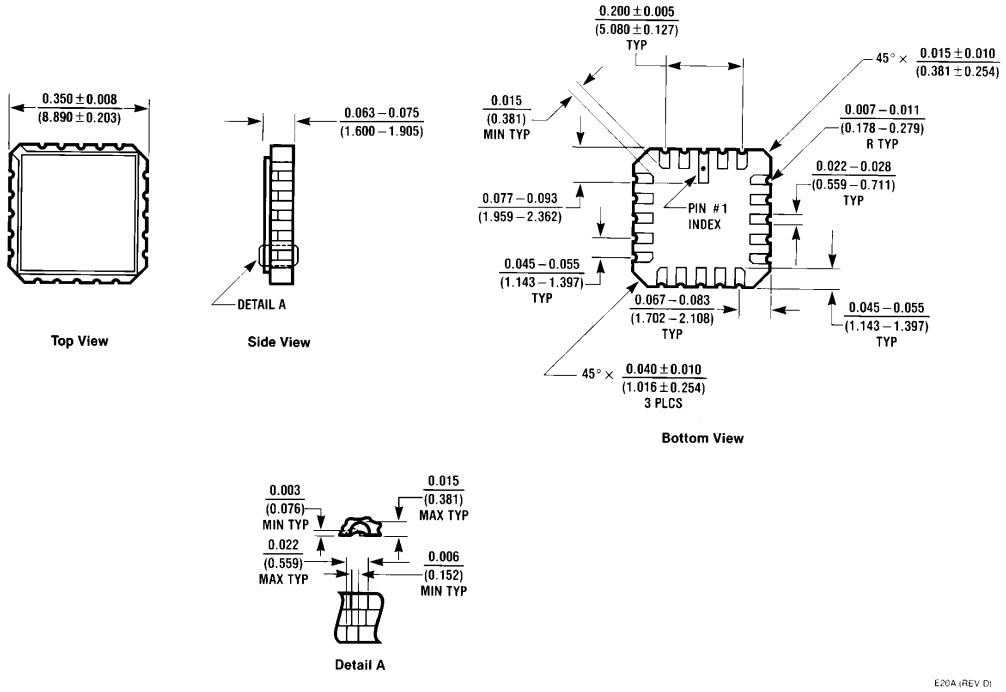
Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Note 3: I_{CC} is measured with all $\overline{R}$ inputs grounded, all $\overline{S}$ inputs at 4.5V and all outputs open.

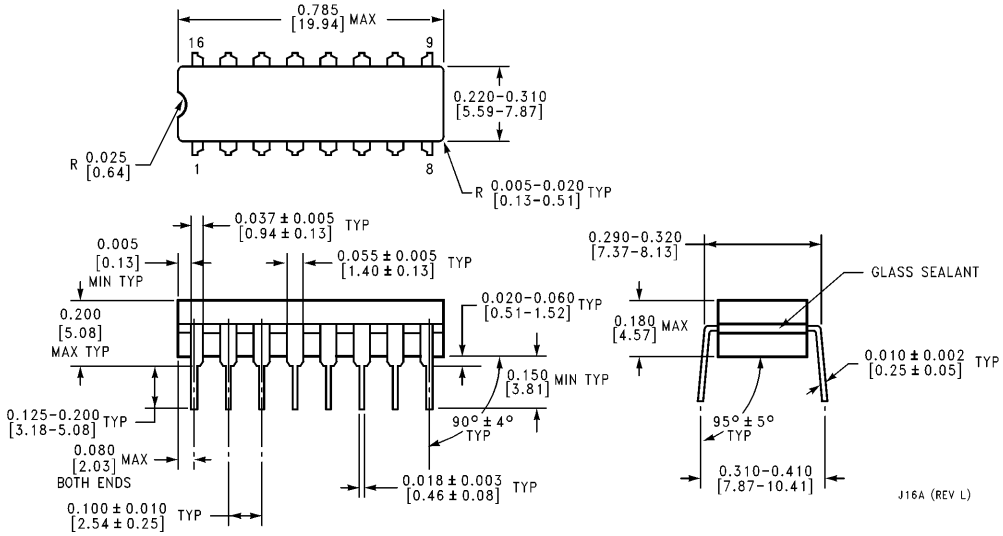
Switching Characteristics at $V_{CC} = 5V$ and $T_A = 25°C$ (See Section 1 for Test Waveforms and Output Load)

Symbol	Parameter	From (Input) To (Output)	$R_L = 2\ k\Omega$				Units
			$C_L = 15$ pF		$C_L = 50$ pF		
			Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output	$\overline{S}$ to Q		22		25	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	$\overline{S}$ to Q		15		23	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	$\overline{R}$ to Q		27		33	ns

Physical Dimensions inches (millimeters)

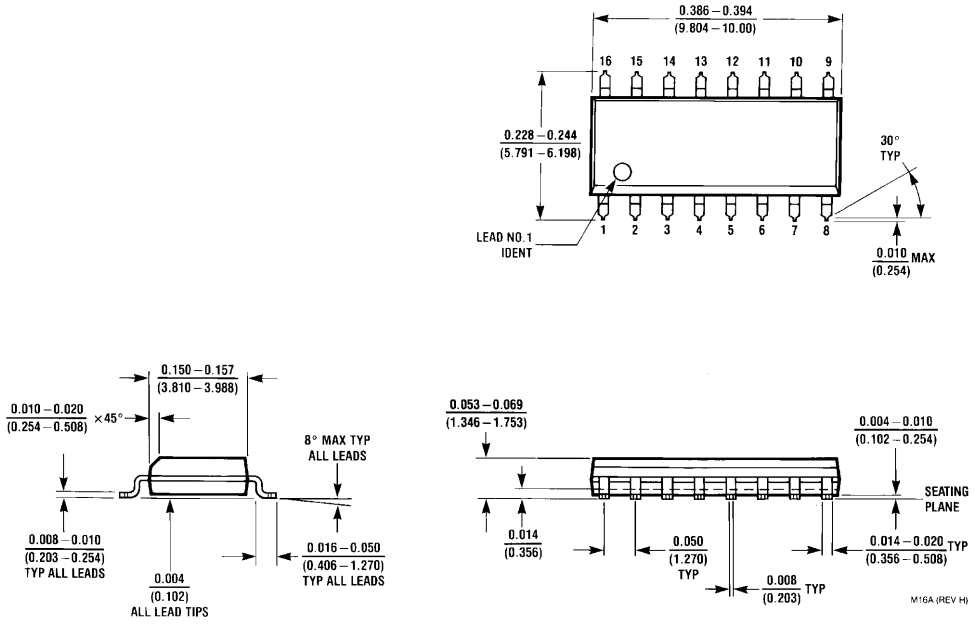


Ceramic Leadless Chip Carrier Package (E)
Order Number 54LS279LMQB
NS Package Number E20A

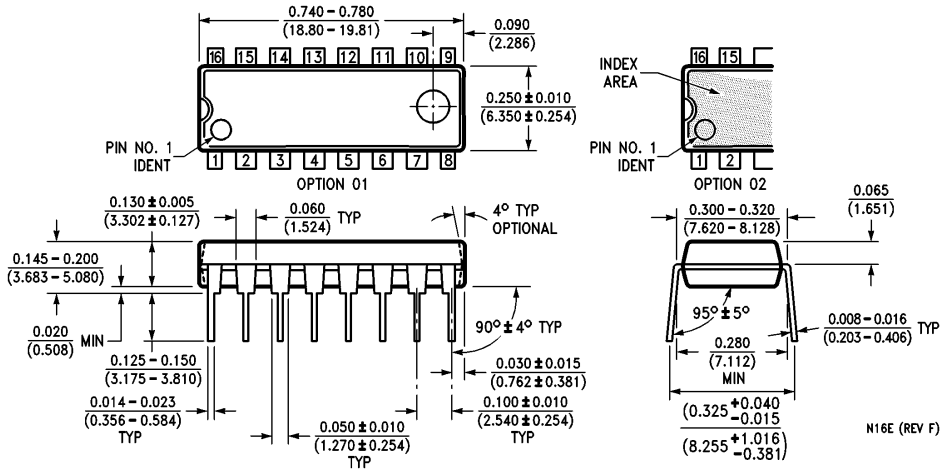


16-Lead Ceramic Dual-In-Line Package (J)
Order Number 54LS279DMQB or DM54LS279J
NS Package Number J16A

Physical Dimensions inches (millimeters) (Continued)

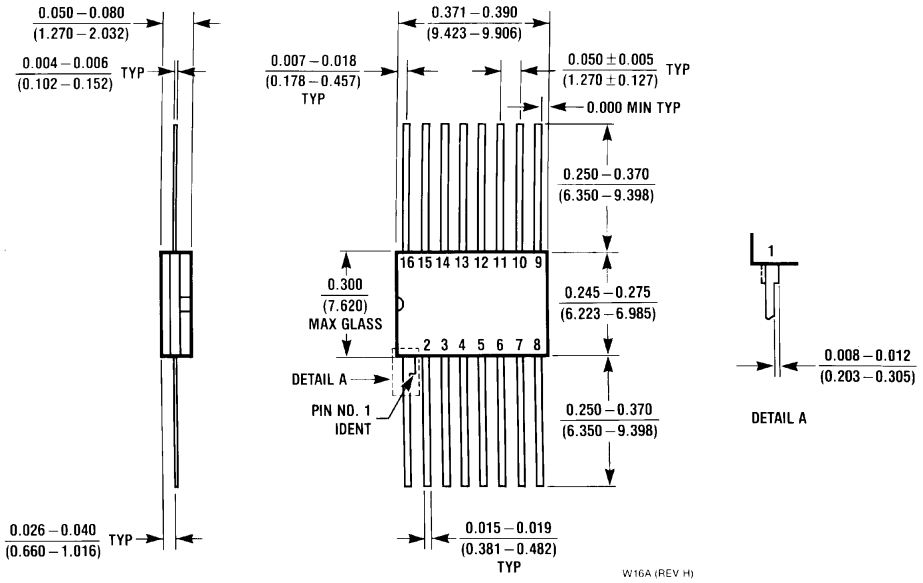


16-Lead Small Outline Molded Package (M)
Order Number DM74LS279M
NS Package Number M16A



16-Lead Molded Dual-In-Line Package (N)
Order Number DM74LS279N
NS Package Number N16E

Physical Dimensions inches (millimeters) (Continued)



16-Lead Ceramic Flat Package (W)
Order Number 54LS279FMQB or DM54LS279W
NS Package Number W16A

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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