

DM54LS273/DM74LS273 8-Bit Register with Clear

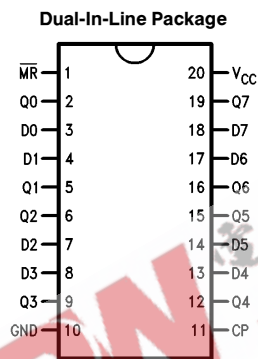
General Description

The 'LS273 is a high speed 8-bit register, consisting of eight D-type flip-flops with a common Clock and an asynchronous active LOW Master Reset. This device is supplied in a 20-pin package featuring 0.3 inch row spacing.

Features

- Edge-triggered
- 8-bit high speed register
- Parallel in and out
- Common clock and master reset

Connection Diagram



TL/F/9825-1

**Order Number DM54LS273E, DM54LS273J,
DM54LS273W, DM74LS273M or DM74LS273N
See NS Package Number E20A, J20A, M20B,
N20A or W20A**

Pin Names	Description
CP	Clock Pulse Input (Active Rising Edge)
D0-D7	Data Inputs
MR	Asynchronous Master Reset Input (Active LOW)
Q0-Q7	Flip-Flop Outputs

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	−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	DM54LS273			DM74LS273			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
t _s (H)	Setup Time HIGH or LOW	15			15			ns
t _s (L)	D _n to CP	15			15			ns
t _h (H)	Hold Time HIGH or LOW	5			5			ns
t _h (L)	D _n to CP	5			5			ns
t _w (H)	CP Pulse Width HIGH or LOW	20			20			ns
t _w (L)		20			20			ns
t _w (L)	MR Pulse Width LOW	20			20			ns
t _{rec}	Recovery Time MR to CP	15			15			ns

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	DM54 2.5 DM74 2.7		3.4	V
V _{OL}	Low Level Output Voltage	V _{CC} = Min, I _{OL} = Max, V _{IH} = Min	DM54 DM74		0.4 0.35	V
		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 V _I = 10V (DM54)			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 DM74 −20		−100 −100	mA
I _{CC}	Supply Current	V _{CC} = Max			27	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.

Switching Characteristics $V_{CC} = +5.0V$, $T_A = +25^\circ C$

Symbol	Parameter	C _L = 15 pF				Units
		DM54LS		DM74LS		
				R _L = 2 kΩ		
		Min	Max	Min	Max	
f _{max}	Maximum Clock Frequency	30		30		MHz
t _{PLH} t _{PHL}	Propagation Delay CP to Q _n		24 24		24 24	ns
t _{PLH}	Propagation Delay MR to Q _n		27		27	ns

Functional Description

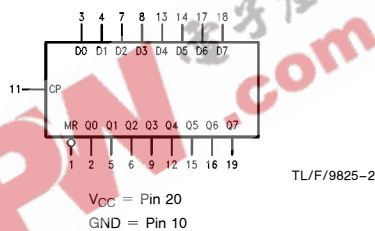
The 'LS273 is an 8-bit parallel register with a common Clock and common Master Reset. When the $\overline{MR}$ input is LOW, the Q outputs are LOW, independent of the other inputs. Information meeting the setup and hold time requirements of the D inputs is transferred to the Q outputs on the LOW-to-HIGH transition of the clock input.

Truth Table

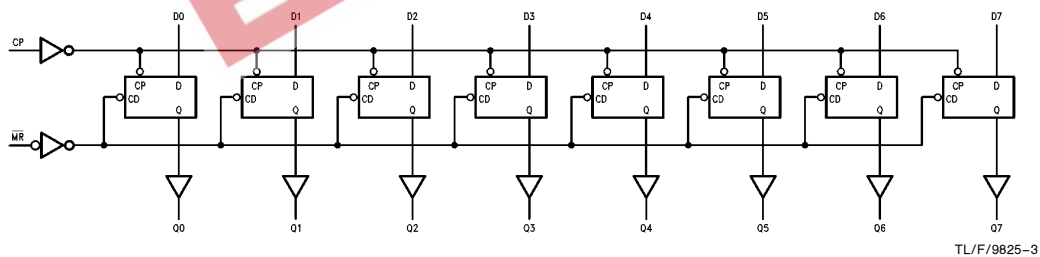
Inputs			Outputs
MR	CP	D_n	Q_n
L	X	X	L
H		H	H
H		L	L

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial

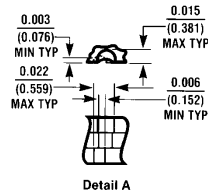
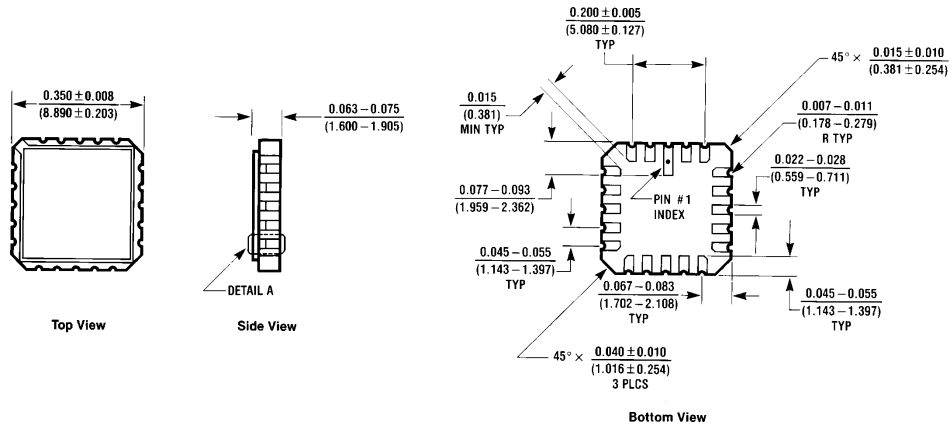
Logic Symbol



Logic Diagram

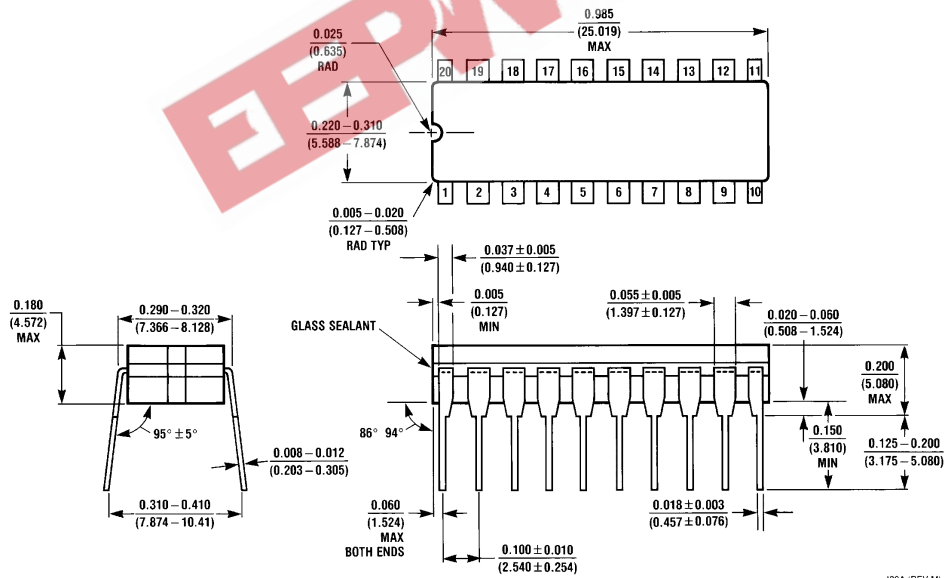


Physical Dimensions inches (millimeters)



Ceramic Leadless Chip Carrier Package (E)
Order Number DM54LS273E
NS Package Number E20A

E20A (REV D)



J20A (REV M)

20-Lead Ceramic Dual-In-Line Package (J)
Order Number DM54LS273J
NS Package Number J20A

The image contains three mechanical drawings of a 20-pin DIP package:

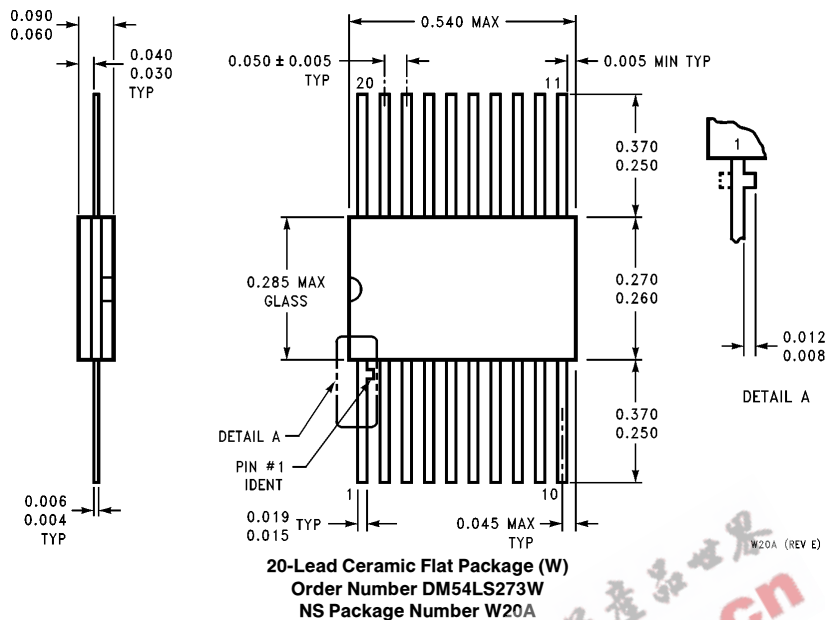
- Top View:** Shows the package with 20 pins numbered 1 to 20. Dimensions include:
 - Pin pitch: $0.093 - 0.104$ (2.362 - 2.642)
 - Overall width: $0.496 - 0.512$ (12.598 - 13.005)
 - Lead height: $0.010 - 0.012$ (0.254 - 0.305)
 - Lead angle: 30° TYP
 - Lead thickness: 0.010 MAX (0.254)
- Side View:** Shows the package profile with dimensions:
 - Package height: $0.093 - 0.104$ (2.362 - 2.642)
 - Lead height: $0.010 - 0.012$ (0.254 - 0.305)
 - Lead angle: 30° TYP
- End View:** Shows the package from the side with dimensions:
 - Package width: $0.291 - 0.299$ (7.391 - 7.595)
 - Lead height: $0.010 - 0.029$ (0.254 - 0.737) $\times 45^\circ$
 - Lead thickness: $0.009 - 0.013$ (0.229 - 0.330) TYP ALL LEADS
 - Lead tip thickness: 0.004 (0.102) ALL LEAD TIPS
 - Lead angle: 8° MAX TYP ALL LEADS
 - Lead length: $0.016 - 0.050$ (0.406 - 1.270) TYP ALL LEADS

Technical drawing of a 20-pin connector. The drawing includes three views: a top view, a side view, and a detail view of the pin. Dimensions are provided in inches and millimeters.

Top View Dimensions:

- Overall length: $1.013 - 1.040$ (25.73 - 26.42)
- Pin pitch: 0.092×0.030 (2.337 $\times$ 0.762) MAX DP
- Pin 1 location: 0.260 ± 0.005 (6.604 $\pm$ 0.127)
- Pin 10 location: 0.260 ± 0.005 (6.604 $\pm$ 0.127)
- Pin 10 pitch: 0.090 (2.286)
- Pin 10 pitch (NOM): 0.060 (1.524) TYP
- Pin 10 pitch (TYP): 0.040 (1.016) TYP
- Pin 10 pitch (OPTION 2): 0.130 ± 0.005 (3.302 $\pm$ 0.127)
- Pin 10 pitch (OPTION 2): $0.145 - 0.200$ (3.683 - 5.080)
- Pin 10 pitch (OPTION 2): 0.020 MIN
- Pin 10 pitch (OPTION 2): $0.125 - 0.140$ (3.175 - 3.556)
- Pin 10 pitch (OPTION 2): 0.018 ± 0.003 (0.457 $\pm$ 0.076)
- Pin 10 pitch (OPTION 2): 0.100 ± 0.010 (2.540 $\pm$ 0.254)
- Pin 10 pitch (OPTION 2): 0.060 ± 0.005 (1.524 $\pm$ 0.127)
- Pin 10 pitch (OPTION 2): $0.009 - 0.015$ (0.229 - 0.381) TYP
- Pin 10 pitch (OPTION 2): 0.065 (1.651)
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5

Physical Dimensions inches (millimeters) (Continued)**LIFE SUPPORT POLICY**

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