

DM74LS75 Quad Latches

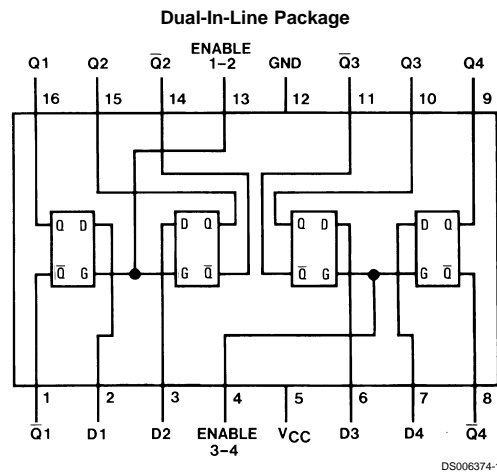
General Description

These latches are ideally suited for use as temporary storage for binary information between processing units and input/output or indicator units. Information present at a data (D) input is transferred to the Q output when the enable is high, and the Q output will follow the data input as long as

the enable remains high. When the enable goes low, the information (that was present at the data input at the time the transition occurred) is retained at the Q output until the enable is permitted to go high.

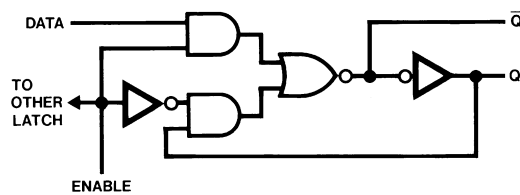
These latches feature complementary Q and \bar{Q} outputs from a 4-bit latch, and are available in 16-pin packages.

Connection Diagram



Order Number DM54LS75J, DM54LS75W,
DM74LS75M or DM74LS75N
See Package Number J16A, M16A, N16A or W16A

Logic Diagram (Each Latch)



Function Table

(Each Latch)

Inputs		Outputs	
D	Enable	Q	\bar{Q}
L	H	L	H
H	H	H	L
X	L	Q_0	\bar{Q}_0

H = High Level, L = Low Level, X = Don't Care

Q_0 = The Level of Q Before the High-to-Low Transition of ENABLE

Absolute Maximum Ratings (Note 1)

Supply Voltage

7V

Input Voltage

7V

Operating Free Air Temperature Range

DM54LS

DM74LS

Storage Temperature Range

–55°C to +125°C

0°C to +70°C

–65°C to +150°C

Recommended Operating Conditions

Symbol	Parameter	DM54LS75			DM74LS75			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_W	Enable Pulse Width (Note 5)	20			20			ns
t_{SU}	Setup Time (Note 5)	20			20			ns
t_H	Hold Time (Note 5)	0			0			ns
T_A	Free Air Operating Temperature	–55		125	0		70	°C

Note 1: 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.

Electrical Characteristics

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

Symbol	Parameter	Conditions	Min	Typ (Note 2)	Max	Units
V_I	Input Clamp Voltage	$V_{CC} = \text{Min}$, $I_I = -18 \text{ mA}$			–1.5	V
V_{OH}	High Level Output Voltage	$V_{CC} = \text{Min}$, $I_{OH} = \text{Max}$	DM54	2.5	3.5	V
		$V_{IL} = \text{Max}$, $V_{IH} = \text{Min}$	DM74	2.7	3.5	
V_{OL}	Low Level Output Voltage	$V_{CC} = \text{Min}$, $I_{OL} = \text{Max}$	DM54		0.25	V
		$V_{IL} = \text{Max}$, $V_{IH} = \text{Min}$	DM74		0.35	
		$I_{OL} = 4 \text{ mA}$, $V_{CC} = \text{Min}$	DM74		0.25	
I_I	Input Current @ Max Input Voltage	$V_{CC} = \text{Max}$, $V_I = 7 \text{ V}$	D		0.1	mA
			Enable		0.4	
I_{IH}	High Level Input Current	$V_{CC} = \text{Max}$, $V_I = 2.7 \text{ V}$	D		20	μA
			Enable		80	
I_{IL}	Low Level Input Current	$V_{CC} = \text{Max}$, $V_I = 0.4 \text{ V}$	D		–0.4	mA
			Enable		–1.6	
I_{OS}	Short Circuit Output Current	$V_{CC} = \text{Max}$	DM54	–20	–100	mA
		(Note 2)	DM74	–20	–100	
I_{CC}	Supply Current	$V_{CC} = \text{Max}$ (Note 3)		6.3	12	mA

Note 2: All typicals are at $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$.

Note 3: Not more than one output should be shorted at a time, and the duration should not exceed one second.

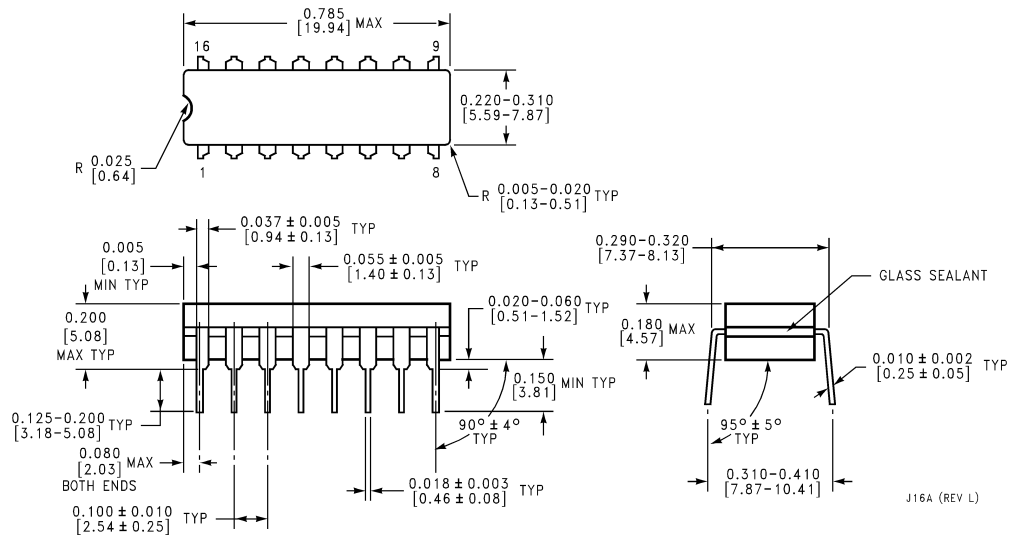
Note 4: I_{CC} is measured with all outputs open and all inputs grounded.

Note 5: $T_A = 25^\circ\text{C}$ and $V_{CC} = 5 \text{ V}$.

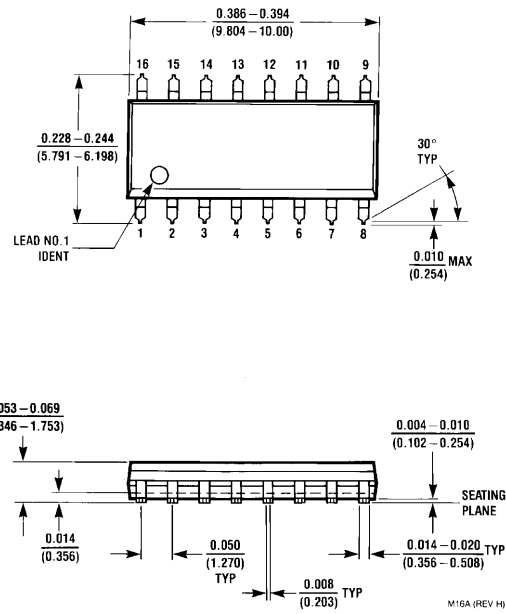
Switching Characteristics

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

Symbol	Parameter	From (Input) To (Output)	R _L = 2 kΩ				Units
			C _L = 15 pF		C _L = 50 pF		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay Time Low to High Level Output	D to Q		27		30	ns
t _{PHL}	Propagation Delay Time High to Low Level Output	D to Q		17		25	ns
t _{PLH}	Propagation Delay Time Low to High Level Output	D to \overline{Q}		20		25	ns
t _{PHL}	Propagation Delay Time High to Low Level Output	D to \overline{Q}		15		20	ns
t _{PLH}	Propagation Delay Time Low to High Level Output	Enable to Q		27		30	ns
t _{PHL}	Propagation Delay Time High to Low Level Output	Enable to Q		25		30	ns
t _{PLH}	Propagation Delay Time Low to High Level Output	Enable to \overline{Q}		30		30	ns
t _{PHL}	Propagation Delay Time High to Low Level Output	Enable to \overline{Q}		15		20	ns

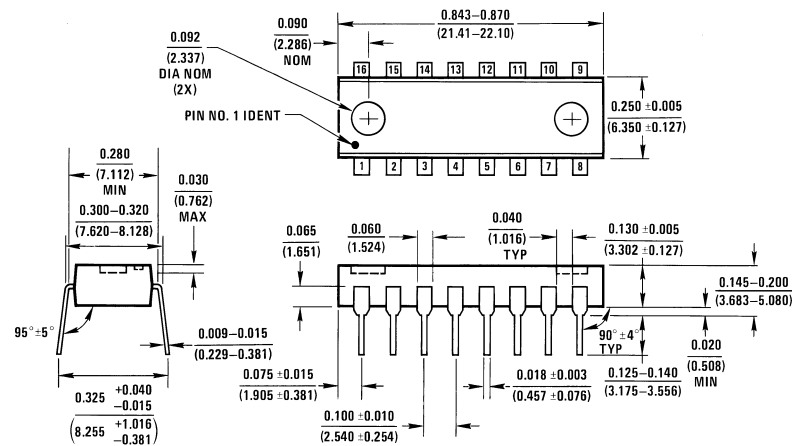
Physical Dimensions inches (millimeters) unless otherwise noted

16-Lead Ceramic Dual-In-Line Package (J)
Order Number DM54LS75J
Package Number J16A



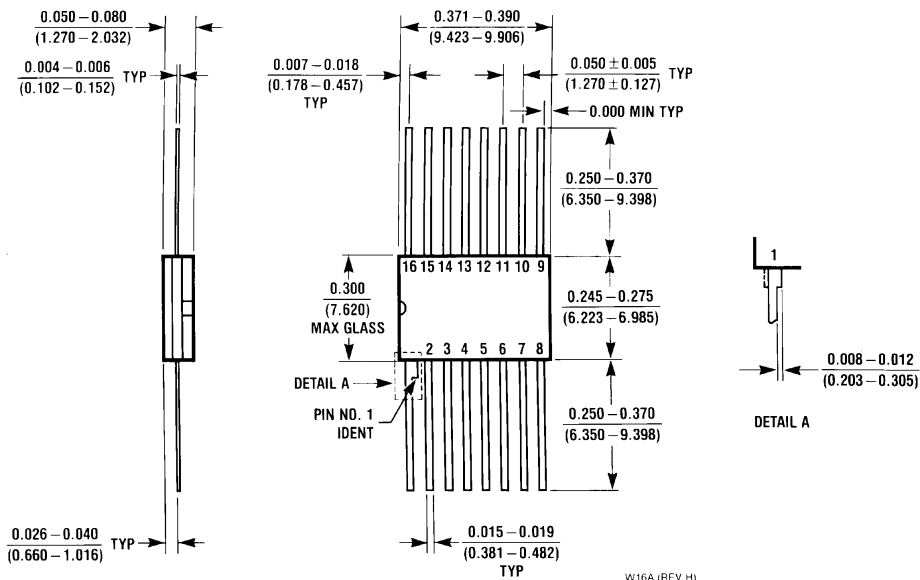
16-Lead Small Outline Molded Package (M)
Order Number DM74LS75M
Package Number M16A

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



N16A (REV E)

16-Lead Molded Dual-In-Line Package (N)
Order Number DM74LS75N
Package Number N16A



W16A (REV H)

16-Lead Ceramic Flat Package (W)
Order Number DM54LS75W
Package Number W16A

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