

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	DM54LS251			DM74LS251			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			−1			−2.6	mA
I _{OL}	Low Level Output Current			12			24	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 2.4	3.4		V
V _{OL}	Low Level Output Voltage	V _{CC} = Min, I _{OL} = Max V _{IL} = Max, V _{IH} = Min	DM54 DM74	0.25 0.35	0.4 0.5	V
		I _{OL} = 12 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 _{OZH}	Off-State Output Current with High Level Output Voltage Applied	V _{CC} = Max, V _O = 2.7V V _{IH} = Min, V _{IL} = Max			20	μA
I _{OZL}	Off-State Output Current with Low Level Output Voltage Applied	V _{CC} = Max, V _O = 0.4V V _{IH} = Min, V _{IL} = Max			−20	μA
I _{OS}	Short Circuit Output Current	V _{CC} = Max (Note 2)	DM54 DM74	−20 −20	−100 −100	mA
I _{CC1}	Supply Current	V _{CC} = Max (Note 3)		6.1	10	mA
I _{CC2}	Supply Current	V _{CC} = Max (Note 4)		7.1	12	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_{CC1} is measured with the outputs open, STROBE grounded, and all other inputs at 4.5V.

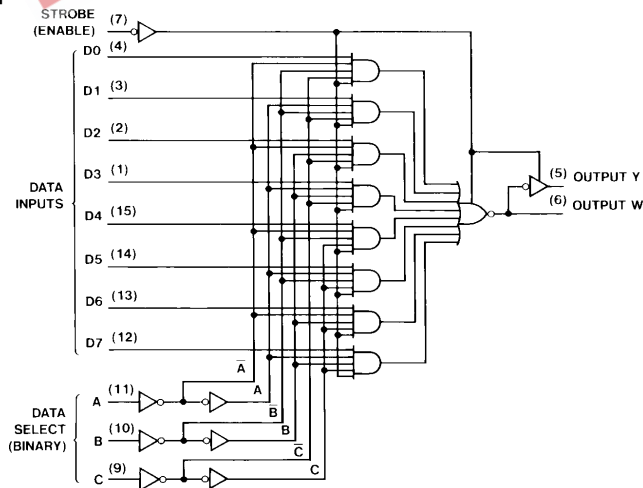
Note 4: I_{CC2} is measured with the outputs open and all inputs at 4.5V.

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

Symbol	Parameter	From (Input) to (Output)	R _L = 667Ω				Units
			C _L = 45 pF		C _L = 150 pF		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay Time Low to High Level Output	A, B, C (4 Levels) to Y		45		53	ns
t _{PHL}	Propagation Delay Time High to Low Level Output	A, B, C (4 Levels) to Y		45		53	ns
t _{PLH}	Propagation Delay Time Low to High Level Output	A, B, C (3 Levels) to W		33		38	ns
t _{PHL}	Propagation Delay Time High to Low Level Output	A, B, C (3 Levels) to W		33		42	ns
t _{PLH}	Propagation Delay Time Low to High Level Output	D to Y		28		35	ns
t _{PHL}	Propagation Delay Time High to Low Level Output	D to Y		28		38	ns
t _{PLH}	Propagation Delay Time Low to High Level Output	D to W		15		25	ns
t _{PHL}	Propagation Delay Time High to Low Level Output	D to W		15		25	ns
t _{PZH}	Output Enable Time to High Level Output	Strobe to Y		45		60	ns
t _{PZL}	Output Enable Time to Low Level Output	Strobe to Y		40		51	ns
t _{PHZ}	Output Disable Time from High Level Output (Note 1)	Strobe to Y		45			ns
t _{PLZ}	Output Disable Time from Low Level Output (Note 1)	Strobe to Y		25			ns
t _{PZH}	Output Enable Time to High Level Output	Strobe to W		27		40	ns
t _{PZL}	Output Enable Time to Low Level Output	Strobe to W		40		47	ns
t _{PHZ}	Output Disable Time from High Level Output (Note 1)	Strobe to W		55			ns
t _{PLZ}	Output Disable Time from Low Level Output (Note 1)	Strobe to W		25			ns

Note 1: $C_L = 5\text{ pF}$

Logic Diagram



TL/F/6415-2

The drawing illustrates the mechanical specifications of a 16-Lead Ceramic Dual-In-Line Package (J). It includes three views: a top view, a side view, and an end view.

Top View Dimensions:

- Overall width: $0.785 \text{ [19.94]} \text{ MAX}$
- Lead pitch: $0.037 \pm 0.005 \text{ [0.94} \pm 0.13] \text{ TYP}$
- Lead width: $0.055 \pm 0.005 \text{ [1.40} \pm 0.13] \text{ TYP}$
- Lead thickness: $0.020 \text{--} 0.060 \text{ [0.51} \text{--} 1.52] \text{ TYP}$
- Lead angle: $90^\circ \pm 4^\circ \text{ TYP}$
- Lead spacing: $0.150 \text{ [3.81]} \text{ MIN TYP}$
- Lead thickness at base: $0.018 \pm 0.003 \text{ [0.46} \pm 0.08] \text{ TYP}$
- Lead thickness at tip: $0.010 \pm 0.010 \text{ [2.54} \pm 0.25] \text{ TYP}$
- Lead thickness at base (both ends): $0.080 \text{ [2.03]} \text{ MAX}$
- Lead thickness at tip (both ends): $0.125 \text{--} 0.200 \text{ [3.18} \text{--} 5.08] \text{ TYP}$
- Lead thickness at base (both ends): $0.200 \text{ [5.08]} \text{ MAX TYP}$
- Lead thickness at tip (both ends): $0.005 \text{ [0.13]} \text{ MIN TYP}$
- Lead thickness at base (both ends): $0.025 \text{ [0.64]} \text{ R}$
- Lead thickness at tip (both ends): $0.005 \text{--} 0.020 \text{ [0.13} \text{--} 0.51] \text{ TYP R}$

Side View Dimensions:

- Overall height: $0.220 \text{--} 0.310 \text{ [5.59} \text{--} 7.87] \text{ TYP}$
- Lead height: $0.037 \pm 0.005 \text{ [0.94} \pm 0.13] \text{ TYP}$
- Lead width: $0.055 \pm 0.005 \text{ [1.40} \pm 0.13] \text{ TYP}$
- Lead thickness: $0.020 \text{--} 0.060 \text{ [0.51} \text{--} 1.52] \text{ TYP}$
- Lead angle: $90^\circ \pm 4^\circ \text{ TYP}$
- Lead spacing: $0.150 \text{ [3.81]} \text{ MIN TYP}$
- Lead thickness at base: $0.018 \pm 0.003 \text{ [0.46} \pm 0.08] \text{ TYP}$
- Lead thickness at tip: $0.010 \pm 0.010 \text{ [2.54} \pm 0.25] \text{ TYP}$
- Lead thickness at base (both ends): $0.080 \text{ [2.03]} \text{ MAX}$
- Lead thickness at tip (both ends): $0.125 \text{--} 0.200 \text{ [3.18} \text{--} 5.08] \text{ TYP}$
- Lead thickness at base (both ends): $0.200 \text{ [5.08]} \text{ MAX TYP}$
- Lead thickness at tip (both ends): $0.005 \text{ [0.13]} \text{ MIN TYP}$
- Lead thickness at base (both ends): $0.025 \text{ [0.64]} \text{ R}$
- Lead thickness at tip (both ends): $0.005 \text{--} 0.020 \text{ [0.13} \text{--} 0.51] \text{ TYP R}$

End View Dimensions:

- Overall width: $0.290 \text{--} 0.320 \text{ [7.37} \text{--} 8.13] \text{ TYP}$
- Lead width: $0.180 \text{ [4.57]} \text{ MAX}$
- Lead thickness: $0.010 \pm 0.002 \text{ [0.25} \pm 0.05] \text{ TYP}$
- Lead angle: $95^\circ \pm 5^\circ \text{ TYP}$
- Lead spacing: $0.310 \text{--} 0.410 \text{ [7.87} \text{--} 10.41] \text{ TYP}$

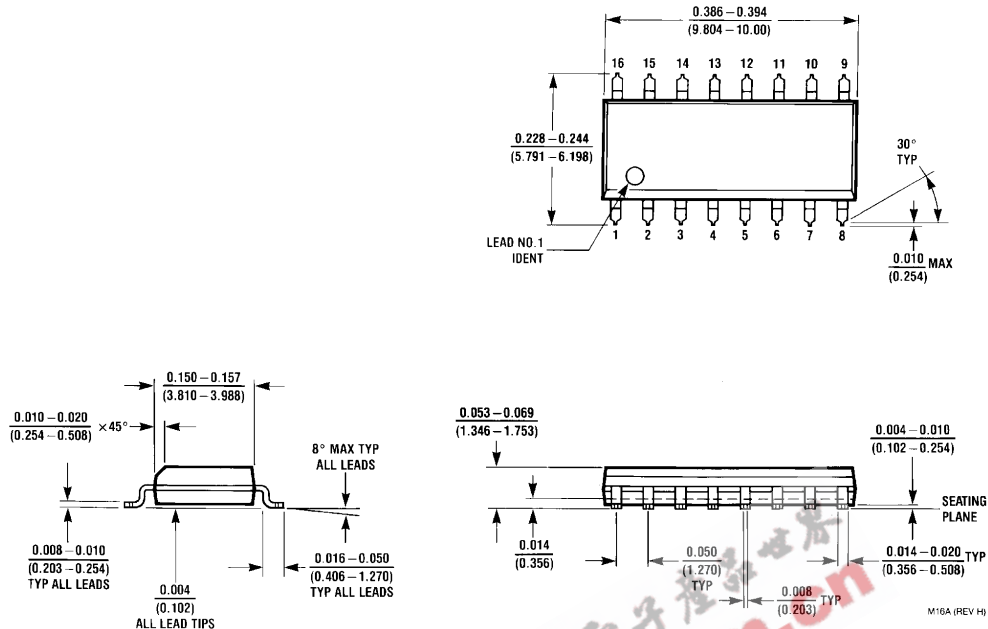
Notes:

- GLASS SEALANT
- J16A (REV L)

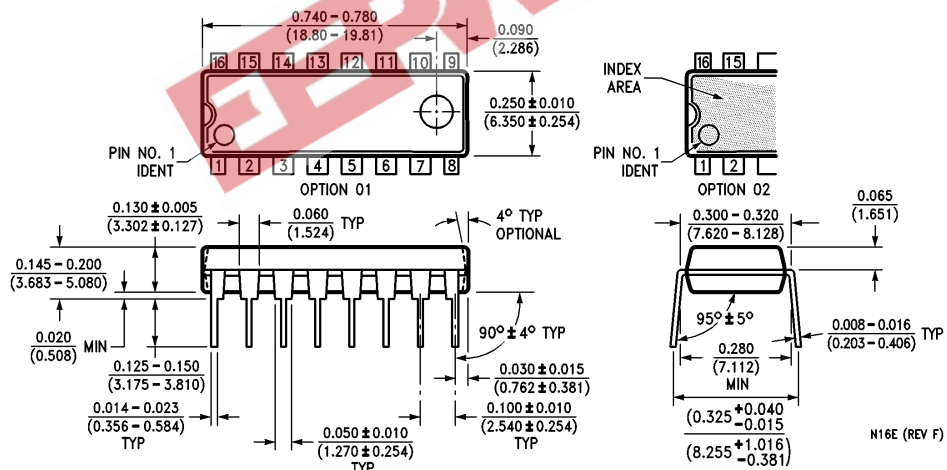
Order Information:

- 16-Lead Ceramic Dual-In-Line Package (J)
- Order Number DM54LS251J
- NS Package Number J16A

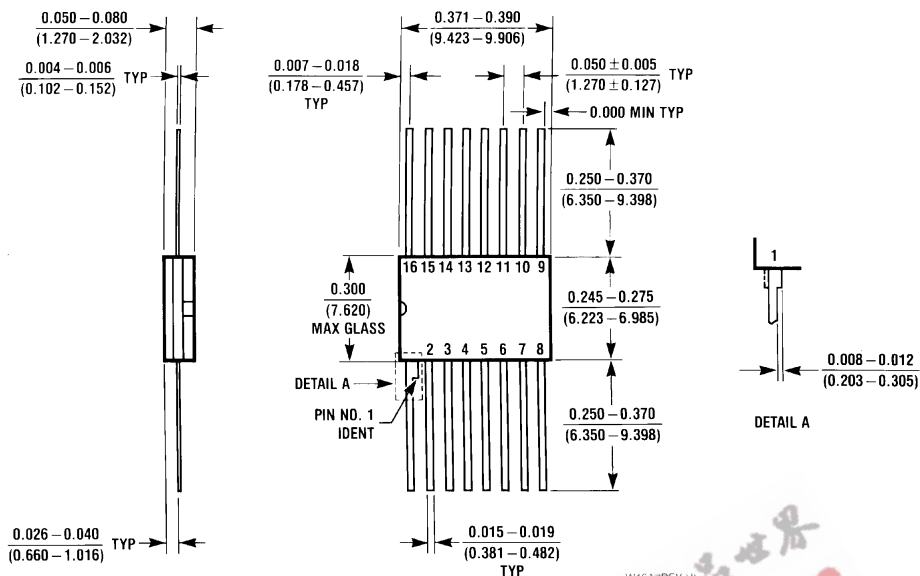
Physical Dimensions inches (millimeters) (Continued)



16-Lead Small Outline Molded Package (M)
Order Number DM74LS251M
NS Package Number M16A



Molded Dual-In-Line Package (N)
Order Number DM74LS251N
NS Package Number N16E

Physical Dimensions inches (millimeters) (Continued)

16-Lead Ceramic Flat Package (W)
Order Number DM54LS251W
NS Package Number W16A

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