March 1998

DM74LS153
Dual 4-Line to 1-Line Data Selectors/Multiplexers

General Description

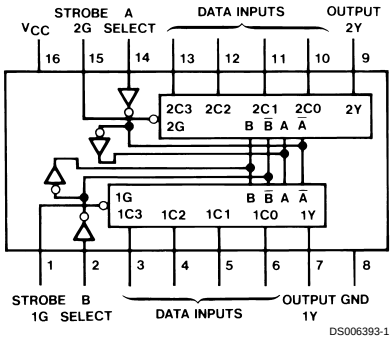
Each of these data selectors/multiplexers contains inverters and drivers to supply fully complementary, on-chip, binary decoding data selection to the AND-OR-invert gates. Separate strobe inputs are provided for each of the two four-line sections.

Features

- Permits multiplexing from N lines to 1 line
- Performs at parallel-to-serial conversion
- Strobe (enable) line provided for cascading (N lines to n lines)
- High fan-out, low impedance, totem pole outputs
- Typical average propagation delay times
  - — From data 14 ns
  - — From strobe 19 ns
  - — From select 22 ns
- Typical power dissipation 31 mW

Connection Diagram

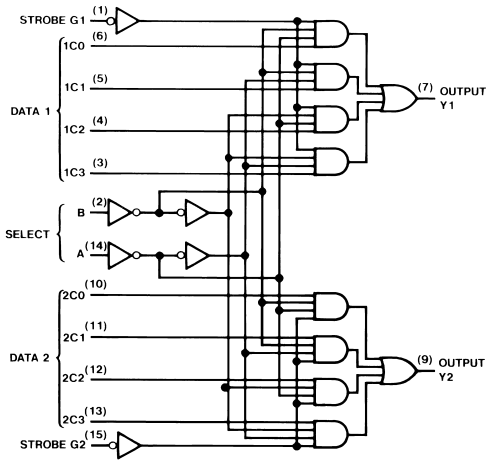
Dual-In-Line Package



DS006393-1

Order Number 54LS153DMQB, 54LS153FMQB, 54LS153LMQB, DM54LS153J, DM54LS153W, DM74LS153M or DM74LS153N
See Package Number E20A, J16A, M16A, N16E or W16A

Logic Diagram



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Function Table

Select Inputs		Data Inputs				Strobe	Output
B	**A**	**C0**	**C1**	**C2**	**C3**	**G**	**Y**
X	X	X	X	X	X	H	L
L	L	L	X	X	X	L	L
L	L	H	X	X	X	L	H
L	H	X	L	X	X	L	L
L	H	X	H	X	X	L	H
H	L	X	X	L	X	L	L
H	L	X	X	H	X	L	H
H	H	X	X	X	L	L	L
H	H	X	X	X	H	L	H

Select inputs A and B are common to both sections.
H = High Level, L = Low Level, X = Don't Care

Absolute Maximum Ratings (Note 1)

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

Recommended Operating Conditions

Symbol	Parameter	DM54LS153			DM74LS153			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

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} = Min, I_I = −18 mA				−1.5	V
V_{OH}	High Level Output Voltage	V_{CC} = Min, I_{OH} = Max	DM54	2.5	3.4		V
		V_{IL} = Max, V_{IH} = Min	DM74	2.7	3.4		
V_{OL}	Low Level Output Voltage	V_{CC} = Min, I_{OL} = Max	DM54		0.25	0.4	V
		V_{IL} = Max, V_{IH} = Min	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				−0.36	mA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 3)	DM54	−20		−100	mA
			DM74	−20		−100	
I_{CC}	Supply Current	V_{CC} = Max (Note 4)			6.2	10	mA

Note 2: All typicals are at V_{CC} = 5V, T_A = 25˚ C.

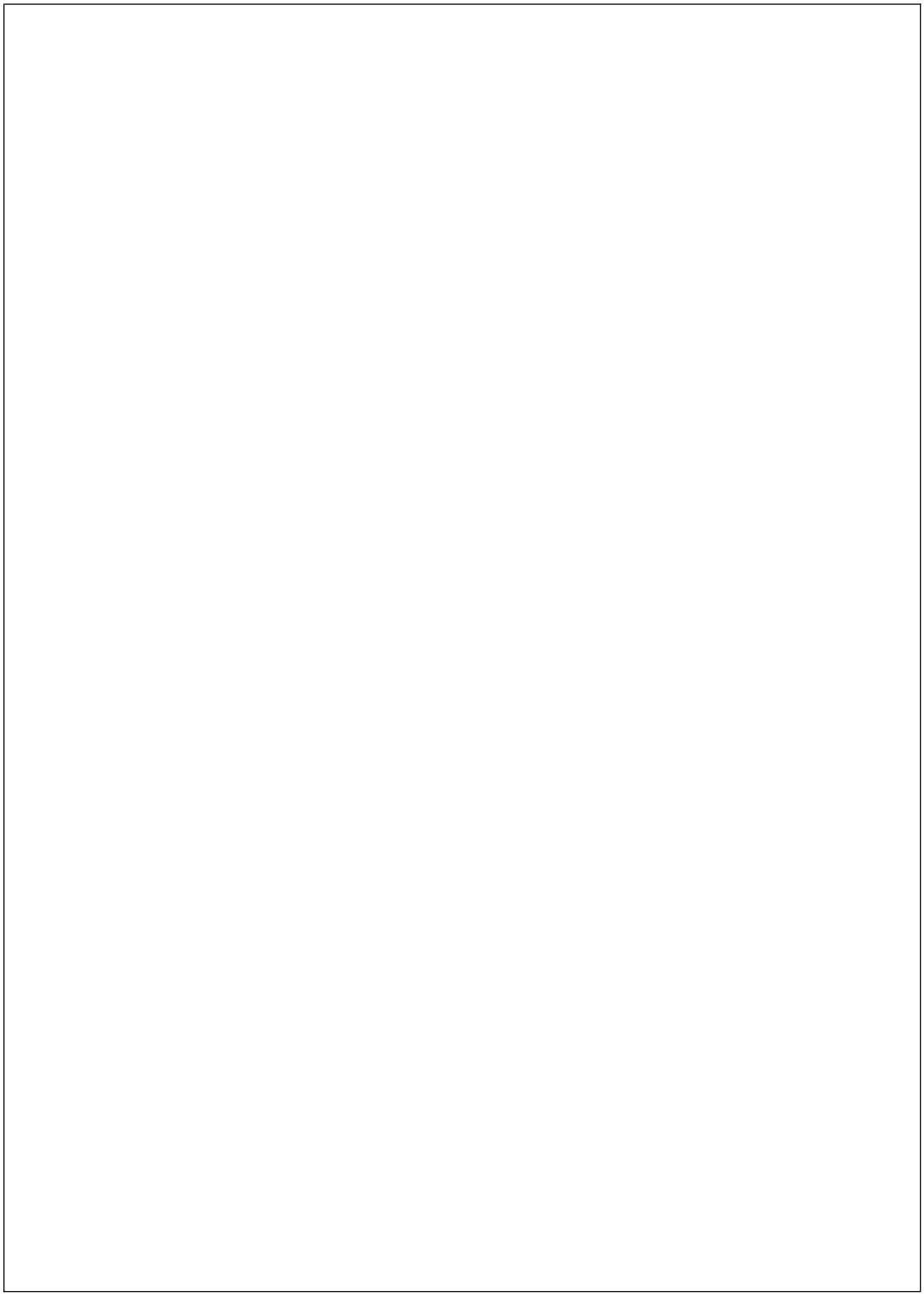
Note 3: Not more than one output should be shorted at a time, and the duration should not exceed one second.

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

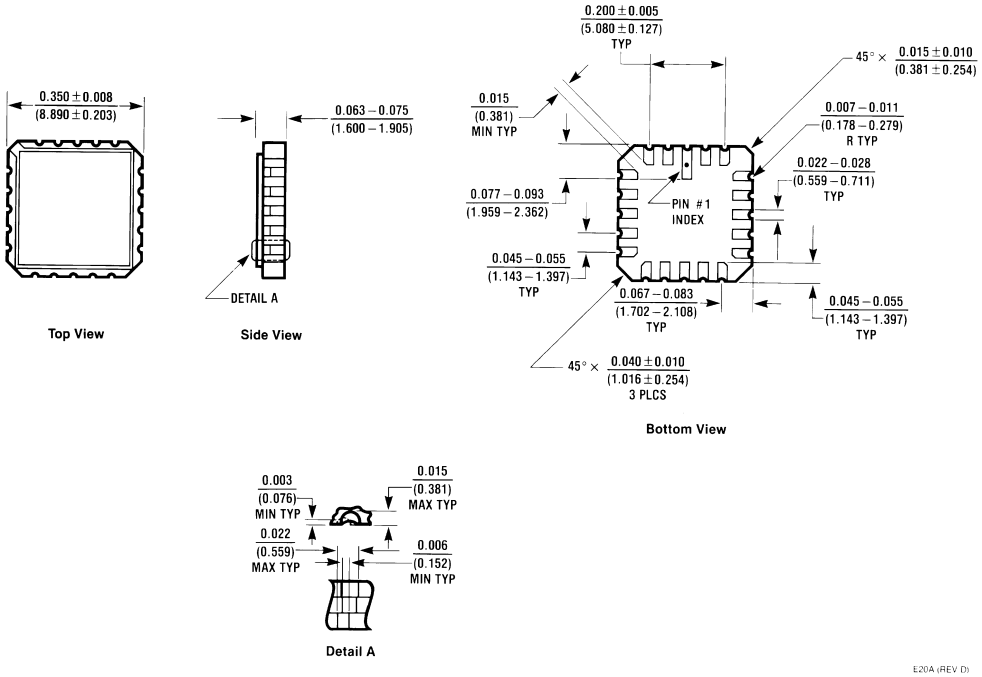
Switching Characteristics

at V_{CC} = 5V and T_A = 25˚C

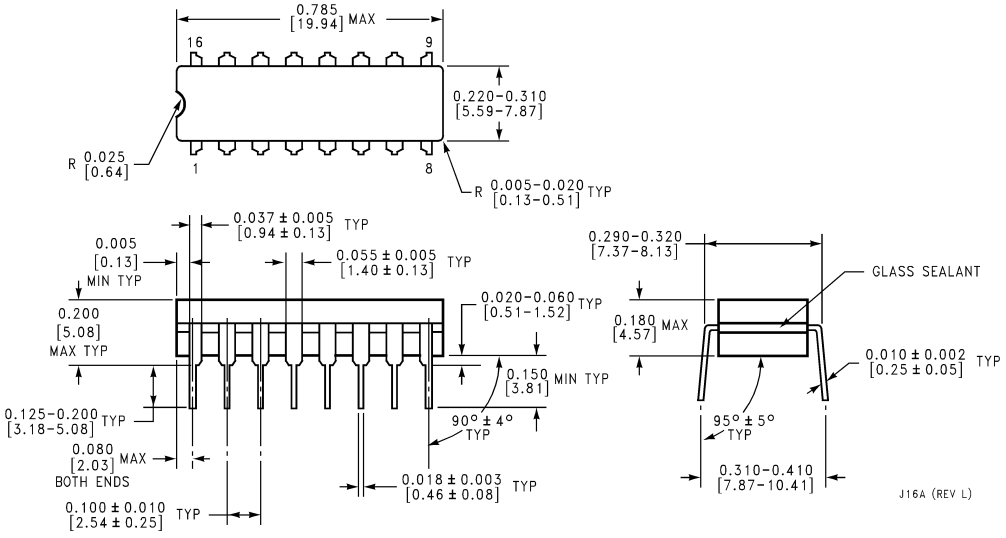
Symbol	Parameter	From (Input) to (Output)	R_L = 2 kΩ				Units
			C_L = 15 pF		C_L = 50 pF		
			Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output	Data to Y		15		20	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	Data to Y		26		35	ns
t_{PLH}	Propagation Delay Time Low to High Level Output	Select to Y		29		35	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	Select to Y		38		45	ns
t_{PLH}	Propagation Delay Time Low to High Level Output	Strobe to Y		24		30	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	Strobe to Y		32		40	ns



Physical Dimensions inches (millimeters) unless otherwise noted

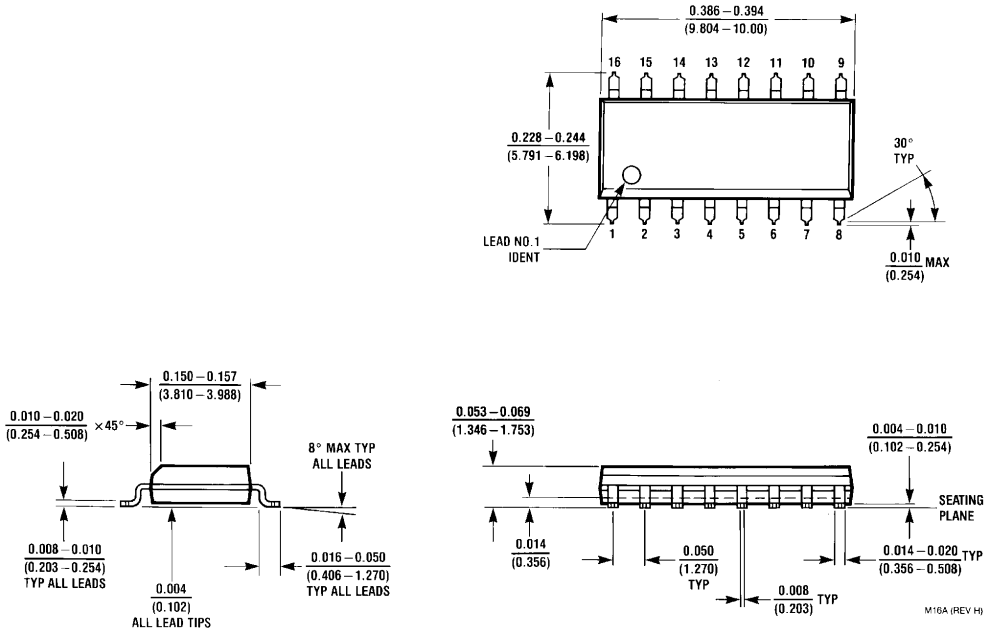


Ceramic Leadless Chip Carrier Package (E)
Order Number 54LS153LMQB
Package Number E20A

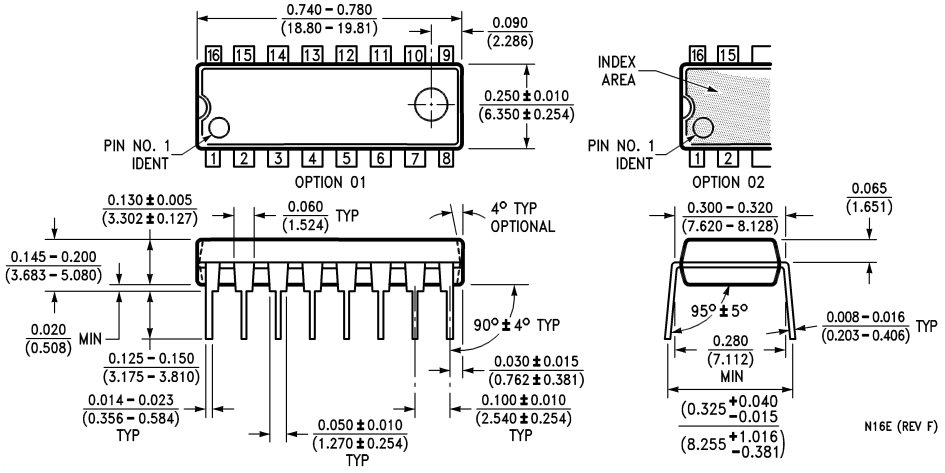


16-Lead Ceramic Dual-In-Line Package (J)
Order Number 54LS153DMQB or DM54LS153J
Package Number J16A

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

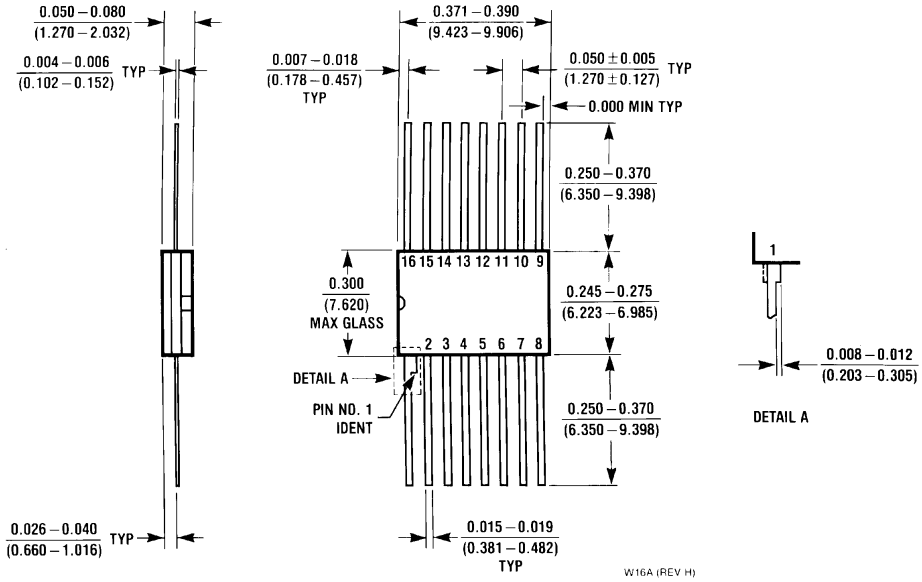


16-Lead Small Outline Molded Package (M)
Order Number DM74LS153M
Package Number M16A



16-Lead Molded Dual-In-Line Package (N)
Order Number DM74LS153N
Package Number N16E

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



16-Lead Ceramic Flat Package (W)
Order Number 54LS153FMQB or DM54LS153W
Package Number W16A

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