FAIRCHILD SEMICONDUCTOR™

April 1984
Revised February 2000

DM74ALS257 • DM74ALS258
3-STATE Quad 1-of-2-Line Data Selector/Multiplexer

General Description

These data selectors/multiplexers contain inverters and drivers to supply full on-chip data selection to the four 3-STATE outputs that can interface directly with data lines of bus-organized systems. A 4-bit word selected from one of two sources is routed to the four outputs. The DM74ALS257 presents true data whereas the DM74ALS258 presents inverted data to minimize propagation delay time.

This 3-STATE output feature means that n-bit (paralleled) data selectors with up to 258 sources can be implemented for data buses. It also permits the use of standard TTL registers for data retention throughout the system.

Features

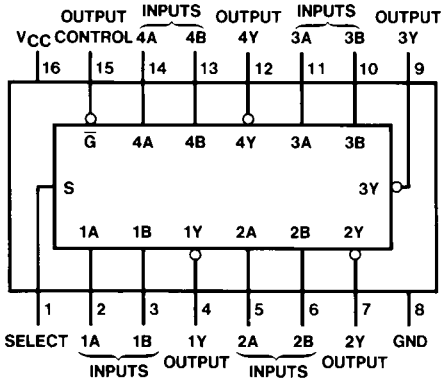
- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and V_{CC} range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with Schottky and low power Schottky TTL counterpart
- Improved AC performance over Schottky and low power Schottky counterparts
- 3-STATE buffer-type outputs drive bus lines directly
- Expand any data input point
- Multiplex dual data buses
- General four functions of two variables (one variable is common)
- Source programmable counters

Ordering Code:

Order Number	Package Number	Package Description
DM74ALS257M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
DM74ALS257SJ	M16D	16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
DM74ALS257N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
DM74ALS258M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
DM74ALS258N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Connection Diagram



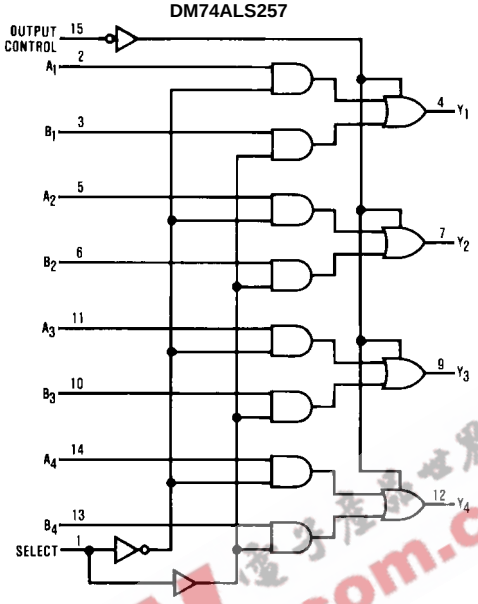
Function Table

Inputs				Output Y	
Output Control	Select	A	B	DM74ALS257	DM74ALS258
H	X	X	X	Z	Z
L	L	L	X	L	H
L	L	H	X	H	L
L	H	X	L	L	H
L	H	X	H	H	L

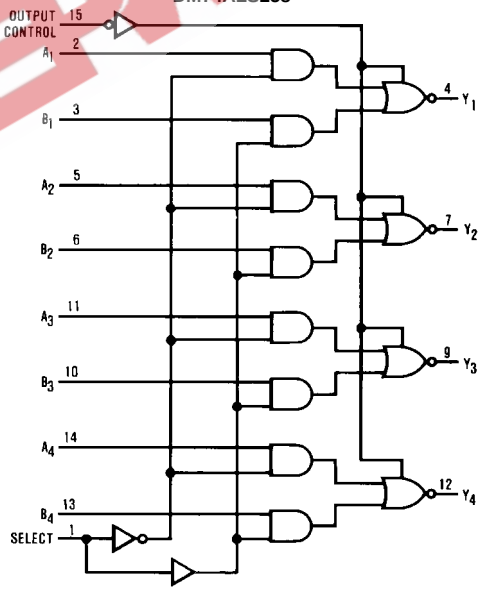
H = HIGH Level
L = LOW Level
X = Don't Care
Z = High Impedance (OFF)

Logic Diagrams

DM74ALS257



DM74ALS258



Absolute Maximum Ratings(Note 1)

Supply Voltage	7V
Input Voltage	7V
Voltage Applied to Disabled Output	5.5V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	−65°C to +150°C
Typical θ_{JA}	
N Package	73.0°C/W
M Package	102.0°C/W

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 tables 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	Min	Nom	Max	Units
V_{CC}	Supply Voltage	4.5	5	5.5	V
V_{IH}	HIGH Level Input Voltage	2			V
V_{IL}	LOW Level Input Voltage			0.8	V
I_{OH}	HIGH Level Output Current			−2.6	mA
I_{OL}	LOW Level Output Current			24	mA
T_A	Free Air Operating Temperature	0		70	°C

Electrical Characteristics

over recommended operating free air temperature range. All typical values are measured at V_{CC} = 5V, T_A = 25°C.

Symbol	Parameter		Conditions		Min	Typ	Max	Units
V_{IK}	Input Clamp Voltage		V_{CC} = 4.5V, I_I = −18 mA				−1.5	V
V_{OH}	HIGH Level Output Voltage		V_{CC} = 4.5V, I_{OH} = −2.6 mA		2.4	3.3		V
			I_{OH} = −0.4 mA		V_{CC} − 2			V
V_{OL}	LOW Level Output Voltage		V_{CC} = 4.5V	I_{OL} = 12 mA		0.25	0.4	V
				I_{OL} = 24 mA		0.35	0.5	V
I_I	Input Current at Maximum Input Voltage		V_{CC} = 5.5V, V_{IH} = 7V				0.1	mA
I_{IH}	HIGH Level Input Current		V_{CC} = 5.5V, V_{IH} = 2.7V				20	µA
I_{IL}	LOW Level Input Current		V_{CC} = 5.5V, V_{IL} = 0.4V				−0.1	mA
I_O	Output Drive Current		V_{CC} = 5.5V, V_O = 2.25V		−30		−112	mA
I_{OZH}	OFF-State Output Current HIGH Level Voltage Applied		V_{CC} = 5.5V, V_O = 2.7V				20	µA
I_{OZL}	OFF-State Output Current, LOW Level Voltage Applied		V_{CC} = 5.5V, V_O = 0.4V				−20	µA
I_{CCH}	Supply Current	DM74ALS257	V_{CC} = 5.5V Outputs OPEN	Outputs HIGH		3	6	mA
		DM74ALS258				2.5	4	mA
I_{CCL}	Supply Current	DM74ALS257		Outputs LOW		8	12	mA
		DM74ALS258				7	11	mA
I_{CCZ}	Supply Current	DM74ALS257		Outputs Disabled		9	14	mA
		DM74ALS258				8	13	mA

Switching Characteristics DM74ALS257

over recommended operating free air temperature range

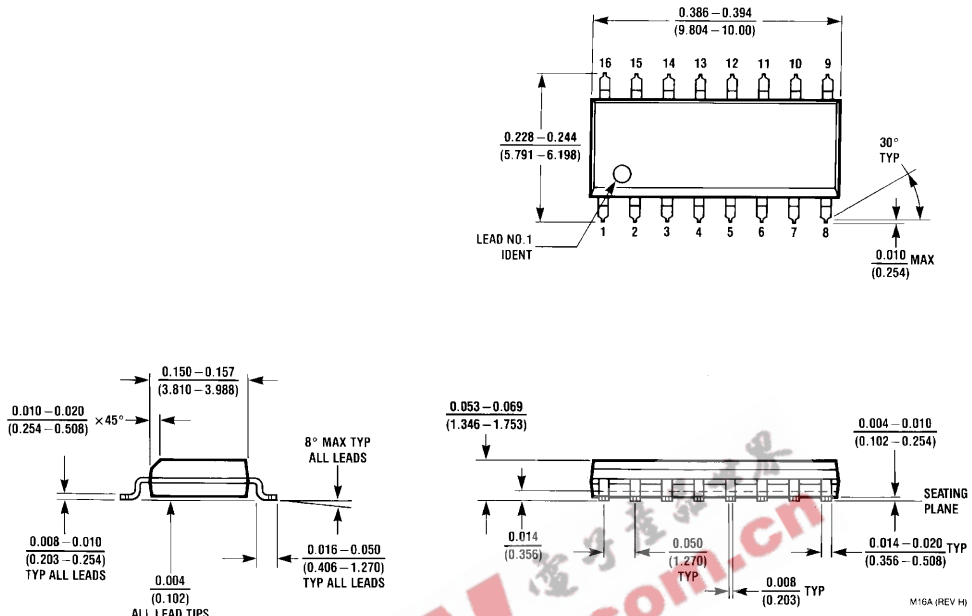
Symbol	Parameter	Conditions	From	To	Min	Max	Units
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	V_{CC} = 4.5V to 5.5V C_L = 50 pF R_L = 500Ω	Data	Any Y	2	10	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output		Data	Any Y	2	12	ns
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output		Select	Any Y	4	18	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output		Select	Any Y	5	22	ns
t_{ZH}	Output Enable Time to HIGH Level		Output Control	Any Y	4	16	ns
t_{ZL}	Output Enable Time to LOW Level		Output Control	Any Y	5	18	ns
t_{HZ}	Output Disable Time from HIGH Level		Output Control	Any Y	2	10	ns
t_{LZ}	Output Disable Time from LOW Level		Output Control	Any Y	3	15	ns

Switching Characteristics DM74ALS258

over recommended operating free air temperature range

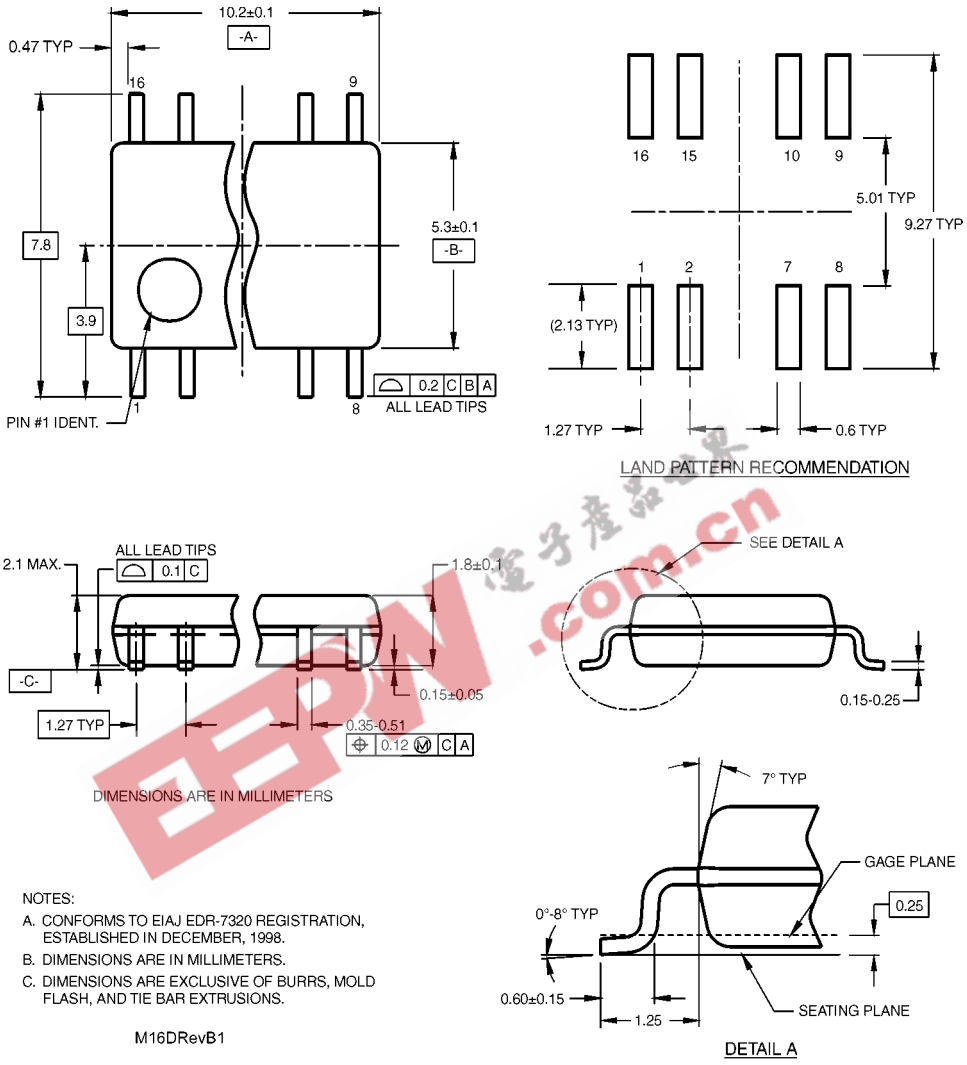
Symbol	Parameter	Conditions	From	To	Min	Max	Units
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	V_{CC} = 4.5V to 5.5V C_L = 50 pF R_L = 500Ω	Data	Any Y	2	8	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output		Data	Any Y	2	7	ns
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output		Select	Any Y	3	20	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output		Select	Any Y	5	25	ns
t_{ZH}	Output Enable Time to HIGH Level		Output Control	Any Y	5	18	ns
t_{ZL}	Output Enable Time to LOW Level		Output Control	Any Y	5	18	ns
t_{HZ}	Output Disable Time from HIGH Level		Output Control	Any Y	2	10	ns
t_{LZ}	Output Disable Time from LOW Level		Output Control	Any Y	3	18	ns

Physical Dimensions inches (millimeters) unless otherwise noted



16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
Package Number M16A

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



NOTES:

A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.

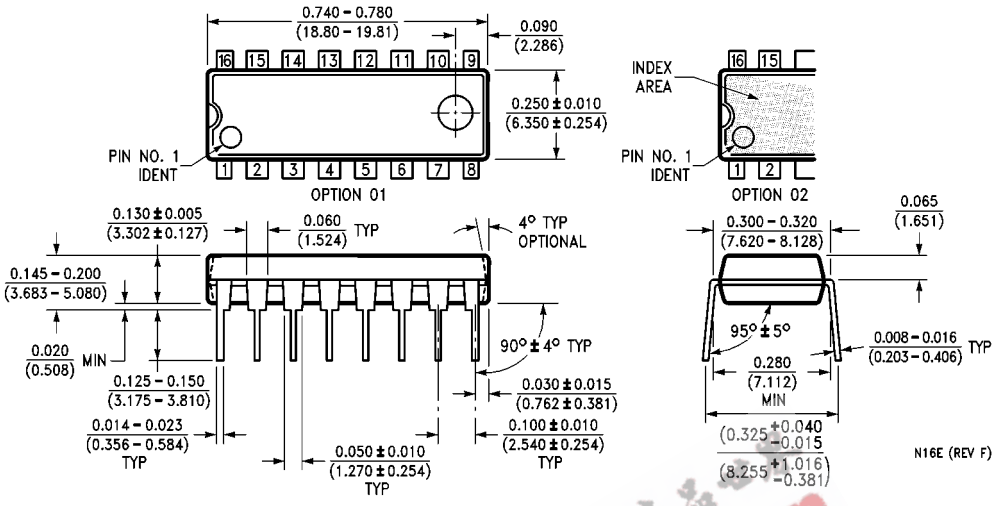
B. DIMENSIONS ARE IN MILLIMETERS.

C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

M16DRevB1

16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M16D

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



16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
Package Number N16E

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2. A critical component in 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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