FAIRCHILD SEMICONDUCTOR

May 2007

DM74AS257, DM74AS258
3-STATE Quad 1 of 2 Line Data Selector/Multiplexers

Features

- Switching specifications at 50pF
- 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, low power Schottky, and advanced low power Schottky TTL counterpart
- Improved AC performance over Schottky, low power Schottky, and advanced low power Schottky counterparts
- 3-STATE buffer-type output 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

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 DM74AS257 presents true data whereas the DM74AS258 presents inverted data to minimize propagation delay time.

This 3-STATE output feature means that n-bit (paralleled) data selectors with up to 300 sources can be implemented for data buses. It also permits the use of standard TTL registers for data retention throughout the system.

Ordering Information

Order Number	Package Number	Package Description
DM74AS257M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
DM74AS257N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
DM74AS258M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow

Devices also available in Tape and Reel. Specify by appending the suffix letter “X” to the ordering number.

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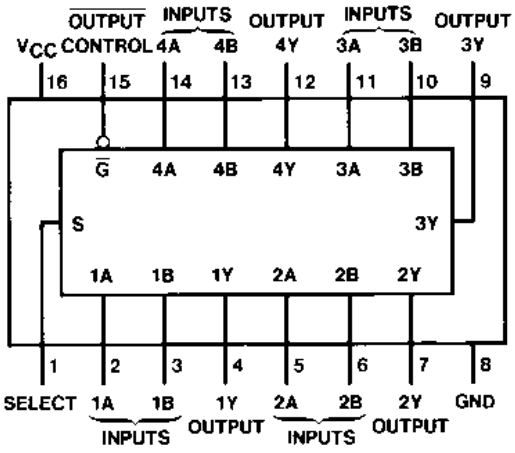
Connection Diagram



Function Table

Inputs				Output Y	
$\overline{\text{OUTPUT}}$ Control	Select	A	B	AS257	AS258
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

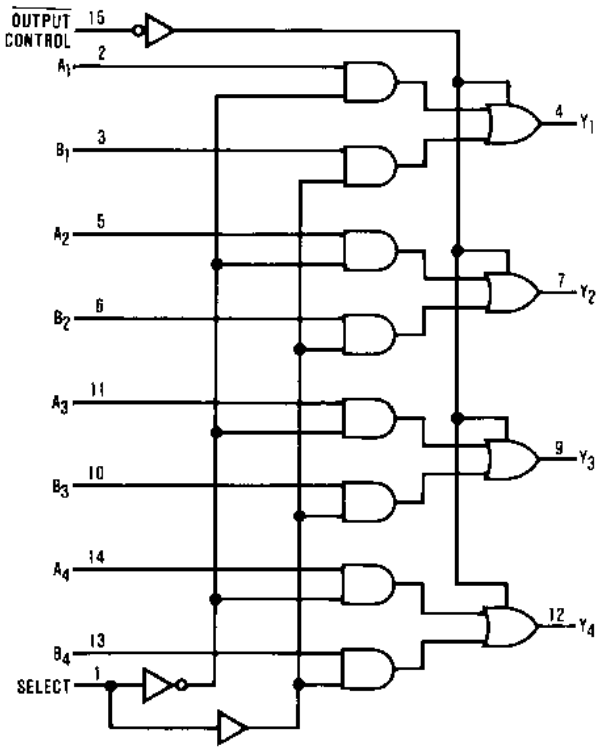
L = LOW Level

X = Don't Care

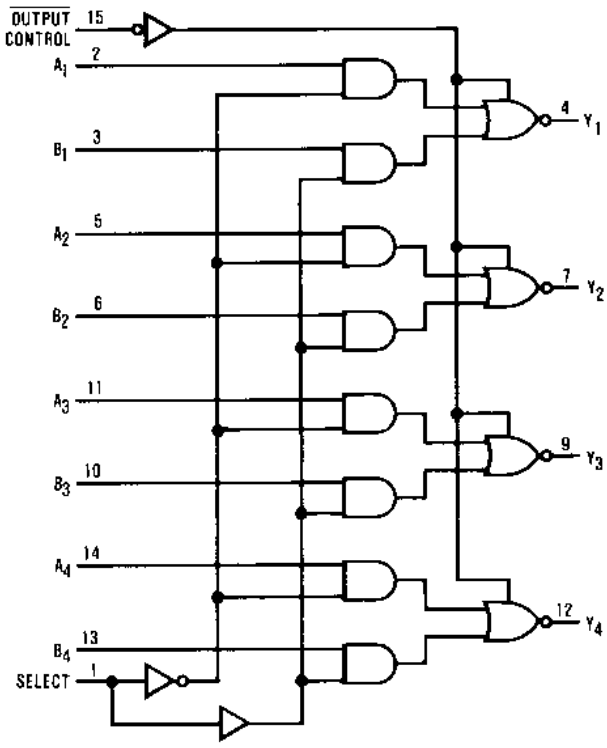
Z = High Impedance (OFF)

Logic Diagrams

DM74AS257



DM74AS258



Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Rating
V_{CC}	Supply Voltage	7V
V_I	Input Voltage	7V
	Voltage Applied to Disabled Output	5.5V
T_A	Operating Free Air Temperature Range	0°C to +70°C
T_{STG}	Storage Temperature Range	–65°C to +150°C
θ_{JA}	Typical Thermal Resistance, N Package	75.0°C/W

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

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			–15	mA
I_{OL}	LOW Level Output Current			48	mA
T_A	Free Air Operating Temperature	0		70	°C

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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				–1.2	V
V_{OH}	HIGH Level Output Voltage		V_{CC} = 4.5V, I_{OH} = Max		2.4	3.2		V
			I_{OH} = –2 mA, V_{CC} = 4.5V to 5.5V		V_{CC} – 2			
V_{OL}	LOW Level Output Voltage		V_{CC} = 4.5V, I_{OL} = Max			0.35	0.5	V
I_I	Input Current @ Max. Input Voltage		V_{CC} = 5.5V, V_{IH} = 7V	A, B, $\overline{G}$			0.1	mA
				Select			0.2	
I_{IH}	HIGH Level Input Current		V_{CC} = 5.5V, V_{IH} = 2.7V	A, B, $\overline{G}$			20	µA
				Select			40	
I_{IL}	LOW Level Input Current		V_{CC} = 5.5V, V_{IL} = 0.4V	Select			–1	mA
				All Others			–0.5	
I_O[(1)]	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				–50	µA
I_{OZL}	Off-State Output Current, LOW Level Voltage Applied		V_{CC} = 5.5V, V_O = 0.4V				–50	µA
I_{CCH}	Supply Current	DM74AS257	V_{CC} = 5.5V, Outputs Open	Outputs HIGH		12.9	19.7	mA
		DM74AS258				8.8	13.5	
I_{CCL}	Supply Current	DM74AS257		Outputs LOW		19	30.6	mA
		DM74AS258				15.8	24.6	
I_{CCZ}	Supply Current	DM74AS257		Outputs Disabled		19.7	31.9	mA
		DM74AS258				15.5	25.2	

Note:

1. The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS}.

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DM74AS257 Switching Characteristics

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	1	5.5	ns
t_{PHL}	Propagation Delay Time, HIGH-to-LOW Level Output				1	6	ns
t_{PLH}	Propagation Delay Time, LOW-to-HIGH Level Output		Select	Any Y	2	11	ns
t_{PHL}	Propagation Delay Time, HIGH-to-LOW Level Output				2	10	ns
t_{PZH}	Output Enable Time to HIGH Level		$\overline{\text{OUTPUT}}$ Control	Any Y	2	7.5	ns
t_{PZL}	Output Enable Time to LOW Level				2	9.5	ns
t_{PHZ}	Output Disable Time from HIGH Level		$\overline{\text{OUTPUT}}$ Control	Any Y	1.5	6.5	ns
t_{PLZ}	Output Disable Time from LOW Level				2	7	ns

DM74AS258 Switching Characteristics

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 = 50pF, R_L = 500Ω	Data	Any Y	1	5	ns
t_{PHL}	Propagation Delay Time, HIGH-to-LOW Level Output				1	4	ns
t_{PLH}	Propagation Delay Time, LOW-to-HIGH Level Output		Select	Any Y	2	9.5	ns
t_{PHL}	Propagation Delay Time, HIGH-to-LOW Level Output				2	10	ns
t_{PZH}	Output Enable Time to HIGH Level		$\overline{\text{OUTPUT}}$ Control	Any Y	2	8	ns
t_{PZL}	Output Enable Time to LOW Level				2	10	ns
t_{PHZ}	Output Disable Time, from HIGH Level		$\overline{\text{OUTPUT}}$ Control	Any Y	1.5	6	ns
t_{PLZ}	Output Disable Time from LOW Level				2	6.5	ns

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Physical Dimensions

Dimensions are in millimeters unless otherwise noted.

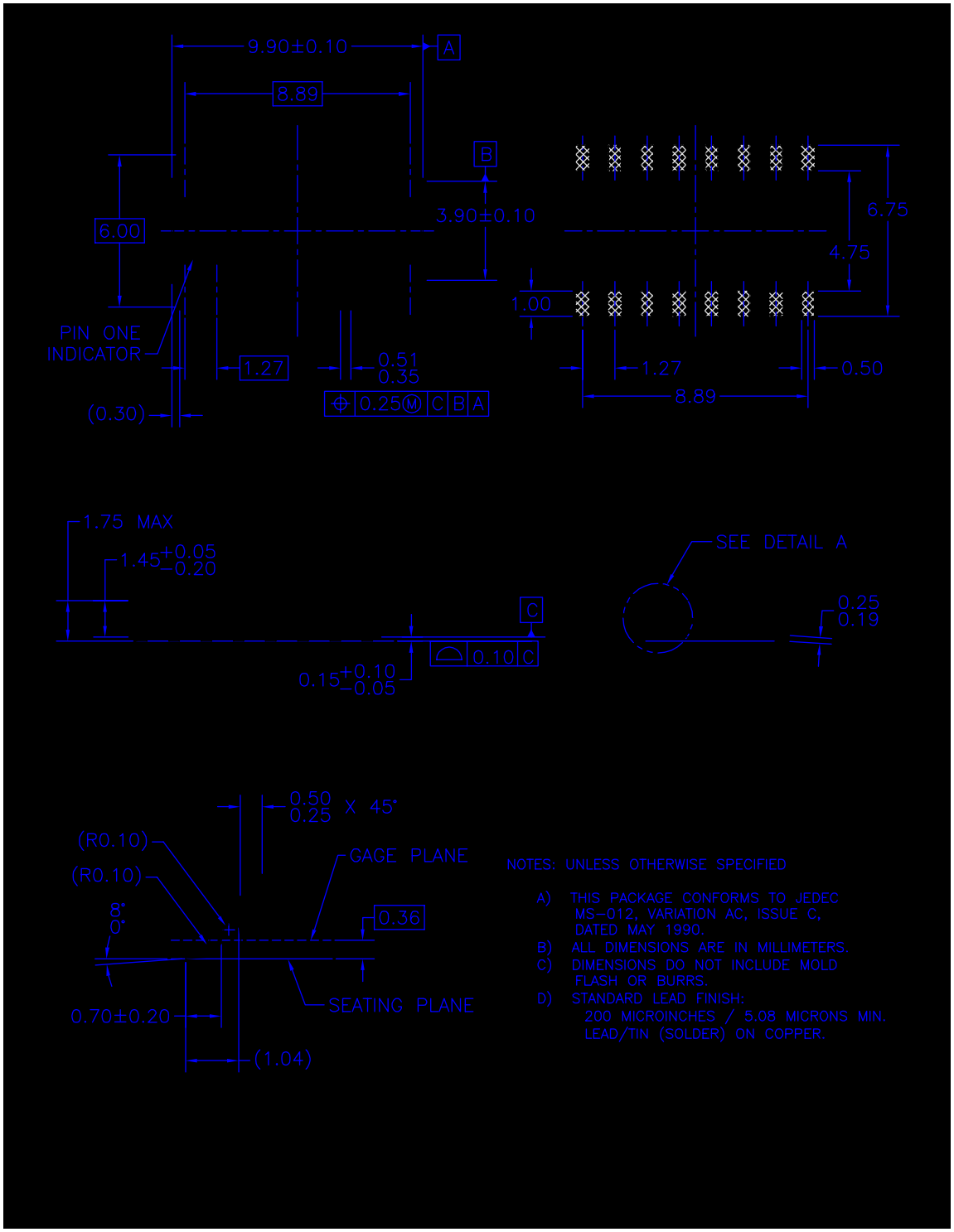

Figure 1. 16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
Package Number M16A

Physical Dimensions (Continued)

Dimensions are in inches (millimeters) unless otherwise noted.

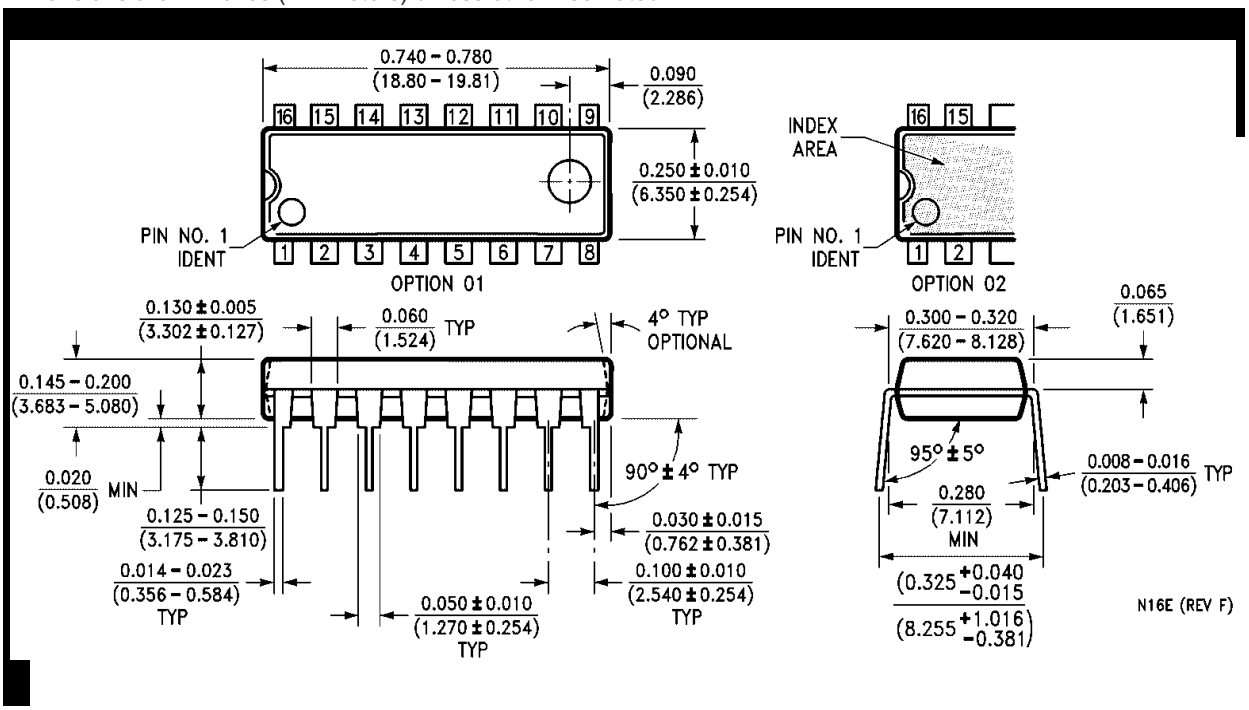

Figure 2. 16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
Package Number N16E

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