FAIRCHILD SEMICONDUCTOR™

September 1986
Revised March 2000

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

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.

Features

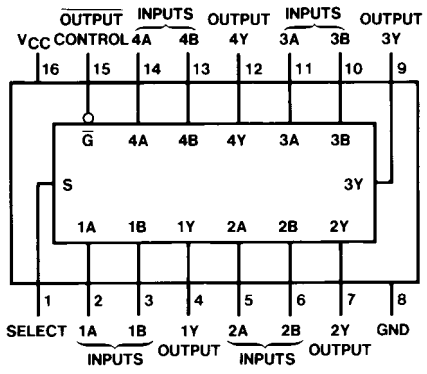
- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and V_{CC} range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with Schottky, low power Schottky, and advanced low power Schottky TTL counterpart
- 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

Ordering Code:

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
DM74AS258N	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



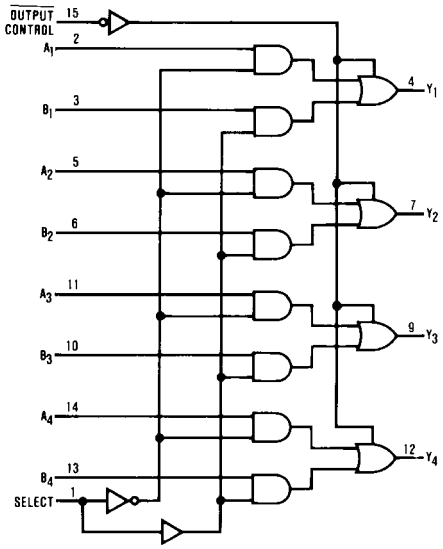
Function Table

INPUTS				OUTPUT Y	
$\overline{\text{OUTPUT CONTROL}}$	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

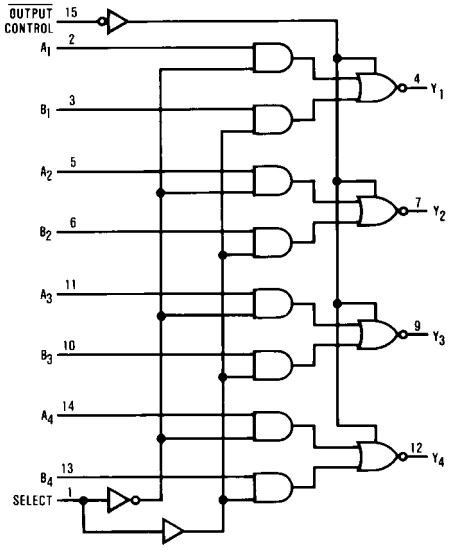
H = HIGH Level
L = LOW Level
X = Don't Care
Z = High Impedance (OFF)

Logic Diagrams

DM74AS257



DM74AS258



Absolute Maximum Ratings(Note 1)

Supply Voltage, V_{CC}	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	75.0°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			−15	mA
I_{OL}	LOW Level Output Current			48	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				−1.2	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
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 (Note 2)	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	mA
I_{CCL}	Supply Current	DM74AS257		Outputs LOW		19	30.6	mA
		DM74AS258				15.8	24.6	mA
I_{CCZ}	Supply Current	DM74AS257		Outputs Disabled		19.7	31.9	mA
		DM74AS258				15.5	25.2	mA

Note 2: The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS}.

DM74AS257 Switching Characteristics

over recommended operating free air temperature range

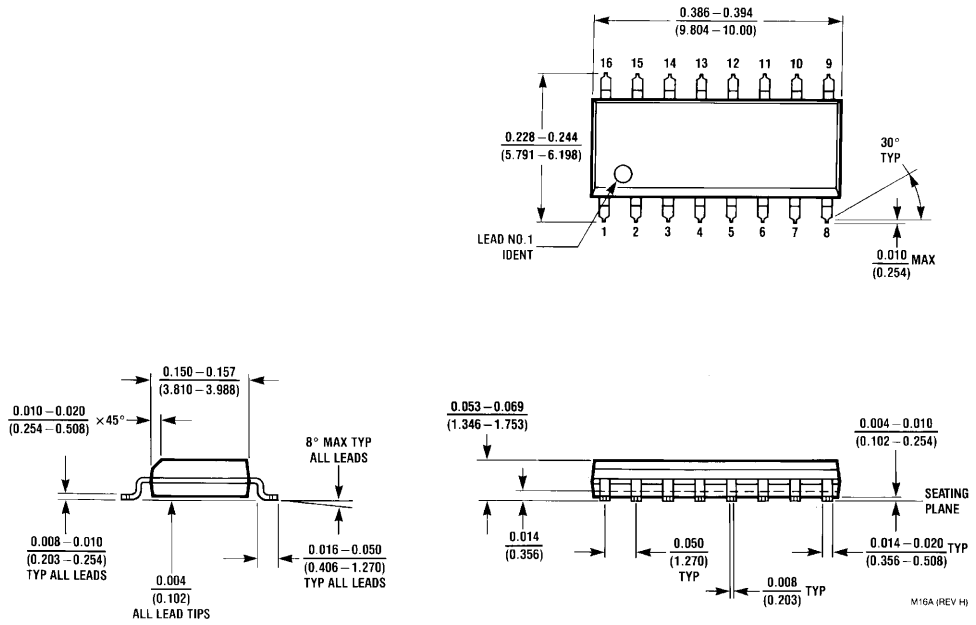
Symbol	Parameter	From	To	Conditions	Min	Max	Units
t_{PLH}	Propagation Delay Time, LOW-to-HIGH Level Output	Data	Any Y	V_{CC} = 4.5V to 5.5V, C_L = 50 pF, R_L = 500Ω	1	5.5	ns
t_{PHL}	Propagation Delay Time, HIGH-to-LOW Level Output				1	6	ns
t_{PLH}	Propagation Delay Time, LOW-to-HIGH Level Output	Select	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	$\overline{OUTPUT}$ 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	$\overline{OUTPUT}$ 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

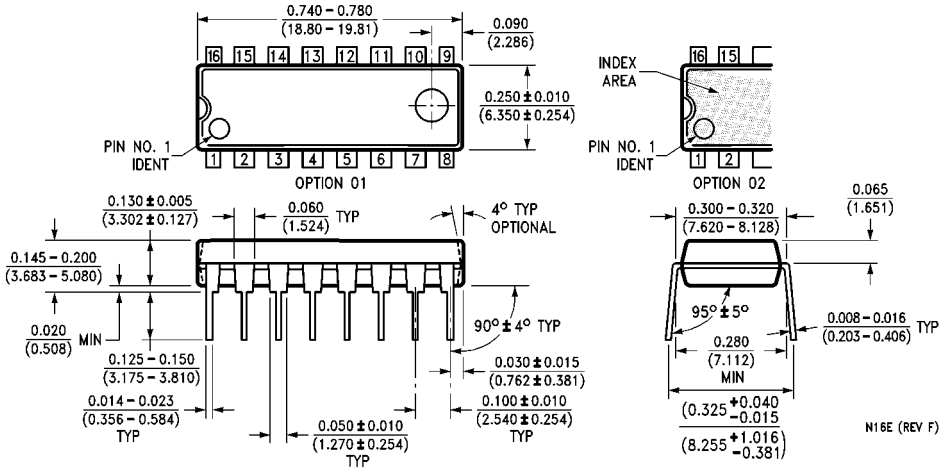
Symbol	Parameter	From	To	Conditions	Min	Max	Units
t_{PLH}	Propagation Delay Time, LOW-to-HIGH Level Output	Data	Any Y	V_{CC} = 4.5V to 5.5V, C_L = 50 pF, R_L = 500Ω	1	5	ns
t_{PHL}	Propagation Delay Time, HIGH-to-LOW Level Output				1	4	ns
t_{PLH}	Propagation Delay Time, LOW-to-HIGH Level Output	Select	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	$\overline{OUTPUT}$ 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	$\overline{OUTPUT}$ Control	Any Y		1.5	6	ns
t_{PLZ}	Output Disable Time, from LOW Level				2	6.5	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)



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