FAIRCHILD SEMICONDUCTOR™

February 1998

DM74AS157/DM74AS158
Quad 1 of 2 Line Data Selector/Multiplexer

General Description

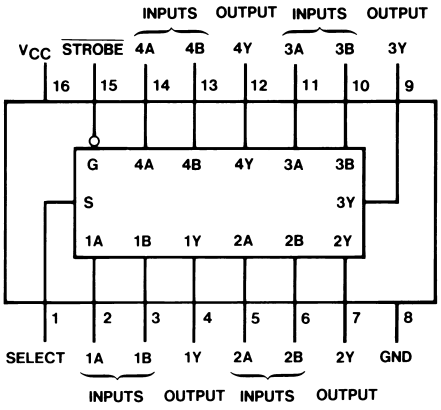
These data selectors/multiplexers contain inverters and drivers to supply full on-chip data selection to the four output gates. A separate $\overline{\text{STROBE}}$ input is provided. A 4-bit word is selected from one of two sources and is routed to the four outputs. The AS157 presents true data whereas the AS158 presents inverted data to minimize propagation delay time.

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
- Expand any data input point
- Multiplex dual data buses
- General four functions of two variables (one variable is common)
- Source programmable counters

Connection Diagram

Dual-In-Line Package



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Order Number DM74AS157M, DM74AS157N, DM74AS158M or DM74AS158N
See Package Number M16A or N16A

Function Table

Inputs				Output Y	
$\overline{\text{STROBE}}$	Select	A	B	AS157	AS158
H	X	X	X	L	H
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

Absolute Maximum Ratings (Note 1)

Supply Voltage 7V
Input Voltage 7V
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

Recommended Operating Conditions

Symbol	Parameter	DM74AS157, 158			Units
		Min	Nom	Max	
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	mA
I_{OL}	Low Level Output Current			20	mA
T_A	Free Air Operating Temperature	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. 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 to 5.5V, I_{OH} = −2 mA		V_{CC} − 2			V
V_{OL}	Low Level Output Voltage	V_{CC} = 4.5V, I_{OL} = 20 mA			0.35	0.5	V
I_I	Input Current at Max Input Voltage	V_{CC} = 5.5V, V_{IH} = 7V	Select			0.2	mA
			All Others			0.1	
I_{IH}	High Level Input Current	V_{CC} = 5.5V, V_{IH} = 2.7V	Select			40	µA
			All Others			20	
I_{IL}	Low Level Input Current	V_{CC} = 5.5V, V_{IL} = 0.4V	Select			−1	mA
			All Others			−0.5	
I_O (Note 3)	Output Drive Current	V_{CC} = 5.5V, V_O = 2.25V		−30		−112	mA
I_{CC}	Supply Current	V_{CC} = 5.5V	'AS157		17.5	28	mA
			'AS158		15.6	22.5	mA

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

'AS157 Switching Characteristics

over recommended operating free air temperature range (Note 3)

Symbol	Parameter	Conditions	From (Input)	To (Output)	DM74AS157		Units
					Min	Max	
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	Y	1	6	ns
t_{PHL}	Propagation Delay Time, High to Low Level Output		Data	Y	1	5.5	ns
t_{PLH}	Propagation Delay Time, Low to High Level Output		$\overline{\text{STROBE}}$	Y	2	10.5	ns
t_{PHL}	Propagation Delay Time, High to Low Level Output		$\overline{\text{STROBE}}$	Y	2	7.5	ns
t_{PLH}	Propagation Delay Time, Low to High Level Output		Select	Y	2	11	ns
t_{PHL}	Propagation Delay Time, High to Low Level Output		Select	Y	2	10	ns

'AS158 Switching Characteristics

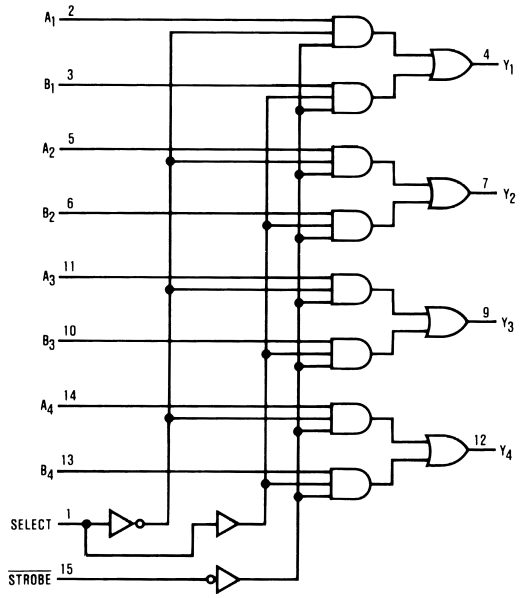
over recommended operating free air temperature range (Note 3)

Symbol	Parameter	Conditions	From (Input)	To (Output)	DM74AS158		Units
					Min	Max	
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	Y	1	5	ns
t_{PHL}	Propagation Delay Time, High to Low Level Output		Data	Y	1	4.5	ns
t_{PLH}	Propagation Delay Time, Low to High Level Output		$\overline{\text{STROBE}}$	Y	2	6.5	ns
t_{PHL}	Propagation Delay Time, High to Low Level Output		$\overline{\text{STROBE}}$	Y	2	10	ns
t_{PLH}	Propagation Delay Time, Low to High Level Output		Select	Y	2	9.5	ns
t_{PHL}	Propagation Delay Time, High to Low Level Output		Select	Y	2	10.5	ns

Note 3: See Section 1 for test waveforms and output load.

Logic Diagrams

AS157



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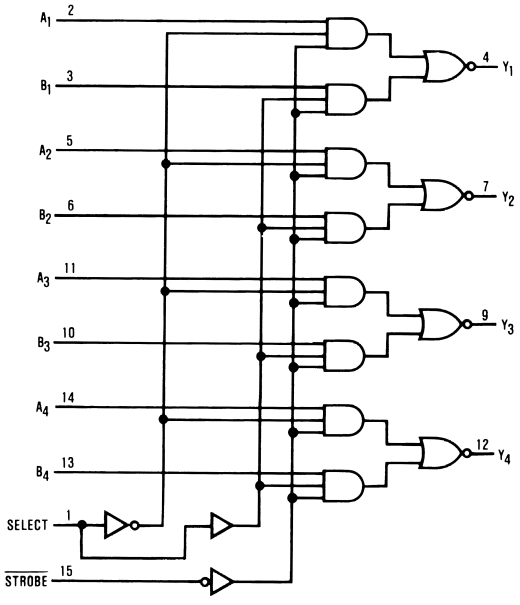
AS158



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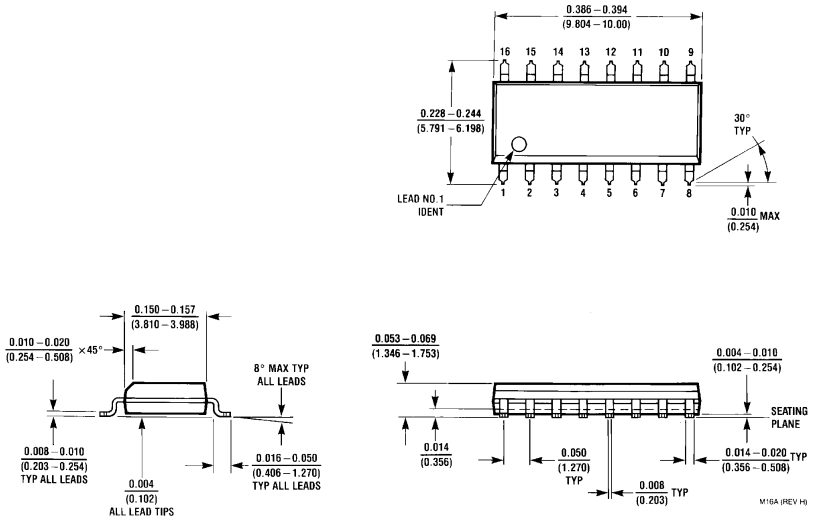
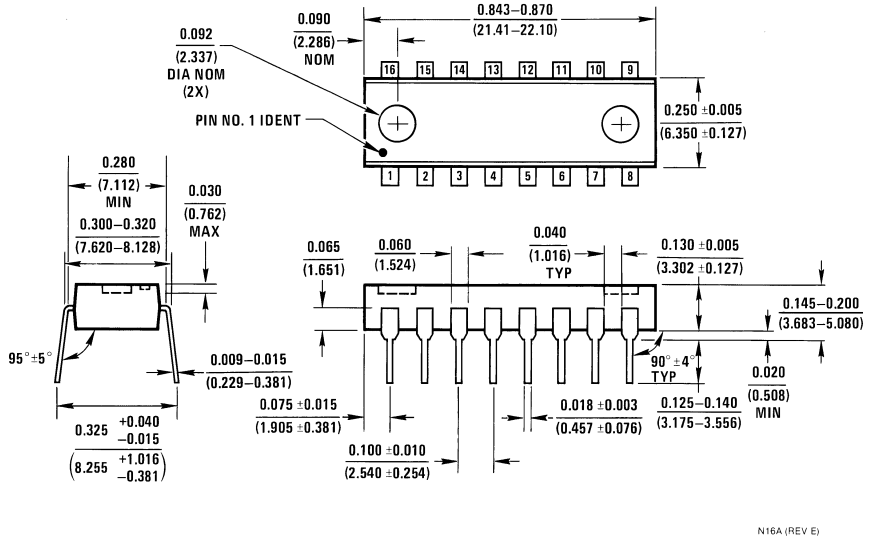
Physical Dimensions inches (millimeters) unless otherwise noted



16-Lead (0.150" Wide) Molded
Small Outline Package, JEDEC
Order Number DM74AS157M or DM74AS158M
Package Number M16A



Molded Dual-In-Line Package (N)
Order Number DM74AS157N or DM74AS158N
Package Number N16A

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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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