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FAIRCHILD SEMICONDUCTOR™

June 1989
Revised November 1999

DM74LS257B
3-STATE Quad 2-Data Selectors/Multiplexers

General Description

These Schottky-clamped high-performance multiplexers feature 3-STATE outputs that can interface directly with data lines of bus-organized systems. With all but one of the common outputs disabled (at a high impedance state), the low impedance of the single enabled output will drive the bus line to a HIGH or LOW logic level. To minimize the possibility that two outputs will attempt to take a common bus to opposite logic levels, the output enable circuitry is designed such that the output disable times are shorter than the output enable times.

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

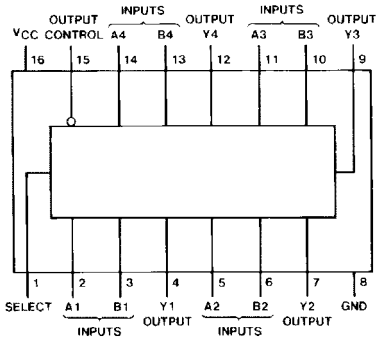
- 3-STATE versions LS157 and LS158 with same pinouts
- Schottky-clamped for significant improvement in A-C performance
- Provides bus interface from multiple sources in high-performance systems
- Average propagation delay from data input 12 ns
- Typical power dissipation: 50 mW

Ordering Code:

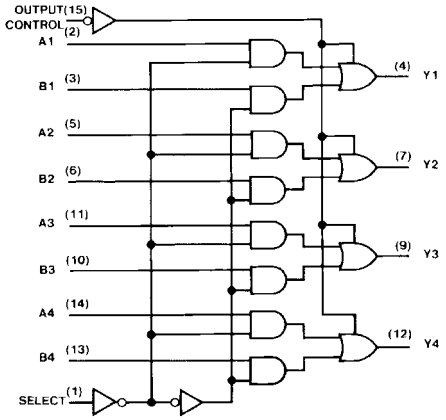
Order Number	Package Number	Package Description
DM74LS257BM	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
DM74LS257BN	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

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

Connection Diagram



Logic Diagram



Function Table

Inputs				Output Y
Output Control	Select	A	B	LS257
H	X	X	X	Z
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	H

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

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

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	4.75	5	5.25	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

DC Electrical Characteristics

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_{IL} = Max, V_{IH} = Min		2.4	3.1		V
V_{OL}	LOW Level Output Voltage	V_{IL} = Max, V_{IH} = Min			0.35	0.5	V
		I_{OL} = 12 mA, V_{CC} = Min			0.25	0.4	
I_I	Input Current @ Max Input Voltage	V_{CC} = Max, V_I = 7V	Select			0.2	mA
			Other			0.1	
I_{IH}	HIGH Level Input Current	V_{CC} = Max, V_I = 2.7V	Select			40	µA
			Other			20	
I_{IL}	LOW Level Input Current	V_{CC} = Max, V_I = 0.4V	Select			−0.8	mA
			Other			−0.4	
I_{OZH}	OFF-State Output Current with HIGH Level Output Voltage Applied	V_{CC} = Max, V_O = 2.7V V_{IH} = Min, V_{IL} = Max				20	µA
I_{OZL}	OFF-State Output Current with LOW Level Output Voltage Applied	V_{CC} = Max, V_O = 0.4V V_{IH} = Min, V_{IL} = Max				−20	µA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 3)		−20		−100	mA
I_{CCH}	Supply Current with Outputs HIGH	V_{CC} = Max (Note 4)			5.9	10	mA
I_{CCL}	Supply Current with Outputs LOW	V_{CC} = Max (Note 4)			9.2	16	mA
I_{CCZ}	Supply Current with Outputs Disabled	V_{CC} = Max (Note 4)			12	19	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 possible inputs grounded, while achieving the stated output conditions.

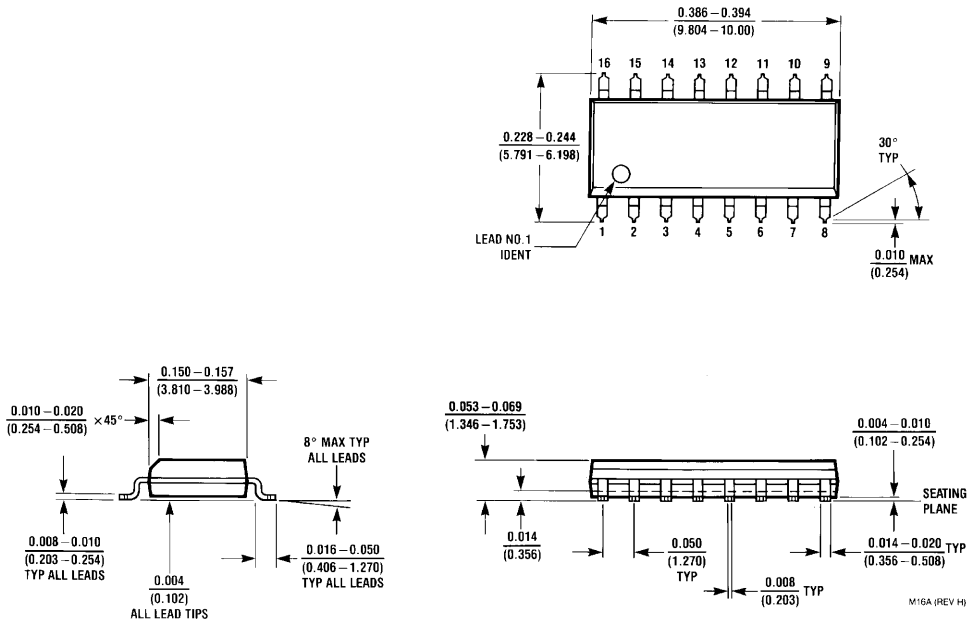
Switching Characteristics

V_{CC} = 5V and T_A = 25°C

Symbol	Parameter	From (Input) To (Output)	RL = 667Ω				Units
			C_L = 45 pF		C_L = 150 pF		
			Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	Data to Output		18		27	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	Data to Output		18		27	ns
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	Select to Output		28		35	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	Select to Output		35		42	ns
t_{PZH}	Output Enable Time to HIGH Level Output	Output Control to Y		15		27	ns
t_{PZL}	Output Enable Time to LOW Level Output	Output Control to Y		28		38	ns
t_{PHZ}	Output Disable Time from HIGH Level Output (Note 5)	Output Control to Y		28			ns
t_{PLZ}	Output Disable Time from LOW Level Output (Note 5)	Output Control to Y		25			ns

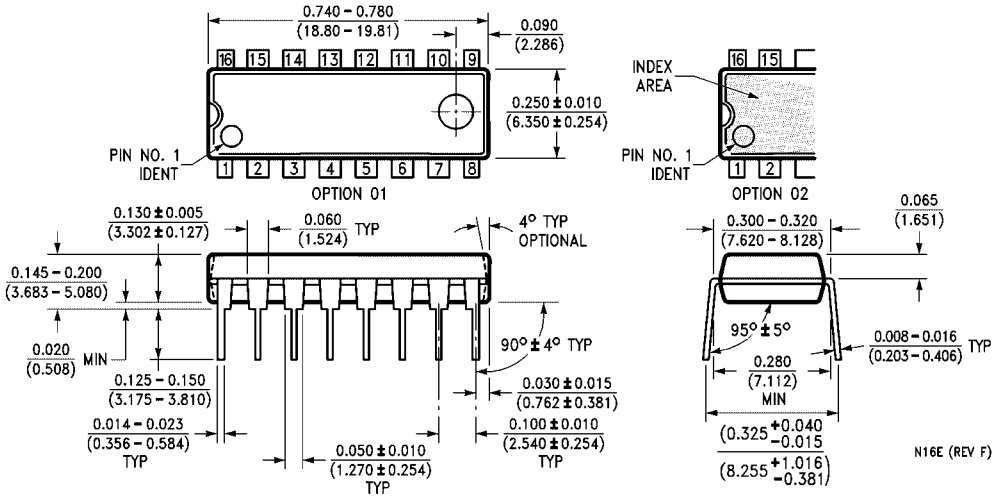
Note 5: C_L = 5 pF

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

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