

August 1986 Revised April 2000

DM74S157 • DM74S158 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 strobe input is provided. A 4-bit word is selected from one of two sources and is routed to the four outputs. The DM74S157 presents true data whereas the DM74S158 presents inverted data to minimize propagation delay time.

Applications

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

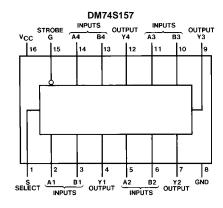
Features

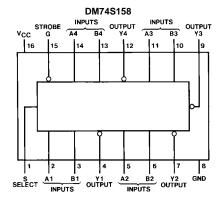
- Buffered inputs and outputs
- Typical propagation time
 DM74S157 5 ns
 DM74S158 4 ns
- Typical power dissipation
 DM74S157 250 mW
 DM74S158 195 mW

Ordering Code:

Order Number	Package Number	Package Description
DM74S157N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
DM74S158N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Connection Diagrams





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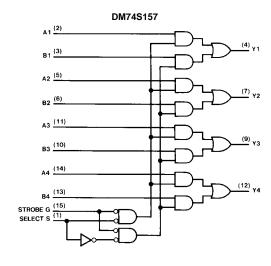
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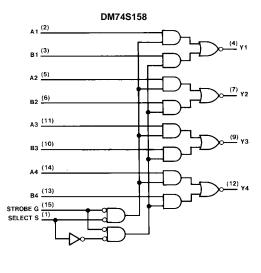
Function Table

Inputs				Output Y			
Strobe	Select	Α	В	DM74S157	DM74S158		
Н	Х	Х	Х	L	Н		
L	L	L	Х	L	Н		
L	L	Н	Х	Н	L		
L	Н	Χ	L	L	Н		
L	Н	X	Н	Н	L		

- H = HIGH Level L = LOW Level X = Don't Care

Logic Diagrams





Absolute Maximum Ratings(Note 1)

Supply Voltage 7V Input Voltage 5.5V Operating Free Air Temperature Range $0^{\circ}\text{C to } +70^{\circ}\text{C}$ Storage Temperature Range $-65^{\circ}\text{C to } +150^{\circ}\text{C}$

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.

DM74157 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 _{ОН}	HIGH Level Output Current			-1	mA
I _{OL}	LOW Level Output Current			20	mA
T _A	Free Air Operating Temperature	0		70	°C

DM74S157 Electrical Characteristics

over recommended operating free air temperature (unless otherwise noted)

Symbol	Parameter	Conditions		Min	Typ (Note 2)	Max	Units
VI	Input Clamp Voltage	$V_{CC} = Min, I_I = -18 \text{ mA}$				-1.2	V
V _{OH}	HIGH Level	V _{CC} = Min, I _{OH} = Max		2.7	3.4		V
	Output Voltage	$V_{IL} = Max, V_{IH} = Min$		2.7	3.4		
V _{OL}	LOW Level	V _{CC} = Min, I _{OL} = Max				0.5	V
	Output Voltage	$V_{IH} = Min, V_{IL} = Max$					
I _I	Input Current @ Max Input Voltage	$V_{CC} = Max, V_I = 5.5V$				1	mA
I _{IH}	HIGH Level	V _{CC} = Max	S or G			100	μА
	Input Current	$V_I = 2.7V$	A or B			50	μΑ
I _{IL}	HIGH Level	V _{CC} = Max	S or G				mA
	Input Current	$V_I = 0.5V$	A or B			-2	IIIA
Ios	Short Circuit Output Current	V _{CC} = Max (Note 3)		-40		-100	mA
Icc	Supply Current	V _{CC} = Max (Note 4)			50	78	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: $\rm I_{\rm CC}$ is measured 4.5V applied to all inputs and all outputs OPEN.

DM74S157 Switching Characteristics

at $V_{CC}=5V$ and $T_A=25^{\circ}C$

				$R_L = 280\Omega$			
Symbol	Parameter	From (Input)	C _L =	C _L = 15 pF		C _L = 50 pF	
		To (Output)	Min	Max	Min	Max	
t _{PLH}	Propagation Delay Time	Data to Y		7.5		10	ns
	LOW-to-HIGH Level Output	Data to 1		7.5		10	113
t _{PHL}	Propagation Delay Time	Data to Y		6.5		10	ns
	HIGH-to-LOW Level Output	Data 10 1		0.5			
t _{PLH}	Propagation Delay Time	Strobe to Y		12.5		15	ns
	LOW-to-HIGH Level Output			12.5			
t _{PHL}	Propagation Delay Time	Strobe to Y		12		15	ns
	HIGH-to-LOW Level Output	Strobe to 1		12		13	115
t _{PLH}	Propagation Delay Time	Select to Y		15		17	ns
	LOW-to-HIGH Level Output	Select to 1		13		17	113
t _{PHL}	Propagation Delay Time	Select to Y		15		17	ns
	HIGH-to-LOW Level Output	Sciect to 1	1	'5		l ''	113

DM74S158 Recommended Operating Conditions

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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
Гон	HIGH Level Output Current			-1	mA
I _{OL}	LOW Level Output Current			20	mA
T _A	Free Air Operating Temperature	0		70	°C

DM74S158 Electrical Characteristics

over recommended operating free air temperature (unless otherwise noted)

Symbol	Parameter	Conditions		Min	Typ (Note 5)	Max	Units
VI	Input Clamp Voltage	$V_{CC} = Min, I_I = -18 \text{ mA}$				-1.2	V
V _{OH}	HIGH Level	V _{CC} = Min, I _{OH} = Max		2.7	3.4		V
	Output Voltage	$V_{IL} = Max, V_{IH} = Min$		2.1	3.4		V
V _{OL}	LOW Level	V _{CC} = Min, I _{OL} = Max				0.5	V
	Output Voltage	$V_{IH} = Min, V_{IL} = Max$				0.5	V
I	Input Current @ Max Input Voltage	$V_{CC} = Max, V_I = 5.5V$				1	mA
I _{IH}	HIGH Level	V _{CC} = Max	S or G			100	μА
	Input Current	$V_I = 2.7V$	A or B			50	μΑ
I _{IL}	LOW Level	V _{CC} = Max	S or G			-4	mA
	Input Current	$V_I = 0.5V$	A or B			-2	IIIA
Ios	Short Circuit Output Current	V _{CC} = Max (Note 6)		-40		-100	mA
I _{CC1}	Supply Current	V _{CC} = Max (Note 7)			39	61	mA
I _{CC2}	Supply Current	V _{CC} = Max (Note 8)				81	mA

Note 5: All typicals are at $V_{CC} = 5V$, $T_A = 25$ °C.

Note 6: Not more than one output should be shorted at a time, and the duration should not exceed one second.

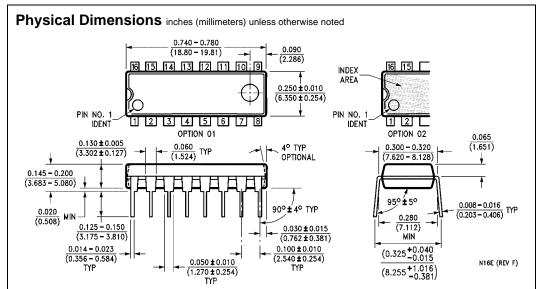
Note 7: $\rm I_{\rm CC1}$ is measured with all outputs OPEN and all inputs at 4.5V.

 $\textbf{Note 8:} \ I_{\text{CC2}} \ \text{is measured with B, G, and S inputs grounded, A inputs at 4.5V, and all outputs OPEN.}$

DM74S158 Switching Characteristics

at $V_{CC} = 5V$ and $T_A = 25~^{\circ}C$

			$R_L = 280\Omega$				
Symbol	Parameter	From (Input)	C _L =	C _L = 15 pF		C _L = 50 pF	
		To (Output)	Min	Max	Min	Max	
t _{PLH}	Propagation Delay Time	Data to Y		6		9	ns
	LOW to-HIGH Level Output	Data to 1		0		3	113
t _{PHL}	Propagation Delay Time	Data to Y		6		9	ns
	HIGH-to-LOW Level Output	Σαια ΙΟ Ι		0			113
t _{PLH}	Propagation Delay Time	Strobe to Y		11.5		12	ns
	LOW-to-HIGH Level Output		11.0	11.5			113
t _{PHL}	Propagation Delay Time	Strobe to Y		12		14	ns
	HIGH-to-LOW Level Output	Chope to 1		1.2		1-4	110
t _{PLH}	Propagation Delay Time	Select to Y		12		15	ns
	LOW-to-HIGH Level Output	Ocident to 1		12		13	113
t _{PHL}	Propagation Delay Time	Select to Y		12		15	ns
	HIGH-to-LOW Level Output	00,000 10 1		12	15		113



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

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