National Semiconductor

DM74ALS257/DM74ALS258 TRI-STATE® 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 TRI-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 ALS257 presents true data whereas the ALS258 presents inverted data to minimize propagation delay time.

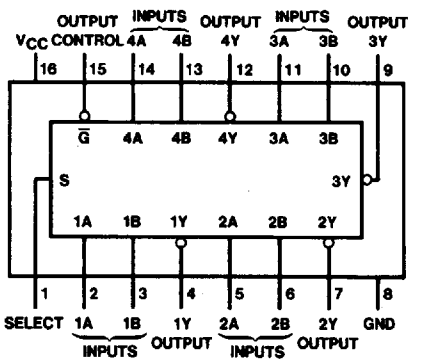
This TRI-STATE output feature means that n-bit (paralleled) data selectors with up to 258 sources can be implemented for data buses. It also permits the use of standard TTL registers for data retention throughout the system.

Features

- 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 and low power Schottky TTL counterpart
- Improved AC performance over Schottky and low power Schottky counterparts
- TRI-STATE buffer-type outputs 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

Connection Diagram

Dual-In-Line Package



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Order Number DM74ALS257M, DM74ALS258M, DM74ALS257N, DM74ALS258N
See NS Package Number M16A or N16A

Function Table

Inputs				Output Y	
Output Control	Select	A	B	ALS257	ALS258
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)

Absolute Maximum Ratings

Supply Voltage	7V
Input Voltage	7V
Voltage Applied to Disabled Output	5.5V
Operating Free Air Temperature Range	
DM74ALS	0°C to +70°C
Storage Temperature Range	−65°C to +150°C
Typical θ_{JA}	
N Package	73.0°C/W
M Package	102.0°C/W

Note: *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.*

Recommended Operating Conditions

Symbol	Parameter	DM74ALS257, 258			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			−2.6	mA
I_{OL}	Low Level Output Current			24	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				−1.5	V
V_{OH}	High Level Output Voltage		V_{CC} = 4.5V	I_{OH} = −2.6 mA	2.4	3.3		V
			I_{OH} = −0.4 mA		V_{CC} − 2			V
V_{OL}	Low Level Output Voltage		V_{CC} = 4.5V	I_{OL} = 12 mA		0.25	0.4	V
				I_{OL} = 24 mA		0.35	0.5	V
I_I	Input Current at Max Input Voltage		V_{CC} = 5.5V, V_{IH} = 7V				0.1	mA
I_{IH}	High Level Input Current		V_{CC} = 5.5V, V_{IH} = 2.7V				20	μA
I_{IL}	Low Level Input Current		V_{CC} = 5.5V, V_{IL} = 0.4V				−0.1	mA
I_O	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				20	μA
I_{OZL}	Off-State Output Current, Low Level Voltage Applied		V_{CC} = 5.5V, V_O = 0.4V				−20	μA
I_{CCH}	Supply Current	ALS257	V_{CC} = 5.5V Outputs Open	Outputs High		3	6	mA
		ALS258				2.5	4	mA
I_{CCL}	Supply Current	ALS257		Outputs Low		8	12	mA
		ALS258				7	11	mA
I_{CCZ}	Supply Current	ALS257		Outputs Disabled		9	14	mA
		ALS258				8	13	mA

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'ALS257 Switching Characteristics over recommended operating free air temperature range (Note 1)

Symbol	Parameter	Conditions	From	To	DM74ALS257		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	Any Y	2	10	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		Data	Any Y	2	12	ns
t_{PLH}	Propagation Delay Time Low to High Level Output		Select	Any Y	4	18	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		Select	Any Y	5	22	ns
t_{ZH}	Output Enable Time to High Level		Output Control	Any Y	4	16	ns
t_{ZL}	Output Enable Time to Low Level		Output Control	Any Y	5	18	ns
t_{HZ}	Output Disable Time from High Level		Output Control	Any Y	2	10	ns
t_{LZ}	Output Disable Time from Low Level		Output Control	Any Y	3	15	ns

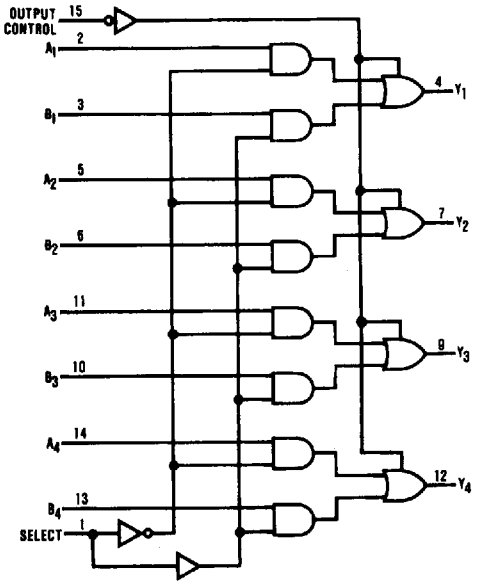
'ALS258 Switching Characteristics over recommended operating free air temperature range (Note 1)

Symbol	Parameter	Conditions	From	To	DM74ALS258		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	Any Y	2	8	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		Data	Any Y	2	7	ns
t_{PLH}	Propagation Delay Time Low to High Level Output		Select	Any Y	3	20	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		Select	Any Y	5	25	ns
t_{ZH}	Output Enable Time to High Level		Output Control	Any Y	5	18	ns
t_{ZL}	Output Enable Time to Low Level		Output Control	Any Y	5	18	ns
t_{HZ}	Output Disable Time from High Level		Output Control	Any Y	2	10	ns
t_{LZ}	Output Disable Time from Low Level		Output Control	Any Y	3	18	ns

Note 1: See Section 5 for test waveforms and output load.

Logic Diagrams

ALS257



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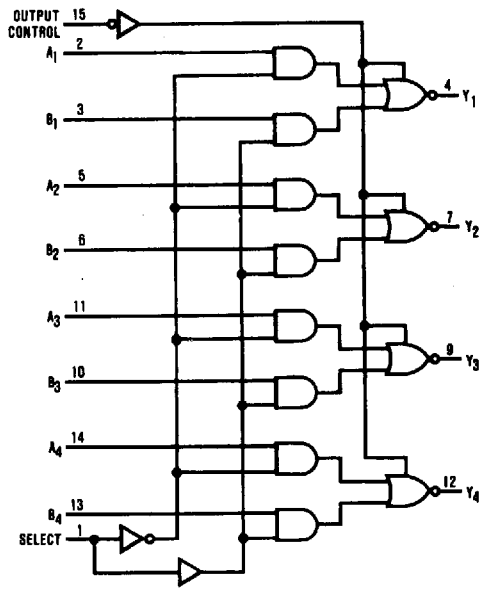
ALS258



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