

## DM74AS257/DM74AS258 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 AS257 presents true data whereas the AS258 presents inverted data to minimize propagation delay time.

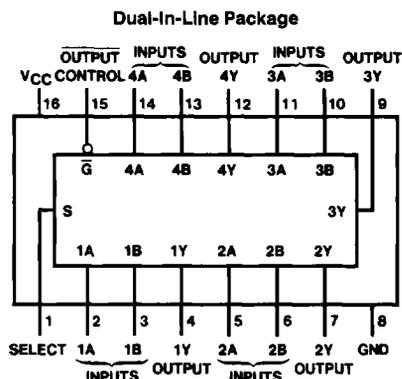
This TRI-STATE output feature means that n-bit (paralleled) data selectors with up to 300 sources can be implemented for data buses. It also permits the use of standard TTL registers for data retention throughout the system.

### 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
- TRI-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

### Connection Diagram



TL/F/6107-1

Order Number DM74AS257M, DM74AS258M, DM74AS257N or DM74AS258N  
See NS Package Number M16A or N16A

### Function Table

OUTPUT CONTROL	INPUTS			OUTPUT Y	
	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)

## Absolute Maximum Ratings

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 $\theta_{JA}$ N Package	75.0°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	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  $V_{CC} = 5V$ ,  $T_A = 25^\circ C$ .

Symbol	Parameter	Conditions	Min	Typ	Max	Units	
$V_{IK}$	Input Clamp Voltage	$V_{CC} = 4.5V$ , $I_I = -18\text{ mA}$			-1.2	V	
$V_{OH}$	High Level Output Voltage	$V_{CC} = 4.5V$ , $I_{OH} = \text{Max}$	2.4	3.2		V	
		$I_{OH} = -2\text{ mA}$ , $V_{CC} = 4.5V\text{ to }5.5V$	$V_{CC} - 2$			V	
$V_{OL}$	Low Level Output Voltage	$V_{CC} = 4.5V$ , $I_{OL} = \text{Max}$		0.35	0.5	V	
$I_I$	Input Current @ Max Input Voltage	$V_{CC} = 5.5V$ , $V_{IH} = 7V$	A, B, $\bar{C}$		0.1	mA	
			Select		0.2		
$I_{IH}$	High Level Input Current	$V_{CC} = 5.5V$ , $V_{IH} = 2.7V$	A, B, $\bar{C}$		20	$\mu A$	
			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 1)	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	$\mu A$	
$I_{OZL}$	Off-State Output Current, Low Level Voltage Applied	$V_{CC} = 5.5V$ $V_O = 0.4V$			-50	$\mu A$	
$I_{CCH}$	Supply Current	AS257	$V_{CC} = 5.5V$ Outputs Open	Outputs High	12.9	19.7	mA
		AS258			8.8	13.5	mA
$I_{CCL}$	Supply Current	AS257		Outputs Low	19	30.6	mA
		AS258			15.8	24.6	mA
$I_{CCZ}$	Supply Current	AS257		Outputs Disabled	19.7	31.9	mA
		AS258			15.5	25.2	mA

Note 1: The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current,  $I_{OS}$ .

**'AS257 Switching Characteristics** over recommended operating free air temperature range (Note 1)

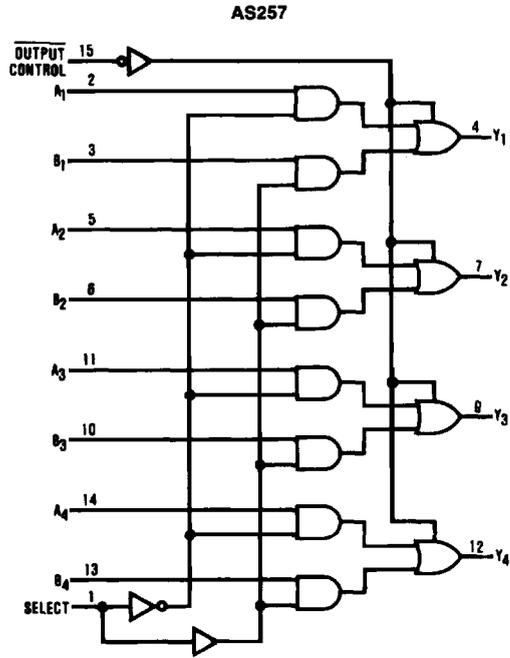
Symbol	Parameter	From	To	Conditions	Min	Max	Units
t <sub>PLH</sub>	Propagation Delay Time, Low to High Level Output	Data	Any Y	V <sub>CC</sub> = 4.5V to 5.5V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500Ω	1	5.5	ns
t <sub>PHL</sub>	Propagation Delay Time, High to Low Level Output				1	6	ns
t <sub>PLH</sub>	Propagation Delay Time, Low to High Level Output	Select	Any Y		2	11	ns
t <sub>PHL</sub>	Propagation Delay Time, High to Low Level Output				2	10	ns
t <sub>PZH</sub>	Output Enable Time to High Level	OUTPUT Control	Any Y		2	7.5	ns
t <sub>PZL</sub>	Output Enable Time to Low Level				2	9.5	ns
t <sub>PHZ</sub>	Output Disable Time, from High Level	OUTPUT Control	Any Y		1.5	6.5	ns
t <sub>PLZ</sub>	Output Disable Time, from Low Level				2	7	ns

**'AS258 Switching Characteristics** over recommended operating free air temperature range (Note 1)

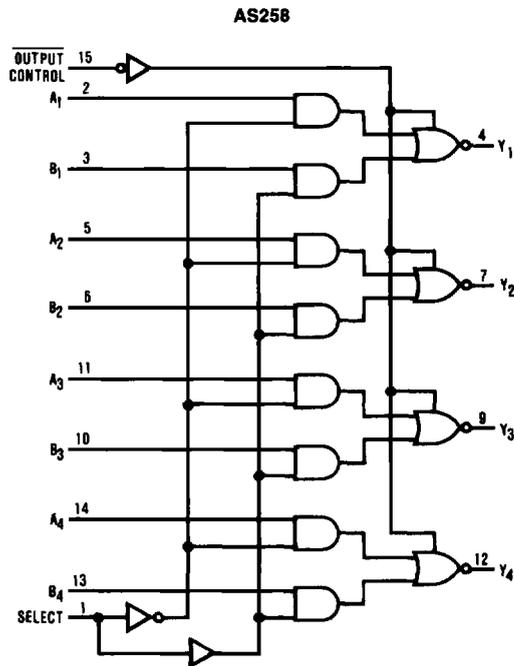
Symbol	Parameter	From	To	Conditions	Min	Max	Units
t <sub>PLH</sub>	Propagation Delay Time, Low to High Level Output	Data	Any Y	V <sub>CC</sub> = 4.5V to 5.5V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500Ω	1	5	ns
t <sub>PHL</sub>	Propagation Delay Time, High to Low Level Output				1	4	ns
t <sub>PLH</sub>	Propagation Delay Time, Low to High Level Output	Select	Any Y		2	9.5	ns
t <sub>PHL</sub>	Propagation Delay Time, High to Low Level Output				2	10	ns
t <sub>PZH</sub>	Output Enable Time to High Level	OUTPUT Control	Any Y		2	8	ns
t <sub>PZL</sub>	Output Enable Time to Low Level				2	10	ns
t <sub>PHZ</sub>	Output Disable Time, from High Level	OUTPUT Control	Any Y		1.5	6	ns
t <sub>PLZ</sub>	Output Disable Time, from Low Level				2	6.5	ns

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

Logic Diagrams



TL/F/6107-2



TL/F/6107-3