National Semiconductor

DM74AS245
Octal Bus Transceiver with TRI-STATE® Outputs

General Description

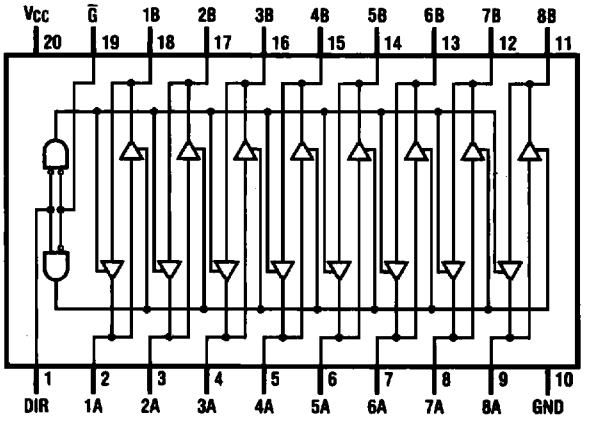
This advanced Schottky device contains 8 pairs of TRI-STATE logic elements configured as octal bus transceivers. These circuits are designed for use in memory, microprocessor systems and in asynchronous bidirectional data buses. Two way communication between buses is controlled by the (DIR) input. Data transmits either from the A bus to the B bus or from the B bus to the A bus. Both the driver and receiver outputs can be disabled via the ($\overline{G}$) enable input which causes outputs to enter the high impedance mode so that the buses are effectively isolated.

Features

- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Non-inverting logic output
- TRI-STATE outputs independently controlled on A and B buses
- Low output impedance to drive terminated transmission lines to 133Ω
- Switching response specified into 500Ω/50 pF
- Specified to interface with CMOS at $V_{OH} = V_{CC} - 2V$
- PNP inputs reduce input loading
- Switching specifications guaranteed over full temperature and V_{CC} range

Connection Diagram

Dual-In-Line Package



TL/F/6299–1

Order Number DM74AS245WM or DM74AS245N
See NS Package Number M20B or N20A

Function Table

Control Inputs		Operation
$\overline{G}$	DIR	
L	L	B Data to A Bus
L	H	A Data to B Bus
H	X	Hi-Z

Absolute Maximum Ratings

Supply Voltage, V_{CC}	7V
Input Voltage	
Control Inputs	7V
I/O Ports	5.5V
Operating Free Air Temperature Range	0°C to 70°C
Storage Temperature Range	−65°C to +150°C
Typical θ_{JA}	
N Package	51.5°C/W
M Package	76.0°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	Typ	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

Symbol	Parameter	Conditions		Min	Typ	Max	Units
V_{IK}	Input Clamp Voltage	V_{CC} = 4.5V, I_{IN} = −18 mA				−1.2	V
V_{OH}	High Level Output Voltage	V_{CC} = 4.5V, I_{OH} = −3 mA		2.4	3.2		V
		V_{CC} = 4.5V, I_{OH} = −15 mA		2	2.3		
		I_{OH} = −2 mA, V_{CC} = 4.5V to 5.5V		V_{CC} − 2			
V_{OL}	Low Level Output Voltage	V_{CC} = 4.5V, I_{OL} = Max			0.35	0.55	V
I_I	Input Current at Max Input Voltage	V_{CC} = 5.5V, V_{IN} = 7V, (V_{IN} = 5.5V for A or B Ports)				0.1	mA
I_{IH}	High Level Input Current	V_{CC} = 5.5V, V_{IN} = 2.7V	Control Inputs			20	μA
			A or B Ports			70	
I_{IL}	Low Level Input Current	V_{CC} = 5.5V, V_{IN} = 0.4V	Control Inputs			−0.5	mA
			A or B Ports			−0.75	
I_O	Output Drive Current	V_{CC} = 5.5V, V_{OUT} = 2.25V		−50		−150	mA
I_{CC}	Supply Current	V_{CC} = 5.5V	Output High		62	97	mA
			Output Low		95	149	
			TRI-STATE		79	123	

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

Symbol	Parameter	Conditions	From	To	Min	Max	Units
t_{PLH}	Propagation Delay Time High-to-Low Level Output	V_{CC} = 4.5V to 5.5V, $R_1 = R_2$ = 500Ω, C_L = 50 pF	A or B	B or A	2	7.5	ns
t_{PHL}	Propagation Delay Time High-to-Low Level Output		A or B	B or A	2	7	ns
t_{PZL}	Output Enable Time to Low Level		$\overline{G}$	A or B	2	8.5	ns
t_{PZH}	Output Enable Time to High Level		$\overline{G}$	A or B	2	9	ns
t_{PLZ}	Output Disable Time from Low Level		$\overline{G}$	A or B	2	9.5	ns
t_{PHZ}	Output Disable Time from High Level		$\overline{G}$	A or B	2	5.5	ns

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