FAIRCHILD SEMICONDUCTOR™

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DM74AS640
3-STATE Octal Bus Transceiver

General Description

This advanced Schottky device contains 8 pairs of 3-STATE logic elements configured as octal bus transceiver. This circuit is designed for use in memory, microprocessor systems and in asynchronous bidirectional data buses. This device transmits data from the A bus to the B bus, or vice versa, depending upon the logic level of the direction control input (DIR). The enable input ($\overline{G}$) can be used to disable the devices, effecting isolation of buses A and B.

The 3-STATE circuitry also contains a protection feature that prevents these transceivers from glitching the bus during power-up or power-down.

Features

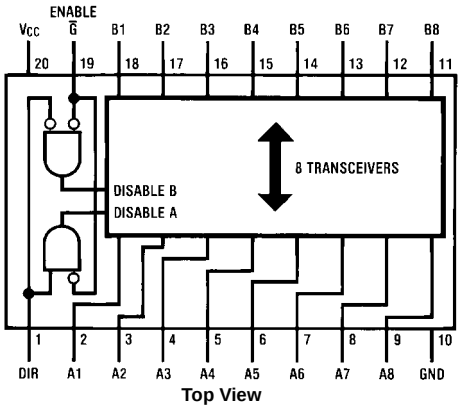
- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and V_{CC} range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with Schottky, low power Schottky, and advanced low power Schottky TTL counterpart
- Improved AC performance over Schottky, low power Schottky, and advanced low power Schottky counterparts
- 3-STATE outputs independently controlled on A and B buses
- Low output impedance drive to drive terminated transmission lines to 133Ω
- Specified to interface with CMOS at $V_{OH} = V_{CC} - 2V$

Ordering Code:

Order Number	Package Number	Package Description
DM74AS640WM	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
DM74AS640N	N20A	20-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



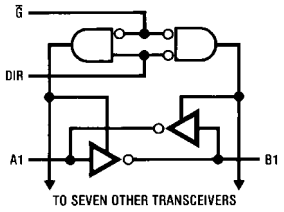
Top View

Function Table

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

H = HIGH Logic Level
L = LOW Logic Level
X = Immaterial

Logic Diagram



Absolute Maximum Ratings(Note 1)

Supply Voltage	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
M Package	69.0°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	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			64	mA
T_A	Free Air Operating Temperature	0		70	°C

Electrical Characteristics

over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions		Min	Typ (Note 2)	Max	Units
V_I	Input Clamp Voltage	V_{CC} = Min, I_I = −18 mA				−1.2	V
V_{OH}	HIGH Level Output Voltage	V_{CC} = 4.5V to 5.5V, I_{OH} = −2 mA		V_{CC} − 2			V
		V_{CC} = 4.5V, I_{OH} = −3 mA		2.4			V
		V_{CC} = 4.5V, I_{OH} = Max		2.4			V
V_{OL}	LOW Level Output Voltage	V_{CC} = Min, I_{OL} = Max			0.35	0.55	V
I_I	Input Current at Max Input Voltage	V_{CC} = Max, V_I = 7V, (V_I = 5.5V for A or B Ports)				0.1	mA
I_{IH}	HIGH Level Input Current	V_{CC} = Max	Control Inputs			20	µA
		V_I = 2.7V (Note 3)	A or B Ports			70	
I_{IL}	LOW Level Input Current	V_{CC} = Max,	Control Inputs			−0.5	mA
		V_I = 0.4V (Note 3)	A or B Ports			−0.75	
I_O	Output Drive Current	V_{CC} = Max, V_O = 2.25V		−50		−150	mA
I_{CCH}	Supply Current with Outputs HIGH	V_{CC} = Max			37	58	mA
I_{CCL}	Supply Current with Outputs LOW				78	123	mA
I_{CCZ}	Supply Current with Outputs in 3-STATE				51	80	mA

Note 2: All typicals are at V_{CC} = 5.0V, T_A = 25°C.

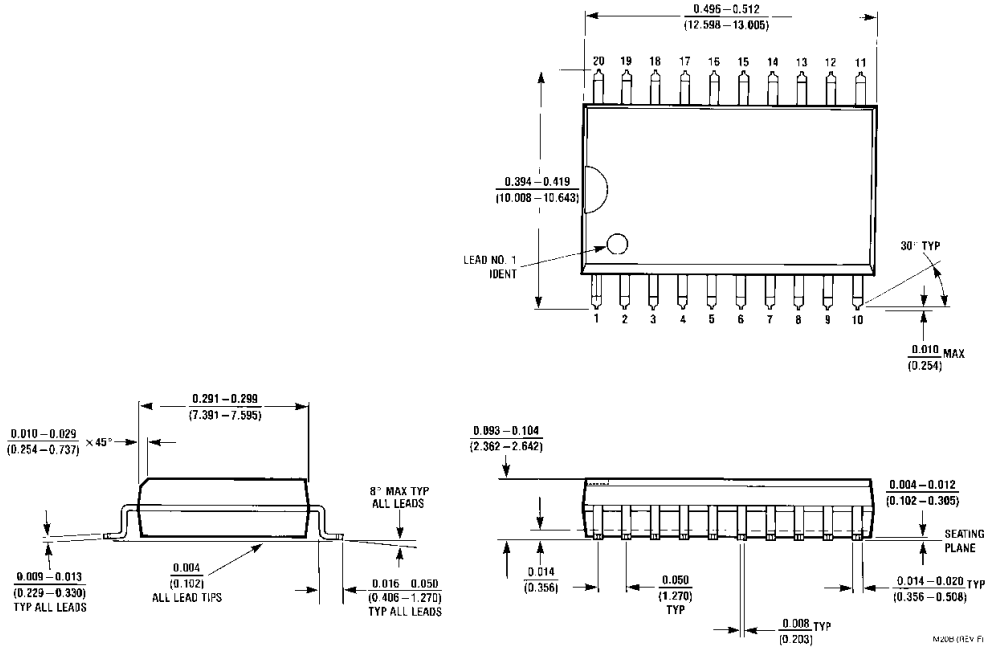
Note 3: For I/O ports, the parameters I_{IH} and I_{IL} include the OFF-State output current, I_{OZH} and I_{OZL}.

Switching Characteristics

over recommended operating free air temperature range (unless otherwise noted)

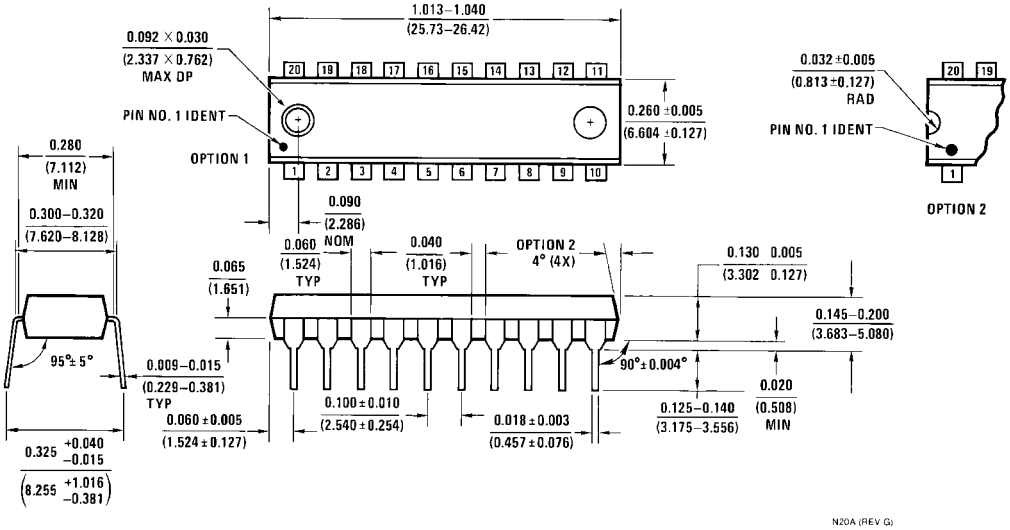
Symbol	Parameter	From (Input)	To (Output)	V_{CC} = Min to Max, C_L = 50 pF, $R_1 = R_2$ = 500Ω		Units
				Min	Max	
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	A or B	B or A	2	7	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	A or B	B or A	2	6	ns
t_{PZH}	Output Enable Time to HIGH Level Output	$\overline{G}$	A or B	2	8	ns
t_{PZL}	Output Enable Time to LOW Level Output	$\overline{G}$	A or B	2	10	ns
t_{PHZ}	Output Disable Time from HIGH Level Output	$\overline{G}$	A or B	2	8	ns
t_{PLZ}	Output Disable Time from LOW Level Output	$\overline{G}$	A or B	2	13	ns

Physical Dimensions inches (millimeters) unless otherwise noted



20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
Package Number M20B

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
Package Number N20A