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October 1986  
Revised March 2000

## 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 ( $\bar{G}$ ) 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

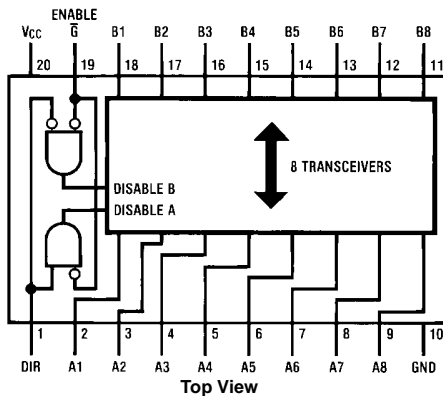
- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and  $V_{CC}$  range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with Schottky, low power Schottky, and advanced low power Schottky TTL counterpart
- 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  $133\Omega$
- Specified to interface with CMOS at  $V_{OH} = V_{CC} - 2V$

### Ordering Code:

Order Number	Package Number	Package Description
DM74AS640WVM	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

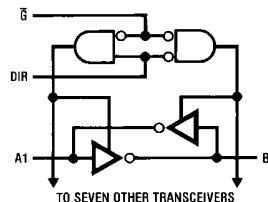


### Function Table

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

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

### Logic Diagram



DM74AS640

### 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 $\theta_{JA}$	
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	$V_{CC} = \text{Min}, I_I = -18 \text{ mA}$			-1.2	V	
$V_{OH}$	HIGH Level Output Voltage	$V_{CC} = 4.5\text{V to } 5.5\text{V}, I_{OH} = -2 \text{ mA}$	$V_{CC} - 2$			V	
		$V_{CC} = 4.5\text{V}, I_{OH} = -3 \text{ mA}$	2.4			V	
		$V_{CC} = 4.5\text{V}, I_{OH} = \text{Max}$	2.4			V	
$V_{OL}$	LOW Level Output Voltage	$V_{CC} = \text{Min}, I_{OL} = \text{Max}$		0.35	0.55	V	
$I_I$	Input Current at Max Input Voltage	$V_{CC} = \text{Max}, V_I = 7\text{V}, (V_I = 5.5\text{V for A or B Ports})$			0.1	mA	
$I_{IH}$	HIGH Level Input Current	$V_{CC} = \text{Max}$			20	$\mu\text{A}$	
		$V_I = 2.7\text{V (Note 3)}$	Control Inputs		70		
$I_{IL}$	LOW Level Input Current	$V_{CC} = \text{Max}, V_I = 0.4\text{V (Note 3)}$			-0.5	mA	
			Control Inputs		-0.75		
$I_O$	Output Drive Current	$V_{CC} = \text{Max}, V_O = 2.25\text{V}$	-50		-150	mA	
$I_{CCH}$	Supply Current with Outputs HIGH	$V_{CC} = \text{Max}$		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

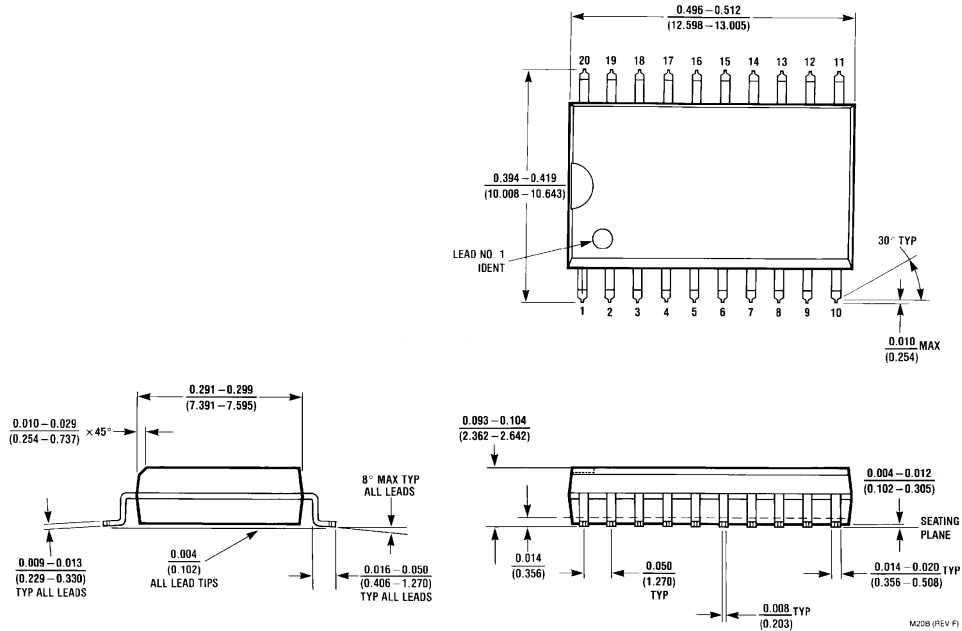
**Note 2:** All typicals are at  $V_{CC} = 5.0\text{V}, T_A = 25^\circ\text{C}$ .

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

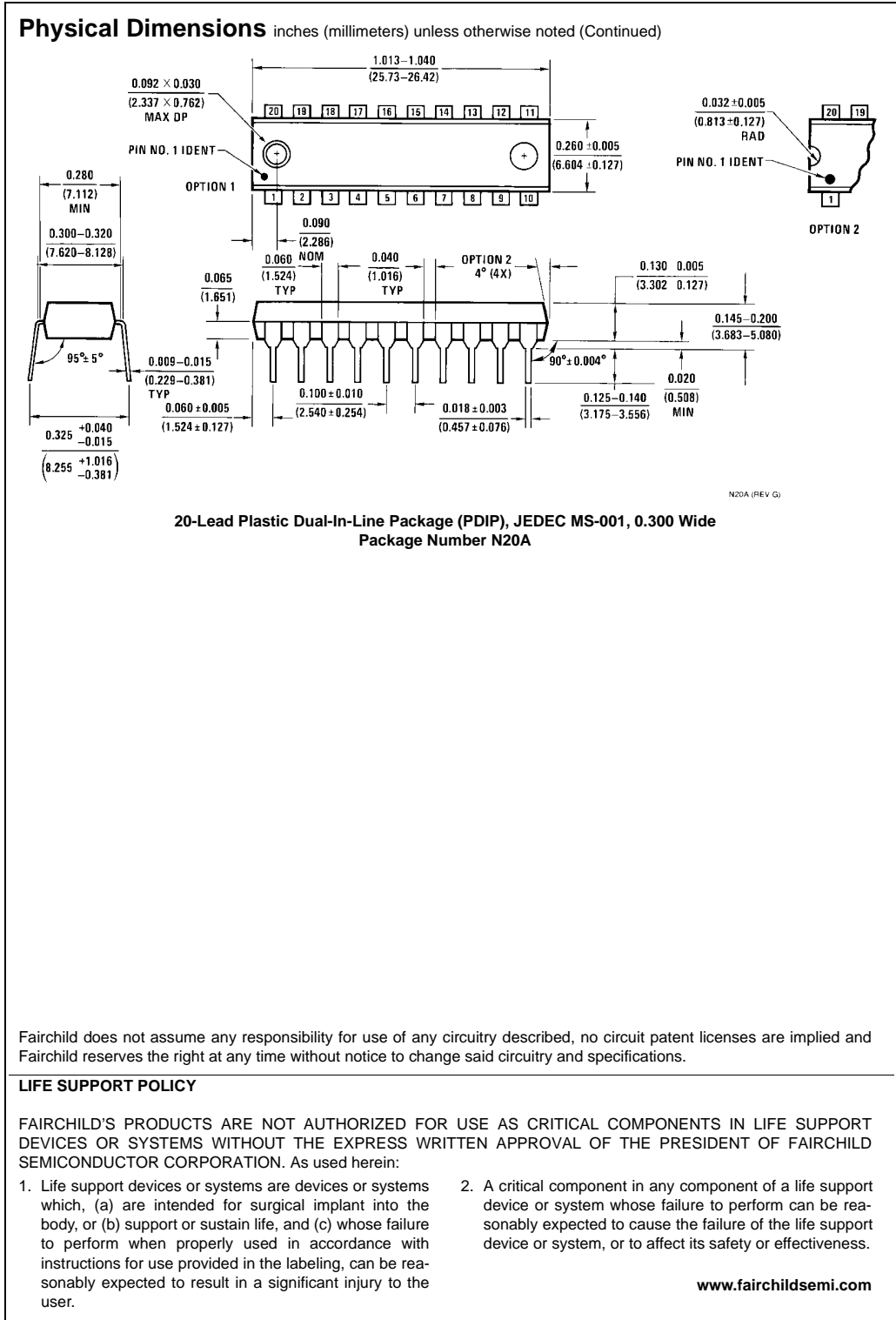
<b>Switching Characteristics</b>						
over recommended operating free air temperature range (unless otherwise noted)						
Symbol	Parameter	From (Input)	To (Output)	V <sub>CC</sub> = Min to Max, C <sub>L</sub> = 50 pF, R <sub>1</sub> = R <sub>2</sub> = 500Ω		Units
				Min	Max	
t <sub>PLH</sub>	Propagation Delay Time LOW-to-HIGH Level Output	A or B	B or A	2	7	ns
t <sub>PHL</sub>	Propagation Delay Time HIGH-to-LOW Level Output	A or B	B or A	2	6	ns
t <sub>PZH</sub>	Output Enable Time to HIGH Level Output	$\overline{G}$	A or B	2	8	ns
t <sub>PZL</sub>	Output Enable Time to LOW Level Output	$\overline{G}$	A or B	2	10	ns
t <sub>PHZ</sub>	Output Disable Time from HIGH Level Output	$\overline{G}$	A or B	2	8	ns
t <sub>PLZ</sub>	Output Disable Time from LOW Level Output	$\overline{G}$	A or B	2	13	ns

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



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



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