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FAIRCHILD SEMICONDUCTOR™

March 1987
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DM74ALS645A
Octal Bus Transceivers

General Description

These octal bus transceivers are designed for asynchronous two-way communication between data busses. These devices transmit data from the A bus to the B bus or from the B bus to the A bus depending upon the level at the direction control (DIR) input. The enable input (G) can be used to disable the device so the busses are effectively isolated.

Features

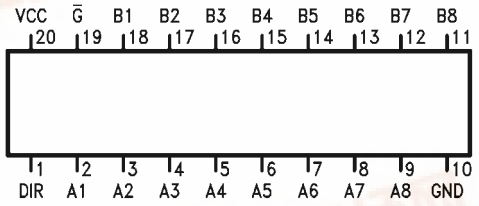
- Advanced Oxide-isolated Ion-implanted Schottky TTL process
- Switching performance is guaranteed over full temperature and V_{CC} supply range
- Switching performance specified at 50 pF
- PNP input design reduces input loading

Ordering Code:

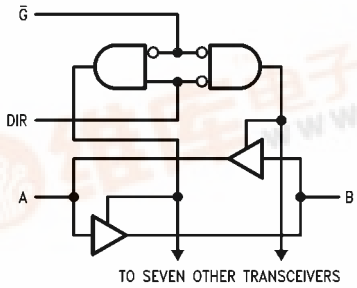
Order Number	Package Number	Package Description
DM74ALS645AWM	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
DM74ALS645AN	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Connection Diagram



Logic Diagram



Function Table

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

L = LOW Logic Level
H = HIGH Logic Level
X = Either LOW or HIGH Logic Level

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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	53.0°C/W
M Package	72.0°C/W

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			24	mA
T_A	Operating Free Air Temperature Range	0		70	°C

Electrical Characteristics

Over Recommended Free Air Temperature Range

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units
V_{IC}	Input Clamp Voltage	V_{CC} = Min, I_I = −18 mA				−1.5	V
V_{OH}	HIGH Level Output Voltage	V_{CC} = 4.5 to 5.5V	I_{OH} = −0.4 mA	V_{CC} − 2			V
		V_{CC} = Max	I_{OH} = − 3 mA	2.4	3.2		
			I_{OH} = Max	2			
V_{OL}	LOW Level Output Voltage	V_{CC} = Min	I_{OL} = 12 mA		0.25	0.4	V
			I_{OL} = 24 mA		0.35	0.5	
I_I	Input Current at Maximum Input Voltage	V_{CC} = Max	I/O Ports, V_I = 5.5V			100	µA
			Control Inputs, V_I = 7V			100	
I_{IH}	HIGH Level Input Current	V_{CC} = Max, V_I = 2.7V (Note 2)				20	µA
I_{IL}	LOW Level Input Current	V_{CC} = Max, V_I = 0.4V (Note 2)				−100	µA
I_O	Output Drive Current	V_{CC} = Max, V_O = 2.25V		−30		−112	mA
I_{CC}	Supply Current	V_{CC} = Max	Outputs HIGH		30	45	mA
			Outputs LOW		36	55	
			Outputs Disabled		38	58	

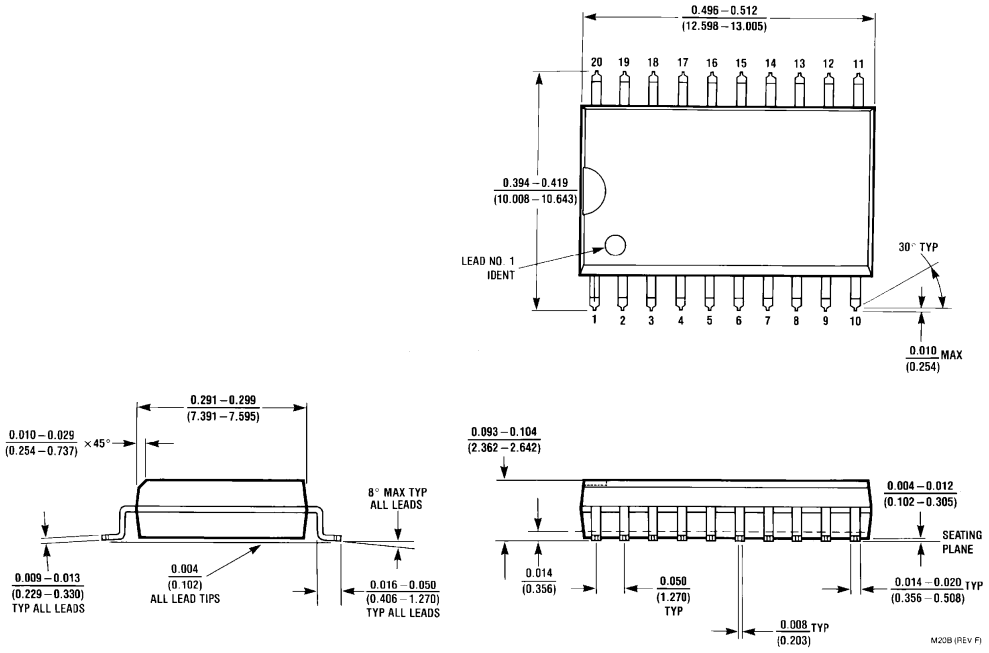
Note 2: For I/O ports, I_{IH} and I_{IL} parameters include the 3-STATE output current (I_{OZL} and I_{OZH}).

Switching Characteristics

Over Recommended Operating Free Air Temperature Range

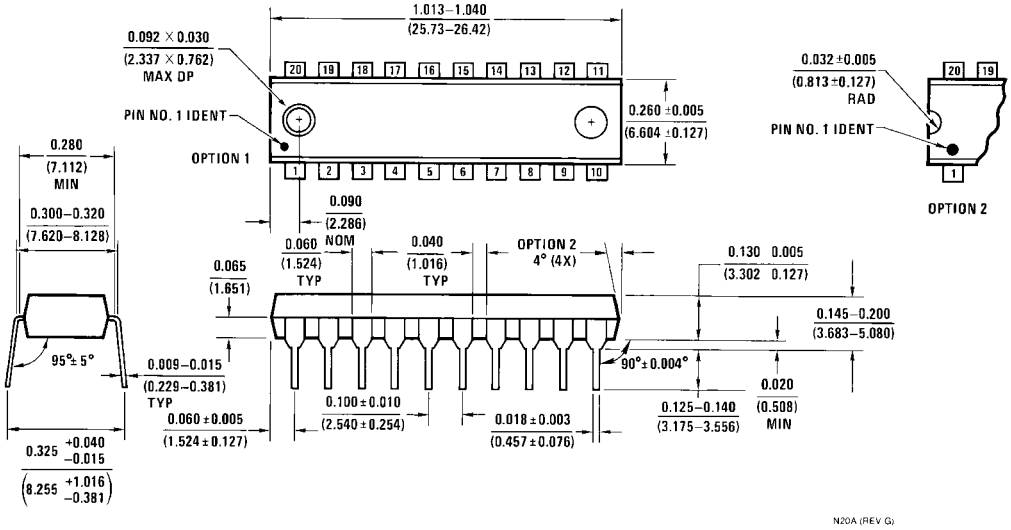
Symbol	Parameter	From (Input)	To (Output)	Conditions	Min	Max	Units
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	A or B	B or A	V_{CC} = 4.5 to 5.5V, C_L = 50 pF, R1 = R2 = 500Ω	3	10	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	A or B	B or A		3	10	ns
t_{PZH}	Output Enable Time to HIGH Level Output	$\overline{G}$	A or B		5	20	ns
t_{PZL}	Output Enable Time to LOW Level Output	$\overline{G}$	A or B		5	20	ns
t_{PHZ}	Output Disable Time from HIGH Level Output	$\overline{G}$	A or B		2	10	ns
t_{PLZ}	Output Disable Time from LOW Level Output	$\overline{G}$	A or B		4	15	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

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