FAIRCHILD SEMICONDUCTOR™

August 1986
Revised March 2000

DM74LS645
Octal Bus Transceiver

General Description

These octal bus transceivers are designed for asynchronous two-way communication between data buses. The 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 ($\overline{G}$) can be used to disable the device so that the buses are effectively isolated.

Features

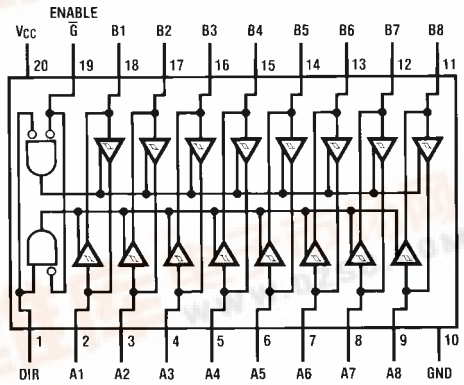
- Bi-directional bus transceivers in high-density 20-pin packages
- Hysteresis at bus inputs improves noise margins
- 3-STATE outputs

Ordering Code:

Order Number	Package Number	Package Description
DM74LS645WM	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
DM74LS645N	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		DM74LS645
$\overline{G}$	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

H = HIGH Level
L = LOW Level
X = Irrelevant

Absolute Maximum Ratings(Note 1)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	−55°C to +150°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	Nom	Max	Units
V_{CC}	Supply Voltage (Note 2)	4.75	5	5.25	V
V_{IH}	HIGH Level Input Voltage	2			V
V_{IL}	LOW Level Input Voltage			0.6	V
I_{OH}	HIGH Level Output Current			−15	mA
I_{OL}	LOW Level Output Current			24	mA
T_A	Free Air Operating Temperature	0		70	°C

Note 2: Voltage values are with respect to the network ground terminal.

Electrical Characteristics

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

Symbol	Parameter	Conditions (Note 3)			Min	Typ (Note 4)	Max	Units
V_I	Input Clamp Voltage	V_{CC} = Min, I_I = 18 mA					−1.5	V
H_{YS}	Hysteresis ($V_{T+} - V_{-}$) A or B Input	V_{CC} = Min			0.2	0.4		V
V_{OH}	HIGH Level Output Voltage	V_{CC} = Min, V_{IH} = 2V, V_{IL} = Max		I_{OH} = −3 mA	2.4	3.4		V
				I_{OH} = Max	2			
V_{OL}	LOW Level Output Voltage	V_{CC} = Min, V_{IH} = 2V, V_{IL} = Max		I_{OL} = 12 mA		0.25	0.4	V
				I_{OL} = 24 mA		0.35	0.5	
I_{OZH}	Off-State Output Current, HIGH Level Voltage Applied	V_{CC} = Max, G at 2V, V_O = 2.7V					20	µA
I_{OZL}	Off-State Output Current, LOW Level Voltage Applied	V_{CC} = Max, G at 2V V_O = 0.4V					−400	µA
I_I	Input Current at Maximum Input Voltage	V_{CC} = Max	A or B	V_I = 5.5V			0.1	mA
			DIR or G	V_I = 7V			0.1	
I_{IH}	HIGH Level Input Current	V_{CC} = Max, V_{IH} = 2.7					20	µA
I_{IL}	LOW Level Input Current	V_{CC} = Max, V_{IL} = 0.4V					−0.4	mA
I_{OS}	Short Circuit Output Current (Note 5)	V_{CC} = Max			−40		−225	mA
I_{CC}	Total Supply Current	Outputs HIGH		V_{CC} = Max, Outputs Open		48	70	mA
		Outputs LOW				62	90	
		Outputs at Hi-Z				64	95	

Note 3: For conditions shown as Min or Max, use the appropriate value specified under Recommended Operating Conditions.

Note 4: All typicals are at V_{CC} = 5V, T_A = 25°C.

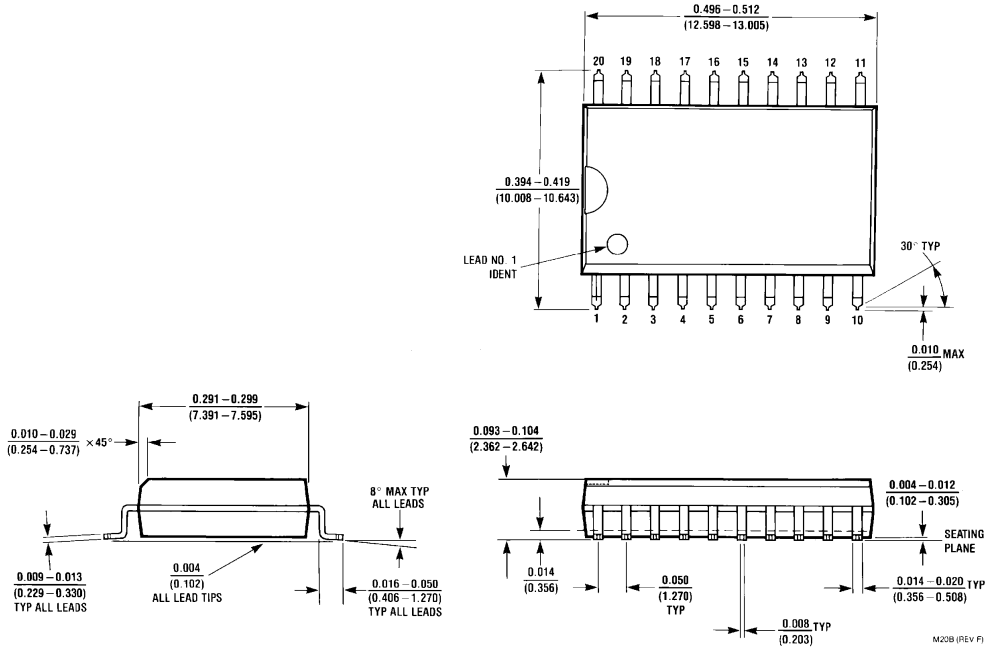
Note 5: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Switching Characteristics

at V_{CC} = 5V and T_A = 25°C

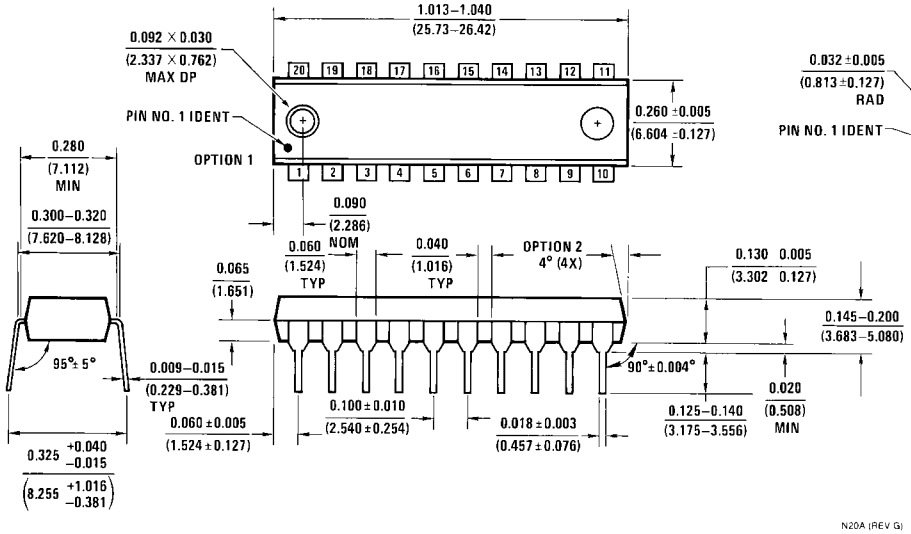
Symbol	Parameter	From (Input) To (Output)	R_L = 667Ω				Units
			C_L = 45 pF		C_L = 5 pF		
			Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	A to B		15			ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	A to B		15			ns
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	B to A		15			ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	B to A		15			ns
t_{PZL}	Output Enable Time to LOW Level	$\overline{G}$ to A		40			ns
t_{PZH}	Output Enable Time to HIGH Level	$\overline{G}$ to A		40			ns
t_{PZL}	Output Enable Time to LOW Level	$\overline{G}$ to B		40			ns
t_{PZH}	Output Enable Time to HIGH Level	$\overline{G}$ to B		40			ns
t_{PLZ}	Output Disable Time to LOW Level	$\overline{G}$ to A				25	ns
t_{PHZ}	Output Disable Time to HIGH Level	$\overline{G}$ to A				25	ns
t_{PLZ}	Output Disable Time to LOW Level	$\overline{G}$ to B				25	ns
t_{PHZ}	Output Disable Time to HIGH Level	$\overline{G}$ to B				25	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