

August 1986 Revised March 2000

DM74LS245 3-STATE Octal Bus Transceiver

General Description

These octal bus transceivers are designed for asynchronous two-way communication between data buses. The control function implementation minimizes external timing requirements.

The device allows data transmission from the A Bus to the B Bus or from the B Bus to the A Bus depending upon the logic 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

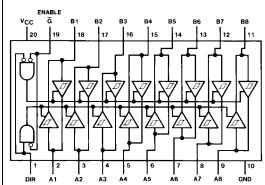
- Bi-Directional bus transceiver in a high-density 20-pin package
- 3-STATE outputs drive bus lines directly
- PNP inputs reduce DC loading on bus lines
- Hysteresis at bus inputs improve noise margins
- Typical propagation delay times, port-to-port 8 ns
- Typical enable/disable times 17 ns
- I_{OI} (sink current)
 - 24 mA
- I_{OH} (source current)
 - -15 mA

Ordering Code:

Order Number	Package Number	Package Description				
DM74LS245WM	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide				
DM74LS245SJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide				
DM74LS245N	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

Enable	Direction	Operation
G	Control	
	DIR	
L	L	B Data to A Bus
L	Н	A Data to B Bus
Н	X	Isolation

- H = HIGH Level
- L = LOW Level

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Absolute Maximum Ratings(Note 1)

 $\begin{array}{ccc} \text{Supply Voltage} & & 7\text{V} \\ \text{Input Voltage} & & & \\ \text{DIR or } \overline{\text{G}} & & 7\text{V} \\ \text{A or B} & & 5.5\text{V} \\ \end{array}$

Operating Free Air Temperature Range 0°C to $+70^{\circ}\text{C}$ Storage Temperature Range -65°C to $+150^{\circ}\text{C}$

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	4.75	5	5.25	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	Free Air Operating Temperature	0		70	°C

Electrical Characteristics

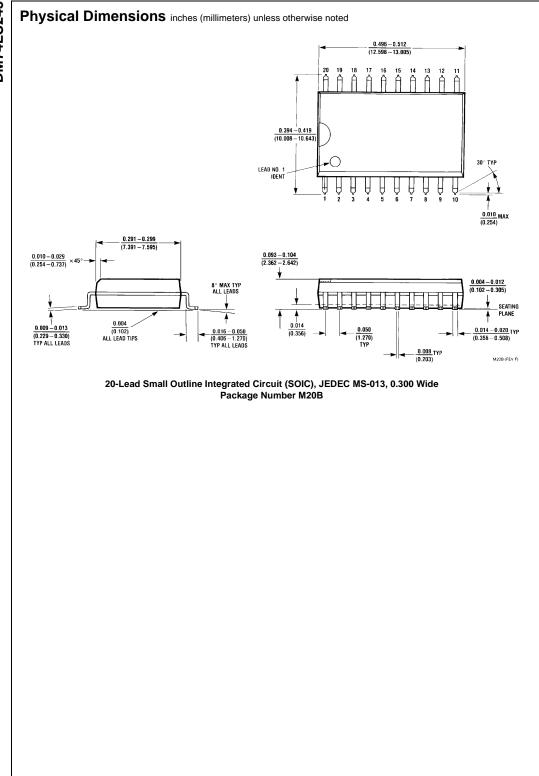
over recommended operating free air temperature range (unless otherwise noted)

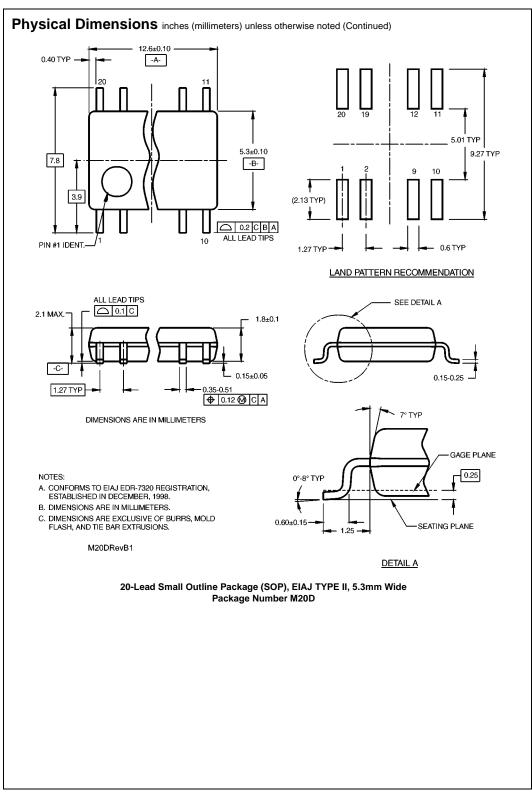
Symbol	Parameter	Conditions		Min	Typ (Note 2)	Max	Units		
VI	Input Clamp Voltage	$V_{CC} = Min, I_I = -18$	V _{CC} = Min, I _I = -18 mA				-1.5	V	
HYS	Hysteresis (V _{T+} – V _{T-})	V _{CC} = Min			0.2	0.4		V	
V _{OH}	HIGH Level Output Voltage	$V_{CC} = Min, V_{IH} = Min$ $V_{IL} = Max, I_{OH} = -1 \text{ mA}$		2.7					
		$V_{CC} = Min, V_{IL} = Min$ $V_{IL} = Max, I_{OH} = -3 \text{ mA}$			2.4	3.4		V	
		$V_{CC} = Min, V_{IH} = Min$ $V_{IL} = 0.5V, I_{OH} = Max$		2					
V _{OL}	LOW Level	V _{CC} = Min	$I_{OL} = 12 \text{ m/s}$	A			0.4		
	Output Voltage	$V_{IL} = Max$ $V_{IH} = Min$	I _{OL} = Max				0.5	V	
I _{OZH}	Off-State Output Current, HIGH Level Voltage Applied	V _{CC} = Max V _{IL} = Max	$V_{O} = 2.7V$ $V_{O} = 0.4V$				20	μА	
I _{OZL}	Off-State Output Current, LOW Level Voltage Applied	V _{IH} = Min					-200	μА	
I	Input Current at Maximum	V _{CC} = Max	A or B	$V_1 = 5.5V$			0.1	4	
	Input Voltage		DIR o	DIR or G	$V_1 = 7V$			0.1	mA
I _{IH}	HIGH Level Input Current	$V_{CC} = Max, V_1 = 2.$	$V_{CC} = Max, V_1 = 2.7V$				20	μΑ	
I _{IL}	LOW Level Input Current	$V_{CC} = Max, V_I = 0.4V$				-0.2	mA		
Ios	Short Circuit Output Current	V _{CC} = Max (Note 3)		-40		-225	mA		
I _{cc}	Supply Current Outputs HIGH				48	70			
		Outputs LOW	00			62	90	mA	
		Outputs at Hi-Z				64	95		

Note 2: All typicals are at $V_{CC} = 5V$, $T_A = 25$ °C.

Note 3: Not more than one output should be shorted at a time, not to exceed one second duration

Symbol	Parameter	Conditions	Min	Max	Units
t _{PLH}	Propagation Delay Time,	C _L = 45 pF		12	ns
	LOW-to-HIGH Level Output	$R_L = 667\Omega$		12	113
t _{PHL}	Propagation Delay Time,			12	ns
	HIGH-to-LOW Level Output			12	115
t _{PZL}	Output Enable Time			40	ns
	to LOW Level			40	115
t _{PZH}	Output Enable Time			40	ns
	to HIGH Level			40	115
t _{PLZ}	Output Disable Time	C _L = 5 pF		25	ns
	from LOW Level	$R_L = 667\Omega$		23	115
t _{PHZ}	Output Disable Time			25	ns
	from HIGH Level			25	113
t _{PLH}	Propagation Delay Time,	C _L = 150 pF		16	ns
	LOW-to-HIGH Level Output	$R_L = 667\Omega$		10	110
t _{PHL}	Propagation Delay Time,			17	ns
	HIGH-to-LOW Level Output			17	115
t _{PZL}	Output Enable Time			45	ns
	to LOW Level			40	115
t _{PZH}	Output Enable Time			45	ns
	to HIGH Level			45	ns





Physical Dimensions inches (millimeters) unless otherwise noted (Continued) 1 013-1 040 (25.73-26.42) 0.092 × 0.030 (2.337 × 0.762) MAX DP 0.032 ± 0.005 20 19 18 17 16 15 14 13 12 11 20 19 (0.813±0.127) RAD 0.260 ±0.005 PIN NO. 1 IDENT (6.604 = 0.127) PIN NO. 1 IDENT 0.280 OPTION 1 (7.112) MIN 1 2 3 4 5 6 7 8 9 10 0.090 OPTION 2 0.300-0.320 (2.286) (7.620-8.128) 0.060 NOM 0.040 OPTION 2 0.130 0.005 (1.524) (1.016) 4° (4 X) 0.065 (3.302 0.127) (1.651) TYP 0.145-0.200 (3.683 - 5.080)95°± 5° 0.009-0.015 90°±0.004° (0.229-0.381) TYP 0.060 ± 0.005 0.020 0.100 ± 0.010 0.125-0.140 (3.175-3.556) (0.508) 0.018 ± 0.003

(2.540 ± 0.254)

(1.524 ± 0.127)

 $0.325 \begin{array}{l} +0.040 \\[-4pt] -0.015\end{array}$

(8.255 +1.016) -0.381)

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

 (0.457 ± 0.076)

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N20A (REV G)

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