FAIRCHILD SEMICONDUCTOR™

March 1998

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.

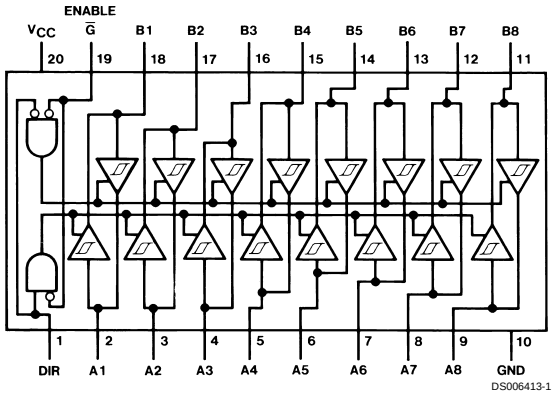
The device allows data transmission from the A bus to the B bus or from the B bus to the A bus depending upon the logic level at the direction control (DIR) input. The enable input ($\overline{G}$)can be used to disable the device so that the buses are effectively isolated.

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_{OL} (sink current)
  - 54LS 12 mA
  - 74LS 24 mA
- I_{OH} (source current)
  - 54LS −12 mA
  - 74LS −15 mA
- Alternate Military/Aerospace device (54LS245) is available. Contact a Fairchild Semiconductor Sales Office/Distributor for specifications.

Connection Diagram

Dual-In-Line Package



DS006413-1

Order Number 54LS245DMQB, 54LS245FMQB, 54LS245LMQB, DM54LS245J, DM54LS245W, DM74LS245WM or DM74LS245N
See Package Number E20A, J20A, M20B, N20A or W20A

Function Table

Enable $\overline{G}$	Direction Control DIR	Operation
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	
DIR or $\overline{G}$	7V
A or B	5.5V

Operating Free Air Temperature Range	
DM54LS and 54LS	−55˚C to +125˚C
DM74LS	0˚C to +70˚C
Storage Temperature Range	−65˚C to +150˚C

Recommended Operating Conditions

Symbol	Parameter	DM54LS245			DM74LS245			Units
		Min	Nom	Max	Min	Nom	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High Level Input Voltage	2			2			V
V_{IL}	Low Level Input Voltage			0.7			0.8	V
I_{OH}	High Level Output Current			−12			−15	mA
I_{OL}	Low Level Output Current			12			24	mA
T_A	Free Air Operating Temperature	−55		125	0		70	˚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" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.*

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					−1.5	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 mA		DM74	2.7			V
		V_{CC} = Min, V_{IL} = Min V_{IL} = Max, I_{OH} = −3 mA		DM54/DM74	2.4	3.4		
		V_{CC} = Min, V_{IH} = Min V_{IL} = 0.5V, I_{OH} = Max		DM54/DM74	2			
V_{OL}	Low Level Output Voltage	V_{CC} = Min	I_{OL} = 12 mA	DM74			0.4	V
		V_{IL} = Max	I_{OL} = Max	DM54			0.4	
		V_{IH} = Min		DM74			0.5	
I_{OZH}	Off-State Output Current, High Level Voltage Applied	V_{CC} = Max V_{IL} = Max	V_O = 2.7V				20	µA
I_{OZL}	Off-State Output Current, Low Level Voltage Applied	V_{IH} = Min	V_O = 0.4V				−200	µA
I_I	Input Current at Maximum Input Voltage	V_{CC} = Max	A or B	V_I = 5.5V			0.1	mA
			DIR or $\overline{G}$	V_I = 7V			0.1	
I_{IH}	High Level Input Current	V_{CC} = Max, V_I = 2.7V					20	µA
I_{IL}	Low Level Input Current	V_{CC} = Max, V_I = 0.4V					−0.2	mA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 3)			−40		−225	mA
I_{CC}	Supply Current	Outputs High		V_{CC} = Max		48	70	mA
		Outputs Low				62	90	
		Outputs at Hi-Z				64	95	

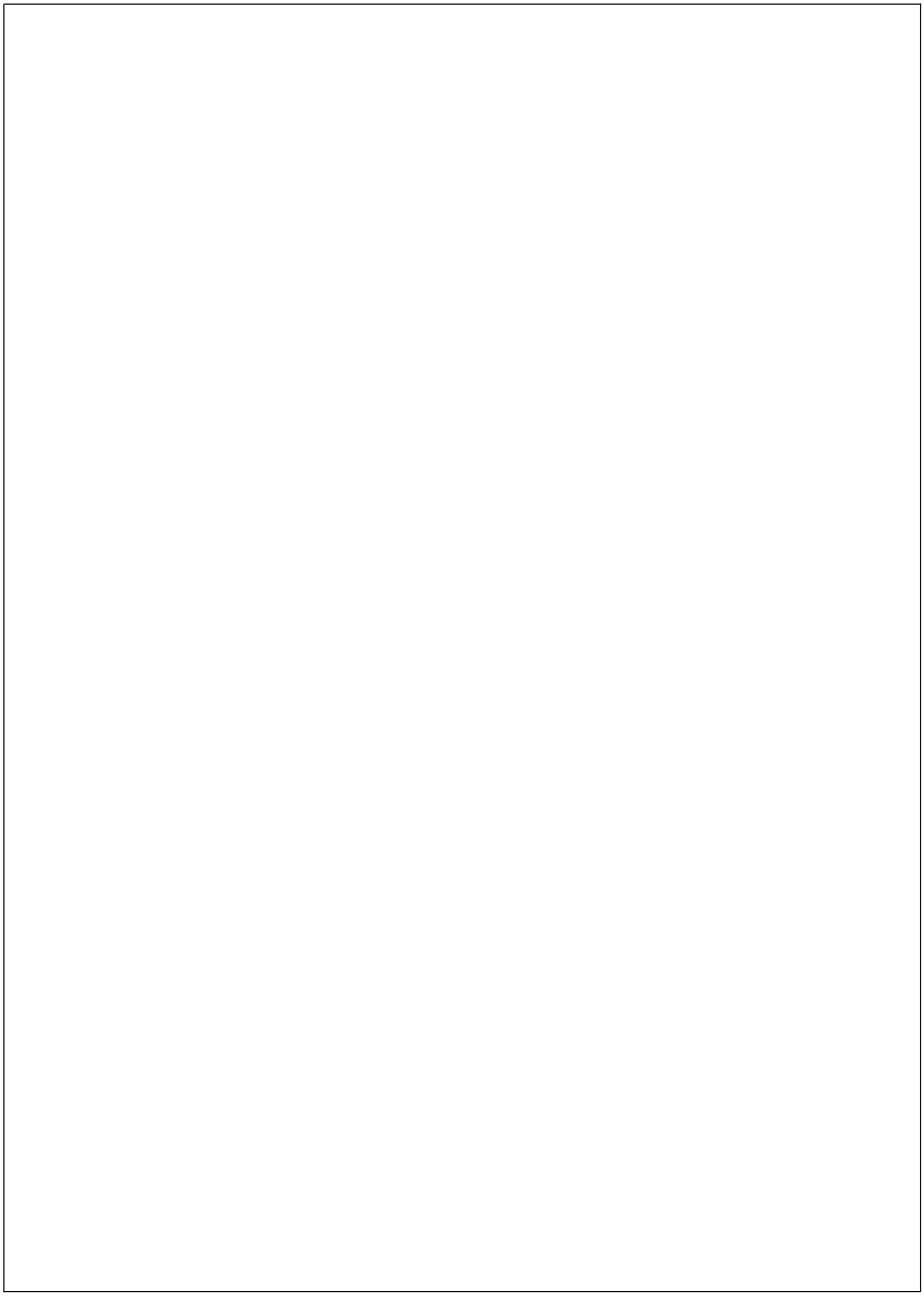
Note 2: All typicals are at V_{CC} = 5V, T_A = 25˚C.

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

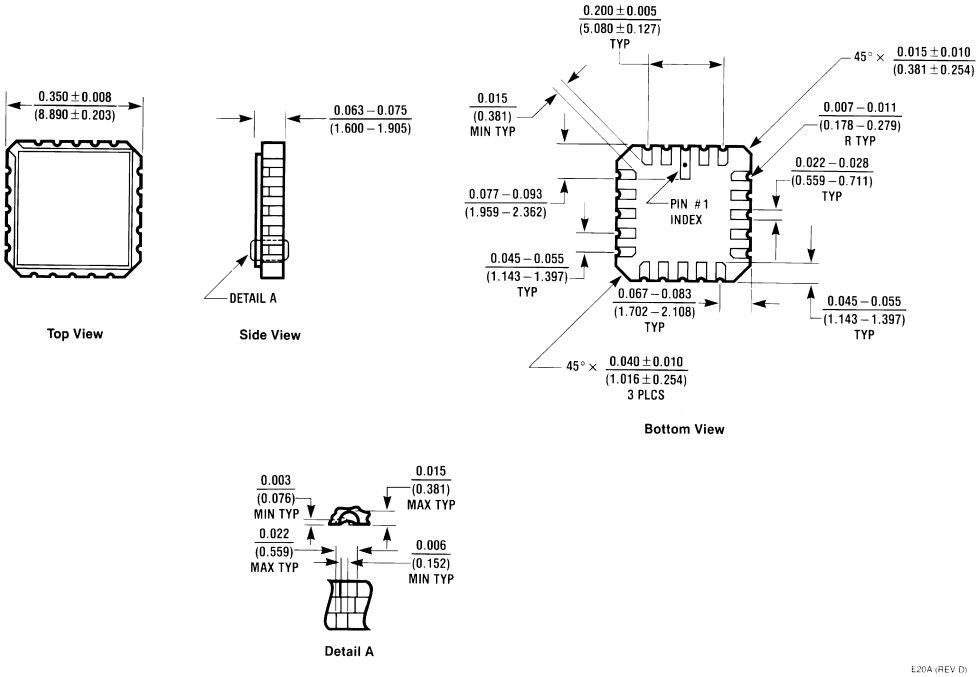
Switching Characteristics

V_{CC} = 5V, T_A = 25˚C

Symbol	Parameter	Conditions	DM54/74 LS245		Units
			Min	Max	
t_{PLH}	Propagation Delay Time, Low-to-High-Level Output	C_L = 45 pF, R_L = 667Ω		12	ns
t_{PHL}	Propagation Delay Time, High-to-Low-Level Output			12	ns
t_{PZL}	Output Enable Time to Low Level			40	ns
t_{PZH}	Output Enable Time to High Level			40	ns
t_{PLZ}	Output Disable Time from Low Level	C_L = 5 pF, R_L = 667Ω		25	ns
t_{PHZ}	Output Disable Time from High Level			25	ns
t_{PLH}	Propagation Delay Time, Low-to-High-Level Output	C_L = 150 pF, R_L = 667Ω		16	ns
t_{PHL}	Propagation Delay Time, High-to-Low-Level Output			17	ns
t_{PZL}	Output Enable Time to Low Level			45	ns
t_{PZH}	Output Enable Time to High Level			45	ns

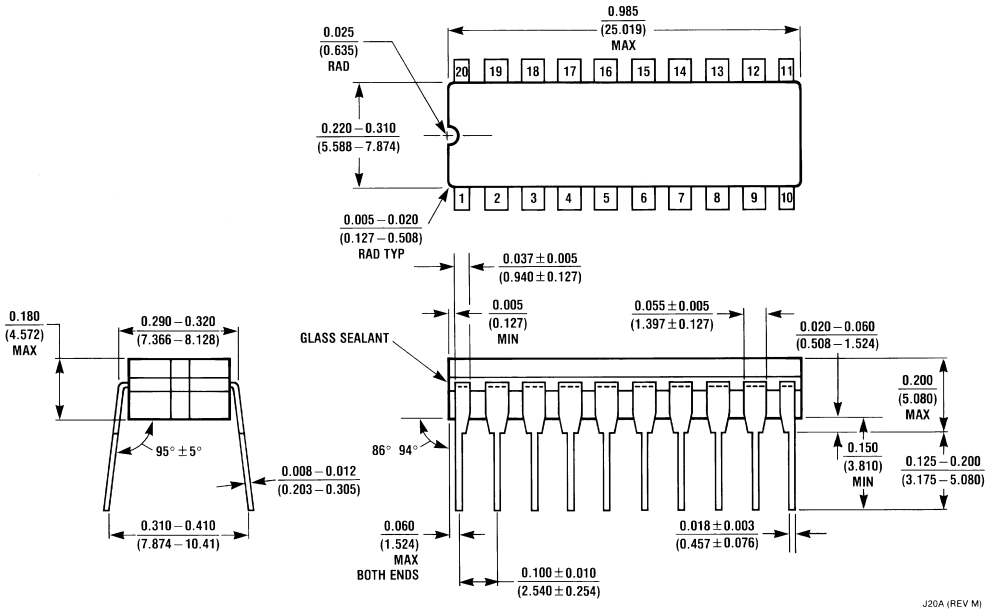


Physical Dimensions inches (millimeters) unless otherwise noted



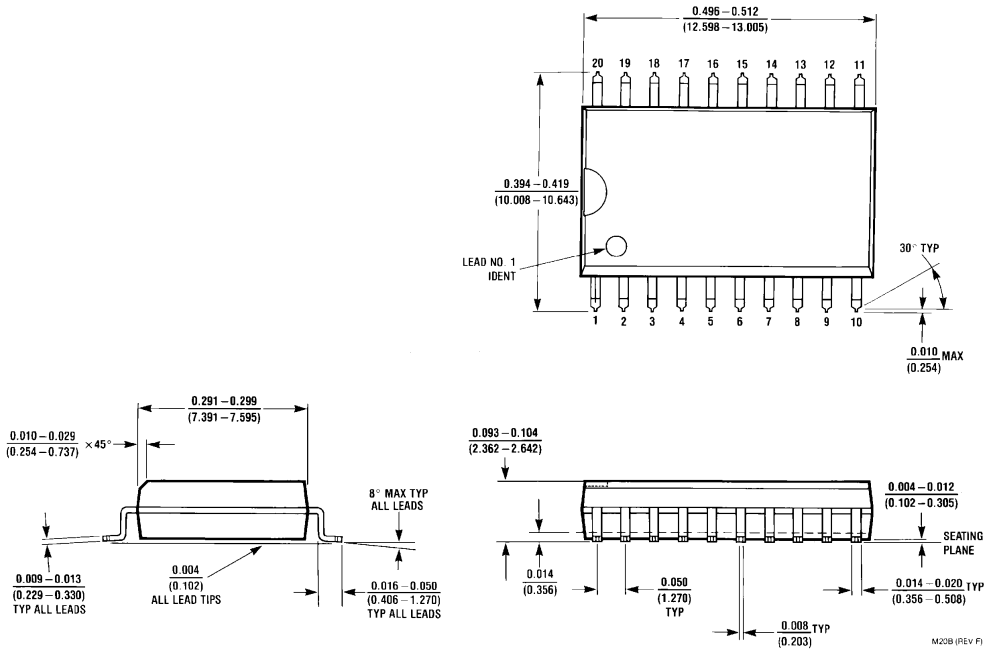
Ceramic Leadless Chip Carrier Package (E)
Order Number 54LS245LMQB
Package Number E20A

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

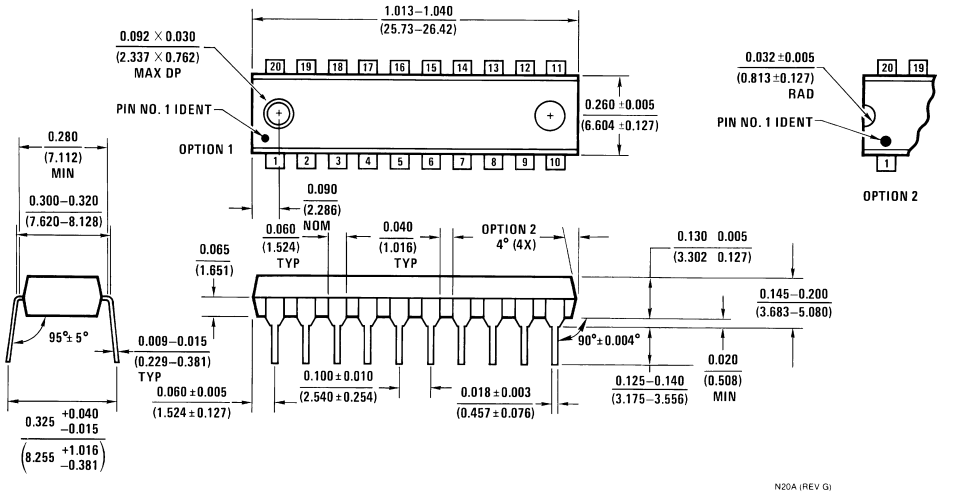


20-Lead Ceramic Dual-In-Line Package (J)
Order Number 54LS245DMQB or DM54LS245J
Package Number J20A

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

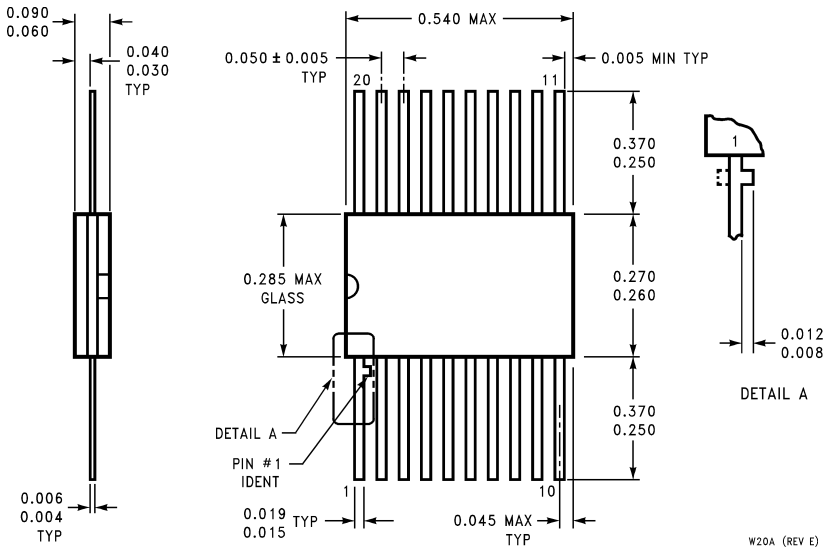


20-Lead Small Outline Molded Package (M)
Order Number DM74LS245WM
Package Number M20B



20-Lead Molded Dual-In-Line Package (N)
Order Number DM74LS245N
Package Number N20A

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



20-Lead Ceramic Flat Package (W)
Order Number 54LS245FMQB or DM54LS245W
Package Number W20A

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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