

November 1996

74F2245 Octal Bidirectional Transceiver with TRI-STATE® Outputs

General Description

The 74F2245 contains eight non-inverting bidirectional buffers with TRI-STATE outputs and is intended for bus-oriented applications. Current sinking capability is 24 mA at the A ports and 12 mA at the B ports. The Transmit/Receive (T/R) input determines the direction of data flow through the bidirectional transceiver. Transmit (active HIGH) enables data from A ports to B ports; Receive (active LOW) enables data from B ports to A ports. The Output Enable input, when HIGH, disables both A and B ports by placing them in a High Z condition.

The 25Ω series resistors in the outputs reduce ringing and eliminate the need for external resistors.

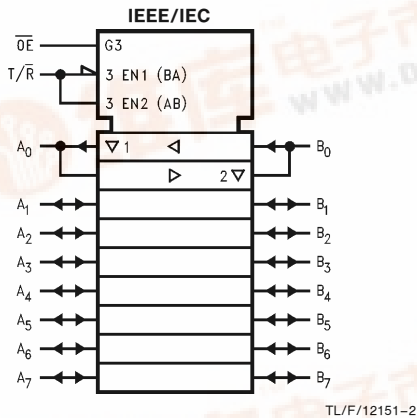
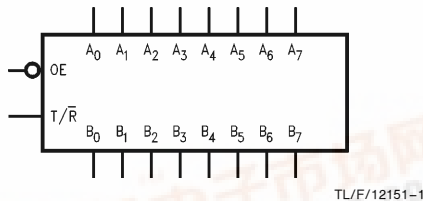
Features

- Non-inverting buffers
- Bidirectional data path
- A outputs sink 24 mA
- B outputs sink 12 mA
- 25Ω series resistors in B outputs eliminate the need for external resistors
- Guaranteed 2000V minimum ESD protection

Commercial	Package Number	Package Description
74F2245SC (Note 1)	M20B	20-Lead (0.300" Wide) Molded Small Outline, JEDEC

Note 1: Devices also available in 13" reel. Use suffix = SCX.

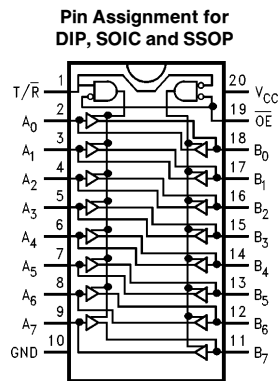
Logic Symbols



TRI-STATE® is a registered trademark of National Semiconductor Corporation.



Connection Diagram



Unit Loading/Fan Out

Pin Names	Description	74F	
		U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
$\overline{OE}$	Output Enable Input (Active LOW)	1.0/2.0	20 μA / - 1.2 mA
T/ $\overline{R}$	Transmit/Receive Input	1.0/2.0	20 μA / - 1.2 mA
A ₀ -A ₇	Side A Inputs or TRI-STATE Outputs	3.5/1.083	70 μA / - 0.65 mA
B ₀ -B ₇	Side B Inputs or TRI-STATE Outputs	150/40(38.3)	- 3 mA/24 mA
		3.5/1.083	70 μA / - 0.65 mA
		750/20	- 15 mA/12 mA

Truth Table

Inputs		Output
$\overline{OE}$	T/ $\overline{R}$	
L	L	Bus B Data to Bus A
L	H	Bus A Data to Bus B
H	X	High Z State

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

Absolute Maximum Ratings (Note 1)

Storage Temperature	−65°C to +150°C
Ambient Temperature under Bias	−55°C to +125°C
Junction Temperature under Bias Plastic	−55°C to +150°C
V _{CC} Pin Potential to Ground Pin	−0.5V to +7.0V
Input Voltage (Note 2)	−0.5V to +7.0V
Input Current (Note 2)	−30 mA to +5.0 mA
Voltage Applied to Output in HIGH State (with V _{CC} = 0V)	
Standard Output	−0.5V to V _{CC}
TRI-STATE Output	−0.5V to +5.5V

Current Applied to Output
in LOW State (Max) twice the rated I_{OL} (mA)

ESD Last Passing Voltage (Min) 4000V

Note 1: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 2: Either voltage limit or current limit is sufficient to protect inputs.

Recommended Operating Conditions

Free Air Ambient Temperature	0°C to +70°C
Commercial	
Supply Voltage	+4.5V to +5.5V
Commercial	

DC Electrical Characteristics

Symbol	Parameter	74F			Units	V _{CC}	Conditions
		Min	Typ	Max			
V _{IH}	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V _{IL}	Input LOW Voltage			0.8	V		Recognized as a LOW Signal
V _{CD}	Input Clamp Diode Voltage			−1.2	V	Min	I _{IN} = −18 mA
V _{OH}	Output HIGH Voltage	10% V _{CC}	2.4		V	Min	I _{OH} = −3 mA (A _n)
		10% V _{CC}	2.0				I _{OH} = −15 mA (B _n)
		5% V _{CC}	2.7				I _{OH} = −3 mA (A _n)
V _{OL}	Output LOW Voltage	10% V _{CC}		0.5	V	Min	I _{OL} = 24 mA (A _n)
		10% V _{CC}		0.5			I _{OL} = 1 mA (B _n)
		10% V _{CC}		0.75			I _{OL} = 12 mA (B _n)
I _{IH}	Input HIGH Current			5.0	μA	Max	V _{IN} = 2.7V
I _{BVI}	Input HIGH Current Breakdown Test			7.0	μA	Max	V _{IN} = 7.0V ($\overline{OE}$, T/ $\overline{R}$)
I _{BVIT}	Input HIGH Current Breakdown (I/O)			0.5	mA	Max	V _{IN} = 5.5 V (A _n , B _n)
I _{CEX}	Output HIGH Leakage Current			50	μA	Max	V _{OUT} = V _{CC} (A _n , B _n)
V _{ID}	Input Leakage Test	4.75			V	0.0	I _{ID} = 1.9 μA All Other Pins Grounded
I _{OD}	Output Leakage Circuit Current			3.75	μA	0.0	V _{IOD} = 150 mV All Other Pins Grounded
I _{IL}	Input LOW Current			−1.2	mA	Max	V _{IN} = 0.5V (T/ $\overline{R}$, $\overline{OE}$)
I _{IH} + I _{OZH}	Output Leakage Current			70	μA	Max	V _{OUT} = 2.7V (A _n , B _n)
I _{IL} + I _{OZL}	Output Leakage Current			−650	μA	Max	V _{OUT} = 0.5V (A _n , B _n)

DC Electrical Characteristics (Continued)

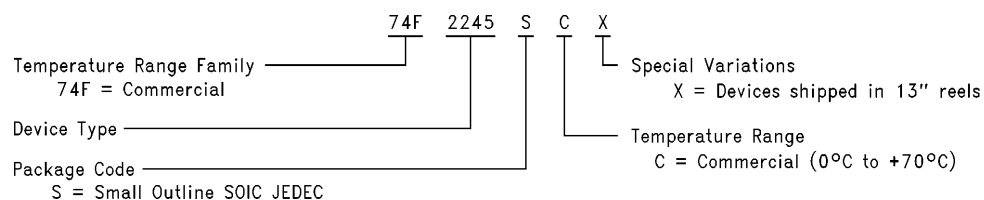
Symbol	Parameter	74F			Units	V _{CC}	Conditions
		Min	Typ	Max			
I _{OS}	Output Short-Circuit Current	−60 −100		−150 −225	mA	Max	V _{OUT} = 0V (A _n) V _{OUT} = 0V (B _n)
I _{ZZ}	Bus Drainage Test			500	μA	0.0V	V _{OUT} = 5.25V(A _n , B _n)
I _{CCH}	Power Supply Current		70	90	mA	Max	V _O = HIGH
I _{CCL}	Power Supply Current		95	120	mA	Max	V _O = LOW
I _{CCZ}	Power Supply Current		85	110	mA	Max	V _O = HIGH Z

AC Electrical Characteristics

Symbol	Parameter	74F			74F		Units
		T _A = +25°C V _{CC} = +5.0V C _L = 50 pF			T _A , V _{CC} = Com C _L = 50 pF		
		Min	Typ	Max	Min	Max	
t _{PLH} t _{PHL}	Propagation Delay A _n to B _n or B _n to A _n	2.5 2.5	4.2 4.2	6.5 7.5	2.0 2.0	7.5 8.5	ns
t _{pZH} t _{pZL}	Output Enable Time	3.0 3.5	5.3 6.0	8.0 10.0	2.5 3.0	9.0 11.0	ns
t _{PHZ} t _{PLZ}	Output Disable Time	2.0 2.0	5.0 5.0	6.5 6.5	2.0 2.0	7.5 7.5	

Ordering Information

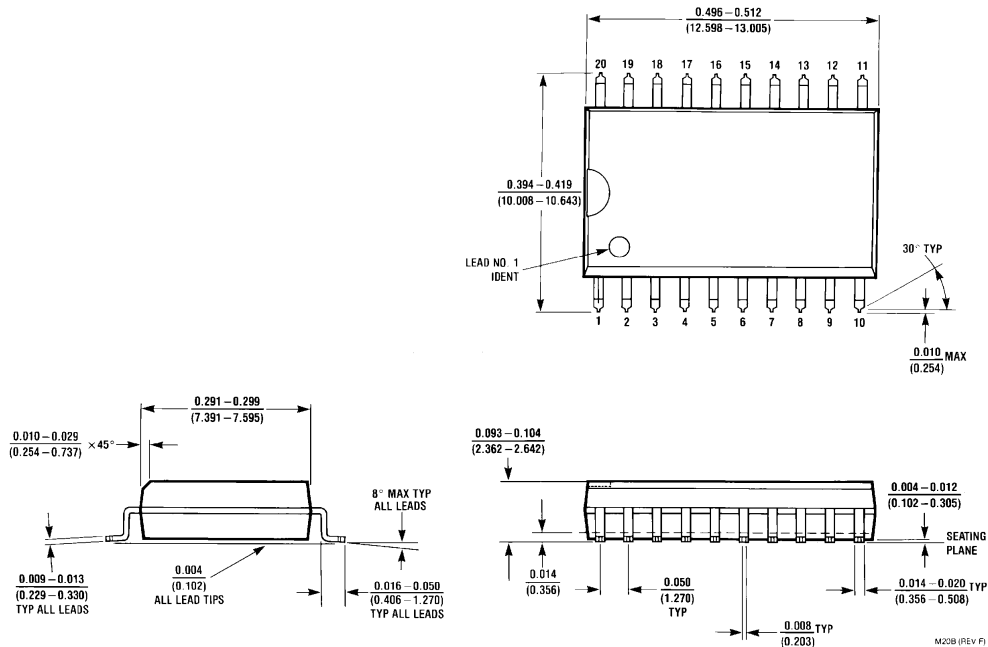
The device number is used to form part of a simplified purchasing code where the package type and temperature range are defined as follows:



TL/F/12151-4



Physical Dimensions inches (millimeters) unless otherwise noted



20-Lead (0.300" Wide) Molded Small Outline Package, JEDEC (S)
NS Package Number M20B

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