

# 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 ( $T/\bar{R}$ ) 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.

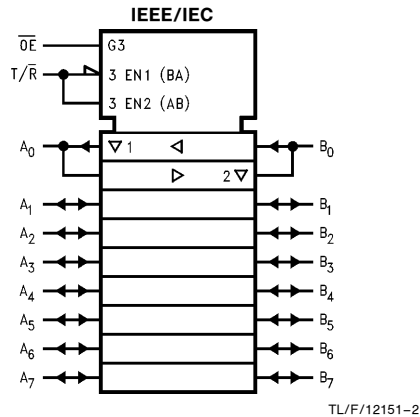
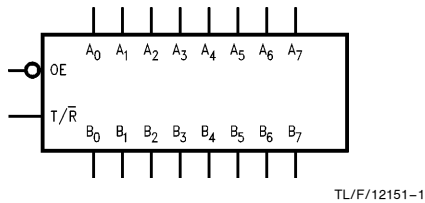
## Features

- 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

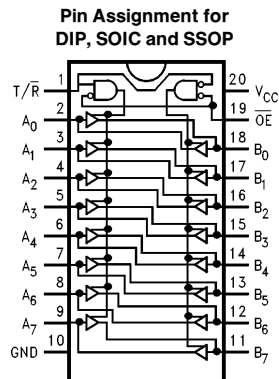
**Note 1:** Devices also available in 13" reel. Use suffix = SCX.

## Logic Symbols



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

## Connection Diagram



TL/F/12151-3

## 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 $\mu A$ / -1.2 mA
$T/\overline{R}$	Transmit/Receive Input	1.0/2.0	20 $\mu A$ / -1.2 mA
$A_0-A_7$	Side A Inputs or TRI-STATE Outputs	3.5/1.083 150/40(38.3)	70 $\mu A$ / -0.65 mA -3 mA/24 mA
$B_0-B_7$	Side B Inputs or TRI-STATE Outputs	3.5/1.083 750/20	70 $\mu A$ / -0.65 mA -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 <sub>CC</sub> 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 <sub>CC</sub> = 0V)	
Standard Output	-0.5V to V <sub>CC</sub>
TRI-STATE Output	-0.5V to +5.5V

Current Applied to Output in LOW State (Max) twice the rated I<sub>OL</sub> (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 Commercial 0°C to +70°C

Supply Voltage Commercial +4.5V to +5.5V

## DC Electrical Characteristics

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

## DC Electrical Characteristics (Continued)

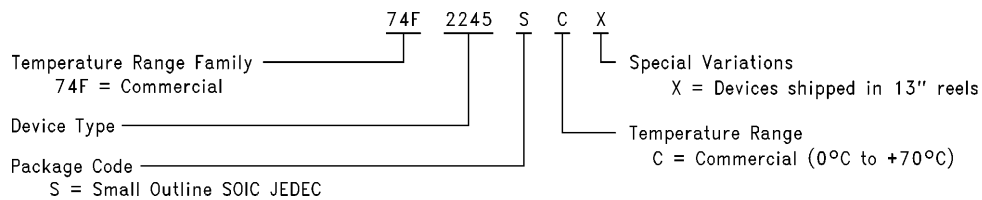
Symbol	Parameter	74F			Units	V <sub>CC</sub>	Conditions
		Min	Typ	Max			
I <sub>OS</sub>	Output Short-Circuit Current	-60 -100		-150 -225	mA	Max	V <sub>OUT</sub> = 0V (A <sub>n</sub> ) V <sub>OUT</sub> = 0V (B <sub>n</sub> )
I <sub>ZZ</sub>	Bus Drainage Test			500	μA	0.0V	V <sub>OUT</sub> = 5.25V(A 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

## AC Electrical Characteristics

Symbol	Parameter	74F			74F		Units
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 50 pF			T <sub>A</sub> , V <sub>CC</sub> = Com C <sub>L</sub> = 50 pF		
		Min	Typ	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay A <sub>n</sub> to B <sub>n</sub> or B <sub>n</sub> to A <sub>n</sub>	2.5	4.2	6.5	2.0	7.5	ns
t <sub>PHL</sub>		2.5	4.2	7.5	2.0	8.5	
t <sub>PZH</sub>	Output Enable Time	3.0	5.3	8.0	2.5	9.0	ns
t <sub>PZL</sub>		3.5	6.0	10.0	3.0	11.0	
t <sub>PHZ</sub>	Output Disable Time	2.0	5.0	6.5	2.0	7.5	ns
t <sub>PLZ</sub>		2.0	5.0	6.5	2.0	7.5	

## Ordering Information

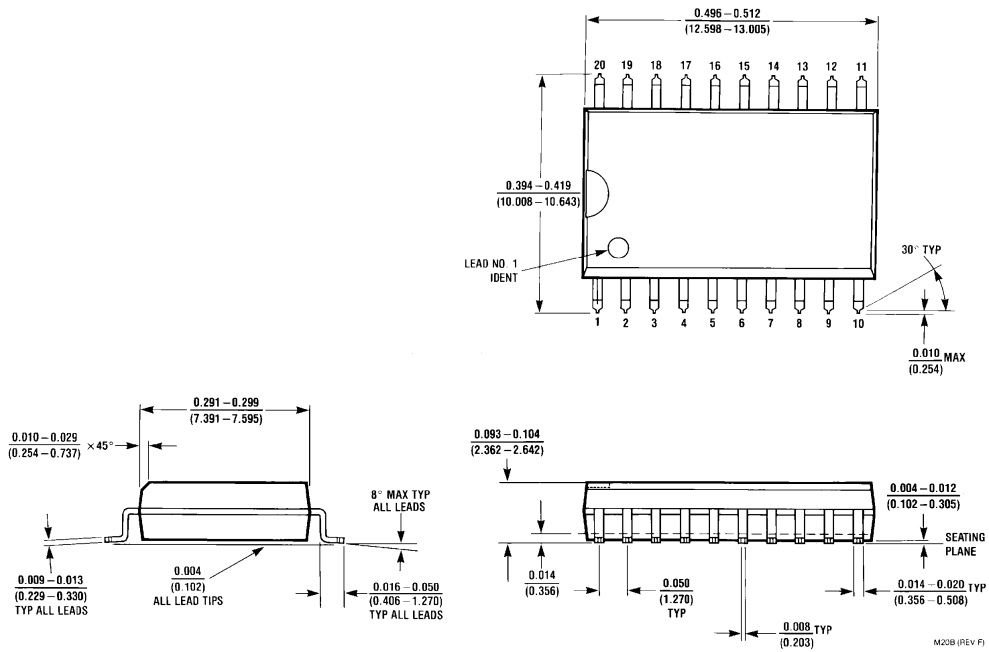
The device number is used to form part of a simplified purchasing code where the package type and temperature range are defined as follows:



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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**National Semiconductor Corporation**  
Americas  
Tel: 1(800) 272-9959  
Fax: 1(800) 737-7018  
Email: support@nsc.com

**National Semiconductor Europe**  
Fax: +49 (0) 180-530 85 86  
Email: europe.support@nsc.com  
Deutsch Tel: +49 (0) 180-530 85 85  
English Tel: +49 (0) 180-532 78 32  
Français Tel: +49 (0) 180-532 93 58  
Italiano Tel: +49 (0) 180-534 16 80

**National Semiconductor Southeast Asia**  
Fax: (852) 2376 3901  
Email: sea.support@nsc.com

**National Semiconductor Japan Ltd.**  
Tel: 81-3-5620-7561  
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