



T-52-07-00

2241•2244

54F/74F2241•54F/74F2244

Octal Buffers/Line Drivers with 25Ω Series Resistors in Outputs

General Description

The 'F2241 and 'F2244 are octal buffers and line drivers designed to drive the capacitive inputs of MOS memory drivers, address drivers, clock drivers and bus-oriented transmitters/receivers.

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

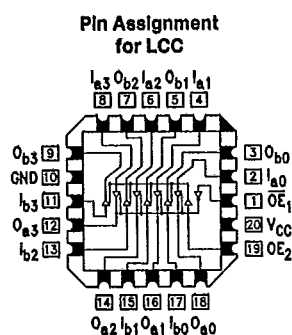
Features

- TRI-STATE® outputs drive bus lines or buffer memory address registers
- 12 mA source current
- 25Ω series resistors in outputs eliminate the need for external resistors.
- Designed to drive the capacitive inputs of MOS devices
- Guaranteed 4000V minimum ESD protection

Ordering Code: See Section 5

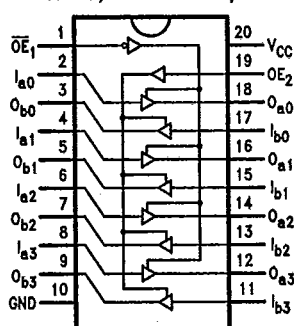
Connection Diagrams

'F2241



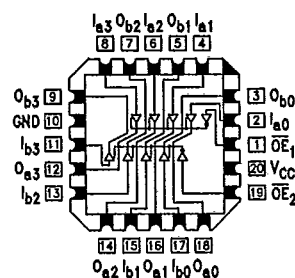
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Pin Assignment for DIP, SOIC and Flatpak

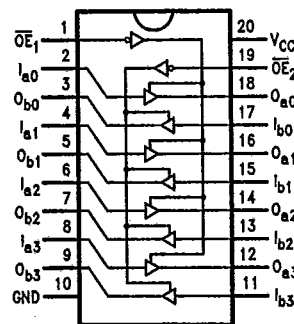


TL/F/9499-2

'F2244



TL/F/9499-3

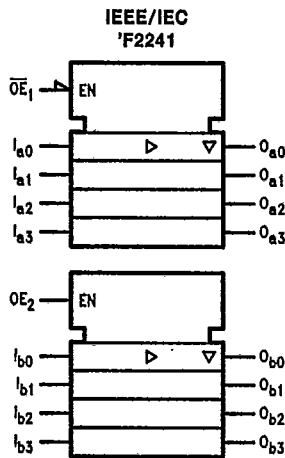


TL/F/9499-4

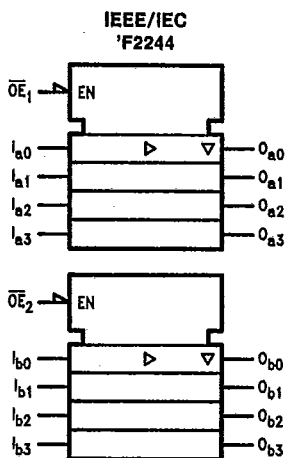
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Logic Symbols

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TL/F/9499-5



TL/F/9499-6

Unit Loading/Fan Out: See Section 2 for U.L. definitions

Pin Names	Description	54F/74F	
		U.L. HIGH/LOW	Input I _{IH} /I _{IL} Output I _{OH} /I _{OL}
$\overline{OE}_1, \overline{OE}_2$	TRI-STATE Output Enable Input (Active LOW)	1.0/1.667	20 μ A/ -1 mA
OE ₂	TRI-STATE Output Enable Input (Active HIGH)	1.0/1.667	20 μ A/ -1 mA
I _{an} , I _{bn}	Inputs	1.0/2.667*	20 μ A/ -1.6 mA
O _{an} , O _{bn}	Outputs	750/20	-15 mA/12 mA

*Worst-case 'F2241, 'F2244 disabled

Truth Tables

'F2241

$\overline{OE}_1$	I _{an}	O _{an}	OE ₂	I _{bn}	O _{bn}
H	X	Z	L	X	Z
L	H	H	H	H	H
L	L	L	H	L	L

'F2244

$\overline{OE}_1$	I _{an}	O _{an}	$\overline{OE}_2$	I _{bn}	O _{bn}
H	X	Z	H	X	Z
L	H	H	L	H	H
L	L	L	L	L	L

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = High Impedance

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Storage Temperature	-65°C to +150°C
Ambient Temperature under Bias	-55°C to +125°C
Junction Temperature under Bias	-55°C to +175°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)	-0.5V to V _{CC}
Standard Output 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**T-52-07**

Free Air Ambient Temperature

Military

-55°C to +125°C

Commercial

0°C to +70°C

Supply Voltage

Military

+4.5V to +5.5V

Commercial

+4.5V to +5.5V

DC Electrical Characteristics

Symbol	Parameter	54F/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	54F 10% V _{CC}	2.4		V	Min	I _{OH} = -3 mA
		54F 10% V _{CC}	2.0				I _{OH} = -12 mA
		74F 10% V _{CC}	2.4				I _{OH} = -3 mA
		74F 10% V _{CC}	2.0				I _{OH} = -15 mA
		74F 5% V _{CC}	2.7				I _{OH} = -3 mA
V _{OL}	Output LOW Voltage		0.50		V	Min	I _{OL} = 1 mA
			0.75				I _{OL} = 12 mA
I _{IH}	Input HIGH Current	54F		20.0	μA	Max	V _{IN} = 2.7V
		74F		5.0			
I _{BVI}	Input HIGH Current Breakdown Test	54F		100	μA	Max	V _{IN} = 7.0V
		74F		7.0			
I _{CEX}	Output HIGH Leakage Current	54F		250	μA	Max	V _{OUT} = V _{CC}
		74F		50			
V _{ID}	Input Leakage Test	74F	4.75		V	0.0	I _{ID} = 1.9 μA All other pins grounded
I _{OD}	Output Leakage Circuit Current	74F		3.75	μA	0.0	V _{IOD} = 150 mV All other pins grounded
I _{IL}	Input LOW Current			-1.0 -1.6	mA	Max	V _{IN} = 0.5V (OE ₁ , OE ₂ , OE ₂) V _{IN} = 0.5V (I _N)
I _{OZH}	Output Leakage Current			50	μA	Max	V _{OUT} = 2.7V
I _{OZL}	Output Leakage Current			-50	μA	Max	V _{OUT} = 0.5V
I _{OS}	Output Short-Circuit Current		-100	-225	mA	Max	V _{OUT} = 0V
I _{CCH}	Power Supply Current		40	60	mA	Max	V _O = HIGH
I _{CCL}	Power Supply Current		60	90	mA	Max	V _O = LOW
I _{CCZ}	Power Supply Current		60	90	mA	Max	V _O = HIGH Z

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AC Electrical Characteristics: See Section 2 for Waveforms and Load Configurations

Symbol	Parameter	74F			54F		74F		Units	Fig. No.
		T _A = +25°C V _{CC} = +5.0V C _L = 50 pF			T _A , V _{CC} = Mil C _L = 50 pF		T _A , V _{CC} = Com C _L = 50 pF			
		Min	Typ	Max	Min	Max	Min	Max		
t _{PLH}	Propagation Delay	1.5		7.0	2.0	6.5	1.5	7.0	ns	2-3
t _{PHL}	Data to Output	2.5		8.0	2.0	7.0	2.0	8.0		
t _{PZH}	Output Enable Time	1.5		9.0	2.0	7.0	1.0	9.5	ns	2-5
t _{PZL}		2.5		11.5	2.0	8.5	2.5	12.0		
t _{PHZ}	Output Disable Time	1.5		9.0	2.0	7.0	1.0	9.5		
t _{PLZ}		1.5		8.5	2.0	7.5	1.5	9.5		