

54F/74F240•54F/74F241•54F/74F244

Octal Buffers/Line Drivers with TRI-STATE® Outputs

General Description

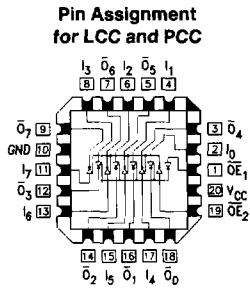
The 'F240, 'F241 and 'F244 are octal buffers and line drivers designed to be employed as memory and address drivers, clock drivers and bus-oriented transmitters/receivers which provide improved PC and board density.

Features

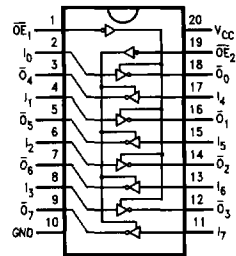
- TRI-STATE outputs drive bus lines or buffer memory address registers
- Outputs sink 64 mA (48 mA mil)
- 12 mA source current
- Input clamp diodes limit high-speed termination effects

Ordering Code: See Section 5

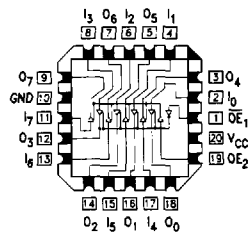
Connection Diagrams

'F240


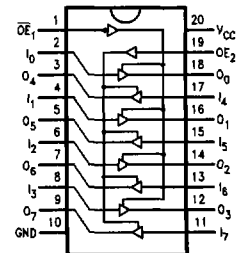
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Pin Assignment for DIP, SOIC and Flatpak


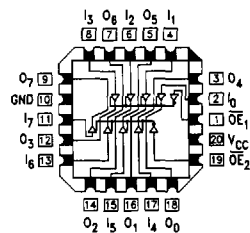
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'F241


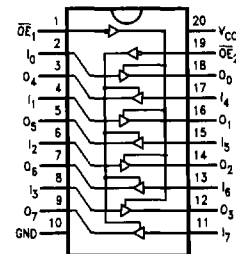
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TL/F/9501-3

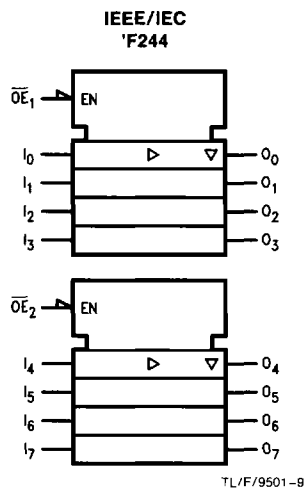
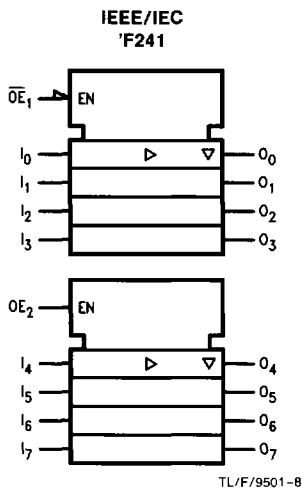
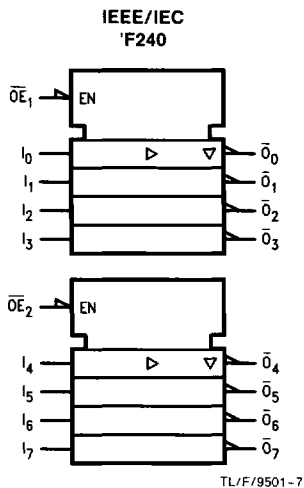
'F244


TL/F/9501-6



TL/F/9501-5

Logic Symbols



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 ₀ -I ₇	Inputs ('F240)	1.0/1.667*	20 μ A/ -1 mA
I ₀ -I ₇	Inputs ('F241, 'F244)	1.0/2.667*	20 μ A/ -1.6 mA
O ₀ -O ₇ , O ₀ -O ₇	Outputs	150/106.6 (80)	-12 mA/64 mA (48 mA)

*Worst-case 'F240 enabled; 'F241, 'F244 disabled

Truth Tables

'F240

\overline{OE}_1	D _{1n}	O _{1n}	\overline{OE}_2	D _{2n}	O _{2n}
H	X	Z	H	X	Z
L	H	H	L	H	H
L	L	L	L	L	L

'F241

\overline{OE}_1	D _{1n}	O _{1n}	OE ₂	D _{2n}	O _{2n}
H	X	Z	L	X	Z
L	H	H	H	H	H
L	L	L	H	L	L

'F244

\overline{OE}_1	D _{1n}	O _{1n}	\overline{OE}_2	D _{2n}	O _{2n}
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, 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)	
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)

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	
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					V		Recognized as a LOW Signal
V _{CD}	Input Clamp Diode Voltage					V	Min	I _{IN} = -18 mA
V _{OH}	Output HIGH Voltage	54F 10% V _{CC} 54F 10% V _{CC} 74F 10% V _{CC} 74F 10% V _{CC} 74F 5% V _{CC} 74F 5% V _{CC}	2.4 2.0 2.4 2.0 2.7 2.0			V	Min	I _{OH} = -3 mA I _{OH} = -12 mA I _{OH} = -3 mA I _{OH} = -12 mA I _{OH} = -3 mA I _{OH} = -15 mA
V _{OL}	Output LOW Voltage	54F 10% V _{CC} 74F 10% V _{CC}		0.55 0.55		V	Min	I _{OL} = 48 mA I _{OL} = 64 mA
I _{IH}	Input HIGH Current					μA	Max	V _{IN} = 2.7V
I _{BVI}	Input High Current Breakdown Test					μA	Max	V _{IN} = 7.0V
I _{IL}	Input LOW Current					mA	Max	V _{IN} = 0.5V (OE ₁ , OE ₂ , OE ₂ , D _n ('F240)) V _{IN} = 0.5V (D _n ('F241, 'F244))
I _{OZH}	Output Leakage Current					μA	Max	V _{OUT} = 2.7V
I _{OZL}	Output Leakage Current					μA	Max	V _{OUT} = 0.5V
I _{OS}	Output Short-Circuit Current					mA	Max	V _{OUT} = 0V
I _{CEX}	Output HIGH Leakage Current					μA	Max	V _{OUT} = V _{CC}
I _{ZZ}	Bus Drainage Test					μA	0.0V	V _{OUT} = V _{CC}
I _{CCH}	Power Supply Current ('F240)					mA	Max	V _O = HIGH
I _{CCL}	Power Supply Current ('F240)					mA	Max	V _O = LOW
I _{CCZ}	Power Supply Current ('F240)					mA	Max	V _O = HIGH Z
I _{CCH}	Power Supply Current ('F241, 'F244)					mA	Max	V _O = HIGH
I _{CCL}	Power Supply Current ('F241, 'F244)					mA	Max	V _O = LOW
I _{CCZ}	Power Supply Current ('F241, 'F244)					mA	Max	V _O = HIGH Z

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} t _{PHL}	Propagation Delay Data to Output ('F240)	3.0 2.0	5.1 3.5	7.0 4.7	3.0 2.0	9.0 6.0	3.0 2.0	8.0 5.7	ns	2-3
t _{PZH} t _{PZL}	Output Enable Time ('F240)	2.0 4.0	3.5 6.9	4.7 9.0	2.0 4.0	6.5 10.5	2.0 4.0	5.7 10.0	ns	2-5
t _{PHZ} t _{PLZ}	Output Disable Time ('F240)	2.0 2.0	4.0 6.0	5.3 8.0	2.0 2.0	6.5 12.5	2.0 2.0	6.3 9.5	ns	2-3
t _{PLH} t _{PHL}	Propagation Delay Data to Output ('F241, 'F244)	2.5 2.5	4.0 4.0	5.2 5.2	2.0 2.0	6.5 7.0	2.5 2.5	6.2 6.5	ns	2-3
t _{PZH} t _{PZL}	Output Enable Time ('F241, 'F244)	2.0 2.0	4.3 5.4	5.7 7.0	2.0 2.0	7.0 8.5	2.0 2.0	6.7 8.0	ns	2-5
t _{PHZ} t _{PLZ}	Output Disable Time ('F241, 'F244)	2.0 2.0	4.5 4.5	6.0 6.0	2.0 2.0	7.0 7.5	2.0 2.0	7.0 7.0	ns	2-5