

74F148 8-Line to 3-Line Priority Encoder

General Description

The 74F148 provides three bits of binary coded output representing the position of the highest order active input, along with an output indicating the presence of any active input. It is easily expanded via input and output enables to provide priority encoding over many bits.

- Provides 3-bit binary priority code
- Input enable capability
- Signals when data is present on any input
- Cascadable for priority encoding of n bits

Features

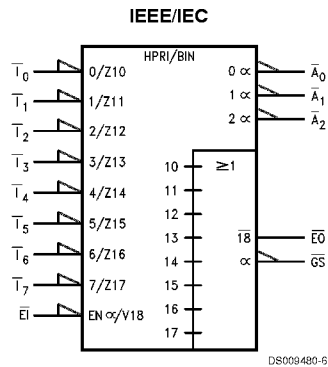
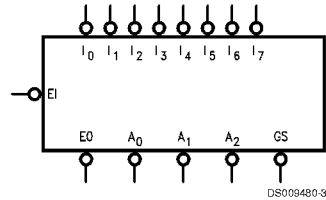
- Encodes eight data lines in priority

Ordering Code:

Commercial	Package Number	Package Description
74F148PC	N16E	16-Lead (0.300" Wide) Molded Dual-In-Line
74F148SC (Note 1)	M16A	16-Lead (0.150" Wide) Molded Small Outline, JEDEC
74F148SJ (Note 1)	M16D	16-Lead (0.300" Wide) Molded Small Outline, EIAJ

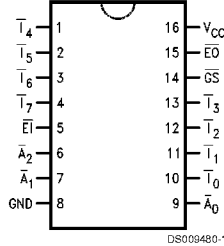
Note 1: Devices also available in 13" reel. Use Suffix = SCX and SJX.

Logic Symbols



Connection Diagram

Pin Assignment
for SOIC and DIP



Unit Loading/Fan Out

Pin Names	Description	74F	
		U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
\bar{I}_0	Priority Input (Active LOW)	1.0/1.0	20 μA / -0.6 mA
\bar{I}_1 – \bar{I}_7	Priority Inputs (Active LOW)	1.0/2.0	20 μA / -1.2 mA
\bar{EI}	Enable Input (Active LOW)	1.0/1.0	20 μA / -0.6 mA
\bar{EO}	Enable Output (Active LOW)	50/33.3	-1 mA / 20 mA
\bar{GS}	Group Signal Output (Active LOW)	50/33.3	-1 mA / 20 mA
\bar{A}_0 – \bar{A}_2	Address Outputs (Active LOW)	50/33.3	-1 mA / 20 mA

Functional Description

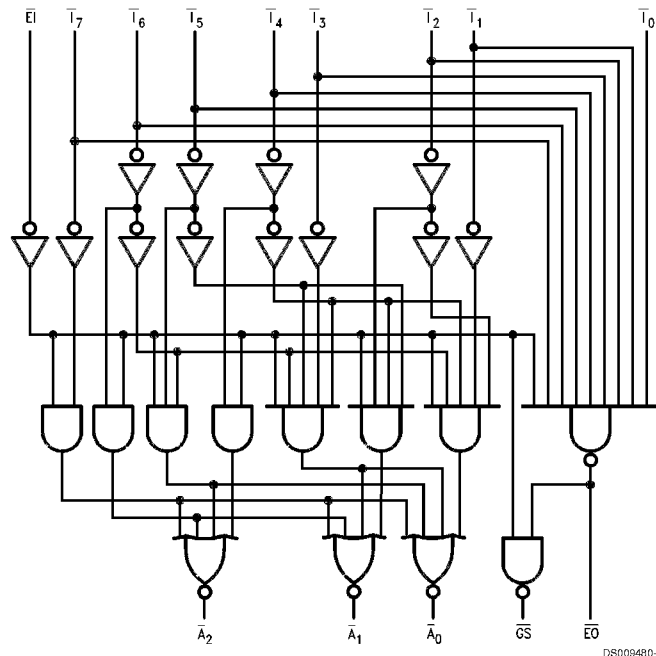
The 'F148 8-input priority encoder accepts data from eight active LOW inputs (\bar{I}_0 – \bar{I}_7) and provides a binary representation on the three active LOW outputs. A priority is assigned to each input so that when two or more inputs are simultaneously active, the input with the highest priority is represented on the output, with input line 7 having the highest priority. A HIGH on the Enable Input (\bar{EI}) will force all outputs to the inactive (HIGH) state and allow new data to settle without producing erroneous information at the outputs. A Group Signal output (\bar{GS}) and Enable Output (\bar{EO}) are provided along with the three priority data outputs (\bar{A}_2 , \bar{A}_1 , \bar{A}_0). \bar{GS} is active LOW when any input is LOW; this indicates when any input is active. \bar{EO} is active LOW when all inputs are HIGH. Using the Enable Output along with the Enable Input allows cascading for priority encoding on any number of input signals. Both \bar{EO} and \bar{GS} are in the inactive HIGH state when the Enable Input is HIGH.

Truth Table

\bar{EI}	Inputs							Outputs					
	\bar{I}_0	\bar{I}_1	\bar{I}_2	\bar{I}_3	\bar{I}_4	\bar{I}_5	\bar{I}_6	\bar{I}_7	\bar{GS}	\bar{A}_0	\bar{A}_1	\bar{A}_2	\bar{EO}
H	X	X	X	X	X	X	X	X	H	H	H	H	H
L	H	H	H	H	H	H	H	H	H	H	H	H	L
L	X	X	X	X	X	X	X	L	L	L	L	L	H
L	X	X	X	X	X	X	L	H	L	H	L	L	H
L	X	X	X	X	X	L	H	H	L	L	H	L	H
L	X	X	X	L	H	H	H	H	L	L	L	H	H
L	X	X	L	H	H	H	H	H	L	L	H	H	H
L	L	H	H	H	H	H	H	H	L	H	H	H	H

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

Logic Diagram



DS008480-4

Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

Absolute Maximum Ratings (Note 2)

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
Plastic	-55°C to +150°C
V _{CC} Pin Potential to Ground Pin	-0.5V to +7.0V
Input Voltage (Note 3)	-0.5V to +7.0V
Input Current (Note 3)	-30 mA to +5.0 mA
Voltage Applied to Output in HIGH State (with V _{CC} = 0V)	
Standard Output	-0.5V to V _{CC}
3-STATE Output	-0.5V to +5.5V

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

Recommended Operating Conditions

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

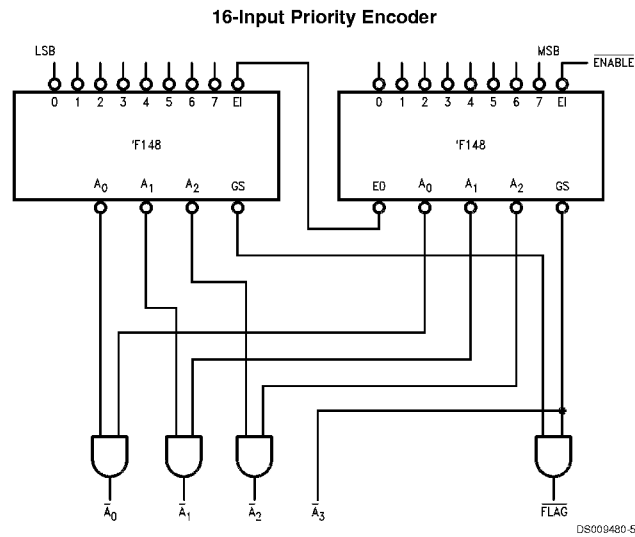
Note 2: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 3: Either voltage limit or current limit is sufficient to protect inputs.

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	74F 10% V _{CC}	2.5		V	Min	I _{OH} = -1 mA
		74F 5% V _{CC}	2.7				
V _{OL}	Output LOW Voltage	74F 10% V _{CC}	0.5		V	Min	I _{OL} = 20 mA
I _{IH}	Input HIGH Current	74F	5.0		μA	Max	V _{IN} = 2.7V
I _{BVI}	Input HIGH Current Breakdown Test	74F	7.0		μA	Max	V _{IN} = 7.0V
I _{CEX}	Output High Leakage Current	74F	50		μA	Max	V _{OUT} = V _{CC}
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		-0.6		mA	Max	V _{IN} = 0.5V (I _O , E _I) V _{IN} = 0.5V (I ₁ -I ₇)
			-1.2				
I _{OS}	Output Short-Circuit Current		-60	-150	mA	Max	V _{OUT} = 0V
I _{CCH}	Power Supply Current		35		mA	Max	V _O = HIGH
I _{CCL}	Power Supply Current		35		mA	Max	V _O = LOW

Application

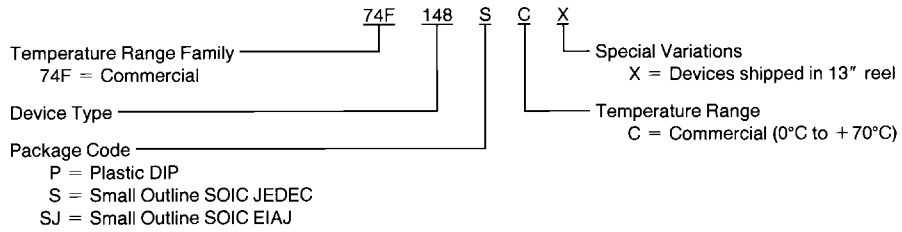


AC Electrical Characteristics

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}	Propagation Delay	3.0	7.0	9.0	3.0	10.0	ns
t _{PHL}	I _n to A _n	3.0	8.0	10.5	3.0	12.0	
t _{PLH}	Propagation Delay	2.5	5.0	6.5	2.5	7.5	ns
t _{PHL}	I _n to E _O	2.5	5.5	7.5	2.5	8.5	
t _{PLH}	Propagation Delay	2.5	7.0	9.0	2.5	10.0	ns
t _{PHL}	I _n to GS	2.5	6.0	8.0	2.5	9.0	
t _{PLH}	Propagation Delay	2.5	6.5	8.5	2.5	9.5	ns
t _{PHL}	E _I to A _n	2.5	6.0	8.0	2.5	9.0	
t _{PLH}	Propagation Delay	2.5	5.0	7.0	2.5	8.0	ns
t _{PHL}	E _I to GS	2.5	6.0	7.5	2.5	8.5	
t _{PLH}	Propagation Delay	2.5	5.5	7.0	2.5	8.0	ns
t _{PHL}	E _I to E _O	3.0	8.0	10.5	3.0	12.0	

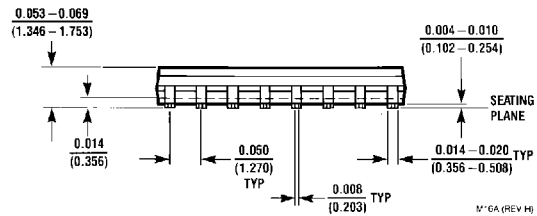
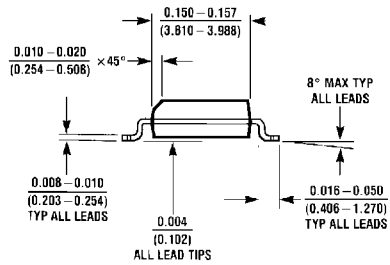
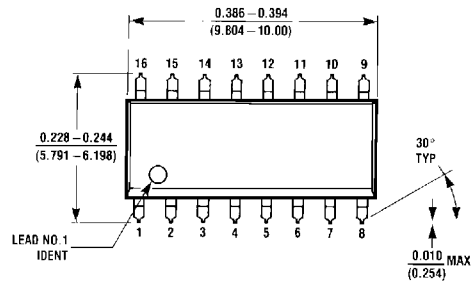
Ordering Information

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



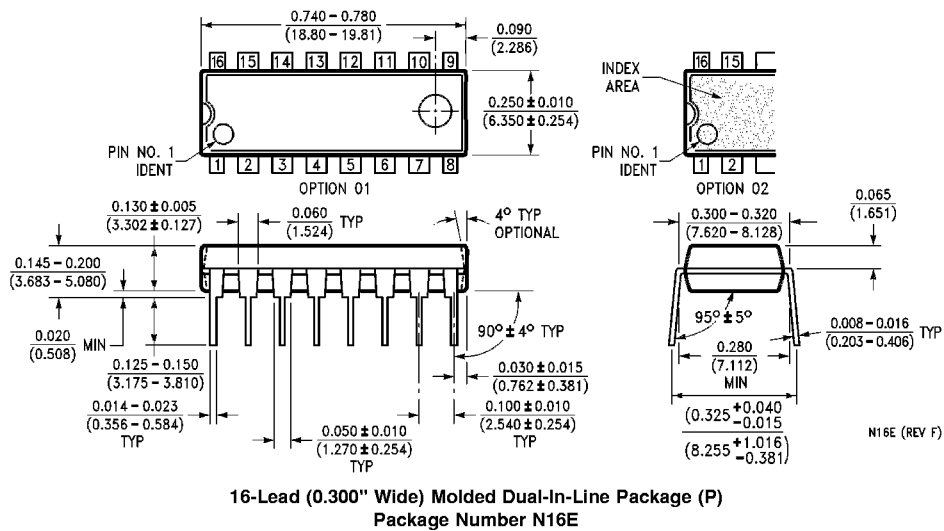
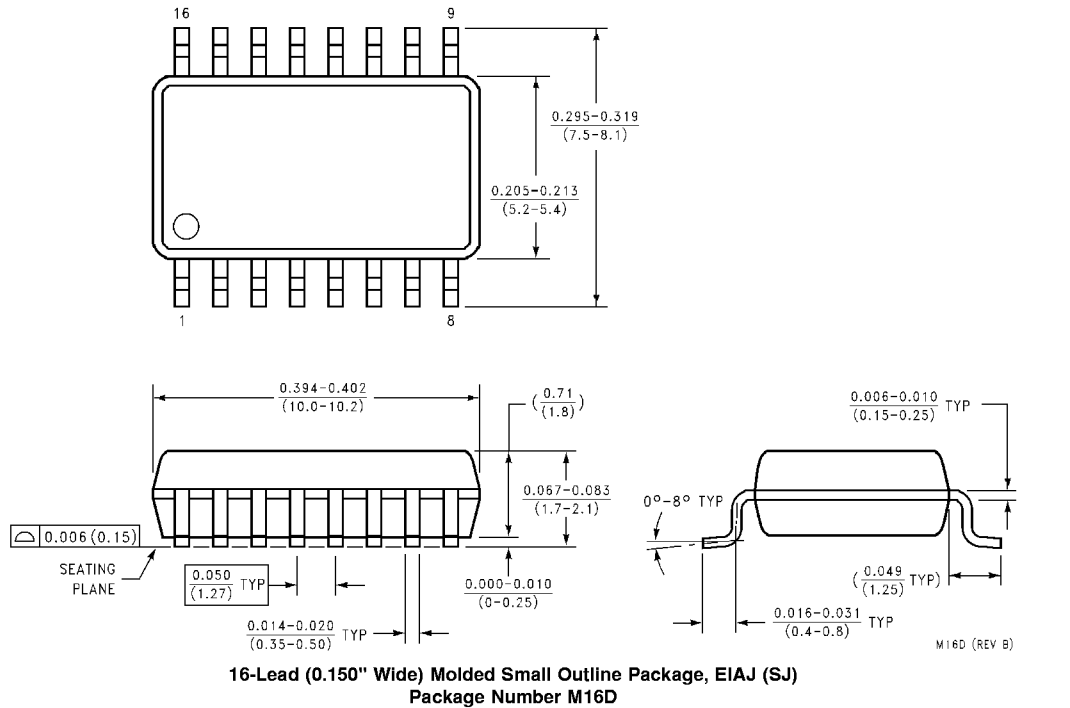
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Physical Dimensions inches (millimeters) unless otherwise noted



16-Lead (0.150" Wide) Molded Small Outline Package, JEDEC (S)
Package Number M16A

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



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