

54F/74F139

Dual 1-of-4 Decoder

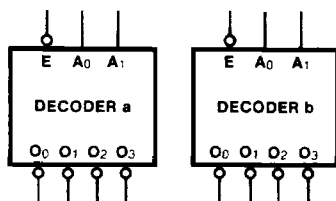
Description

The 'F139 is a high-speed, dual 1-of-4 decoder/demultiplexer. The device has two independent decoders, each accepting two inputs and providing four mutually exclusive active LOW outputs. Each decoder has an active LOW Enable input which can be used as a data input for a 4-output demultiplexer. Each half of the 'F139 can be used as a function generator providing all four minterms of two variables.

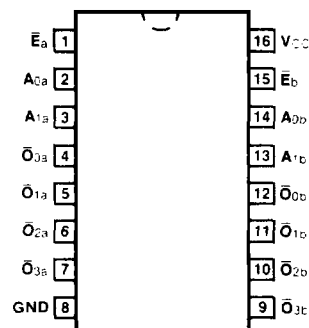
- Multifunction Capability
- Two Completely Independent 1-of-4 Decoders
- Active LOW Mutually Exclusive Outputs

Ordering Code: See Section 5

Logic Symbol

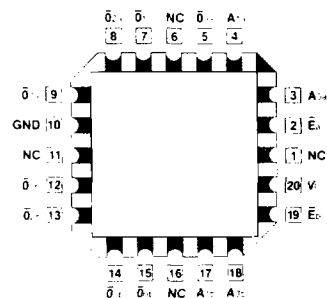


Connection Diagrams



**Pin Assignment
for DIP and SOIC**

4

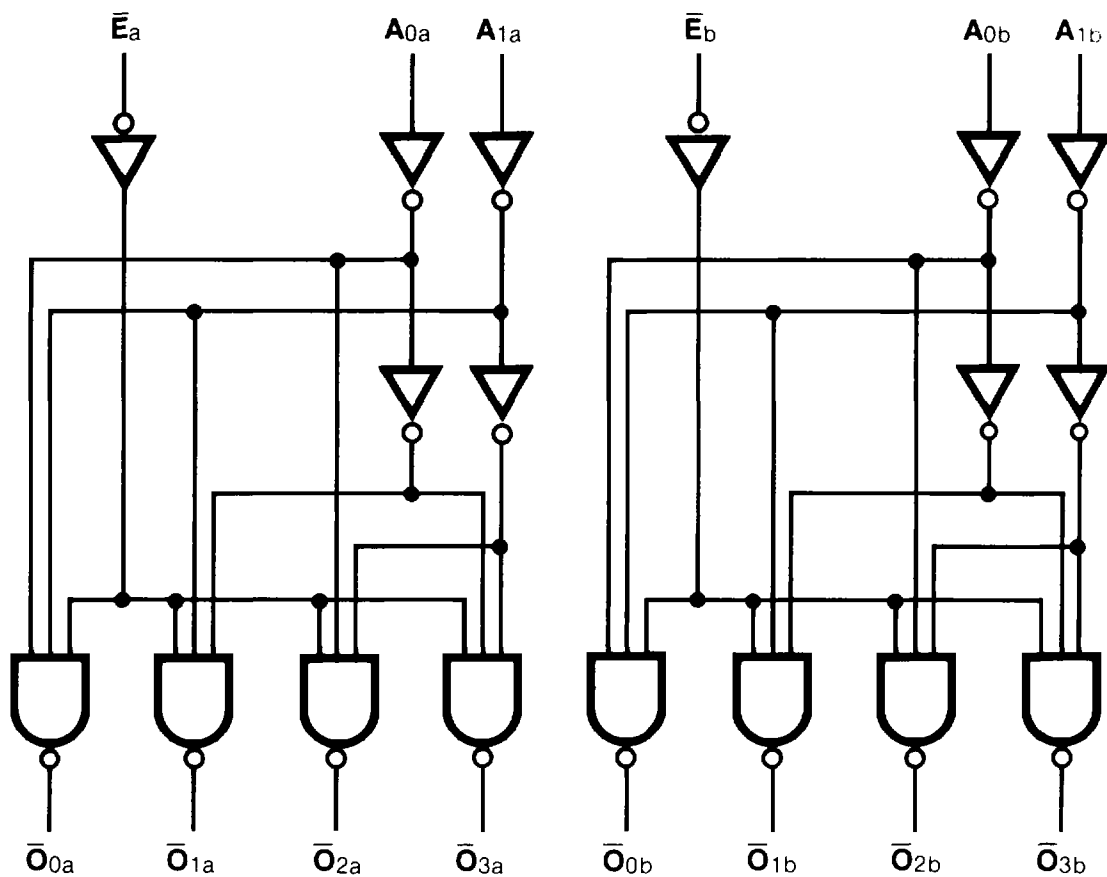


**Pin Assignment
for LCC and PCC**

Input Loading/Fan-Out: See Section 3 for U.L. definitions

Pin Names	Description	54F/74F(U.L.) HIGH/LOW
A ₀ , A ₁	Address Inputs	0.5/0.375
\bar{E}	Enable Inputs (Active LOW)	0.5/0.375
\bar{O}_0 - \bar{O}_3	Outputs (Active LOW)	25/12.5

Logic Diagram



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

Functional Description

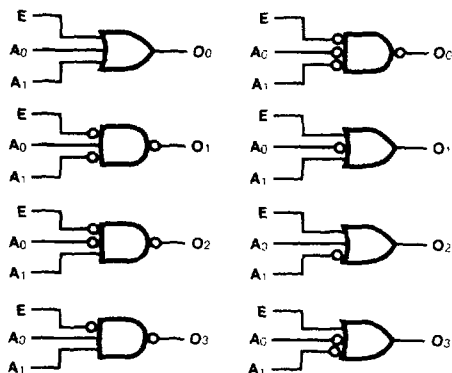
The 'F139 is a high-speed dual 1-of-4 decoder/demultiplexer. The device has two independent decoders, each of which accepts two binary weighed inputs (A_0 - A_1) and provides four mutually exclusive active LOW outputs (\bar{O}_0 - \bar{O}_3). Each decoder has an active LOW enable (\bar{E}). When \bar{E} is HIGH all outputs are forced HIGH. The enable can be used as the data input for a 4-output demultiplexer application. Each half of the 'F139 generates all four minterms of two variables. These four minterms are useful in some applications, replacing multiple gate functions as shown in Figure a, and thereby reducing the number of packages required in a logic network.

Truth Table

Inputs			Outputs			
\bar{E}	A_0	A_1	\bar{O}_0	\bar{O}_1	\bar{O}_2	\bar{O}_3
H	X	X	H	H	H	H
L	L	L	L	H	H	H
L	H	L	H	L	H	H
L	L	H	H	H	L	H
L	H	H	H	H	H	L

H \approx HIGH Voltage Level
L \approx LOW Voltage Level
X \approx Immaterial

Fig. a Gate Functions (each half)



DC Characteristics over Operating Temperature Range (unless otherwise specified)

Symbol	Parameter	54F/74F			Units	Conditions
		Min	Typ	Max		
I_{CC}	Power Supply Current		13	20	mA	$V_{CC} = \text{Max}$

AC Characteristics: See Section 3 for waveforms and load configurations

Symbol	Parameter	54F/74F			54F		74F		Units	Fig. No.
		$T_A = +25^\circ\text{C}$ $V_{CC} = +5.0\text{ V}$ $C_L = 50\text{ pF}$			$T_A, V_{CC} = \text{Mil}$ $C_L = 50\text{ pF}$		$T_A, V_{CC} = \text{Com}$ $C_L = 50\text{ pF}$			
		Min	Typ	Max	Min	Max	Min	Max		
t_{PLH} t_{PHL}	Propagation Delay A_0 or A_1 to \bar{O}_n	3.5	5.3	7.5	2.5	12.0	3.0	8.5	ns	3-1 3-10
t_{PLH} t_{PHL}	Propagation Delay \bar{E}_1 to \bar{O}_n	3.5	5.4	7.0	3.0	9.0	3.5	8.0		
		3.0	4.7	6.5	2.5	8.0	3.0	7.5		