

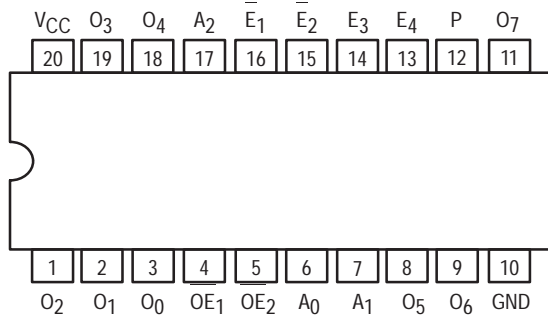


1-OF-8 DECODER WITH 3-STATE OUTPUTS

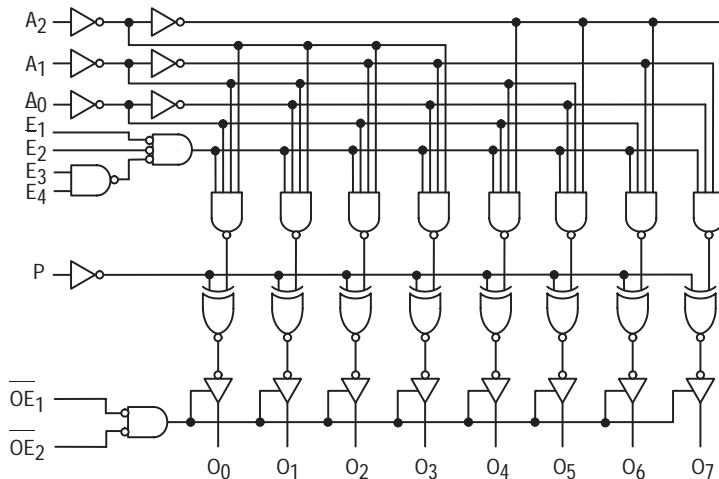
The MC54/74F538 decoder/demultiplexer accepts three Address (A_0-A_2) input signals and decodes them to select one of eight mutually exclusive outputs. A polarity control input (P) determines whether the outputs are active LOW or active HIGH. A HIGH Signal on either of the active LOW Output Enable (OE) inputs forces all outputs to the high impedance state. Two active HIGH and two active LOW input enables are available for easy expansion to 1-of-32 decoding with four packages, or for data demultiplexing to 1-of-8 or 1-of-16 destinations.

- Output Polarity Control
- Data Demultiplexing Capability
- Multiple Enables for Expansion
- 3-State Outputs
- ESD Protection > 4000 Volts

CONNECTION DIAGRAM DIP (TOP VIEW)



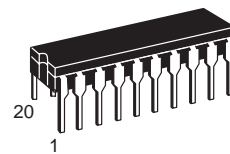
LOGIC DIAGRAM



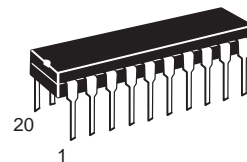
Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

MC54/74F538

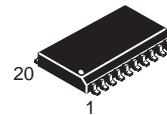
**1-OF-8 DECODER
WITH 3-STATE OUTPUTS**
FAST™ SCHOTTKY TTL



**J SUFFIX
CERAMIC
CASE 732-03**



**N SUFFIX
PLASTIC
CASE 738-03**

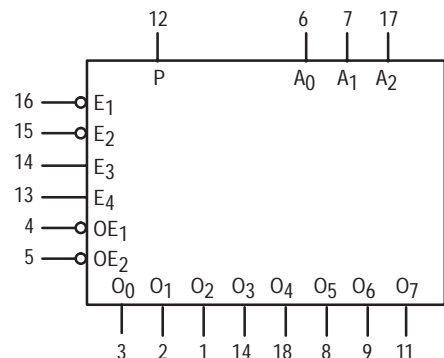


**DW SUFFIX
SOIC
CASE 751D-03**

ORDERING INFORMATION

MC54FXXXJ Ceramic
MC74FXXXN Plastic
MC74FXXXDW SOIC

LOGIC SYMBOL



V_{CC} = PIN 20
GND = PIN 10

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MC54/74F538

GUARANTEED OPERATING RANGES

| Symbol | Parameter | Min | Typ | Max | Unit | |
|-----------------|-------------------------------------|--------|-----|-----|------|----|
| V _{CC} | Supply Voltage | 54, 74 | 4.5 | 5.0 | 5.5 | V |
| T _A | Operating Ambient Temperature Range | 54 | -55 | 25 | 125 | °C |
| | | 74 | 0 | 25 | 70 | |
| I _{OH} | Output Current — High | 54, 74 | | | -3.0 | mA |
| I _{OL} | Output Current — Low | 54, 74 | | | 24 | mA |

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

| Symbol | Parameter | Limits | | | Unit | Test Conditions |
|------------------|---------------------------------------|--------|-----|------|------|---|
| | | Min | Typ | Max | | |
| V _{IH} | Input HIGH Voltage | 2.0 | | | V | Guaranteed Input HIGH Voltage |
| V _{IL} | Input LOW Voltage | | | 0.8 | V | Guaranteed Input LOW Voltage |
| V _{IK} | Input Clamp Diode Voltage | | | -1.2 | V | V _{CC} = MIN, I _{IN} = -18 mA |
| V _{OH} | Output HIGH Voltage | 54, 74 | 2.4 | | V | I _{OH} = -3.0 mA, V _{CC} = 4.5 V |
| | | 74 | 2.7 | | V | I _{OH} = -3.0 mA, V _{CC} = 4.75 V |
| V _{OL} | Output LOW Voltage | | | 0.5 | V | I _{OL} = 24 mA, V _{CC} = MIN |
| I _{OZH} | Output OFF Current — HIGH | | | 50 | μA | V _{OUT} = 2.7 V, V _{CC} = MAX |
| I _{OZL} | Output OFF Current — LOW | | | -50 | μA | V _{OUT} = 0.5 V, V _{CC} = MAX |
| I _{IH} | Input HIGH Current | | | 20 | μA | V _{CC} = MAX, V _{IN} = 2.7 V |
| | | | | 0.1 | mA | V _{CC} = MAX, V _{IN} = 7.0 V |
| I _{IL} | Input LOW Current | | | -0.6 | mA | V _{CC} = MAX, V _{IN} = 0.5 V |
| I _{OS} | Output Short Circuit Current (Note 2) | -60 | | -150 | mA | V _{CC} = MAX, V _{OUT} = 0 V |
| I _{CCZ} | Power Supply Current | | 37 | 56 | mA | V _{CC} = MAX: A ₀ -A ₂ , E ₁ , E ₂ = GND OE ₁ , OE ₂ , E ₃ , E ₄ , P = HIGH |

AC CHARACTERISTICS

| Symbol | Parameter | 54/74F | | | 54F | | 74F | | Unit |
|--------------------------------------|---|--|------------|--------------|---|--------------|---|------------|------|
| | | T _A = +25°C V _{CC} = +5.0 V C _L = 50 pF | | | T _A = -55 to +125°C V _{CC} = 5.0 V ± 10% C _L = 50 pF | | T _A = 0 to 70°C V _{CC} = 5.0 V ± 10% C _L = 50 pF | | |
| | | Min | Typ | Max | Min | Max | Min | Max | |
| t _{PLH} t _{PHL} | Propagation Delay A _n to O _n | 4.0 3.0 | 11 7.5 | 13 12.5 | 4.0 3.0 | 17 16.5 | 4.0 3.0 | 14 13.5 | ns |
| t _{PLH} t _{PHL} | Propagation Delay E ₁ or E ₂ to O _n | 4.0 3.0 | 8.5 6.5 | 12 12 | 3.5 3.0 | 15 14.5 | 3.5 3.0 | 13 12.5 | |
| t _{PLH} t _{PHL} | Propagation Delay E ₃ or E ₄ to O _n | 6.5 4.0 | 11 10 | 12.5 12.5 | 5.5 3.5 | 15.5 15 | 5.5 3.5 | 13.5 13 | ns |
| t _{PLH} t _{PHL} | Propagation Delay P to O _n | 4.5 3.5 | 11.5 11 | 15 11.5 | 4.0 3.5 | 18.5 12.5 | 4.0 3.5 | 16.5 12 | |
| t _{PZH} t _{PZL} | Output Enable Time OE ₁ or OE ₂ to O _n | 2.5 4.0 | 5.5 9.0 | 9.5 13.5 | 2.0 4.0 | 13 16 | 2.0 4.0 | 11 15 | ns |
| t _{PHZ} t _{PLZ} | Output Disable Time OE ₁ or OE ₂ to O _n | 1.0 1.0 | 4.0 5.0 | 6.0 8.5 | 1.0 1.0 | 8.0 10.5 | 1.0 1.0 | 7.0 9.5 | |

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MC54/74F538

TRUTH TABLE

| FUNCTION | INPUTS | | | | | | | | | OUTPUTS | | | | | | | |
|----------------------------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | OE ₁ | OE ₂ | E ₁ | E ₂ | E ₃ | E ₄ | A ₂ | A ₁ | A ₀ | O ₀ | O ₁ | O ₂ | O ₃ | O ₄ | O ₅ | O ₆ | O ₇ |
| High Impedance | H | X | X | X | X | X | X | X | X | Z | Z | Z | Z | Z | Z | Z | Z |
| | X | H | X | X | X | X | X | X | X | Z | Z | Z | Z | Z | Z | Z | Z |
| Disable | L | L | H | X | X | X | X | X | X | Outputs Equal P Input | | | | | | | |
| | L | L | X | H | X | X | X | X | X | | | | | | | | |
| | L | L | X | X | L | X | X | X | X | | | | | | | | |
| | L | L | X | X | X | L | X | X | X | | | | | | | | |
| Active HIGH Output (P = L) | L | L | L | L | H | H | L | L | L | H | L | L | L | L | L | L | L |
| | L | L | L | L | H | H | L | L | H | L | H | L | L | L | L | L | L |
| | L | L | L | L | H | H | L | H | L | L | L | H | L | L | L | L | L |
| | L | L | L | L | H | H | H | L | L | L | L | L | H | L | L | L | L |
| | L | L | L | L | H | H | H | L | H | L | L | L | L | L | L | L | L |
| | L | L | L | L | H | H | H | H | L | L | L | L | L | L | L | L | L |
| | L | L | L | L | H | H | H | H | H | L | L | L | L | L | L | L | L |
| | L | L | L | L | H | H | H | H | H | H | L | L | L | L | L | L | L |
| Active LOW Output (P = H) | L | L | L | L | H | H | L | L | L | L | H | H | H | H | H | H | H |
| | L | L | L | L | H | H | L | L | H | H | L | H | H | H | H | H | H |
| | L | L | L | L | H | H | L | H | L | H | H | L | H | H | H | H | H |
| | L | L | L | L | H | H | L | H | H | H | H | L | H | H | H | H | H |
| | L | L | L | L | H | H | H | L | L | H | H | H | H | H | H | H | H |
| | L | L | L | L | H | H | H | L | H | L | H | H | H | H | H | H | H |
| | L | L | L | L | H | H | H | H | L | L | H | H | H | H | H | H | H |
| | L | L | L | L | H | H | H | H | H | H | H | H | H | H | H | H | H |

H = HIGH Voltage Level
 L = LOW Voltage Level
 X = Don't Care
 Z = High Impedance


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