

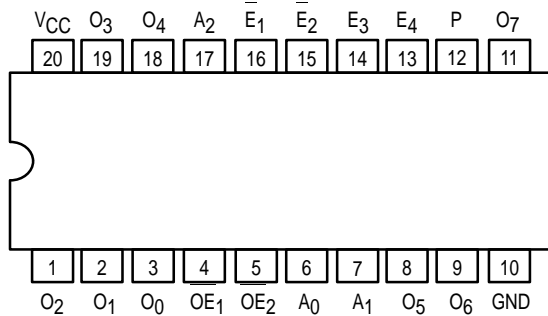


# 1-OF-8 DECODER WITH 3-STATE OUTPUTS

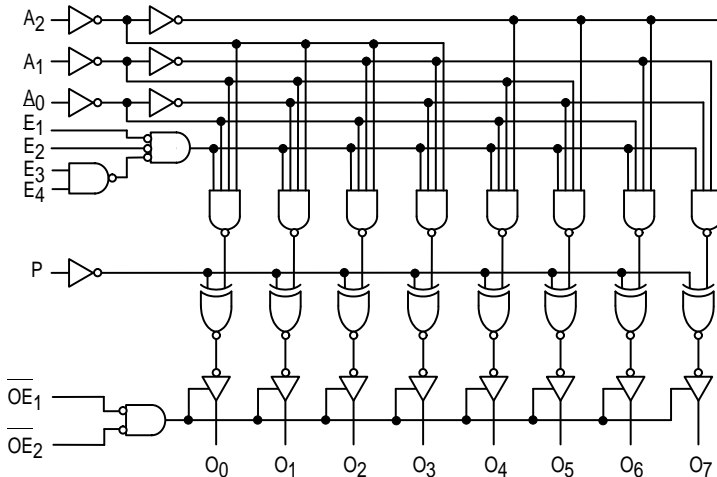
The MC54/74F538 decoder/demultiplexer accepts three Address ( $A_0-A_2$ ) input signals and decodes them to select one of eight mutually exclusive outputs. A polarity control input (P) determines whether the outputs are active LOW or active HIGH. A HIGH Signal on either of the active LOW Output Enable (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)



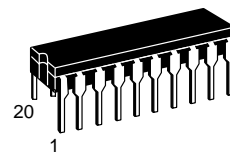
LOGIC DIAGRAM



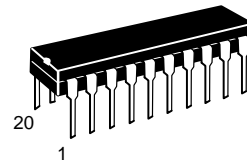
Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

## MC54/74F538

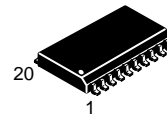
1-OF-8 DECODER  
WITH 3-STATE OUTPUTS  
FAST™ SCHOTTKY TTL



J SUFFIX  
CERAMIC  
CASE 732-03



N SUFFIX  
PLASTIC  
CASE 738-03

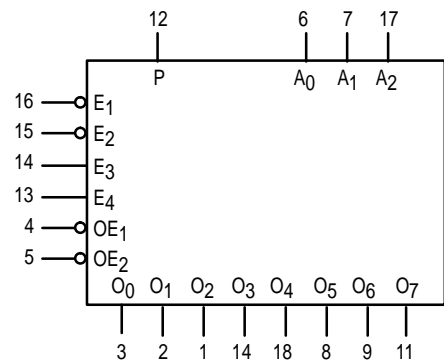


DW SUFFIX  
SOIC  
CASE 751D-03

ORDERING INFORMATION

MC54FXXXJ Ceramic  
MC74FXXXN Plastic  
MC74FXXXDW SOIC

LOGIC SYMBOL



VCC = PIN 20  
GND = PIN 10

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# MC54/74F538

## GUARANTEED OPERATING RANGES

Symbol	Parameter	Min	Typ	Max	Unit	
V <sub>CC</sub>	Supply Voltage	54, 74	4.5	5.0	5.5	V
T <sub>A</sub>	Operating Ambient Temperature Range	54	-55	25	125	°C
		74	0	25	70	
I <sub>OH</sub>	Output Current — High	54, 74			-3.0	mA
I <sub>OL</sub>	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 <sub>IH</sub>	Input HIGH Voltage	2.0			V	Guaranteed Input HIGH Voltage
V <sub>IL</sub>	Input LOW Voltage			0.8	V	Guaranteed Input LOW Voltage
V <sub>IK</sub>	Input Clamp Diode Voltage			-1.2	V	V <sub>CC</sub> = MIN, I <sub>IN</sub> = -18 mA
V <sub>OH</sub>	Output HIGH Voltage	54, 74	2.4		V	I <sub>OH</sub> = -3.0 mA, V <sub>CC</sub> = 4.5 V
		74	2.7		V	I <sub>OH</sub> = -3.0 mA, V <sub>CC</sub> = 4.75 V
V <sub>OL</sub>	Output LOW Voltage			0.5	V	I <sub>OL</sub> = 24 mA, V <sub>CC</sub> = MIN
I <sub>OZH</sub>	Output OFF Current — HIGH			50	μA	V <sub>OUT</sub> = 2.7 V, V <sub>CC</sub> = MAX
I <sub>OZL</sub>	Output OFF Current — LOW			-50	μA	V <sub>OUT</sub> = 0.5 V, V <sub>CC</sub> = MAX
I <sub>IH</sub>	Input HIGH Current			20	μA	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 2.7 V
				0.1	mA	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 7.0 V
I <sub>IL</sub>	Input LOW Current			-0.6	mA	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.5 V
I <sub>OS</sub>	Output Short Circuit Current (Note 2)	-60		-150	mA	V <sub>CC</sub> = MAX, V <sub>OUT</sub> = 0 V
I <sub>CCZ</sub>	Power Supply Current		37	56	mA	V <sub>CC</sub> = MAX: A <sub>0</sub> -A <sub>2</sub> , E <sub>1</sub> , E <sub>2</sub> = GND OE <sub>1</sub> , OE <sub>2</sub> , E <sub>3</sub> , E <sub>4</sub> , P = HIGH

## AC CHARACTERISTICS

Symbol	Parameter	54/74F			54F		74F		Unit
		T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0 V C <sub>L</sub> = 50 pF			T <sub>A</sub> = -55 to +125°C V <sub>CC</sub> = 5.0 V ± 10% C <sub>L</sub> = 50 pF		T <sub>A</sub> = 0 to 70°C V <sub>CC</sub> = 5.0 V ± 10% C <sub>L</sub> = 50 pF		
		Min	Typ	Max	Min	Max	Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay A <sub>n</sub> to O <sub>n</sub>	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 <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay E <sub>1</sub> or E <sub>2</sub> to O <sub>n</sub>	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 <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay E <sub>3</sub> or E <sub>4</sub> to O <sub>n</sub>	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 <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay P to O <sub>n</sub>	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 <sub>PZH</sub> t <sub>PZL</sub>	Output Enable Time OE <sub>1</sub> or OE <sub>2</sub> to O <sub>n</sub>	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 <sub>PHZ</sub> t <sub>P LZ</sub>	Output Disable Time OE <sub>1</sub> or OE <sub>2</sub> to O <sub>n</sub>	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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**TRUTH TABLE**

FUNCTION	INPUTS									OUTPUTS							
	OE <sub>1</sub>	OE <sub>2</sub>	E <sub>1</sub>	E <sub>2</sub>	E <sub>3</sub>	E <sub>4</sub>	A <sub>2</sub>	A <sub>1</sub>	A <sub>0</sub>	O <sub>0</sub>	O <sub>1</sub>	O <sub>2</sub>	O <sub>3</sub>	O <sub>4</sub>	O <sub>5</sub>	O <sub>6</sub>	O <sub>7</sub>
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	L	H	H	L	L	L	L	L	L	L	L
	L	L	L	L	H	H	H	L	L	L	L	L	L	H	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	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	H
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	L	L	L	L	L	L	L	L
	L	L	L	L	H	H	H	L	L	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

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


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