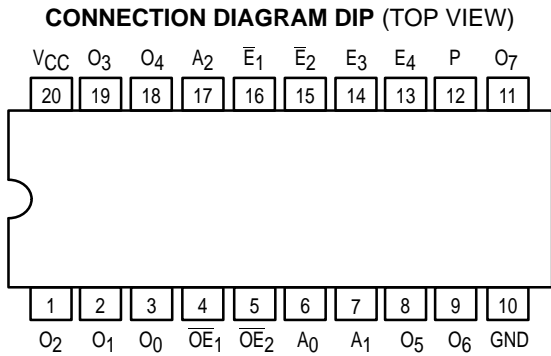




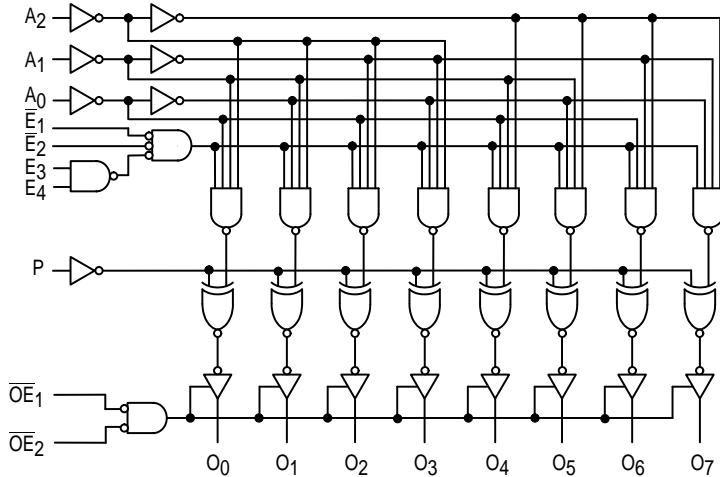
# 1-OF-8 DECODER WITH 3-STATE OUTPUTS

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 ( $\overline{OE}$ ) 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



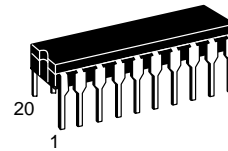
## LOGIC DIAGRAM



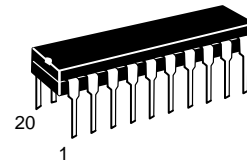
Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

# MC54/74F538

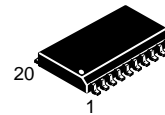
**1-OF-8 DECODER WITH 3-STATE OUTPUTS**  
**FAST™ SCHOTTKY TTL**



**J SUFFIX**  
 CERAMIC  
 CASE 732-03



**N SUFFIX**  
 PLASTIC  
 CASE 738-03

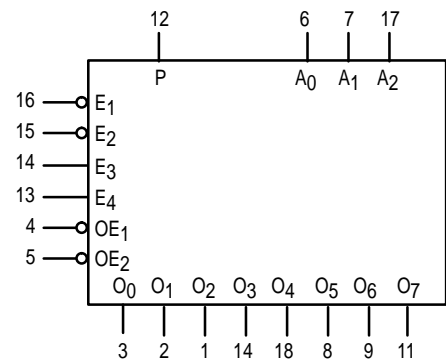


**DW SUFFIX**  
 SOIC  
 CASE 751D-03

## ORDERING INFORMATION

MC54FXXXJ Ceramic  
 MC74FXXXN Plastic  
 MC74FXXXDW SOIC

## LOGIC SYMBOL



$V_{CC}$  = PIN 20  
 $GND$  = PIN 10

# 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> , $\bar{E}_1$ , $\bar{E}_2$ = GND $\bar{OE}_1$ , $\bar{OE}_2$ , 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 $\bar{E}_1$ or $\bar{E}_2$ 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 $\bar{OE}_1$ or $\bar{OE}_2$ 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>PLZ</sub>	Output Disable Time $\bar{OE}_1$ or $\bar{OE}_2$ 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	

# MC54/74F538

**TRUTH TABLE**

FUNCTION	INPUTS									OUTPUTS								
	$\overline{OE}_1$	$\overline{OE}_2$	$\overline{E}_1$	$\overline{E}_2$	$E_3$	$E_4$	$A_2$	$A_1$	$A_0$	$O_0$	$O_1$	$O_2$	$O_3$	$O_4$	$O_5$	$O_6$	$O_7$	
High Impedance	H X	X H	X X	X X	X X	X X	X X	X X	X X	Z Z	Z Z	Z Z	Z Z	Z Z	Z Z	Z Z	Z Z	
Disable	L L L L	L L L L	H X X X	X H X X	X X L X	X X L L	X X X X	X X X X	X X X X	Outputs Equal P Input								
Active HIGH Output (P = L)	L L L L L L L L	L L L L L L L L	L L L L L L L L	L L L L L L L L	H H H H H H H H	H H H H H H H H	L L L L L L L L	L L L L L L L L	L L L L L L L L	H L L L L L L L	L H L L L L L L	L L H L L L L L	L L L H L L L L	L L L L L L L L	L L L L L L L L	L L L L L L L L	L L L L L L L L	L L L L L L L L
Active LOW Output (P = H)	L L L L L L L L	L L L L L L L L	L L L L L L L L	L L L L L L L L	H H H H H H H H	H H H H H H H H	L L L L L L L L	L L L L L L L L	L L L L L L L L	L H H H H H H H	H L L L L L L L	H H L H H H H H	H H L H H H H H	H H H L H H H H	H H H H L H H H	H H H H H L H H	H H H H H L H H	H H H H H L H L

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