MOTOROLA

MC54/74F539

DUAL 1-OF-4 DECODER WITH 3-STATE OUTPUTS

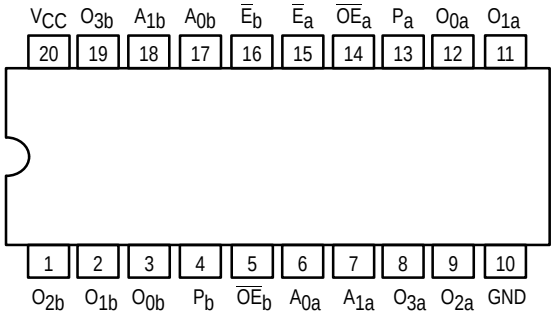
DUAL 1-OF-4 DECODER WITH 3-STATE OUTPUTS

FAST™ SCHOTTKY TTL

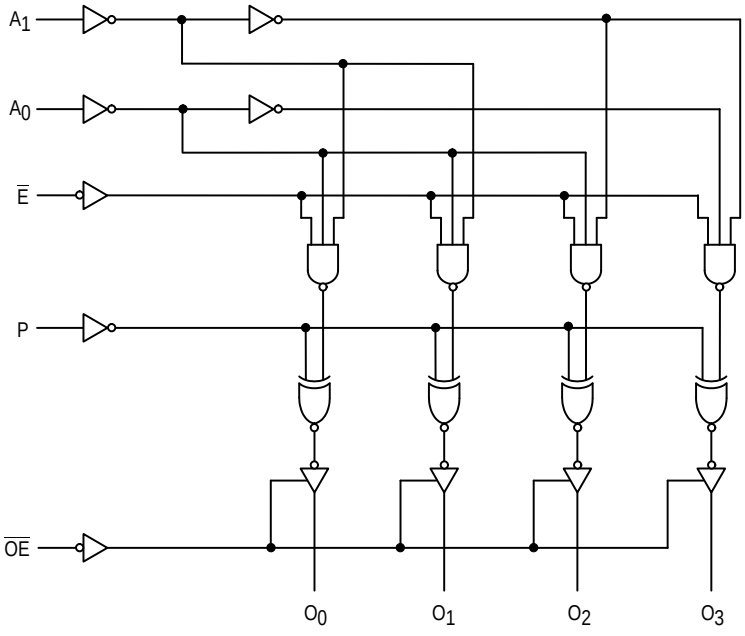
The MC54/74F539 contains two independent decoders. Each accepts two Address ($A_0 - A_1$) input signals and decodes them to select one of four mutually exclusive outputs. A polarity control input (P) determines whether the outputs are active HIGH (P = L) or active LOW (P = H). An active LOW input Enable ($\overline{E}$) is available for data demultiplexing; data is routed to the selected output in non-inverted form in the active LOW mode or in inverted form in the active HIGH mode. A HIGH Signal on the active LOW Output Enable ($\overline{OE}$) input forces the 3-state outputs to the high impedance state.

- Demultiplexing Capability
- 3-State Outputs
- Two Completely Independent 1-of-4 Decoders
- Input Clamp Diodes Limit High Speed Termination Effects
- ESD Protection > 4000 Volts

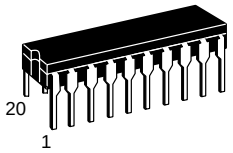
CONNECTION DIAGRAM DIP (TOP VIEW)



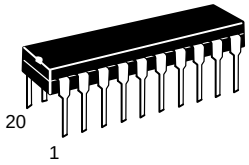
LOGIC DIAGRAM (1/2 SHOWN)



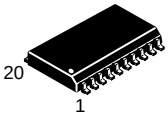
Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.



J SUFFIX
CERAMIC
CASE 732-03



N SUFFIX
PLASTIC
CASE 738-03

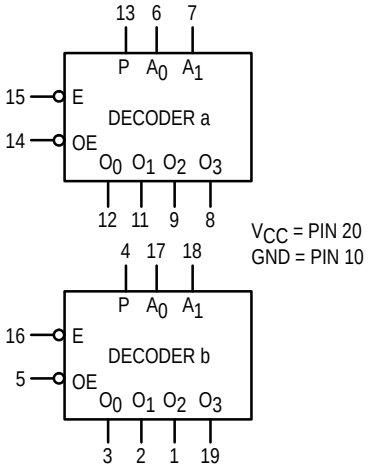


DW SUFFIX
SOIC
CASE 751D-03

ORDERING INFORMATION

MC54FXXXJ	Ceramic
MC74FXXXN	Plastic
MC74FXXXDW	SOIC

LOGIC SYMBOL



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 Min	Typ	Max	Unit	Test Conditions	
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			40	60	mA	V_{CC} = MAX, A_0, A_1, $\overline{E}$ = GND $\overline{OE}$, P = HIGH	

AC CHARACTERISTICS

Symbol	Parameter	54/74F T_A = +25°C V_{CC} = +5.0 V C_L = 50 pF			54F T_A = –55 to +125°C V_{CC} = 5.0 V ± 10% C_L = 50 pF		74F T_A = 0 to 70°C V_{CC} = 5.0 V ± 10% C_L = 50 pF		Unit
		Min	Typ	Max	Min	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation Delay A_n to O_n	3.5 3.0		12.5 12.5	3.0 2.5	18.5 16	3.0 2.5	13.5 13	ns
t_{PLH} t_{PHL}	Propagation Delay $\overline{E}$ to O_n	3.0 3.0		11 11	2.5 3.0	14 13.5	3.0 3.0	12 11.5	ns
t_{PLH} t_{PHL}	Propagation Delay P to O_n	4.0 3.5		9.5 9.5	3.5 3.0	12.5 11.5	3.5 3.0	10.5 10	ns
t_{PLH} t_{PHL}	Propagation Delay P to $\overline{O}_n$	5.0 3.0		14.5 9.0	4.0 3.0	19.5 11.5	4.0 3.0	15.5 9.5	ns
t_{PZH} t_{PZL}	Output Enable Time $\overline{OE}$ to O_n	2.5 4.0		7.5 10	2.0 3.5	10.5 13.5	2.0 3.5	8.5 11.5	ns
t_{PHZ} t_{PLZ}	Output Disable Time $\overline{OE}$ to O_n	1.5 2.0		6.0 8.0	1.0 1.5	7.5 9.5	1.0 1.5	6.5 8.5	

TRUTH TABLE (each half)

Function	Inputs				Outputs			
	$\overline{OE}$	$\overline{E}$	A_1	A_0	O_0	O_1	O_2	O_3
High Impedance	H	X	X	X	Z	Z	Z	Z
Disable	L	H	X	X	$O_n = P$			
Active HIGH Output (P = L)	L	L	L	L	H	L	L	L
	L	L	L	H	L	H	L	L
	L	L	H	L	L	L	H	L
	L	L	H	H	L	L	L	H
Active LOW Output (P = H)	L	L	L	L	L	H	H	H
	L	L	L	H	H	L	H	H
	L	L	H	L	H	H	L	H
	L	L	H	H	H	H	H	L

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