

74F537

1-of-10 Decoder with 3-STATE Outputs

General Description

The 'F537 is one-of-ten decoder/demultiplexer with four active HIGH BCD inputs and ten mutually exclusive outputs. A polarity control input determines whether the outputs are active LOW or active HIGH. The 'F537 has 3-STATE outputs, and a HIGH signal on the Output Enable ($\overline{OE}$) input forces all

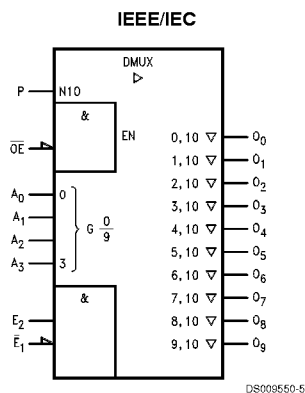
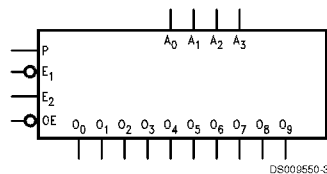
outputs to the high impedance state. Two input enables, active HIGH E_2 and active LOW $\overline{E}_1$, are available for demultiplexing data to the selected output in either non-inverted or inverted form. Input codes greater than BCD nine cause all outputs to go to the inactive state (i.e., same polarity as the P input).

Ordering Code:

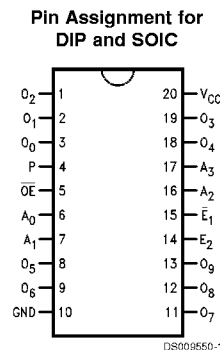
Commercial	Package Number	Package Description
74F537PC	N20A	20-Lead (0.300" Wide) Molded Dual-In-Line
74F537SC (Note 1)	M20B	20-Lead (0.300" Wide) Molded Small Outline, JEDEC
74F537SJ (Note 1)	M20D	20-Lead (0.300" Wide) Molded Small Outline, EIAJ

Note 1: Devices also available in 13" reel. Use suffix = SCX and SJX.

Logic Symbols



Connection Diagram



Unit Loading/Fan Out

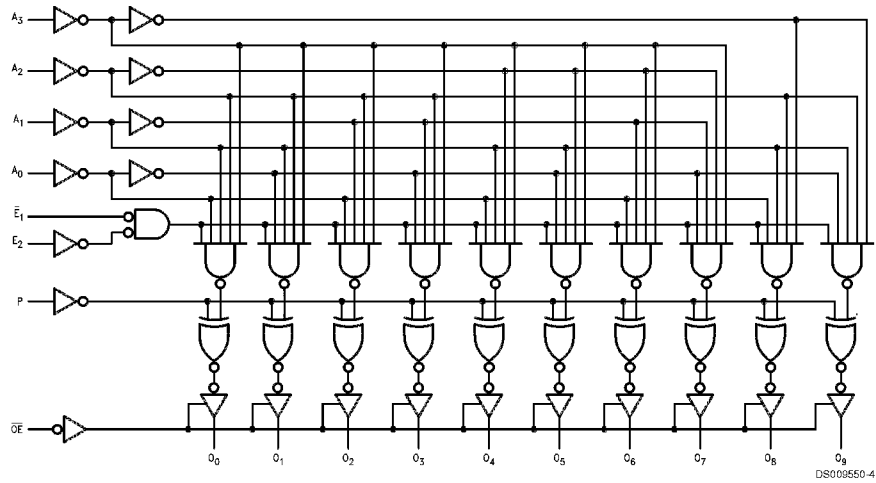
Pin Names	Description	74F	
		U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
A_0-A_3	Address Inputs	1.0/1.0	20 μA /-0.6 mA
$\overline{E}_1$	Enable Input (Active LOW)	1.0/1.0	20 μA /-0.6 mA
E_2	Enable Input (Active HIGH)	1.0/1.0	20 μA /-0.6 mA
$\overline{OE}$	Output Enable Input (Active LOW)	1.0/1.0	20 μA /-0.6 mA
P	Polarity Control Input	1.0/1.0	20 μA /-0.6 mA
O_0-O_9	3-STATE Outputs	150/40 (33.3)	-3 mA/24 mA (20 mA)

Truth Table

Function	Inputs									Outputs								
	$\overline{OE}$	$\overline{E}_1$	E_2	A_3	A_2	A_1	A_0	O_0	O_1	O_2	O_3	O_4	O_5	O_6	O_7	O_8	O_9	
High Impedance	H	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	
Disable	L	H	X	X	X	X	X			Outputs Equal P Input								
	L	X	L	X	X	X	X											
Active HIGH Output (P = L)	L	L	H	L	L	L	L	H	L	L	L	L	L	L	L	L	L	
	L	L	H	L	L	L	H	L	H	L	L	L	L	L	L	L	L	
	L	L	H	L	L	H	L	L	L	H	L	L	L	L	L	L	L	
	L	L	H	L	L	H	H	L	L	L	H	L	L	L	L	L	L	
	L	L	H	L	L	H	H	L	L	L	L	L	L	L	L	L	L	
	L	L	H	L	L	H	H	L	L	L	L	L	L	L	L	L	L	
	L	L	H	L	L	H	H	L	L	L	L	L	L	L	L	L	L	
	L	L	H	L	L	H	H	L	L	L	L	L	L	L	L	L	L	
	L	L	H	L	L	H	H	L	L	L	L	L	L	L	L	L	L	
	L	L	H	L	L	H	H	L	L	L	L	L	L	L	L	L	L	
	L	L	H	L	L	H	H	L	L	L	L	L	L	L	L	L	L	
	L	L	H	L	L	H	H	L	L	L	L	L	L	L	L	L	L	
	L	L	H	L	L	H	H	L	L	L	L	L	L	L	L	L	L	
	L	L	H	L	L	H	H	L	L	L	L	L	L	L	L	L	L	
	L	L	H	L	L	H	H	L	L	L	L	L	L	L	L	L	L	
	L	L	H	L	L	H	H	L	L	L	L	L	L	L	L	L	L	
Active LOW Output (P = H)	L	L	H	L	L	L	L	L	H	H	H	H	H	H	H	H	H	
	L	L	H	L	L	L	H	H	L	H	H	H	H	H	H	H	H	
	L	L	H	L	L	H	L	H	H	L	H	H	H	H	H	H	H	
	L	L	H	L	L	H	H	H	H	H	L	H	H	H	H	H	H	
	L	L	H	L	L	H	H	H	H	H	L	H	H	H	H	H	H	
	L	L	H	L	L	H	H	H	H	H	L	H	H	H	H	H	H	
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	L	L	H	L	L	H	H	H	H	H	L	H	H	H	H	H	H	
L	L	H	L	L	H	H	H	H	H	L	H	H	H	H	H	H		

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = High Impedance

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.

Absolute Maximum Ratings (Note 2)

Storage Temperature	−65°C to +150°C
Ambient Temperature under Bias	−55°C to +125°C
Junction Temperature under Bias	−55°C to +175°C
Plastic	−55°C to +150°C
V _{CC} Pin Potential to Ground Pin	−0.5V to +7.0V
Input Voltage (Note 3)	−0.5V to +7.0V
Input Current (Note 3)	−30 mA to +5.0 mA
Voltage Applied to Output in HIGH State (with V _{CC} = 0V)	
Standard Output	−0.5V to V _{CC}
3-STATE Output	−0.5V to +5.5V

Current Applied to Output in LOW State (Max) twice the rated I_{OL} (mA)

Recommended Operating Conditions

Free Air Ambient Temperature	
Commercial	0°C to +70°C
Supply Voltage	
Commercial	+4.5V to +5.5V

Note 2: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 3: Either voltage limit or current limit is sufficient to protect inputs.

DC Electrical Characteristics

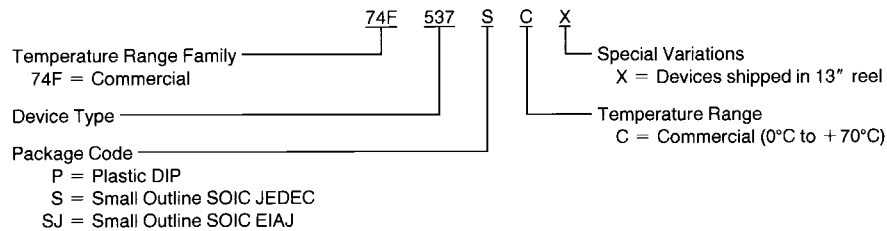
Symbol	Parameter		74F			Units	V _{CC}	Conditions
			Min	Typ	Max			
V _{IH}	Input HIGH Voltage		2.0			V		Recognized as a HIGH Signal
V _{IL}	Input LOW Voltage				0.8	V		Recognized as a LOW Signal
V _{CD}	Input Clamp Diode Voltage				−1.2	V	Min	I _{IN} = −18 mA
V _{OH}	Output HIGH Voltage	74F 10% V _{CC}	2.5			V	Min	I _{OH} = −1 mA
		74F 10% V _{CC}	2.4					I _{OH} = −3 mA
		74F 5% V _{CC}	2.7					I _{OH} = −1 mA
		74F 5% V _{CC}	2.7					I _{OH} = −3 mA
V _{OL}	Output LOW Voltage	74F 10% V _{CC}			0.5	V	Min	I _{OL} = 24 mA
I _{IH}	Input HIGH Current	74F			5.0	μA	Max	V _{IN} = 2.7V
I _{BVI}	Input HIGH Current Breakdown Test	74F			7.0	μA	Max	V _{IN} = 7.0V
I _{CEX}	Output HIGH Leakage Current	74F			50	μA	Max	V _{OUT} = V _{CC}
V _{ID}	Input Leakage Test	74F	4.75			V	0.0	I _{ID} = 1.9 μA All Other Pins Grounded
I _{OD}	Output Leakage Circuit Current	74F			3.75	μA	0.0	V _{IOD} = 150 mV All Other Pins Grounded
I _{IL}	Input LOW Current				−0.6	mA	Max	V _{IN} = 0.5V
I _{OZH}	Output Leakage Current				50	μA	Max	V _{OUT} = 2.7V
I _{OZL}	Output Leakage Current				−50	μA	Max	V _{OUT} = 0.5V
I _{OS}	Output Short-Circuit Current		−60		−150	mA	Max	V _{OUT} = 0V
I _{ZZ}	Bus Drainage Test				500	μA	0.0V	V _{OUT} = 5.25V
I _{CCH}	Power Supply Current				56	mA	Max	V _O = HIGH
I _{CCZ}	Power Supply Current			44	66	mA	Max	V _O = HIGH Z

AC Electrical Characteristics

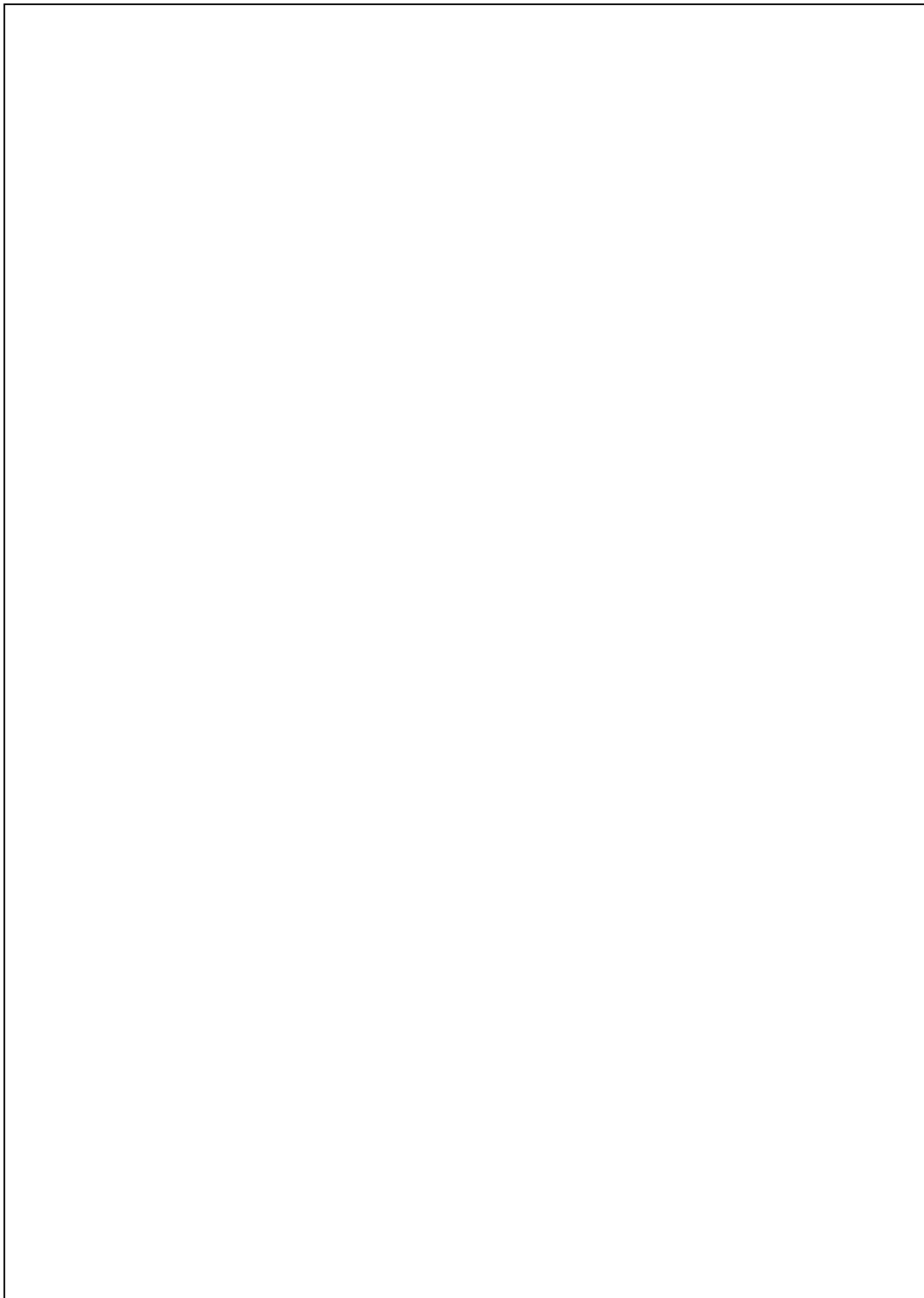
Symbol	Parameter	74F			74F		Units
		$T_A = +25^{\circ}\text{C}$ $V_{CC} = +5.0\text{V}$ $C_L = 50\text{ pF}$			$T_A, V_{CC} = \text{Com}$ $C_L = 50\text{ pF}$		
		Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay	6.0	11.0	16.0	6.0	17.0	ns
t_{PHL}	A_n to O_n	4.0	7.5	11.0	4.0	12.0	
t_{PLH}	Propagation Delay	5.0	8.5	14.5	5.0	15.5	
t_{PHL}	$\overline{E}_1$ to O_n	4.0	6.5	9.0	4.0	10.0	ns
t_{PLH}	Propagation Delay	6.0	11.0	16.0	6.0	17.0	
t_{PHL}	E_2 to O_n	5.0	10.0	14.0	5.0	15.0	
t_{PLH}	Propagation Delay	6.0	11.5	18.0	6.0	20.0	
t_{PHL}	P to O_n	6.0	11.0	16.0	6.0	17.0	
t_{PZH}	Output Enable Time	3.0	5.5	10.5	3.0	11.5	ns
t_{PZL}	$\overline{OE}$ to O_n	5.0	9.0	13.0	5.0	14.0	
t_{PHZ}	Output Disable Time	2.0	4.0	6.0	2.0	7.0	
t_{PLZ}	$\overline{OE}$ to O_n	3.0	5.0	7.0	3.0	8.0	

Ordering Information

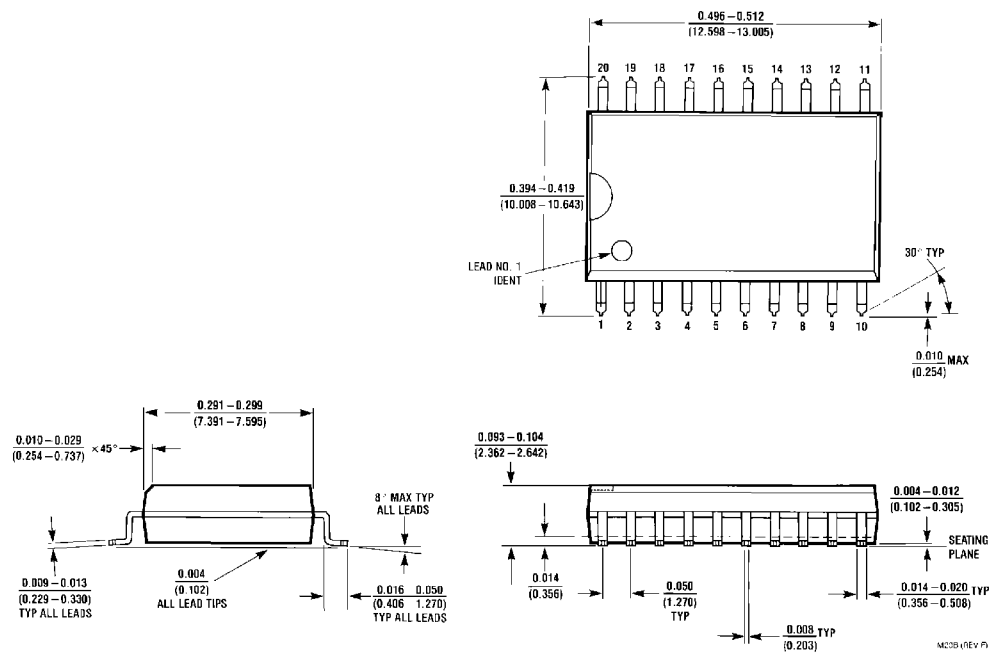
The device number is used to form part of a simplified purchasing code where the package type and temperature range are defined as follows:



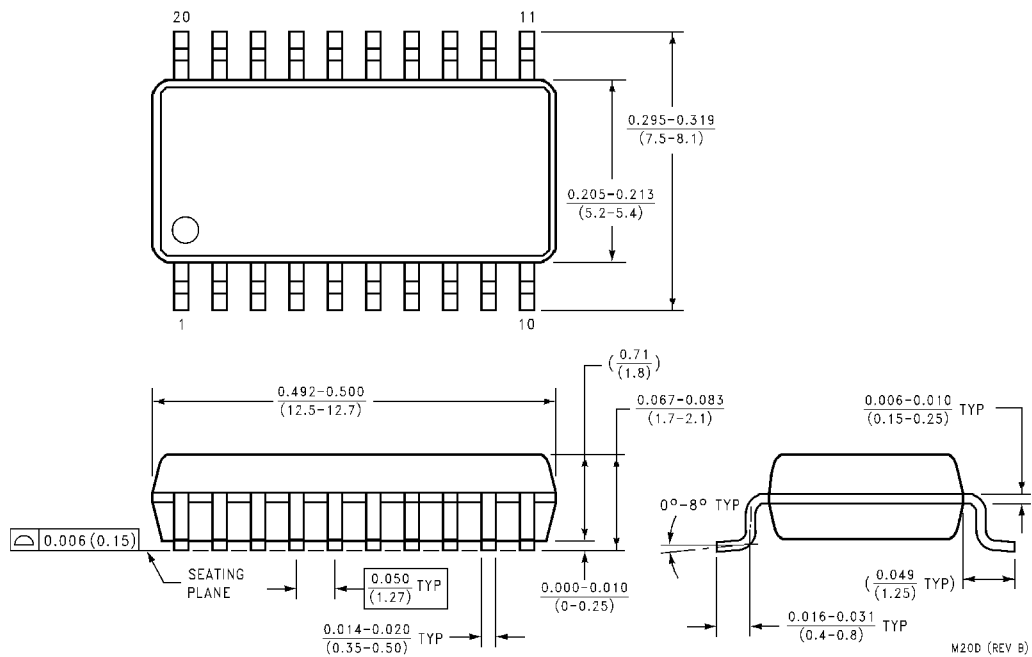
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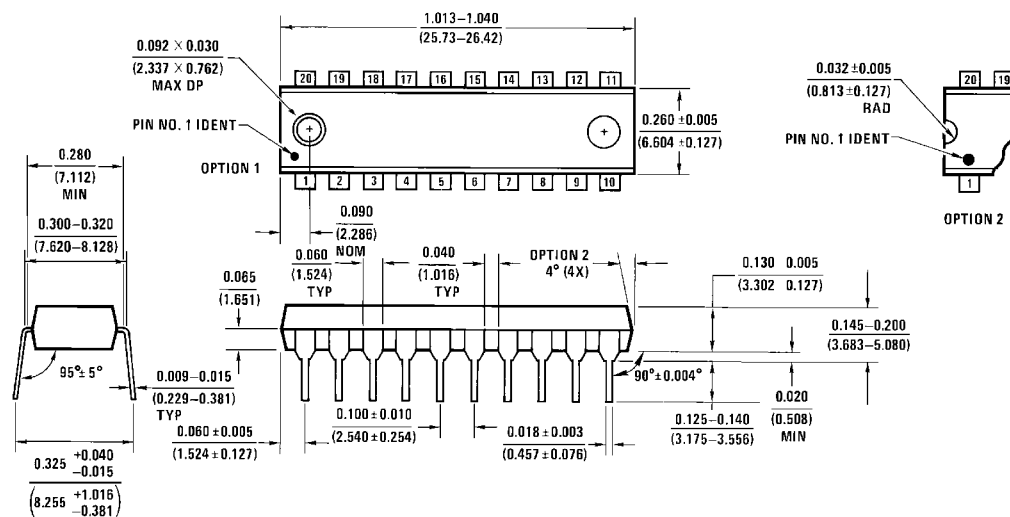
Physical Dimensions inches (millimeters) unless otherwise noted



**20-Lead (0.300" Wide) Molded Small Outline Package, JEDEC (S)
Package Number M20B**



**20-Lead (0.300" Wide) Molded Small Outline Package, EIAJ (SJ)
Package Number M20D**

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)

20-Lead (0.300" Wide) Molded Dual-In-Line Package (P)
Package Number N20A

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