

## 74F537 1-of-10 Decoder with 3-STATE Outputs

### General Description

The 74F537 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 74F537 has 3-STATE outputs, and a HIGH signal on the Output Enable ( $\overline{OE}$ ) input forces all

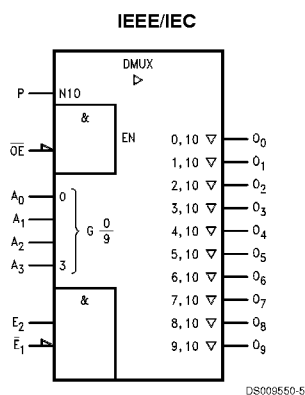
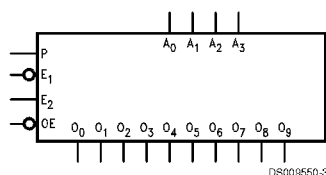
outputs to the high impedance state. Two input enables, active HIGH  $E_2$  and active LOW  $\overline{E}_1$ , are available for demultiplexing data to the selected output in either non-inverted or inverted form. Input codes greater than BCD nine cause all outputs to go to the inactive state (i.e., same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

### Ordering Code:

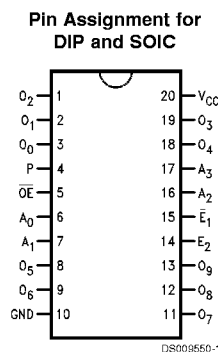
Commercial	Package Number	Package Description
74F537PC	N20A	20-Lead (0.300" Wide) Molded Dual-In-Line
74F537SC (Note 1)	M20B	20-Lead (0.300" Wide) Molded Small Outline, JEDEC
74F537SJ (Note 1)	M20D	20-Lead (0.300" Wide) Molded Small Outline, EIAJ

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 <sub>IH</sub> /I <sub>IL</sub> Output I <sub>OH</sub> /I <sub>OL</sub>
A <sub>0</sub> -A <sub>3</sub>	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 <sub>2</sub>	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 <sub>0</sub> -O <sub>9</sub>	3-STATE Outputs	150/40 (33.3)	-3 mA/24 mA (20 mA)

## Truth Table

Function	Inputs								Outputs								
	$\overline{OE}$	$\overline{E}_1$	E <sub>2</sub>	A <sub>3</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>	O <sub>8</sub>	O <sub>9</sub>
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			Outputs Equal P Input							
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	H	L	L	L	L	L	L	L	L	L	L	L	L
	L	L	H	L	H	L	H	L	L	L	L	L	L	L	L	L	L
	L	L	H	L	H	H	L	L	L	L	L	L	L	L	L	L	L
	L	L	H	L	H	H	L	L	L	L	L	L	L	L	L	L	L
	L	L	H	L	H	H	H	L	L	L	L	L	L	L	L	L	L
	L	L	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L
	L	L	H	H	L	L	H	L	L	L	L	L	L	L	L	L	L
	L	L	H	H	X	H	X	L	L	L	L	L	L	L	L	L	L
	L	L	H	H	H	X	X	L	L	L	L	L	L	L	L	L	L

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



### 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 <sub>CC</sub> 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 <sub>CC</sub> = 0V)	
Standard Output	-0.5V to V <sub>CC</sub>
3-STATE Output	-0.5V to +5.5V

Current Applied to Output in LOW State (Max) twice the rated I<sub>OL</sub> (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

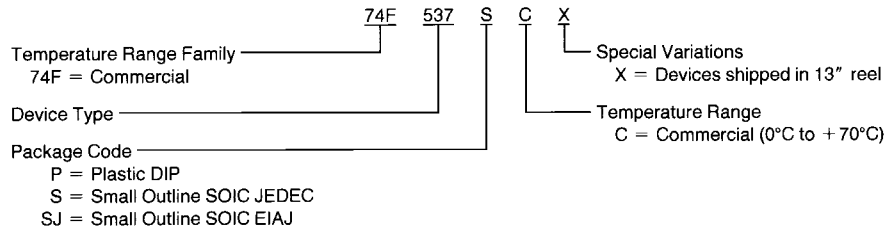
Symbol	Parameter	74F			Units	V <sub>CC</sub>	Conditions
		Min	Typ	Max			
V <sub>IH</sub>	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V <sub>IL</sub>	Input LOW Voltage	0.8			V		Recognized as a LOW Signal
V <sub>CD</sub>	Input Clamp Diode Voltage	-1.2			V	Min	I <sub>IN</sub> = -18 mA
V <sub>OH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

## AC Electrical Characteristics

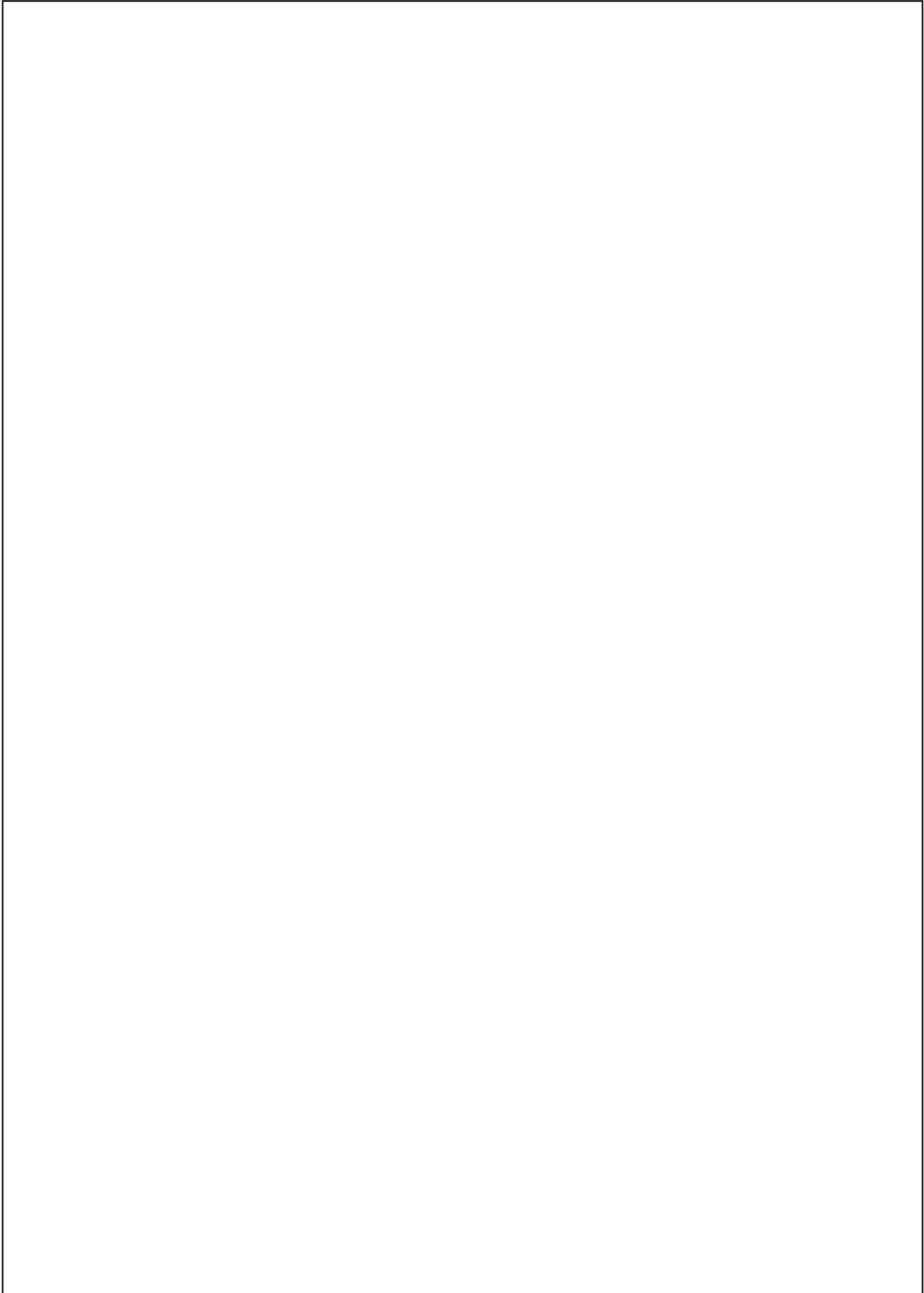
Symbol	Parameter	74F			74F		Units
		$T_A = +25^\circ\text{C}$ $V_{CC} = +5.0\text{V}$ $C_L = 50\text{ pF}$			$T_A, V_{CC} = \text{Com}$ $C_L = 50\text{ pF}$		
		Min	Typ	Max	Min	Max	
$t_{PLH}$	Propagation Delay	6.0	11.0	16.0	6.0	17.0	ns
$t_{PHL}$	$A_n$ to $O_n$	4.0	7.5	11.0	4.0	12.0	
$t_{PLH}$	Propagation Delay	5.0	8.5	14.5	5.0	15.5	ns
$t_{PHL}$	$\bar{E}_1$ to $O_n$	4.0	6.5	9.0	4.0	10.0	
$t_{PLH}$	Propagation Delay	6.0	11.0	16.0	6.0	17.0	ns
$t_{PHL}$	$E_2$ 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	ns
$t_{PHL}$	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
$t_{PZL}$	$\bar{O}E$ 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	ns
$t_{PLZ}$	$\bar{O}E$ to $O_n$	3.0	5.0	7.0	3.0	8.0	

## Ordering Information

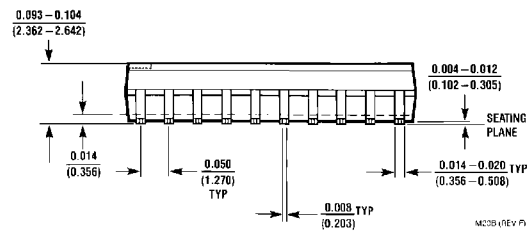
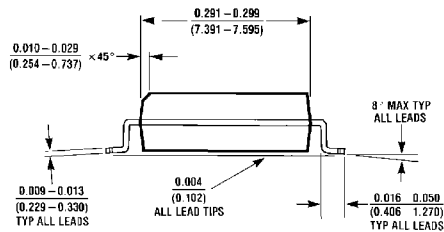
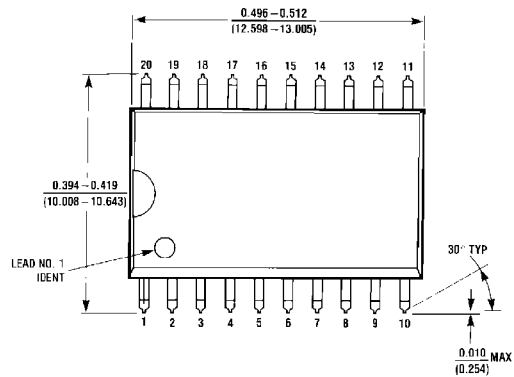
The device number is used to form part of a simplified purchasing code where the package type and temperature range are defined as follows:



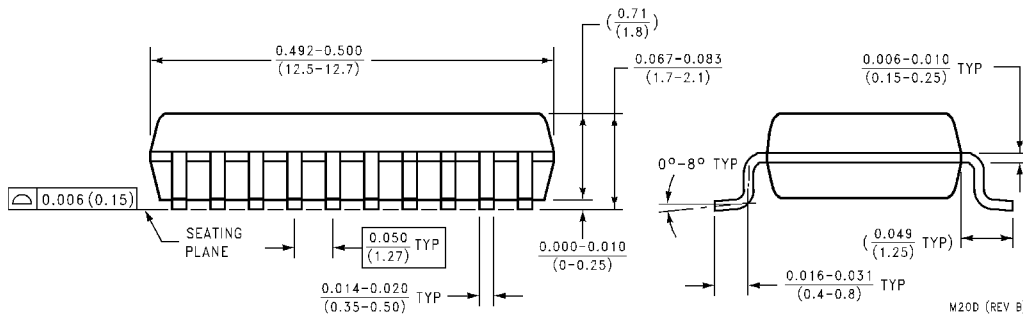
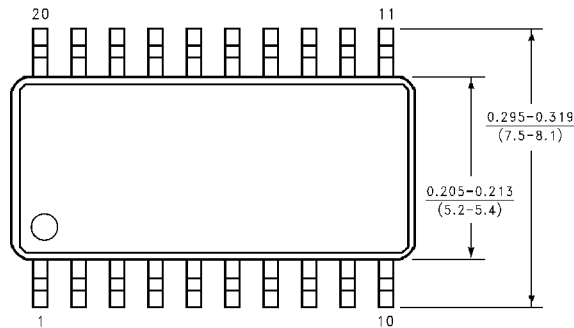
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**Physical Dimensions** inches (millimeters) unless otherwise noted

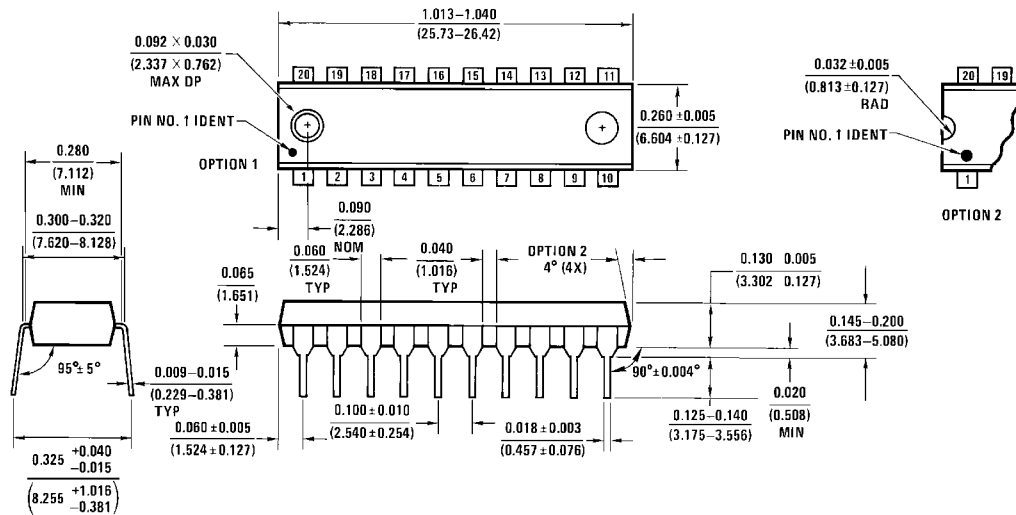


**20-Lead (0.300" Wide) Molded Small Outline Package, JEDEC (S)  
Package Number M20B**



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

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



N20A (REV G)

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

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