National Semiconductor

January 1995

74F2240
Octal Buffer/Line Driver with 25Ω Series Resistors in the Outputs

General Description

The 'F2240 is an inverting octal buffer and line driver designed to drive capacitive inputs of MOS memory devices, address and clock lines or act as a low undershoot general purpose bus driver.

The 25Ω series resistor in the outputs reduces undershoot and ringing and eleminates the need for external resistors.

Features

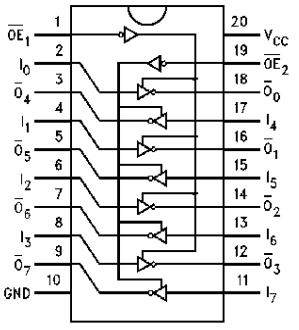
- TRI-STATE® outputs drive bus lines or buffer memory address registers
- Outputs sink 12 mA and source 15 mA
- 25Ω series resistors in outputs eliminate the need for external resistors
- Designed to drive the capacitive inputs of MOS devices
- Guaranteed 4000V minimum ESD protection

Commercial	Military	Package Number	Package Description
74F2240SC (Note 1)		M20B	20-Lead (0.300" Wide) Molded Small Outline, JEDEC
74F2240SJ (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.

Connection Diagram

Pin Assignment
SOIC



TL/F/10898–1

Truth Table

$\overline{OE}_1$	D_{1n}	O_{1n}	$\overline{OE}_2$	D_{2n}	O_{2n}
H	X	Z	H	X	Z
L	H	L	L	H	L
L	L	H	L	L	H

Unit Loading/Fan Out:

Pin Names	Description	74F	
		U.L. High/Low	Output I_{OH}/I_{OL}
$\overline{OE}_1$, $\overline{OE}_2$	TRI-STATE Output Enable Input (Active LOW)	1.0/1.667	20 μA/−1 mA
I_0–I_7	Inputs	1.0/1.667	20 μA/−1 mA
$\overline{O}_0$–$\overline{O}_7$	Outputs	750/20	−15 mA/12 mA

TRI-STATE® is a registered trademark of National Semiconductor Corporation.

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

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 2)	−0.5V to +7.0V
Input Current (Note 2)	−30 mA to +5.0 mA
Voltage Applied to Output in HIGH State (with V_{CC} = 0V)	
Standard Output	−0.5V to V_{CC}
TRI-STATE Output	−0.5V to +5.5V
Current Applied to Output in LOW State (Max)	twice the rated I_{OL} (mA)
ESD Last Passing Voltage (Min)	4000V

Note 1: 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 2: Either voltage limit or current limit is sufficient to protect inputs.

Recommended Operating Conditions

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

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}	2.4			V	Min	I_{OH} = −3 mA
		74F 10% V_{CC}	2.0					I_{OH} = −15 mA
V_{OL}	Output LOW Voltage	74F 10% V_{CC}			0.75	V	Min	I_{OL} = 12 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	μA	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				−1.0	mA	Max	V_{IN} = 0.5V ($\overline{OE}_1$, $\overline{OE}_2$, D_n)
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		−100		−225	mA	Max	V_{OUT} = 0V
I_{ZZ}	Bus Drainage Test				500	μA	0.0V	V_{OUT} = 5.25V

DC Electrical Characteristics (Continued)

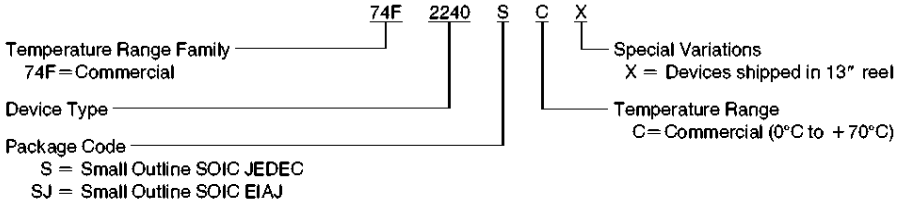
Symbol	Parameter	74F			Units	V_{CC}	Conditions
		Min	Typ	Max			
I_{CCH}	Power Supply Current		16	29	mA	Max	V_O = HIGH
I_{CCL}	Power Supply Current		47	75	mA	Max	V_O = LOW
I_{CCZ}	Power Supply Current		45	63	mA	Max	V_O = HIGH Z

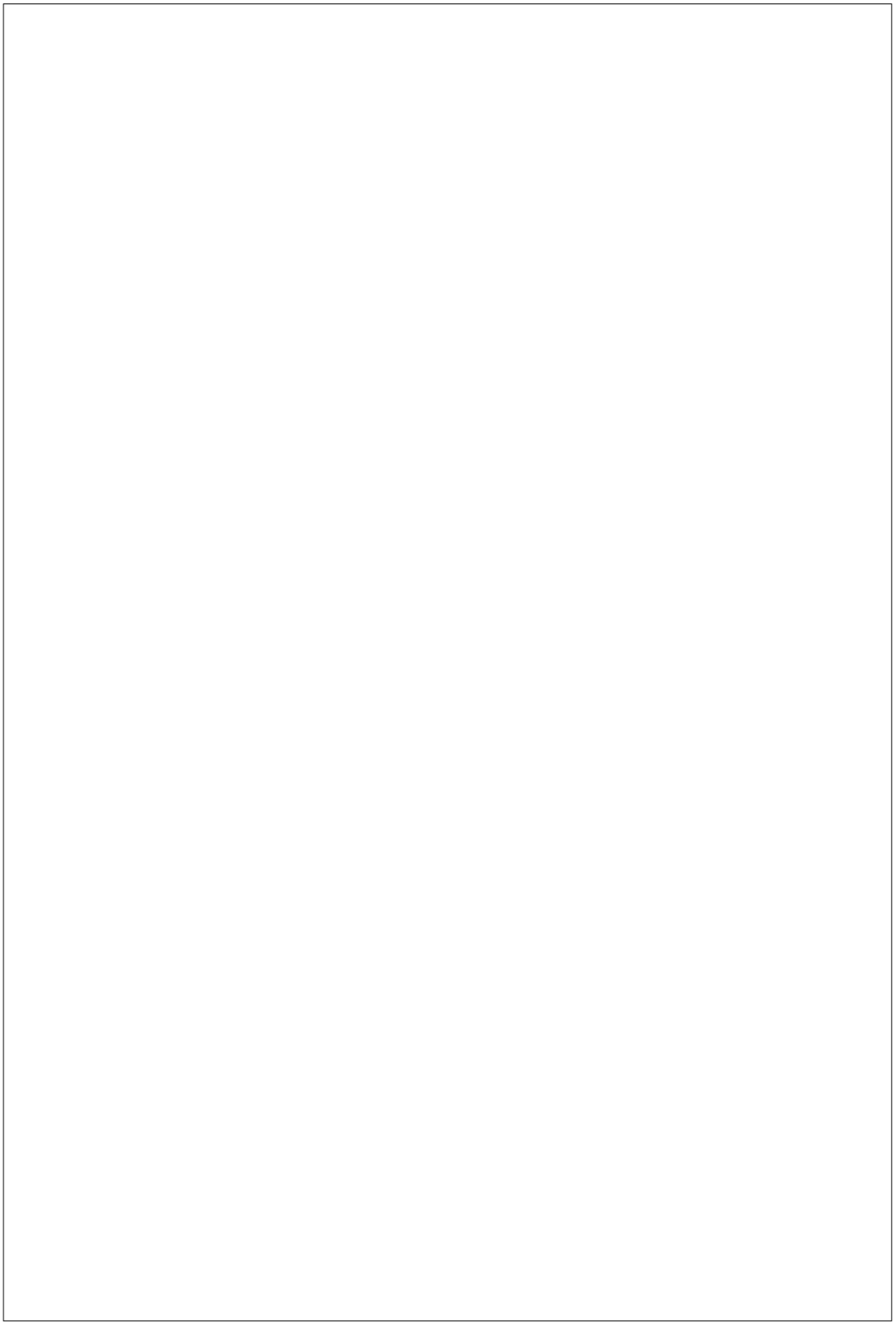
AC Electrical Characteristics

Symbol	Parameter	74F			74F		Units
		T_A = +25°C V_{CC} = +5.0V C_L = 50 pF			T_A, V_{CC} = Com C_L = 50 pF		
		Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation Delay Data to Output	3.0 2.0	4.9 3.7	7.5 6.0	3.0 2.0	7.5 6.0	ns
t_{PZH} t_{PZL}	Output Enable Time	2.0 4.0	3.9 6.7	6.5 9.5	2.0 4.0	7.0 10.0	ns
t_{PHZ} t_{PLZ}	Output Disable Time	2.0 2.0	4.1 4.9	6.5 8.5	2.0 2.0	7.0 9.5	ns

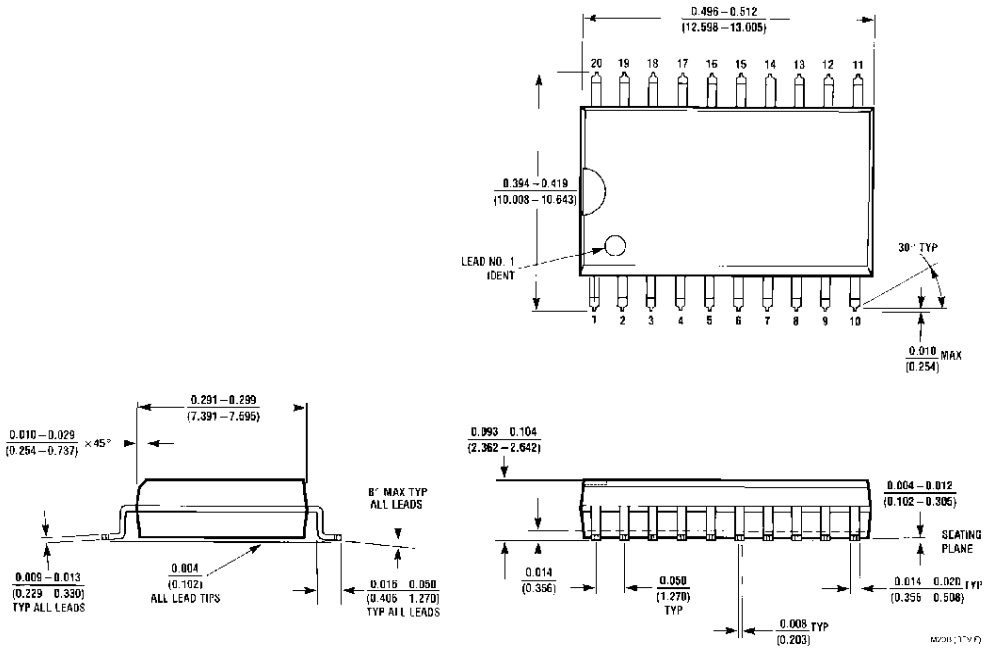
Ordering Information

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



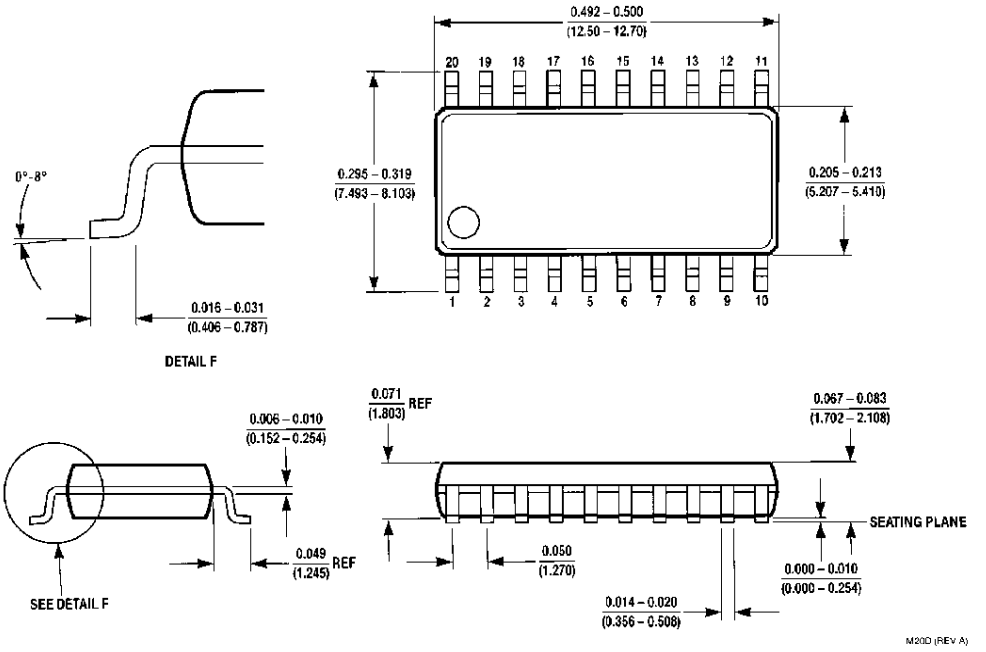


Physical Dimensions inches (millimeters)



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

Physical Dimensions inches (millimeters) (Continued)



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

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