National Semiconductor

August 1995

54F/74F2244
Octal Buffer/Line Driver with 25Ω Series Resistors in Outputs

General Description

The 'F2244 is an octal buffer/line driver designed to drive the capacitive inputs of MOS memory drivers, address drivers, clock drivers and bus-oriented transmitters/receivers.

The 25Ω series resistors in the outputs reduce ringing and eliminate the need for external resistors.

Features

- TRI-STATE® outputs drive bus lines or buffer memory address registers
- 12 mA source current
- 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
74F2244PC		N20B	20-Lead (0.300″ Wide) Molded Dual-In-Line
	54F2244DM (Note 2)	J20A	20-Lead Ceramic Dual-In-Line
74F2244SC (Note 1)		M20B	20-Lead (0.300″ Wide) Molded Small Outline JEDEC
74F2244MSA (Note 1)		MSA20	20-Lead Molded Shrink Small Outline EIAJ Type II
	54F2244FM (Note 2)	W20A	20-Lead Cerpak
	54F2244LM (Note 2)	E20A	20-Lead Ceramic Leadless Chip Carier, Type C

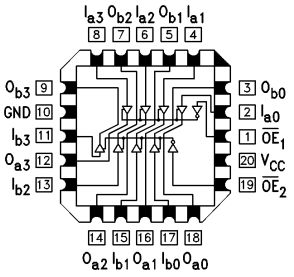
Note 1: Devices also available in 13″ reel. Use suffix = SCX and MSAX.

Note 2: Military grade device with environmental and burn-in processing. Use suffix = DMQB, FMQB and LMQB.

Connection Diagrams

Pin Assignment for LCC

'F2244



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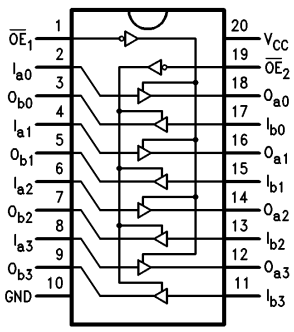
Pin Assignment for DIP, SOIC and SSOP

'F2244



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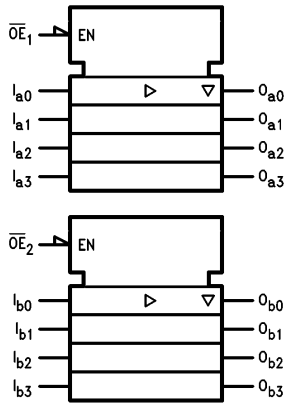
Logic Symbol

IEEE/IEC
'F2244



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Unit Loading/Fan Out

Pin Names	Description	54F/74F	
		U.L. HIGH/LOW	Input I_{IH}/I_{IL} 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
OE_2	TRI-STATE Output Enable Input (Active HIGH)	1.0/1.667	20 μA/ −1 mA
I_{an}, I_{bn}	Inputs	1.0/2.667*	20 μA/ −1.6 mA
O_{an},O_{bn}	Outputs	750/20	−15 mA/12 mA

*Worst-case 'F2244 disabled

Truth Table

'F2244

$\overline{OE}_1$	I_{an}	O_{an}	$\overline{OE}_2$	I_{bn}	O_{bn}
H	X	Z	H	X	Z
L	H	H	L	H	H
L	L	L	L	L	L

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

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	
Military	−55°C to +125°C
Commercial	0°C to +70°C
Supply Voltage	
Military	+4.5V to +5.5V
Commercial	+4.5V to +5.5V

DC Electrical Characteristics

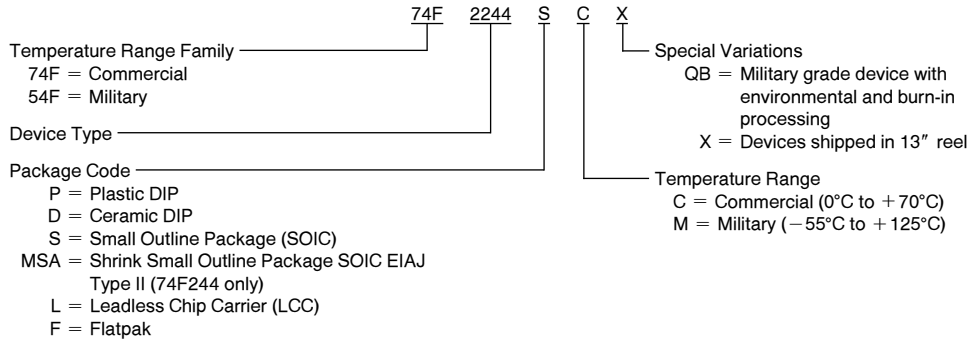
Symbol	Parameter		54F/74F Min	54F/74F Typ	54F/74F Max	Units	V_{CC}	Conditions
V_{IH}	Input HIGH Voltage		2.0			V		Recognized as a HIGH Signal
V_{IL}	Input LOW Voltage				0.8	V		Recognized as a LOW Signal
V_{CD}	Input Clamp Diode Voltage				−1.2	V	Min	I_{IN} = −18 mA
V_{OH}	Output HIGH Voltage	54F 10% V_{CC}	2.4			V	Min	I_{OH} = −3 mA
		54F 10% V_{CC}	2.0					I_{OH} = −12 mA
		74F 10% V_{CC}	2.4					I_{OH} = −3 mA
		74F 10% V_{CC}	2.0					I_{OH} = −15 mA
		74F 5% V_{CC}	2.7					I_{OH} = −3 mA
V_{OL}	Output LOW Voltage				0.50	V	Min	I_{OL} = 1 mA
					0.75			I_{OL} = 12 mA
I_{IH}	Input HIGH Current	54F			20.0	μA	Max	V_{IN} = 2.7V
		74F			5.0			
I_{BVI}	Input HIGH Current Breakdown Test	54F			100	μA	Max	V_{IN} = 7.0V
		74F			7.0			
I_{CEX}	Output HIGH Leakage Current	54F			250	μA	Max	V_{OUT} = V_{CC}
		74F			50			
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 ($\overline{OE}_1$, $\overline{OE}_2$, OE_2)
					−1.6			V_{IN} = 0.5V (I_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_{CCH}	Power Supply Current			40	60	mA	Max	V_O = HIGH
I_{CCL}	Power Supply Current			60	90	mA	Max	V_O = LOW
I_{CCZ}	Power Supply Current			60	90	mA	Max	V_O = HIGH Z

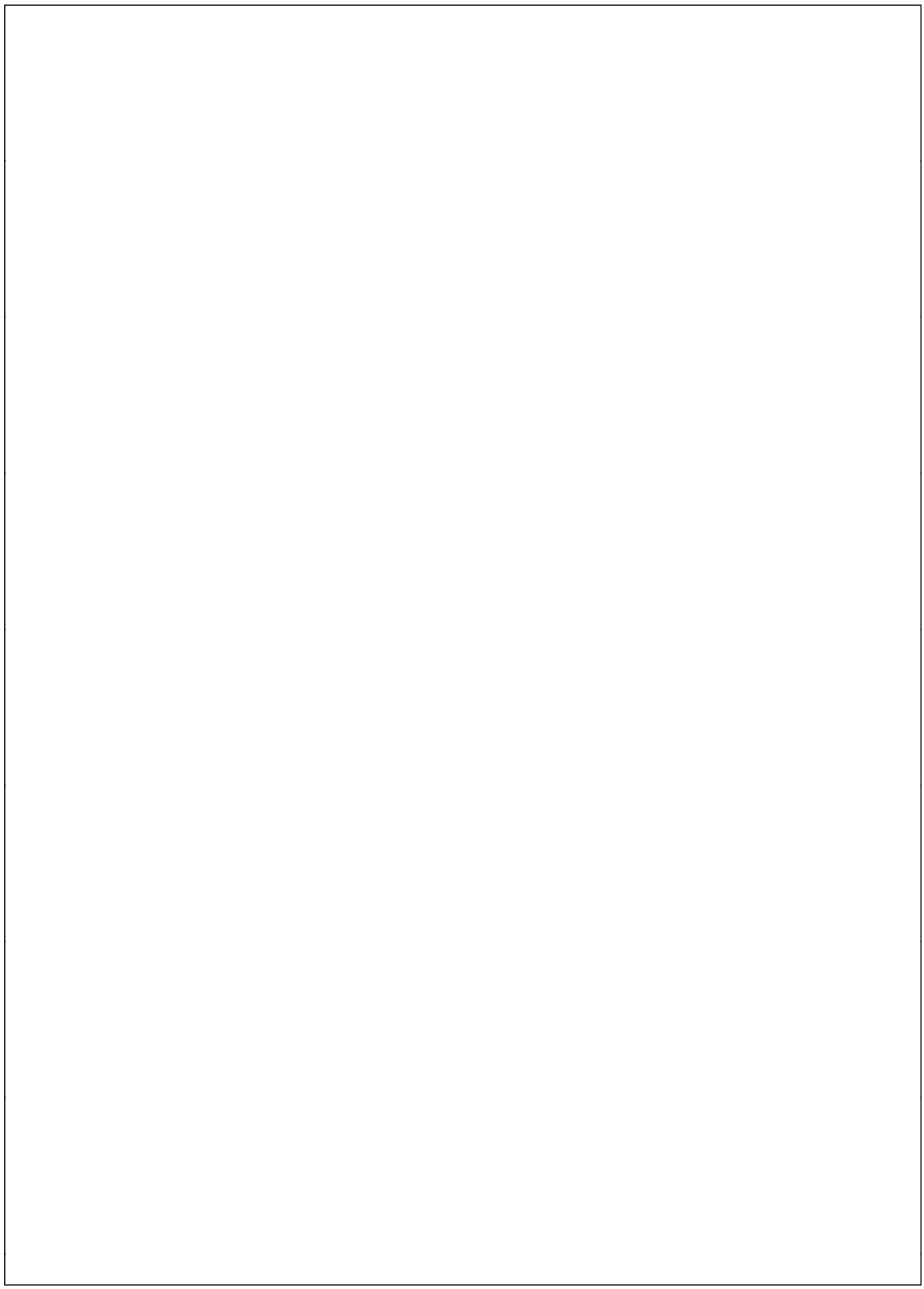
AC Electrical Characteristics

Symbol	Parameter	74F $T_A = +25°C$, $V_{CC} = +5.0V$, $C_L = 50$ pF			54F $T_A, V_{CC} =$ Mil, $C_L = 50$ pF		74F $T_A, V_{CC} =$ Com, $C_L = 50$ pF		Units
		Min	Typ	Max	Min	Max	Min	Max	
t_{PLH}	Propagation Delay	1.5		7.0	2.0	6.5	1.5	7.0	ns
t_{PHL}	Data to Output	2.5		8.0	2.0	7.0	2.0	8.0	
t_{PZH}	Output Enable Time	1.5		9.0	2.0	7.0	1.0	9.5	ns
t_{PZL}		2.5		11.5	2.0	8.5	2.5	12.0	
t_{PHZ}	Output Disable Time	1.5		9.0	2.0	7.0	1.0	9.5	
t_{PLZ}		1.5		8.5	2.0	7.5	1.5	9.5	

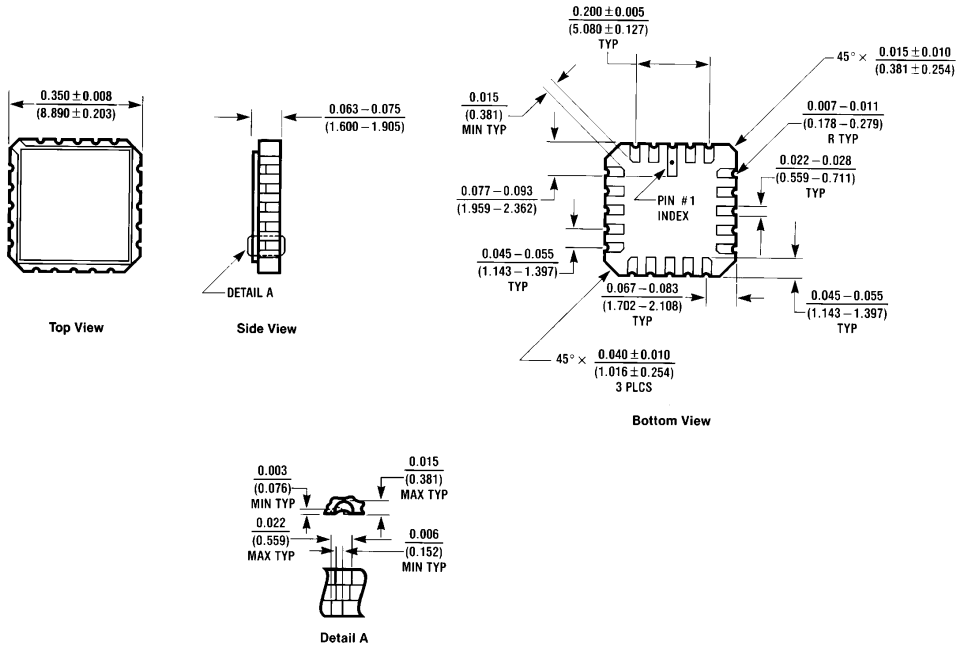
Ordering Information

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

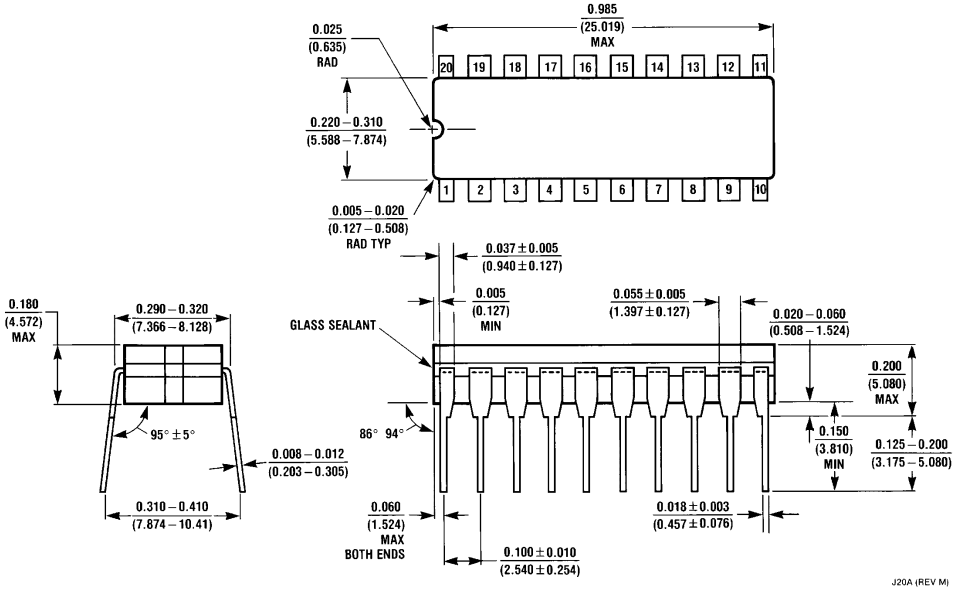




Physical Dimensions inches (millimeters)

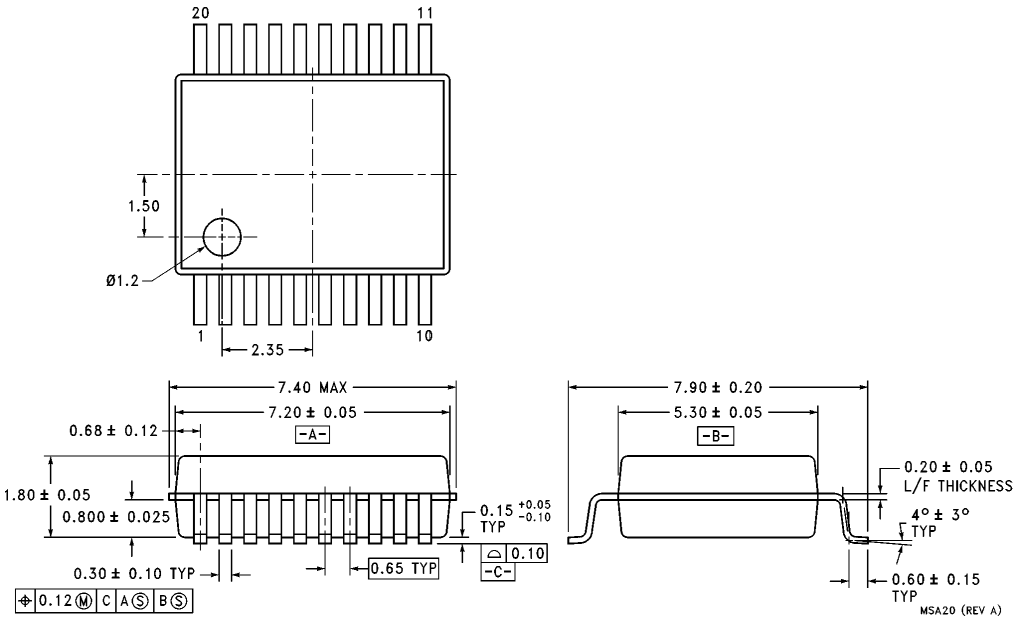


20-Lead Ceramic Leadless Chip Carrier, Type C (L)
NS Package Number E20A

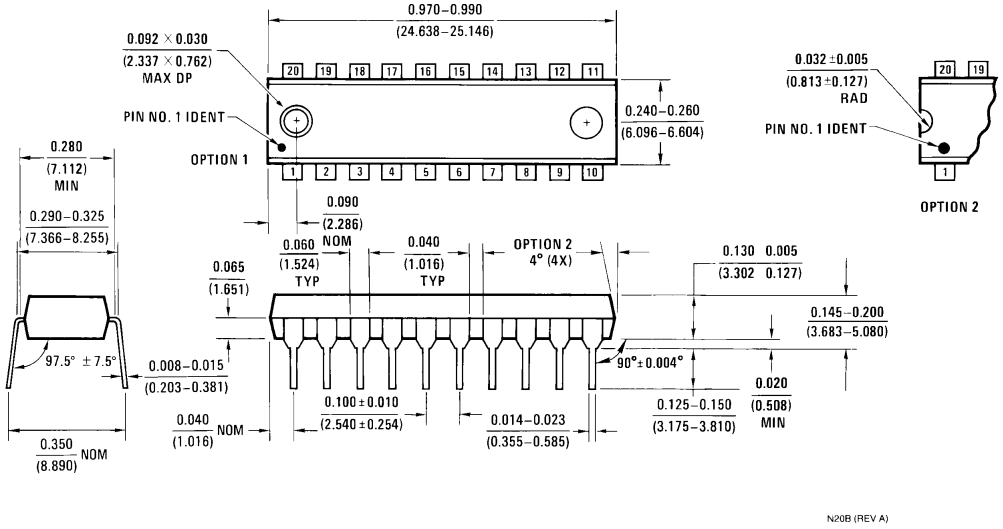


20-Lead Ceramic Dual-In-Line Package (D)
NS Package Number J20A

Physical Dimensions inches (millimeters) (Continued)

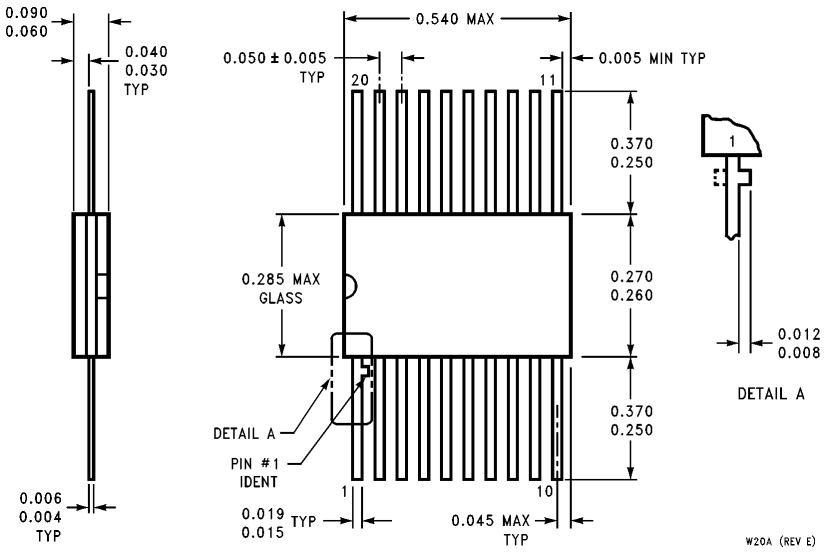


20-Lead Molded Shrink Small Outline Package, EIAJ Type II (MSA)
NS Package Number MSA20



20-Lead (0.300″ Wide) Molded Dual-In-Line Package (P)
NS Package Number N20B

Physical Dimensions inches (millimeters) (Continued)



20-Lead Cerpak (F)
NS Package Number W20A

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