

74F240 • 74F241 • 74F244 Octal Buffers/Line Drivers with 3-STATE Outputs

General Description

The 'F240, 'F241 and 'F244 are octal buffers and line drivers designed to be employed as memory and address drivers, clock drivers and bus-oriented transmitters/receivers which provide improved PC and board density.

- Outputs sink 64 mA (48 mA mil)
- 12 mA source current
- Input clamp diodes limit high-speed termination effects
- Guaranteed 4000V minimum ESD protection

Features

- 3-STATE outputs drive bus lines or buffer memory address registers

Ordering Code:

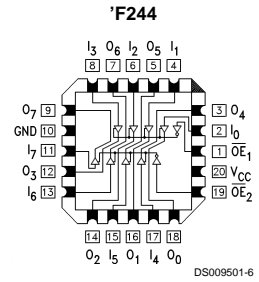
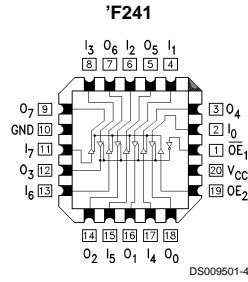
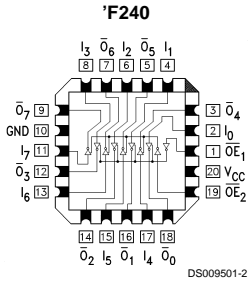
Commercial	Military	Package Number	Package Description
74F240PC		N20A	20-Lead (0.300" Wide) Molded Dual-In-Line
	54F240DM (Note 2)	J20A	20-Lead Ceramic Dual-In-Line
74F240SC (Note 1)		M20B	20-Lead (0.300" Wide) Molded Small Outline, JEDEC
74F240SJ (Note 1)		M20D	20-Lead (0.300" Wide) Molded Small Outline, EIAJ
	54F240FM (Note 2)	W20A	20-Lead Cerpack
	54F240LM (Note 2)	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C
74F241PC		N20A	20-Lead (0.300" Wide) Molded Dual-In-Line
	54F241DM (Note 2)	J20A	20-Lead Ceramic Dual-In-Line
74F241SC (Note 1)		M20B	20-Lead (0.300" Wide) Molded Small Outline, JEDEC
74F241SJ (Note 1)		M20D	20-Lead (0.300" Wide) Molded Small Outline, EIAJ
	54F241FM (Note 2)	W20A	20-Lead Cerpack
	54F241LM (Note 2)	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C
74F244PC		N20A	20-Lead (0.300" Wide) Molded Dual-In-Line
	54F244DM (Note 2)	J20A	20-Lead Ceramic Dual-In-Line
74F244SC (Note 1)		M20B	20-Lead (0.300" Wide) Molded Small Outline, JEDEC
74F244SJ (Note 1)		M20D	20-Lead (0.300" Wide) Molded Small Outline, EIAJ
74F244MSA (Note 1)		MSA20	20-Lead Molded Shrink Small Outline, EIAJ Type II
	54F244FM (Note 2)	W20A	20-Lead Cerpack
	54F244LM (Note 2)	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

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

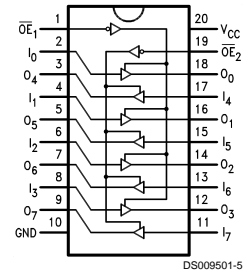
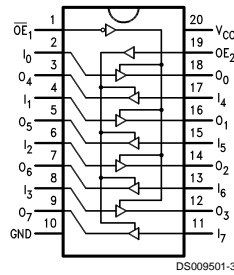
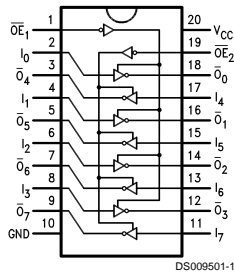
Note 2: Military grade device with environmental and burn-in processing. Use suffix = DMOB, FMOB and LMOB.

Connection Diagrams

Pin Assignment for LCC

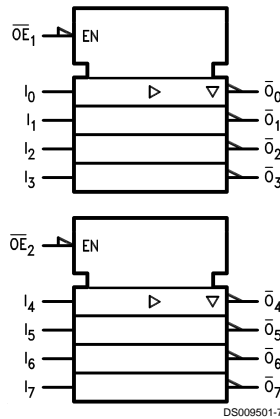


Pin Assignment for DIP, SOIC, SSOP and Flatpak



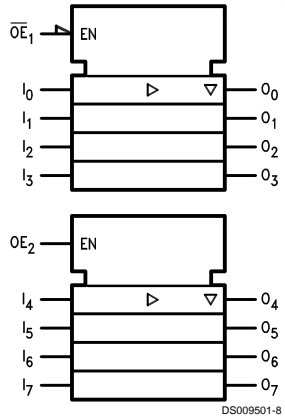
Logic Symbols

IEEE/IEC 'F240

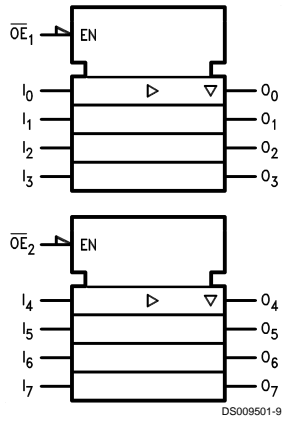


Logic Symbols (Continued)

IEEE/IEC
'F241



IEEE/IEC
'F244



Unit Loading/Fan Out

Pin Names	Description	54F74F	
		U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
$\overline{OE}_1, \overline{OE}_2$	3-STATE Output Enable Input (Active LOW)	1.0/1.667	20 μ A/-1 mA
OE_2	3-STATE Output Enable Input (Active HIGH)	1.0/1.667	20 μ A/-1 mA
I_0-I_7	Inputs ('F240)	1.0/1.667 (Note 3)	20 μ A/-1 mA
I_0-I_7	Inputs ('F241, 'F244)	1.0/2.667 (Note 3)	20 μ A/-1.6 mA
$\overline{O}_0-\overline{O}_7, O_0-O_7$	Outputs	600/106.6 (80)	-12 mA/64 mA (48 mA)

Note 3: Worst-case 'F240 enabled; 'F241, 'F244 disabled

Truth Tables

'F240

\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

'F241

\overline{OE}_1	D_{1n}	O_{1n}	OE_2	D_{2n}	O_{2n}
H	X	Z	L	X	Z
L	H	H	H	H	H
L	L	L	H	L	L

'F244

\overline{OE}_1	D_{1n}	O_{1n}	\overline{OE}_2	D_{2n}	O_{2n}
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 4)

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 5)	-0.5V to +7.0V
Input Current (Note 5)	-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)

ESD Last Passing Voltage (Min)

4000V

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

Note 4: 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 5: Either voltage limit or current limit is sufficient to protect inputs.

DC Electrical Characteristics

Symbol	Parameter	54F/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	54F 10% V _{CC} 54F 10% V _{CC} 74F 10% V _{CC} 74F 10% V _{CC} 74F 5% V _{CC}	2.4 2.0 2.4 2.0 2.7		V	Min	I _{OH} = -3 mA I _{OH} = -12 mA I _{OH} = -3 mA I _{OH} = -15 mA I _{OH} = -3 mA
V _{OL}	Output LOW Voltage	54F 10% V _{CC} 74F 10% V _{CC}		0.55 0.55	V	Min	I _{OL} = 48 mA I _{OL} = 64 mA
I _{IH}	Input HIGH Current	54F 74F		20.0 5.0	μA	Max	V _{IN} = 2.7V
I _{BVI}	Input HIGH Current Breakdown Test	54F 74F		100 7.0	μA	Max	V _{IN} = 7.0V
I _{CEx}	Output HIGH Leakage Current	54F 74F		250 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 -1.6	mA	Max	V _{IN} = 0.5V ($\overline{OE}_1, \overline{OE}_2, OE_2, D_n$ ('F240)) V _{IN} = 0.5V (D _n ('F241, 'F244))
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	mA	Max	V _{OUT} = 0V
I _{ZZ}	Bus Drainage Test			500	μA	0.0V	V _{OUT} = 5.25V
I _{CCH}	Power Supply Current ('F240)		19	29	mA	Max	V _O = HIGH
I _{CCL}	Power Supply Current ('F240)		50	75	mA	Max	V _O = LOW
I _{CCZ}	Power Supply Current ('F240)		42	63	mA	Max	V _O = HIGH Z
I _{CCH}	Power Supply Current ('F241, 'F244)		40	60	mA	Max	V _O = HIGH
I _{CCL}	Power Supply Current ('F241, 'F244)		60	90	mA	Max	V _O = LOW

DC Electrical Characteristics (Continued)

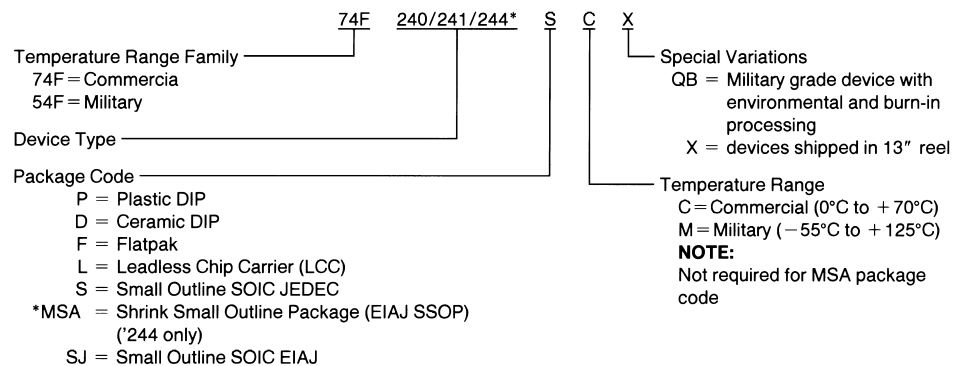
Symbol	Parameter	54F/74F			Units	V _{CC}	Conditions
		Min	Typ	Max			
I _{CCZ}	Power Supply Current (F241, F244)	60	90		mA	Max	V _O = HIGH Z

AC Electrical Characteristics

Symbol	Parameter	74F			54F		74F		Units
		T _A = +25°C V _{CC} = +5.0V C _L = 50 pF			T _A , V _{CC} = Mil C _L = 50 pF		T _A , V _{CC} = Com C _L = 50 pF		
		Min	Typ	Max	Min	Max	Min	Max	
t _{PLH}	Propagation Delay	3.0	5.1	7.0	3.0	9.0	3.0	8.0	ns
t _{PHL}	Data to Output (F240)	2.0	3.5	4.7	2.0	6.0	2.0	5.7	
t _{PZH}	Output Enable Time (F240)	2.0	3.5	4.7	2.0	6.5	2.0	5.7	ns
t _{PZL}		4.0	6.9	9.0	4.0	10.5	4.0	10.0	
t _{PHZ}	Output Disable Time (F240)	2.0	4.0	5.3	2.0	6.5	2.0	6.3	ns
t _{PLZ}		2.0	6.0	8.0	2.0	12.5	2.0	9.5	
t _{PLH}	Propagation Delay	2.5	4.0	5.2	2.0	6.5	2.5	6.2	ns
t _{PHL}	Data to Output (F241, F244)	2.5	4.0	5.2	2.0	7.0	2.5	6.5	
t _{PZH}	Output Enable Time	2.0	4.3	5.7	2.0	7.0	2.0	6.7	ns
t _{PZL}	(F241, F244)	2.0	5.4	7.0	2.0	8.5	2.0	8.0	
t _{PHZ}	Output Disable Time	2.0	4.5	6.0	2.0	7.0	2.0	7.0	ns
t _{PLZ}	(F241, F244)	2.0	4.5	6.0	2.0	7.5	2.0	7.0	

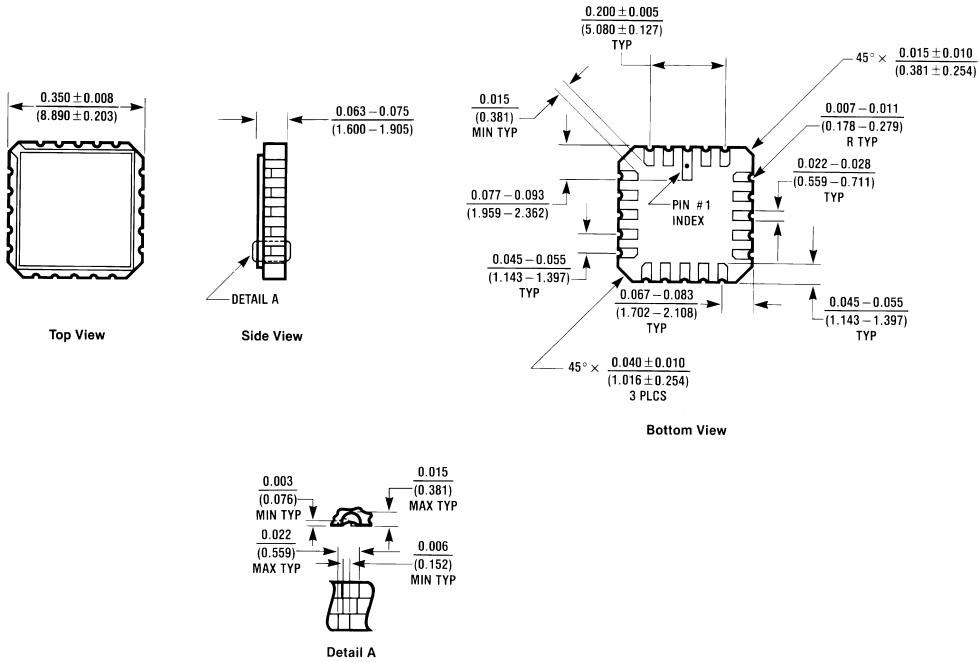
Ordering Information

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



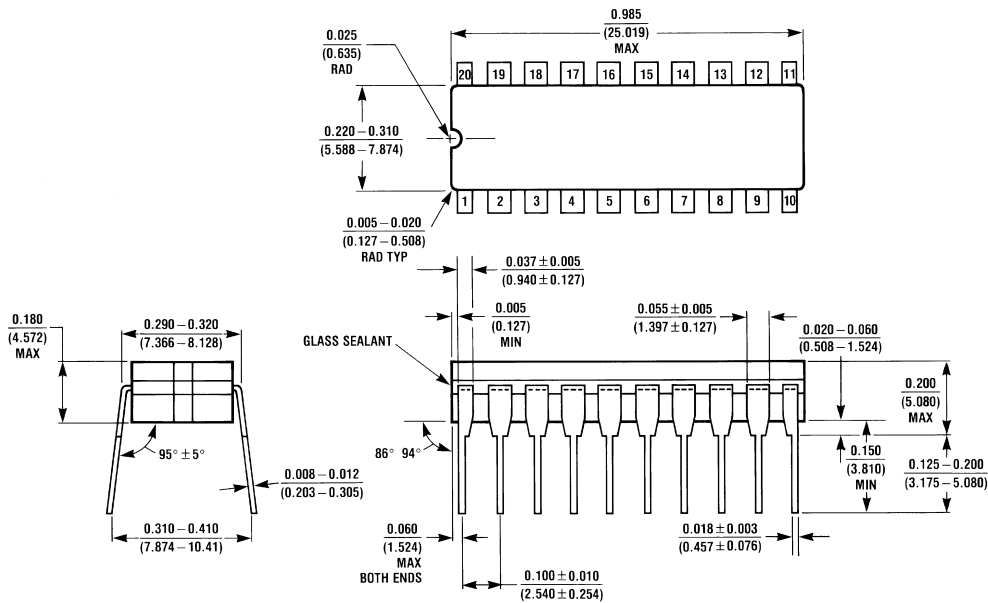
DS009501-10

Physical Dimensions inches (millimeters) unless otherwise noted



E20A (REV D)

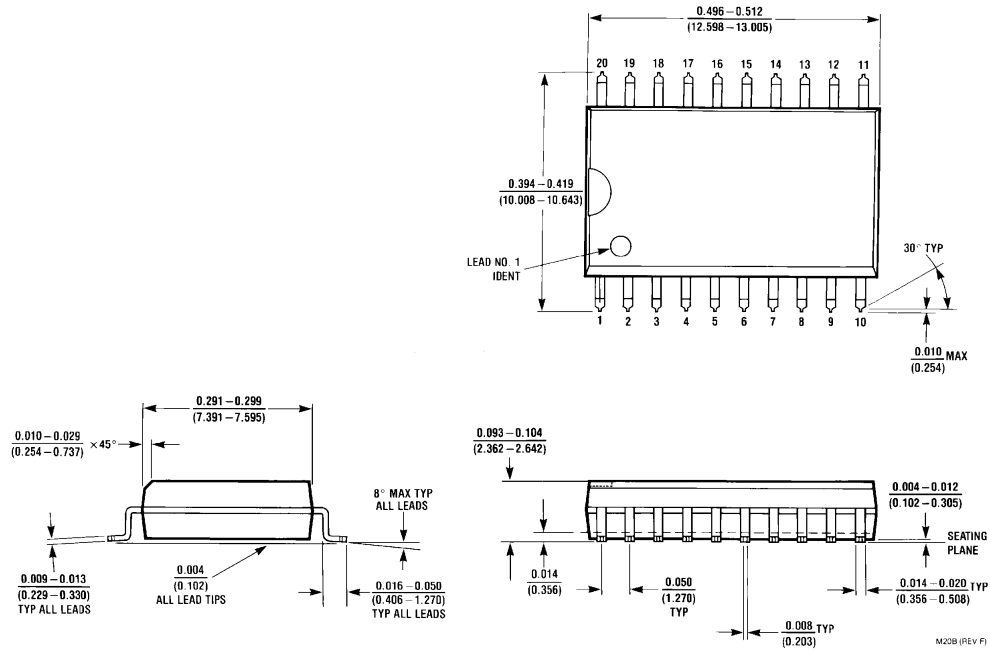
**20-Lead Ceramic Leadless Chip Carrier (L)
Package Number E20A**



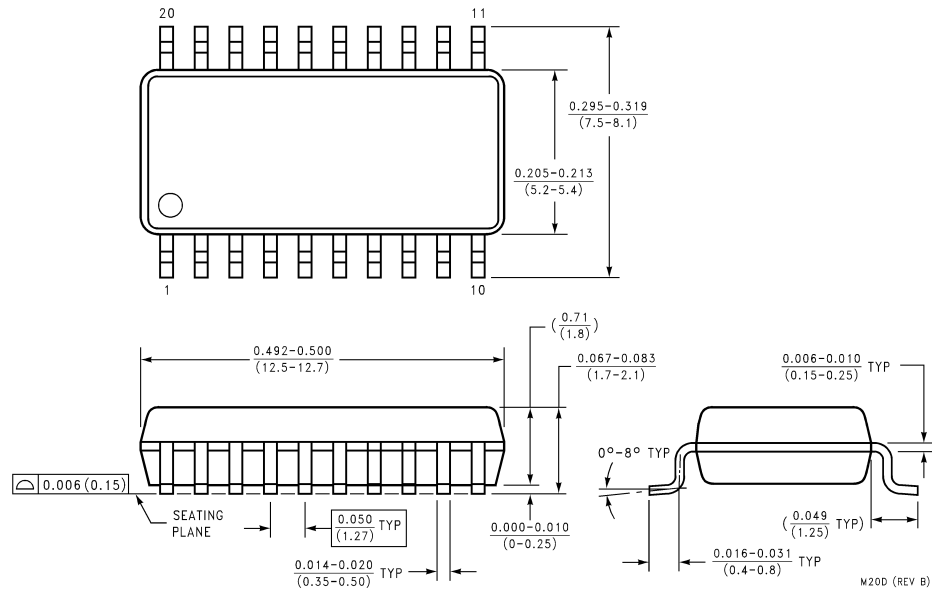
J20A (REV M)

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

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

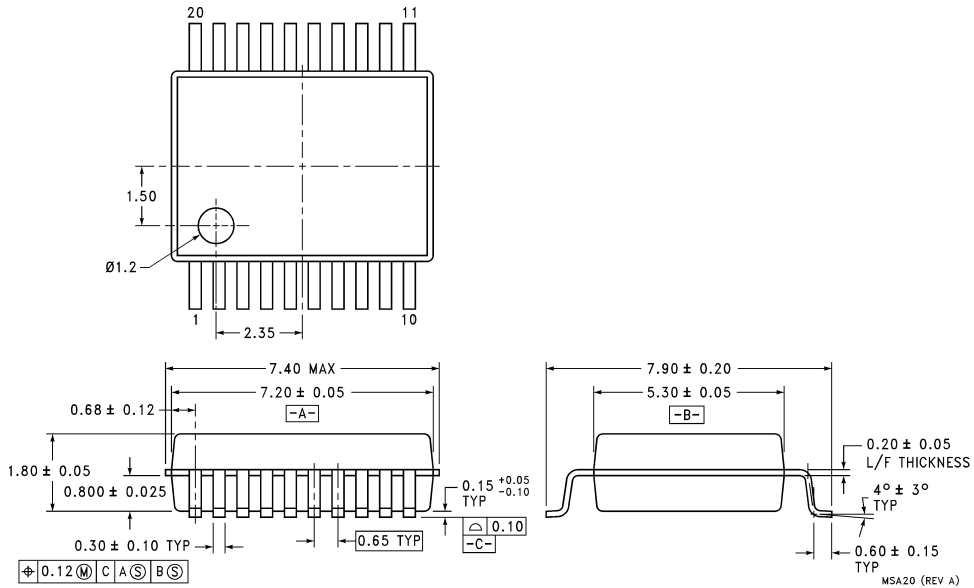


**20-Lead (0.300" Wide) Molded Small Outline Package, JEDEC (S)
Package Number M20B**

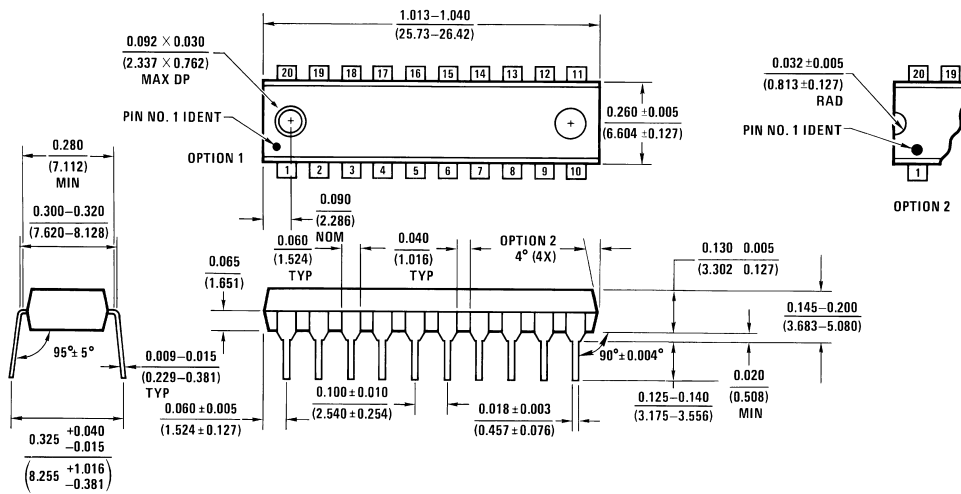


**20-Lead (0.300" Wide) Molded Small Outline Package, EIAJ (SJ)
Package Number M20D**

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

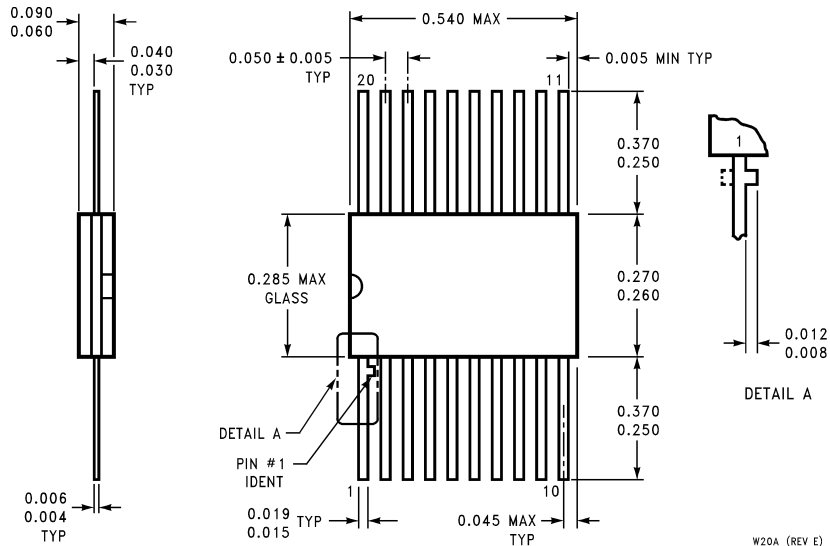


**20-Lead Molded Shrink Small Outline, EIAJ Type II (MSA)
Package Number MSA20**



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

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



**20-Lead Ceramic Flatpak (F)
Package Number W20A**

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