

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

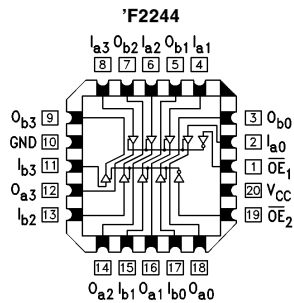
| Commercial | Military | Package Number | Package Description |
|---------------------|--------------------|----------------|--|
| 74F2244PC | | N20B | 20-Lead (0.300" Wide) Molded Dual-In-Line |
| | 54F2244DM (Note 2) | J20A | 20-Lead Ceramic Dual-In-Line |
| 74F2244SC (Note 1) | | M20B | 20-Lead (0.300" 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 Carrier, 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.

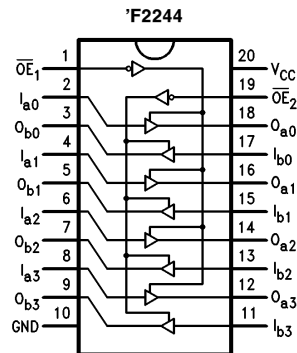
Connection Diagrams

Pin Assignment for LCC



TL/F/9499-3

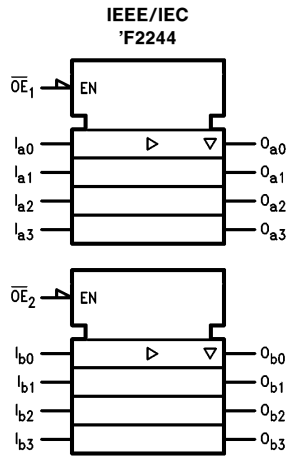
Pin Assignment for DIP, SOIC and SSOP



TL/F/9499-4

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Logic Symbol



TL/F/9499-6

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

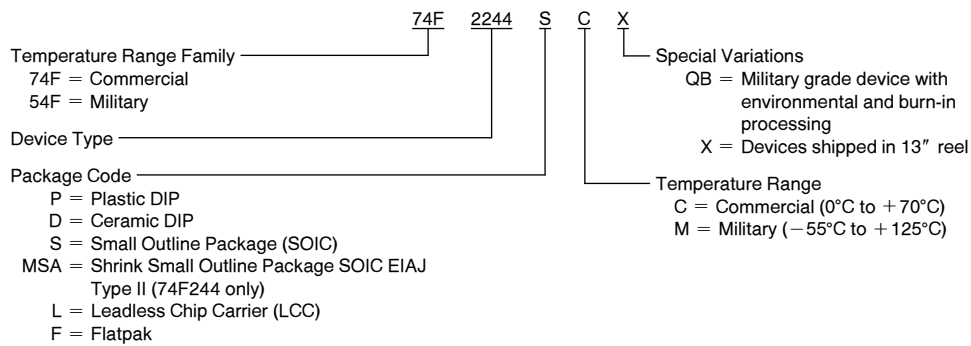
| Symbol | Parameter | 54F/74F | | | Units | V _{CC} | Conditions |
|------------------|-----------------------------------|--|---------------------------------|--------------|-------|-----------------|---|
| | | Min | Typ | Max | | | |
| V _{IH} | Input HIGH Voltage | 2.0 | | | V | | Recognized as a 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 | | 0.50 0.75 | | V | Min | I _{OL} = 1 mA I _{OL} = 12 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 ($\overline{OE}_1, \overline{OE}_2, OE_2$) 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 | | | 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 | 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 | |

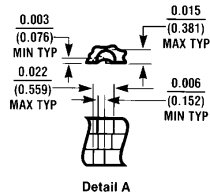
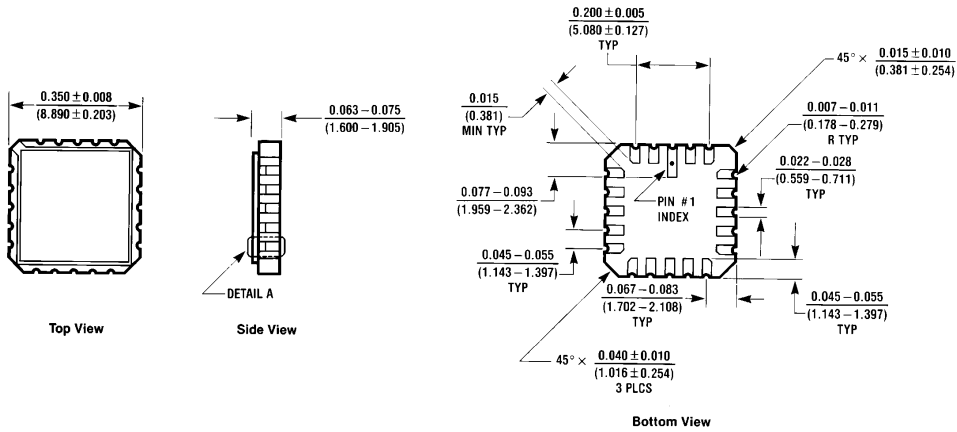
Ordering Information

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



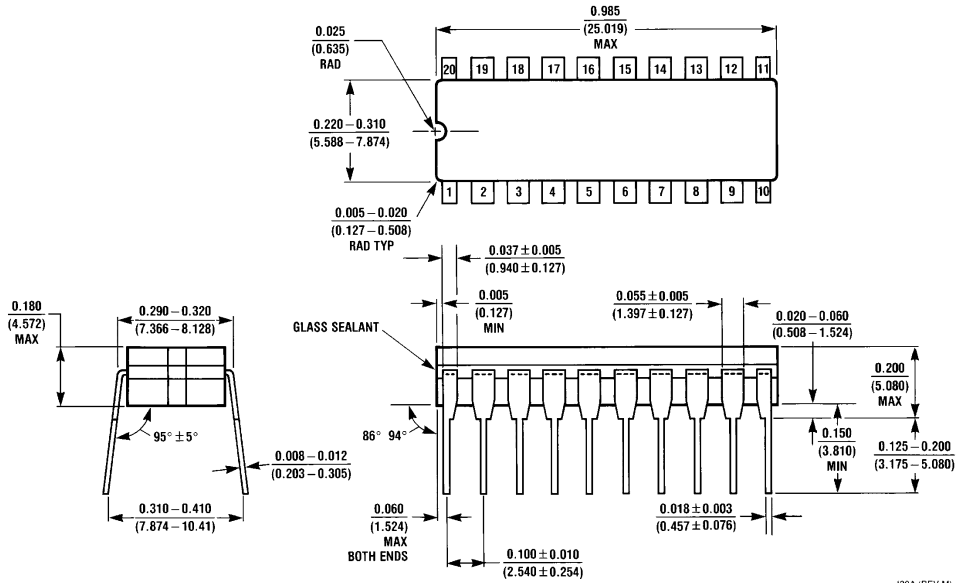


Physical Dimensions inches (millimeters)



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

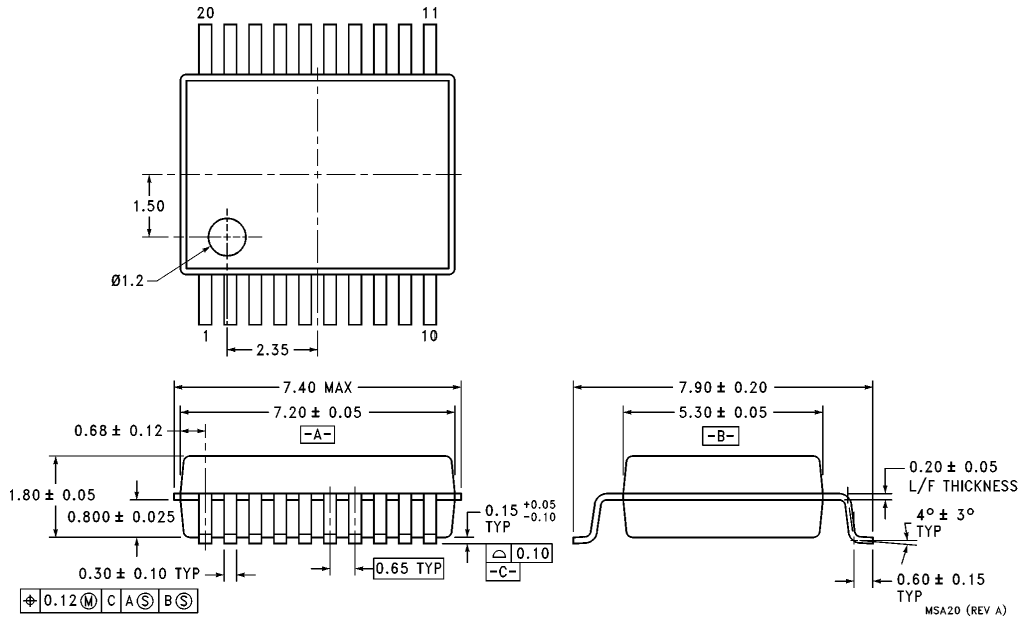
E20A (REV D)



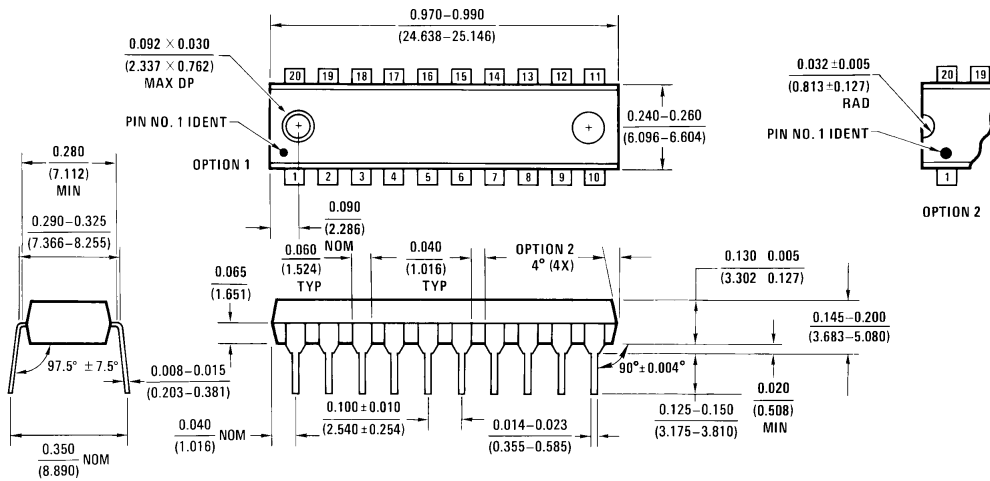
20-Lead Ceramic Dual-In-Line Package (D)
 NS Package Number J20A

J20A (REV M)

Physical Dimensions inches (millimeters) (Continued)

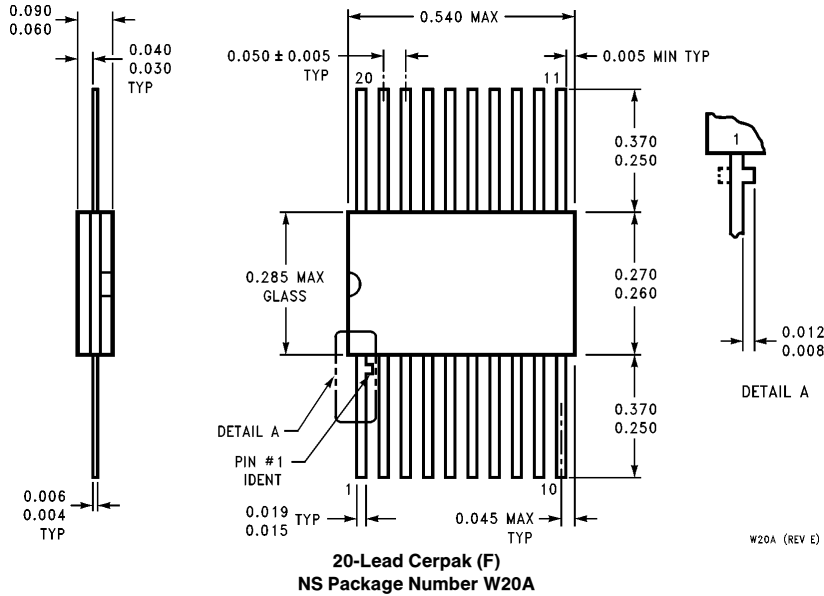


20-Lead Molded Shrink Small Outline Package, EIAJ Type II (MSA)
NS Package Number MSA20



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

Physical Dimensions inches (millimeters) (Continued)



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