

## 74F240 • 74F241 • 74F244

### Octal Buffers/Line Drivers with 3-STATE Outputs

#### General Description

The 74F240, 74F241 and 74F244 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.

#### Features

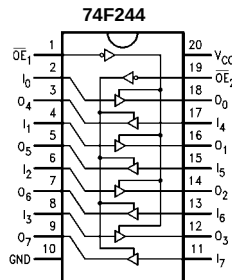
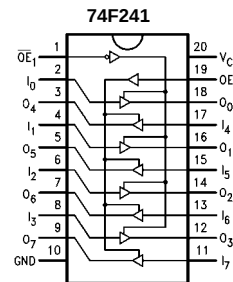
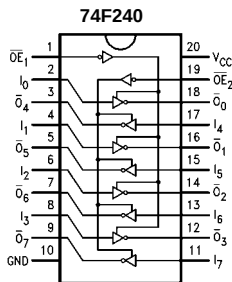
- 3-STATE outputs drive bus lines or buffer memory address registers
- Outputs sink 64 mA (48 mA mil)
- 12 mA source current
- Input clamp diodes limit high-speed termination effects

#### Ordering Code:

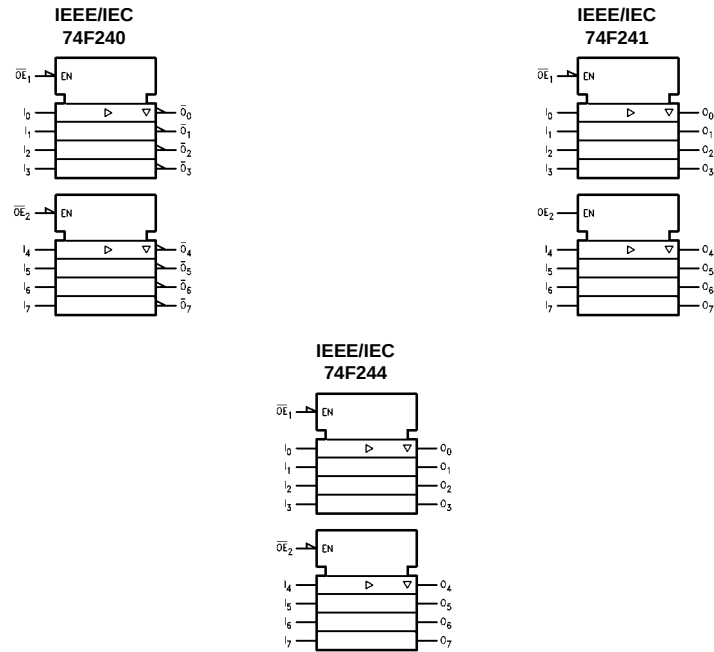
| Order Code | Package Number | Package Description                                                       |
|------------|----------------|---------------------------------------------------------------------------|
| 74F240SC   | M20B           | 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide |
| 74F240SJ   | M20D           | 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide             |
| 74F240PC   | N20A           | 20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide     |
| 74F241SC   | M20B           | 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide |
| 74F241SJ   | M20D           | 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide             |
| 74F241PC   | N20A           | 20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide     |
| 74F244SC   | M20B           | 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide |
| 74F244SJ   | M20D           | 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide             |
| 74F244MSA  | MSA20          | 20-Lead Shrink Small Outline Package (SSOP), EIAJ TYPE II, 5.3mm Wide     |
| 74F244PC   | N20A           | 20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide     |

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

#### Connection Diagrams



Logic Symbols



Unit Loading/Fan Out

| Pin Names                                        | Description                               | U.L.<br>HIGH/LOW   | Input $I_{IH}/I_{IL}$<br>Output $I_{OH}/I_{OL}$ |
|--------------------------------------------------|-------------------------------------------|--------------------|-------------------------------------------------|
| $\overline{OE}_1, \overline{OE}_2$               | 3-STATE Output Enable Input (Active LOW)  | 1.0/1.667          | 20 $\mu$ A/–1 mA                                |
| $OE_2$                                           | 3-STATE Output Enable Input (Active HIGH) | 1.0/1.667          | 20 $\mu$ A/–1 mA                                |
| $I_0$ – $I_7$                                    | Inputs (74F240)                           | 1.0/1.667 (Note 1) | 20 $\mu$ A/–1 mA                                |
| $I_0$ – $I_7$                                    | Inputs (74F241, 74F244)                   | 1.0/2.667 (Note 1) | 20 $\mu$ 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 1: Worst-case 74F240 enabled; 74F241, 74F244 disabled

Truth Tables

| 74F240            |          |          |                   |          |          | 74F244            |          |          |                   |          |          |
|-------------------|----------|----------|-------------------|----------|----------|-------------------|----------|----------|-------------------|----------|----------|
| $\overline{OE}_1$ | $D_{1n}$ | $O_{1n}$ | $\overline{OE}_2$ | $D_{2n}$ | $O_{2n}$ | $\overline{OE}_1$ | $D_{1n}$ | $O_{1n}$ | $\overline{OE}_2$ | $D_{2n}$ | $O_{2n}$ |
| H                 | X        | Z        | H                 | X        | Z        | H                 | X        | Z        | H                 | X        | Z        |
| L                 | H        | L        | L                 | H        | L        | L                 | H        | H        | L                 | H        | H        |
| L                 | L        | H        | L                 | L        | H        | L                 | L        | L        | L                 | L        | L        |

| 74F241            |          |          |        |          |          |
|-------------------|----------|----------|--------|----------|----------|
| $\overline{OE}_1$ | $D_{1n}$ | $O_{1n}$ | $OE_2$ | $D_{2n}$ | $O_{2n}$ |
| H                 | X        | Z        | L      | X        | Z        |
| L                 | H        | H        | H      | H        | H        |
| L                 | L        | L        | H      | L        | L        |

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 +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<br>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<br>in LOW State (Max)                        | twice the rated I <sub>OL</sub> (mA) |
| ESD Last Passing Voltage (Min)                                         | 4000V                                |

**Recommended Operating Conditions**

|                              |                |
|------------------------------|----------------|
| Free Air Ambient Temperature | 0°C to +70°C   |
| Supply Voltage               | +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.

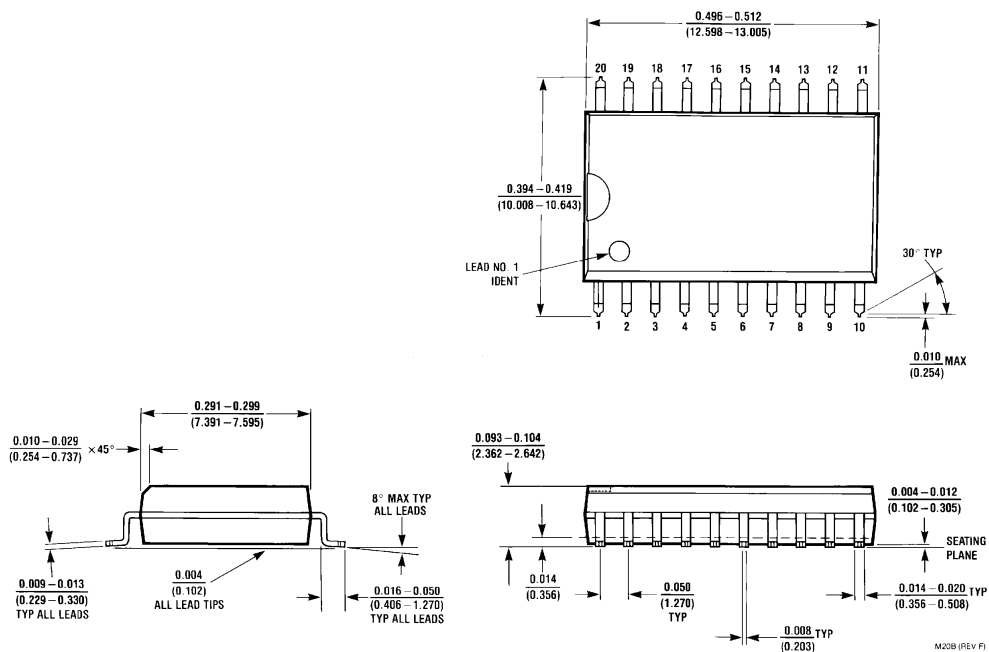
**DC Electrical Characteristics**

| Symbol          | Parameter                                                          | Min | Typ | Max  | Units | V <sub>CC</sub> | Conditions                  |
|-----------------|--------------------------------------------------------------------|-----|-----|------|-------|-----------------|-----------------------------|
| 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 Voltage (t <sub>TJ</sub> = 5.5 0 0 4.8 107297 Tw .81 Tm –0. |     |     |      |       |                 |                             |

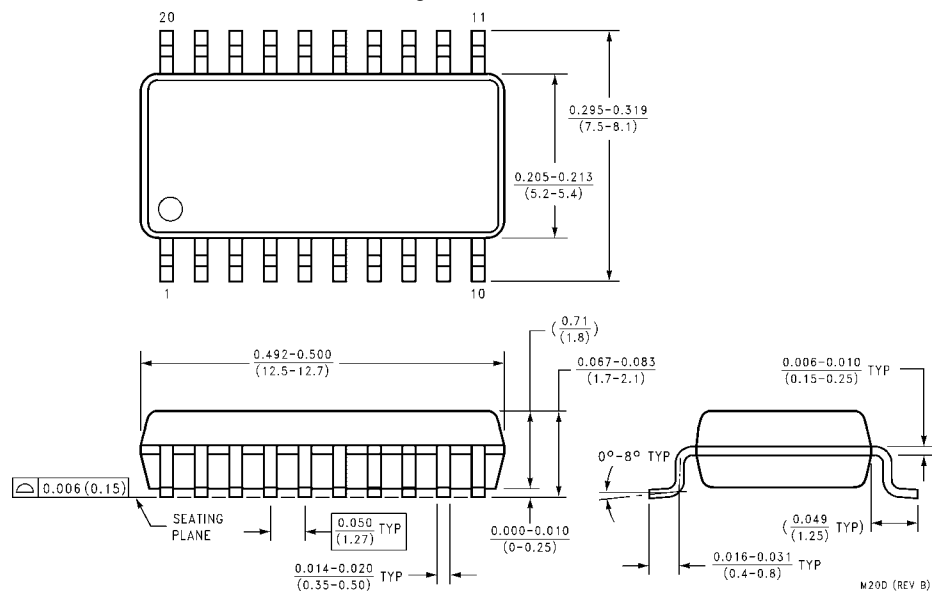
## AC Electrical Characteristics

| Symbol           | Parameter                       | T <sub>A</sub> = +25°C<br>V <sub>CC</sub> = +5.0V<br>C <sub>L</sub> = 50 pF |     |     | T <sub>A</sub> = -55°C to +125°C<br>V <sub>CC</sub> = 5.0V<br>C <sub>L</sub> = 50 pF |      | T <sub>A</sub> = 0°C to +70°C<br>V <sub>CC</sub> = 5.0V<br>C <sub>L</sub> = 50 pF |      | Units |
|------------------|---------------------------------|-----------------------------------------------------------------------------|-----|-----|--------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|------|-------|
|                  |                                 | Min                                                                         | Typ | Max | Min                                                                                  | Max  | Min                                                                               | Max  |       |
| t <sub>PLH</sub> | Propagation Delay               | 3.0                                                                         | 5.1 | 7.0 | 3.0                                                                                  | 9.0  | 3.0                                                                               | 8.0  | ns    |
| t <sub>PHL</sub> | Data to Output (74F240)         | 2.0                                                                         | 3.5 | 4.7 | 2.0                                                                                  | 6.0  | 2.0                                                                               | 5.7  |       |
| t <sub>pZH</sub> | Output Enable Time (74F240)     | 2.0                                                                         | 3.5 | 4.7 | 2.0                                                                                  | 6.5  | 2.0                                                                               | 5.7  | ns    |
| t <sub>pZL</sub> |                                 | 4.0                                                                         | 6.9 | 9.0 | 4.0                                                                                  | 10.5 | 4.0                                                                               | 10.0 |       |
| t <sub>PHZ</sub> | Output Disable Time (74F240)    | 2.0                                                                         | 4.0 | 5.3 | 2.0                                                                                  | 6.5  | 2.0                                                                               | 6.3  |       |
| t <sub>PLZ</sub> |                                 | 2.0                                                                         | 6.0 | 8.0 | 2.0                                                                                  | 12.5 | 2.0                                                                               | 9.5  |       |
| t <sub>PLH</sub> | Propagation Delay               | 2.5                                                                         | 4.0 | 5.2 | 2.0                                                                                  | 6.5  | 2.5                                                                               | 6.2  | ns    |
| t <sub>PHL</sub> | Data to Output (74F241, 74F244) | 2.5                                                                         | 4.0 | 5.2 | 2.0                                                                                  | 7.0  | 2.5                                                                               | 6.5  |       |
| t <sub>pZH</sub> | Output Enable Time              | 2.0                                                                         | 4.3 | 5.7 | 2.0                                                                                  | 7.0  | 2.0                                                                               | 6.7  | ns    |
| t <sub>pZL</sub> | (74F241, 74F244)                | 2.0                                                                         | 5.4 | 7.0 | 2.0                                                                                  | 8.5  | 2.0                                                                               | 8.0  |       |
| t <sub>PHZ</sub> | Output Disable Time             | 2.0                                                                         | 4.5 | 6.0 | 2.0                                                                                  | 7.0  | 2.0                                                                               | 7.0  |       |
| t <sub>PLZ</sub> | (74F241, 74F244)                | 2.0                                                                         | 4.5 | 6.0 | 2.0                                                                                  | 7.5  | 2.0                                                                               | 7.0  |       |

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

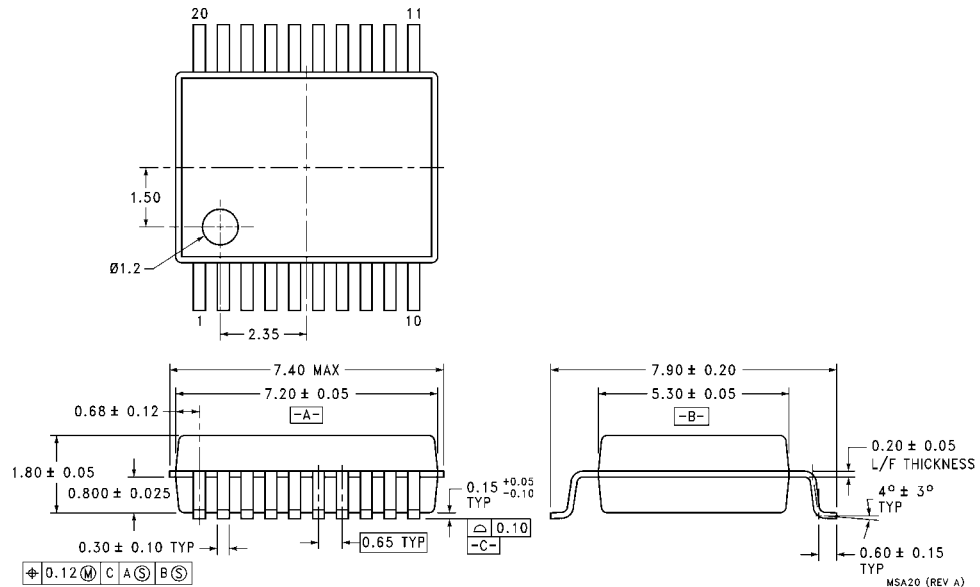


**20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide  
Package Number M20B**



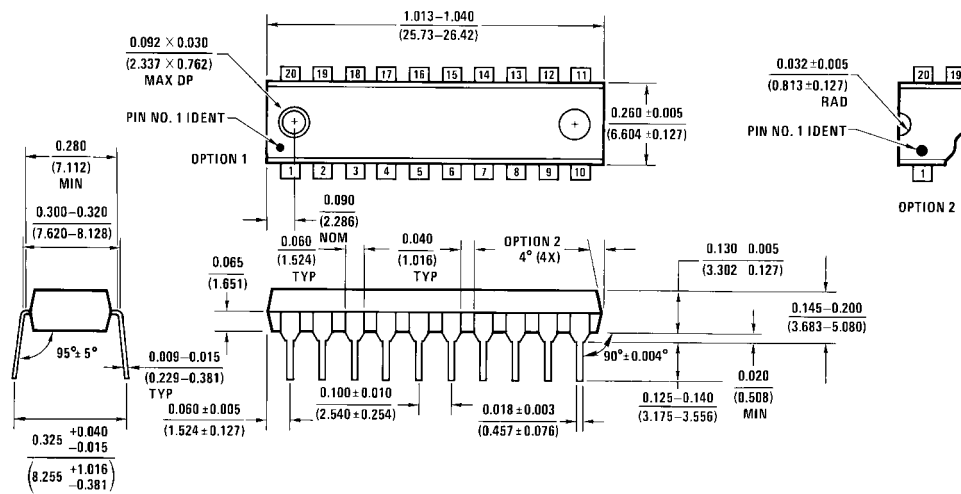
**20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide  
Package Number M20D**

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



**20-Lead Shrink Small Outline Package (SSOP), EIAJ TYPE II, 5.3mm Wide**  
**Package Number MSA20**

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



20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide  
Package Number N20A

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