

FAIRCHILD
SEMICONDUCTOR™

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74F219 64-Bit Random Access Memory with 3-STATE Outputs

General Description

The 74F219 is a high-speed 64-bit RAM organized as a 16-word by 4-bit array. Address inputs are buffered to minimize loading and are fully decoded on-chip. The outputs are 3-STATE and are in the high-impedance state whenever the Chip Select (CS) input is HIGH. The outputs are active only in the Read mode. This device is similar to the 74F189 but features non-inverting, rather than inverting, data outputs.

Features

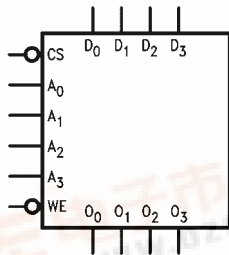
- 3-STATE outputs for data bus applications
- Buffered inputs minimize loading
- Address decoding on-chip
- Diode clamped inputs minimize ringing
- Available in SOIC (300 mil only)

Ordering Code:

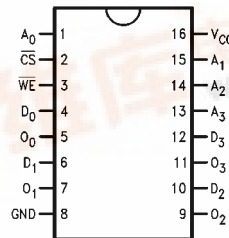
| Order Number | Package Number | Package Description |
|--------------|----------------|--|
| 74F219SC | M16B | 16-Lead Small Outline Intergrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide |
| 74F219SJ | M16D | 16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide |
| 74F219PC | N16E | 16-Lead 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.

Logic Symbol



Connection Diagram



74F219 64-Bit Random Access Memory with 3-STATE Outputs



Unit Loading/Fan Out

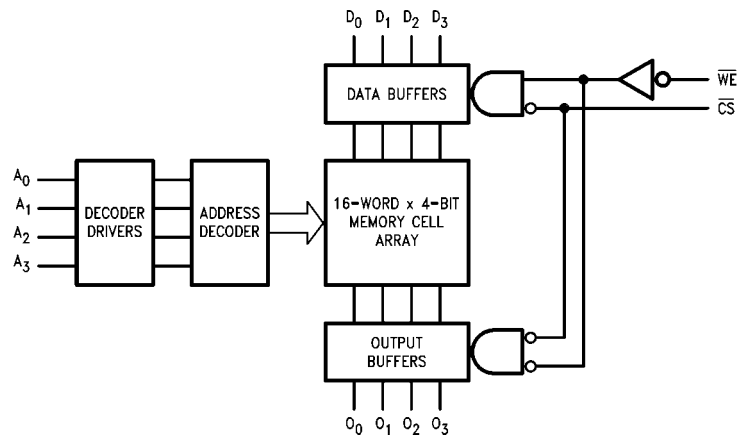
| Pin Names | Description | U.L. HIGH/LOW | Input I_{IH}/I_{IL} Output I_{OH}/I_{OL} |
|-----------------|---------------------------------|------------------|---|
| A_0 - A_3 | Address Inputs | 1.0/1.0 | 20 μ A/-0.6 mA |
| \overline{CS} | Chip Select Input (Active LOW) | 1.0/2.0 | 20 μ A/-1.2 mA |
| \overline{WE} | Write Enable Input (Active LOW) | 1.0/1.0 | 20 μ A/-0.6 mA |
| D_0 - D_3 | Data Inputs | 1.0/1.0 | 20 μ A/-0.6 mA |
| O_0 - O_3 | 3-STATE Data Outputs | 150/40 (33.3) | -3 mA/24 mA (20 mA) |

Function Table

| Inputs | | Operation | Condition of Outputs |
|-----------------|-----------------|-----------|----------------------|
| \overline{CS} | \overline{WE} | | |
| L | L | Write | High Impedance |
| L | H | Read | True Stored Data |
| H | X | Inhibit | High Impedance |

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial

Block Diagram



Absolute Maximum Ratings(Note 1)

| | |
|---|-------------------|
| 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 _{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}

3-STATE Output -0.5V to +5.5V

Current Applied to Output

in LOW State (Max) twice the rated I_{OL} (mA)**Recommended Operating Conditions**

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

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.

DC Electrical Characteristics

| Symbol | Parameter | Min | Typ | 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 | 10% V _{CC} 10% V _{CC} 5% V _{CC} 5% V _{CC} | 2.5 2.4 2.7 2.7 | | V | Min | I _{OH} = -1 mA I _{OH} = -3 mA I _{OH} = -1 mA I _{OH} = -3 mA |
| V _{OL} | Output LOW Voltage | 10% V _{CC} | | 0.5 | V | Min | I _{OL} = 24 mA |
| I _{IH} | Input HIGH Current | | | 5.0 | μA | Max | V _{IN} = 2.7V |
| I _{BVI} | Input HIGH Current Breakdown Test | | | 7.0 | μA | Max | V _{IN} = 7.0V |
| I _{CEX} | Output HIGH Leakage Current | | | 50 | μA | Max | V _{OUT} = V _{CC} |
| V _{ID} | Input Leakage Test | 4.75 | | | V | 0.0 | I _{ID} = 1.9 μA All Other Pins Grounded |
| I _{OD} | Output Leakage Circuit Current | | | 3.75 | μA | 0.0 | V _{ID} = 150 mV All Other Pins Grounded |
| I _{IL} | Input LOW Current | | | -0.6 -1.2 | mA | Max | V _{IN} = 0.5V (A _n , WE, D _n) V _{IN} = 0.5V (CS) |
| 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 | -60 | | -150 | mA | Max | V _{OUT} = 0V |
| I _{ZZ} | Bus Drainage Test | | | 500 | μA | 0.0V | V _{OUT} = 5.25V |
| I _{CC} | Power Supply Current | | 37 | 55 | mA | Max | |

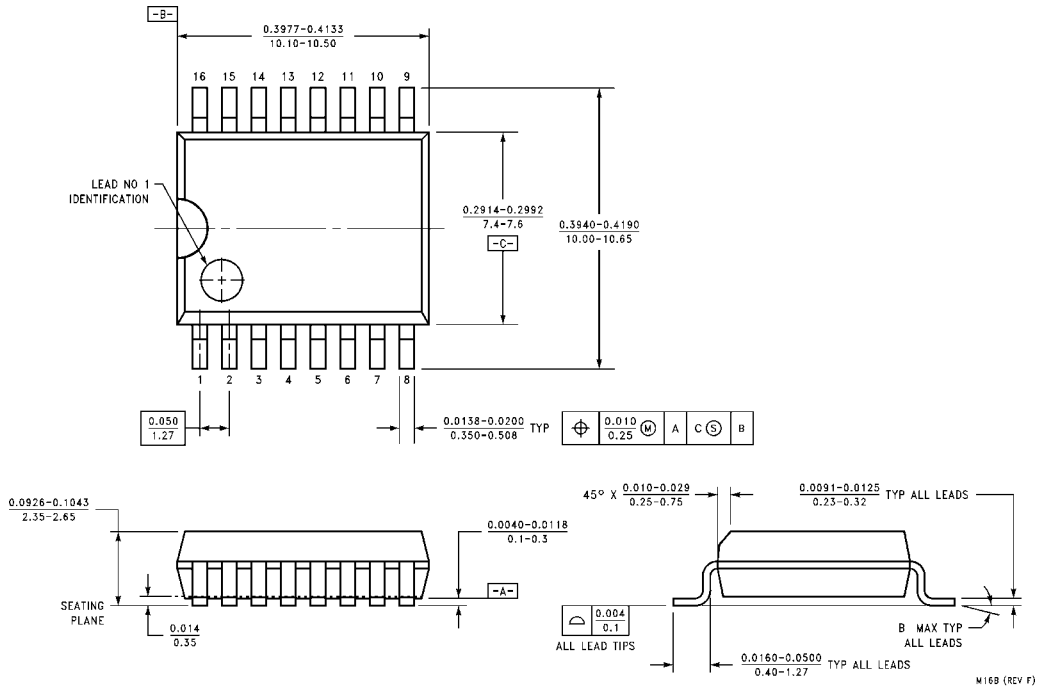
AC Electrical Characteristics

| Symbol | Parameter | T _A = +25°C V _{CC} = +5.0V C _L = 50 pF | | | T _A = -55°C to +125°C V _{CC} = +5.0V C _L = 50 pF | | T _A = 0°C to +70°C V _{CC} = +5.0V C _L = 50 pF | | Units |
|------------------|--|---|------|------|---|------|--|------|-------|
| | | Min | Typ | Max | Min | Max | Min | Max | |
| t _{PLH} | Access Time, HIGH or LOW | 10.0 | 18.5 | 26.0 | 9.0 | 32.0 | 10.0 | 27.0 | ns |
| t _{PHL} | A _n to O _n | 8.0 | 13.5 | 19.0 | 8.0 | 23.0 | 8.0 | 20.0 | |
| t _{PZH} | Access Time, HIGH or LOW | 3.5 | 6.0 | 8.5 | 3.5 | 10.5 | 3.5 | 9.5 | ns |
| t _{PZL} | \overline{CS} to O _n | 5.0 | 9.0 | 13.0 | 5.0 | 15.0 | 5.0 | 14.0 | |
| t _{PHZ} | Disable Time, HIGH or LOW | 2.0 | 4.0 | 6.0 | 2.0 | 8.0 | 2.0 | 7.0 | ns |
| t _{PLZ} | \overline{CS} to O _n | 3.0 | 5.5 | 8.0 | 2.5 | 10.0 | 3.0 | 9.0 | |
| t _{PZH} | Write Recovery Time | 6.5 | 20.0 | 28.0 | 6.5 | 37.5 | 6.5 | 29.0 | ns |
| t _{PZL} | HIGH or LOW, \overline{WE} to O _n | 6.5 | 11.0 | 15.5 | 6.5 | 17.5 | 6.5 | 16.5 | |
| t _{PHZ} | Disable Time, HIGH or LOW | 4.0 | 7.0 | 10.0 | 3.5 | 12.0 | 4.0 | 11.0 | ns |
| t _{PLZ} | \overline{WE} to O _n | 5.0 | 9.0 | 13.0 | 5.0 | 15.0 | 5.0 | 14.0 | |

AC Operating Requirements

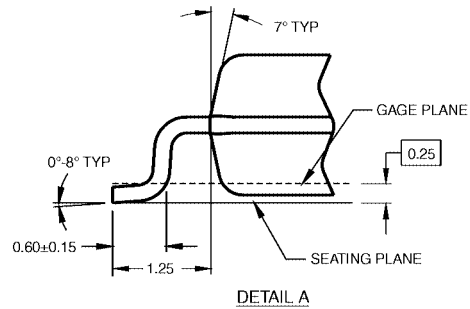
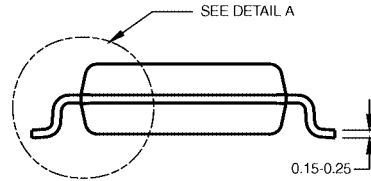
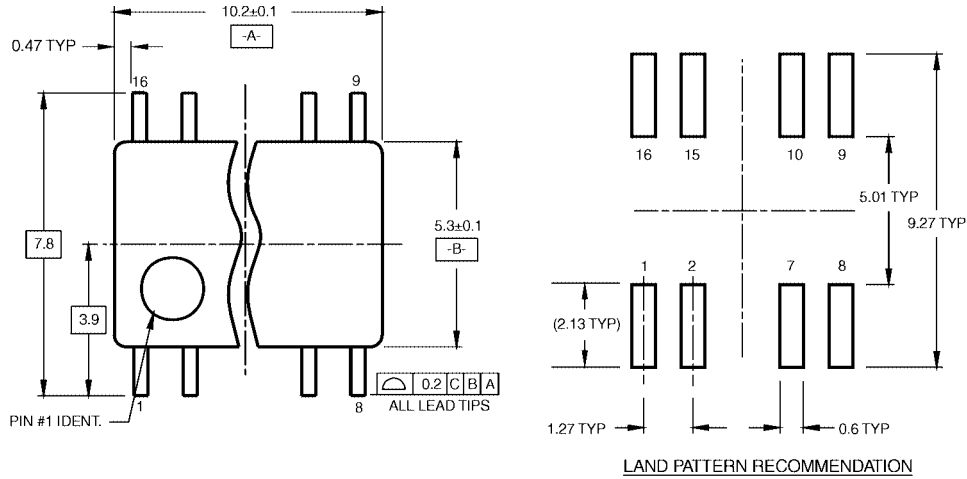
| Symbol | Parameter | T _A = +25°C V _{CC} = +5.0V | | T _A = -55°C to +125°C V _{CC} = +5.0V | | T _A = 0°C to +70°C V _{CC} = +5.0V | | Units |
|--------------------|---|---|-----|---|-----|--|-----|-------|
| | | Min | Max | Min | Max | Min | Max | |
| t _S (H) | Setup Time, HIGH or LOW | 0 | | 0 | | 0 | | ns |
| t _S (L) | A _n to \overline{WE} | 0 | | 0 | | 0 | | |
| t _H (H) | Hold Time, HIGH or LOW | 2.0 | | 2.0 | | 2.0 | | ns |
| t _H (L) | A _n to \overline{WE} | 2.0 | | 2.0 | | 2.0 | | |
| t _S (H) | Setup Time, HIGH or LOW | 10.0 | | 11.0 | | 10.0 | | ns |
| t _S (L) | D _n to \overline{WE} | 10.0 | | 11.0 | | 10.0 | | |
| t _H (H) | Hold Time, HIGH or LOW | 0 | | 2.0 | | 0 | | ns |
| t _H (L) | D _n to \overline{WE} | 0 | | 2.0 | | 0 | | |
| t _S (L) | Setup Time, LOW \overline{CS} to \overline{WE} | 0 | | 0 | | 0 | | ns |
| t _H (L) | Hold Time, LOW \overline{CS} to \overline{WE} | 6.0 | | 7.5 | | 6.0 | | |
| t _W (L) | \overline{WE} Pulse Width, LOW | 6.0 | | 15.0 | | 6.0 | | ns |

Physical Dimensions inches (millimeters) unless otherwise noted



16-Lead Small Outline Intergrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide Package Number M16B

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



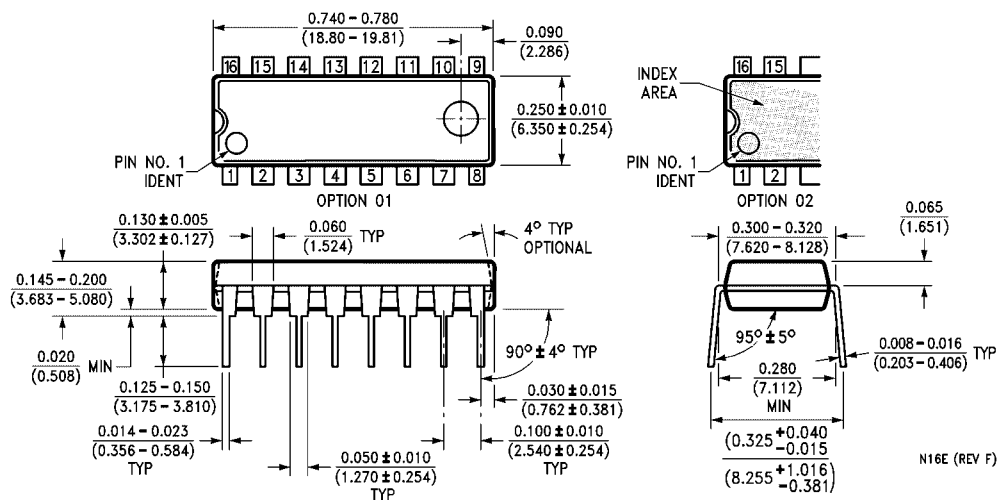
DIMENSIONS ARE IN MILLIMETERS

- NOTES:
 A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
 B. DIMENSIONS ARE IN MILLIMETERS.
 C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

M16DRevB1

**16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
 Package Number M16D**

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



16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide Package Number N16E

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