

# 54F379,74F379

*54F379 74F379 Quad Parallel Register with Enable*



Literature Number: SNOS193A

## 54F/74F379 Quad Parallel Register with Enable

### General Description

The 'F379 is a 4-bit register with buffered common Enable. This device is similar to the 'F175 but features the common Enable rather than common Master Reset.

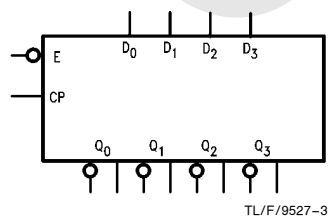
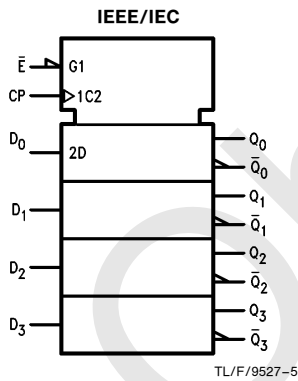
### Features

- Edge triggered D-type inputs
- Buffered positive edge-triggered clock
- Buffered common enable input
- True and complement outputs
- Guaranteed 4000V minimum ESD protection

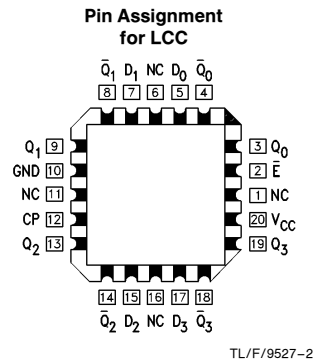
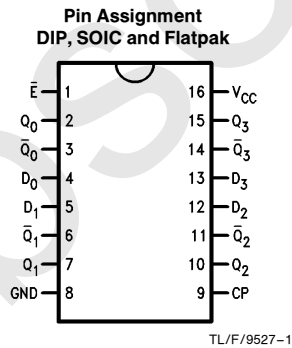
| Commercial        | Military      | Package Number | Package Description                               |
|-------------------|---------------|----------------|---|
| 74F379PC          |               | N16E           | 16-Lead (0.300" Wide) Molded Dual-In-Line         |
|                   | 54F379DM (QB) | J16A           | 16-Lead Ceramic Dual-In-Line                      |
| 74F379SC (Note 1) |               | M16A           | 16-Lead (0.300" Wide) Molded Small Outline, JEDEC |
| 74F379SJ (Note 1) |               | M16D           | 16-Lead (0.300" Wide) Molded Small Outline, EIAJ  |
|                   | 54F379FM (QB) | W16A           | 16-Lead Cerpack                                   |
|                   | 54F379LM (QB) | E20A           | 20-Lead Ceramic Leadless Chip Carrier, Type C     |

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

### Logic Symbols



### Connection Diagrams



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


## Unit Loading/Fan Out


| Pin Names                 | Description                            | 54F/74F          |   |
|---------------------------|--|------------------|---|
|                           |  | U.L.<br>HIGH/LOW | Input $I_{IH}/I_{IL}$<br>Output $I_{OH}/I_{OL}$ |
| $\bar{E}$                 | Enable Input (Active LOW)              | 1.0/1.0          | 20 $\mu$ A/ -0.6 mA                             |
| $D_0$ - $D_3$             | Data Inputs                            | 1.0/1.0          | 20 $\mu$ A/ -0.6 mA                             |
| CP                        | Clock Pulse Input (Active Rising Edge) | 1.0/1.0          | 20 $\mu$ A/ -0.6 mA                             |
| $Q_0$ - $Q_3$             | Flip-Flop Outputs                      | 50/33.3          | -1 mA/20 mA                                     |
| $\bar{Q}_0$ - $\bar{Q}_3$ | Complement Outputs                     | 50/33.3          | -1 mA/20 mA                                     |

## Functional Description

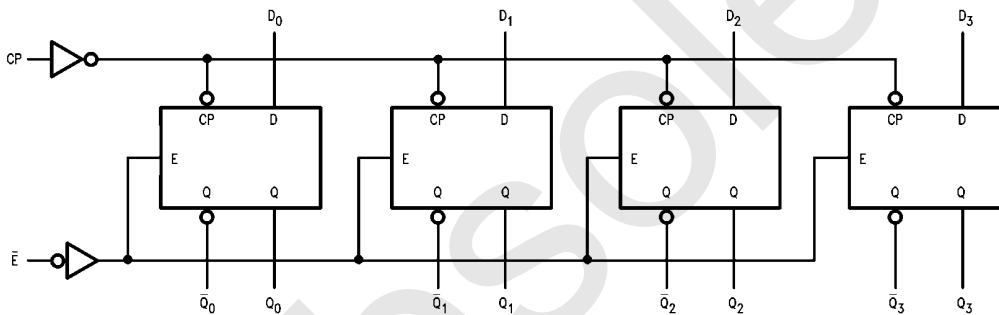
The 'F379 consists of four edge-triggered D-Type flip-flops with individual D inputs and Q and  $\bar{Q}$  outputs. The Clock (CP) and Enable ( $\bar{E}$ ) inputs are common to all flip-flops. When the  $\bar{E}$  is input HIGH, the register will retain the present data independent of the CP input. The  $D_n$  and  $\bar{E}$  inputs can change when the clock is in either state, provided that the recommended setup and hold times are observed.

## Truth Table

| Inputs    |   |       | Outputs |             |
|-----------|---|-------|---------|-------------|
| $\bar{E}$ | CP  | $D_n$ | $Q_n$   | $\bar{Q}_n$ |
| H         |  | X     | NC      | NC          |
| L         |  | H     | H       | L           |
| L         |  | L     | L       | H           |

H = HIGH Voltage Level  
 L = LOW Voltage Level  
 X = Immaterial  
 = LOW-to-HIGH Transition  
 NC = No Change

## Logic Diagram



TL/F/9527-4

Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

## 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 <sub>CC</sub> 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 <sub>CC</sub> = 0V) |                                      |
| Standard Output   | -0.5V to V <sub>CC</sub>             |
| TRI-STATE® Output   | -0.5V to +5.5V                       |
| Current Applied to Output in LOW State (Max)                        | twice the rated I <sub>OL</sub> (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 <sub>CC</sub> | Conditions  |
|------------------|-----------------------------------|-------------------------|------|------|-------|-----------------|---|
|                  |                                   | Min                     | Typ  | Max  |       |                 |   |
| 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 HIGH Voltage               | 54F 10% V <sub>CC</sub> | 2.5  |      | V     | Min             | I <sub>OH</sub> = -1 mA<br>I <sub>OH</sub> = -1 mA<br>I <sub>OH</sub> = -1 mA |
|                  |                                   | 74F 10% V <sub>CC</sub> | 2.5  |      |       |                 |   |
|                  |                                   | 74F 5% V <sub>CC</sub>  | 2.7  |      |       |                 |   |
| V <sub>OL</sub>  | Output LOW Voltage                | 54F 10% V <sub>CC</sub> | 0.5  |      | V     | Min             | I <sub>OL</sub> = 20 mA<br>I <sub>OL</sub> = 20 mA                            |
|                  |                                   | 74F 10% V <sub>CC</sub> | 0.5  |      |       |                 |   |
| I <sub>IH</sub>  | Input HIGH Current                | 54F                     | 20.0 |      | μA    | Max             | V <sub>IN</sub> = 2.7V  |
|                  |                                   | 74F                     | 5.0  |      |       |                 |   |
| I <sub>BVI</sub> | Input HIGH Current Breakdown Test | 54F                     | 100  |      | μA    | Max             | V <sub>IN</sub> = 7.0V  |
|                  |                                   | 74F                     | 7.0  |      |       |                 |   |
| I <sub>CEX</sub> | Output HIGH Leakage Current       | 54F                     | 250  |      | μA    | Max             | V <sub>OUT</sub> = V <sub>CC</sub>  |
|                  |                                   | 74F                     | 50   |      |       |                 |   |
| V <sub>ID</sub>  | Input Leakage Test                | 74F                     | 4.75 |      | V     | 0.0             | I <sub>ID</sub> = 1.9 μA<br>All Other Pins Grounded                           |
| I <sub>OD</sub>  | Output Leakage Circuit Current    | 74F                     | 3.75 |      | μA    | 0.0             | V <sub>IOD</sub> = 150 mV<br>All Other Pins Grounded                          |
| I <sub>IL</sub>  | Input LOW Current                 |                         | -0.6 |      | mA    | Max             | V <sub>IN</sub> = 0.5V  |
| I <sub>OS</sub>  | Output Short-Circuit Current      |                         | -60  | -150 | mA    | Max             | V <sub>OUT</sub> = 0V   |
| I <sub>CCL</sub> | Power Supply Current              |                         | 28   | 40   | mA    | Max             | V <sub>O</sub> = LOW  |

## AC Electrical Characteristics

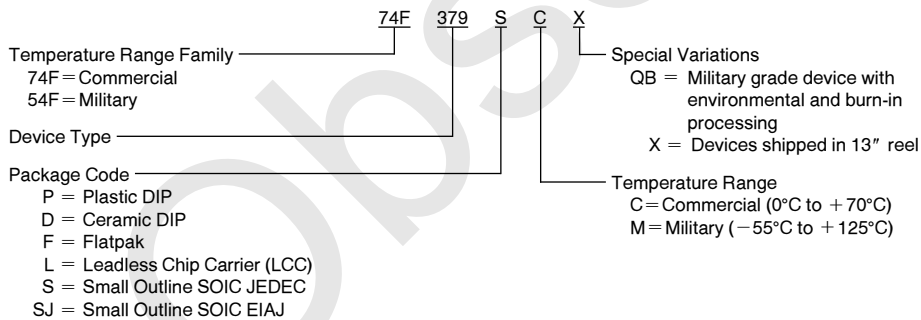
| Symbol           | Parameter                               | 74F   |     |     | 54F  |      | 74F  |     | Units |
|------------------|---|---|-----|-----|--|------|--|-----|-------|
|                  |   | T <sub>A</sub> = +25°C<br>V <sub>CC</sub> = +5.0V<br>C <sub>L</sub> = 50 pF |     |     | T <sub>A</sub> , V <sub>CC</sub> = Mil<br>C <sub>L</sub> = 50 pF |      | T <sub>A</sub> , V <sub>CC</sub> = Com<br>C <sub>L</sub> = 50 pF |     |       |
|                  |   | Min   | Typ | Max | Min  | Max  | Min  | Max |       |
| f <sub>max</sub> | Maximum Clock Frequency                 | 100   | 140 |     | 75   |      | 100  |     | MHz   |
| t <sub>PLH</sub> | Propagation Delay                       | 3.5   | 5.0 | 6.5 | 3.0  | 8.5  | 3.5  | 7.5 | ns    |
| t <sub>PHL</sub> | CP to Q <sub>n</sub> , $\overline{Q}_n$ | 5.0   | 6.5 | 8.5 | 4.0  | 10.0 | 5.0  | 9.5 |       |

## AC Operating Requirements

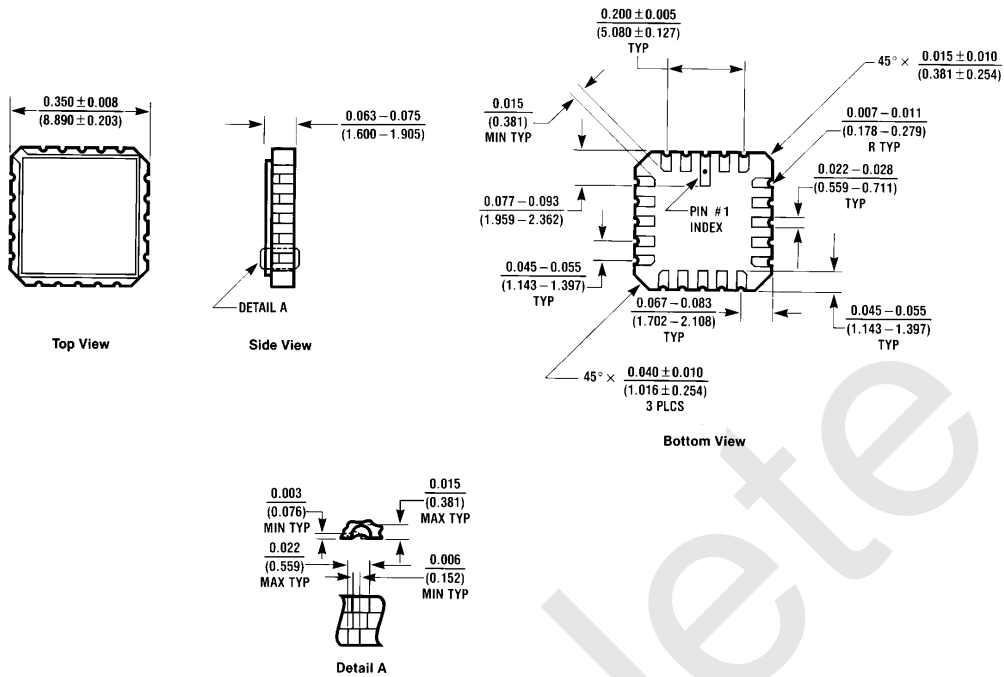
| Symbol             | Parameter               | 74F   |     | 54F                                    |     | 74F                                    |     | Units |
|--------------------|-------------------------|---|-----|--|-----|--|-----|-------|
|                    |                         | T <sub>A</sub> = +25°C<br>V <sub>CC</sub> = +5.0V |     | T <sub>A</sub> , V <sub>CC</sub> = Mil |     | T <sub>A</sub> , V <sub>CC</sub> = Com |     |       |
|                    |                         | Min   | Max | Min                                    | Max | Min                                    | Max |       |
| t <sub>s</sub> (H) | Setup Time, HIGH or LOW | 3.0   |     | 4.0                                    |     | 3.0                                    |     | ns    |
| t <sub>s</sub> (L) | D <sub>n</sub> to CP    | 3.0   |     | 4.0                                    |     | 3.0                                    |     |       |
| t <sub>h</sub> (H) | Hold Time, HIGH or LOW  | 1.0   |     | 2.0                                    |     | 1.0                                    |     | ns    |
| t <sub>h</sub> (L) | D <sub>n</sub> to CP    | 1.0   |     | 2.0                                    |     | 1.0                                    |     |       |
| t <sub>s</sub> (H) | Setup Time, HIGH or LOW | 6.0   |     | 8.0                                    |     | 6.0                                    |     | ns    |
| t <sub>s</sub> (L) | $\overline{E}$ to CP    | 6.0   |     | 8.0                                    |     | 6.0                                    |     |       |
| t <sub>h</sub> (H) | Hold Time, HIGH or LOW  | 0   |     | 0                                      |     | 0                                      |     | ns    |
| t <sub>h</sub> (L) | $\overline{E}$ to CP    | 0   |     | 0                                      |     | 0                                      |     |       |
| t <sub>w</sub> (H) | CP Pulse Width          | 4.0   |     | 5.0                                    |     | 4.0                                    |     | ns    |
| t <sub>w</sub> (L) | HIGH or LOW             | 5.0   |     | 7.0                                    |     | 5.0                                    |     |       |

## 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:

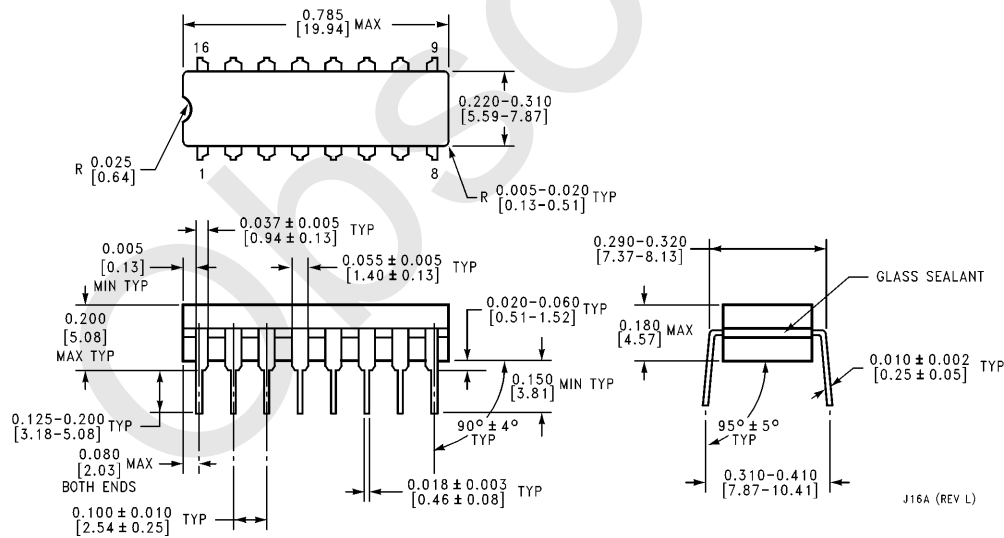


**Physical Dimensions** inches (millimeters)



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

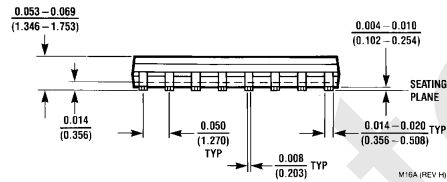
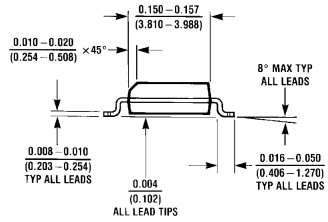
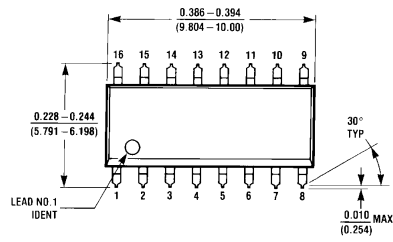
E20A (REV D)



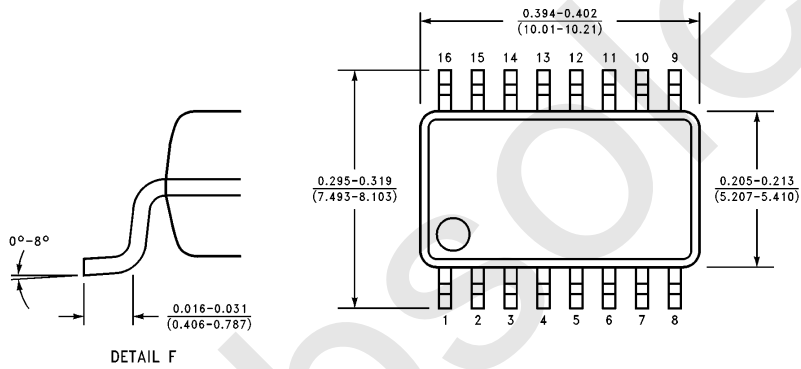
**16-Lead Ceramic Dual-In-Line Package (D)**  
**NS Package Number J16A**

J16A (REV L)

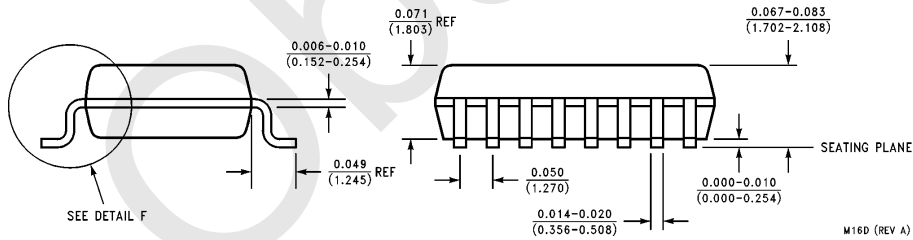
**Physical Dimensions** inches (millimeters) (Continued)



**16-Lead (0.150" Wide) Molded Small Outline Integrated Circuit (S)  
NS Package Number M16A**

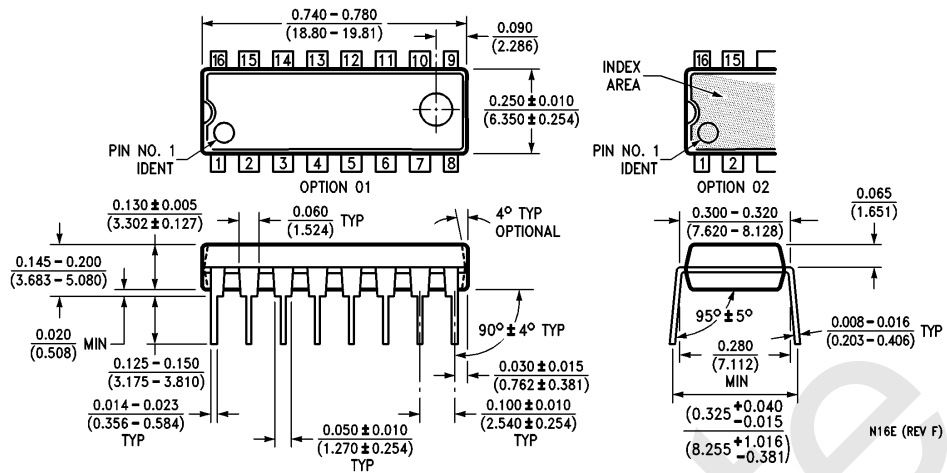


DETAIL F



**16-Lead (0.300" Wide) Molded Small Outline Package, EIAJ (SJ)  
NS Package Number M16D**

**Physical Dimensions** inches (millimeters) (Continued)

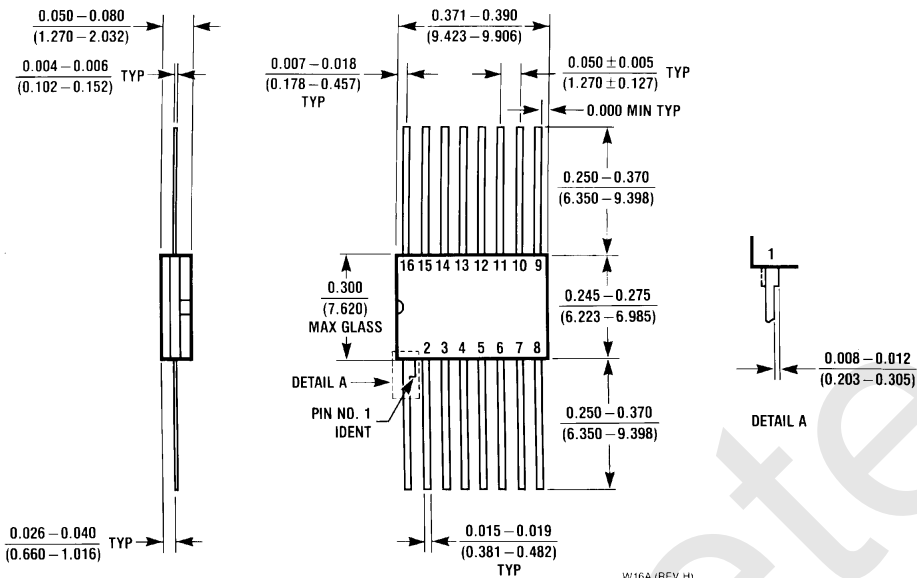


**16-Lead (0.300" Wide) Molded Dual-In-Line Package (P)**  
**NS Package Number N16E**

N16E (REV F)



**Physical Dimensions** inches (millimeters) (Continued)



**16-Lead Ceramic Flatpak (F)  
NS Package Number W16A**

W16A (REV H)

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