

SN54LS377, SN54LS378, SN54LS379,  
SN74LS377, SN74LS378, SN74LS379  
OCTAL, HEX, AND QUAD D-TYPE FLIP-FLOPS WITH ENABLE

SDLS167 – OCTOBER 1976 – REVISED MARCH 1988

- 'LS377 and 'LS378 Contain Eight and Six Flip-Flops, Respectively, with Single-Rail Outputs
- 'LS379 Contains Four Flip-Flops with Double-Rail Outputs
- Individual Data Input to Each Flip-Flop
- Applications Include:  
    Buffer/Storage Registers  
    Shift Registers  
    Pattern Generators

#### description

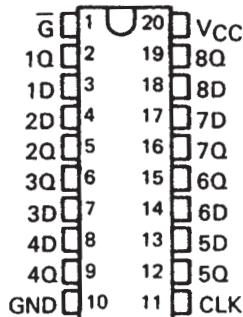
These monolithic, positive-edge-triggered flip-flops utilize TTL circuitry to implement D-type flip-flop logic with an enable input. The 'LS377, 'LS378, and 'LS379 devices are similar to 'LS273, 'LS174, and 'LS175, respectively, but feature a common enable instead of a common clear.

Information at the D inputs meeting the setup time requirements is transferred to the Q outputs on the positive-going edge of the clock pulse if the enable input  $\bar{G}$  is low. Clock triggering occurs at a particular voltage level and is not directly related to the transition time of the positive-going pulse. When the clock input is at either the high or low level, the D input signal has no effect at the output. The circuits are designed to prevent false clocking by transitions at the  $\bar{G}$  input.

These flip-flops are guaranteed to respond to clock frequencies ranging from 0 to 30 MHz while maximum clock frequency is typically 40 megahertz. Typical power dissipation is 10 milliwatts per flip-flop.

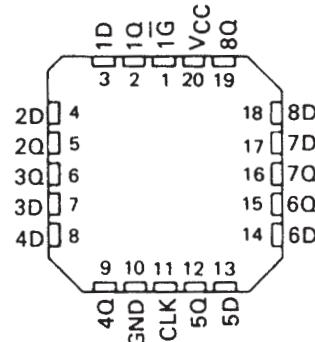
**SN54LS377 . . . J PACKAGE  
SN74LS377 . . . DW OR N PACKAGE**

(TOP VIEW)



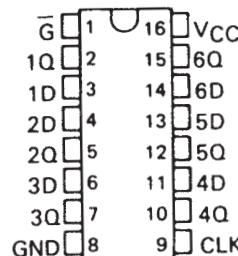
**SN54LS377 . . . FK PACKAGE**

(TOP VIEW)



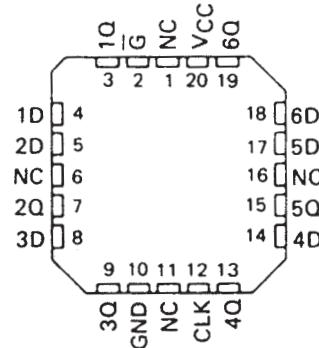
**SN54LS378 . . . J OR W PACKAGE  
SN74LS378 . . . D OR N PACKAGE**

(TOP VIEW)



**SN54LS378 . . . FK PACKAGE**

(TOP VIEW)



NC – No internal connection

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

Copyright © 1988, Texas Instruments Incorporated

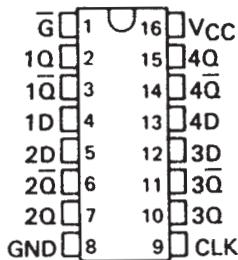


POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

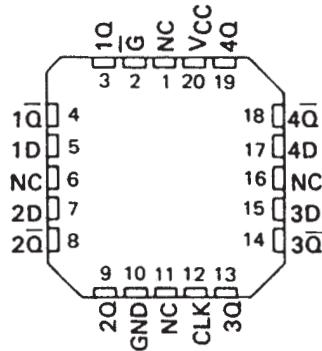
**SN54LS377, SN54LS378, SN54LS379,  
SN74LS377, SN74LS378, SN74LS379  
OCTAL, HEX, AND QUAD D-TYPE FLIP-FLOPS WITH ENABLE**

SDLS167 – OCTOBER 1976 – REVISED MARCH 1988

**SN54LS379 . . . J OR W PACKAGE  
SN74LS379 . . . D OR N PACKAGE**  
(TOP VIEW)

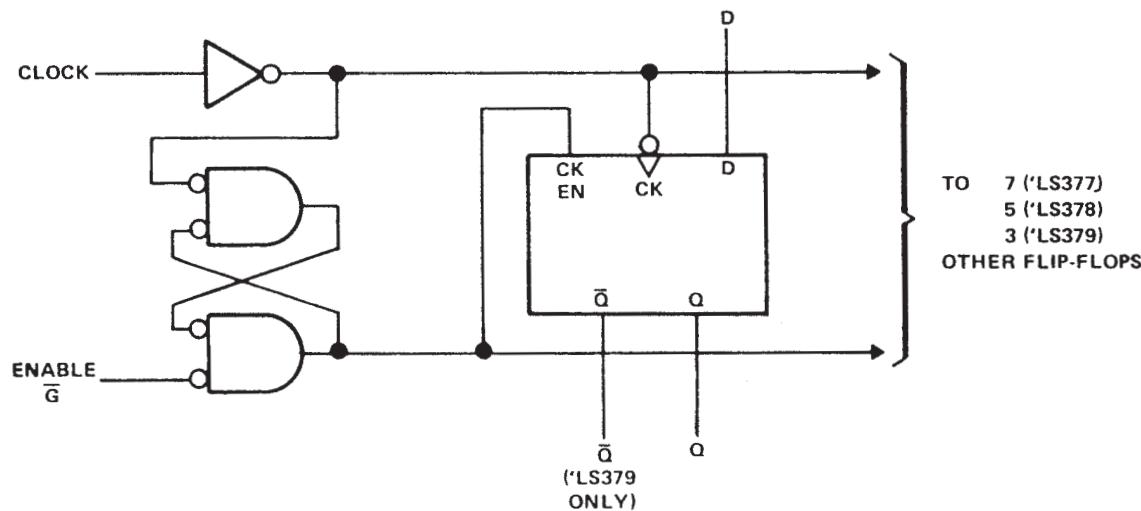


**SN54LS379 . . . FK PACKAGE**  
(TOP VIEW)

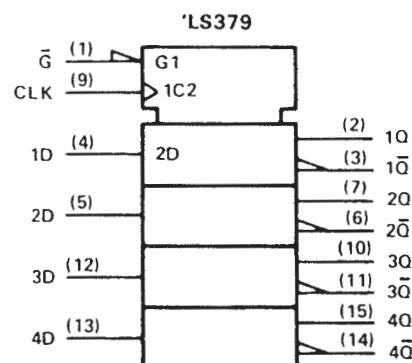
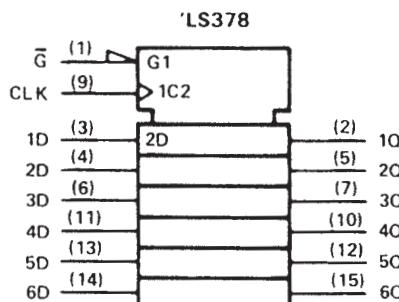
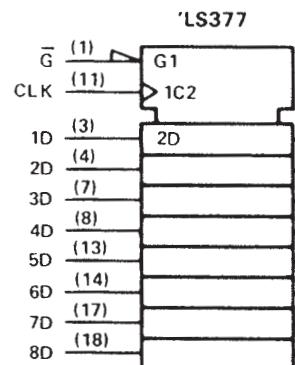


NC – No internal connection

**logic diagram (positive logic)**

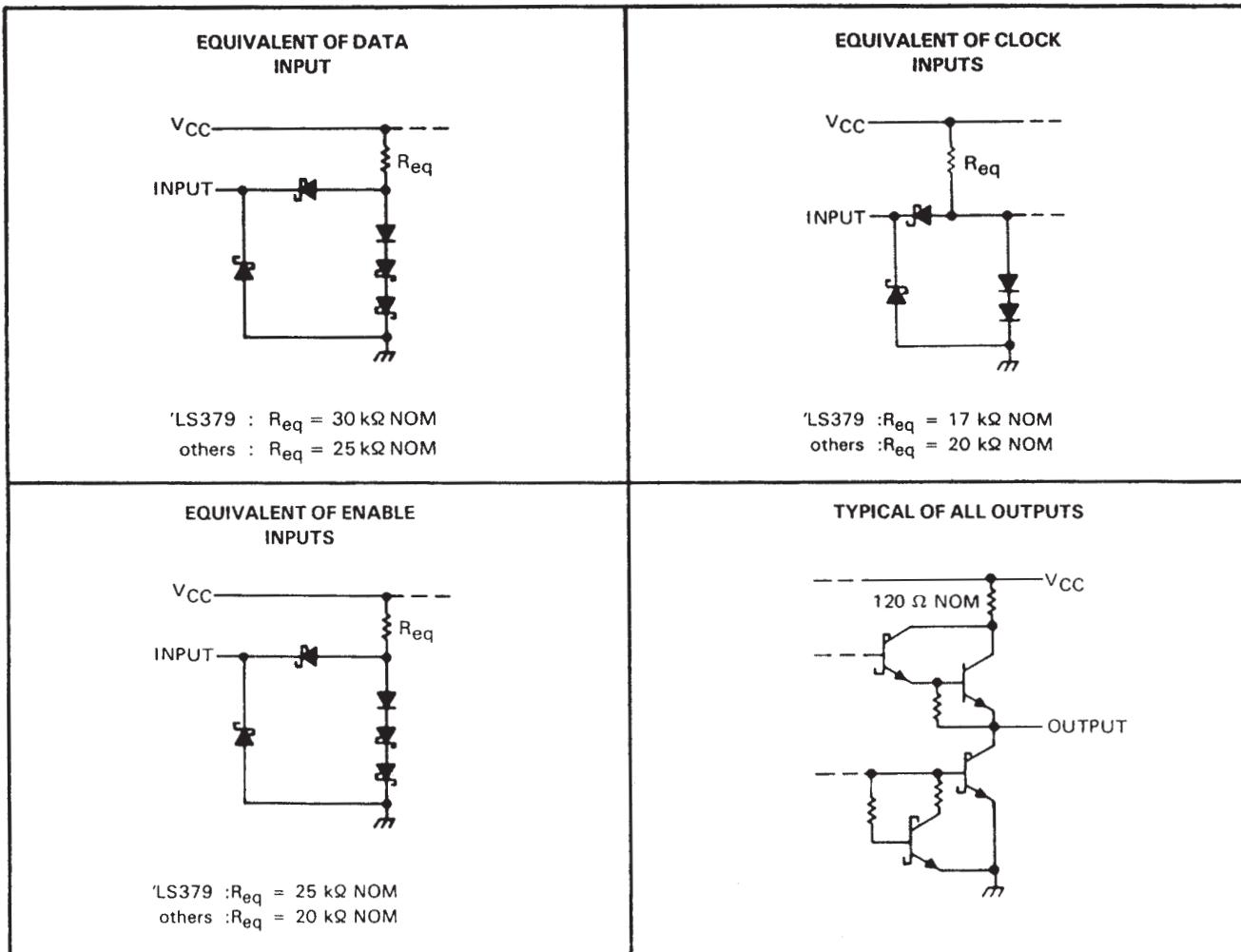


**logic symbols<sup>†</sup>**



<sup>†</sup> These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.  
Pin numbers shown are for DW, J, and N packages.

## schematics of inputs and outputs



**absolute maximum rating over operating free-air temperature range (unless otherwise noted)**

NOTE 1: Voltage values are with respect to network ground terminal.



**SN54LS377, SN54LS378, SN54LS379,  
SN74LS377, SN74LS378, SN74LS379  
OCTAL, HEX, AND QUAD D-TYPE FLIP-FLOPS WITH ENABLE**

SDLS167 – OCTOBER 1976 – REVISED MARCH 1988

**recommended operating conditions**

|  | Data input            | SN54LS' |     |      | SN74LS' |     |      | UNIT |
|--|-----------------------|---------|-----|------|---------|-----|------|------|
|  |                       | MIN     | NOM | MAX  | MIN     | NOM | MAX  |      |
| Supply voltage, V <sub>CC</sub>                |                       | 4.5     | 5   | 5.5  | 4.75    | 5   | 5.25 | V    |
| High-level output current, I <sub>OH</sub>     |                       |         |     | –400 |         |     | –400 | μA   |
| Low-level output current, I <sub>OL</sub>      |                       |         |     | 4    |         |     | 8    | mA   |
| Clock frequency, f <sub>CLOCK</sub>            |                       | 0       |     | 30   | 0       |     | 30   | MHz  |
| Width of clock pulse, t <sub>W</sub>           |                       | 20      |     |      | 20      |     |      | ns   |
| Setup time, t <sub>SU</sub>                    | Data input            | 20†     |     |      | 20†     |     |      | ns   |
|  | Enable active-state   | 25†     |     |      | 25†     |     |      |      |
|  | Enable inactive-state | 10†     |     |      | 10†     |     |      |      |
| Hold time, t <sub>H</sub>                      | Data and enable       | 5†      |     |      | 5†      |     |      | ns   |
| Operating free-air temperature, T <sub>A</sub> |                       | –55     |     | 125  | 0       |     | 70   | °C   |

† The arrow indicates that the rising edge of the clock pulse is used for reference.

**electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)**

| PARAMETER   | TEST CONDITIONS†   | SN54LS' |      |      | SN74LS' |      |      | UNIT |
|---|--|---------|------|------|---------|------|------|------|
|   |  | MIN     | TYP‡ | MAX  | MIN     | TYP‡ | MAX  |      |
| V <sub>IH</sub> High-level input voltage              |  | 2       |      |      | 2       |      |      | V    |
| V <sub>IL</sub> Low-level input voltage               |  |         |      | 0.7  |         |      | 0.8  | V    |
| V <sub>IK</sub> Input clamp voltage                   | V <sub>CC</sub> = MIN, I <sub>I</sub> = –18 mA                   |         |      | –1.5 |         |      | –1.5 | V    |
| V <sub>OH</sub> High-level output voltage             | V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V,                    | 2.5     | 3.5  |      | 2.7     | 3.5  |      | V    |
| V <sub>OL</sub> Low-level output voltage              | V <sub>IL</sub> = V <sub>IL</sub> max, I <sub>OH</sub> = –400 μA |         |      |      |         |      |      |      |
| I <sub>I</sub> Input current at maximum input voltage | V <sub>CC</sub> = MAX, V <sub>I</sub> = 7 V                      | 0.25    | 0.4  |      | 0.25    | 0.4  |      | mA   |
| I <sub>II</sub> High-level input current              | V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V                    |         |      | 0.1  |         |      | 0.1  |      |
| I <sub>IL</sub> Low-level input current               | V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V                    |         |      | –0.4 |         |      | –0.4 | mA   |
| I <sub>OS</sub> Short-circuit output current§         | V <sub>CC</sub> = MAX  | –20     | –100 | –20  | –20     | –100 | –100 | mA   |
| I <sub>CC</sub> Supply current                        | V <sub>CC</sub> = MAX, See Note 2                                | 'LS377  | 17   | 28   | 17      | 28   | mA   |      |
|   |  | 'LS378  | 13   | 22   | 13      | 22   | mA   |      |
|   |  | 'LS379  | 9    | 15   | 9       | 15   | mA   |      |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Note more than one input should be shorted at a time, and duration of the short-circuit should not exceed one second.

NOTE 2: With all outputs open and ground applied to all data and enable inputs, I<sub>CC</sub> is measured after a momentary ground, then 4.5 V, is applied to clock.

**switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C**

| PARAMETER  | TEST CONDITIONS                               | MIN        | TYP | MAX | UNIT |
|--|---|------------|-----|-----|------|
| f <sub>max</sub> Maximum clock frequency                                     | C <sub>L</sub> = 15 pF, R <sub>L</sub> = 2 kΩ | 30         | 40  |     | MHz  |
| t <sub>PLH</sub> Propagation delay time, low-to-high-level output from clock |   | 17         | 27  | ns  |      |
| t <sub>PHL</sub> Propagation delay time, high-to-low-level output from clock |   | See Note 3 | 18  | 27  | ns   |

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

**PACKAGING INFORMATION**

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 5962-8992501EA   | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| 5962-8992501FA   | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| 5962-8992501FA   | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| JM38510/32504B2A | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| JM38510/32504B2A | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| JM38510/32504BRA | ACTIVE                | CDIP         | J               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| JM38510/32504BRA | ACTIVE                | CDIP         | J               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| JM38510/32504BSA | ACTIVE                | CFP          | W               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| JM38510/32504BSA | ACTIVE                | CFP          | W               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SN54LS377J       | ACTIVE                | CDIP         | J               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SN54LS377J       | ACTIVE                | CDIP         | J               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SN54LS378J       | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SN54LS378J       | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SN54LS379J       | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SN54LS379J       | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SN74LS377DW      | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS377DW      | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS377DWE4    | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS377DWE4    | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS377DWR     | ACTIVE                | SOIC         | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS377DWR     | ACTIVE                | SOIC         | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS377DWRE4   | ACTIVE                | SOIC         | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS377DWRE4   | ACTIVE                | SOIC         | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS377N       | ACTIVE                | PDIP         | N               | 20   | 20          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC               |
| SN74LS377N       | ACTIVE                | PDIP         | N               | 20   | 20          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC               |
| SN74LS377N3      | OBsolete              | PDIP         | N               | 20   |             | TBD                     | Call TI          | Call TI                      |
| SN74LS377N3      | OBsolete              | PDIP         | N               | 20   |             | TBD                     | Call TI          | Call TI                      |
| SN74LS377NE4     | ACTIVE                | PDIP         | N               | 20   | 20          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC               |
| SN74LS377NE4     | ACTIVE                | PDIP         | N               | 20   | 20          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC               |
| SN74LS377NSR     | ACTIVE                | SO           | NS              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS377NSR     | ACTIVE                | SO           | NS              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS377NSRE4   | ACTIVE                | SO           | NS              | 20   | 2000        | Green (RoHS &           | CU NIPDAU        | Level-1-260C-UNLIM           |

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| no Sb/Br)        |                       |              |                 |      |             |                         |                  |                              |
| SN74LS377NSRE4   | ACTIVE                | SO           | NS              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS378D       | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS378D       | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS378DE4     | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS378DE4     | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS378DR      | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS378DR      | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS378DRE4    | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS378DRE4    | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS378N       | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC               |
| SN74LS378N       | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC               |
| SN74LS378N3      | OBsolete              | PDIP         | N               | 16   |             | TBD                     | Call TI          | Call TI                      |
| SN74LS378N3      | OBsolete              | PDIP         | N               | 16   |             | TBD                     | Call TI          | Call TI                      |
| SN74LS378NE4     | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC               |
| SN74LS378NE4     | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC               |
| SN74LS378NSR     | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS378NSR     | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS378NSRE4   | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS378NSRE4   | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74LS379D       | OBsolete              | SOIC         | D               | 16   |             | TBD                     | Call TI          | Call TI                      |
| SN74LS379D       | OBsolete              | SOIC         | D               | 16   |             | TBD                     | Call TI          | Call TI                      |
| SN74LS379J       | OBsolete              | CDIP         | J               | 16   |             | TBD                     | Call TI          | Call TI                      |
| SN74LS379J       | OBsolete              | CDIP         | J               | 16   |             | TBD                     | Call TI          | Call TI                      |
| SN74LS379N       | OBsolete              | PDIP         | N               | 16   |             | TBD                     | Call TI          | Call TI                      |
| SN74LS379N       | OBsolete              | PDIP         | N               | 16   |             | TBD                     | Call TI          | Call TI                      |
| SNJ54LS377FK     | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS377FK     | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS377J      | ACTIVE                | CDIP         | J               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS377J      | ACTIVE                | CDIP         | J               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS377W      | ACTIVE                | CFP          | W               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS377W      | ACTIVE                | CFP          | W               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| SNJ54LS378FK     | OBsolete              | LCCC         | FK              | 20   |             | TBD                     | Call TI          | Call TI                      |
| SNJ54LS378FK     | OBsolete              | LCCC         | FK              | 20   |             | TBD                     | Call TI          | Call TI                      |
| SNJ54LS378J      | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS378J      | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS378W      | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS378W      | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS379FK     | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS379FK     | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS379J      | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS379J      | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS379W      | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54LS379W      | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBsolete:** TI has discontinued the production of the device.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

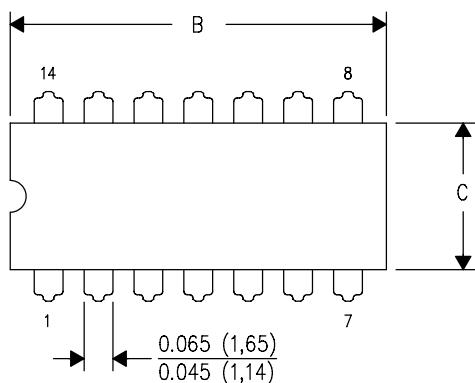
**Important Information and Disclaimer:** The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

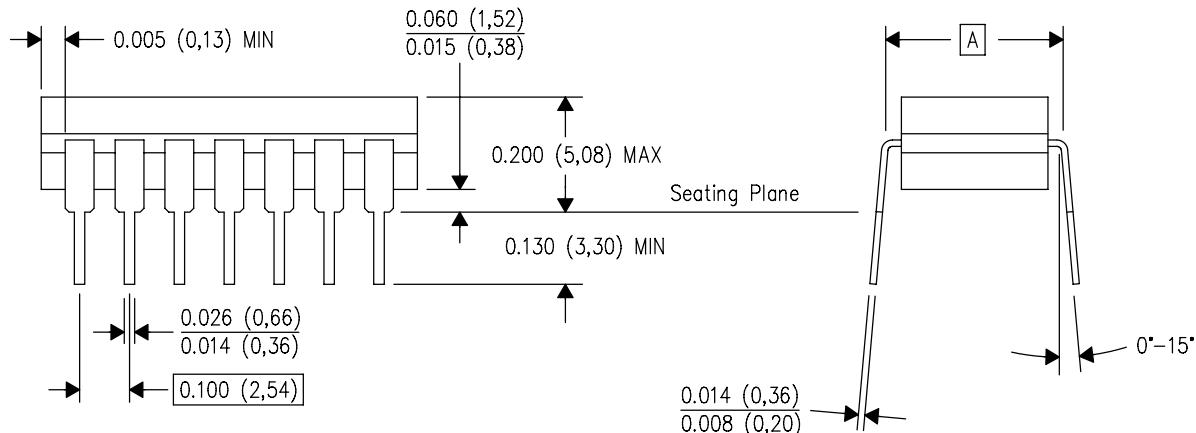
J (R-GDIP-T\*\*)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



| PINS **\nDIM | 14                     | 16                     | 18                     | 20                     |
|--------------|------------------------|------------------------|------------------------|------------------------|
| A            | 0.300<br>(7,62)<br>BSC | 0.300<br>(7,62)<br>BSC | 0.300<br>(7,62)<br>BSC | 0.300<br>(7,62)<br>BSC |
| B MAX        | 0.785<br>(19,94)       | .840<br>(21,34)        | 0.960<br>(24,38)       | 1.060<br>(26,92)       |
| B MIN        | —                      | —                      | —                      | —                      |
| C MAX        | 0.300<br>(7,62)        | 0.300<br>(7,62)        | 0.310<br>(7,87)        | 0.300<br>(7,62)        |
| C MIN        | 0.245<br>(6,22)        | 0.245<br>(6,22)        | 0.220<br>(5,59)        | 0.245<br>(6,22)        |

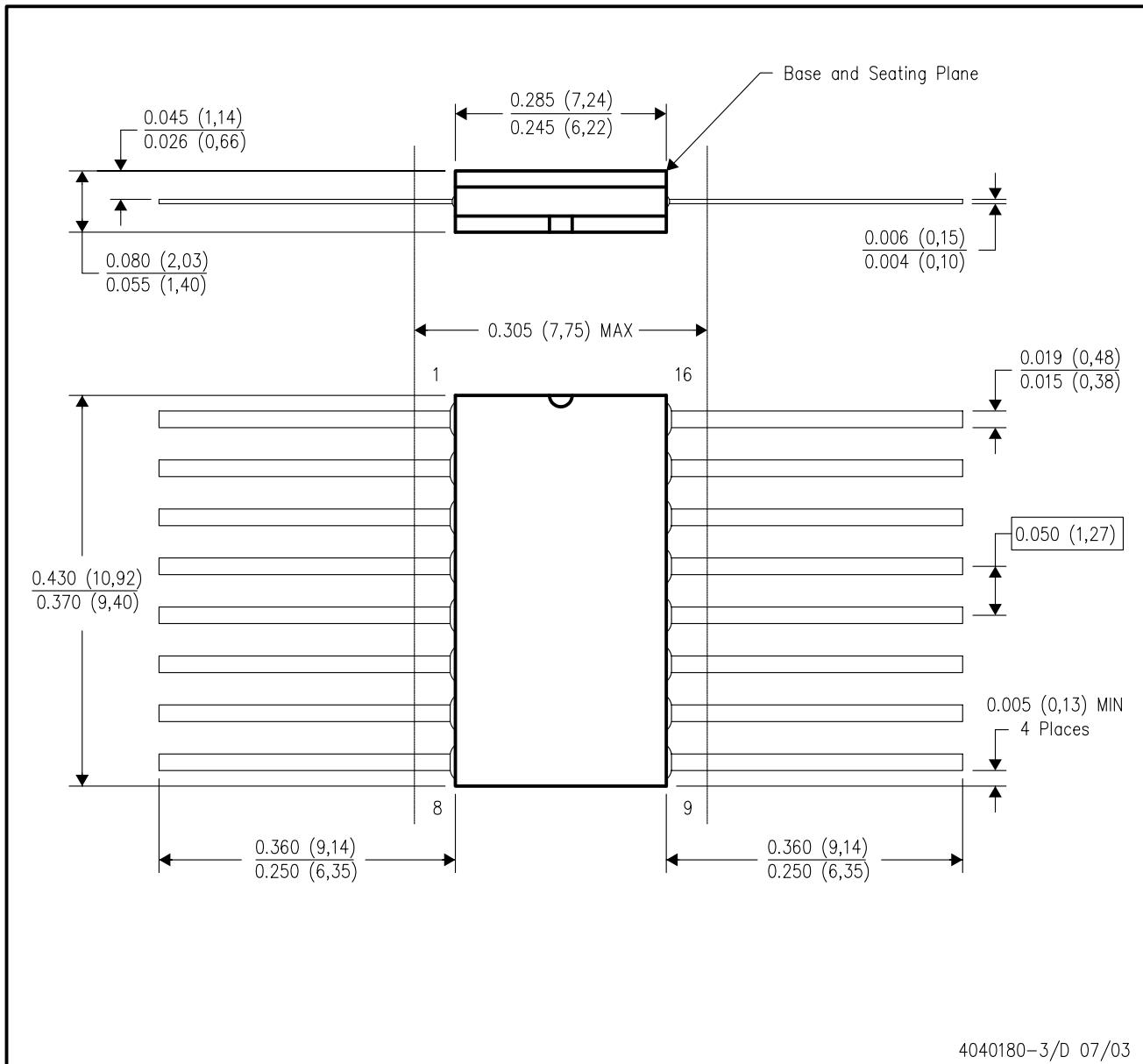


4040083/F 03/03

- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package is hermetically sealed with a ceramic lid using glass frit.
  - D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
  - E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

W (R-GDFP-F16)

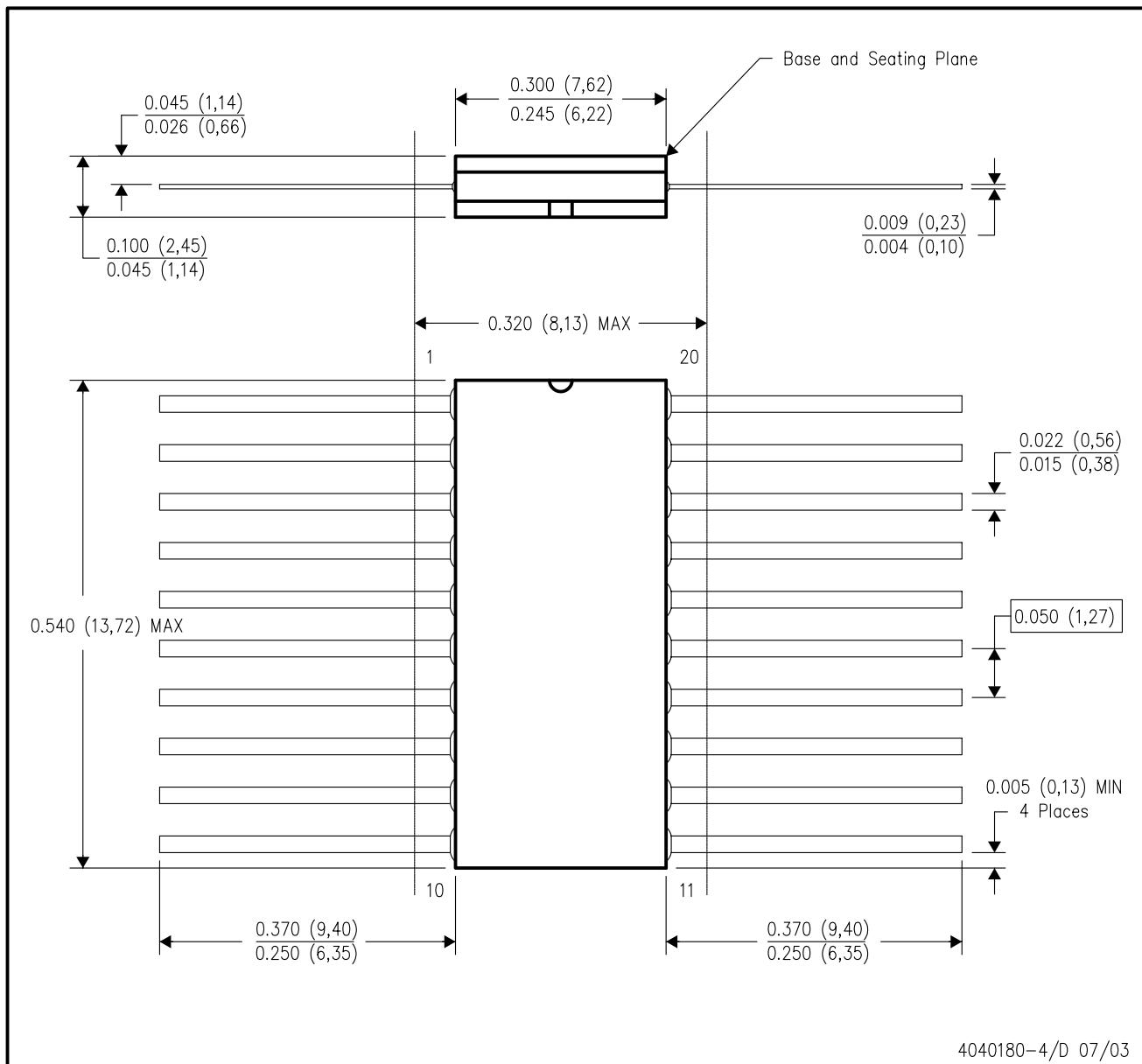
CERAMIC DUAL FLATPACK



- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - This package can be hermetically sealed with a ceramic lid using glass frit.
  - Index point is provided on cap for terminal identification only.
  - Falls within MIL-STD 1835 GDFP1-F16 and JEDEC MO-092AC

W (R-GDFP-F20)

CERAMIC DUAL FLATPACK

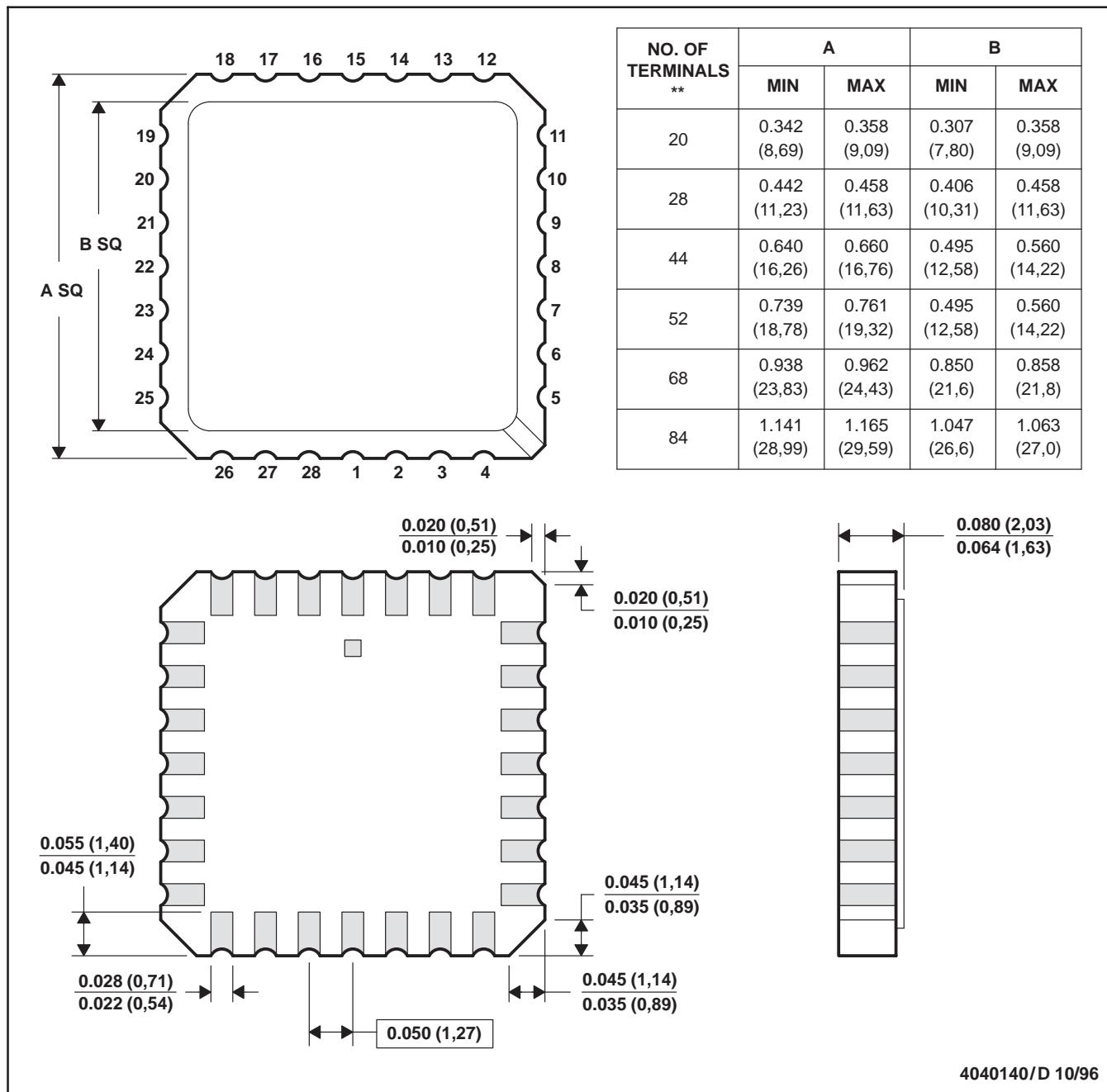


- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - This package can be hermetically sealed with a ceramic lid using glass frit.
  - Index point is provided on cap for terminal identification only.
  - Falls within Mil-Std 1835 GDFP2-F20

## FK (S-CQCC-N\*\*)

## LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



NOTES: A. All linear dimensions are in inches (millimeters).

B. This drawing is subject to change without notice.

C. This package can be hermetically sealed with a metal lid.

D. The terminals are gold plated.

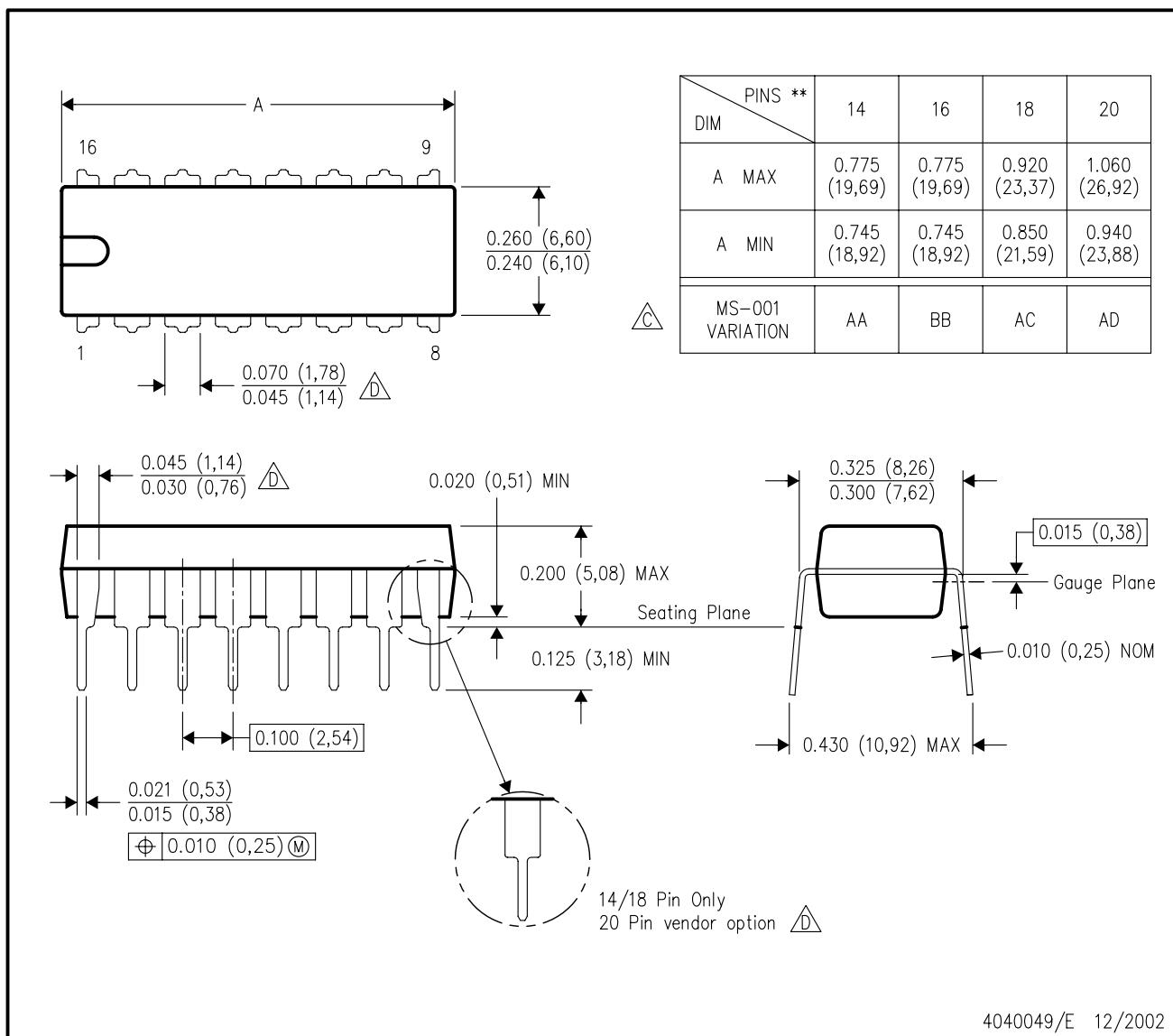
E. Falls within JEDEC MS-004

4040140/D 10/96

## N (R-PDIP-T\*\*)

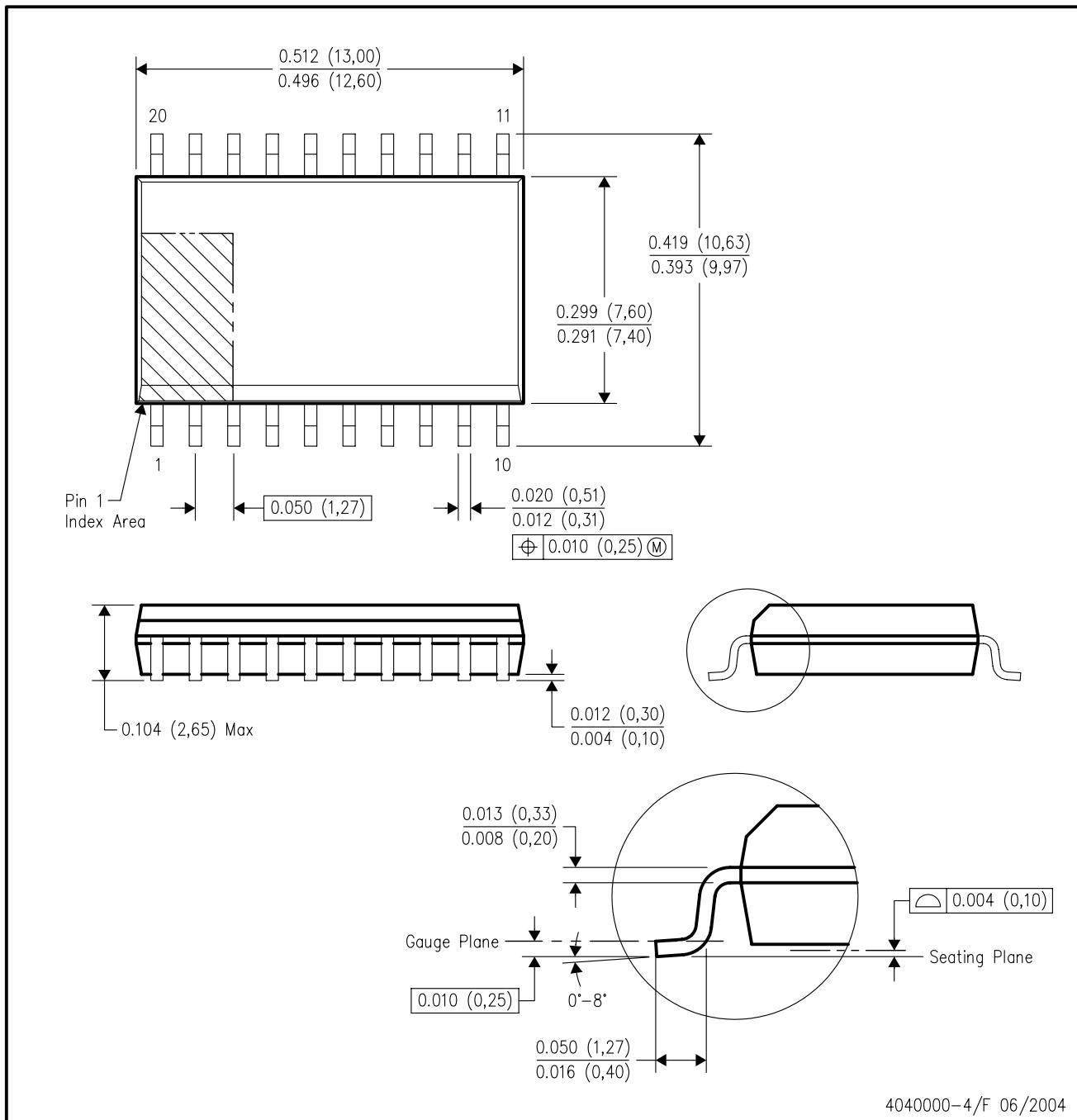
16 PINS SHOWN

## PLASTIC DUAL-IN-LINE PACKAGE



## DW (R-PDSO-G20)

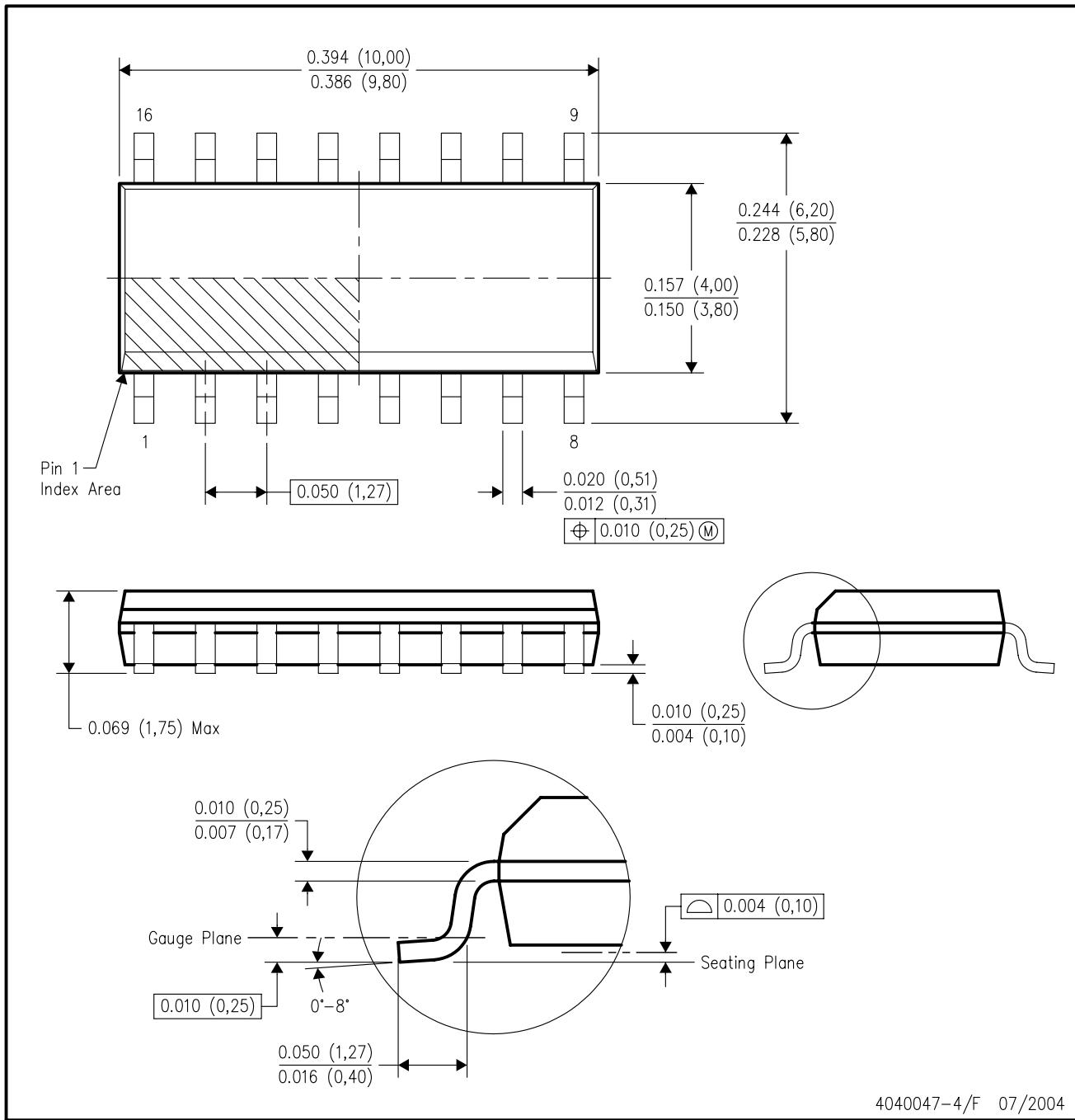
## PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
  - Falls within JEDEC MS-013 variation AC.

## D (R-PDSO-G16)

## PLASTIC SMALL-OUTLINE PACKAGE



4040047-4/F 07/2004

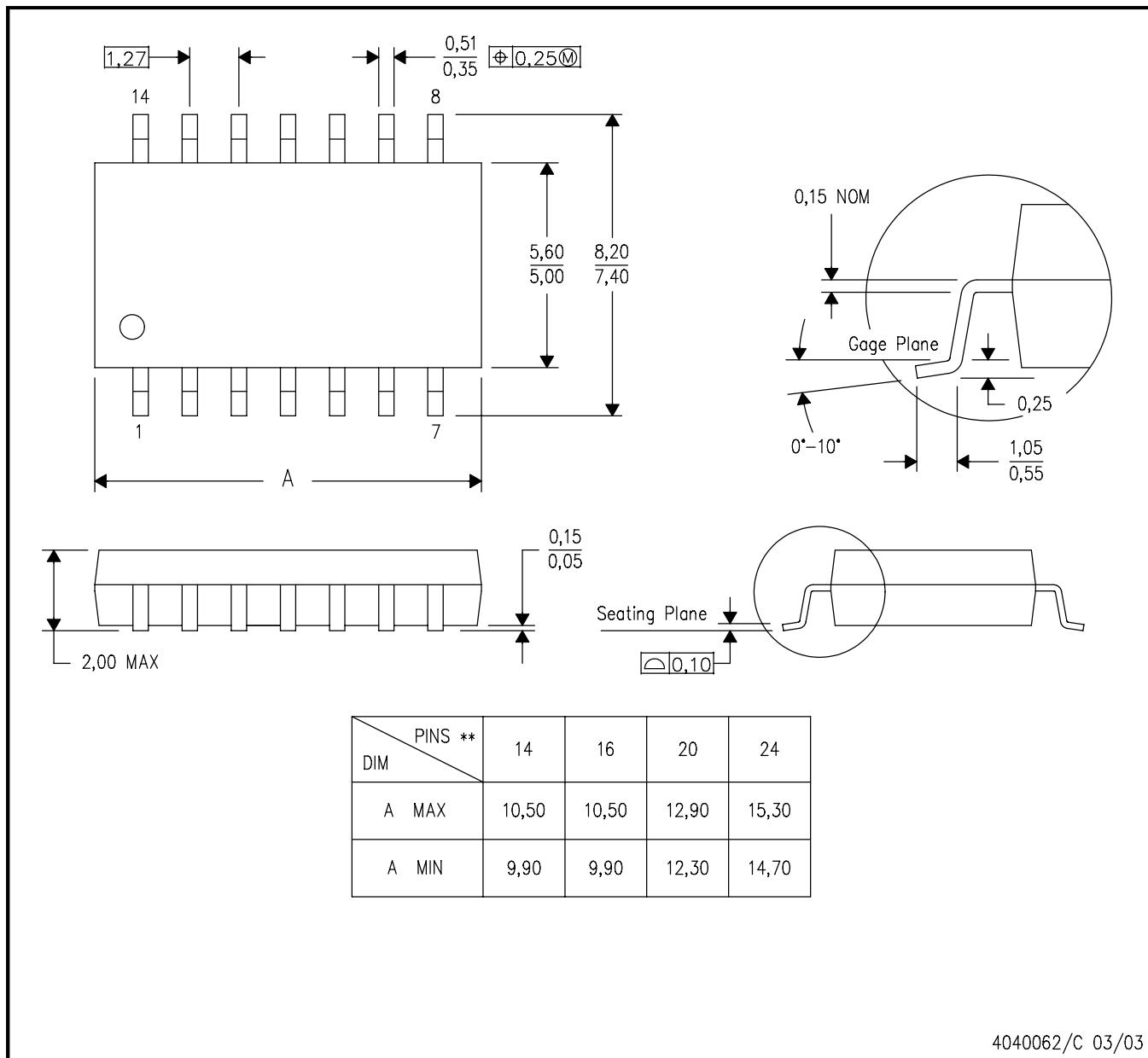
- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
  - Falls within JEDEC MS-012 variation AC.

## MECHANICAL DATA

**NS (R-PDSO-G\*\*)**

**14-PINS SHOWN**

**PLASTIC SMALL-OUTLINE PACKAGE**



- NOTES: A. All linear dimensions are in millimeters.  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

## **IMPORTANT NOTICE**

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

| <b>Products</b>  |                        | <b>Applications</b> |  |
|------------------|------------------------|---------------------|--|
| Amplifiers       | amplifier.ti.com       | Audio               | <a href="http://www.ti.com/audio">www.ti.com/audio</a>                   |
| Data Converters  | dataconverter.ti.com   | Automotive          | <a href="http://www.ti.com/automotive">www.ti.com/automotive</a>         |
| DSP              | dsp.ti.com             | Broadband           | <a href="http://www.ti.com/broadband">www.ti.com/broadband</a>           |
| Interface        | interface.ti.com       | Digital Control     | <a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a> |
| Logic            | logic.ti.com           | Military            | <a href="http://www.ti.com/military">www.ti.com/military</a>             |
| Power Mgmt       | power.ti.com           | Optical Networking  | <a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a> |
| Microcontrollers | microcontroller.ti.com | Security            | <a href="http://www.ti.com/security">www.ti.com/security</a>             |
|                  |                        | Telephony           | <a href="http://www.ti.com/telephony">www.ti.com/telephony</a>           |
|                  |                        | Video & Imaging     | <a href="http://www.ti.com/video">www.ti.com/video</a>                   |
|                  |                        | Wireless            | <a href="http://www.ti.com/wireless">www.ti.com/wireless</a>             |

Mailing Address:    Texas Instruments  
Post Office Box 655303 Dallas, Texas 75265

Copyright © 2005, Texas Instruments Incorporated

View ROHS Compliant Devices

View RoHS Compliant Devices

 clear gif**SN74LS377, Status: ACTIVE**  
Octal D-Type Flip-Flops With Clock Enable clear gif Features Quality & Pb-Free Data Related Products Tools & Software Samples Pricing/Packaging Inventory Symbols/Footprints Technical Documents Applications Notes Simulation Models Reference Designs**Refine Your Selection**

- Logic: D-Type Flip-Flop

**Support**

- KnowledgeBase
- Contact Technical Support
- TI Cross Reference
- Training
- Part Marking Lookup
- Part Number Nomenclature

**Datasheet****Octal, Hex, And Quad D-Type Flip-Flops With Enable** (sn74ls377.pdf, 728 KB)01 Mar 1988 [Download](#)

|                         | <b>SN54LS377</b>          | <b>SN74LS377</b>          |
|-------------------------|---------------------------|---------------------------|
| <b>Voltage Nodes(V)</b> | 5                         | 5                         |
| <b>Vcc range(V)</b>     | 4.5 to 5.5                | 4.75 to 5.25              |
| <b>Input Level</b>      | TTL                       | TTL                       |
| <b>Output Level</b>     | TTL                       | TTL                       |
| <b>Output Drive(mA)</b> |                           | -0.4/8                    |
| <b>Output</b>           | 2S                        | 2S                        |
| <b>No. of Bits</b>      | 8                         | 8                         |
| <b>Static Current</b>   |                           | 28                        |
| <b>th(ns)</b>           |                           | 5                         |
| <b>tpd max(ns)</b>      |                           | 27                        |
| <b>tsu(ns)</b>          |                           | 20                        |
|                         | <a href="#">Samples</a>   | <a href="#">Samples</a>   |
|                         | <a href="#">Inventory</a> | <a href="#">Inventory</a> |

**Product Information** Features Save this to your personal library

'LS377 and 'LS378 Contain Eight and Six Flip-Flops, Respectively, with Single-Rail Outputs

'LS379 Contains Four Flip-Flops with Double-Rail Outputs

Individual Data Input to Each Flip-Flop

Applications Include:

- Buffer/Storage Registers
- Shift Registers
- Pattern Generators

**Description**

These monolithic, positive-edge-triggered flip-flops utilize TTL circuitry to implement D-type flip-flop logic with an enable input. The 'LS377, 'LS378, and 'LS379 devices are similar to 'LS273, 'LS174, and 'LS175, respectively, but feature a common enable instead of a common clear.

Information at the D inputs meeting the setup time requirements is transferred to the Q outputs on the positive-going edge of the clock pulse if the enable input G\ is low. Clock triggering occurs at a particular voltage level and is not directly related to the transition time of the positive-going pulse. When the clock input is at either the high or low level, the D input signal has no effect at the output. The circuits are designed to prevent false clocking by transitions at the G\ input.

These flip-flops are guaranteed to respond to clock frequencies ranging from 0 to 30 MHz while maximum clock frequency is typically 40 megahertz. Typical power dissipation is 10 milliwatts per flip-flop.

### Pricing/Packaging/CAD Design Tools/Samples

|                |          |           | Price                     | Packaging                         |                  |                        | CAD Design Tools |                          | Samples          |
|----------------|----------|-----------|---------------------------|-----------------------------------|------------------|------------------------|------------------|--------------------------|------------------|
| Device         | Status   | Temp (°C) | Budget Price (\$US)   QTY | Industry Standard (TI Pkg)   Pins | Top Side Marking | Standard Pack Quantity | Footprints       |                          | Samples          |
| SN74LS377DW    | ACTIVE   | 0 to 70   | 0.81   1KU                | SOIC (DW)   20                    | View             | 25                     |                  | <input type="checkbox"/> | Purchase Samples |
| SN74LS377DWE4  | ACTIVE   | 0 to 70   | 0.81   1KU                | SOIC (DW)   20                    | View             | 25                     |                  | <input type="checkbox"/> | Purchase Samples |
| SN74LS377DWR   | ACTIVE   | 0 to 70   | 0.81   1KU                | SOIC (DW)   20                    | View             | 2000                   |                  | <input type="checkbox"/> | Purchase Samples |
| SN74LS377DWRE4 | ACTIVE   | 0 to 70   | 0.81   1KU                | SOIC (DW)   20                    | View             | 2000                   |                  | <input type="checkbox"/> | Purchase Samples |
| SN74LS377N     | ACTIVE   | 0 to 70   | 0.81   1KU                | PDIP (N)   20                     | View             | 20                     |                  | <input type="checkbox"/> | Purchase Samples |
| SN74LS377N3    | OBsolete | 0 to 70   |                           | PDIP (N)   20                     | View             |                        |                  | <input type="checkbox"/> | Not Available    |
| SN74LS377NE4   | ACTIVE   | 0 to 70   | 0.81   1KU                | PDIP (N)   20                     | View             | 20                     |                  | <input type="checkbox"/> | Purchase Samples |
| SN74LS377NSR   | ACTIVE   | 0 to 70   | 0.81   1KU                | SO (NS)   20                      | View             | 2000                   |                  | <input type="checkbox"/> | Purchase Samples |
| SN74LS377NSRE4 | ACTIVE   | 0 to 70   | 0.81   1KU                | SO (NS)   20                      | View             | 2000                   |                  | <input type="checkbox"/> | Purchase Samples |

### Inventory

|                       |  | TI Inventory Status            |                        |           | Reported Distributor Inventory                     |                |          |                      |   |
|-----------------------|--|--------------------------------|------------------------|-----------|--|----------------|----------|----------------------|---|
|                       |  | As of 9:09 AM GMT, 29 Nov 2005 |                        |           | As of 9:09 AM GMT, 29 Nov 2005                     |                |          |                      |   |
|                       |  | In Stock                       | In Progress QTY   Date | Lead Time | Region   | Company        | In Stock | Purchase             |   |
| <b>SN74LS377DW</b>    |  | 0*                             | 7625   12 Dec          | 8 Weeks   | Europe   | Spoerle        | 48       | <input type="text"/> |   |
|                       |  |                                | >10k   30 Jan          |           |  |                |          |                      |   |
| <b>SN74LS377DWE4</b>  |  | As of 9:09 AM GMT, 29 Nov 2005 |                        |           | As of 9:09 AM GMT, 29 Nov 2005                     |                |          |                      |   |
|                       |  | In Stock                       | In Progress QTY   Date | Lead Time | Region   | Company        | In Stock | Purchase             |   |
|                       |  | 0*                             | 7625   12 Dec          | 8 Weeks   | None Reported<br><a href="#">View Distributors</a> |                |          |                      |   |
|                       |  |                                | >10k   30 Jan          |           |  |                |          |                      |   |
| <b>SN74LS377DWR</b>   |  | As of 9:09 AM GMT, 29 Nov 2005 |                        |           | As of 9:09 AM GMT, 29 Nov 2005                     |                |          |                      |   |
|                       |  | In Stock                       | In Progress QTY   Date | Lead Time | Region   | Company        | In Stock | Purchase             |   |
|                       |  | 0*                             | >10k   27 Jan          | 9 Weeks   | None Reported<br><a href="#">View Distributors</a> |                |          |                      |   |
|                       |  |                                |                        |           |  |                |          |                      |   |
| <b>SN74LS377DWRE4</b> |  | As of 9:09 AM GMT, 29 Nov 2005 |                        |           | As of 9:09 AM GMT, 29 Nov 2005                     |                |          |                      |   |
|                       |  | In Stock                       | In Progress QTY   Date | Lead Time | Region   | Company        | In Stock | Purchase             |   |
|                       |  | 0*                             | >10k   27 Jan          | 9 Weeks   | None Reported<br><a href="#">View Distributors</a> |                |          |                      |   |
|                       |  |                                |                        |           |  |                |          |                      |   |
| <b>SN74LS377N</b>     |  | As of 9:09 AM GMT, 29 Nov 2005 |                        |           | As of 9:09 AM GMT, 29 Nov 2005                     |                |          |                      |   |
|                       |  | In Stock                       | In Progress QTY   Date | Lead Time | Region   | Company        | In Stock | Purchase             |   |
|                       |  | 0*                             | 1000   14 Dec          | 10 Weeks  | Americas   | Avnet          | 421      | <input type="text"/> | - |
|                       |  |                                | >10k   16 Jan          |           |  | DigiKey        | 494      | <input type="text"/> |   |
|                       |  |                                |                        |           |  | Newark InOne   | 615      | <input type="text"/> |   |
|                       |  |                                |                        |           |  | Avnet-SILICA   | 40       | <input type="text"/> |   |
|                       |  |                                |                        | Europe    |  | EBV Elektronik | 100      | <input type="text"/> |   |
|                       |  |                                |                        |           |  | Spoerle        | 147      | <input type="text"/> |   |
|                       |  |                                |                        |           |  |                |          |                      |   |
| <b>SN74LS377NE4</b>   |  | As of 9:09 AM GMT, 29 Nov 2005 |                        |           | As of 9:09 AM GMT, 29 Nov 2005                     |                |          |                      |   |
|                       |  | In Stock                       | In Progress QTY   Date | Lead Time | Region   | Company        | In Stock | Purchase             |   |

[View all Distributors](#)

[Choose a Region](#)



|                       |                                |                               |                                |  |  |                 |                 |
|-----------------------|--------------------------------|-------------------------------|--------------------------------|--|--|-----------------|-----------------|
|                       | <b>0*</b>                      | 1000   14 Dec                 | 10 Weeks                       | None Reported<br><a href="#">View Distributors</a> |  |                 |                 |
|                       |                                | >10k   16 Jan                 |                                |  |  |                 |                 |
| <b>SN74LS377NSR</b>   | As of 9:09 AM GMT, 29 Nov 2005 |                               | As of 9:09 AM GMT, 29 Nov 2005 |  |  |                 |                 |
|                       | <b>In Stock</b>                | <b>In Progress QTY   Date</b> | <b>Lead Time</b>               | <b>Region</b>                                      | <b>Company</b>                                     | <b>In Stock</b> | <b>Purchase</b> |
|                       | <b>0*</b>                      | 738   30 Nov                  |                                | 8 Weeks  | None Reported<br><a href="#">View Distributors</a> |                 |                 |
|                       |                                | >10k   30 Dec                 |                                |  |  |                 |                 |
| <b>SN74LS377NSRE4</b> | As of 9:09 AM GMT, 29 Nov 2005 |                               | As of 9:09 AM GMT, 29 Nov 2005 |  |  |                 |                 |
|                       | <b>In Stock</b>                | <b>In Progress QTY   Date</b> | <b>Lead Time</b>               | <b>Region</b>                                      | <b>Company</b>                                     | <b>In Stock</b> | <b>Purchase</b> |
|                       | <b>0*</b>                      | 738   30 Nov                  |                                | 8 Weeks  | None Reported<br><a href="#">View Distributors</a> |                 |                 |
|                       |                                | >10k   30 Dec                 |                                |  |  |                 |                 |

\* Our information is updated daily, so please check back with us soon if this does not meet your needs. You may also contact your [TI Authorized Distributor](#), including those [listed above](#), for real time stock information.

\*\* Lead time information is not available at this time. However, our information is updated daily so please check back with us soon. Please contact your preferred [TI Authorized Distributor](#) for additional information.

### Quality & Lead (Pb)-Free Data

|   | Product Content         |                  |                        |                      |                      | MTBF/FIT Rate |
|---|-------------------------|------------------|------------------------|----------------------|----------------------|---------------|
| Device                                  | Eco Plan*               | Lead/Ball Finish | MSL Rating/Peak Reflow | Details              | Details              |               |
| SN74LS377DW <input type="checkbox"/>    | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM     | <a href="#">View</a> | <a href="#">View</a> |               |
| SN74LS377DWE4 <input type="checkbox"/>  | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM     | <a href="#">View</a> | <a href="#">View</a> |               |
| SN74LS377DWR <input type="checkbox"/>   | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM     | <a href="#">View</a> | <a href="#">View</a> |               |
| SN74LS377DWRE4 <input type="checkbox"/> | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM     | <a href="#">View</a> | <a href="#">View</a> |               |
| SN74LS377N <input type="checkbox"/>     | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC         | <a href="#">View</a> | <a href="#">View</a> |               |
| SN74LS377NE4 <input type="checkbox"/>   | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC         | <a href="#">View</a> | <a href="#">View</a> |               |
| SN74LS377NSR <input type="checkbox"/>   | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM     | <a href="#">View</a> | <a href="#">View</a> |               |
| SN74LS377NSRE4 <input type="checkbox"/> | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM     | <a href="#">View</a> | <a href="#">View</a> |               |

\* The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please click on the Product Content Details "View" link in the table above for the latest availability information and additional product content details.

If the information you are requesting is not available online at this time, contact one of our [Product Information Centers](#) regarding the availability of this information.

### Technical Documents

| Datasheets   | Keep track of what's new |
|--|--------------------------|
| <b>Octal, Hex, And Quad D-Type Flip-Flops With Enable</b> (sn74ls377.pdf, 728 KB)                  |                          |
| 01 Mar 1988 <a href="#">Download</a>   |                          |
| Application Notes  |                          |
| <b>Semiconductor Packing Material Electrostatic Discharge (ESD) Protection</b> (szza047.htm, 9 KB) |                          |
| 08 Jul 2004 <a href="#">Abstract</a>   |                          |
| <b>Shelf-Life Evaluation of Lead-Free Component Finishes</b> (szza046.htm, 9 KB)                   |                          |
| 24 May 2004 <a href="#">Abstract</a>   |                          |
| <b>Understanding and Interpreting Standard-Logic Data Sheets (Rev. B)</b> (szza036b.htm, 8 KB)     |                          |
| 28 May 2003 <a href="#">Abstract</a>   |                          |
| <b>TI IBIS File Creation, Validation, and Distribution Processes</b> (szza034.htm, 9 KB)           |                          |
| 29 Aug 2002 <a href="#">Abstract</a>   |                          |
| <b>Designing With Logic (Rev. C)</b> (sdya009c.htm, 9 KB)  |                          |
| 01 Jun 1997 <a href="#">Abstract</a>   |                          |
| <b>Designing with the SN54/74LS123 (Rev. A)</b> (sdla006a.htm, 9 KB)                               |                          |
| 01 Mar 1997 <a href="#">Abstract</a>   |                          |
| <b>Live Insertion</b> (sdya012.htm, 9 KB)  |                          |
| 01 Oct 1996 <a href="#">Abstract</a>   |                          |
| <b>Input and Output Characteristics of Digital Integrated Circuits</b> (sdya010.htm, 9 KB)         |                          |
| 01 Oct 1996 <a href="#">Abstract</a>   |                          |
| <a href="#">View Application Notes for D-TYPE FLIP-FLOPS</a>                                       |                          |
| User Guides  |                          |

[More Literature](#)

**Logic Selection Guide 2005 (Rev. X)** (sdyu001x.pdf, 6909 KB)

15 Mar 2005 [Download](#)

**Military Semiconductors Selection Guide 2004-2005 (Rev. D)** (sgyc003d.pdf, 964 KB)

10 Aug 2004 [Download](#)

**Logic Cross-Reference (Rev. A)** (scyb017a.pdf, 2938 KB)

07 Oct 2003 [Download](#)

[View More Literature for D-TYPE FLIP-FLOPS](#)

