

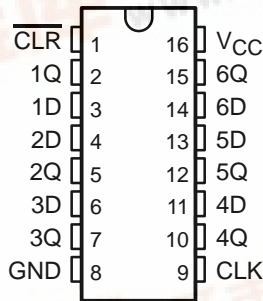
# SN54ALS174, SN54ALS175, SN54AS174, SN54AS175B SN74ALS174, SN74ALS175, SN74AS174, SN74AS175B HEX/QUADRUPLE D-TYPE FLIP-FLOPS WITH CLEAR

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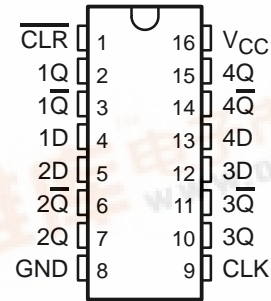
- 'ALS174 and 'AS174 Contain Six Flip-Flops With Single-Rail Outputs
- 'ALS175 and 'AS175B Contain Four Flip-Flops With Double-Rail Outputs
- Buffered Clock and Direct-Clear Inputs

- Applications Include:
  - Buffer/Storage Registers
  - Shift Registers
  - Pattern Generators
- Fully Buffered Outputs for Maximum Isolation From External Disturbances ('AS Only)

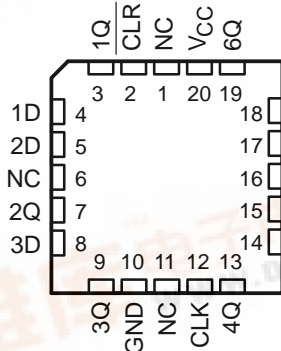
SN54ALS174 ... J OR W PACKAGE  
SN54AS174 ... J PACKAGE  
SN74ALS174, SN74AS174 ... D, N, OR NS PACKAGE  
(TOP VIEW)



SN54ALS175 ... J OR W PACKAGE  
SN54AS175B ... J PACKAGE  
SN74ALS175, SN74AS175B ... D, N, OR NS PACKAGE  
(TOP VIEW)

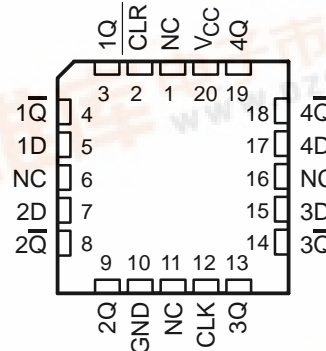


SN54ALS174, SN54AS174 ... FK PACKAGE  
(TOP VIEW)



NC – No internal connection

SN54ALS175 ... FK PACKAGE  
(TOP VIEW)



## description

These positive-edge-triggered flip-flops utilize TTL circuitry to implement D-type flip-flop logic. All have a direct-clear ( $\overline{\text{CLR}}$ ) input. The 'ALS175 and 'AS175B feature complementary outputs from each flip-flop.

Information at the data (D) inputs meeting the setup-time requirements is transferred to the outputs on the positive-going edge of the clock pulse. 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 (CLK) input is at either the high or low level, the D-input signal has no effect at the output.

These circuits are fully compatible for use with most TTL circuits.

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

**SN54ALS174, SN54ALS175, SN54AS174, SN54AS175B  
SN74ALS174, SN74ALS175, SN74AS174, SN74AS175B  
HEX/QUADRUPLE D-TYPE FLIP-FLOPS WITH CLEAR**

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**ORDERING INFORMATION**

| T <sub>A</sub> | PACKAGE†  |               | ORDERABLE<br>PART NUMBER | TOP-SIDE<br>MARKING |
|----------------|-----------|---------------|--------------------------|---------------------|
| 0°C to 70°C    | PDIP – N  | Tube          | SN74ALS174N              | SN74ALS174N         |
|                |           |               | SN74AS174N               | SN74AS174N          |
|                |           |               | SN74ALS175N              | SN74ALS175N         |
|                |           |               | SN74AS175BN              | SN74AS175BN         |
|                | SOIC – D  | Tube          | SN74ALS174D              | ALS174              |
|                |           | Tape and reel | SN74ALS174DR             |                     |
|                |           | Tube          | SN74AS174D               | AS174               |
|                |           | Tape and reel | SN74AS174DR              |                     |
|                |           | Tube          | SN74ALS175D              | ALS175              |
|                |           | Tape and reel | SN74ALS175DR             |                     |
|                |           | Tube          | SN74AS175BD              | AS175B              |
|                |           | Tape and reel | SN74AS175BDR             |                     |
|                | SOP – NS  | Tape and reel | SN74ALS174NSR            | ALS174              |
|                |           |               | SN74AS174NSR             | 74AS174             |
|                |           |               | SN74ALS175NSR            | ALS175              |
|                |           |               | SN74AS175BNSR            | 74AS175B            |
| –55°C to 125°C | CDIP – J  | Tube          | SNJ54ALS174J             | SNJ54ALS174J        |
|                |           |               | SNJ54AS174J              | SNJ54AS174J         |
|                |           |               | SNJ54ALS175J             | SNJ54ALS175J        |
|                |           |               | SNJ54AS175BJ             | SNJ54AS175BJ        |
|                | CFP – W   | Tube          | SNJ54ALS174W             | SNJ54ALS174W        |
|                |           |               | SNJ54ALS175W             | SNJ54ALS175W        |
|                | LCCC – FK | Tube          | SNJ54ALS174FK            | SNJ54ALS174FK       |
|                |           |               | SNJ54AS174FK‡            | SNJ54AS174FK        |
|                |           |               | SNJ54ALS175FK            | SNJ54ALS175FK       |

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).

‡ This orderable is not recommended for new designs.

**FUNCTION TABLE**  
(each flip-flop)

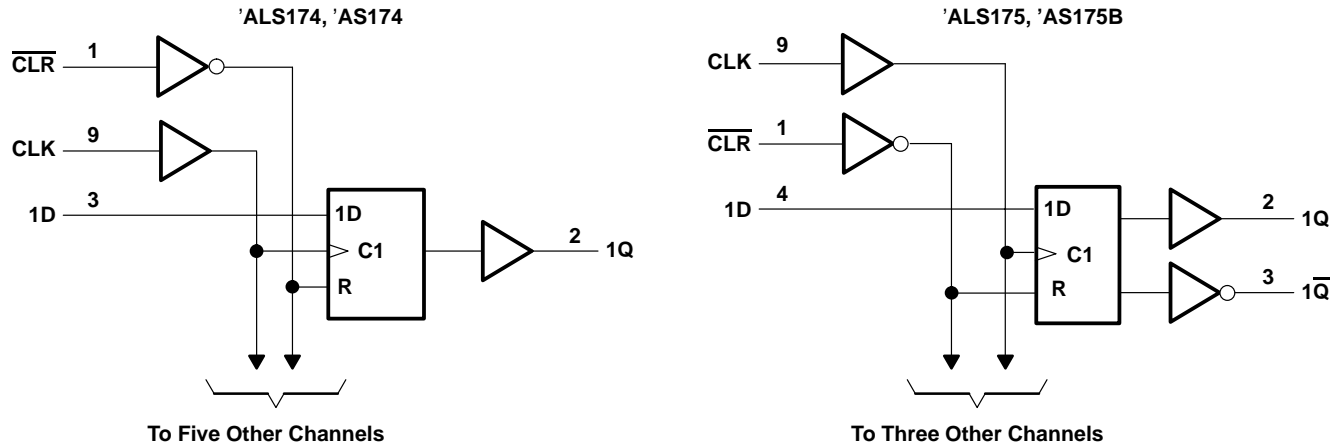
| INPUTS                   |     |   | OUTPUTS        |                            |
|--------------------------|-----|---|----------------|----------------------------|
| CL $\overline{\text{R}}$ | CLK | D | Q              | $\overline{\text{Q}}^{\S}$ |
| L                        | X   | X | L              | H                          |
| H                        | ↑   | H | H              | L                          |
| H                        | ↑   | L | L              | H                          |
| H                        | L   | X | Q <sub>0</sub> | $\overline{\text{Q}}_0$    |

<sup>§</sup> 'ALS175 and 'AS175B only

# SN54ALS174, SN54ALS175, SN54AS174, SN54AS175B SN74ALS174, SN74ALS175, SN74AS174, SN74AS175B HEX/QUADRUPL D-TYPE FLIP-FLOPS WITH CLEAR

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## logic diagrams (positive logic)



Pin numbers shown are for the D, J, N, NS, and W packages.

## absolute maximum ratings over operating free-air temperature range, SN54/74ALS174, SN54/74ALS175 (unless otherwise noted)<sup>†</sup>

|  |                |
|--|----------------|
| Supply voltage, $V_{CC}$   | 7 V            |
| Input voltage, $V_I$   | 7 V            |
| Package thermal impedance, $\theta_{JA}$ (see Note 1): D package | 73°C/W         |
| N package  | 67°C/W         |
| NS package   | 64°C/W         |
| Storage temperature range, $T_{stg}$                             | –65°C to 150°C |

<sup>†</sup> Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The package thermal impedance is calculated in accordance with JESD 51-7.

## recommended operating conditions (see Note 2)

|          |                                | SN54ALS174<br>SN54ALS175 |     |      | SN74ALS174<br>SN74ALS175 |     |      | UNIT |
|----------|--------------------------------|--------------------------|-----|------|--------------------------|-----|------|------|
|          |                                | MIN                      | NOM | MAX  | MIN                      | NOM | MAX  |      |
| $V_{CC}$ | Supply voltage                 | 4.5                      | 5   | 5.5  | 4.5                      | 5   | 5.5  | V    |
| $V_{IH}$ | High-level input voltage       | 2                        |     |      | 2                        |     |      | V    |
| $V_{IL}$ | Low-level input voltage        |                          |     | 0.8  |                          |     | 0.8  | V    |
| $I_{OH}$ | High-level output current      |                          |     | –0.4 |                          |     | –0.4 | mA   |
| $I_{OL}$ | Low-level output current       |                          |     | 4    |                          |     | 8    | mA   |
| $T_A$    | Operating free-air temperature | –55                      |     | 125  | 0                        |     | 70   | °C   |

NOTE 2: All unused inputs of the device must be held at  $V_{CC}$  or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

**SN54ALS174, SN54ALS175, SN54AS174, SN54AS175B  
SN74ALS174, SN74ALS175, SN74AS174, SN74AS175B  
HEX/QUADRUPLE D-TYPE FLIP-FLOPS WITH CLEAR**

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

| PARAMETER        |            | TEST CONDITIONS   |                        | SN54ALS174<br>SN54ALS175 |      |      | SN74ALS174<br>SN74ALS175 |      |      | UNIT |
|------------------|------------|---|------------------------|--------------------------|------|------|--------------------------|------|------|------|
|                  |            |   |                        | MIN                      | TYP† | MAX  | MIN                      | TYP† | MAX  |      |
| V <sub>IK</sub>  |            | V <sub>CC</sub> = 4.5 V, I <sub>I</sub> = −18 mA            |                        | −1.5                     |      |      | −1.5                     |      |      | V    |
| V <sub>OH</sub>  |            | V <sub>CC</sub> = 4.5 V to 5.5 V, I <sub>OH</sub> = −0.4 mA |                        | V <sub>CC</sub> −2       |      |      | V <sub>CC</sub> −2       |      |      | V    |
| V <sub>OL</sub>  |            | V <sub>CC</sub> = 4.5 V                                     | I <sub>OL</sub> = 4 mA | 0.25                     |      | 0.4  | 0.25                     |      | 0.4  | V    |
|                  |            |   | I <sub>OL</sub> = 8 mA |                          |      | 0.35 |                          | 0.5  |      |      |
| I <sub>I</sub>   |            | V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 7 V               |                        | 0.1                      |      |      | 0.1                      |      |      | mA   |
| I <sub>IH</sub>  |            | V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 2.7 V             |                        | 20                       |      |      | 20                       |      |      | μA   |
| I <sub>IL</sub>  | All others | V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0.4 V             |                        | −0.1                     |      |      | −0.1                     |      |      | mA   |
|                  | CLK        |   |                        | −0.15                    |      |      |                          |      |      |      |
| I <sub>O</sub> ‡ |            | V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 2.25 V            |                        | −20                      |      | −112 | −30                      |      | −112 | mA   |
| I <sub>CC</sub>  | 'ALS174    | V <sub>CC</sub> = 5.5 V, See Note 3                         |                        | 11                       |      | 19   | 11                       |      | 19   | mA   |
|                  | 8          |   |                        | 14                       | 9    |      | 14                       |      |      |      |

† All typical values are at  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

‡ The output conditions have been chosen to produce a current that closely approximates one-half of the true short-circuit output current,  $I_{OS}$ .

NOTE 3:  $I_{CC}$  is measured with D inputs and  $\overline{\text{CLR}}$  grounded, and CLK at 4.5 V.

**timing requirements over recommended operating free-air temperature range (unless otherwise noted)**

|                    |                            | SN54ALS174<br>SN54ALS175 |      | SN74ALS174<br>SN74ALS175 |     | UNIT |
|--------------------|----------------------------|--------------------------|------|--------------------------|-----|------|
|                    |                            | MIN                      | MAX  | MIN                      | MAX |      |
| f <sub>clock</sub> | Clock frequency            | 40                       |      | 50                       |     | MHz  |
| t <sub>w</sub>     | Pulse duration             | CLR low                  | 15   | 10                       | ns  |      |
|                    |                            | CLK high                 | 12.5 | 10                       |     |      |
|                    |                            | CLK low                  | 12.5 | 10                       |     |      |
| t <sub>su</sub>    | Setup time before CLK↑     | Data                     | 15   | 10                       | ns  |      |
|                    |                            | CLR inactive             | 8    | 6                        |     |      |
| t <sub>h</sub>     | Hold time, data after CLK↑ | 0                        |      | 0                        |     | ns   |

**switching characteristics (see Figure 1)**

| PARAMETER | FROM<br>(INPUT) | TO<br>(OUTPUT)            | VCC = 4.5 V to 5.5 V,<br>CL = 50 pF,<br>RL = 500 Ω,<br>TA = MIN to MAX§ |     |                          |     | UNIT |
|-----------|-----------------|---------------------------|---|-----|--------------------------|-----|------|
|           |                 |                           | SN54ALS174<br>SN54ALS175  |     | SN74ALS174<br>SN74ALS175 |     |      |
|           |                 |                           | MIN   | MAX | MIN                      | MAX |      |
| fmax      |                 |                           | 40  |     | 50                       |     | MHz  |
| tPLH      | CLR             | Any Q<br>(or Q̄, 'ALS175) | 3   | 20  | 5                        | 18  | ns   |
| tPHL      |                 |                           | 5   | 30  | 8                        | 23  |      |
| tPLH      | CLK             | Any Q<br>(or Q̄, 'ALS175) | 3   | 20  | 3                        | 15  | ns   |
| tPHL      |                 |                           | 5   | 24  | 5                        | 17  |      |

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

**SN54ALS174, SN54ALS175, SN54AS174, SN54AS175B  
SN74ALS174, SN74ALS175, SN74AS174, SN74AS175B  
HEX/QUADRUPLE D-TYPE FLIP-FLOPS WITH CLEAR**

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**absolute maximum ratings over operating free-air temperature range, SN54/74AS174, SN54/74AS175B (unless otherwise noted)<sup>†</sup>**

|  |                |
|--|----------------|
| Supply voltage, $V_{CC}$   | 7 V            |
| Input voltage, $V_I$   | 7 V            |
| Package thermal impedance, $\theta_{JA}$ (see Note 1): D package | 73°C/W         |
| N package  | 67°C/W         |
| NS package   | 64°C/W         |
| Storage temperature range, $T_{stg}$                             | –65°C to 150°C |

<sup>†</sup> Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The package thermal impedance is calculated in accordance with JESD 51-7.

**recommended operating conditions (see Note 2)**

|          |                                | SN54AS174<br>SN54AS175B |     |     | SN74AS174<br>SN74AS175B |     |     | UNIT |
|----------|--------------------------------|-------------------------|-----|-----|-------------------------|-----|-----|------|
|          |                                | MIN                     | NOM | MAX | MIN                     | NOM | MAX |      |
| $V_{CC}$ | Supply voltage                 | 4.5                     | 5   | 5.5 | 4.5                     | 5   | 5.5 | V    |
| $V_{IH}$ | High-level input voltage       | 2                       |     |     | 2                       |     |     | V    |
| $V_{IL}$ | Low-level input voltage        |                         |     | 0.8 |                         |     | 0.8 | V    |
| $I_{OH}$ | High-level output current      |                         |     | –2  |                         |     | –2  | mA   |
| $I_{OL}$ | Low-level output current       |                         |     | 20  |                         |     | 20  | mA   |
| $T_A$    | Operating free-air temperature | –55                     |     | 125 | 0                       |     | 70  | °C   |

NOTE 2: All unused inputs of the device must be held at  $V_{CC}$  or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

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

| PARAMETER       |         | TEST CONDITIONS  | SN54AS174<br>SN54AS175B |                  |      | SN74AS174<br>SN74AS175B |                  |      | UNIT |
|-----------------|---------|--|-------------------------|------------------|------|-------------------------|------------------|------|------|
|                 |         |  | MIN                     | TYP <sup>‡</sup> | MAX  | MIN                     | TYP <sup>‡</sup> | MAX  |      |
| $V_{IK}$        |         | $V_{CC} = 4.5\text{ V}$ , $I_I = -18\text{ mA}$                    |                         |                  | –1.2 |                         |                  | –1.2 | V    |
| $V_{OH}$        |         | $V_{CC} = 4.5\text{ V to } 5.5\text{ V}$ , $I_{OH} = -2\text{ mA}$ | $V_{CC}-2$              |                  |      | $V_{CC}-2$              |                  |      | V    |
| $V_{OL}$        |         | $V_{CC} = 4.5\text{ V}$ , $I_{OL} = 20\text{ mA}$                  |                         | 0.35             | 0.5  |                         | 0.35             | 0.5  | V    |
| $I_I$           |         | $V_{CC} = 5.5\text{ V}$ , $V_I = 7\text{ V}$                       |                         |                  | 0.1  |                         |                  | 0.1  | mA   |
| $I_{IH}$        |         | $V_{CC} = 5.5\text{ V}$ , $V_I = 2.7\text{ V}$                     |                         |                  | 20   |                         |                  | 20   | μA   |
| $I_{IL}$        |         | $V_{CC} = 5.5\text{ V}$ , $V_I = 0.4\text{ V}$                     |                         |                  | –0.5 |                         |                  | –0.5 | mA   |
| $I_{O\text{§}}$ |         | $V_{CC} = 5.5\text{ V}$ , $V_O = 2.25\text{ V}$                    | –30                     |                  | –112 | –30                     |                  | –112 | mA   |
| $I_{CC}$        | 'AS174  | $V_{CC} = 5.5\text{ V}$ ,<br>See Note 4                            |                         | 30               | 45   |                         | 30               | 45   | mA   |
|                 | 'AS175B |  |                         | 22.5             | 34   |                         | 22.5             | 34   |      |

<sup>‡</sup> All typical values are at  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

<sup>§</sup> The output conditions have been chosen to produce a current that closely approximates one-half of the true short-circuit output current,  $I_{OS}$ .

NOTE 4:  $I_{CC}$  is measured with D inputs,  $\overline{\text{CLR}}$ , and CLK grounded.

**SN54ALS174, SN54ALS175, SN54AS174, SN54AS175B  
SN74ALS174, SN74ALS175, SN74AS174, SN74AS175B  
HEX/QUADRUPLE D-TYPE FLIP-FLOPS WITH CLEAR**

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**timing requirements over recommended operating free-air temperature range (unless otherwise noted)**

|                      |                            |  |              | SN54AS174<br>SN54AS175B |     | SN74AS174<br>SN74AS175B |     | UNIT |    |
|----------------------|----------------------------|--|--------------|-------------------------|-----|-------------------------|-----|------|----|
|                      |                            |  |              | MIN                     | MAX | MIN                     | MAX |      |    |
| f <sub>clock</sub> * | Clock frequency            |  |              | 100                     |     | 100                     |     | MHz  |    |
| t <sub>w</sub> *     | Pulse duration             |  | CLR low      | 5.5                     |     | 5                       |     | ns   |    |
|                      |                            |  | CLK high     |                         | 4   |                         |     |      |    |
|                      |                            |  | CLK low      | 'AS174                  | 6   |                         |     |      |    |
|                      |                            |  | CLK low      | 'AS175B                 | 5   |                         |     |      |    |
| t <sub>su</sub> *    | Setup time before CLK↑     |  | Data         | 'AS174                  | 4   |                         | 4   |      | ns |
|                      |                            |  |              | 'AS175B                 | 3   |                         | 3   |      |    |
|                      |                            |  | CLR inactive |                         | 6   |                         | 6   |      |    |
| t <sub>h</sub> *     | Hold time, data after CLK↑ |  |              | 1                       |     | 1                       |     | ns   |    |

\* On products compliant to MIL-STD-883, Class B, this parameter is based on characterization data, but is not production tested.

**switching characteristics (see Figure 1)**

| PARAMETER | FROM<br>(INPUT) | TO<br>(OUTPUT) | VCC = 4.5 V to 5.5 V,<br>CL = 50 pF,<br>RL = 500 Ω,<br>TA = MIN to MAX† |      |           |     | UNIT |
|-----------|-----------------|----------------|---|------|-----------|-----|------|
|           |                 |                | SN54AS174   |      | SN74AS174 |     |      |
|           |                 |                | MIN   | MAX  | MIN       | MAX |      |
| fmax*     |                 |                | 100   |      | 100       |     | MHz  |
| tPHL      | CLR             | Any Q          | 5   | 15   | 5         | 14  | ns   |
| tPLH      | CLK             | Any Q          | 3.5   | 9.5  | 3.5       | 8   | ns   |
| tPHI      |                 |                | 4.5   | 11.5 | 4.5       | 10  |      |

\* On products compliant to MIL-STD-883, Class B, this parameter is based on characterization data, but is not production tested.

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

**switching characteristics (see Figure 1)**

| PARAMETER | FROM<br>(INPUT) | TO<br>(OUTPUT) | VCC = 4.5 V to 5.5 V,<br>CL = 50 pF,<br>RL = 500 Ω,<br>TA = MIN to MAX† |     |            |     | UNIT |
|-----------|-----------------|----------------|---|-----|------------|-----|------|
|           |                 |                | SN54AS175B  |     | SN74AS175B |     |      |
|           |                 |                | MIN   | MAX | MIN        | MAX |      |
| fmax*     |                 |                | 100   |     | 100        |     | MHz  |
| tPLH      | CLR             | Any Q or Q̄    | 4   | 10  | 4          | 9   | ns   |
| tPHL      |                 |                | 4.5   | 15  | 4.5        | 13  |      |
| tPLH      | CLK             | Any Q or Q̄    | 3   | 8.5 | 3          | 7.5 | ns   |
| tPHL      |                 |                | 3   | 11  | 3          | 10  |      |

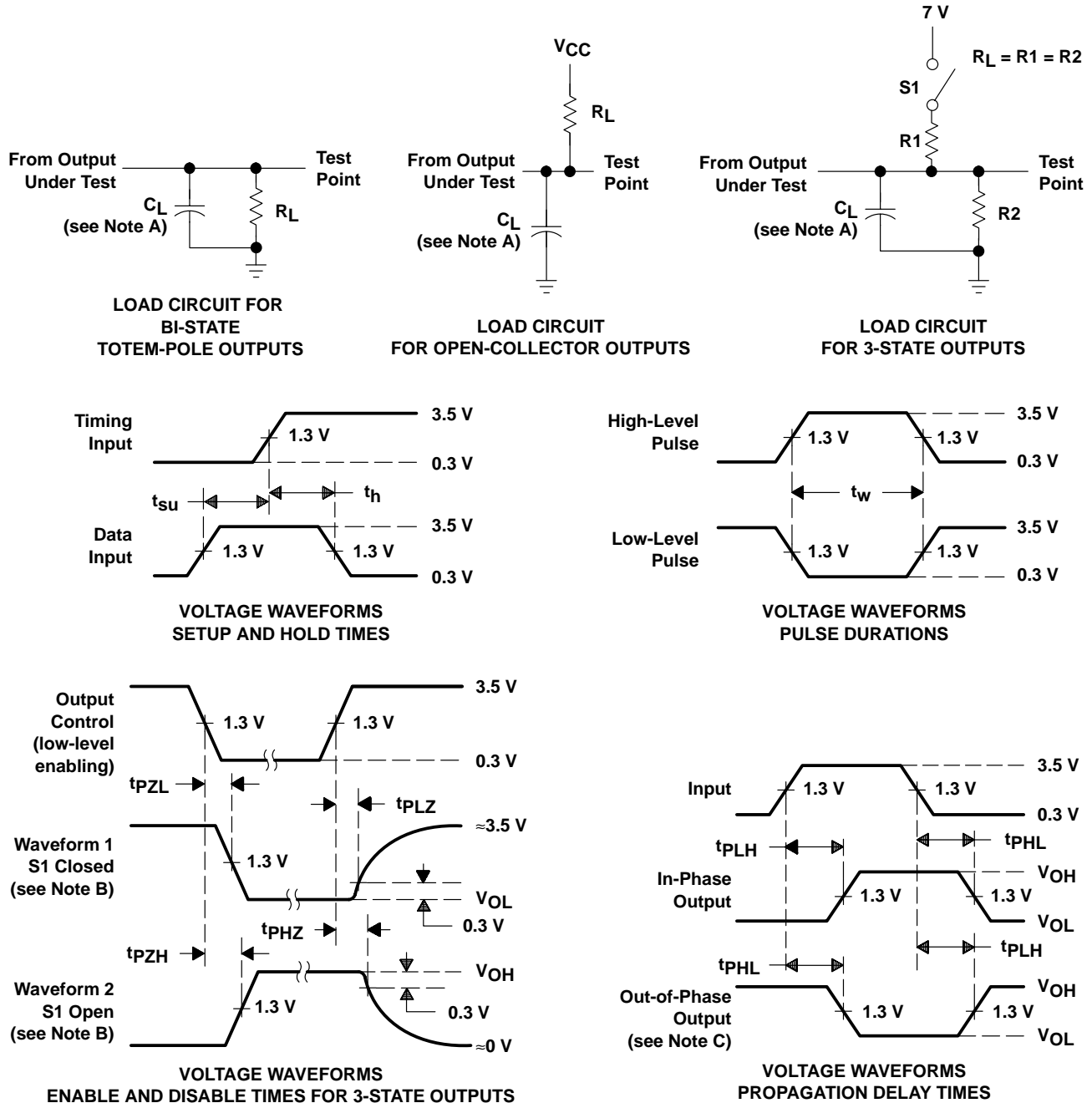
\* On products compliant to MIL-STD-883, Class B, this parameter is based on characterization data, but is not production tested.

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

# SN54ALS174, SN54ALS175, SN54AS174, SN54AS175B SN74ALS174, SN74ALS175, SN74AS174, SN74AS175B HEX/QUADRUPLE D-TYPE FLIP-FLOPS WITH CLEAR

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## PARAMETER MEASUREMENT INFORMATION SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.  
C. When measuring propagation delay items of 3-state outputs, switch S1 is open.  
D. All input pulses have the following characteristics:  $PRR \leq 1 \text{ MHz}$ ,  $t_r = t_f = 2 \text{ ns}$ , duty cycle = 50%.  
E. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms

**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> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 5962-9553701Q2A  | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| 5962-9553701QEA  | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| 83019012A        | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| 8301901EA        | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| 8301901FA        | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| 83019022A        | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| 8301902EA        | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| 8301902FA        | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| JM38510/37201B2A | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| JM38510/37201BEA | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| JM38510/37202B2A | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| JM38510/37202BEA | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SN54ALS174J      | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SN54ALS175J      | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SN54AS174J       | OBSOLETE              | CDIP         | J               | 16   |             | TBD                     | Call TI          | Level-NC-NC-NC               |
| SN54AS175BJ      | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Call TI                      |
| SN74ALS174D      | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74ALS174DE4    | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74ALS174DG4    | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74ALS174DR     | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74ALS174DRE4   | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74ALS174DRG4   | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74ALS174N      | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC               |
| SN74ALS174N3     | OBSOLETE              | PDIP         | N               | 16   |             | TBD                     | Call TI          | Call TI                      |
| SN74ALS174NE4    | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC               |
| SN74ALS174NSR    | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74ALS174NSRE4  | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74ALS175D      | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74ALS175DE4    | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74ALS175DR     | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74ALS175DRE4   | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74ALS175N      | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free                 | CU NIPDAU        | 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> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| (RoHS)           |                       |              |                 |      |             |                         |                  |                              |
| SN74ALS175NSR    | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74ALS175NSRE4  | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74AS174D       | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-2-260C-1YEAR           |
| SN74AS174DE4     | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-2-260C-1YEAR           |
| SN74AS174DR      | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-2-260C-1YEAR           |
| SN74AS174DRE4    | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-2-260C-1YEAR           |
| SN74AS174N       | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC               |
| SN74AS174NSR     | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74AS174NSRE4   | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74AS175BD      | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74AS175BDE4    | ACTIVE                | SOIC         | D               | 16   | 40          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74AS175BDR     | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74AS175BDRE4   | ACTIVE                | SOIC         | D               | 16   | 2500        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74AS175BN      | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC               |
| SN74AS175BNE4    | ACTIVE                | PDIP         | N               | 16   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC               |
| SN74AS175BNSR    | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN74AS175BNSRE4  | ACTIVE                | SO           | NS              | 16   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SNJ54ALS174FK    | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54ALS174J     | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54ALS174W     | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54ALS175FK    | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54ALS175J     | ACTIVE                | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54ALS175W     | ACTIVE                | CFP          | W               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54AS174FK     | NRND                  | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54AS174J      | NRND                  | CDIP         | J               | 16   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54AS175BFK    | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54AS175BJ     | ACTIVE                | CDIP         | J               | 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

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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.

(2) 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)

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

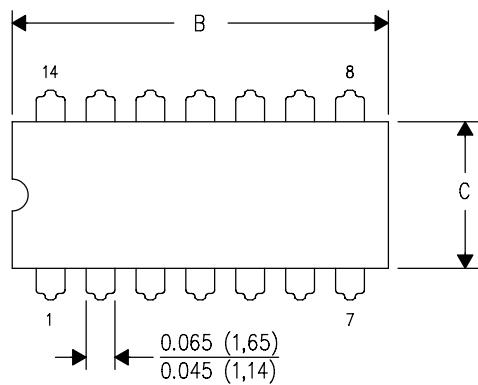
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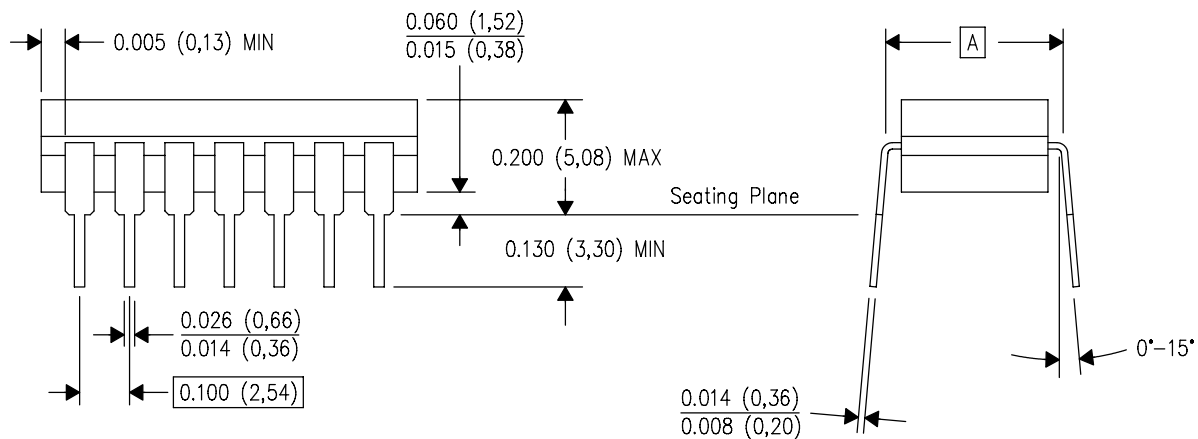
J (R-GDIP-T\*\*)

14 LEADS SHOWN

# CERAMIC DUAL IN-LINE PACKAGE



| DIM \ PINS ** | 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)        |



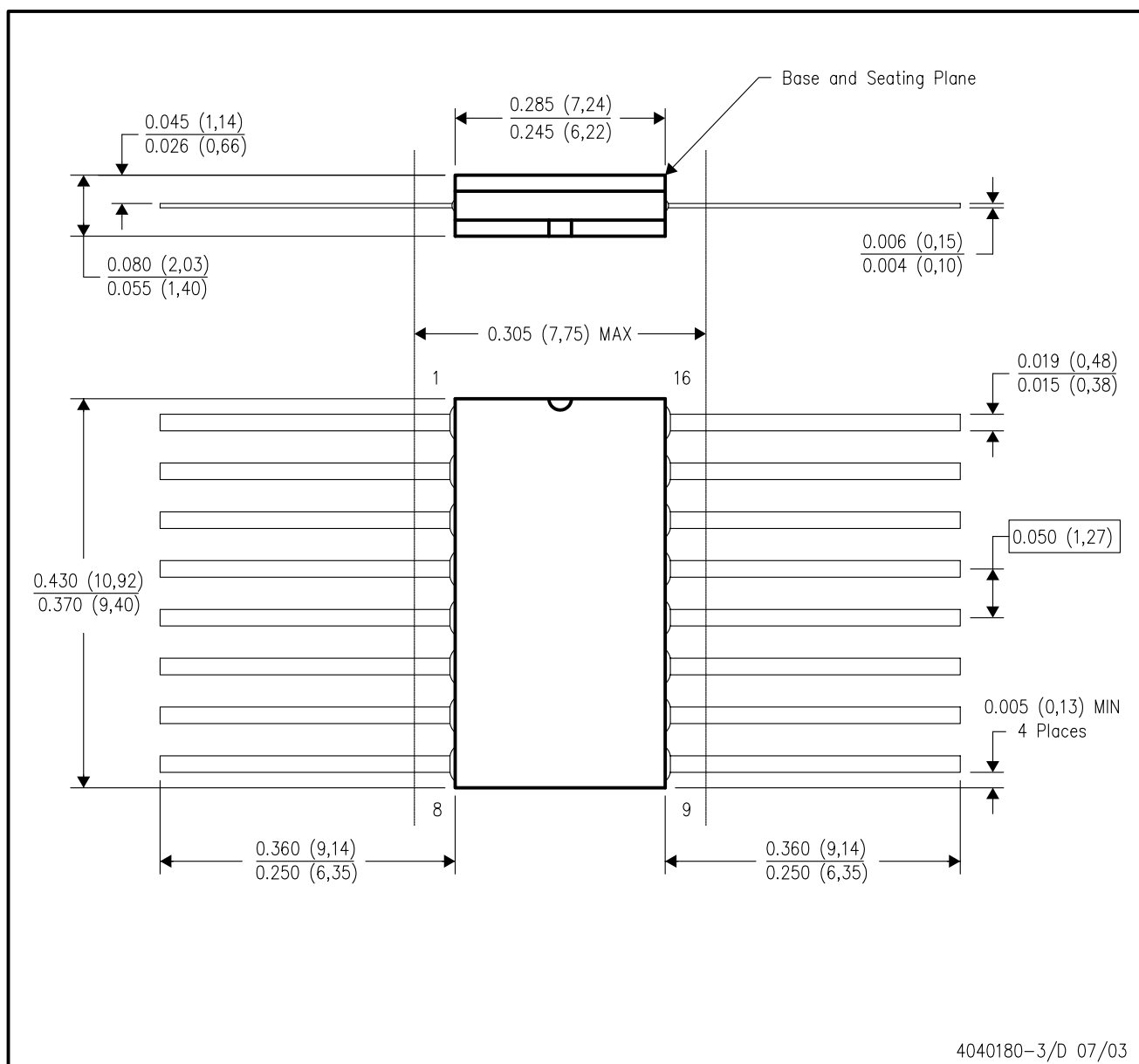
4040083/F 03/03

- 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.

## MECHANICAL DATA

W (R-GDFP-F16)

## CERAMIC DUAL FLATPACK



- 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 ceramic lid using glass frit.
  - D. Index point is provided on cap for terminal identification only.
  - E. Falls within MIL STD 1835 GDFP1-F16 and JEDEC MO-092AC

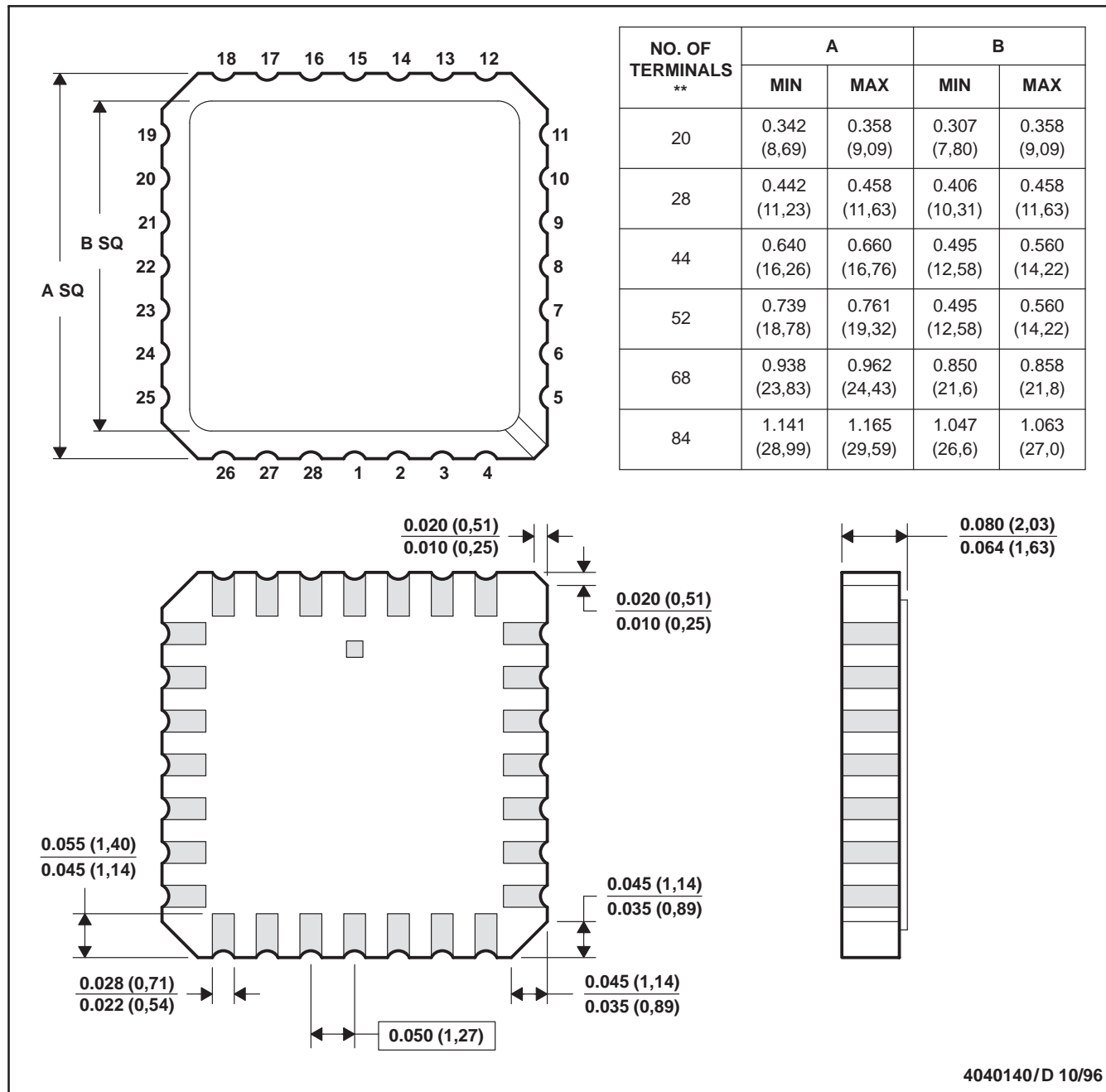
# MECHANICAL DATA

MLCC006B – OCTOBER 1996

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

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



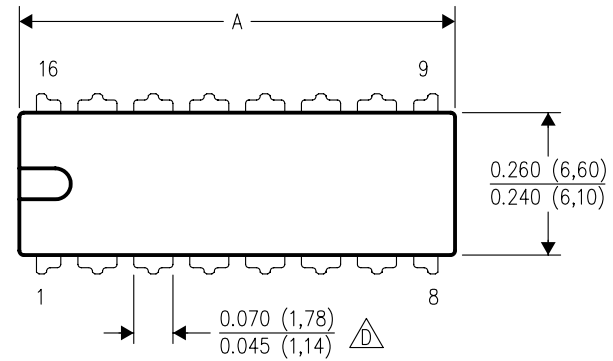
- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package can be hermetically sealed with a metal lid.
  - D. The terminals are gold plated.
  - E. Falls within JEDEC MS-004

# MECHANICAL DATA

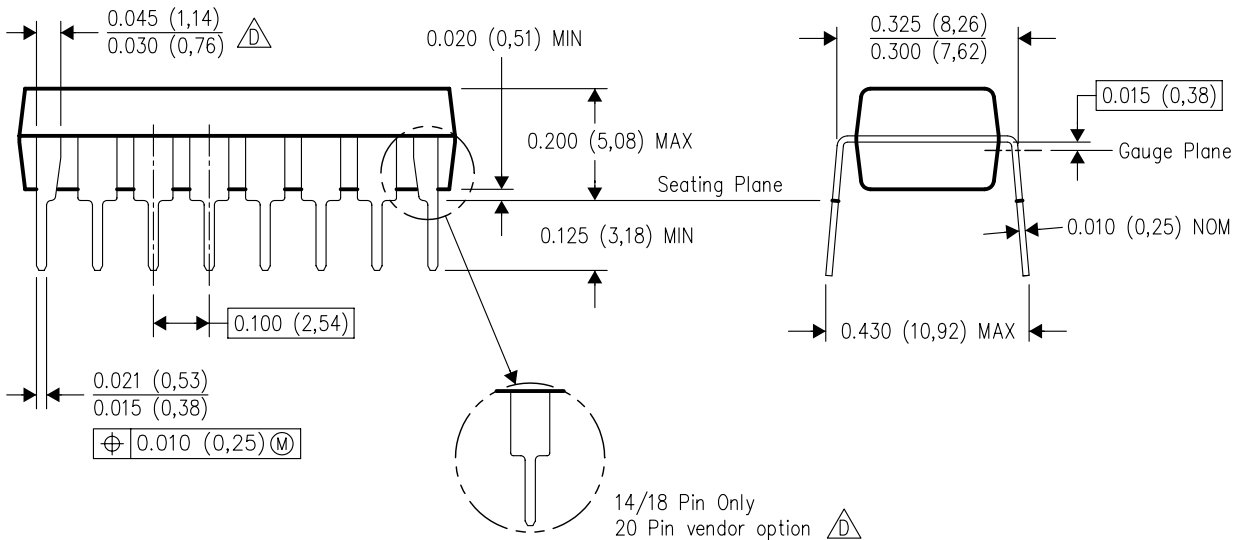
## N (R-PDIP-T\*\*)

16 PINS SHOWN

## PLASTIC DUAL-IN-LINE PACKAGE



| PINS **             | 14               | 16               | 18               | 20               |
|---------------------|------------------|------------------|------------------|------------------|
| DIM                 |                  |                  |                  |                  |
| A MAX               | 0.775<br>(19,69) | 0.775<br>(19,69) | 0.920<br>(23,37) | 1.060<br>(26,92) |
| A MIN               | 0.745<br>(18,92) | 0.745<br>(18,92) | 0.850<br>(21,59) | 0.940<br>(23,88) |
| MS-001<br>VARIATION | AA               | BB               | AC               | AD               |



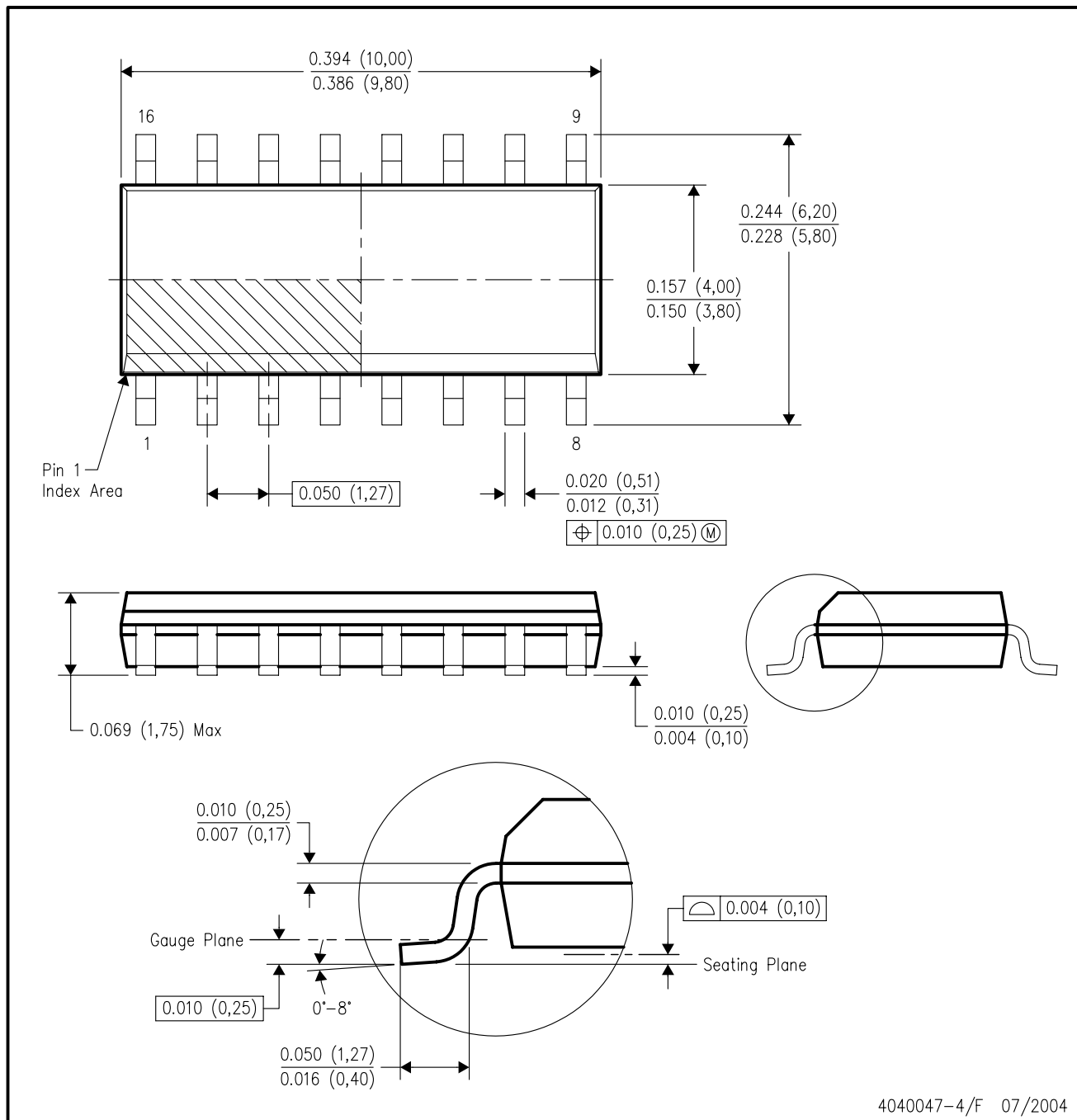
4040049/E 12/2002

- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
  - D. The 20 pin end lead shoulder width is a vendor option, either half or full width.

# MECHANICAL DATA

## D (R-PDSO-G16)

## PLASTIC SMALL-OUTLINE PACKAGE



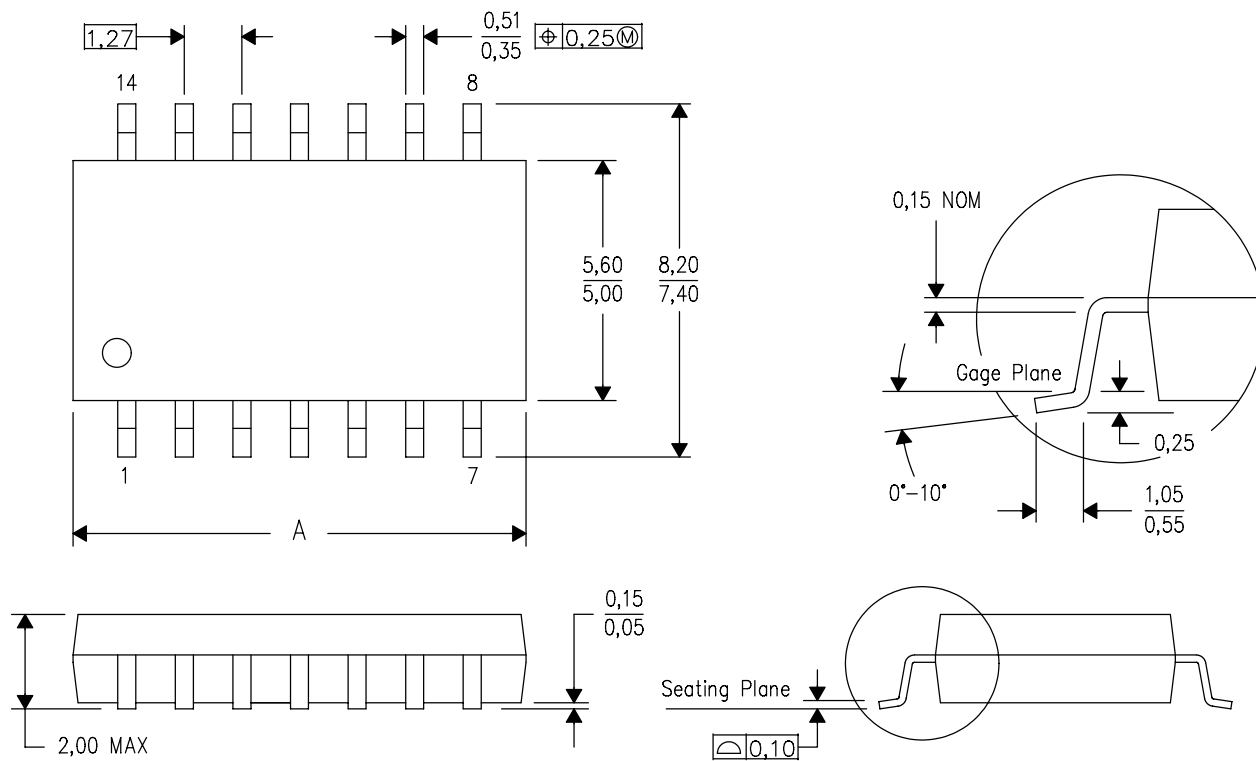
4040047-4/F 07/2004

## MECHANICAL DATA

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

## PLASTIC SMALL-OUTLINE PACKAGE

### 14-PINS SHOWN



| DIM \ PINS ** | 14    | 16    | 20    | 24    |
|---------------|-------|-------|-------|-------|
| A MAX         | 10,50 | 10,50 | 12,90 | 15,30 |
| A MIN         | 9,90  | 9,90  | 12,30 | 14,70 |

4040062/C 03/03

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.



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