

# SN54ALS576B, SN54AS576 SN74ALS576B, SN74ALS577A, SN74AS576 OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS

SDAS065B – DECEMBER 1982 – REVISED JANUARY 1995

- 3-State Buffer-Type Inverting Outputs Drive Bus Lines Directly
- Bus-Structured Pinout
- Buffered Control Inputs
- SN74ALS577A Has Synchronous Clear
- Package Options Include Plastic Small-Outline (DW) Packages, Ceramic Chip Carriers (FK), Standard Plastic (N, NT) and Ceramic (J) 300-mil DIPs, and Ceramic Flat (W) Packages

## description

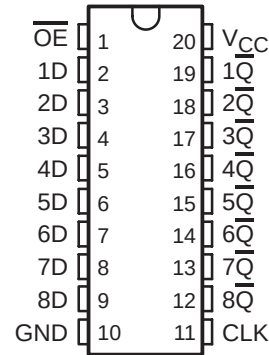
These octal D-type edge-triggered flip-flops feature 3-state outputs designed specifically for bus driving. They are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

These flip-flops enter data on the low-to-high transition of the clock (CLK) input.

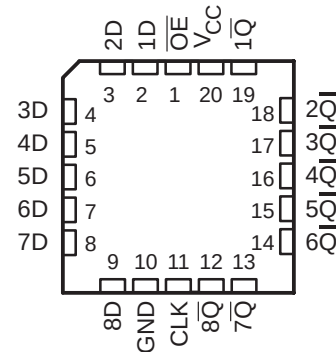
The output-enable ( $\overline{OE}$ ) input does not affect internal operations of the flip-flops. Old data can be retained or new data can be entered while the outputs are disabled.

The SN54ALS576B and SN54AS576 are characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74ALS576B, SN74ALS577A, and SN74AS576 are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

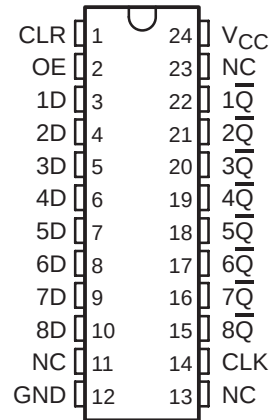
SN54ALS576B, SN54AS576 . . . J OR W PACKAGE  
SN74ALS576B, SN74AS576 . . . DW OR N PACKAGE  
(TOP VIEW)



SN54ALS576B, SN54AS576 . . . FK PACKAGE  
(TOP VIEW)



SN74ALS577A . . . DW OR NT PACKAGE  
(TOP VIEW)



NC – No internal connection

# SN54ALS576B, SN54AS576

## SN74ALS576B, SN74ALS577A, SN74AS576

### OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS

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#### Function Tables

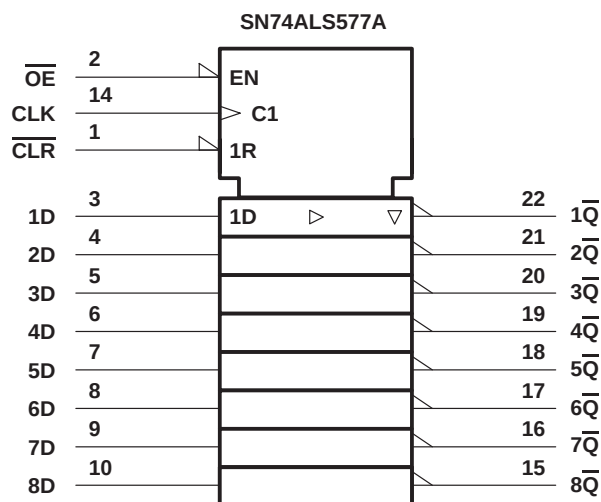
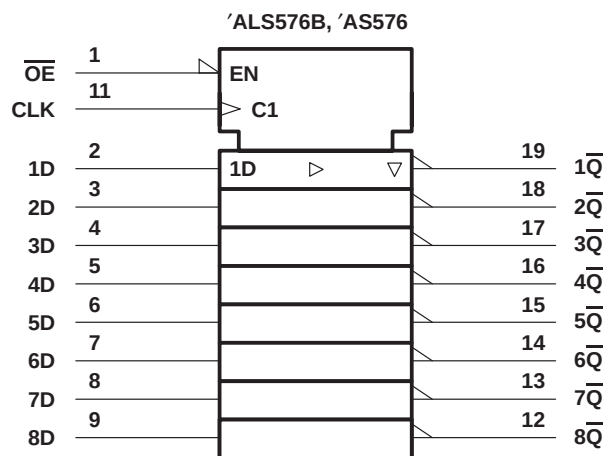
'ALS576B, 'AS576  
(each flip-flop)

| INPUTS          |            |   | OUTPUT<br>$\overline{Q}$ |
|-----------------|------------|---|--------------------------|
| $\overline{OE}$ | CLK        | D |                          |
| L               | $\uparrow$ | H | L                        |
| L               | $\uparrow$ | L | H                        |
| L               | L          | X | $\overline{Q}_0$         |
| H               | X          | X | Z                        |

SN74ALS577A  
(each flip-flop)

| INPUTS          |                  |            |   | OUTPUT<br>$\overline{Q}$ |
|-----------------|------------------|------------|---|--------------------------|
| $\overline{OE}$ | $\overline{CLR}$ | CLK        | D |                          |
| L               | L                | $\uparrow$ | X | H                        |
| L               | H                | $\uparrow$ | H | L                        |
| L               | H                | $\uparrow$ | L | H                        |
| L               | H                | L          | X | $\overline{Q}_0$         |
| H               | X                | X          | X | Z                        |

#### logic symbols†



† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

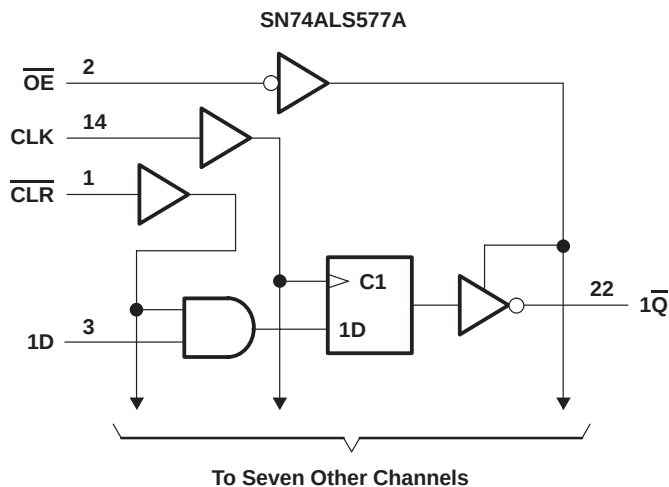
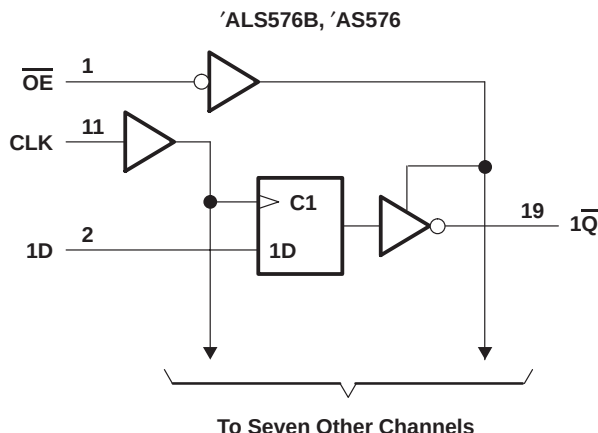
Pin numbers shown for the 'ALS576B and 'AS576 are for the DW, J, N, and W packages.

Pin numbers shown for the SN74ALS577A are for the DW and NT packages.

**SN54ALS576B, SN54AS576**  
**SN74ALS576B, SN74ALS577A, SN74AS576**  
**OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS**

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**logic diagrams (positive logic)**



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

Pin numbers shown are for the DW and NT packages.

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

|                                                           |                |
|-----------------------------------------------------------|----------------|
| Supply voltage, $V_{CC}$                                  | 7 V            |
| Input voltage, $V_I$                                      | 7 V            |
| Voltage applied to a disabled 3-state output              | 5.5 V          |
| Operating free-air temperature range, $T_A$ : SN54ALS576B | –55°C to 125°C |
| SN74ALS576B, SN74ALS577A                                  | 0°C to 70°C    |
| Storage temperature range                                 | –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.

**recommended operating conditions**

|                    |                                |                              | SN54ALS576B |     |     | SN74ALS576B<br>SN74ALS577A |     |     | UNIT |
|--------------------|--------------------------------|------------------------------|-------------|-----|-----|----------------------------|-----|-----|------|
|                    |                                |                              | MIN         | NOM | MAX | MIN                        | NOM | MAX |      |
| V <sub>CC</sub>    | Supply voltage                 |                              | 4.5         | 5   | 5.5 | 4.5                        | 5   | 5.5 | V    |
| V <sub>IH</sub>    | High-level input voltage       |                              | 2           |     |     | 2                          |     |     | V    |
| V <sub>IL</sub>    | Low-level input voltage        |                              | 0.7         |     |     | 0.8                        |     |     | V    |
| I <sub>OH</sub>    | High-level output current      |                              | −1          |     |     | −2.6                       |     |     | mA   |
| I <sub>OL</sub>    | Low-level output current       |                              | 12          |     |     | 24                         |     |     | mA   |
| f <sub>clock</sub> | Clock frequency                | 'ALS576B                     | 0           |     |     | 22                         |     |     | MHz  |
|                    |                                | SN74ALS577A                  |             |     |     | 0                          |     |     |      |
| t <sub>w</sub>     | Pulse duration                 | 'ALS576B, CLK high or low    | 25          |     |     | 16.5                       |     |     | ns   |
|                    |                                | SN74ALS577A, CLK high or low |             |     |     | 16.5                       |     |     |      |
| t <sub>su</sub>    | Setup time before CLK↑         | Data                         | 15          |     |     | 15                         |     |     | ns   |
|                    |                                | SN74ALS577A $\overline{CLR}$ |             |     |     | 15                         |     |     |      |
| t <sub>h</sub>     | Hold time after CLK↑           | Data                         | 4           |     |     | 0                          |     |     | ns   |
|                    |                                | SN74ALS577A $\overline{CLR}$ |             |     |     | 0                          |     |     |      |
| T <sub>A</sub>     | Operating free-air temperature |                              | −55         |     |     | 125                        |     |     | °C   |



**SN54ALS576B, SN54AS576**  
**SN74ALS576B, SN74ALS577A, SN74AS576**  
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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER      | TEST CONDITIONS                                                        | SN54ALS576B  |      |      | SN74ALS576B<br>SN74ALS577A |      |      | UNIT          |
|----------------|------------------------------------------------------------------------|--------------|------|------|----------------------------|------|------|---------------|
|                |                                                                        | MIN          | TYP† | MAX  | MIN                        | TYP† | MAX  |               |
| $V_{IK}$       | $V_{CC} = 4.5\text{ V}$ ,<br>$I_I = -18\text{ mA}$                     |              |      | -1.2 |                            |      | -1.2 | V             |
| $V_{OH}$       | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ ,<br>$I_{OH} = -0.4\text{ mA}$ | $V_{CC} - 2$ |      |      | $V_{CC} - 2$               |      |      | V             |
|                | $V_{CC} = 4.5\text{ V}$ ,<br>$I_{OH} = -1\text{ mA}$                   | 2.4          | 3.3  |      |                            |      |      |               |
|                | $V_{CC} = 4.5\text{ V}$ ,<br>$I_{OH} = -2.6\text{ mA}$                 |              |      |      | 2.4                        | 3.2  |      |               |
| $V_{OL}$       | $V_{CC} = 4.5\text{ V}$ ,<br>$I_{OL} = 12\text{ mA}$                   |              | 0.25 | 0.4  |                            | 0.25 | 0.4  | V             |
|                | $V_{CC} = 4.5\text{ V}$ ,<br>$I_{OL} = 24\text{ mA}$                   |              |      |      |                            | 0.35 | 0.5  |               |
| $I_{OZH}$      | $V_{CC} = 5.5\text{ V}$ ,<br>$V_O = 2.7\text{ V}$                      |              |      | 20   |                            |      | 20   | $\mu\text{A}$ |
| $I_{OZL}$      | $V_{CC} = 5.5\text{ V}$ ,<br>$V_O = 0.4\text{ V}$                      |              |      | -20  |                            |      | -20  | $\mu\text{A}$ |
| $I_I$          | $V_{CC} = 5.5\text{ V}$ ,<br>$V_I = 7\text{ V}$                        |              |      | 0.1  |                            |      | 0.1  | mA            |
| $I_{IH}$       | $V_{CC} = 5.5\text{ V}$ ,<br>$V_I = 2.7\text{ V}$                      |              |      | 20   |                            |      | 20   | $\mu\text{A}$ |
| $I_{IL}$       | $V_{CC} = 5.5\text{ V}$ ,<br>$V_I = 0.4\text{ V}$                      |              |      | -0.2 |                            |      | -0.2 | mA            |
| $I_O^\ddagger$ | $V_{CC} = 5.5\text{ V}$ ,<br>$V_O = 2.25\text{ V}$                     | -20          |      | -112 | -30                        |      | -112 | mA            |
| $I_{CC}$       | $V_{CC} = 5.5\text{ V}$ ,<br>Outputs high                              |              | 10   | 18   |                            | 10   | 18   | mA            |
|                | $V_{CC} = 5.5\text{ V}$ ,<br>Outputs low                               |              | 15   | 24   |                            | 15   | 24   |               |
|                | $V_{CC} = 5.5\text{ V}$ ,<br>Outputs disabled                          |              | 16   | 30   |                            | 16   | 30   |               |

† 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,  $I_{OS}$ .

**switching characteristics (see Figure 1)**

| PARAMETER        | FROM<br>(INPUT) | TO<br>(OUTPUT)     | V <sub>CC</sub> = 4.5 V to 5.5 V,<br>C <sub>L</sub> = 50 pF,<br>R1 = 500 Ω,<br>R2 = 500 Ω,<br>T <sub>A</sub> = MIN to MAX§ |     |             |     |             |     | UNIT |
|------------------|-----------------|--------------------|----------------------------------------------------------------------------------------------------------------------------|-----|-------------|-----|-------------|-----|------|
|                  |                 |                    | SN54ALS576B                                                                                                                |     | SN74ALS576B |     | SN74ALS577A |     |      |
|                  |                 |                    | MIN                                                                                                                        | MAX | MIN         | MAX | MIN         | MAX |      |
| f <sub>max</sub> |                 |                    | 22                                                                                                                         |     | 30          |     | 30          |     | MHz  |
| t <sub>PLH</sub> | CLK             | Any $\overline{Q}$ | 4                                                                                                                          | 24  | 3           | 14  | 4           | 14  | ns   |
| t <sub>PHL</sub> |                 |                    | 4                                                                                                                          | 20  | 4           | 14  | 4           | 14  |      |
| t <sub>PZH</sub> | $\overline{OE}$ | Any $\overline{Q}$ | 4                                                                                                                          | 24  | 3           | 18  | 4           | 18  | ns   |
| t <sub>PZL</sub> |                 |                    | 3                                                                                                                          | 23  | 4           | 18  | 4           | 18  |      |
| t <sub>PHZ</sub> | $\overline{OE}$ | Any $\overline{Q}$ | 2                                                                                                                          | 14  | 1           | 10  | 2           | 10  | ns   |
| t <sub>PLZ</sub> |                 |                    | 3                                                                                                                          | 29  | 2           | 15  | 3           | 15  |      |

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



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**SN74ALS576B, SN74ALS577A, SN74AS576**  
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**absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>†</sup>**

|                                                         |                |
|---------------------------------------------------------|----------------|
| Supply voltage, $V_{CC}$                                | 7 V            |
| Input voltage, $V_I$                                    | 7 V            |
| Voltage applied to a disabled 3-state output            | 5.5 V          |
| Operating free-air temperature range, $T_A$ : SN54AS576 | –55°C to 125°C |
| SN74AS576                                               | 0°C to 70°C    |
| Storage temperature range                               | –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.

**recommended operating conditions**

|                      |                                |          | SN54AS576 |     |     | SN74AS576 |     |     | UNIT |    |
|----------------------|--------------------------------|----------|-----------|-----|-----|-----------|-----|-----|------|----|
|                      |                                |          | MIN       | NOM | MAX | MIN       | NOM | MAX |      |    |
| V <sub>CC</sub>      | Supply voltage                 |          | 4.5       | 5   | 5.5 | 4.5       | 5   | 5.5 | V    |    |
| V <sub>IH</sub>      | High-level input voltage       |          | 2         |     |     | 2         |     |     | V    |    |
| V <sub>IL</sub>      | Low-level input voltage        |          | 0.8       |     |     | 0.8       |     |     | V    |    |
| I <sub>OH</sub>      | High-level output current      |          | −12       |     |     | −15       |     |     | mA   |    |
| I <sub>OL</sub>      | Low-level output current       |          | 32        |     |     | 48        |     |     | mA   |    |
| f <sub>clock</sub> * | Clock frequency                |          | 0         | 100 |     | 0         | 125 |     | MHz  |    |
| t <sub>w</sub> *     | Pulse duration                 | CLK high | 5         |     |     | 4         |     |     | ns   |    |
|                      |                                | CLK low  | 4         |     |     | 2         |     |     |      |    |
| t <sub>su</sub> *    | Setup time, data before CLK↑   |          | 3         |     |     | 2         |     |     | ns   |    |
| t <sub>h</sub> *     | Hold time, data after CLK↑     |          | 3         |     |     | 2         |     |     | ns   |    |
| T <sub>A</sub>       | Operating free-air temperature |          | −55       |     |     | 125       |     | 0   | 70   | °C |

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



**SN54ALS576B, SN54AS576**  
**SN74ALS576B, SN74ALS577A, SN74AS576**  
**OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS**

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

| PARAMETER        |            | TEST CONDITIONS                   |                          | SN54AS576           |      | SN74AS576           |      | UNIT |
|------------------|------------|-----------------------------------|--------------------------|---------------------|------|---------------------|------|------|
|                  |            |                                   |                          | MIN                 | TYP† | MAX                 | MIN  |      |
| V <sub>IK</sub>  |            | V <sub>CC</sub> = 4.5 V,          | I <sub>I</sub> = −18 mA  | −1.2                |      | −1.2                |      | V    |
| V <sub>OH</sub>  |            | V <sub>CC</sub> = 4.5 V to 5.5 V, | I <sub>OH</sub> = −2 mA  | V <sub>CC</sub> − 2 |      | V <sub>CC</sub> − 2 |      | V    |
|                  |            | V <sub>CC</sub> = 4.5 V           | I <sub>OH</sub> = −12 mA | 2.4                 | 3.2  |                     |      |      |
|                  |            |                                   | I <sub>OH</sub> = −15 mA |                     |      | 2.4                 | 3.3  |      |
| V <sub>OL</sub>  |            | V <sub>CC</sub> = 4.5 V           | I <sub>OL</sub> = 32 mA  | 0.29                | 0.5  |                     |      | V    |
|                  |            |                                   | I <sub>OL</sub> = 48 mA  |                     |      | 0.33                | 0.5  |      |
| I <sub>OZH</sub> |            | V <sub>CC</sub> = 5.5 V,          | V <sub>O</sub> = 2.7 V   | 50                  |      | 50                  |      | μA   |
| I <sub>OZL</sub> |            | V <sub>CC</sub> = 5.5 V,          | V <sub>O</sub> = 0.4 V   | −50                 |      | −50                 |      | μA   |
| 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>  | D          | V <sub>CC</sub> = 5.5 V,          | V <sub>I</sub> = 0.4 V   | −3                  |      | −2                  |      | mA   |
|                  | All others |                                   |                          | −0.5                |      | −0.5                |      |      |
| I <sub>O</sub> ‡ |            | V <sub>CC</sub> = 5.5 V,          | V <sub>O</sub> = 2.25 V  | −30                 | −112 | −30                 | −112 | mA   |
| I <sub>CC</sub>  |            | V <sub>CC</sub> = 5.5 V           | Outputs high             | 77                  | 125  | 77                  | 125  | mA   |
|                  |            |                                   | Outputs low              | 84                  | 135  | 84                  | 135  |      |
|                  |            |                                   | Outputs disabled         | 84                  | 135  | 84                  | 135  |      |

† 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,  $I_{OS}$ .

**switching characteristics (see Figure 1)**

| PARAMETER          | FROM<br>(INPUT) | TO<br>(OUTPUT)     | V <sub>CC</sub> = 4.5 V to 5.5 V,<br>C <sub>L</sub> = 50 pF,<br>R <sub>1</sub> = 500 Ω,<br>R <sub>2</sub> = 500 Ω,<br>T <sub>A</sub> = MIN to MAX <sup>§</sup> |     |           |     | UNIT |
|--------------------|-----------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------|-----|------|
|                    |                 |                    | SN54AS576                                                                                                                                                      |     | SN74AS576 |     |      |
|                    |                 |                    | MIN                                                                                                                                                            | MAX | MIN       | MAX |      |
| f <sub>max</sub> * |                 |                    | 100                                                                                                                                                            |     | 125       |     | MHz  |
| t <sub>PLH</sub>   | CLK             | Any $\overline{Q}$ | 3                                                                                                                                                              | 11  | 3         | 8   | ns   |
| t <sub>PHL</sub>   |                 |                    | 4                                                                                                                                                              | 11  | 4         | 9   |      |
| t <sub>PZH</sub>   | $\overline{OE}$ | Any $\overline{Q}$ | 2                                                                                                                                                              | 7   | 2         | 6   | ns   |
| t <sub>PZL</sub>   |                 |                    | 3                                                                                                                                                              | 11  | 3         | 10  |      |
| t <sub>PHZ</sub>   | $\overline{OE}$ | Any $\overline{Q}$ | 2                                                                                                                                                              | 7   | 2         | 6   | ns   |
| t <sub>PLZ</sub>   |                 |                    | 2                                                                                                                                                              | 7   | 2         | 6   |      |

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

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

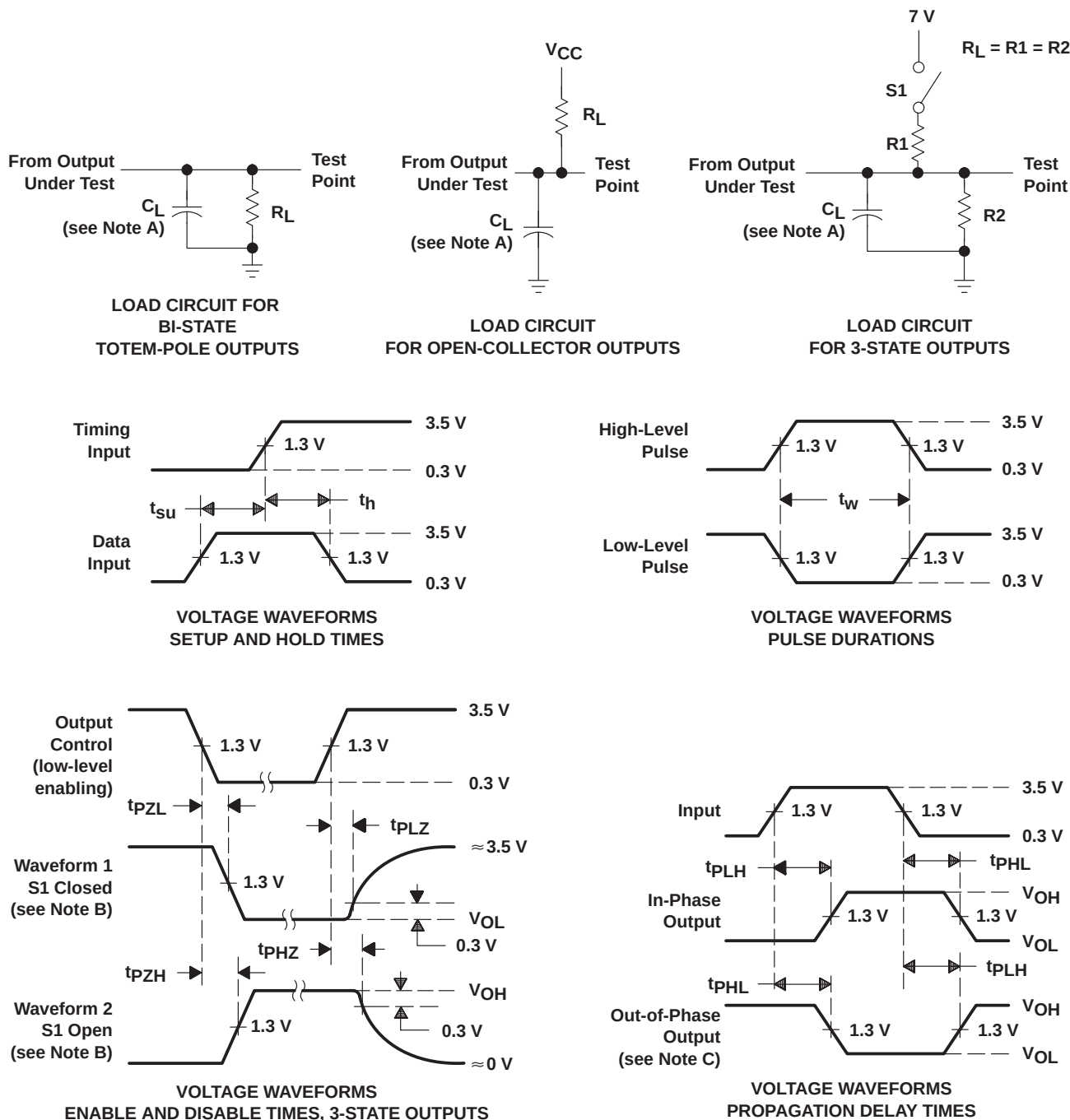


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# OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS

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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:  $PRR \leq 1$  MHz,  $t_r = t_f = 2$  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 part number          | Status<br>(1) | Material type<br>(2) | Package   Pins | Package qty   Carrier | RoHS<br>(3) | Lead finish/<br>Ball material<br>(4) | MSL rating/<br>Peak reflow<br>(5) | Op temp (°C) | Part marking<br>(6)             |
|--------------------------------|---------------|----------------------|----------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------------------|
| <a href="#">84001022A</a>      | Active        | Production           | LCCC (FK)   20 | 55   TUBE             | No          | SNPB                                 | N/A for Pkg Type                  | -55 to 125   | 84001022A<br>SNJ54ALS<br>576BFB |
| <a href="#">8400102RA</a>      | Active        | Production           | CDIP (J)   20  | 20   TUBE             | No          | SNPB                                 | N/A for Pkg Type                  | -55 to 125   | 8400102RA<br>SNJ54ALS576BJ      |
| <a href="#">SN74ALS576BDW</a>  | Obsolete      | Production           | SOIC (DW)   20 | -                     | -           | Call TI                              | Call TI                           | 0 to 70      | ALS576B                         |
| <a href="#">SN74ALS576BDWR</a> | Active        | Production           | SOIC (DW)   20 | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | 0 to 70      | ALS576B                         |
| SN74ALS576BDWR.A               | Active        | Production           | SOIC (DW)   20 | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | 0 to 70      | ALS576B                         |
| <a href="#">SN74ALS576BN</a>   | Active        | Production           | PDIP (N)   20  | 20   TUBE             | Yes         | NIPDAU                               | N/A for Pkg Type                  | 0 to 70      | SN74ALS576BN                    |
| SN74ALS576BN.A                 | Active        | Production           | PDIP (N)   20  | 20   TUBE             | Yes         | NIPDAU                               | N/A for Pkg Type                  | 0 to 70      | SN74ALS576BN                    |
| <a href="#">SN74ALS576BNSR</a> | Active        | Production           | SOP (NS)   20  | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | 0 to 70      | ALS576B                         |
| SN74ALS576BNSR.A               | Active        | Production           | SOP (NS)   20  | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | 0 to 70      | ALS576B                         |
| <a href="#">SN74ALS577ADWR</a> | Active        | Production           | SOIC (DW)   24 | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | 0 to 70      | ALS577A                         |
| SN74ALS577ADWR.A               | Active        | Production           | SOIC (DW)   24 | 2000   LARGE T&R      | Yes         | NIPDAU                               | Level-1-260C-UNLIM                | 0 to 70      | ALS577A                         |
| <a href="#">SN74AS576N</a>     | Active        | Production           | PDIP (N)   20  | 20   TUBE             | Yes         | NIPDAU                               | N/A for Pkg Type                  | 0 to 70      | SN74AS576N                      |
| SN74AS576N.A                   | Active        | Production           | PDIP (N)   20  | 20   TUBE             | Yes         | NIPDAU                               | N/A for Pkg Type                  | 0 to 70      | SN74AS576N                      |
| <a href="#">SNJ54ALS576BFB</a> | Active        | Production           | LCCC (FK)   20 | 55   TUBE             | No          | SNPB                                 | N/A for Pkg Type                  | -55 to 125   | 84001022A<br>SNJ54ALS<br>576BFB |
| SNJ54ALS576BFB.A               | Active        | Production           | LCCC (FK)   20 | 55   TUBE             | No          | SNPB                                 | N/A for Pkg Type                  | -55 to 125   | 84001022A<br>SNJ54ALS<br>576BFB |
| <a href="#">SNJ54ALS576BJ</a>  | Active        | Production           | CDIP (J)   20  | 20   TUBE             | No          | SNPB                                 | N/A for Pkg Type                  | -55 to 125   | 8400102RA<br>SNJ54ALS576BJ      |
| SNJ54ALS576BJ.A                | Active        | Production           | CDIP (J)   20  | 20   TUBE             | No          | SNPB                                 | N/A for Pkg Type                  | -55 to 125   | 8400102RA<br>SNJ54ALS576BJ      |

<sup>(1)</sup> **Status:** For more details on status, see our [product life cycle](#).

<sup>(2)</sup> **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.



<sup>(3)</sup> **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

<sup>(4)</sup> **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

<sup>(5)</sup> **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

<sup>(6)</sup> **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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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.

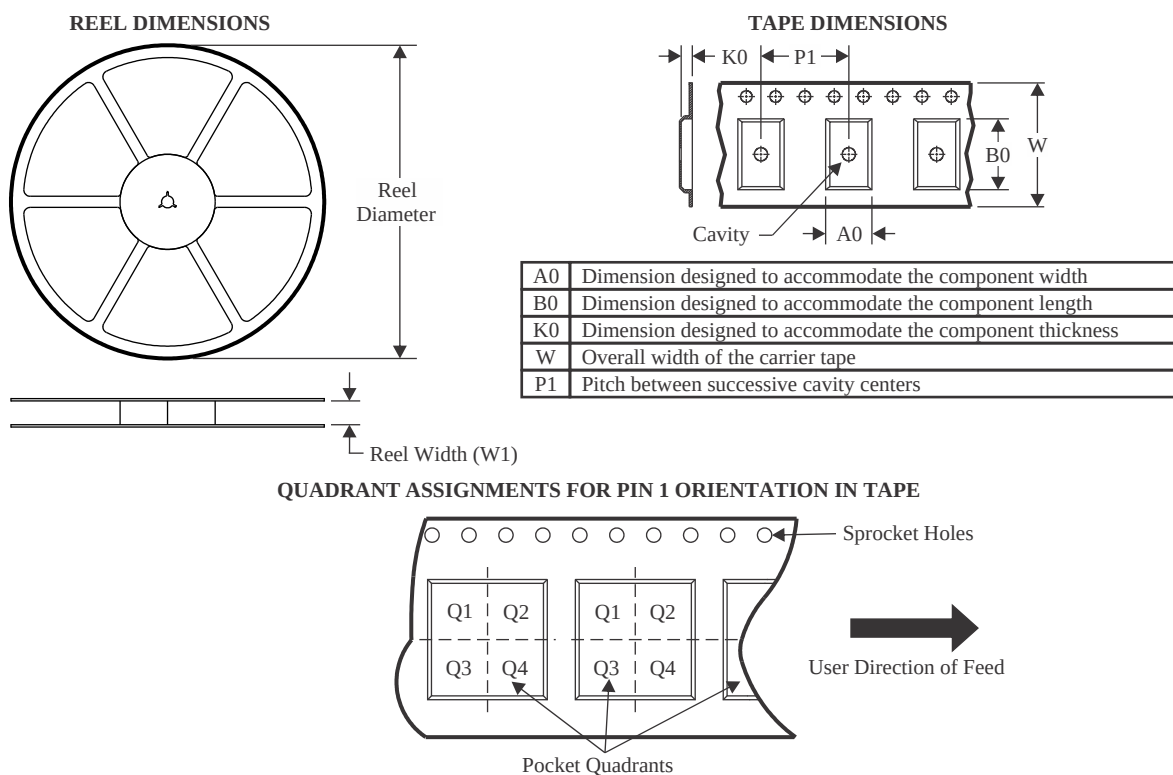
**OTHER QUALIFIED VERSIONS OF SN54ALS576B, SN74ALS576B :**

- Catalog : [SN74ALS576B](#)
- Military : [SN54ALS576B](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

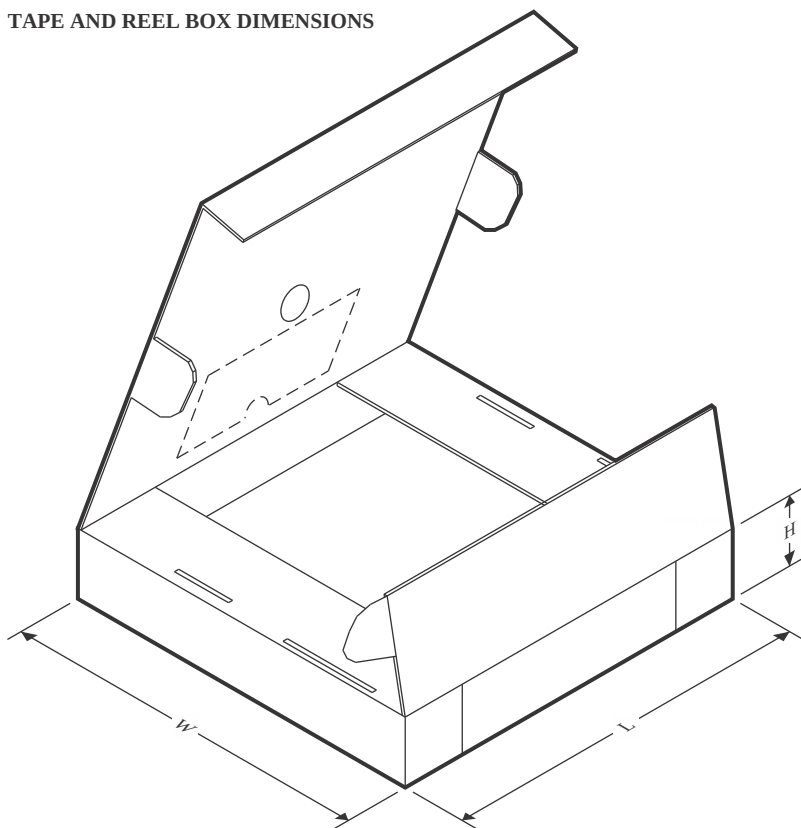
## TAPE AND REEL INFORMATION



\*All dimensions are nominal

| Device         | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74ALS576BDWR | SOIC         | DW              | 20   | 2000 | 330.0              | 24.4               | 10.8    | 13.3    | 2.7     | 12.0    | 24.0   | Q1            |
| SN74ALS576BNSR | SOP          | NS              | 20   | 2000 | 330.0              | 24.4               | 8.4     | 13.0    | 2.5     | 12.0    | 24.0   | Q1            |
| SN74ALS577ADWR | SOIC         | DW              | 24   | 2000 | 330.0              | 24.4               | 10.75   | 15.7    | 2.7     | 12.0    | 24.0   | Q1            |

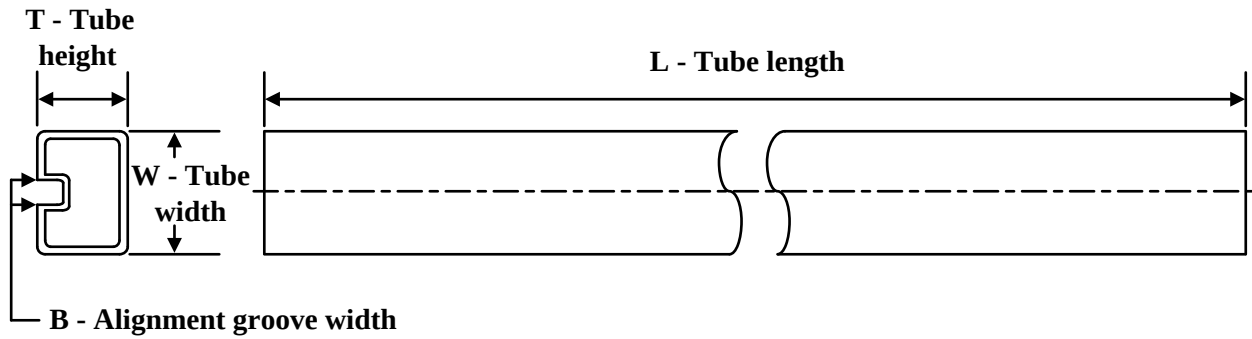
## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

| Device         | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74ALS576BDWR | SOIC         | DW              | 20   | 2000 | 356.0       | 356.0      | 45.0        |
| SN74ALS576BNSR | SOP          | NS              | 20   | 2000 | 356.0       | 356.0      | 45.0        |
| SN74ALS577ADWR | SOIC         | DW              | 24   | 2000 | 350.0       | 350.0      | 43.0        |

## TUBE



\*All dimensions are nominal

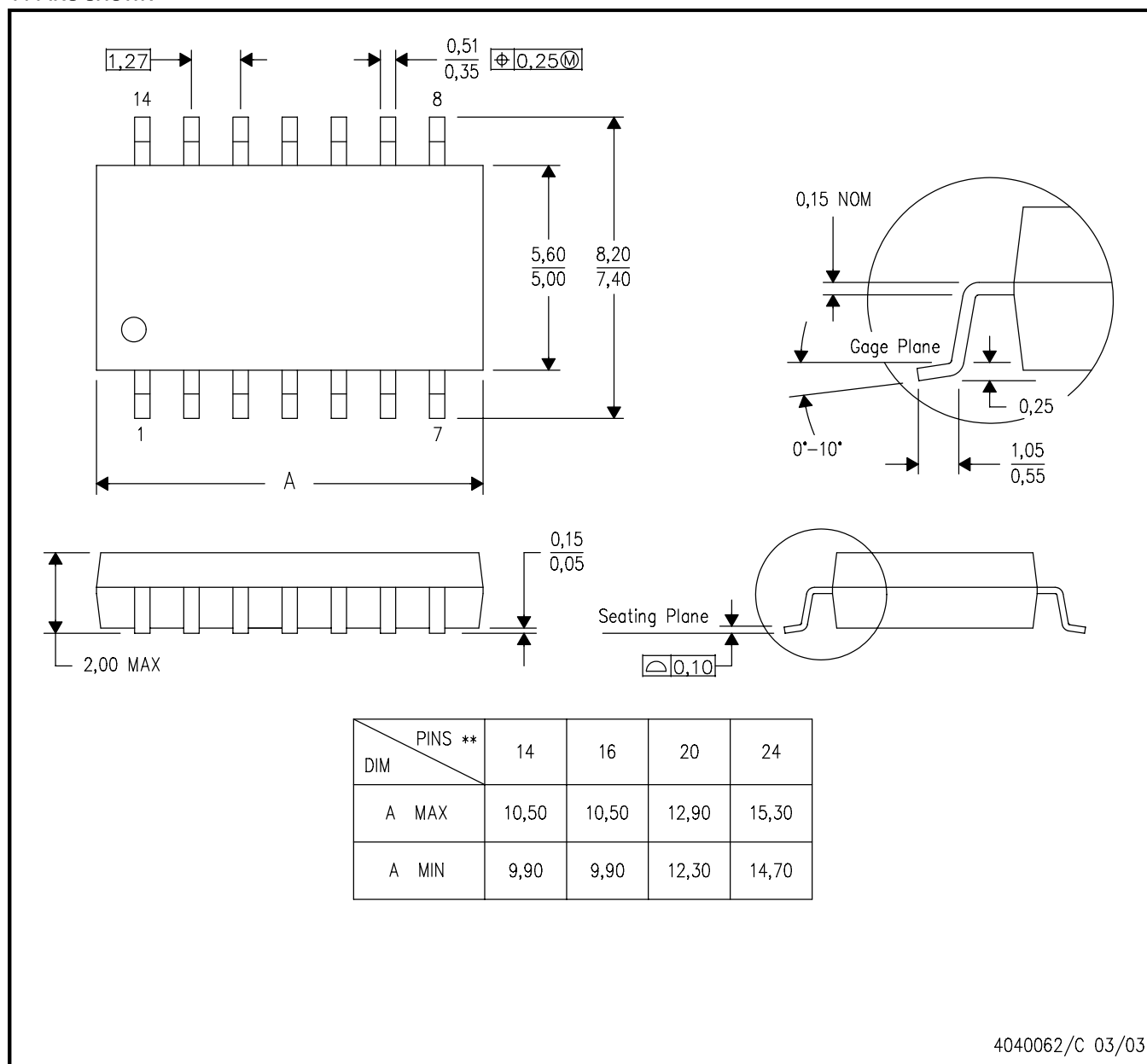
| Device           | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (μm) | B (mm) |
|------------------|--------------|--------------|------|-----|--------|--------|--------|--------|
| 84001022A        | FK           | LCCC         | 20   | 55  | 506.98 | 12.06  | 2030   | NA     |
| SN74ALS576BN     | N            | PDIP         | 20   | 20  | 506    | 13.97  | 11230  | 4.32   |
| SN74ALS576BN.A   | N            | PDIP         | 20   | 20  | 506    | 13.97  | 11230  | 4.32   |
| SN74AS576N       | N            | PDIP         | 20   | 20  | 506    | 13.97  | 11230  | 4.32   |
| SN74AS576N.A     | N            | PDIP         | 20   | 20  | 506    | 13.97  | 11230  | 4.32   |
| SNJ54ALS576BFK   | FK           | LCCC         | 20   | 55  | 506.98 | 12.06  | 2030   | NA     |
| SNJ54ALS576BFK.A | FK           | LCCC         | 20   | 55  | 506.98 | 12.06  | 2030   | NA     |

# MECHANICAL DATA

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

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN

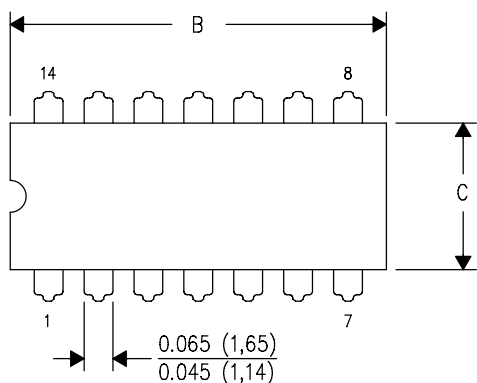


- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

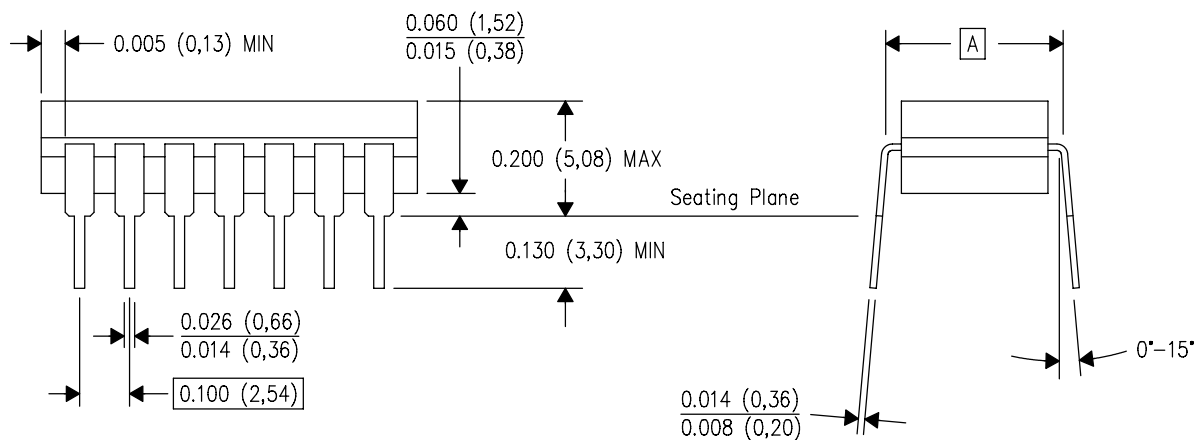
J (R-GDIP-T\*\*)

14 LEADS SHOWN

# CERAMIC DUAL IN-LINE PACKAGE



| PINS **<br>DIM | 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)        |

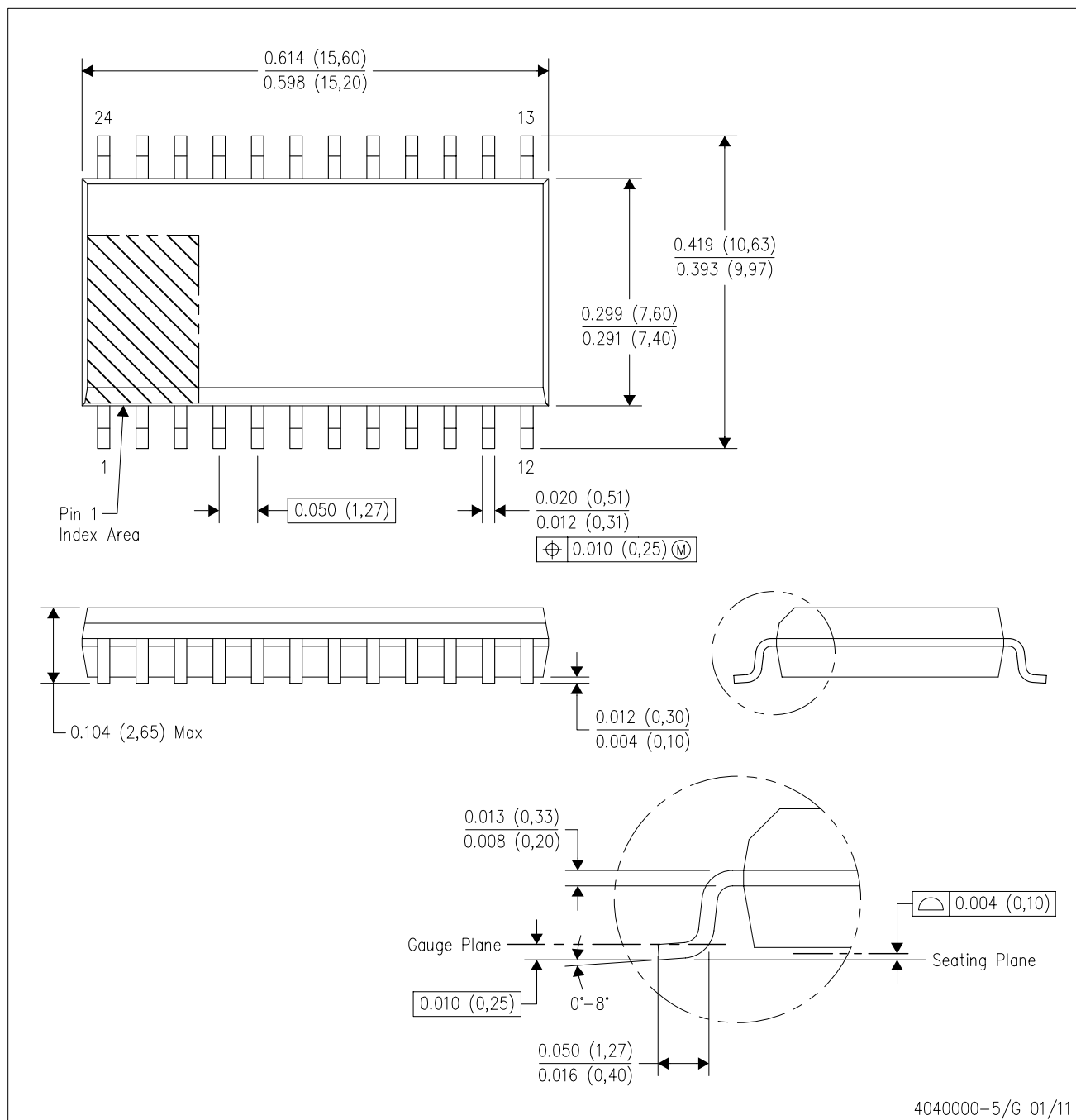


4040083/F 03/03

- 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.

DW (R-PDSO-G24)

PLASTIC SMALL OUTLINE



- NOTES:
- All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M-1994.
  - 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 AD.

## GENERIC PACKAGE VIEW

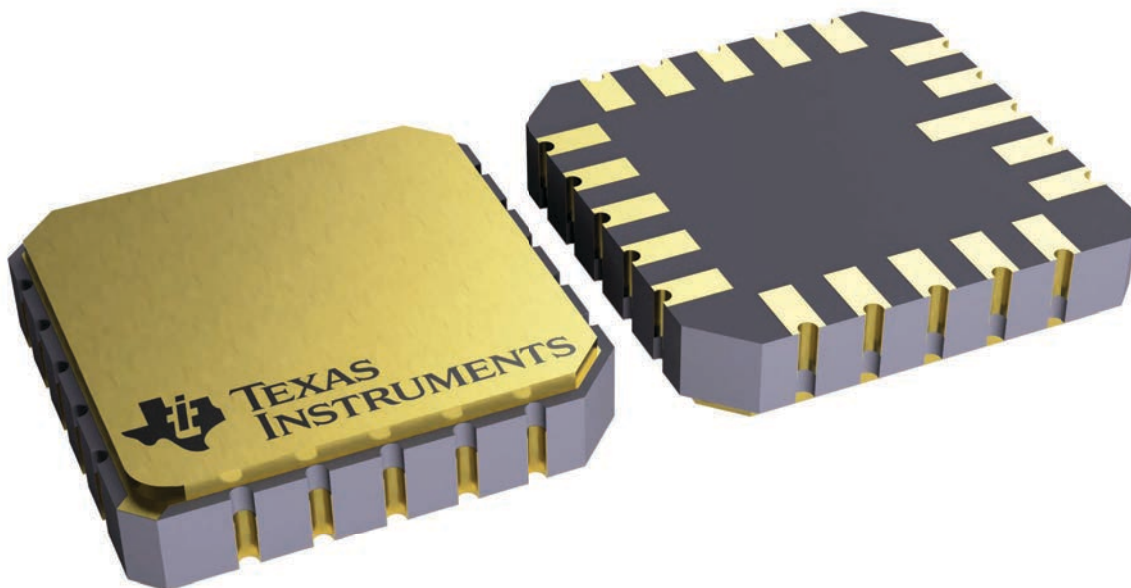
**FK 20**

**LCCC - 2.03 mm max height**

8.89 x 8.89, 1.27 mm pitch

LEADLESS CERAMIC CHIP CARRIER

This image is a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.



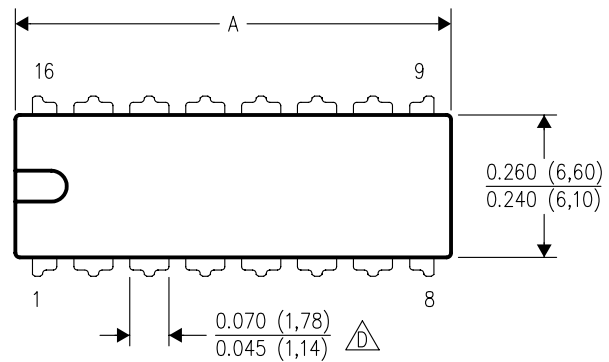
4229370VA\



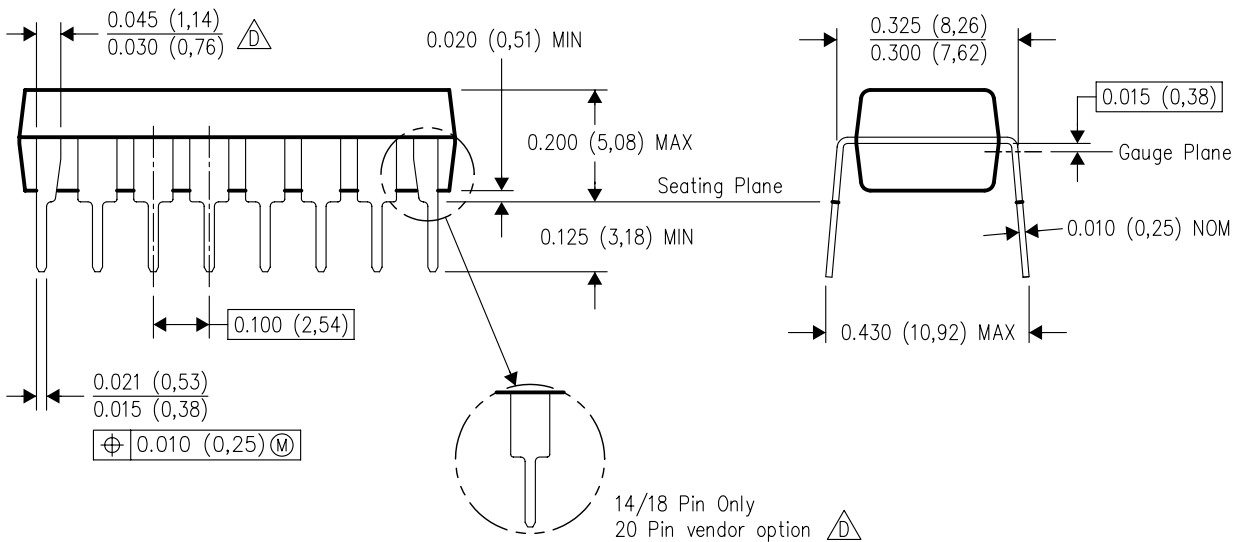
## N (R-PDIP-T\*\*)

16 PINS SHOWN

## PLASTIC DUAL-IN-LINE PACKAGE



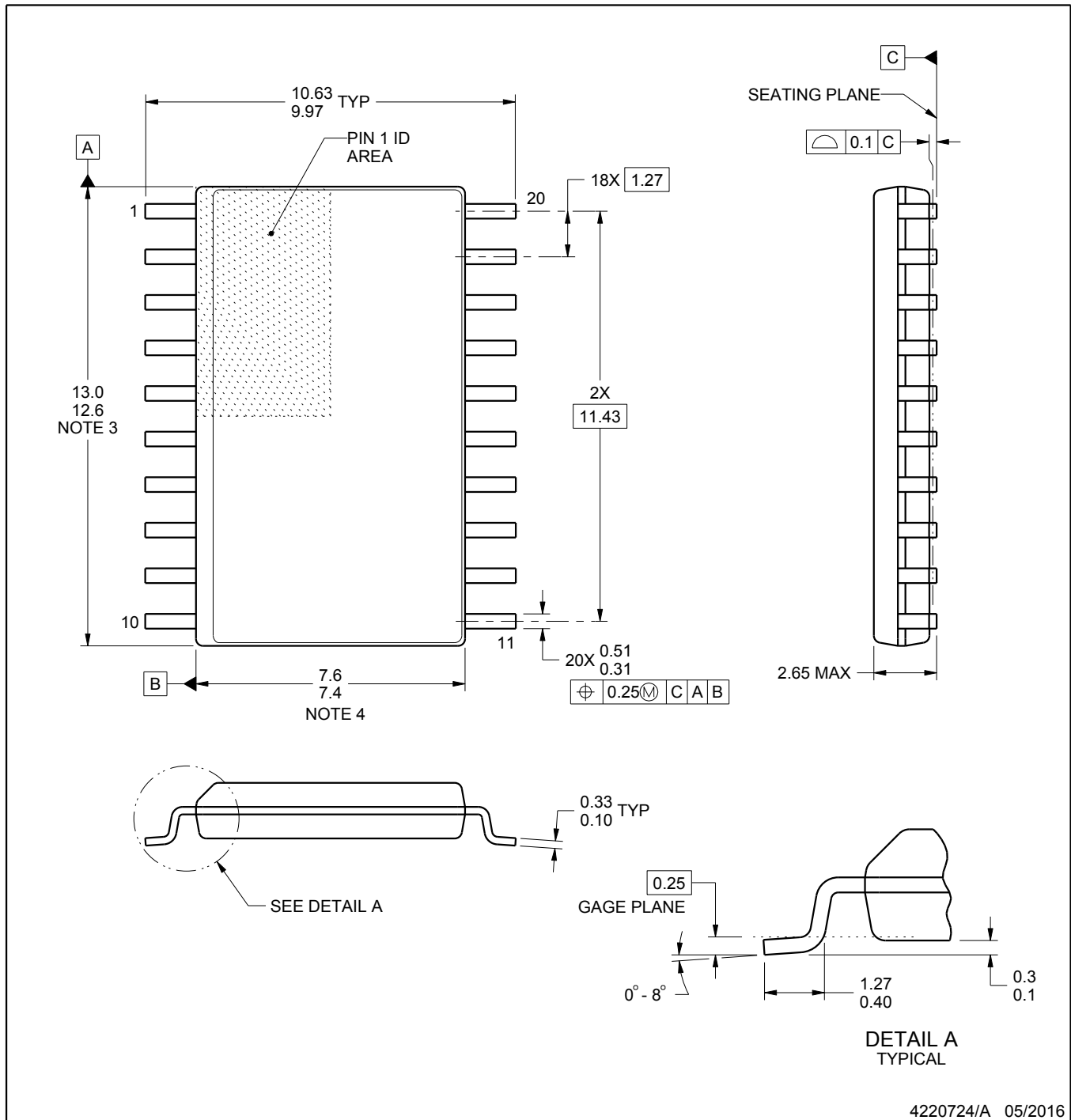
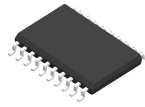
| PINS **             | 14               | 16               | 18               | 20               |
|---------------------|------------------|------------------|------------------|------------------|
| DIM                 |                  |                  |                  |                  |
| 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               |



14/18 Pin Only  
20 Pin vendor option

4040049/E 12/2002

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



4220724/A 05/2016

## NOTES:

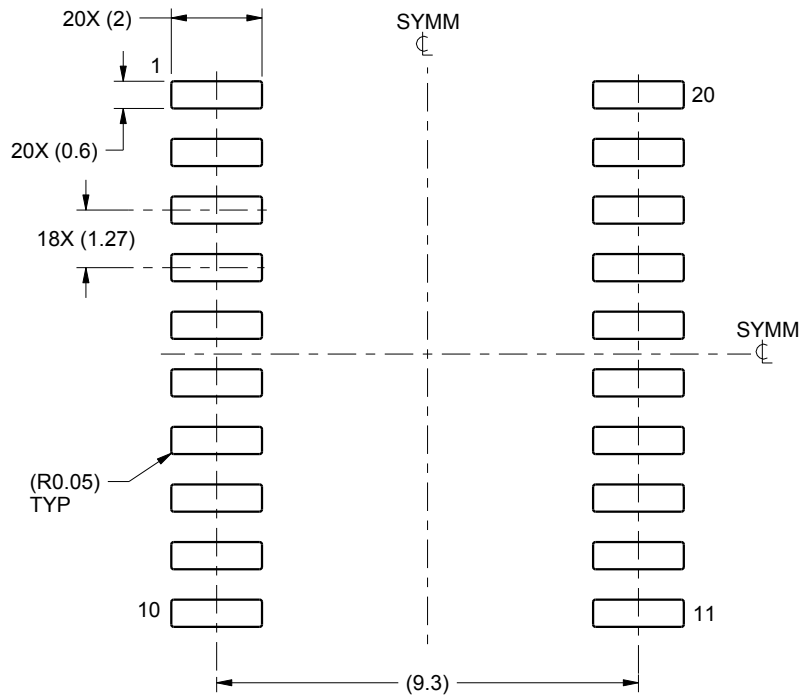
1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm per side.
5. Reference JEDEC registration MS-013.

# EXAMPLE BOARD LAYOUT

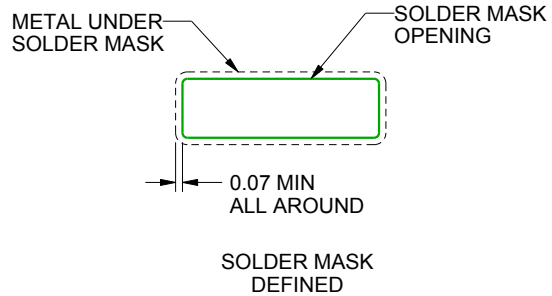
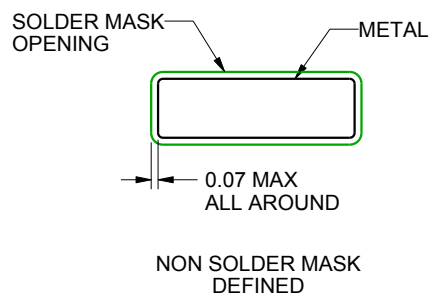
DW0020A

SOIC - 2.65 mm max height

SOIC



LAND PATTERN EXAMPLE  
SCALE:6X



SOLDER MASK DETAILS

4220724/A 05/2016

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

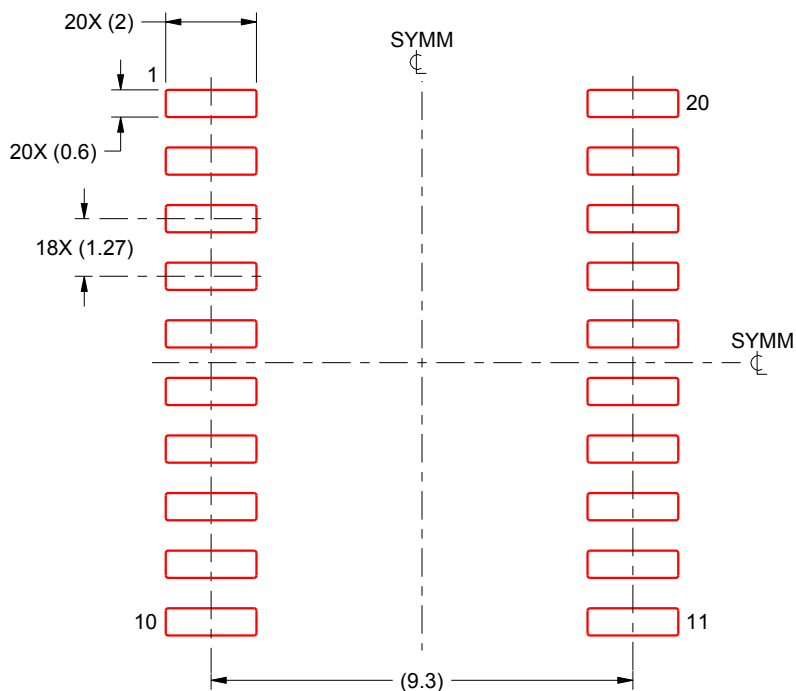
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

## EXAMPLE STENCIL DESIGN

DW0020A

SOIC - 2.65 mm max height

SOIC



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:6X

4220724/A 05/2016

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

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