- **3-State Outputs Drive Bus Lines Directly**
- **Package Options Include Plastic Small-Outline (SOIC) and Shrink Small-Outline (SSOP) Packages, Ceramic Chip Carriers, and Plastic and Ceramic DIPs**

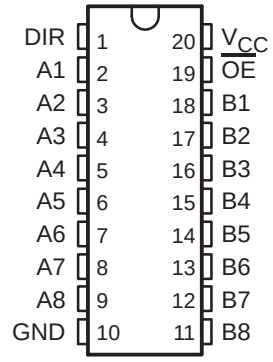
## description

These octal bus transceivers are designed for asynchronous communication between data buses. The devices transmit data from the A bus to the B bus or from the B bus to the A bus depending upon the logic level at the direction-control (DIR) input. The output enable ($\overline{OE}$) input can be used to disable the device so the buses are effectively isolated.

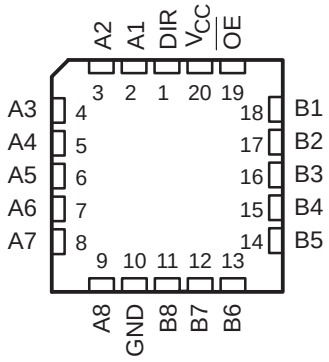
The SN74F245 is available in TI's shrink small-outline package (DB), which provides the same I/O pin count and functionality of standard small-outline packages in less than half the printed-circuit-board area.

The SN54F245 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74F245 is characterized for operation from 0°C to 70°C.

**SN54F245 . . . J PACKAGE**
**SN74F245 . . . DB, DW, OR N PACKAGE**
**(TOP VIEW)**



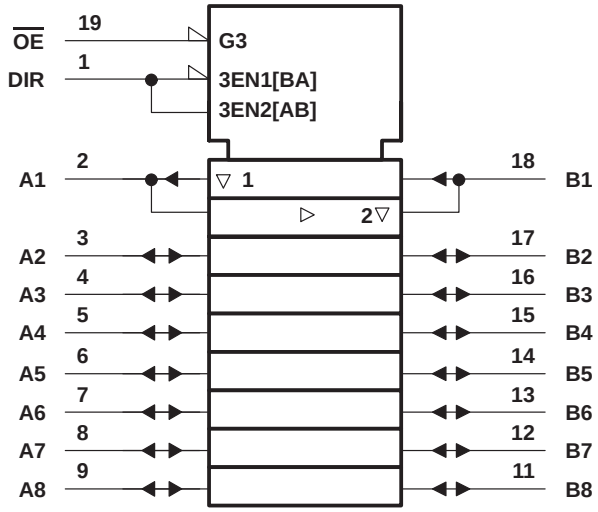

**SN54F245 . . . FK PACKAGE**
**(TOP VIEW)**



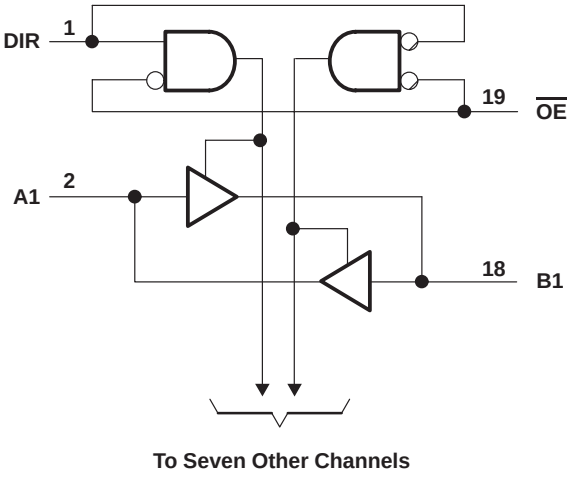

**FUNCTION TABLE**

| INPUTS | | OPERATION |
|---|---|---|
| $\overline{OE}$ | DIR | |
| L | L | B data to A bus |
| L | H | A data to B bus |
| H | X | Isolation |

### logic symbol†




### logic diagram (positive logic)




† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)‡

Supply voltage range, $V_{CC}$ . . . . . –0.5 V to 7 V
Input voltage range, $V_I$ (except I/O ports) (see Note 1) . . . . . –1.2 V to 7 V
Input current range . . . . . –30 mA to 5 mA
Voltage range applied to any output in the disabled or power-off state . . . . . –0.5 V to 5.5 V
Voltage range applied to any output in the high state . . . . . –0.5 V to $V_{CC}$
Current into any output in the low state: SN54F245 (A1 thru A8) . . . . . 40 mA
SN54F245 (B1 thru B8) . . . . . 96 mA
SN74F245 (A1 thru A8) . . . . . 48 mA
SN74F245 (B1 thru B8) . . . . . 128 mA
Operating free-air temperature range: SN54F245 . . . . . –55°C to 125°C
SN74F245 . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°C

‡ 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 input voltage ratings may be exceeded provided the input current ratings are observed.

## recommended operating conditions

| | | | SN54F245 | | | SN74F245 | | | 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 |
| $I_{IK}$ | Input clamp current | | | | –18 | | | –18 | mA |
| $I_{OH}$ | High-level output current | A1 thru A8 | | | – 3 | | | – 3 | mA |
| | | B1 thru B8 | | | – 12 | | | – 15 | |
| $I_{OL}$ | Low-level output current | A1 thru A8 | | | 20 | | | 24 | mA |
| | | B1 thru B8 | | | 48 | | | 64 | |
| $T_A$ | Operating free-air temperature | | –55 | | 125 | 0 | | 70 | °C |

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

| PARAMETER | | TEST CONDITIONS | | SN54F245 | | | SN74F245 | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP† | MAX | MIN | TYP† | MAX | |
| $V_{IK}$ | | $V_{CC}$ = 4.5 V, | $I_I$ = –18 mA | | | –1.2 | | | –1.2 | V |
| $V_{OH}$ | A1 thru A8 | $V_{CC}$ = 4.5 V | $I_{OH}$ = – 1 mA | 2.5 | 3.4 | | 2.5 | 3.4 | | V |
| | | | $I_{OH}$ = – 3 mA | 2.4 | 3.3 | | 2.4 | 3.3 | | |
| | B1 thru B8 | $V_{CC}$ = 4.5 V | $I_{OH}$ = – 12 mA | 2 | 3.2 | | | | | |
| | | | $I_{OH}$ = – 15 mA | | | | 2 | 3.1 | | |
| | Any output | $V_{CC}$ = 4.75 V, | $I_{OH}$ = –1 mA to – 3 mA | | | | 2.7 | | | |
| $V_{OL}$ | A1 thru A8 | $V_{CC}$ = 4.5 V | $I_{OL}$ = 20 mA | | 0.3 | 0.5 | | | | V |
| | | | $I_{OL}$ = 24 mA | | | | | 0.35 | 0.5 | |
| | B1 thru B8 | $V_{CC}$ = 4.5 V | $I_{OL}$ = 48 mA | | 0.38 | 0.55 | | | | |
| | | | $I_{OL}$ = 64 mA | | | | | 0.42 | 0.55 | |
| $I_I$ | A and B | $V_{CC}$ = 5.5 V | $V_I$ = 5.5 V | | | 1 | | | 1 | mA |
| | DIR, $\overline{OE}$ | | $V_I$ = 7 V | | | 0.1 | | | 0.1 | |
| $I_{IH}$‡ | A and B | $V_{CC}$ = 5.5 V, | $V_I$ = 2.7 V | | | 70 | | | 70 | µA |
| | DIR, $\overline{OE}$ | | | | | 20 | | | 20 | |
| $I_{IL}$‡ | A and B | $V_{CC}$ = 5.5 V, | $V_I$ = 0.5 V | | | –0.65 | | | –0.65 | mA |
| | DIR, $\overline{OE}$ | | | | | – 1.2 | | | – 1.2 | |
| $I_{OS}$§ | A1 thru A8 | $V_{CC}$ = 5.5 V, | $V_O$ = 0 | –60 | | –150 | –60 | | –150 | mA |
| | B1 thru B8 | | | –100 | | –225 | –100 | | –225 | |
| $I_{CC}$ | | $V_{CC}$ = 5.5 V | Outputs high | | 70 | 90 | | 70 | 90 | mA |
| | | | Outputs low | | 95 | 120 | | 95 | 120 | |
| | | | Outputs disabled | | 85 | 110 | | 85 | 110 | |

† All typical values are at $V_{CC}$ = 5 V, $T_A$ = 25°C.
‡ For I/O ports, the parameters $I_{IH}$ and $I_{IL}$ include the off-state output current.
§ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

## switching characteristics (see Note 2)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ = 5 V, $C_L$ = 50 pF, $R_L$ = 500 Ω, $T_A$ = 25°C | | | $V_{CC}$ = 4.5 V to 5.5 V, $C_L$ = 50 pF, $R_L$ = 500 Ω, $T_A$ = MIN to MAX† | | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | ′F245 | | | SN54F245 | | SN74F245 | | |
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $t_{PLH}$ | A or B | B or A | 1.7 | 3.8 | 6 | 1.2 | 7.5 | 1.7 | 7 | ns |
| $t_{PHL}$ | | | 1.7 | 4.2 | 6 | 1.2 | 7.5 | 1.7 | 7 | |
| $t_{PZH}$ | $\overline{OE}$ | A or B | 2.2 | 4.9 | 7 | 1.7 | 9 | 2.2 | 8 | ns |
| $t_{PZL}$ | | | 2.7 | 5.6 | 8 | 2.2 | 10 | 2.7 | 9 | |
| $t_{PHZ}$ | $\overline{OE}$ | A or B | 2.2 | 4.6 | 6.5 | 1.7 | 9 | 2.2 | 7.5 | ns |
| $t_{PLZ}$ | | | 1.2 | 4.6 | 6.5 | 1.2 | 10 | 1.2 | 7.5 | |

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

NOTE 2: Load circuits and waveforms are shown in Section 1.

## PACKAGING INFORMATION

| Orderable part number | Status (1) | Material type (2) | Package \| Pins | Package qty \| Carrier | RoHS (3) | Lead finish/ Ball material (4) | MSL rating/ Peak reflow (5) | Op temp (°C) | Part marking (6) |
|---|---|---|---|---|---|---|---|---|---|
| 85511012A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 85511012A SNJ54F 245FK |
| 8551101RA | Active | Production | CDIP (J) \| 20 | 20 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8551101RA SNJ54F245J |
| 8551101SA | Active | Production | CFP (W) \| 20 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8551101SA SNJ54F245W |
| JM38510/34803B2A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510/ 34803B2A |
| JM38510/34803B2A.A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510/ 34803B2A |
| JM38510/34803BRA | Active | Production | CDIP (J) \| 20 | 20 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510/ 34803BRA |
| JM38510/34803BRA.A | Active | Production | CDIP (J) \| 20 | 20 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510/ 34803BRA |
| JM38510/34803BSA | Active | Production | CFP (W) \| 20 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510/ 34803BSA |
| JM38510/34803BSA.A | Active | Production | CFP (W) \| 20 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510/ 34803BSA |
| M38510/34803B2A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510/ 34803B2A |
| M38510/34803BRA | Active | Production | CDIP (J) \| 20 | 20 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510/ 34803BRA |
| M38510/34803BSA | Active | Production | CFP (W) \| 20 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510/ 34803BSA |
| SN54F245J | Active | Production | CDIP (J) \| 20 | 20 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | SN54F245J |
| SN54F245J.A | Active | Production | CDIP (J) \| 20 | 20 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | SN54F245J |
| SN74F245DBR | Active | Production | SSOP (DB) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | F245 |
| SN74F245DBR.A | Active | Production | SSOP (DB) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | F245 |
| SN74F245DW | Obsolete | Production | SOIC (DW) \| 20 | - | - | Call TI | Call TI | 0 to 70 | F245 |
| SN74F245DWR | Active | Production | SOIC (DW) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | F245 |
| SN74F245DWR.A | Active | Production | SOIC (DW) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | F245 |

| Orderable part number | Status (1) | Material type (2) | Package \| Pins | Package qty \| Carrier | RoHS (3) | Lead finish/ Ball material (4) | MSL rating/ Peak reflow (5) | Op temp (°C) | Part marking (6) |
|---|---|---|---|---|---|---|---|---|---|
| SN74F245DWR.B | Active | Production | SOIC (DW) \| 20 | 2000 \| LARGE T&R | - | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | F245 |
| SN74F245N | Active | Production | PDIP (N) \| 20 | 20 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | SN74F245N |
| SN74F245N.A | Active | Production | PDIP (N) \| 20 | 20 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | SN74F245N |
| SN74F245NE4 | Active | Production | PDIP (N) \| 20 | 20 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | SN74F245N |
| SN74F245NSR | Active | Production | SOP (NS) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 74F245 |
| SN74F245NSR.A | Active | Production | SOP (NS) \| 20 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 74F245 |
| SN74F245NSR.B | Active | Production | SOP (NS) \| 20 | 2000 \| LARGE T&R | - | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 74F245 |
| SNJ54F245FK | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 85511012A SNJ54F 245FK |
| SNJ54F245FK.A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 85511012A SNJ54F 245FK |
| SNJ54F245J | Active | Production | CDIP (J) \| 20 | 20 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8551101RA SNJ54F245J |
| SNJ54F245J.A | Active | Production | CDIP (J) \| 20 | 20 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8551101RA SNJ54F245J |
| SNJ54F245W | Active | Production | CFP (W) \| 20 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8551101SA SNJ54F245W |
| SNJ54F245W.A | Active | Production | CFP (W) \| 20 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8551101SA SNJ54F245W |

(1) **Status:** For more details on status, see our product life cycle.

(2) **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.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) **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.

**(5) 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.

**(6) 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 SN54F245, SN74F245 :**

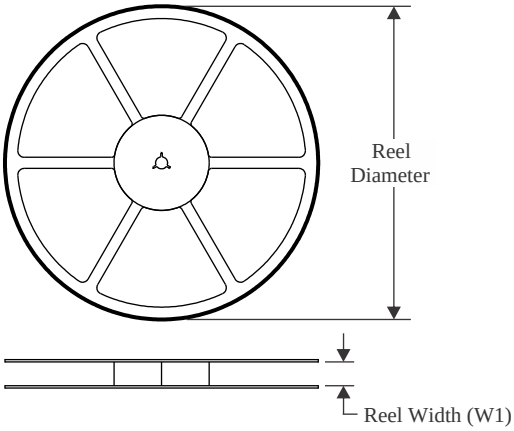
- Catalog : SN74F245
- Military : SN54F245

NOTE: Qualified Version Definitions:

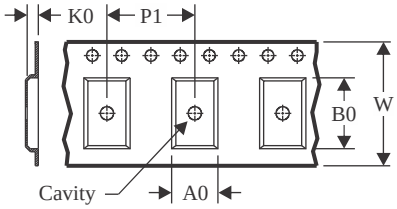
- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

## TAPE AND REEL INFORMATION

**REEL DIMENSIONS**

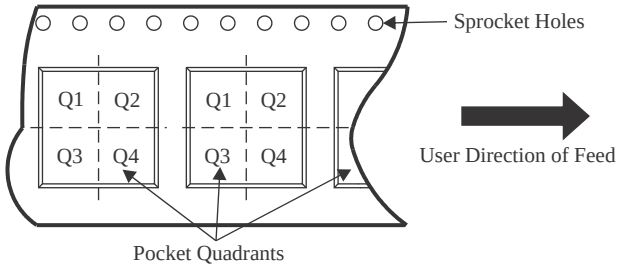



**TAPE DIMENSIONS**




| | |
|---|---|
| A0 | Dimension designed to accommodate the component width |
| B0 | Dimension designed to accommodate the component length |
| K0 | Dimension designed to accommodate the component thickness |
| W | Overall width of the carrier tape |
| P1 | Pitch between successive cavity centers |

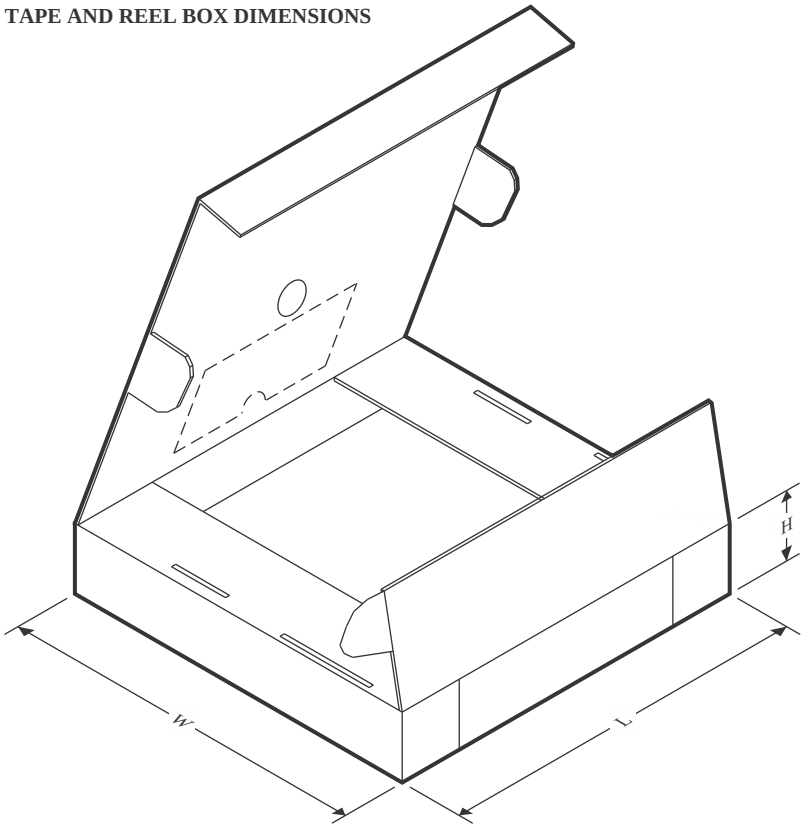
**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**




*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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SN74F245DBR | SSOP | DB | 20 | 2000 | 330.0 | 16.4 | 8.2 | 7.5 | 2.5 | 12.0 | 16.0 | Q1 |
| SN74F245DWR | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.3 | 2.7 | 12.0 | 24.0 | Q1 |
| SN74F245NSR | SOP | NS | 20 | 2000 | 330.0 | 24.4 | 8.4 | 13.0 | 2.5 | 12.0 | 24.0 | Q1 |

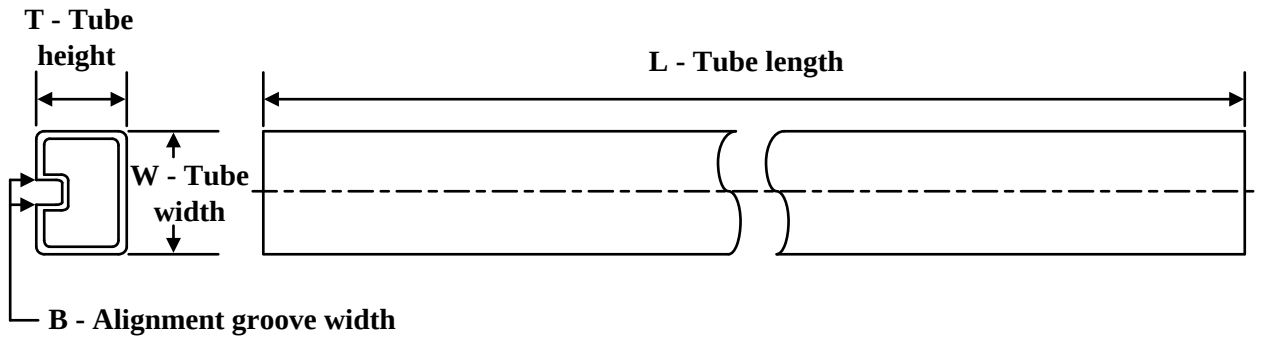
TAPE AND REEL BOX DIMENSIONS




*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| SN74F245DBR | SSOP | DB | 20 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74F245DWR | SOIC | DW | 20 | 2000 | 356.0 | 356.0 | 45.0 |
| SN74F245NSR | SOP | NS | 20 | 2000 | 356.0 | 356.0 | 45.0 |

## TUBE



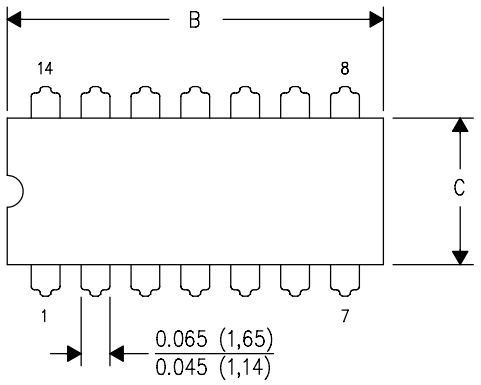

*All dimensions are nominal

| Device | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (µm) | B (mm) |
|---|---|---|---|---|---|---|---|---|
| 85511012A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| 8551101SA | W | CFP | 20 | 25 | 506.98 | 26.16 | 6220 | NA |
| JM38510/34803B2A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| JM38510/34803B2A.A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| JM38510/34803BSA | W | CFP | 20 | 25 | 506.98 | 26.16 | 6220 | NA |
| JM38510/34803BSA.A | W | CFP | 20 | 25 | 506.98 | 26.16 | 6220 | NA |
| M38510/34803B2A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| M38510/34803BSA | W | CFP | 20 | 25 | 506.98 | 26.16 | 6220 | NA |
| SN74F245N | N | PDIP | 20 | 20 | 506 | 13.97 | 11230 | 4.32 |
| SN74F245N.A | N | PDIP | 20 | 20 | 506 | 13.97 | 11230 | 4.32 |
| SN74F245NE4 | N | PDIP | 20 | 20 | 506 | 13.97 | 11230 | 4.32 |
| SNJ54F245FK | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| SNJ54F245FK.A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| SNJ54F245W | W | CFP | 20 | 25 | 506.98 | 26.16 | 6220 | NA |
| SNJ54F245W.A | W | CFP | 20 | 25 | 506.98 | 26.16 | 6220 | NA |

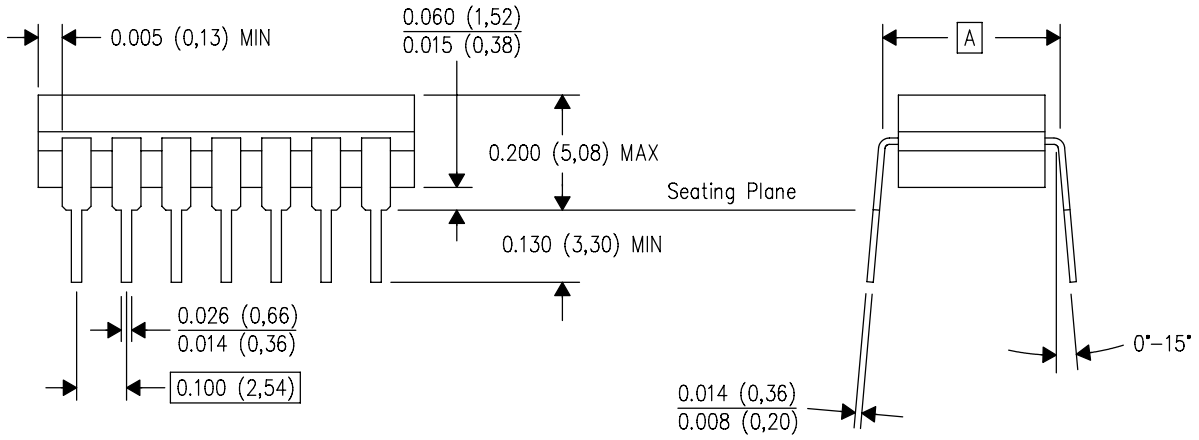
J (R–GDIP–T**)

14 LEADS SHOWN

# CERAMIC DUAL IN–LINE PACKAGE




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

# GENERIC PACKAGE VIEW

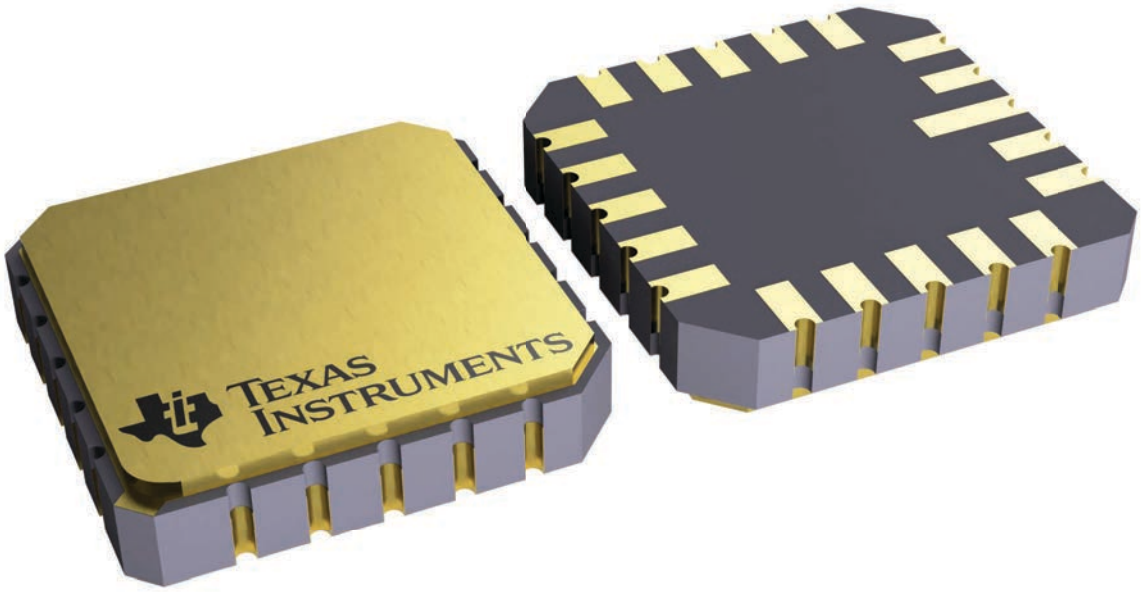
## FK 20

## 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.

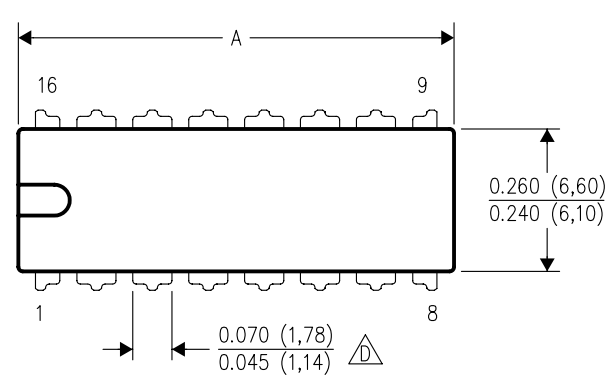



4229370VA\

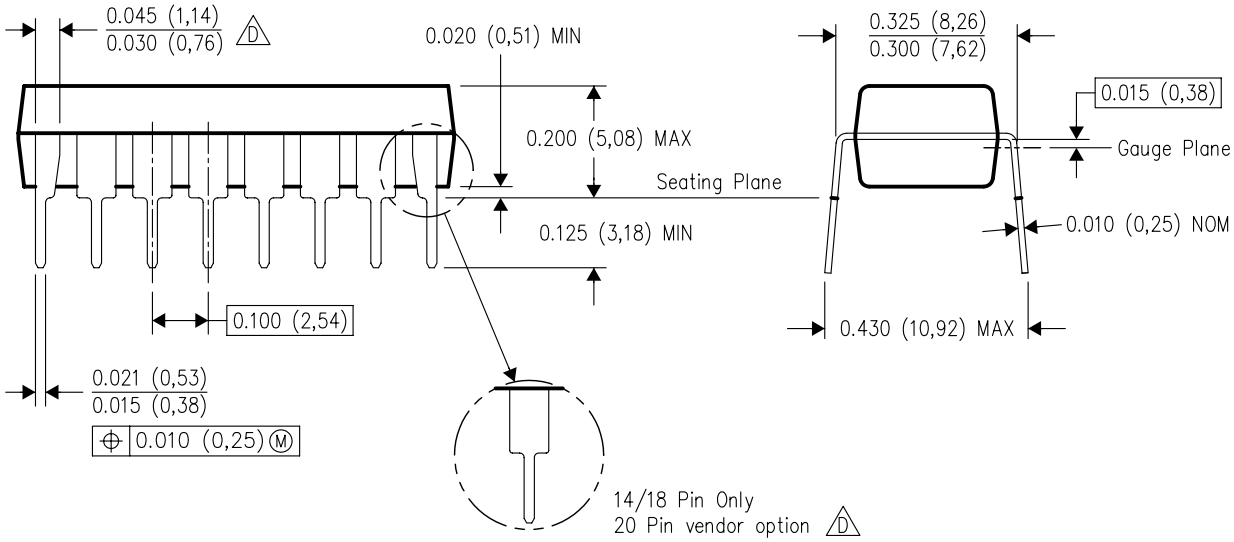
## N (R–PDIP–T**)

## PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN

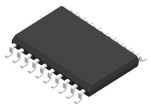



| DIM \ PINS ** | 14 | 16 | 18 | 20 |
|---|---|---|---|---|
| A MAX | 0.775 (19,69) | 0.775 (19,69) | 0.920 (23,37) | 1.060 (26,92) |
| A MIN | 0.745 (18,92) | 0.745 (18,92) | 0.850 (21,59) | 0.940 (23,88) |
| MS–001 VARIATION (C) | AA | BB | AC | AD |




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.

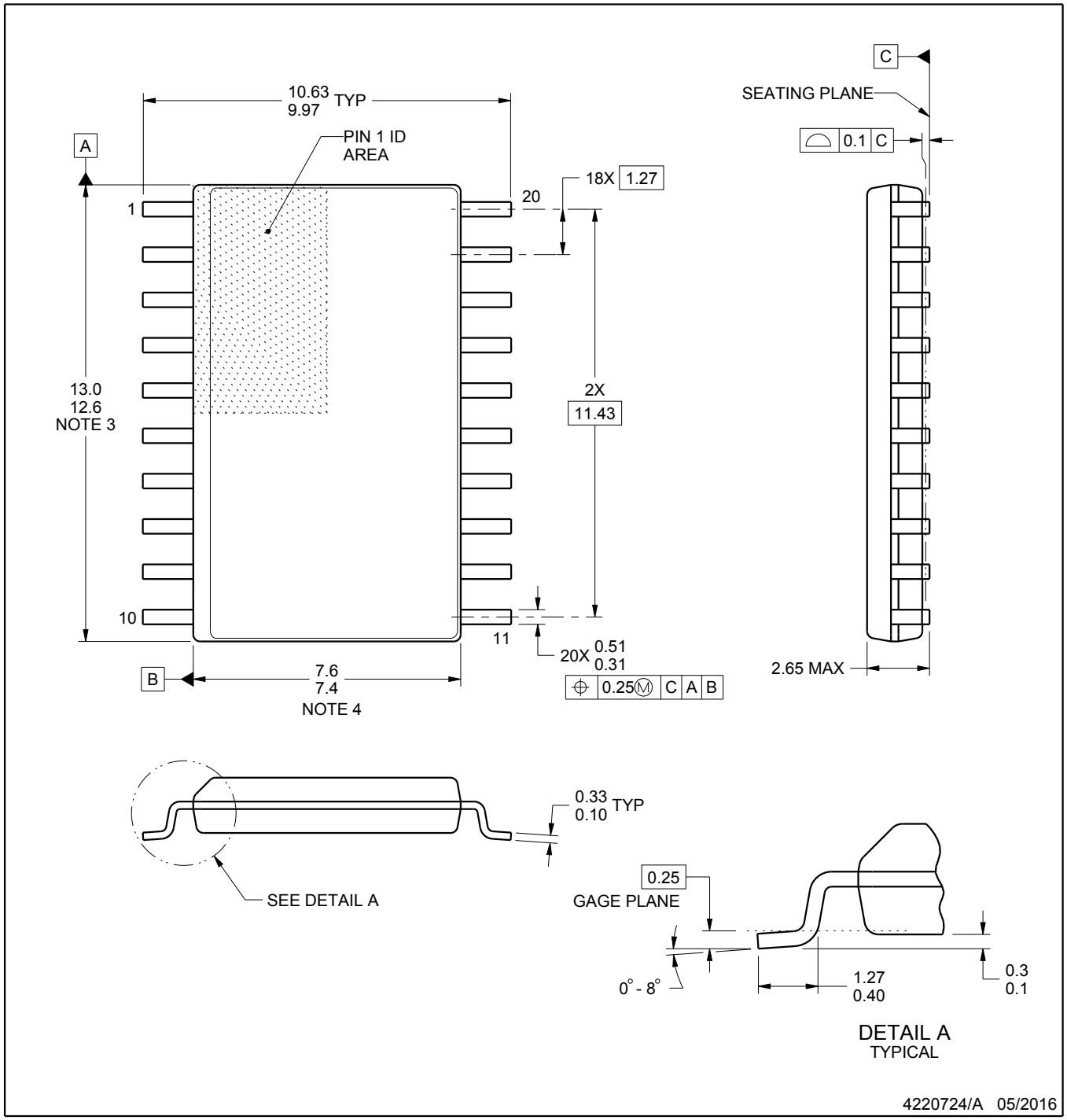


# PACKAGE OUTLINE

## DW0020A

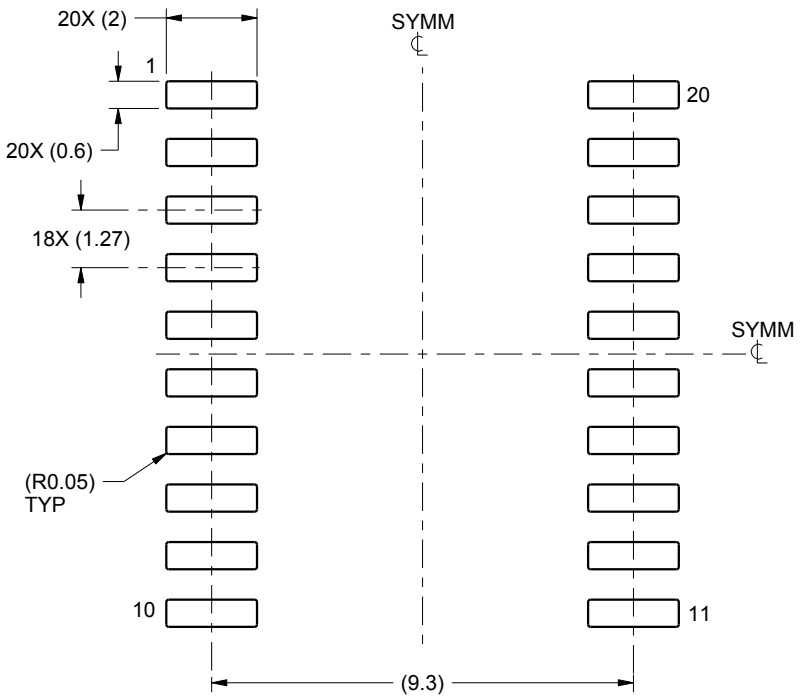
## SOIC - 2.65 mm max height

SOIC

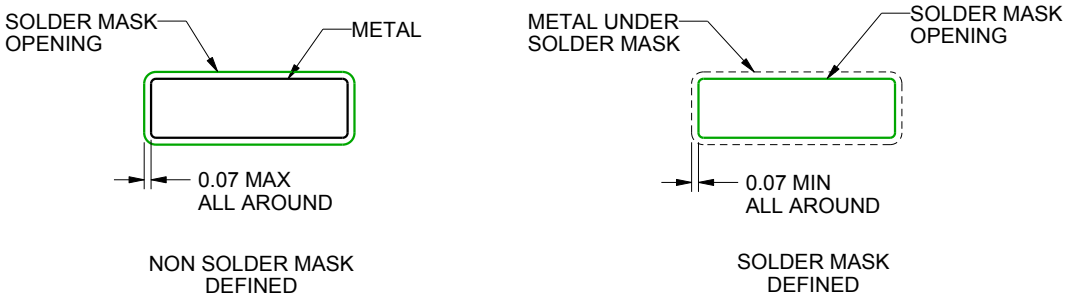



NOTES:

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.




LAND PATTERN EXAMPLE
SCALE:6X

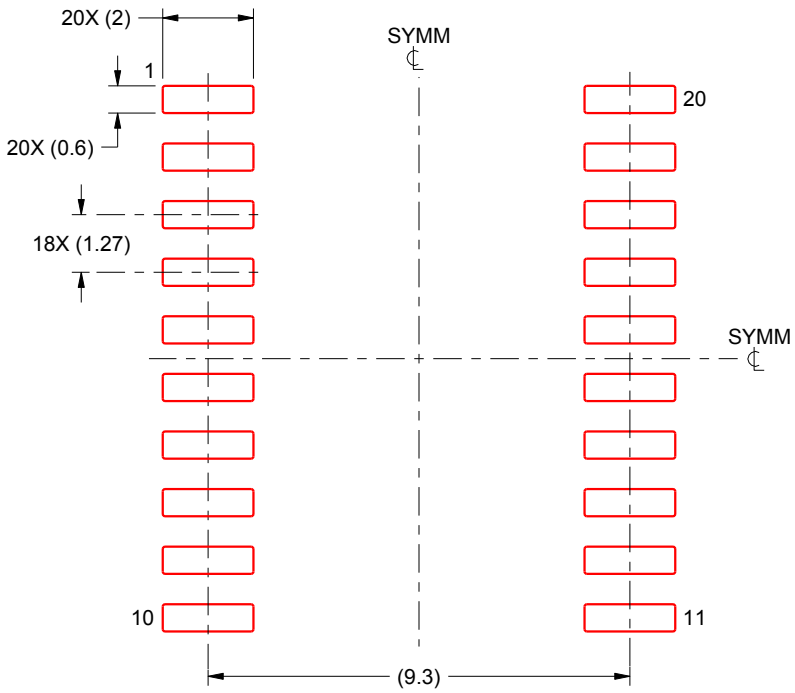



SOLDER MASK DETAILS

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.



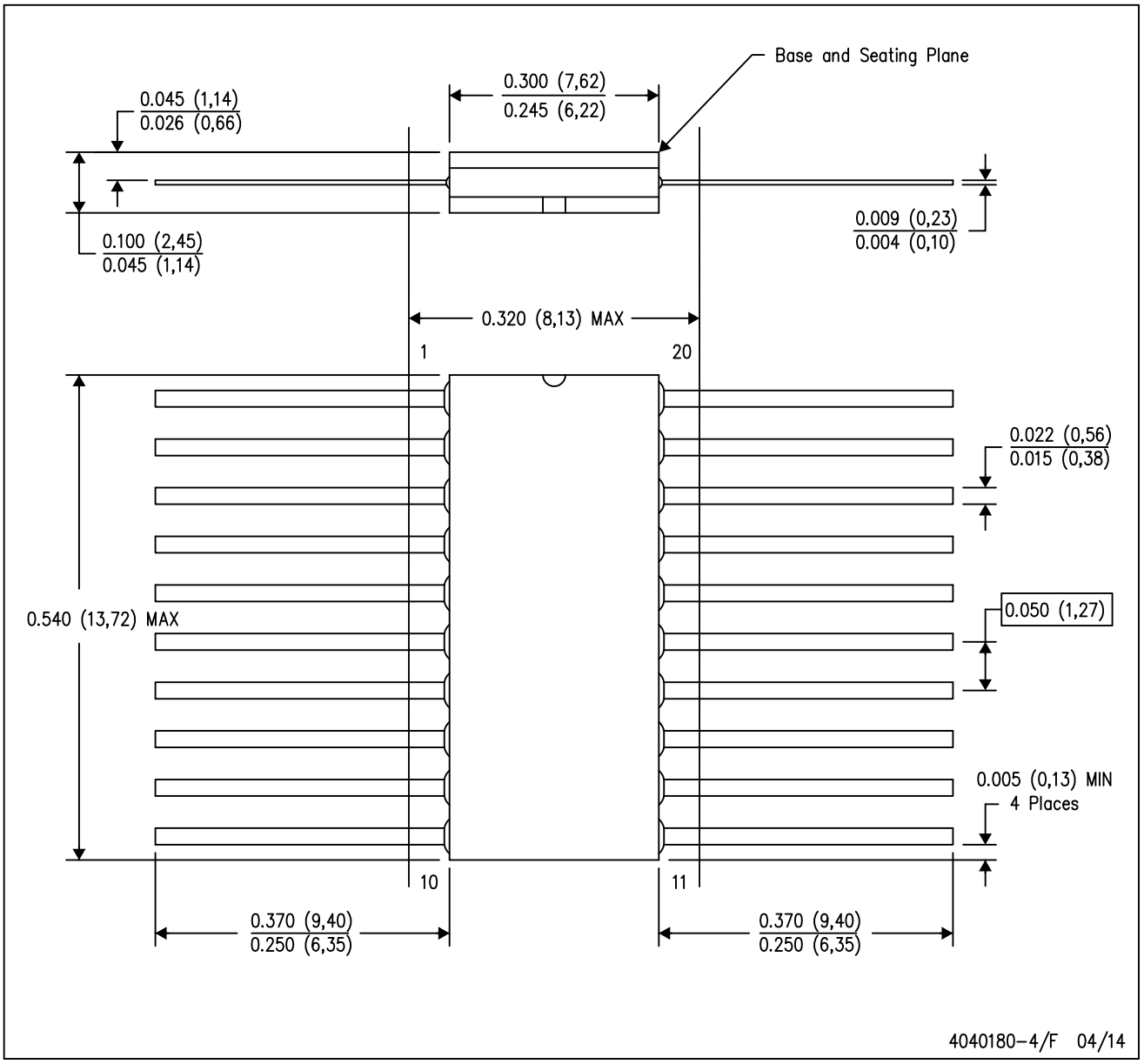

SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:6X

4220724/A 05/2016

NOTES: (continued)

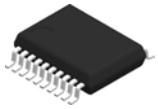
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

W (R–GDFP–F20) 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 GDFP2–F20

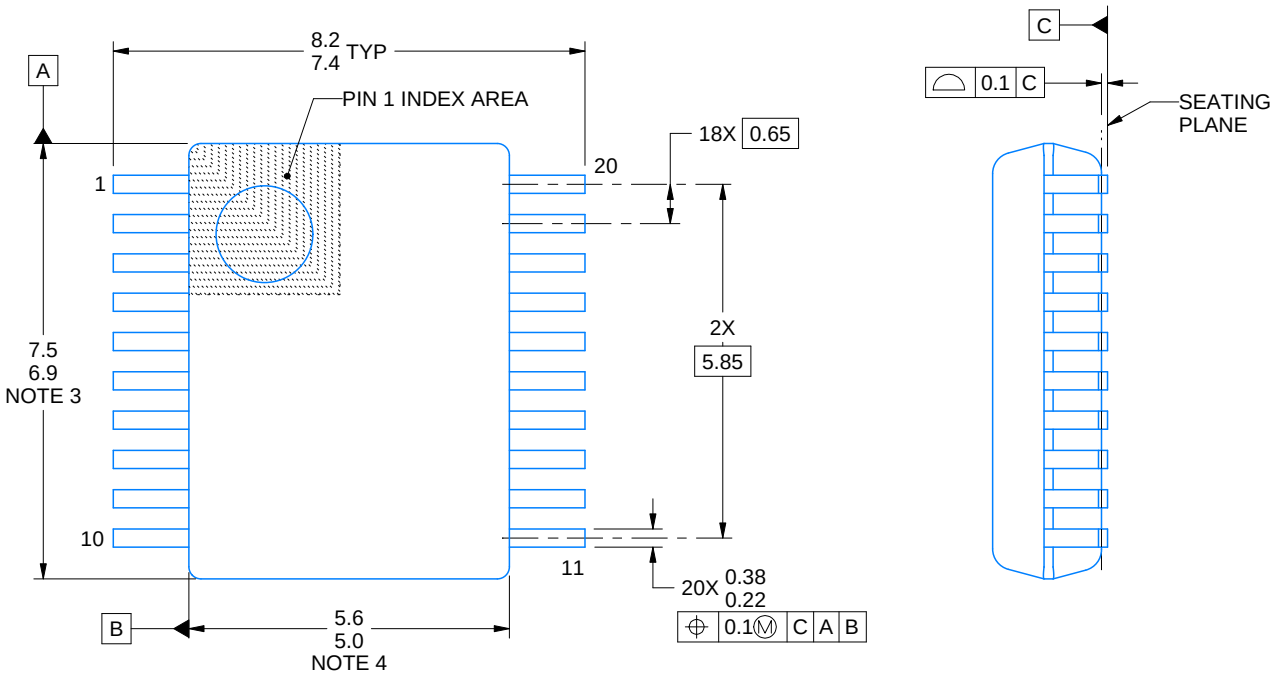
# DB0020A

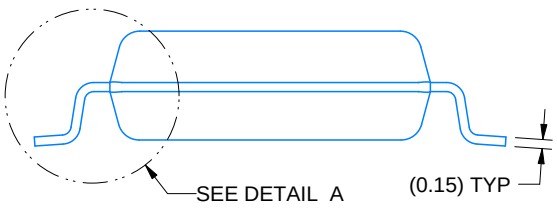


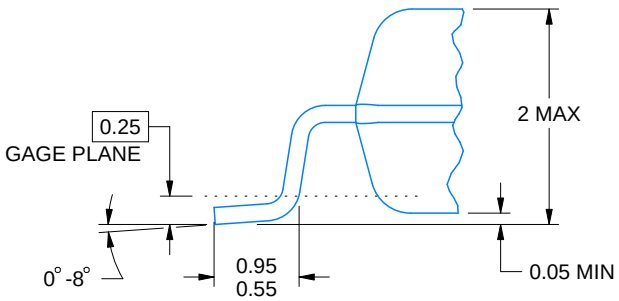
# PACKAGE OUTLINE

## SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



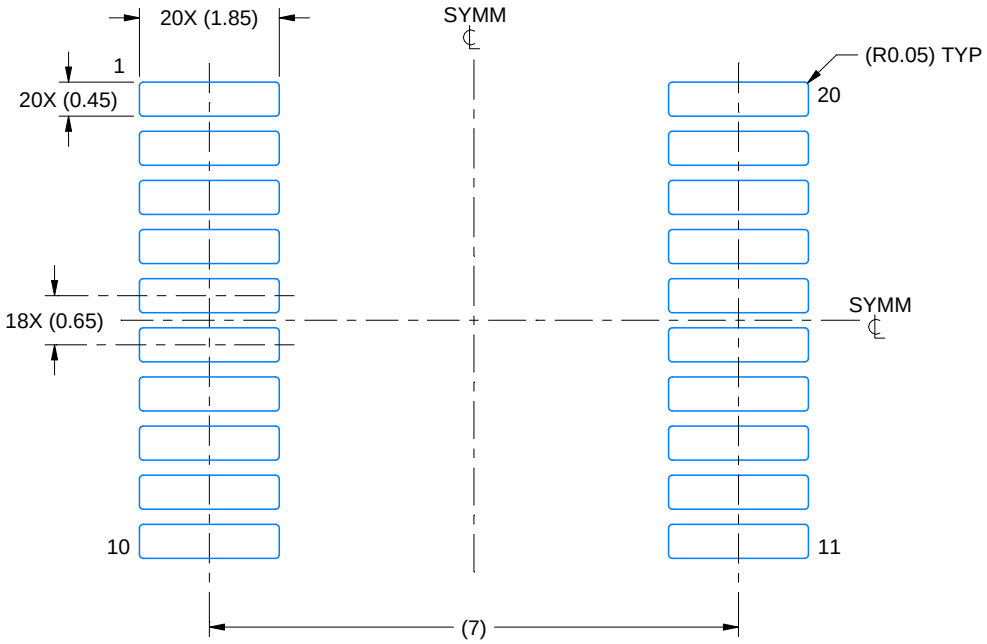




DETAIL A
TYPICAL

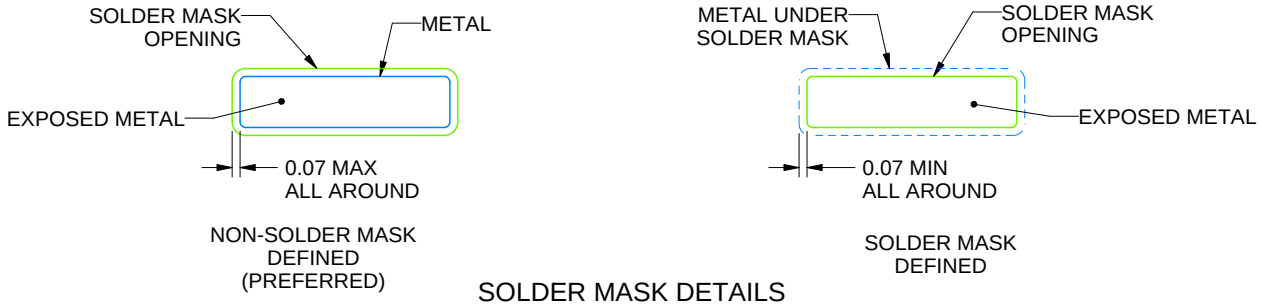
4214851/B 08/2019

NOTES:

1. All linear dimensions are in millimeters. Any 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 0.25 mm per side.
5. Reference JEDEC registration MO-150.




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X




SOLDER MASK DETAILS

4214851/B 08/2019

NOTES: (continued)

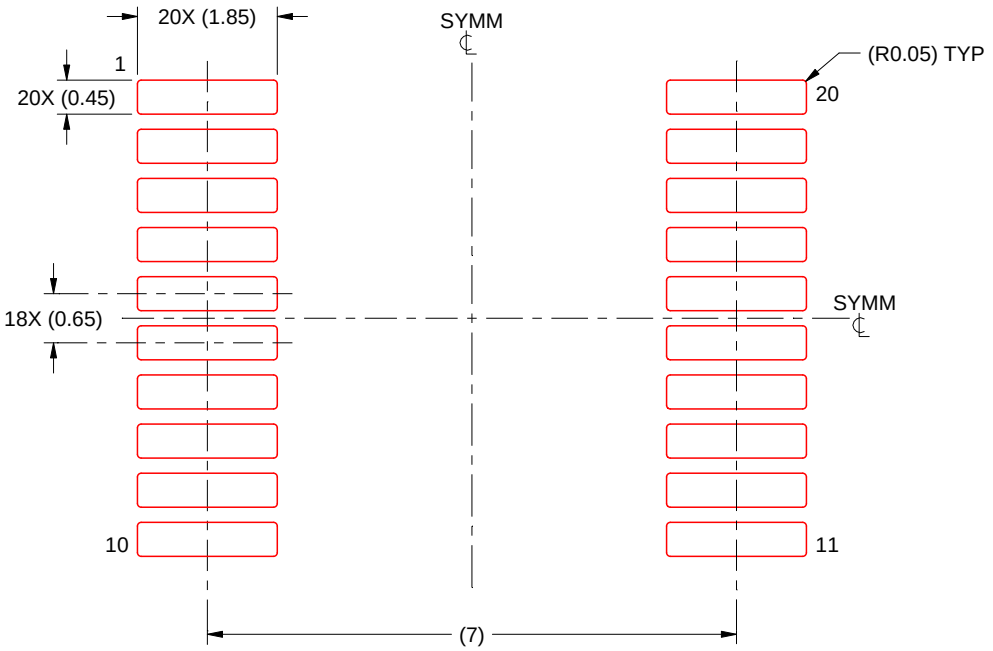
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

## DB0020A

## SSOP - 2 mm max height

SMALL OUTLINE PACKAGE




SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 10X

4214851/B 08/2019

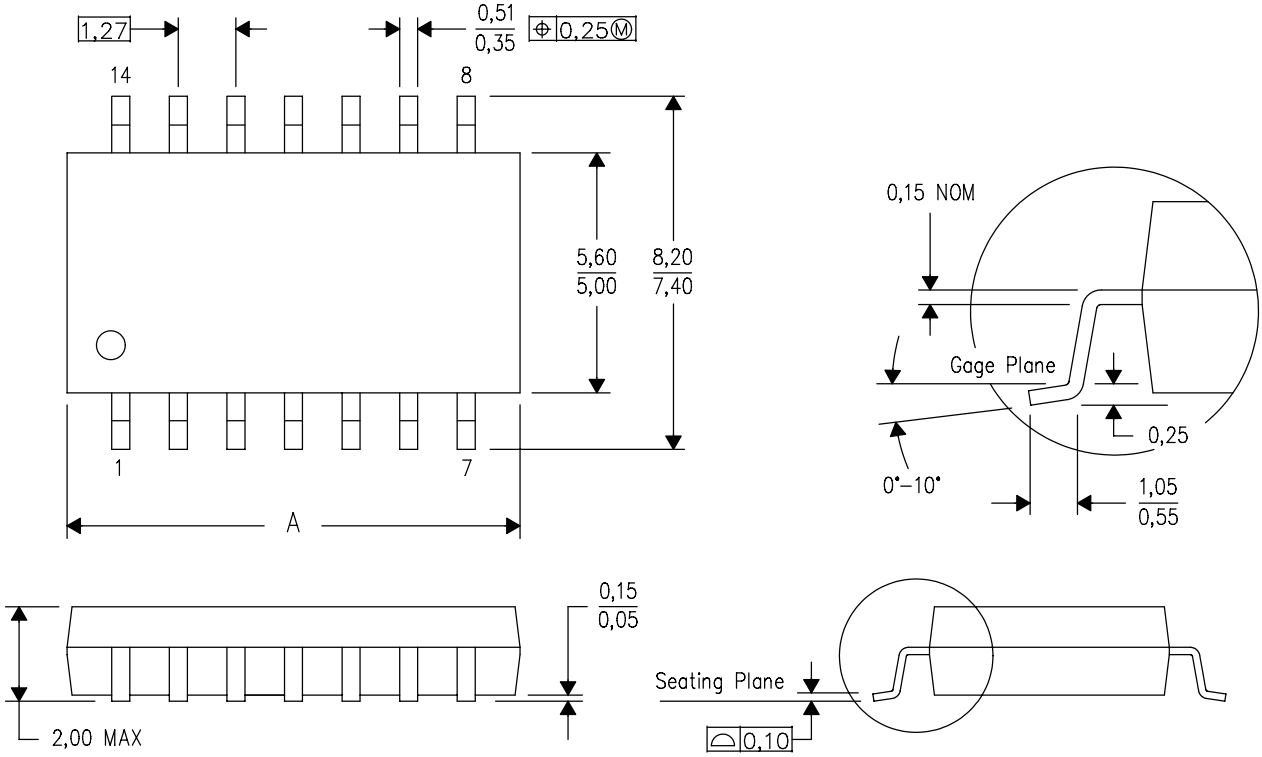
NOTES: (continued)

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.

## 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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