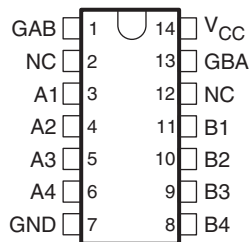


QUADRUPLE BUS TRANSCEIVERS

FEATURES

- Two-Way Asynchronous Communication Between Data Buses
- PNP Inputs Reduce D-C Loading
- Hysteresis (Typically 400 mV) at Inputs Improves Noise Margin

SN54LS243 . . . J OR W PACKAGE
SN74LS243 . . . D, N, OR NS PACKAGE
(TOP VIEW)



**FUNCTION TABLE
(EACH TRANSCEIVER)**

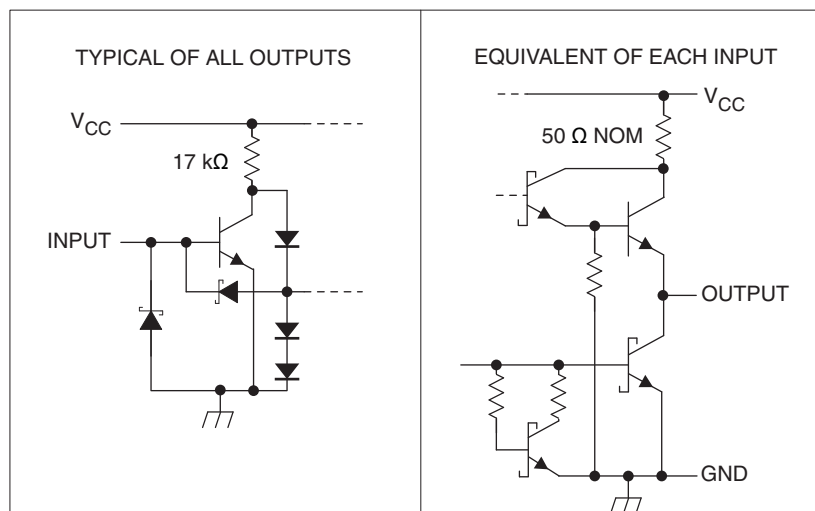
| INPUTS | | SNxxLS243 |
|-------------------------|-----|--------------------------|
| $\overline{\text{GAB}}$ | GBA | |
| L | L | A to B |
| H | H | B to A |
| H | L | Isolation |
| L | H | Latch A and B (A = B) |

DESCRIPTION

These four-data-line transceivers are designed for asynchronous two-way communications between data buses. SN74LS243 can be used to drive terminated lines down to 133 Ω .

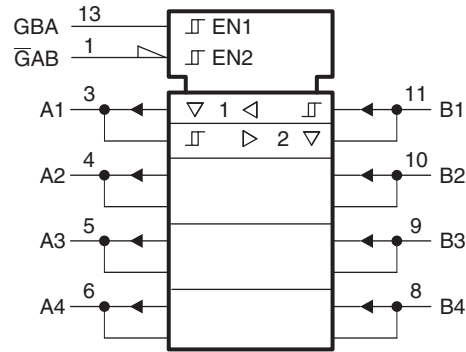
SN54LS243 is characterized for operation over the full military temperature range of -55°C to 125°C . SN74LS243 is characterized for operation from 0°C to 70°C .

SCHEMATICS OF INPUTS AND OUTPUTS



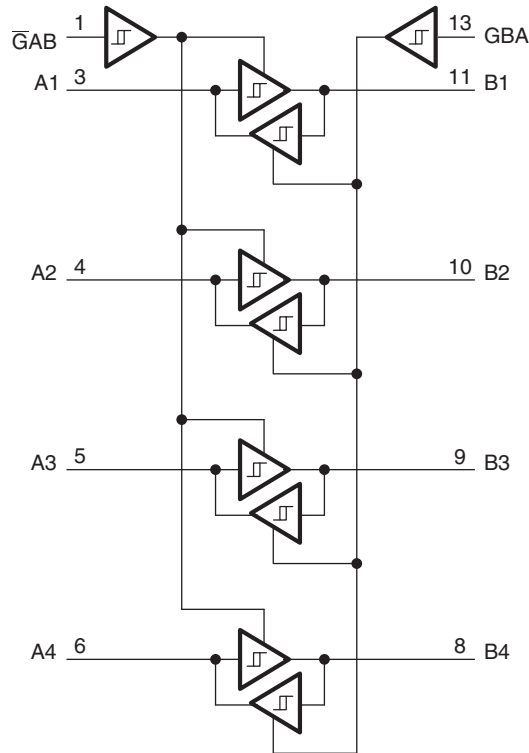
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LOGIC SYMBOL



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

LOGIC DIAGRAM (POSITIVE LOGIC)



ABSOLUTE MAXIMUM RATINGS⁽¹⁾

| | | | MIN | MAX | UNIT |
|------------------|--------------------------------------|-----------|-----|-----|------|
| V _{CC} | Supply voltage ⁽²⁾ | | | 7 | V |
| V _{IN} | Input voltage | | | 7 | V |
| | OFF-state output voltage | | | 5.5 | V |
| T _A | Operating free-air temperature range | SN54LS243 | –55 | 125 | °C |
| | | SN74LS243 | 0 | 70 | |
| T _{stg} | Storage temperature range | | –65 | 150 | °C |

- (1) 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.
- (2) Voltage values are with respect to network ground terminal.

RECOMMENDED OPERATING CONDITIONS

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

| | | SN54LS243 | | | SN74LS243 | | | UNIT |
|-----------------|--------------------------------|-----------|-----|-----|-----------|-----|------|------|
| | | MIN | NOM | MAX | MIN | NOM | MAX | |
| V _{CC} | Supply voltage ⁽¹⁾ | 4.5 | 5 | 5.5 | 4.75 | 5 | 5.25 | V |
| V _{IH} | High-level input voltage | 2 | | | 2 | | | V |
| V _{IL} | Low-level input voltage | | | 0.7 | | | 0.8 | V |
| I _{OH} | High-level output voltage | | | –12 | | | –15 | mA |
| I _{OL} | Low-level output voltage | | | 12 | | | 24 | mA |
| T _A | Operating free-air temperature | –55 | | 125 | 0 | | 70 | °C |

- (1) Voltage values are with respect to network ground terminal.

ELECTRICAL CHARACTERISTICS

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

| PARAMETER | | TEST CONDITIONS ⁽¹⁾ | | SN54LS243 | | | SN74LS243 | | | UNIT |
|----------------------------------|--------------------------------|---|---|-----------|--------------------|------|-----------|--------------------|---------------|------|
| | | | | MIN | TYP ⁽²⁾ | MAX | MIN | TYP ⁽²⁾ | MAX | |
| V_{IK} | A or B | $V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$ | | -1.5 | | | -1.5 | | | V |
| Hysteresis ($V_{T+} - V_{T-}$) | | $V_{CC} = \text{MIN},$ | | 0.2 | 0.4 | | 0.2 | 0.4 | | V |
| V_{OH} | | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V},$ | $V_{IL} = \text{MAX}, I_{OH} = -3 \text{ mA}$ | 2.4 | 3.1 | | 2.4 | 3.1 | | V |
| | | | $V_{IL} = 0.5 \text{ V}, I_{OH} = \text{MAX}$ | 2 | | 2 | | | | |
| V_{OL} | | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = \text{MAX}$ | $I_{OL} = 12 \text{ mA}$ | 0.25 | | 0.4 | 0.25 | | 0.4 | V |
| | | | $I_{OL} = 24 \text{ mA}$ | | | | 0.35 | | 0.5 | |
| I_{OZH} | | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = \text{MAX}, V_O = 2.7 \text{ V}$ | 40 | | | 40 | | | μA | |
| I_{OZL} | | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = \text{MAX}, V_O = 0.4 \text{ V}$ | -200 | | | -200 | | | μA | |
| I_I | A or B | $V_{CC} = \text{MAX},$ | $V_I = 5.5 \text{ V}$ | 0.1 | | | | 0.1 | mA | |
| | $\overline{\text{GAB}}$ or GBA | | $V_I = 7 \text{ V}$ | 0.1 | | | | 0.1 | | |
| I_{IH} | | $V_{CC} = \text{MAX},$ | 20 | | | 20 | | | μA | |
| I_{IL} | A inputs | $V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}, \text{GAB and GBA at } 0 \text{ V}$ | | -0.2 | | | -0.2 | | | mA |
| | B inputs | $V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}, \text{GAB and GBA at } 4.5 \text{ V}$ | | -0.2 | | | -0.2 | | | |
| | $\overline{\text{GAB}}$ or GBA | $V_{CC} = \text{MAX}, V_I = 0.4 \text{ V},$ | | -0.2 | | | -0.2 | | | |
| I_{OS} | | $V_{CC} = \text{MAX}$ | -40 | -225 | | -40 | -225 | | mA | |
| I_{CC} | Outputs high | $V_{(3)} = \text{MAX},$ | Outputs open, | 22 | 38 | | 22 | 38 | mA | |
| | Outputs low | | | 29 | 50 | | 29 | 50 | | |
| | All outputs disabled | | | 32 | 54 | | 32 | 54 | | |

- (1) For conditions shown as MIN or MAX, use the appropriate value specified under "recommended operating conditions."
- (2) All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.
- (3) I_{CC} is measured with transceivers enabled in one direction only, or with all transceivers disabled.

SWITCHING CHARACTERISTICS

$V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$

| PARAMETER | TEST CONDITIONS | | SN54LS243 | | | SN74LS243 | | | UNIT |
|-----------|---------------------|-----------------------|-----------|-----|-----|-----------|-----|-----|------|
| | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| t_{PLH} | $R_L = 667 \Omega,$ | $C_L = 45 \text{ pF}$ | 9 | | 14 | 12 | | 18 | ns |
| t_{PHL} | | | 12 | | 18 | 12 | | 18 | ns |
| t_{PZL} | | | 20 | | 30 | 20 | | 30 | ns |
| t_{PZH} | | | 15 | | 23 | 15 | | 23 | ns |
| t_{PLZ} | $R_L = 667 \Omega,$ | $C_L = 5 \text{ pF}$ | 10 | | 20 | 10 | | 20 | ns |
| t_{PHZ} | | | 15 | | 25 | 15 | | 25 | ns |

PACKAGING INFORMATION

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 80020022A | OBSOLETE | | | 20 | | TBD | Call TI | Call TI |
| 8002002CA | ACTIVE | CDIP | J | 14 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| 8002002DA | ACTIVE | CFP | W | 14 | 1 | TBD | A42 | N / A for Pkg Type |
| SN54LS243J | ACTIVE | CDIP | J | 14 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| SN74LS243D | ACTIVE | SOIC | D | 14 | 50 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS243DE4 | ACTIVE | SOIC | D | 14 | 50 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS243DG4 | ACTIVE | SOIC | D | 14 | 50 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS243DR | ACTIVE | SOIC | D | 14 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS243DRE4 | ACTIVE | SOIC | D | 14 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS243DRG4 | ACTIVE | SOIC | D | 14 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS243J | OBSOLETE | CDIP | J | 14 | | TBD | Call TI | Call TI |
| SN74LS243N | ACTIVE | PDIP | N | 14 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74LS243N3 | OBSOLETE | PDIP | N | 14 | | TBD | Call TI | Call TI |
| SN74LS243NE4 | ACTIVE | PDIP | N | 14 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SNJ54LS243FK | OBSOLETE | | | 20 | | TBD | Call TI | Call TI |
| SNJ54LS243J | ACTIVE | CDIP | J | 14 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| SNJ54LS243W | ACTIVE | CFP | W | 14 | 1 | TBD | A42 | N / A for Pkg Type |

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

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

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

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

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), 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.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

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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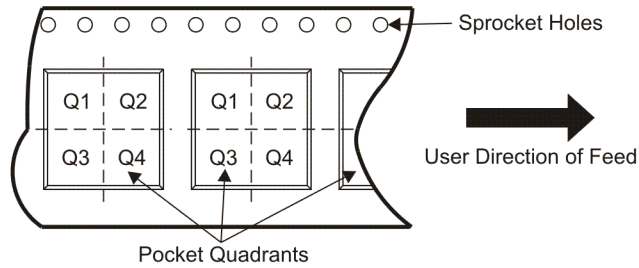
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TAPE AND REEL INFORMATION



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 |
|-------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LS243DR | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|-------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74LS243DR | SOIC | D | 14 | 2500 | 346.0 | 346.0 | 33.0 |

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) |

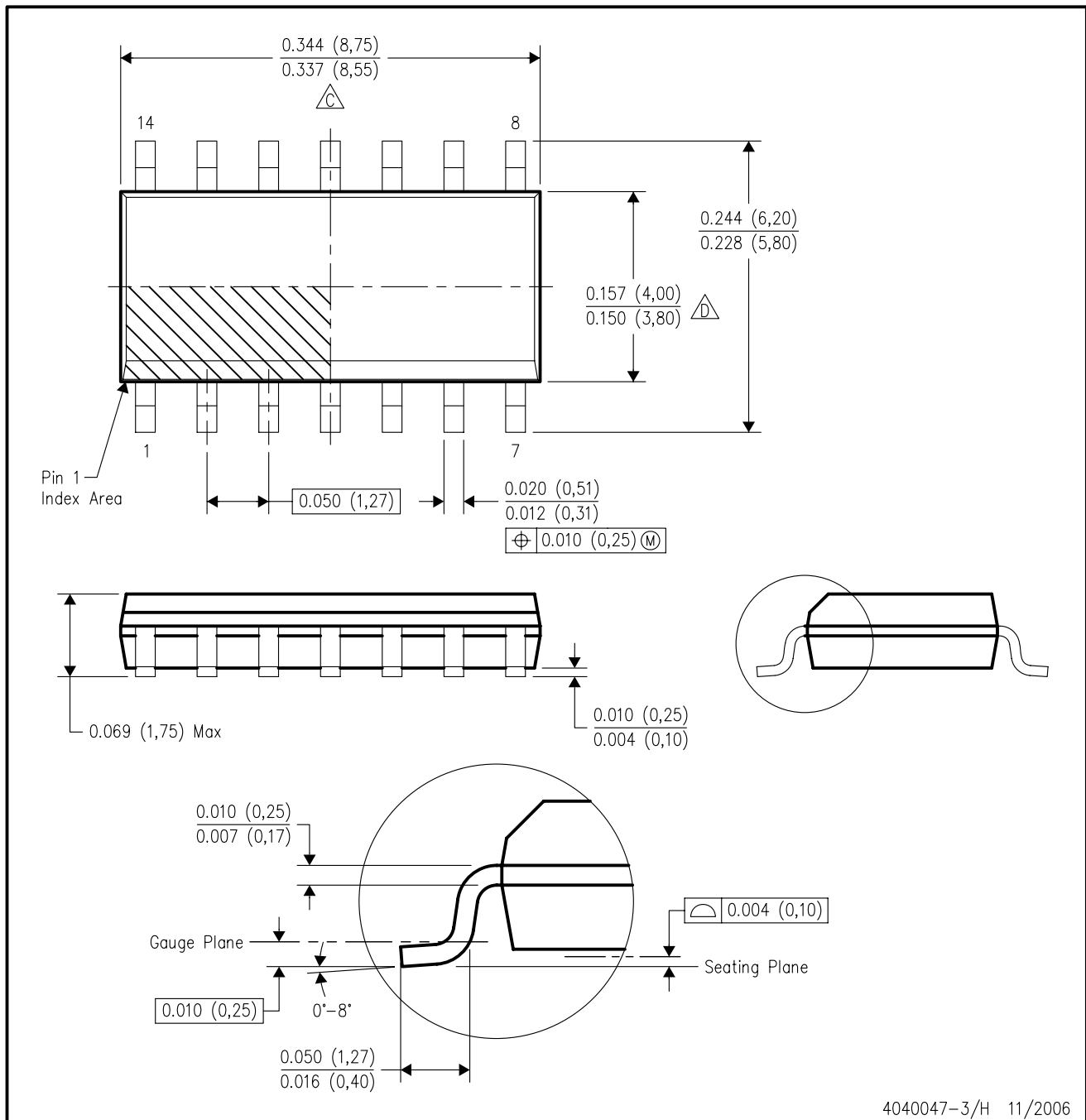


4040083/F 03/03

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

D (R-PDSO-G14)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 (0,15) per end.
 - D. Body width does not include interlead flash. Interlead flash shall not exceed .017 (0,43) per side.
 - E. Reference JEDEC MS-012 variation AB.

W (R-GDFP-F14)

CERAMIC DUAL FLATPACK



4040180-2/D 07/03

- 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-F14 and JEDEC MO-092AB

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