

SN54ALS1245A, SN74ALS1245A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SDAS245A – DECEMBER 1982 – REVISED JANUARY 1995

- Bidirectional Bus Transceivers in High-Density 20-Pin Packages
- Low-Power Versions of 'ALS245 Series
- 'ALS1245 Series Is Identical to 'ALS1645 Series
- Package Options Include Plastic Small-Outline (DW) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs

description

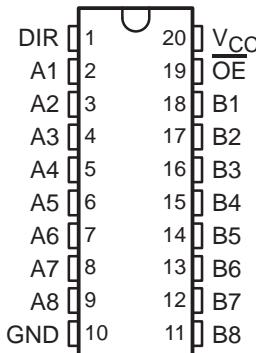
These octal bus transceivers are designed for asynchronous two-way communication between data buses. These devices transmit data from the A bus to the B bus or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input. The output-enable (OE) input can be used to disable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

The SN54ALS1245A is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS1245A is characterized for operation from 0°C to 70°C .

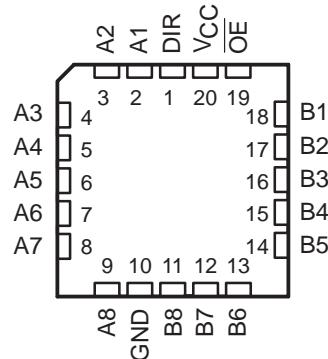
FUNCTION TABLE

| INPUTS | | OPERATION |
|--------|-----|-----------------|
| OE | DIR | |
| L | L | B data to A bus |
| L | H | A data to B bus |
| H | X | Isolation |

SN54ALS1245A . . . J PACKAGE
SN74ALS1245A . . . DW OR N PACKAGE
(TOP VIEW)



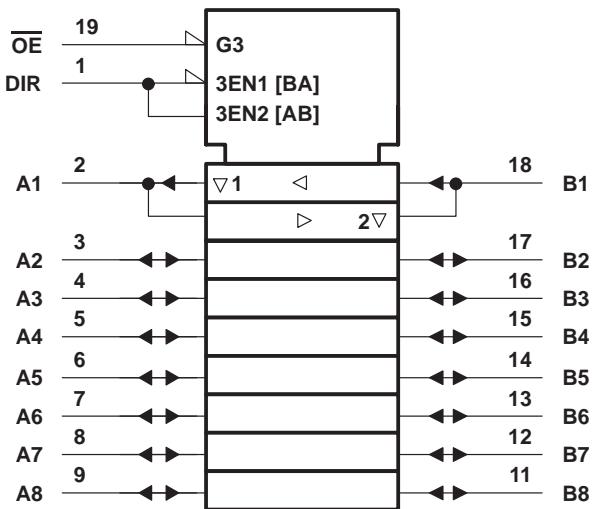
SN54ALS1245A . . . FK PACKAGE
(TOP VIEW)



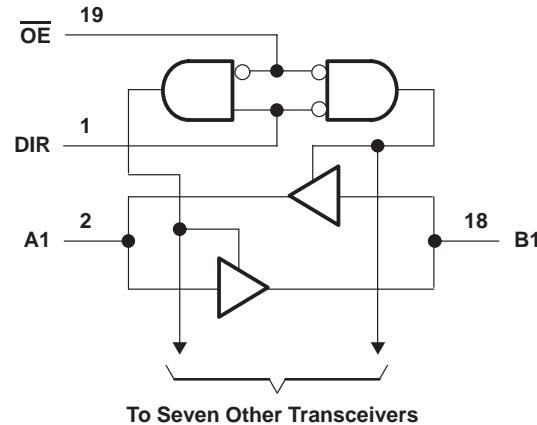
**SN54ALS1245A, SN74ALS1245A
OCTAL BUS TRANSCEIVERS
WITH 3-STATE OUTPUTS**

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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, V_{CC} | 7 V |
| Input voltage, V_I : All inputs | 7 V |
| I/O ports | 5.5 V |
| Operating free-air temperature range, T_A : SN54ALS1245A | –55°C to 125°C |
| SN74ALS1245A | 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.

recommended operating conditions

| | | SN54ALS1245A | | | SN74ALS1245A | | | 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 | | | 0.7 | | | 0.8 | V |
| I_{OH} | High-level output current | | | –12 | | | –15 | mA |
| I_{OL} | Low-level output current | | | 8 | | | 16 | mA |
| T_A | Operating free-air temperature | –55 | 125 | 0 | 0 | 70 | 0 | °C |

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

| PARAMETER | TEST CONDITIONS | SN54ALS1245A | | | SN74ALS1245A | | | UNIT |
|-----------|---|---------------------------|-----------------------|------|--------------|------|------|---------------|
| | | MIN | TYP† | MAX | MIN | TYP† | MAX | |
| V_{IK} | $V_{CC} = 4.5 \text{ V}$, $I_I = -18 \text{ mA}$ | | | -1.5 | | | -1.5 | V |
| V_{OH} | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$, $I_{OH} = -0.4 \text{ mA}$ | $V_{CC} - 2$ | | | $V_{CC} - 2$ | | | V |
| | $V_{CC} = 4.5 \text{ V}$ | $I_{OH} = -3 \text{ mA}$ | 2.4 | 3.2 | 2.4 | 3.2 | | |
| | | $I_{OH} = -12 \text{ mA}$ | 2 | | | | | |
| | | $I_{OH} = -15 \text{ mA}$ | | | | 2 | | |
| V_{OL} | $V_{CC} = 4.5 \text{ V}$ | $I_{OL} = 8 \text{ mA}$ | 0.25 | 0.4 | 0.25 | 0.4 | | V |
| | | $I_{OL} = 16 \text{ mA}$ | | | 0.35 | 0.5 | | |
| I_I | Control inputs | $V_I = 7 \text{ V}$ | | 0.1 | | 0.1 | | mA |
| | A or B ports | $V_I = 5.5 \text{ V}$ | | 0.1 | | 0.1 | | |
| I_{IH} | Control inputs | $V_{CC} = 5.5 \text{ V}$ | $V_I = 2.7 \text{ V}$ | 20 | | 20 | | μA |
| | A or B ports‡ | | | 20 | | 20 | | |
| I_{IL} | Control inputs | $V_{CC} = 5.5 \text{ V}$ | $V_I = 0.4 \text{ V}$ | -0.1 | | -0.1 | | mA |
| | A or B ports‡ | | | -0.1 | | -0.1 | | |
| $I_O^§$ | $V_{CC} = 5.5 \text{ V}$ | $V_O = 2.25 \text{ V}$ | -20 | -112 | -30 | -112 | mA | |
| I_{CC} | $V_{CC} = 5.5 \text{ V}$ | Outputs high | 21 | 33 | 21 | 30 | | mA |
| | | Outputs low | 23 | 36 | 23 | 33 | | |
| | | Outputs disabled | 25 | 40 | 25 | 36 | | |

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

‡ For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.

§ 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)

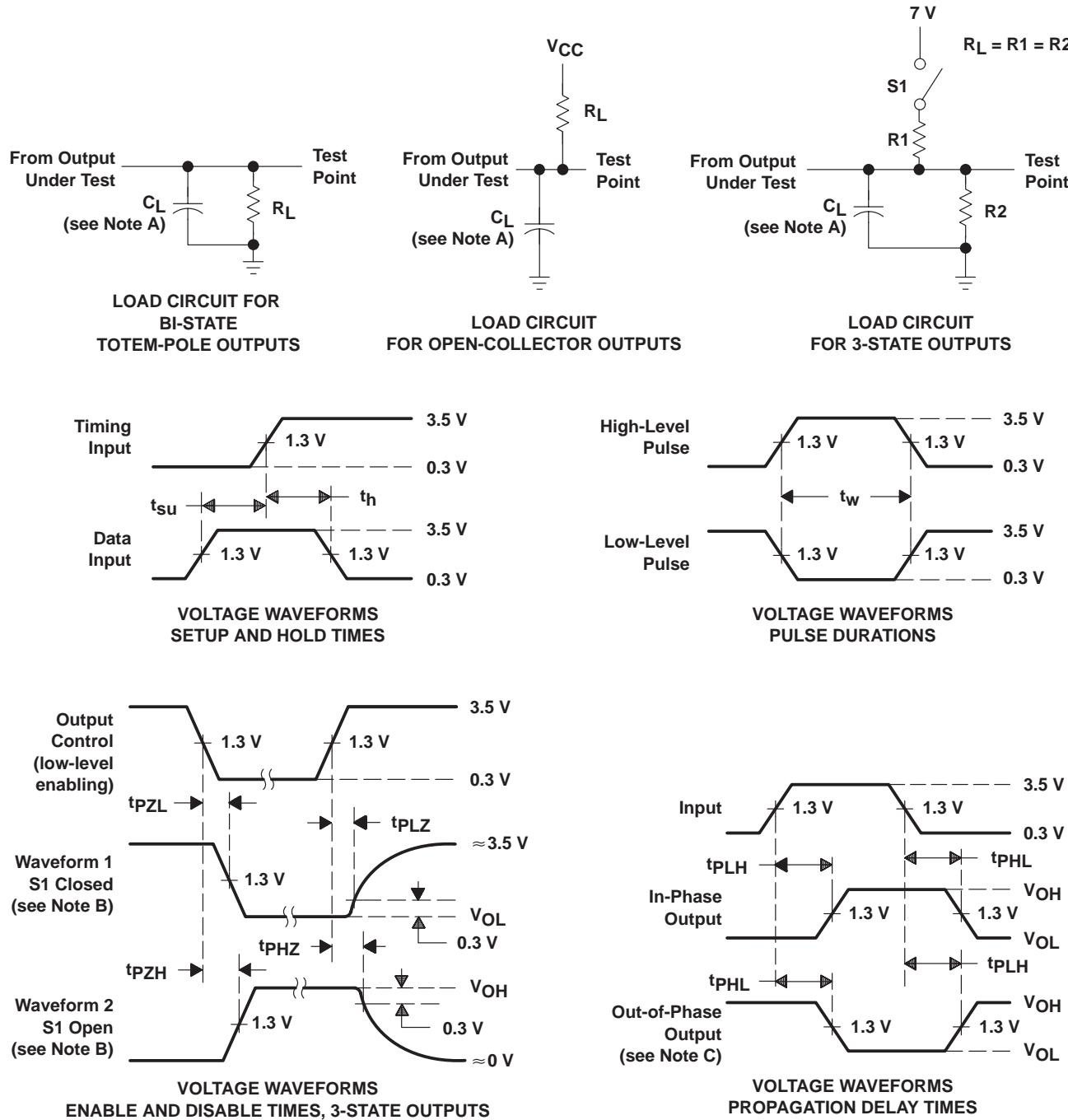
| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$, $C_L = 50 \text{ pF}$, $R1 = 500 \Omega$, $R2 = 500 \Omega$, $T_A = \text{MIN to MAX}^\dagger$ | | | | UNIT | | |
|-----------|-----------------|----------------|--|-----|--------------|-----|------|--|--|
| | | | SN54ALS1245A | | SN74ALS1245A | | | | |
| | | | MIN | MAX | MIN | MAX | | | |
| t_{PLH} | A or B | B or A | 2 | 19 | 2 | 13 | ns | | |
| | | | 2 | 15 | 2 | 13 | | | |
| t_{PHL} | \overline{OE} | A or B | 8 | 30 | 8 | 25 | ns | | |
| | | | 8 | 29 | 8 | 25 | | | |
| t_{PZH} | \overline{OE} | A or B | 2 | 14 | 2 | 12 | ns | | |
| | | | 3 | 30 | 3 | 18 | | | |
| t_{PZL} | | | | | | | | | |
| | | | | | | | | | |
| t_{PHZ} | | | | | | | | | |
| | | | | | | | | | |
| t_{PLZ} | | | | | | | | | |
| | | | | | | | | | |

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

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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: $PRR \leq 1 \text{ MHz}$, $t_r = t_f = 2 \text{ ns}$, 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 (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------|-------------------------|----------------------|--------------|---------------------------------------|---------|
| 5962-88737012A | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type | -55 to 125 | 5962-88737012A SNJ54ALS 1245AFK | Samples |
| 5962-8873701RA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type | -55 to 125 | 5962-8873701RA SNJ54ALS1245AJ | Samples |
| SN74ALS1245AN | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type | 0 to 70 | SN74ALS1245AN | Samples |
| SNJ54ALS1245AFK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type | -55 to 125 | 5962-88737012A SNJ54ALS 1245AFK | Samples |
| SNJ54ALS1245AJ | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type | -55 to 125 | 5962-8873701RA SNJ54ALS1245AJ | Samples |

(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.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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OTHER QUALIFIED VERSIONS OF SN54ALS1245A, SN74ALS1245A :

- Catalog: [SN74ALS1245A](#)
- Military: [SN54ALS1245A](#)

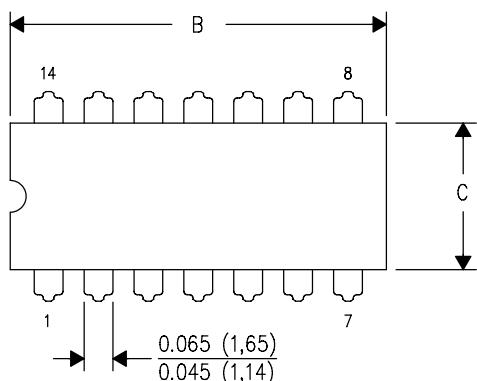
NOTE: Qualified Version Definitions:

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

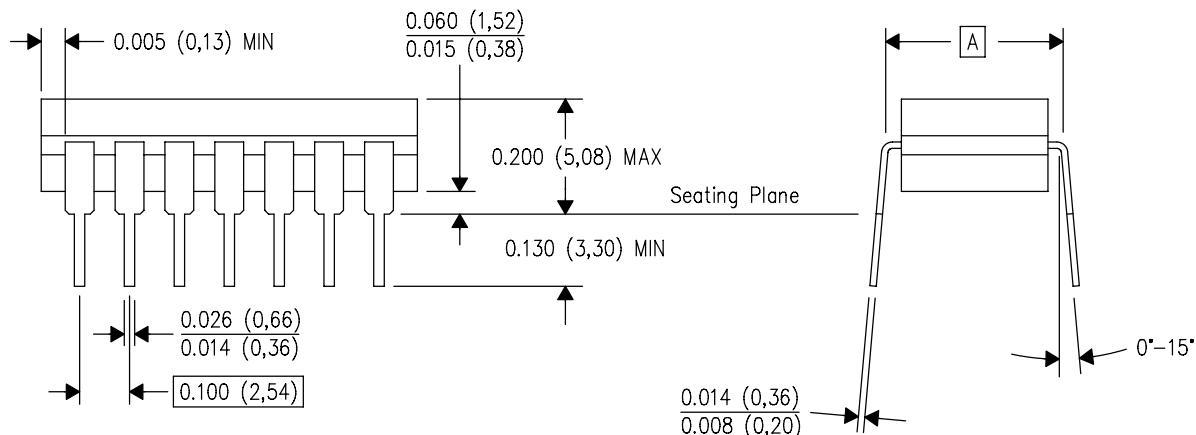
J (R-GDIP-T**)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



| PINS ** DIM | 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) |



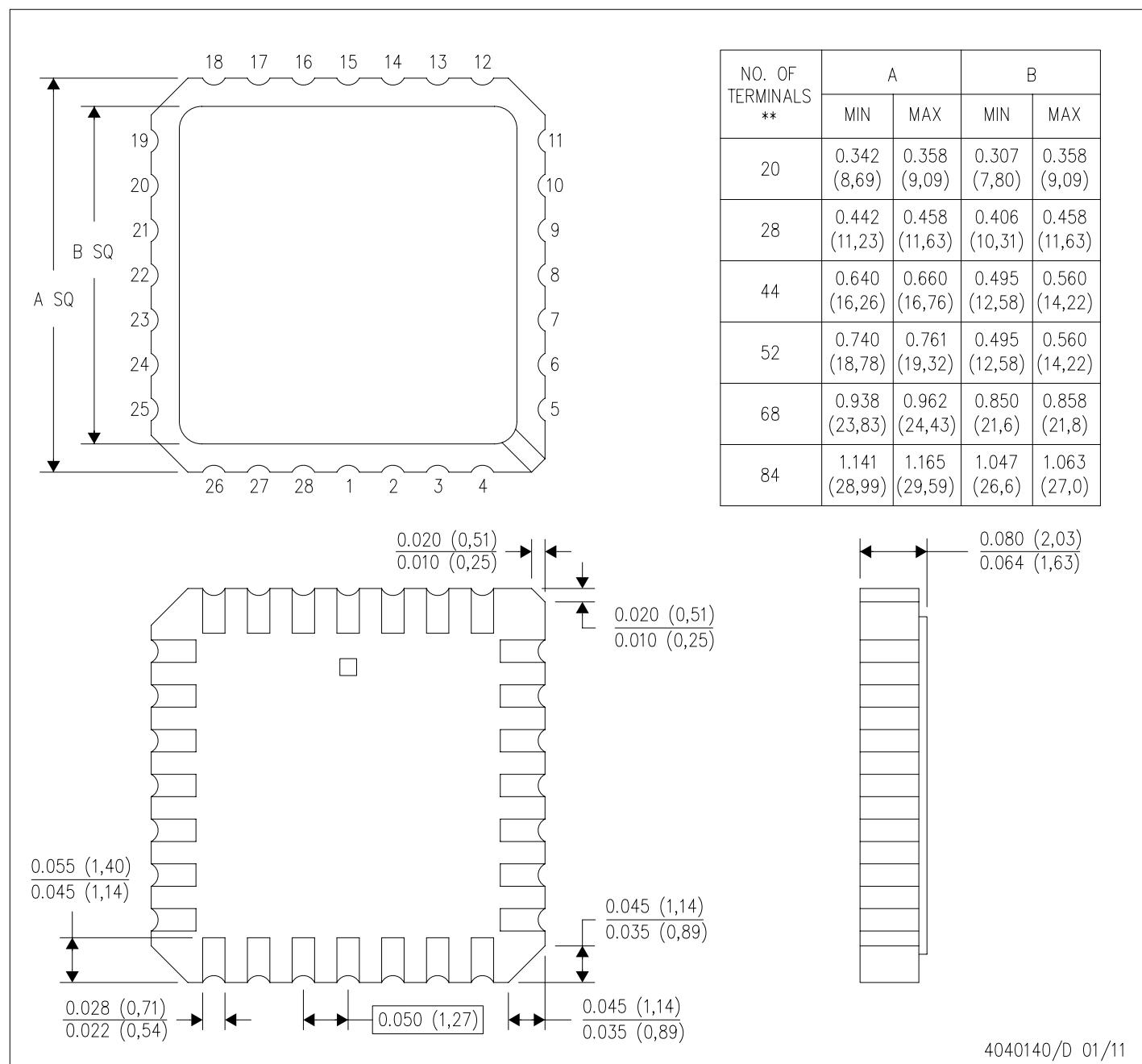
4040083/F 03/03

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.

FK (S-CQCC-N**)

28 TERMINAL SHOWN

LEADLESS CERAMIC CHIP CARRIER



NOTES:

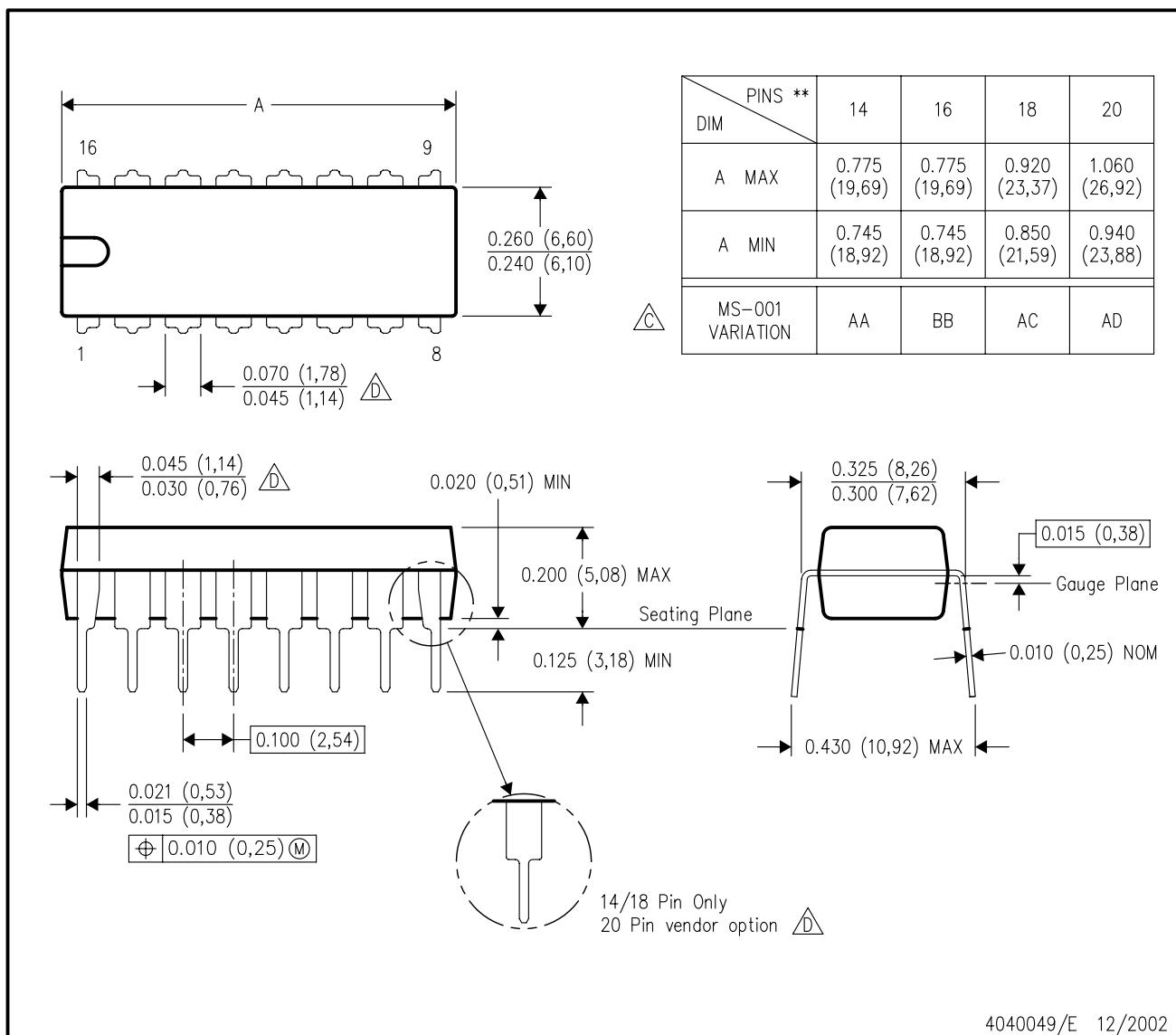
- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a metal lid.
- D. Falls within JEDEC MS-004

4040140/D 01/11

N (R-PDIP-T**)

16 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE



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.

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