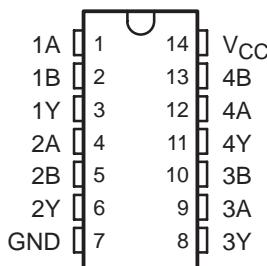
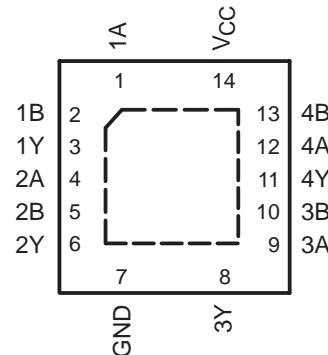


- Inputs Are TTL-Voltage Compatible
- Latch-Up Performance Exceeds 250 mA Per JESD 17
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 200-V Machine Model (A115-A)

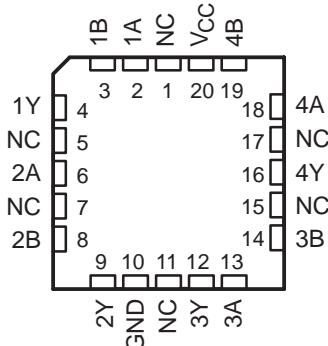
SN54AHCT32 . . . J OR W PACKAGE  
SN74AHCT32 . . . D, DB, DGV, N, NS,  
OR PW PACKAGE  
(TOP VIEW)



SN74AHCT32 . . . RGY PACKAGE  
(TOP VIEW)



SN54AHCT32 . . . FK PACKAGE  
(TOP VIEW)



NC – No internal connection

### description/ordering information

The 'AHCT32 devices are quadruple 2-input positive-OR gates. These devices perform the Boolean function  $Y = \overline{A} \bullet \overline{B}$  or  $Y = A + B$  in positive logic.

### ORDERING INFORMATION

TA	PACKAGE <sup>†</sup>		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	QFN – RGY	Tape and reel	SN74AHCT32RGYR	HB32
	PDIP – N	Tube	SN74AHCT32N	SN74AHCT32N
	SOIC – D	Tube	SN74AHCT32D	AHCT32
		Tape and reel	SN74AHCT32DR	
	SOP – NS	Tape and reel	SN74AHCT32NSR	AHCT32
	SSOP – DB	Tape and reel	SN74AHCT32DBR	HB32
	TSSOP – PW	Tube	SN74AHCT32PW	HB32
		Tape and reel	SN74AHCT32PWR	
–55°C to 125°C	TVSOP – DGV	Tape and reel	SN74AHCT32DGVR	HB32
	CDIP – J	Tube	SNJ54AHCT32J	SNJ54AHCT32J
	CFP – W	Tube	SNJ54AHCT32W	SNJ54AHCT32W
	LCCC – FK	Tube	SNJ54AHCT32FK	SNJ54AHCT32FK

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



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

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



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On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

## **SN54AHCT32, SN74AHCT32 QUADRUPLE 2-INPUT POSITIVE-OR GATES**

SCLS248L – OCTOBER 1995 – REVISED JULY 2003

## FUNCTION TABLE (each gate)

INPUTS		OUTPUT
A	B	Y
H	X	H
X	H	H
L	L	L

logic diagram, each gate (positive logic)



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

† 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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

1. The input and output stage ratings may be converted into the input and output thermal resistance values using the following formulas:
  2. The package thermal impedance is calculated in accordance with JESD 51-7.
  3. The package thermal impedance is calculated in accordance with JESD 51-5.

**SN54AHCT32, SN74AHCT32**  
**QUADRUPLE 2-INPUT POSITIVE-OR GATES**

SCLS248L – OCTOBER 1995 – REVISED JULY 2003

**recommended operating conditions (see Note 4)**

		SN54AHCT32			SN74AHCT32			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
V <sub>CC</sub>	Supply voltage	4.5	5.5		4.5	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
V <sub>I</sub>	Input voltage	0	5.5		0	5.5		V
V <sub>O</sub>	Output voltage	0	V <sub>CC</sub>		0	V <sub>CC</sub>		V
I <sub>OH</sub>	High-level output current		-8		-8			mA
I <sub>OL</sub>	Low-level output current		8		8			mA
Δt/Δv	Input transition rise or fall rate		20		20			ns/V
T <sub>A</sub>	Operating free-air temperature	-55	125		-40	85		°C

NOTE 4: All unused inputs of the device must be held at V<sub>CC</sub> or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

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

PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	T <sub>A</sub> = 25°C			SN54AHCT32		SN74AHCT32		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V <sub>OH</sub>	I <sub>OH</sub> = -50 μA	4.5 V	4.4	4.5		4.4		4.4		V
	I <sub>OH</sub> = -8 mA		3.94			3.8		3.8		
V <sub>OL</sub>	I <sub>OL</sub> = 50 μA	4.5 V		0.1		0.1		0.1		V
	I <sub>OL</sub> = 8 mA			0.36		0.44		0.44		
I <sub>I</sub>	V <sub>I</sub> = 5.5 V or GND	0 V to 5.5 V		±0.1		±1*		±1		μA
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0	5.5 V		2		20		20		μA
ΔI <sub>CC</sub> †	One input at 3.4 V, Other inputs at V <sub>CC</sub> or GND	5.5 V		1.35		1.5		1.5		mA
C <sub>i</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5 V	2	10				10		pF

\* On products compliant to MIL-PRF-38535, this parameter is not production tested at V<sub>CC</sub> = 0 V.

† This is the increase in supply current for each input at one of the specified TTL voltage levels, rather than 0 V or V<sub>CC</sub>.

**switching characteristics over recommended operating free-air temperature range, V<sub>CC</sub> = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	T <sub>A</sub> = 25°C			SN54AHCT32		SN74AHCT32		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	Y	C <sub>L</sub> = 15 pF	5**	6.9**		1**	8**	1	8	ns
				5**	6.9**		1**	8**	1	8	
t <sub>PLH</sub>	A or B	Y	C <sub>L</sub> = 50 pF	5.5	7.9		1	9	1	9	ns
				5.5	7.9		1	9	1	9	

\*\* On products compliant to MIL-PRF-38535, this parameter is not production tested.

# SN54AHCT32, SN74AHCT32 QUADRUPLE 2-INPUT POSITIVE-OR GATES

SCLS248L – OCTOBER 1995 – REVISED JULY 2003

## noise characteristics, $V_{CC} = 5$ V, $C_L = 50$ pF, $T_A = 25^\circ\text{C}$ (see Note 5)

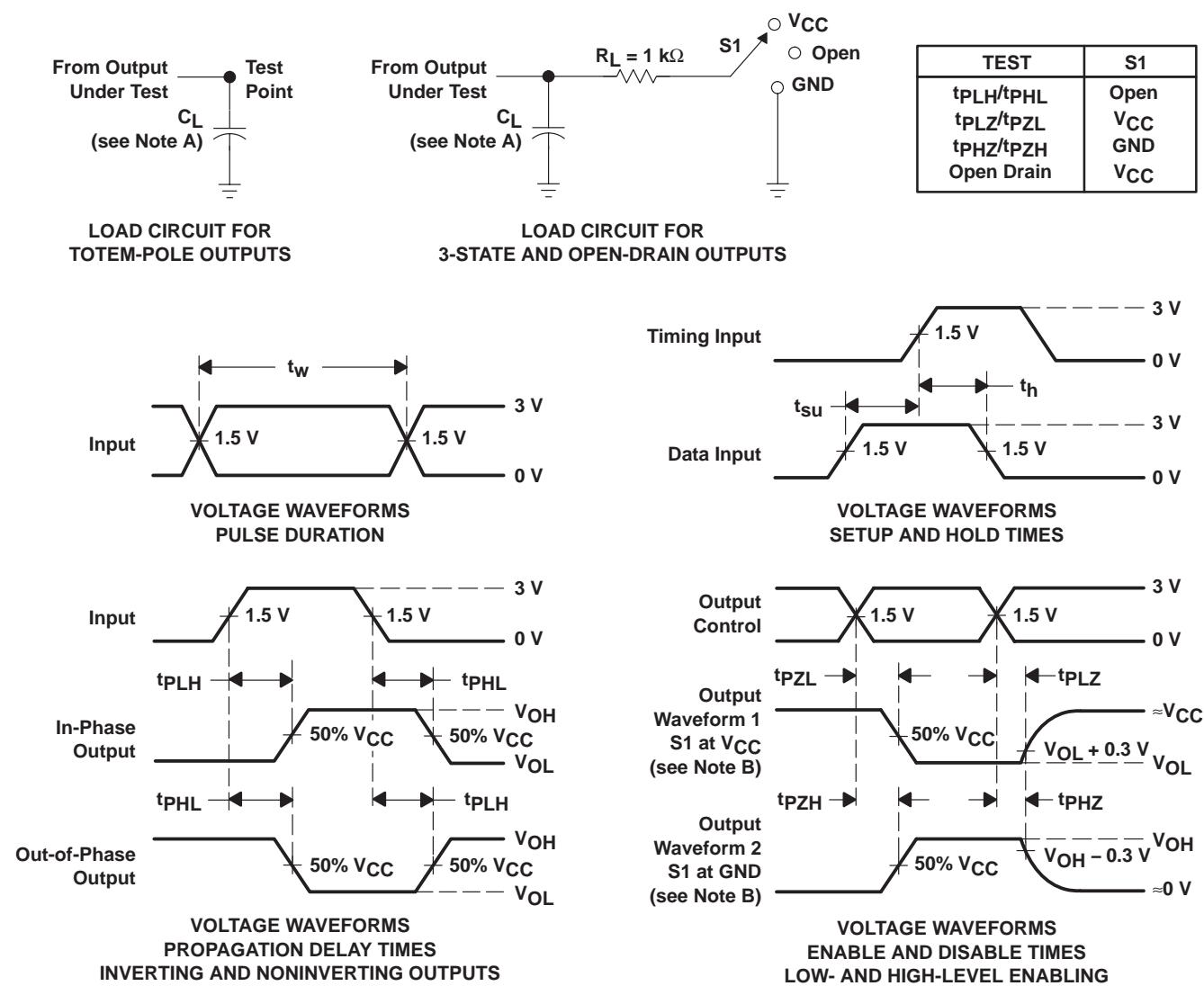
PARAMETER	SN74AHCT32			UNIT
	MIN	TYP	MAX	
$V_{OL(P)}$ Quiet output, maximum dynamic $V_{OL}$		0.4	0.8	V
$V_{OL(V)}$ Quiet output, minimum dynamic $V_{OL}$		-0.4	-0.8	V
$V_{OH(V)}$ Quiet output, minimum dynamic $V_{OH}$		4.5		V
$V_{IH(D)}$ High-level dynamic input voltage		2		V
$V_{IL(D)}$ Low-level dynamic input voltage			0.8	V

NOTE 5: Characteristics are for surface-mount packages only.

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

PARAMETER	TEST CONDITIONS	TYP	UNIT
$C_{pd}$ Power dissipation capacitance	No load, $f = 1$ MHz	11.5	pF

PARAMETER MEASUREMENT INFORMATION



NOTES:

- $C_L$  includes probe and jig capacitance.
- 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.
- All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r \leq 3 \text{ ns}$ ,  $t_f \leq 3 \text{ ns}$ .
- The outputs are measured one at a time with one input transition per measurement.
- All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms

**PACKAGING INFORMATION**

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
5962-9682601Q2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
5962-9682601QCA	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type
5962-9682601QDA	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type
SN74AHCT32D	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32DBLE	OBsolete	SSOP	DB	14		TBD	Call TI	Call TI
SN74AHCT32DBR	ACTIVE	SSOP	DB	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32DBRE4	ACTIVE	SSOP	DB	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32DBRG4	ACTIVE	SSOP	DB	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32DG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32DGVR	ACTIVE	TVSOP	DGV	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32DGVRE4	ACTIVE	TVSOP	DGV	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32DGVRG4	ACTIVE	TVSOP	DGV	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32DRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32DRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74AHCT32NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74AHCT32NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32NSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32NSRG4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32PW	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32PWE4	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32PWG4	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32PWLE	OBsolete	TSSOP	PW	14		TBD	Call TI	Call TI
SN74AHCT32PWR	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32PWRE4	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
SN74AHCT32PWRG4	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT32RGYR	ACTIVE	VQFN	RGY	14	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
SN74AHCT32RGYRG4	ACTIVE	VQFN	RGY	14	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
SNJ54AHCT32FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
SNJ54AHCT32J	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type
SNJ54AHCT32W	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

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

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

<sup>(2)</sup> 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)

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

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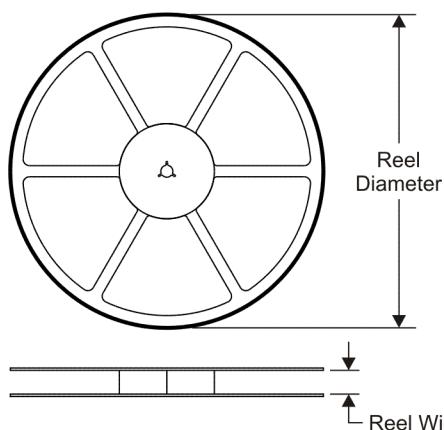
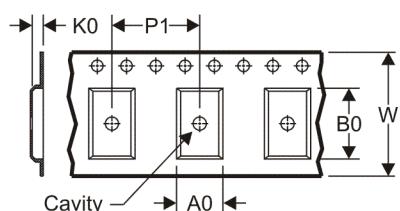
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

#### OTHER QUALIFIED VERSIONS OF SN54AHCT32, SN74AHCT32 :

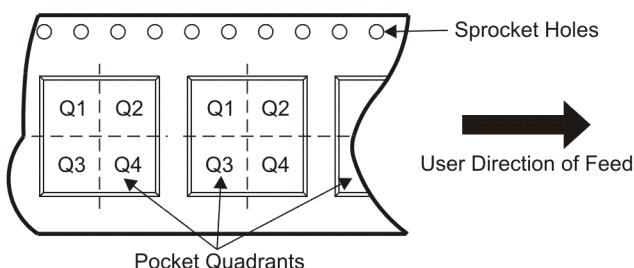
- Automotive: [SN74AHCT32-Q1](#)
- Enhanced Product: [SN74AHCT32-EP](#)

NOTE: Qualified Version Definitions:

- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications

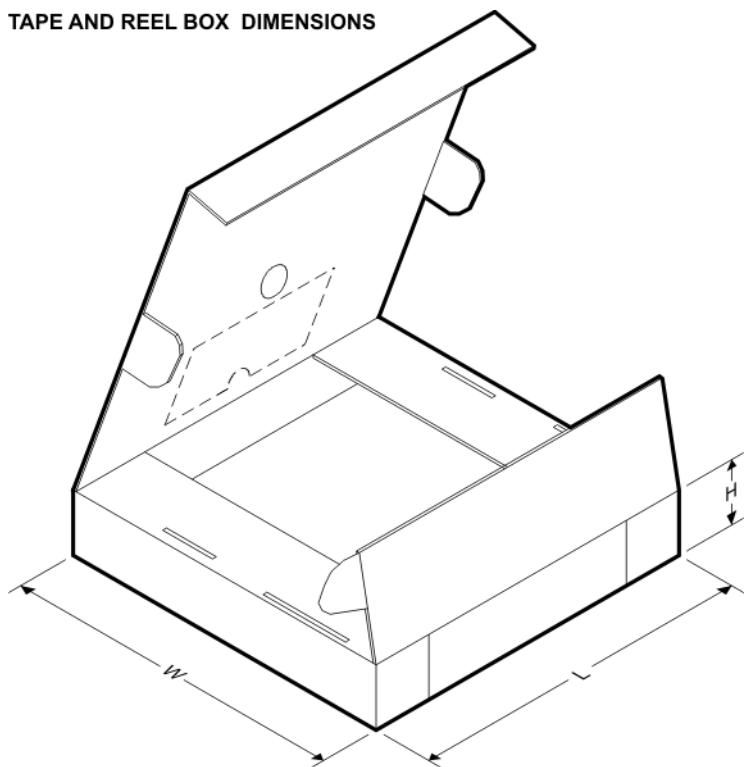
**TAPE AND REEL INFORMATION**
**REEL DIMENSIONS**

**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
SN74AHCT32DBR	SSOP	DB	14	2000	330.0	16.4	8.2	6.6	2.5	12.0	16.0	Q1
SN74AHCT32DGVR	TVSOP	DGV	14	2000	330.0	12.4	6.8	4.0	1.6	8.0	12.0	Q1
SN74AHCT32DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74AHCT32NSR	SO	NS	14	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
SN74AHCT32PWR	TSSOP	PW	14	2000	330.0	12.4	7.0	5.6	1.6	8.0	12.0	Q1
SN74AHCT32RGYR	VQFN	RGY	14	3000	180.0	12.4	3.75	3.75	1.15	8.0	12.0	Q1

**TAPE AND REEL BOX DIMENSIONS**


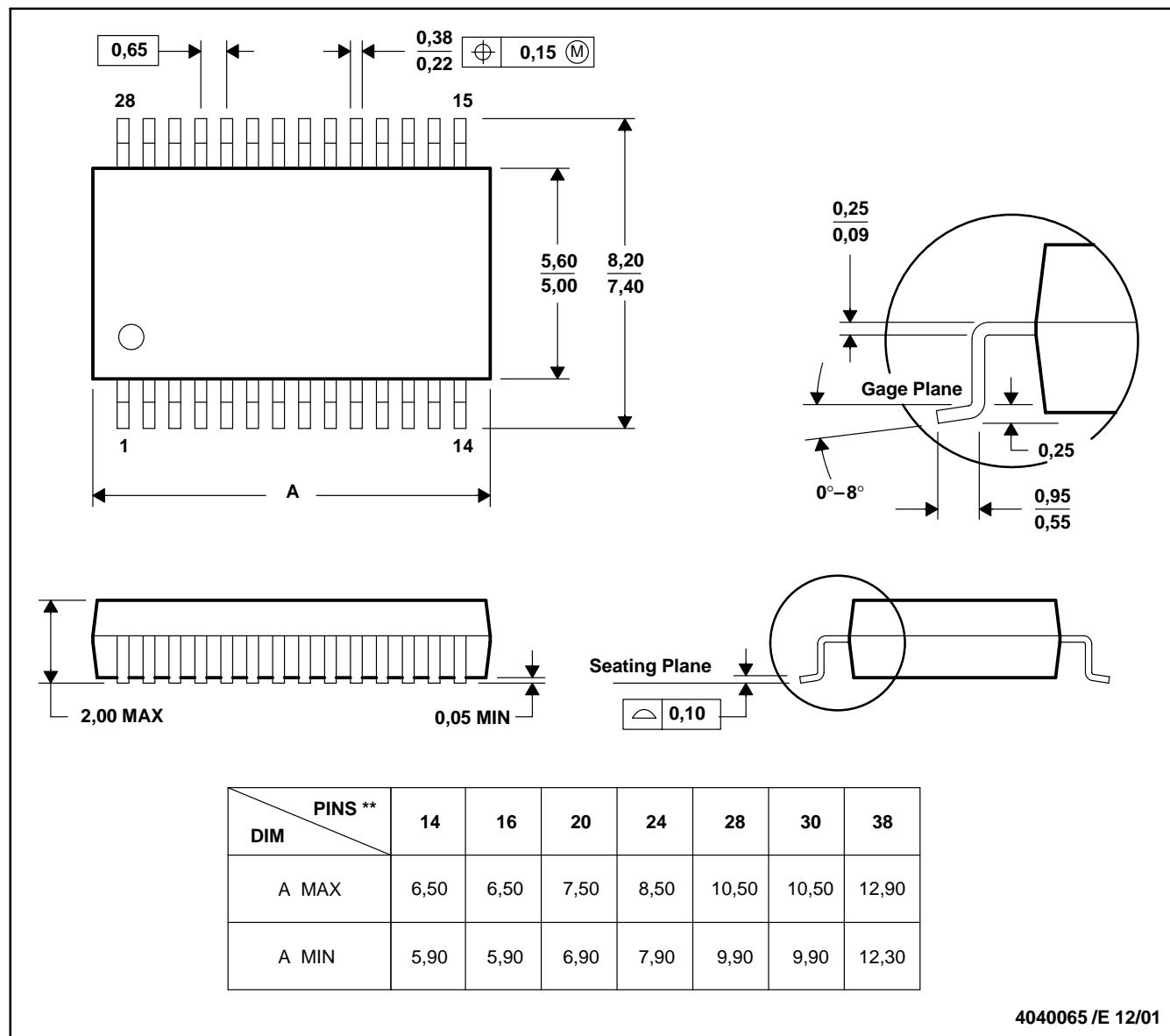
\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AHCT32DBR	SSOP	DB	14	2000	346.0	346.0	33.0
SN74AHCT32DGVR	TVSOP	DGV	14	2000	346.0	346.0	29.0
SN74AHCT32DR	SOIC	D	14	2500	346.0	346.0	33.0
SN74AHCT32NSR	SO	NS	14	2000	346.0	346.0	33.0
SN74AHCT32PWR	TSSOP	PW	14	2000	346.0	346.0	29.0
SN74AHCT32RGYR	VQFN	RGY	14	3000	190.5	212.7	31.8

## DB (R-PDSO-G\*\*)

## PLASTIC SMALL-OUTLINE

28 PINS SHOWN



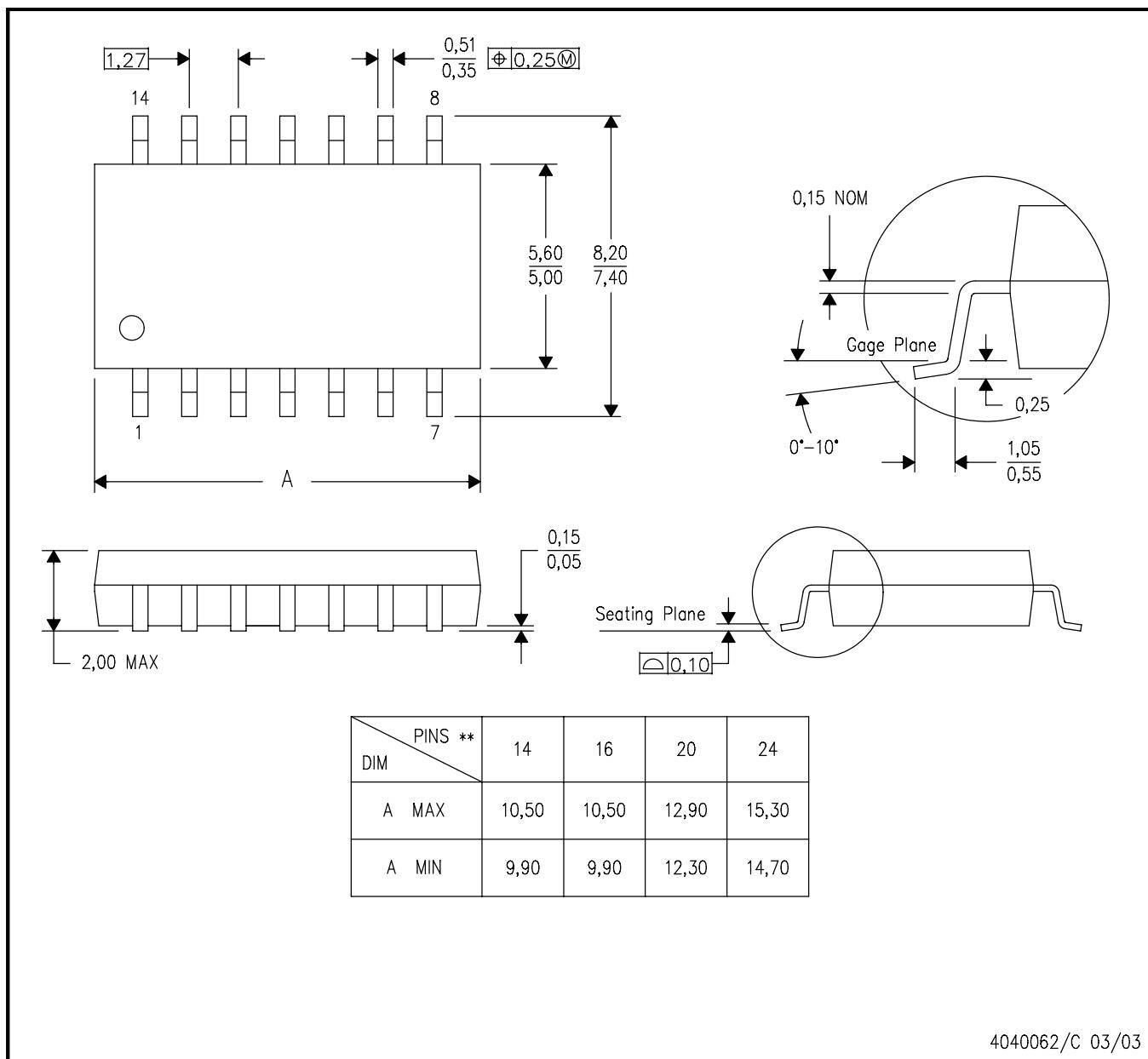
NOTES: A. All linear dimensions are in millimeters.  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.  
 D. Falls within JEDEC MO-150

## MECHANICAL DATA

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

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



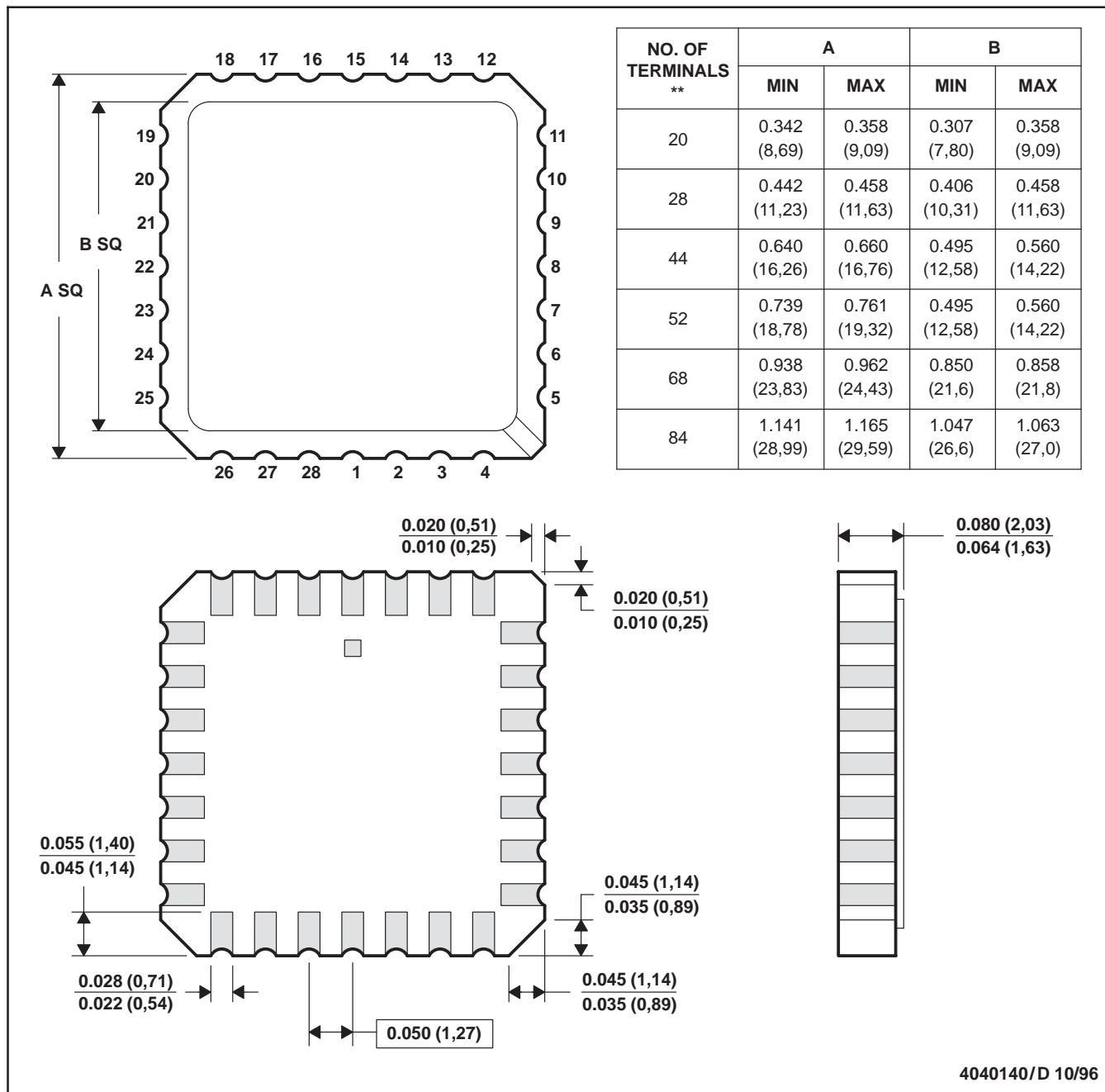
NOTES: A. All linear dimensions are in millimeters.  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

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

## LEADLESS CERAMIC CHIP CARRIER

## 28 TERMINAL SHOWN



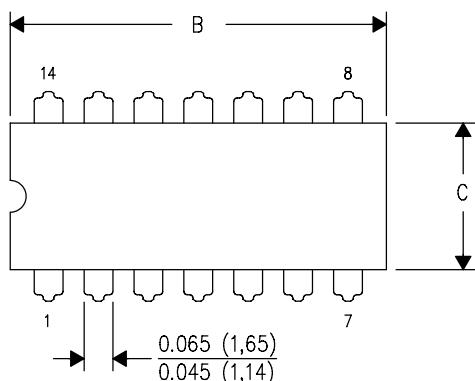
NOTES:

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

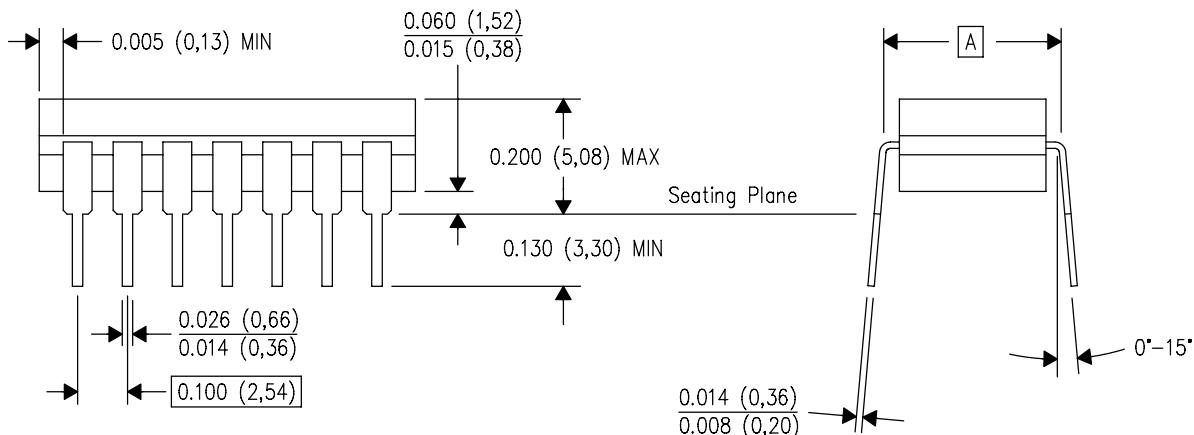
J (R-GDIP-T\*\*)

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)



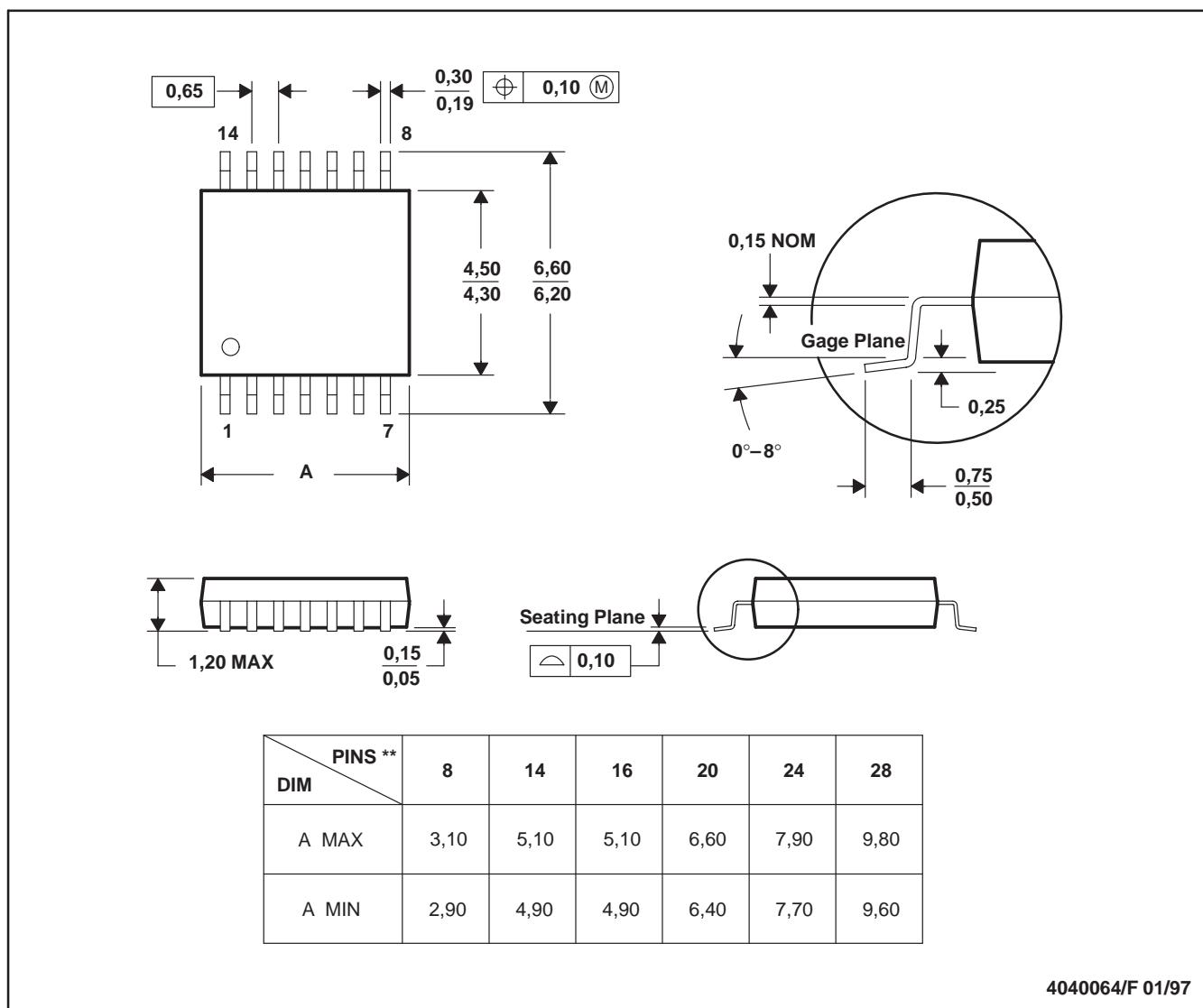
4040083/F 03/03

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.

## PW (R-PDSO-G\*\*)

## PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



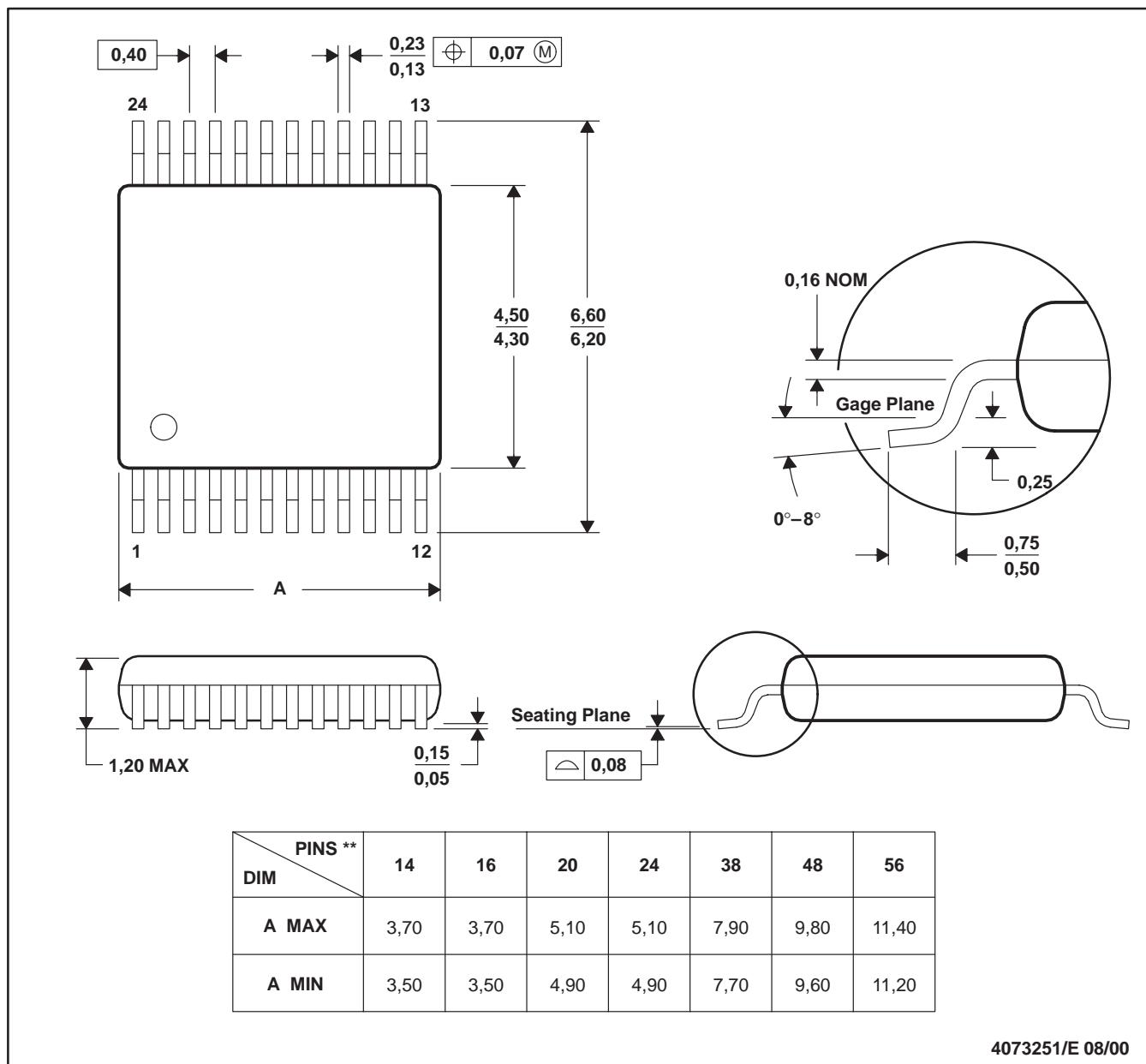
NOTES:

- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- Body dimensions do not include mold flash or protrusion not to exceed 0,15.
- Falls within JEDEC MO-153

## DGV (R-PDSO-G\*\*)

## PLASTIC SMALL-OUTLINE

24 PINS SHOWN

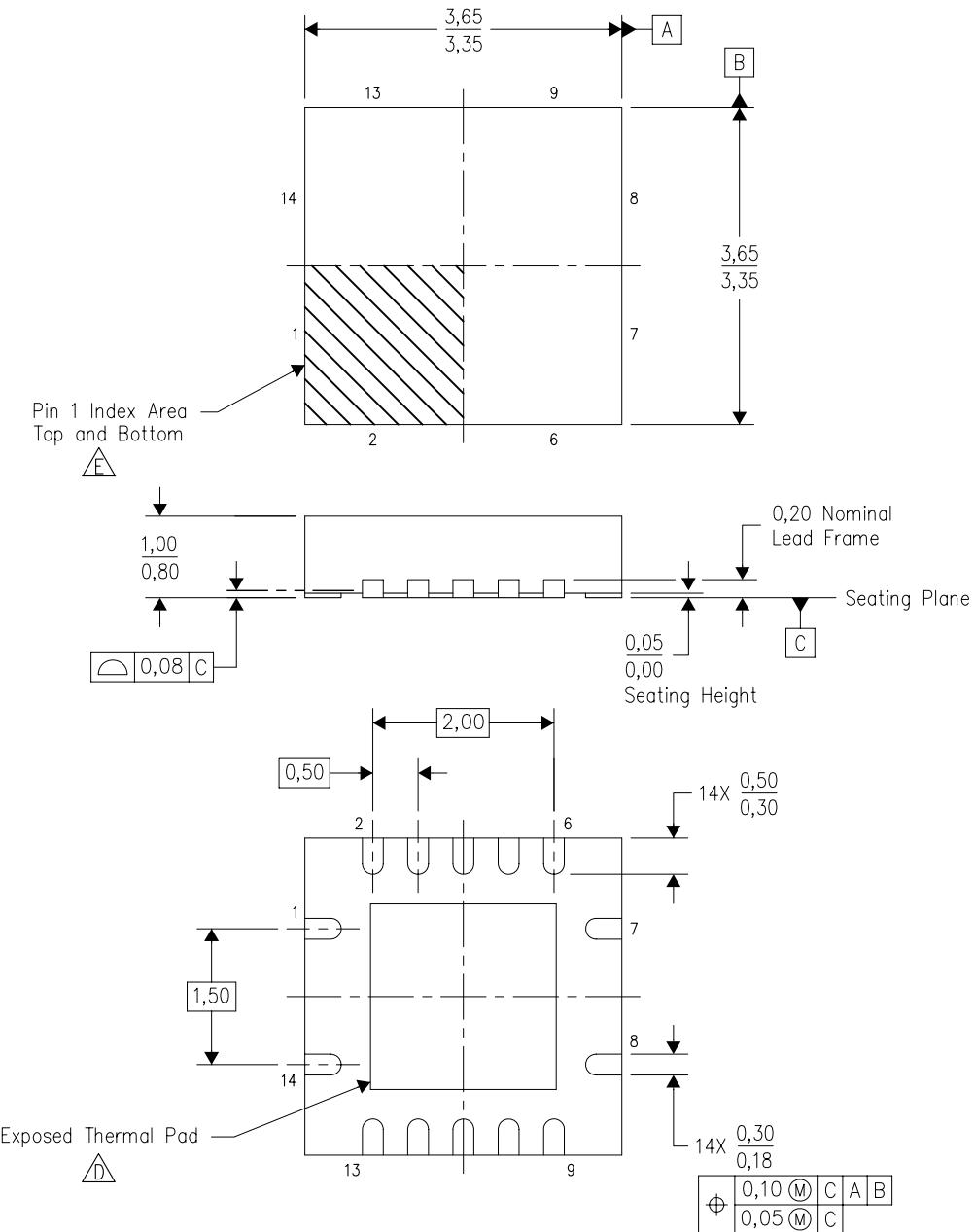


NOTES: A. All linear dimensions are in millimeters.  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15 per side.  
 D. Falls within JEDEC: 24/48 Pins – MO-153  
 14/16/20/56 Pins – MO-194

## MECHANICAL DATA

RGY (S-PVQFN-N14)

PLASTIC QUAD FLATPACK NO-LEAD



Bottom View

4203539-2/H 06/2009

NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.

B. This drawing is subject to change without notice.

C. QFN (Quad Flatpack No-Lead) package configuration.

D. The package thermal pad must be soldered to the board for thermal and mechanical performance. See the Product Data Sheet for details regarding the exposed thermal pad dimensions.

E. Pin 1 identifiers are located on both top and bottom of the package and within the zone indicated. The Pin 1 identifiers are either a molded, marked, or metal feature.

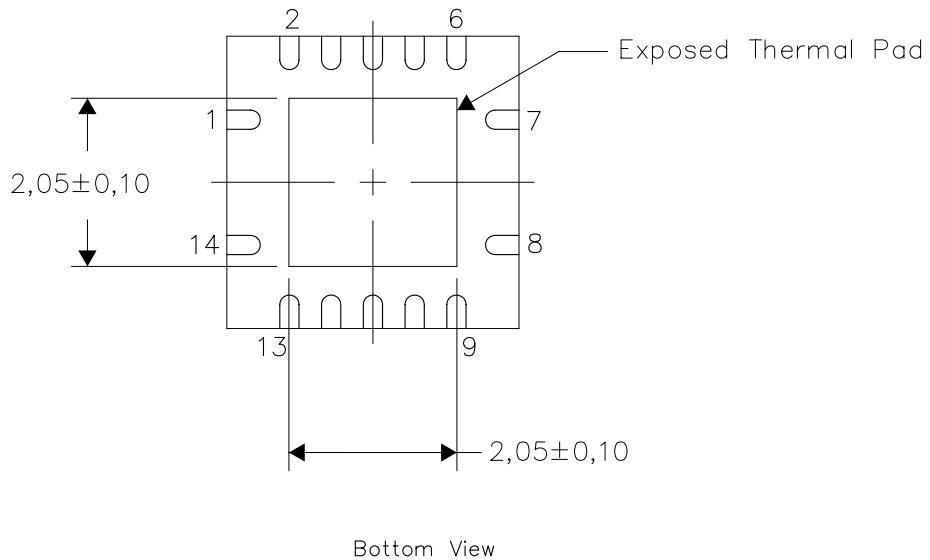
F. Package complies to JEDEC MO-241 variation BA.

## THERMAL INFORMATION

This package incorporates an exposed thermal pad that is designed to be attached directly to an external heatsink. The thermal pad must be soldered directly to the printed circuit board (PCB). After soldering, the PCB can be used as a heatsink. In addition, through the use of thermal vias, the thermal pad can be attached directly to the appropriate copper plane shown in the electrical schematic for the device, or alternatively, can be attached to a special heatsink structure designed into the PCB. This design optimizes the heat transfer from the integrated circuit (IC).

For information on the Quad Flatpack No-Lead (QFN) package and its advantages, refer to Application Report, QFN/SON PCB Attachment, Texas Instruments Literature No. SLUA271. This document is available at [www.ti.com](http://www.ti.com).

The exposed thermal pad dimensions for this package are shown in the following illustration.

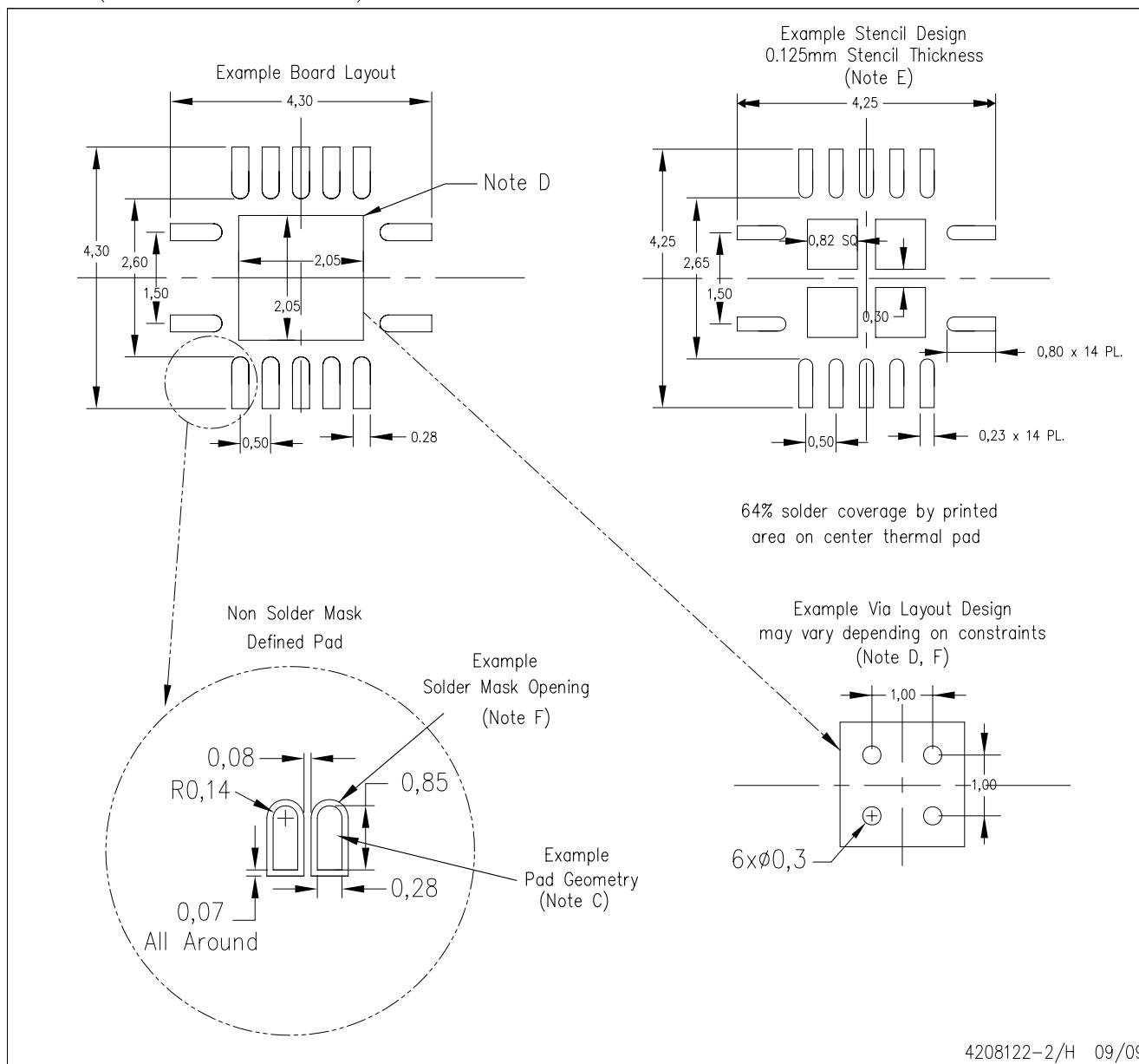


Bottom View

NOTES: All linear dimensions are in millimeters

Exposed Thermal Pad Dimensions

## RGY (S-PVQFN-N14)

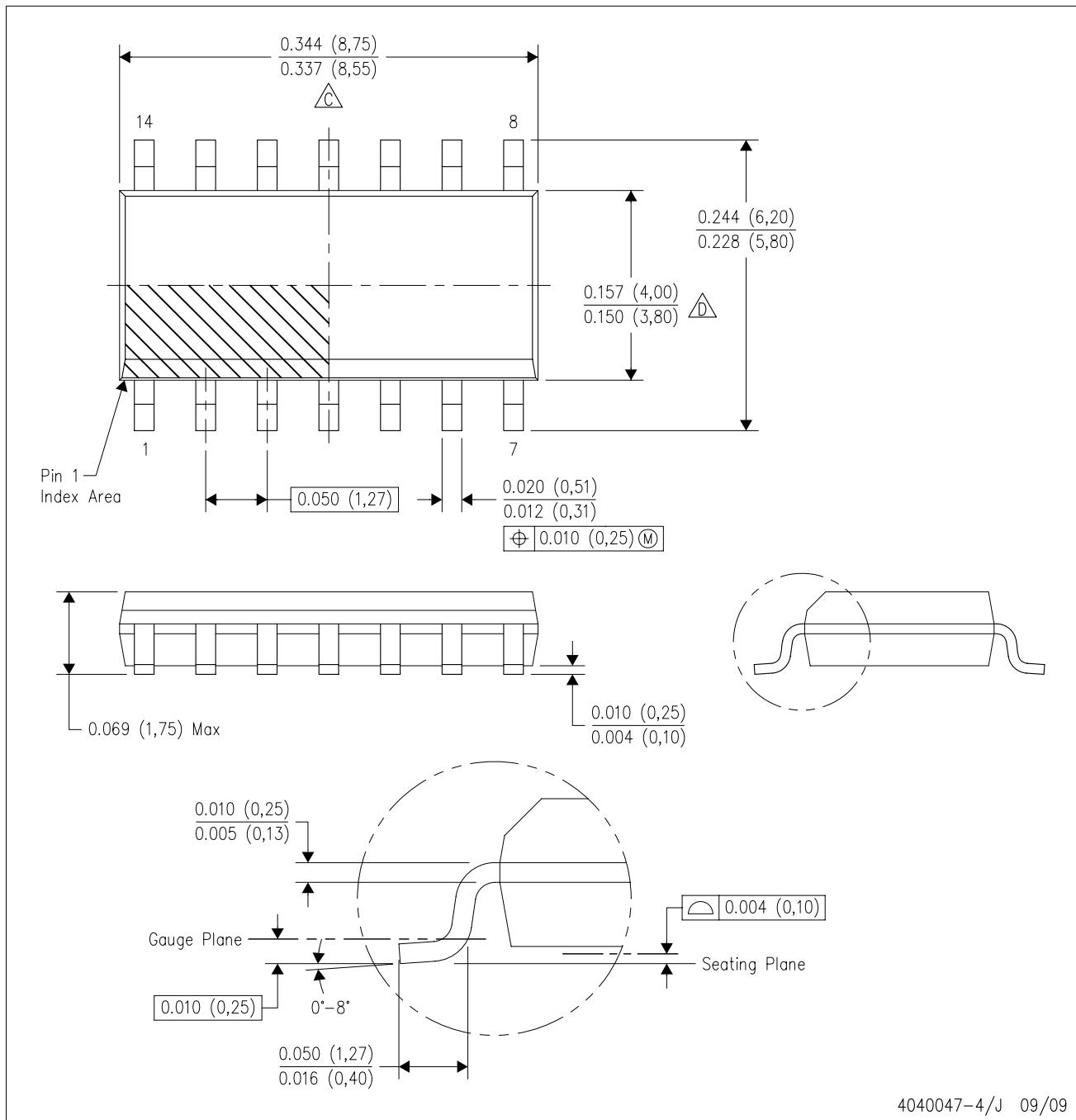


NOTES:

- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- Publication IPC-7351 is recommended for alternate designs.
- This package is designed to be soldered to a thermal pad on the board. Refer to Application Note, Quad Flat-Pack QFN/SON PCB Attachment, Texas Instruments Literature No. SLUA271, and also the Product Data Sheets for specific thermal information, via requirements, and recommended board layout. These documents are available at [www.ti.com](http://www.ti.com) <<http://www.ti.com>>.
- Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC 7525 for stencil design considerations.
- Customers should contact their board fabrication site for minimum solder mask web tolerances between signal pads.

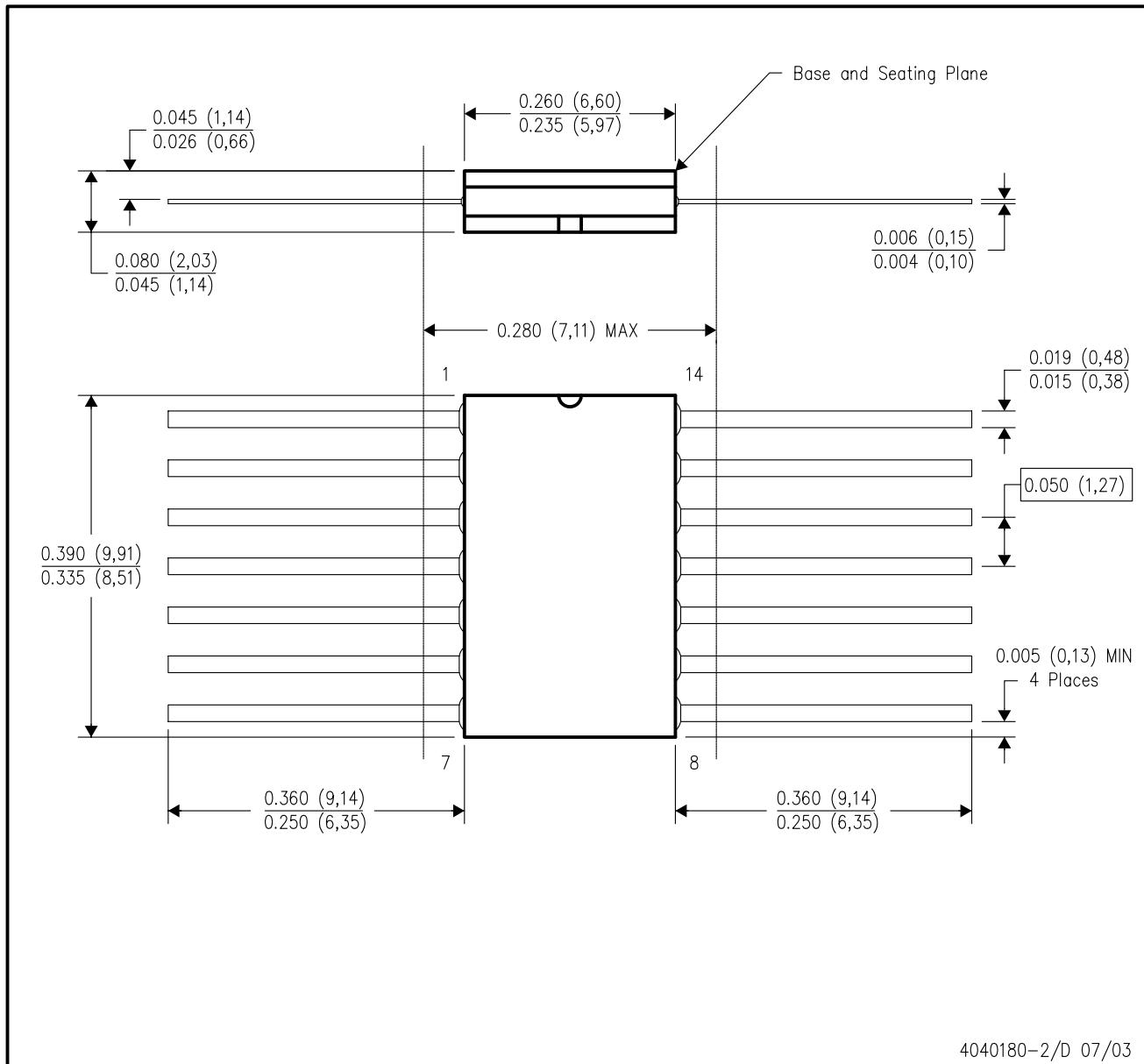
D (R-PDSO-G14)

PLASTIC SMALL-OUTLINE PACKAGE



W (R-GDFP-F14)

CERAMIC DUAL FLATPACK



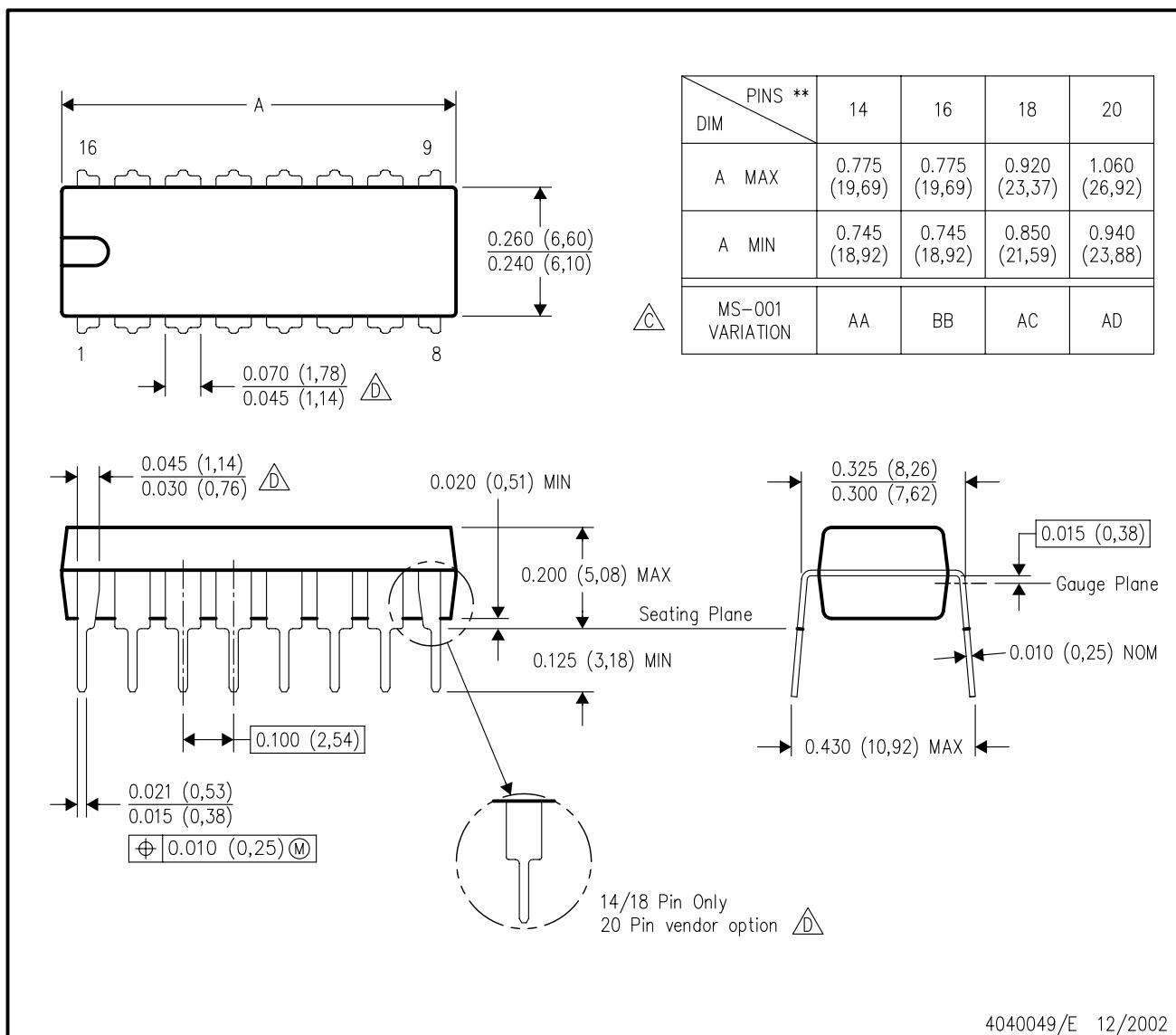
NOTES:

- All linear dimensions are in inches (millimeters).
- This drawing is subject to change without notice.
- This package can be hermetically sealed with a ceramic lid using glass frit.
- Index point is provided on cap for terminal identification only.
- Falls within MIL-STD 1835 GDFP1-F14 and JEDEC MO-092AB

## 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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