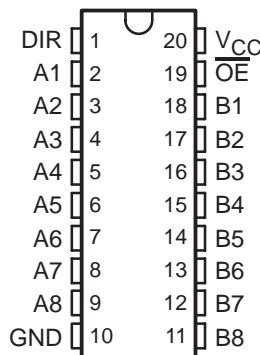
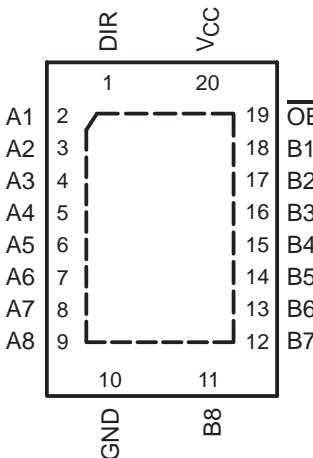


- Typical V_{OLP} (Output Ground Bounce) <1 V at $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$
- I_{off} and Power-Up 3-State Support Hot Insertion
- High-Drive Outputs (-32 -mA I_{OH} , 64 -mA I_{OL})
- Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD 17
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)

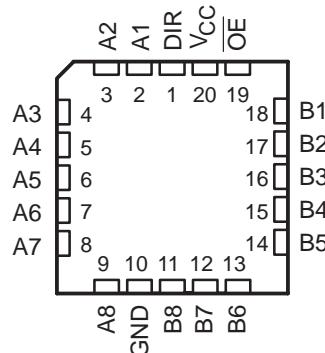
SN54ABT245A . . . J OR W PACKAGE
SN74ABT245B . . . DB, DGV, DW, N, NS,
OR PW PACKAGE
(TOP VIEW)



SN74ABT245B . . . RGY PACKAGE
(TOP VIEW)



SN54ABT245B . . . FK PACKAGE
(TOP VIEW)



description/ordering information

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 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.

ORDERING INFORMATION

T_A	PACKAGE [†]		ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 85°C	PDIP – N	Tube	SN74ABT245BN	SN74ABT245BN
	QFN – RGY	Tape and reel	SN74ABT245BRGYR	AB245B
	SOIC – DW	Tube	SN74ABT245BDW	
		Tape and reel	SN74ABT245BDWR	ABT245B
	SOP – NS	Tape and reel	SN74ABT245BNSR	ABT245B
	SSOP – DB	Tape and reel	SN74ABT245BDDBR	AB245B
	TSSOP – PW	Tube	SN74ABT245BPW	
		Tape and reel	SN74ABT245BPWR	AB245B
	TVSOP – DGV	Tape and reel	SN74ABT245BDGVR	AB245B
-55°C to 125°C	VFBGA – GQN	Tape and reel	SN74ABT245BGQNR	
	VFBGA – ZQN (Pb-free)		SN74ABT245BZQNR	AB245B
	CDIP – J	Tube	SNJ54ABT245AJ	SNJ54ABT245AJ
	CFP – W	Tube	SNJ54ABT245AW	SNJ54ABT245AW
	LCCC – FK	Tube	SNJ54ABT245AFK	SNJ54ABT245AFK

[†] Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at 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.

 **TEXAS
INSTRUMENTS**

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SN54ABT245A, SN74ABT245B OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

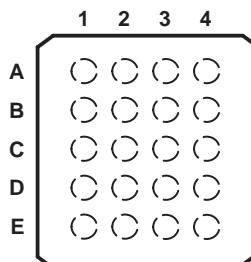
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description/ordering information (continued)

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

This device is fully specified for hot-insertion applications using I_{off} and power-up 3-state. The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down. The power-up 3-state circuitry places the outputs in the high-impedance state during power up and power down, which prevents driver conflict.

**SN74ABT245B . . . GQN OR ZQN PACKAGE
(TOP VIEW)**



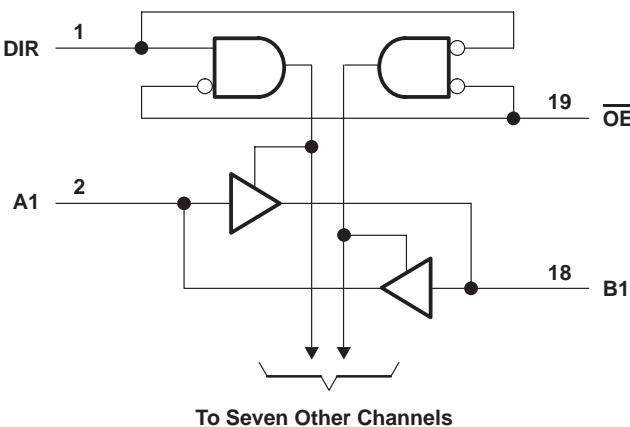
terminal assignments

	1	2	3	4
A	A1	DIR	V_{CC}	\overline{OE}
B	A3	B2	A2	B1
C	A5	A4	B4	B3
D	A7	B6	A6	B5
E	GND	A8	B8	B7

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 diagram (positive logic)



Pin numbers shown are for the DB, DGV, DW, FK, J, N, NS, PW, RGY, and W packages.

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 negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
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.

recommended operating conditions (see Note 4)

		SN54ABT245A		SN74ABT245B		UNIT
		MIN	MAX	MIN	MAX	
V _{CC}	Supply voltage	4.5	5.5	4.5	5.5	V
V _{IH}	High-level input voltage	2		2		V
V _{IL}	Low-level input voltage		0.8		0.8	V
V _I	Input voltage	0	V _{CC}	0	V _{CC}	V
I _{OH}	High-level output current		-24		-32	mA
I _{OL}	Low-level output current		48		64	mA
Δt/Δv	Input transition rise or fall rate		5		5	ns/V
Δt/ΔV _{CC}	Power-up ramp rate			200		μs/V
T _A	Operating free-air temperature	-55	125	-40	85	°C

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

**SN54ABT245A, SN74ABT245B
OCTAL BUS TRANSCEIVERS
WITH 3-STATE OUTPUTS**

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

PARAMETER	TEST CONDITIONS	TA = 25°C			SN54ABT245A		SN74ABT245B		UNIT
		MIN	TYPT†	MAX	MIN	MAX	MIN	MAX	
VIK	VCC = 4.5 V, I _I = -18 mA			-1.2		-1.2		-1.2	V
VOH	VCC = 4.5 V, I _{OH} = -3 mA	2.5			2.5		2.5		V
	VCC = 5 V, I _{OH} = -3 mA	3			3		3		
	VCC = 4.5 V	I _{OH} = -24 mA	2		2			2	
		I _{OH} = -32 mA	2*						
VOL	VCC = 4.5 V	I _{OL} = 48 mA	0.55		0.55				V
		I _{OL} = 64 mA	0.55*				0.55		
V _{hys}		100							mV
I _I	Control inputs	VCC = 0 to 5.5 V, V _I = VCC or GND			±1		±1	±1	µA
	A or B ports	VCC = 2.1 V to 5.5 V, V _I = VCC or GND			±20		±100	±20	
I _{OZPU}	VCC = 0 to 2.1 V, V _O = 0.5 V to 2.7 V, OE = X			±50		±50		±50	µA
I _{OZPD}	VCC = 2.1 V to 0, V _O = 0.5 V to 2.7 V, OE = X			±50		±50		±50	µA
I _{OZH} ‡	VCC = 2.1 V to 5.5 V, V _O = 2.7 V, OE ≥ 2 V			10		10		10	µA
I _{OZL} ‡	VCC = 2.1 V to 5.5 V, V _O = 0.5 V, OE ≥ 2 V			-10		-10		-10	µA
I _{off}	VCC = 0, V _I or V _O ≤ 5.5 V			±100				±100	µA
I _{CEX}	VCC = 5.5 V, V _O = 5.5 V	Outputs high		50		50		50	µA
I _O §	VCC = 5.5 V, V _O = 2.5 V	-50	-140	-180	-50	-180	-50	-180	mA
I _{CC}	A or B ports	VCC = 5.5 V, I _O = 0, V _I = VCC or GND	Outputs high	5	250		250	250	µA
			Outputs low	22	30		30	30	mA
			Outputs disabled	1	250		250	250	µA
ΔI _{CC} ¶	Data inputs	VCC = 5.5 V, One input at 3.4 V, Other inputs at VCC or GND	Outputs enabled		1.5		1.5	1.5	mA
			Outputs disabled		50		50	50	µA
	Control inputs	VCC = 5.5 V, One input at 3.4 V, Other inputs at VCC or GND			1.5		1.5	1.5	mA
C _i	Control inputs	V _I = 2.5 V or 0.5 V		4					pF
C _{io}	A or B ports	V _O = 2.5 V or 0.5 V		8					pF

* On products compliant to MIL-PRF-38535, this parameter does not apply.

† All typical values are at VCC = 5 V.

‡ The parameters I_{OZH} and I_{OZL} include the input leakage current.

§ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

¶ This is the increase in supply current for each input that is at the specified TTL voltage level, rather than VCC or GND.

**SN54ABT245A, SN74ABT245B
OCTAL BUS TRANSCEIVERS
WITH 3-STATE OUTPUTS**

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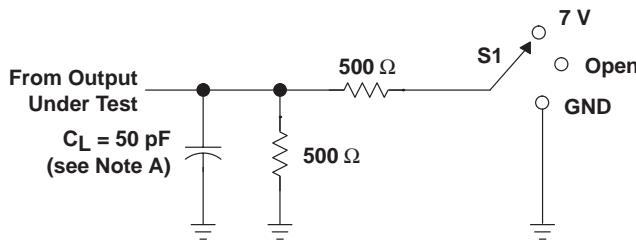
switching characteristics over recommended ranges of supply voltage and operating free-air temperature, $C_L = 50 \text{ pF}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 5 V, T _A = 25°C			SN54ABT245A	SN74ABT245B	UNIT	
			MIN	TYP	MAX	MIN	MAX		
t _{PLH}	A or B	B or A	1	2	3.2	0.8	3.8	1	3.6
t _{PHL}			1	2.6	3.5	1	4.2	1	3.9
t _{PZH}	\overline{OE}	A or B	2	3.5	4.5	1.2	6.2	2	5.6
t _{PZL}			1.9	4	5.3	1.3	6.8	1.9	6.2
t _{PHZ}	\overline{OE}	A or B	2.2	4.4	5.4	2.2	6.1	2.2	5.9
t _{PLZ}			1.5	3	4	1.0	4.9	1.5	4.5
t _{sk(o)}					0.5			0.5	ns

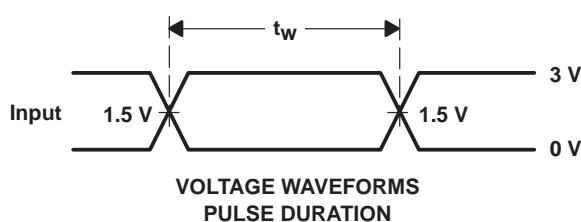
SN54ABT245A, SN74ABT245B OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

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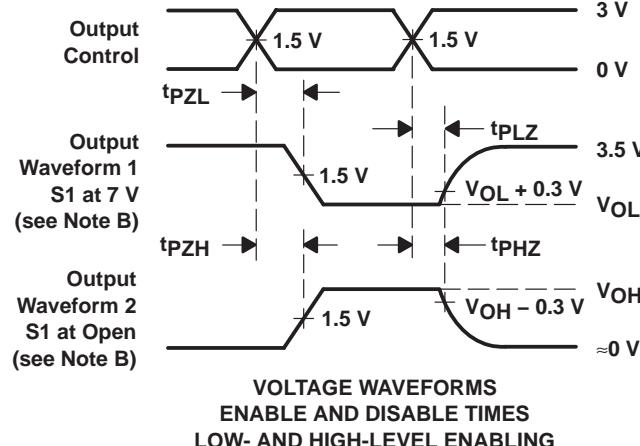
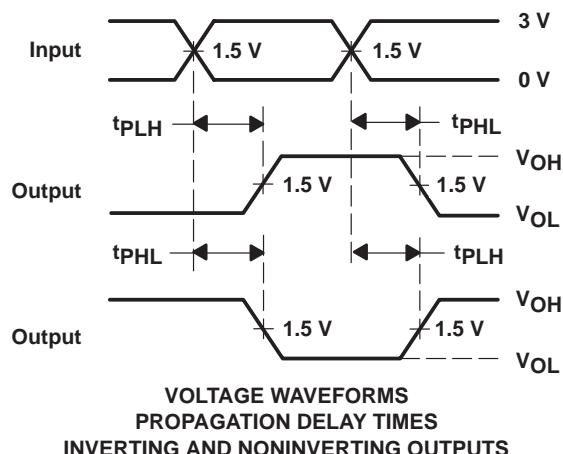
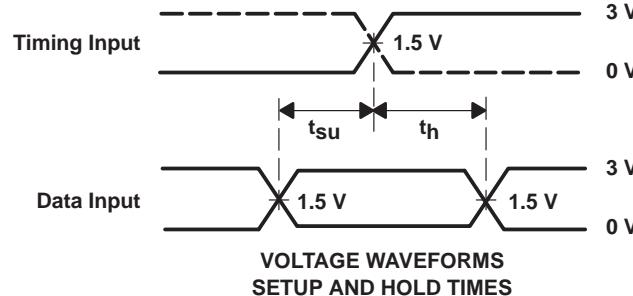
PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT



TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	7 V
t_{PHZ}/t_{PZH}	Open



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. All input pulses are supplied by generators having the following characteristics: PRR $\leq 10 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r \leq 2.5 \text{ ns}$, $t_f \leq 2.5 \text{ ns}$.
- D. The outputs are measured one at a time, with one transition per measurement.
- E. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
5962-9214802Q2A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
5962-9214802QRA	ACTIVE	CDIP	J	20	1	TBD	Call TI	Level-NC-NC-NC
5962-9214802QSA	ACTIVE	CFP	W	20	1	TBD	Call TI	Level-NC-NC-NC
SN74ABT245BDBLE	OBsolete	SSOP	DB	20		TBD	Call TI	Call TI
SN74ABT245BDBR	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ABT245BDBRG4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1YEAR
SN74ABT245BDGVR	ACTIVE	TVSOP	DGV	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74ABT245BDGVRE4	ACTIVE	TVSOP	DGV	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74ABT245BDW	ACTIVE	SOIC	DW	20	25	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN74ABT245BDWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ABT245BDWR	ACTIVE	SOIC	DW	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN74ABT245BDWRG4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ABT245BGQNR	ACTIVE	VFBGA	GQN	20	1000	TBD	SNPB	Level-1-240C-UNLIM
SN74ABT245BN	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74ABT245BNSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ABT245BNSRE4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ABT245BPW	ACTIVE	TSSOP	PW	20	70	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74ABT245BPWE4	ACTIVE	TSSOP	PW	20	70	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74ABT245BPWLE	OBsolete	TSSOP	PW	20		TBD	Call TI	Call TI
SN74ABT245BPWR	ACTIVE	TSSOP	PW	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74ABT245BPWRE4	ACTIVE	TSSOP	PW	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74ABT245BRGYR	ACTIVE	QFN	RGY	20	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1YEAR
SN74ABT245BZQNR	ACTIVE	VFBGA	ZQN	20	1000	Pb-Free (RoHS)	SNAGCU	Level-1-260C-UNLIM
SNJ54ABT245AFK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
SNJ54ABT245AJ	ACTIVE	CDIP	J	20	1	TBD	Call TI	Level-NC-NC-NC
SNJ54ABT245AW	ACTIVE	CFP	W	20	1	TBD	Call TI	Level-NC-NC-NC

⁽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) 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.

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.

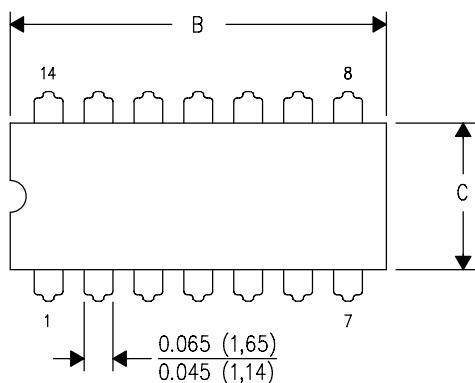
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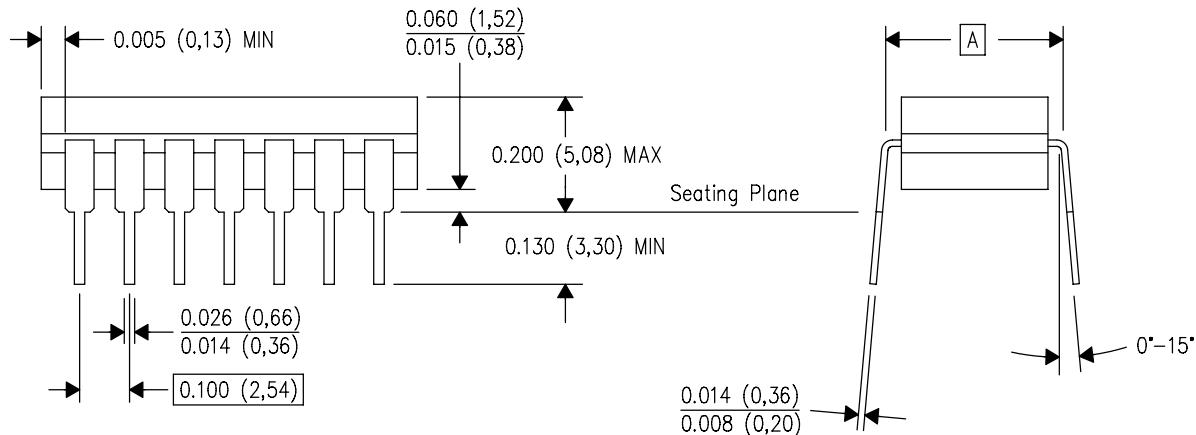
J (R-GDIP-T**)

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)

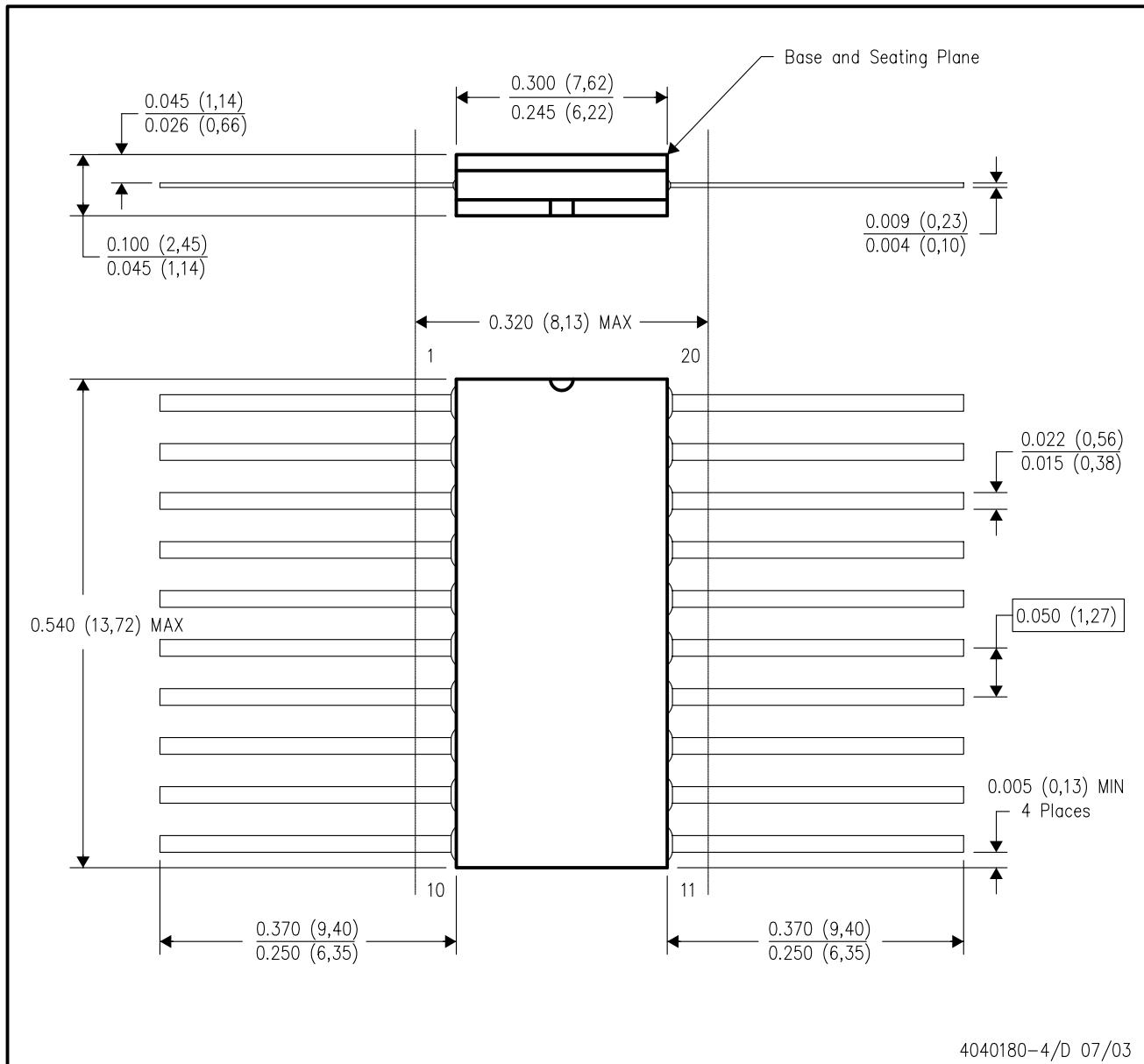


4040083/F 03/03

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.

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

FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN

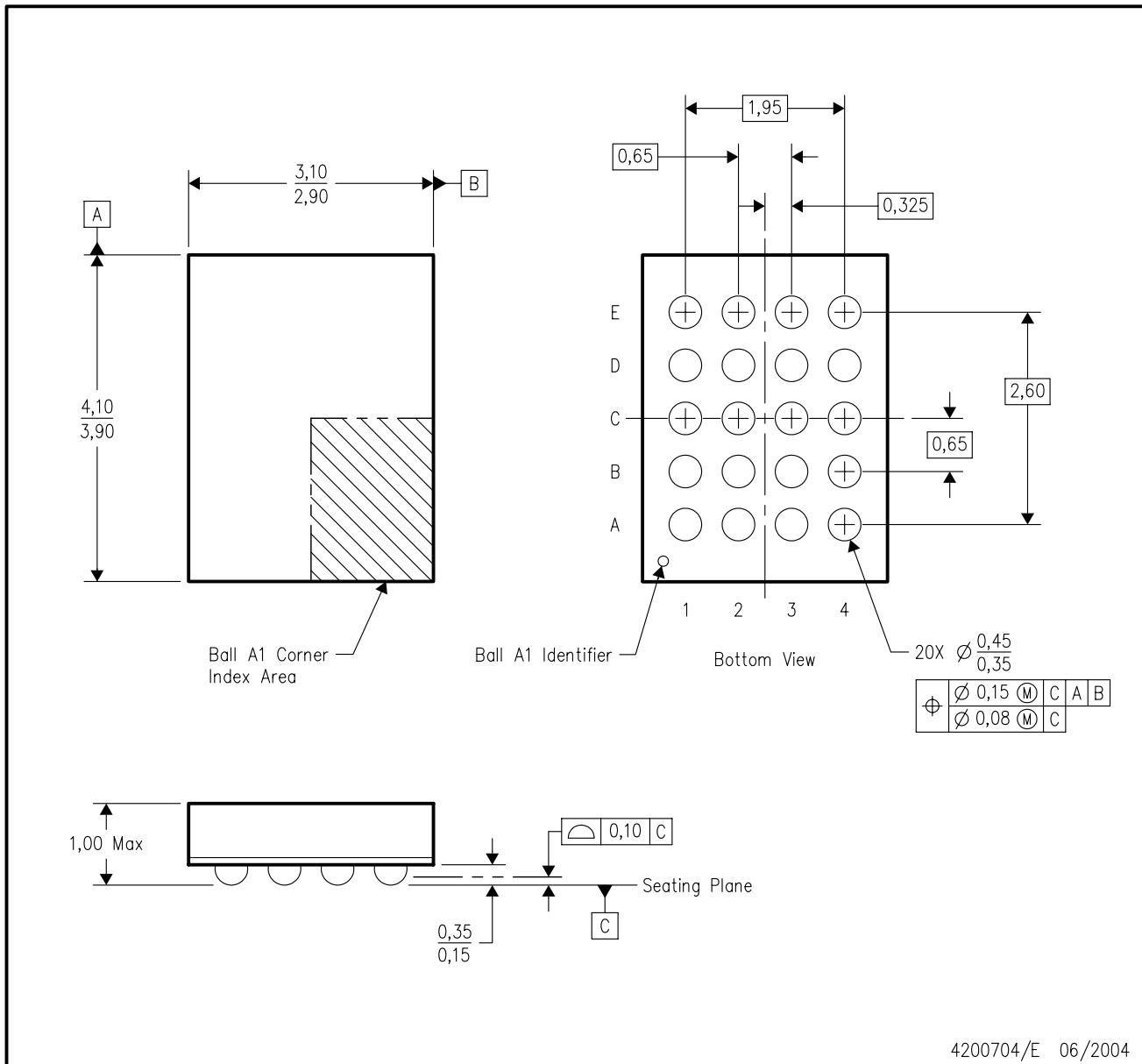


NOTES: A. All linear dimensions are in inches (millimeters).
 B. This drawing is subject to change without notice.
 C. This package can be hermetically sealed with a metal lid.
 D. The terminals are gold plated.
 E. Falls within JEDEC MS-004

4040140/D 10/96

GQN (R-PBGA-N20)

PLASTIC BALL GRID ARRAY



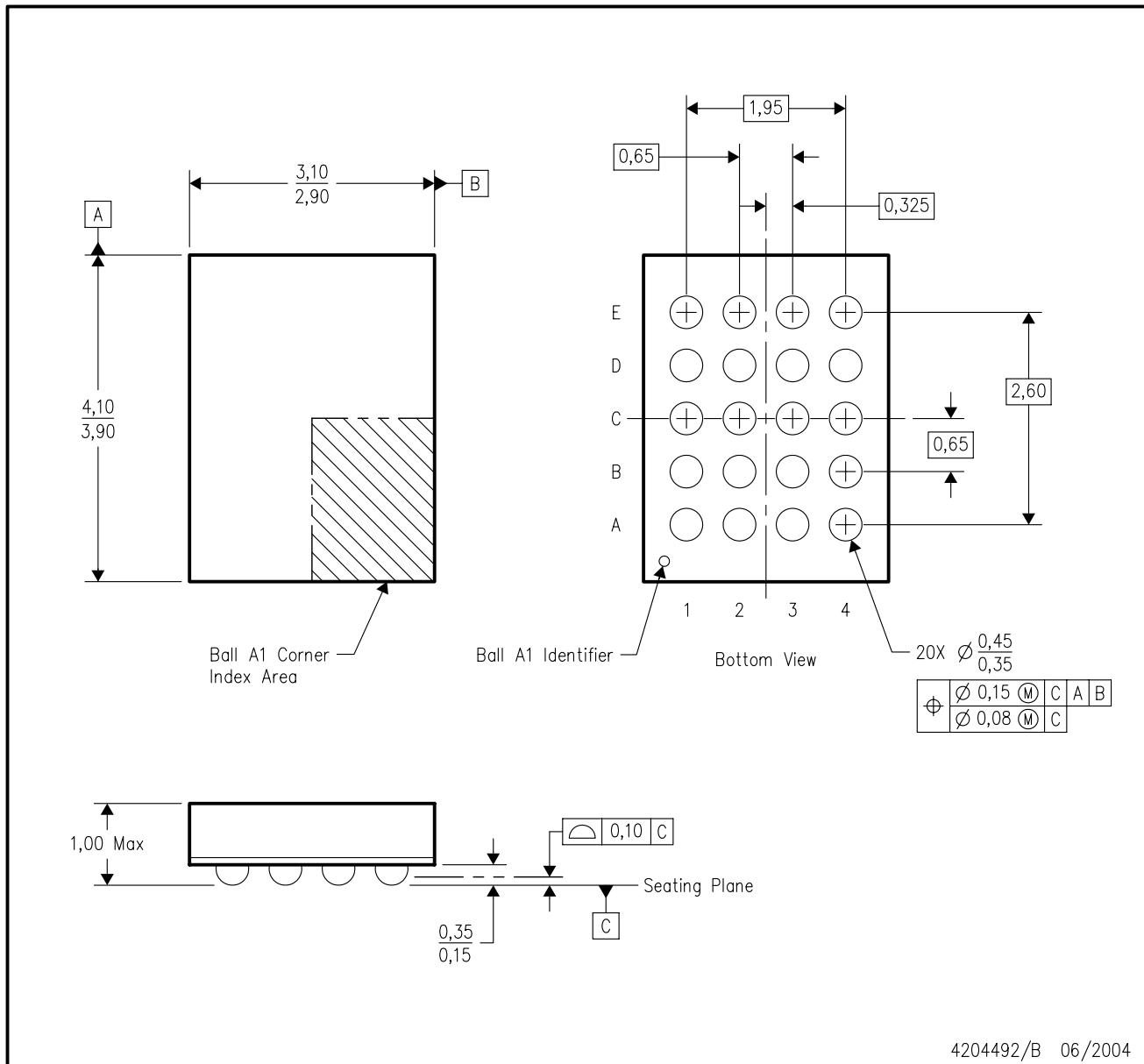
4200704/E 06/2004

NOTES:

- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- Falls within JEDEC MO-225 variation BC.
- This package is tin-lead (SnPb). Refer to the 20 ZQN package (drawing 4204492) for lead-free.

ZQN (R-PBGA-N20)

PLASTIC BALL GRID ARRAY



NOTES:

- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- Falls within JEDEC MO-225 variation BC.
- This package is lead-free. Refer to the 20 GQN package (drawing 4200704) for tin-lead (SnPb).

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.

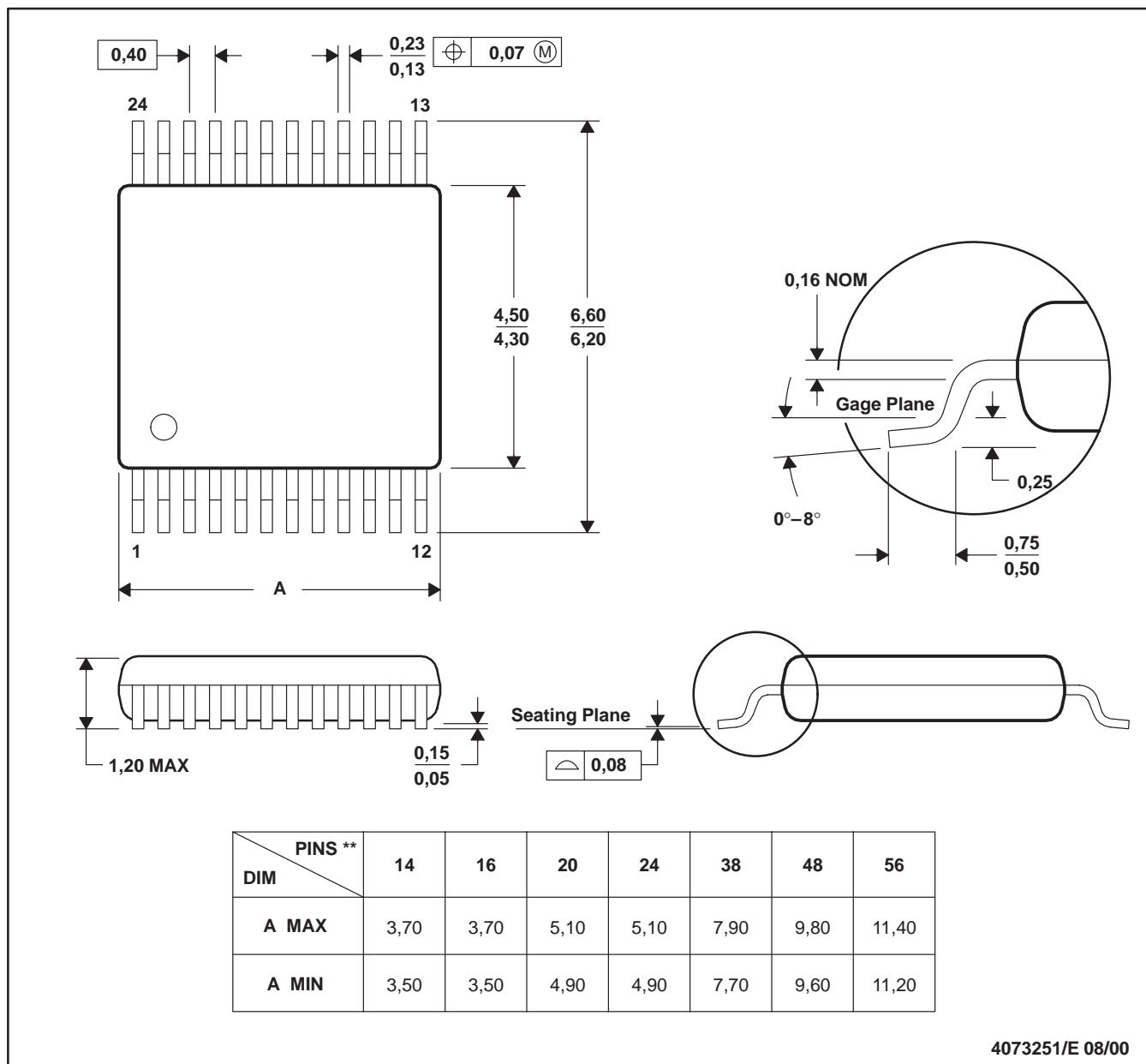
△ Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).

△ The 20 pin end lead shoulder width is a vendor option, either half or full width.

DGV (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

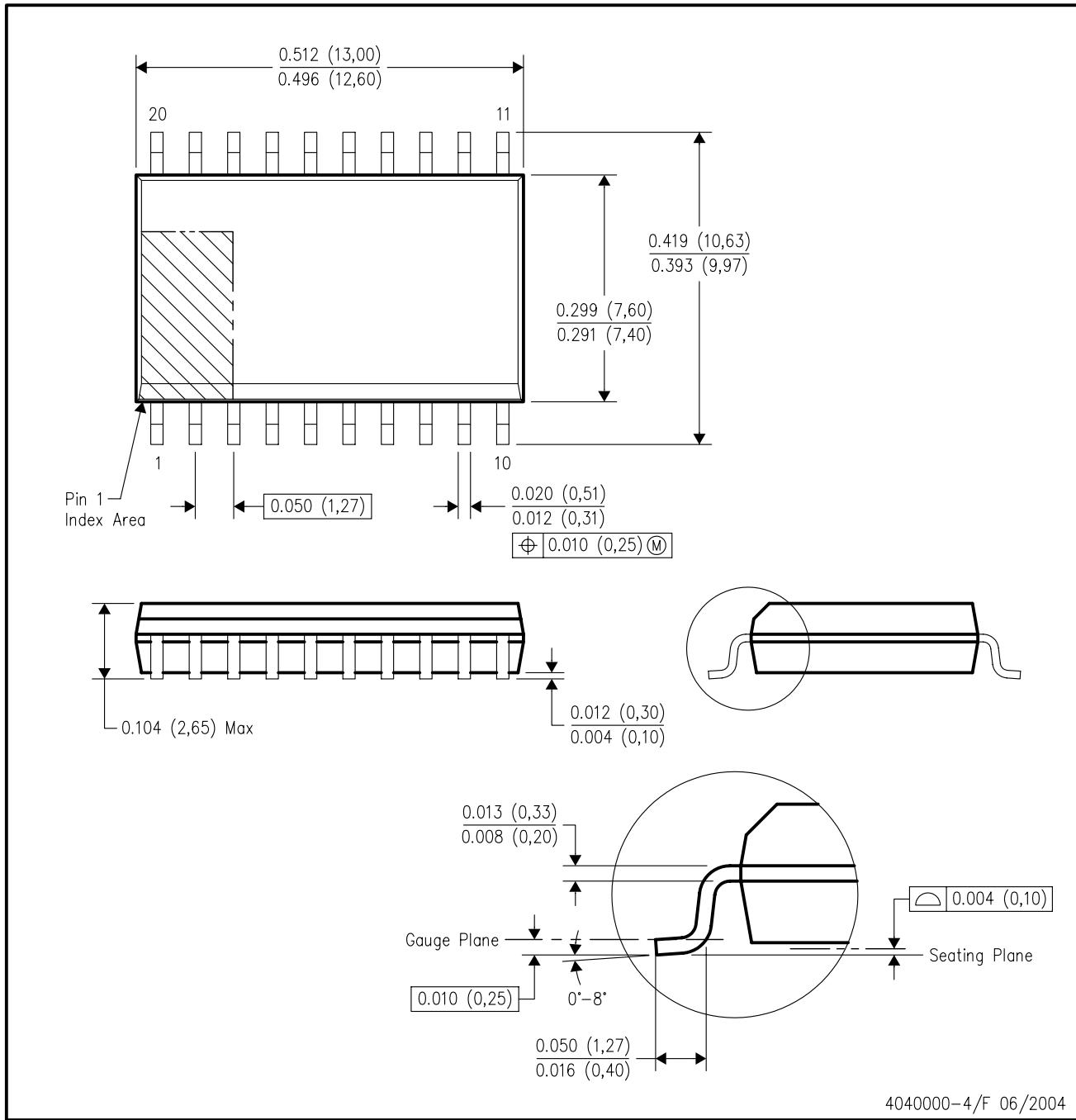
24 PINS SHOWN



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

DW (R-PDSO-G20)

PLASTIC SMALL-OUTLINE PACKAGE

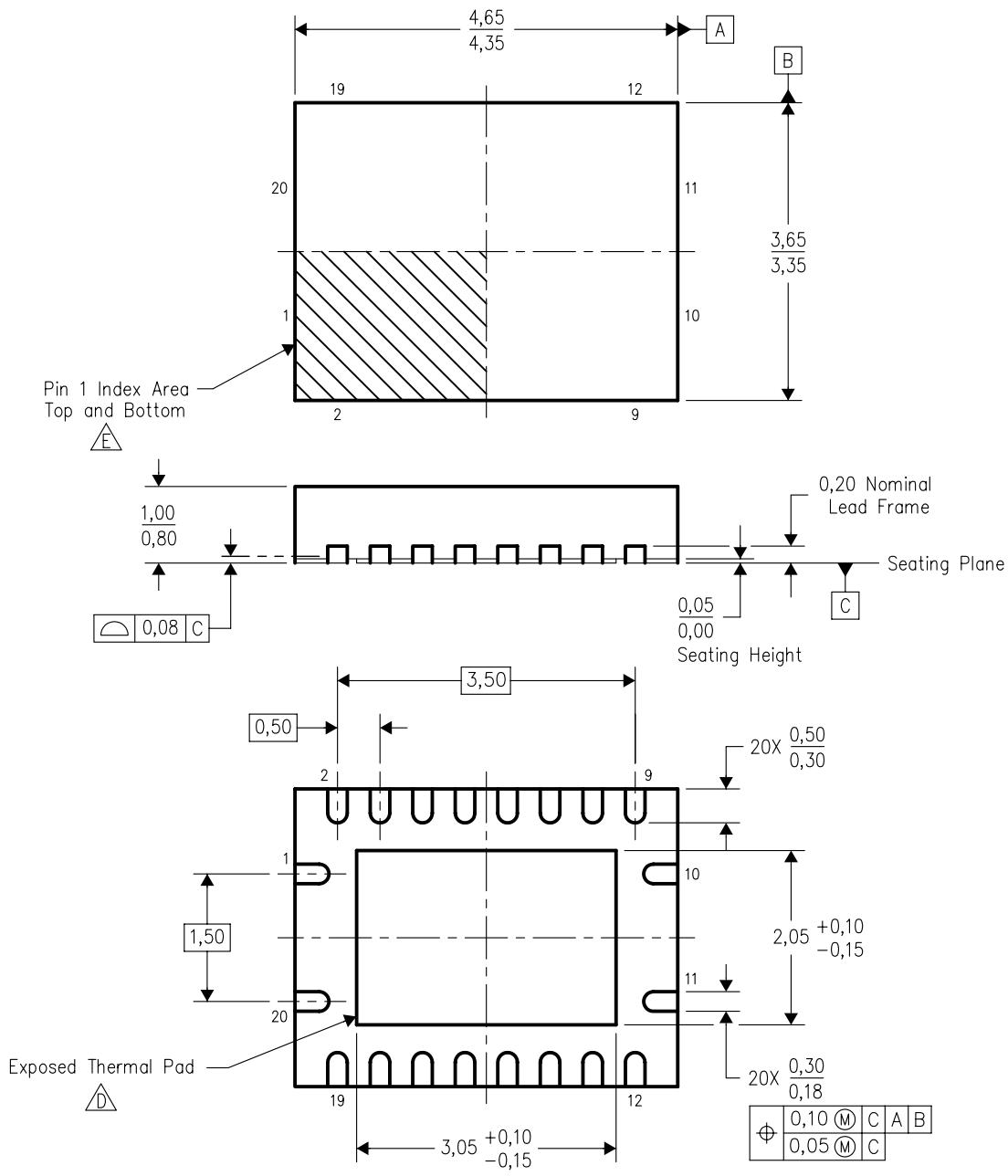


NOTES:

- All linear dimensions are in inches (millimeters).
- 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 AC.

RGY (R-PQFP-N20)

PLASTIC QUAD FLATPACK



Bottom View

4203539-4/G 04/2005

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.

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 BC.

MECHANICAL DATA

NS (R-PDSO-G)**

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



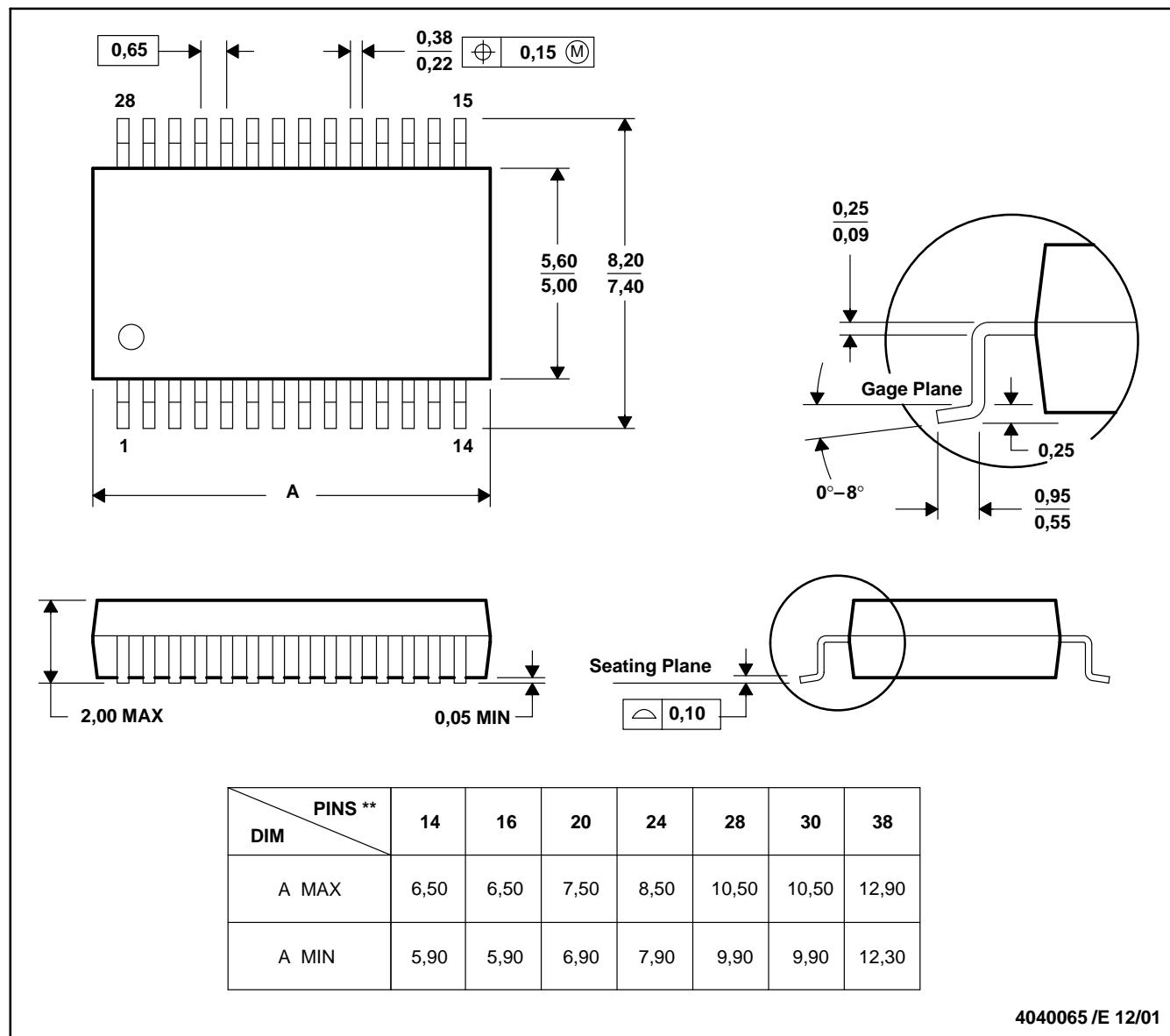
NOTES:

- 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.

DB (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

28 PINS SHOWN

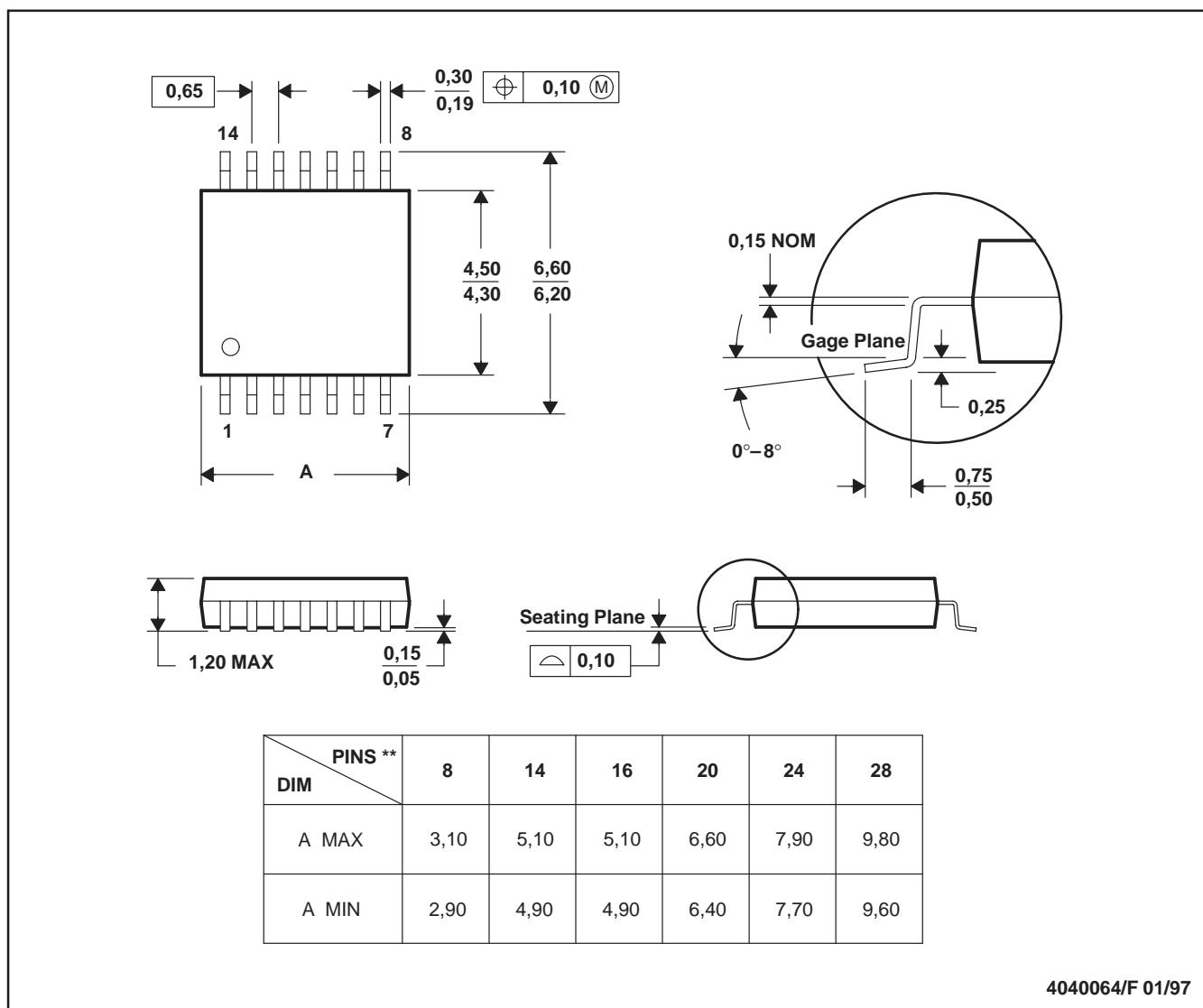


NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
 D. Falls within JEDEC MO-150

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

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Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265

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