SN54ABT125, SN74ABT125 QUADRUPLE BUS BUFFER GATES WITH 3-STATE OUTPUTS

SCBS182I - FEBRUARY 1997 - REVISED NOVEMBER 2002

- Typical VOLP (Output Ground Bounce) <1 V at V_{CC} = 5 V, T_A = 25°C
- High-Drive Outputs (-32-mA IOH, 64-mA IOL)
- Ioff and Power-Up 3-State Support Hot Insertion
- 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)
- SN54ABT125 ... J OR W PACKAGE SN74ABT125 ... RGY PACKAGE SN54ABT125 . . . FK PACKAGE (TOP VIEW) (TOP VIEW) SN74ABT125 ... D, DB, N, NS, **OR PW PACKAGE** (TOP VIEW) √CC õ ç ŚĮĞ 10E V_{CC} 14 1 14 18 4A 1A 🛛 4OE 1Y 2 13 4OE 2 13 1A NC 5 17 NC 1Y 4A 12 3 12 1Y 3 4A 2OE 16 4Y 6 20E 4Y 4 11 2<mark>0E</mark> 4 11 4Y NC 15 NC Π7 2A [5 10 3OE 5 10 3OE 2Δ 2A 3OE 14 2Y 8 6 q _ 3A 2Y 6 C 3A 10 11 12 8 GND 3Y 7 8 後为養部世常 GND 2√ GND ANC 37 NC NC - No internal connection

description/ordering information

The 'ABT125 guadruple bus buffer gates feature independent line drivers with 3-state outputs. Each output is disabled when the associated output-enable (OE) input is high.

These devices are 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 devices when they are 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.

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.

TA	PACKAGE [†]		ORDERABLE PART NUMBER	TOP-SIDE MARKING					
	PDIP – N	Tube	SN74ABT125N	SN74ABT125N					
–40°C to 85°C	QFN – RGY	Tape and reel	SN74ABT125RGYR	AB125					
	SOIC – D	Tube	SN74ABT125D	ABT125					
	30IC - D	Tape and reel	SN74ABT125DR	ABT125					
	SOP – NS	Tape and reel	SN74ABT125NSR	ABT125					
	SSOP – DB Tape and reel		SN74ABT125DBR	AB125					
	TSSOP – PW	Tape and reel	SN74ABT125PWR	AB125					
	CDIP – J	Tube	SNJ54ABT125J	SNJ54ABT125J					
–55°C to 125°C	CFP – W	Tube	SNJ54ABT125W	SNJ54ABT125W					
	LCCC – FK	Tube	SNJ54ABT125FK	SNJ54ABT125FK					

ORDERING INFORMATION

[†]Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



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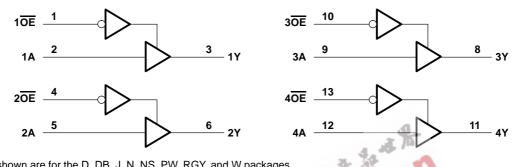
PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



Copyright © 2002. Texas Instruments Incorporated 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.

FUNCTION TABLE (each buffer)						
INPUTS OUTPUT						
OE	Α	Y				
L	Н	Н				
L	L	L				
Н	Х	Z				

logic diagram (positive logic)



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

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

Supply voltage range, V _{CC}		–0.5 V to 7 V
	ə 1)	
Voltage range applied to any out	put in the high or power-off state, VO	–0.5 V to 5.5 V
Current into any output in the low	v state, IO: SN54ABT125	
	SN74ABT125	128 mA
Input clamp current, I_{IK} (V ₁ < 0)		–18 mA
Output clamp current, IOK (VO <	0)	
Package thermal impedance, $\theta_{\rm J}$	A (see Note 2): D package	
	(see Note 2): DB package	
	(see Note 2): N package	80°C/W
	(see Note 2): NS package	
	(see Note 2): PW package	113°C/W
	(see Note 3): RGY package	47°C/W
Storage temperature range, T _{stg}		–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.

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)

		SN54ABT125		SN74A	BT125	UNIT
		MIN	MAX	MIN	MAX	UNIT
VCC	Supply voltage	4.5	5.5	4.5	5.5	V
VIH	High-level input voltage	2		2		V
VIL	Low-level input voltage		0.8		0.8	V
VI	Input voltage	0	VCC	0	VCC	V
ЮН	High-level output current		-24		-32	mA
IOL	Low-level output current		48		64	mA
$\Delta t/\Delta v$	Input transition rise or fall rate		10		10	ns/V
$\Delta t / \Delta V_{CC}$	Power-up ramp rate	200		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.





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

PARAMETER		TEST CONDITIONS		٦	A = 25°C	;	SN54A	BT125	SN74A	BT125	UNIT	
		TEST CONDITIONS			TYP†	MAX	MIN	MAX	MIN	MAX	UNIT	
VIK		$V_{CC} = 4.5 \text{ V},$ $I_{I} = -18 \text{ mA}$				-1.2		-1.2		-1.2	V	
V _{CC} = 4.5 V,		V _{CC} = 4.5 V,	I _{OH} = –3 mA	2.5			2.5		2.5			
Varia		$V_{CC} = 5 V$, $I_{OH} = -3 mA$		3			3		3		v	
VOH		V _{CC} = 4.5 V	I _{OH} = -24 mA	2			2				V	
		VCC = 4.5 V	I _{OH} = -32 mA	2*					2			
Ve		V _{CC} = 4.5 V	I _{OL} = 48 mA			0.55		0.55			V	
VOL		VCC = 4.5 V	I _{OL} = 64 mA	0.55*					0.55	v		
V _{hys}					100						mV	
Ιį		$V_{CC} = 0$ to 5.5 V, $V_I = V_{CC}$ or GND				±1		±1		±1	μA	
IOZPU		$V_{CC} = 0$ to 2.1 V, $V_O = 0.5$ V to 2.7 V, $\overline{OE} = X$				±50		±50		±50	μA	
IOZPD		$V_{CC} = 2.1 \text{ V to } 0, V_O = 0.5 \text{ V to } 2.7 \text{ V}, \overline{OE} = X$				±50		±50		±50	μA	
IOZH		$V_{CC} = 2.1 \text{ V to } 5.5 \text{ V}, \qquad V_{O} = 2.7 \text{ V}, \overline{OE} \ge 2 \text{ V}$				10	0	10		10	μA	
IOZL		$V_{CC} = 2.1 \text{ V to } 5.5 \text{ V}, \qquad V_{O} = 0.5 \text{ V}, \overline{\text{OE}} \ge 2 \text{ V}$				-10	The second	-10		-10	μA	
loff		V _{CC} = 0,	$V_I \text{ or } V_O \leq 4.5 \text{ V}$			±100				±100	μA	
ICEX		V _{CC} = 5.5 V, V _O = 5.5 V	Outputs high	. 3	3	50	.C.	50		50	μA	
10‡		V _{CC} = 5.5 V,	V _O = 2.5 V	-50	-100	-200§	-50	–200§	-50	–200§	mA	
		V _{CC} = 5.5 V,	Outputs high		G	250		250		250	μΑ	
ICC		$I_{O} = 0,$	Outputs low		24	30		30		30	mA	
		$V_I = V_{CC}$ or GND	Outputs disabled		0.5	250		250		250	μA	
	Data	$V_{CC} = 5.5 V$, One input at 3.4 V,	Outputs enabled			1.5		1.5		1.5		
∆ICC [¶]	inputs	Other inputs at V _{CC} or GND	Outputs disabled			0.05		0.05		0.05	mA	
	Control inputs	V_{CC} = 5.5 V, One input at 3.4 V, Other inputs at V_{CC} or GND				1.5		1.5		1.5		
Ci		VI = 2.5 V or 0.5 V			3						pF	
Co		Vo = 2.5 V or 0.5 V			7						pF	

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

[†] All typical values are at $V_{CC} = 5 V$.

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

§ This limit may vary among suppliers.

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



switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V ₍ Tj	CC = 5 V A = 25°C	, ,	SN54A	BT125	SN74A	BT125	UNIT	
		(001F01)					MAX	MIN	MAX		
^t PLH [†]	٨	٨	v	1	3.2	4.6	1	6	1	4.9	
^t PHL [†]	A	Ť	1	2.5	4.6	1	6.2	1	4.9	ns	
^t PZH [†]		V	1	3.6	5	1	6	1	5.9		
^t PZL [†]	OE	Ŷ	1	2.5	6.2	1	7.5	1	6.8	ns	
^t PHZ			1	3.8	5.4	1	6.3	1	6.2		
^t PLZ [†]	ŌĒ	T	1	3.3	5.3	1	6.5	1	6.2	ns	

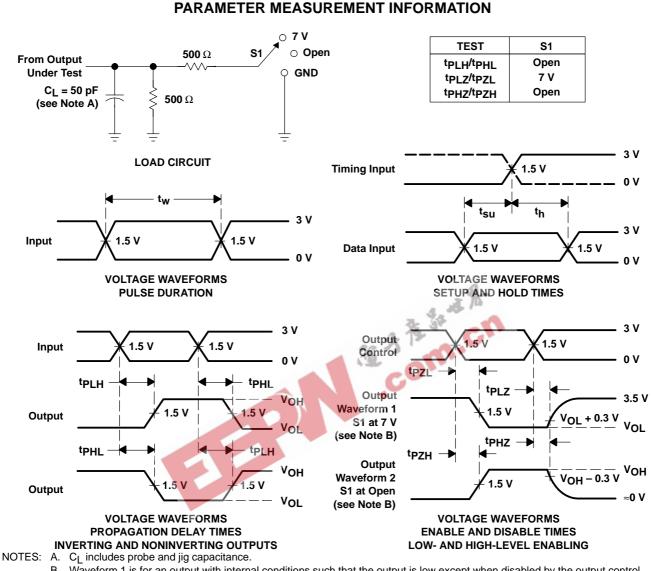
[†] This limit may vary among suppliers.





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SCBS182I - FEBRUARY 1997 - REVISED NOVEMBER 2002



- 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 MHz, Z_O = 50 Ω , t_f \leq 2.5 ns, t_f \leq 2.5 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





PACKAGE OPTION ADDENDUM

28-Feb-2005

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
5962-9676801Q2A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
5962-9676801QCA	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
5962-9676801QDA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
SN74ABT125D	ACTIVE	SOIC	D	14	50	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74ABT125DBLE	OBSOLETE	SSOP	DB	14		None	Call TI	Call TI
SN74ABT125DBR	ACTIVE	SSOP	DB	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74ABT125DR	ACTIVE	SOIC	D	14	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74ABT125N	ACTIVE	PDIP	Ν	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74ABT125NSR	ACTIVE	SO	NS	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74ABT125PW	ACTIVE	TSSOP	PW	14	90	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74ABT125PWLE	OBSOLETE	TSSOP	PW	14	ふや	None	Call TI	Call TI
SN74ABT125PWR	ACTIVE	TSSOP	PW	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74ABT125RGYR	ACTIVE	QFN	RGY	14	1000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR
SNJ54ABT125FK	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
SNJ54ABT125J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SNJ54ABT125W	ACTIVE	CFP	W	14	1	None	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 - May not be currently available - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

None: Not yet available Lead (Pb-Free).

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" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDECindustry standard classifications, and peak solder temperature.

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PACKAGE OPTION ADDENDUM

28-Feb-2005

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J (R-GDIP-T**) 14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE

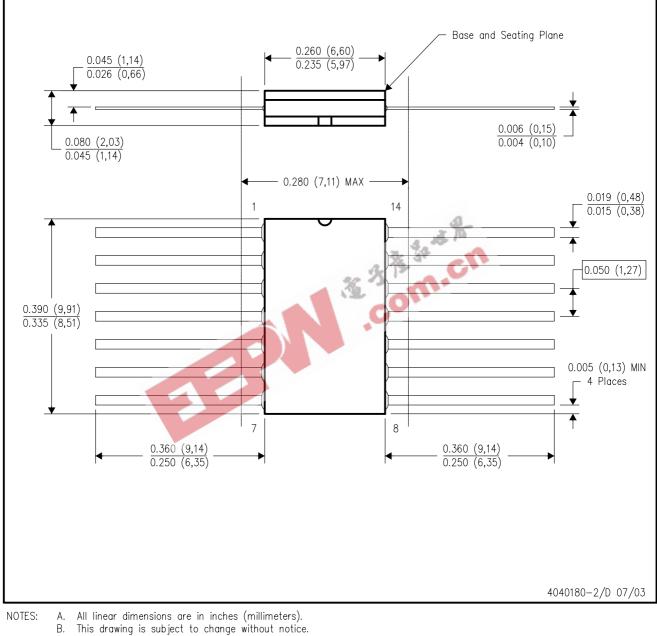
PINS ** 14 16 18 20 DIM 0.300 0.300 0.300 0.300 В А (7,62) (7,62) (7,62) (7,62) BSC BSC BSC BSC 8 14 0.785 1.060 .840 0.960 B MAX (19,94)(21, 34)(24, 38)(26, 92)B MIN С 0.300 0.300 0.310 0.300 C MAX (7, 62)(7,62) (7, 62)(7, 87)C MIN 7 0.245 0.245 0.220 0.245 0.065 (1,65) 0.045 (1,14) (6, 22)(6, 22)(5, 59)(6, 22)0.060 (1,52) - 0.005 (0,13) MIN Α -0.015 (0,38) 0.200 (5,08) MAX Seating Plane 0.130 (3,30) MIN 0.026 (0,66) 0.014 (0,36) 0°-15° 0.100 (2,54) 0.014 (0,36) 0.008 (0,20) 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-F14)

CERAMIC DUAL FLATPACK



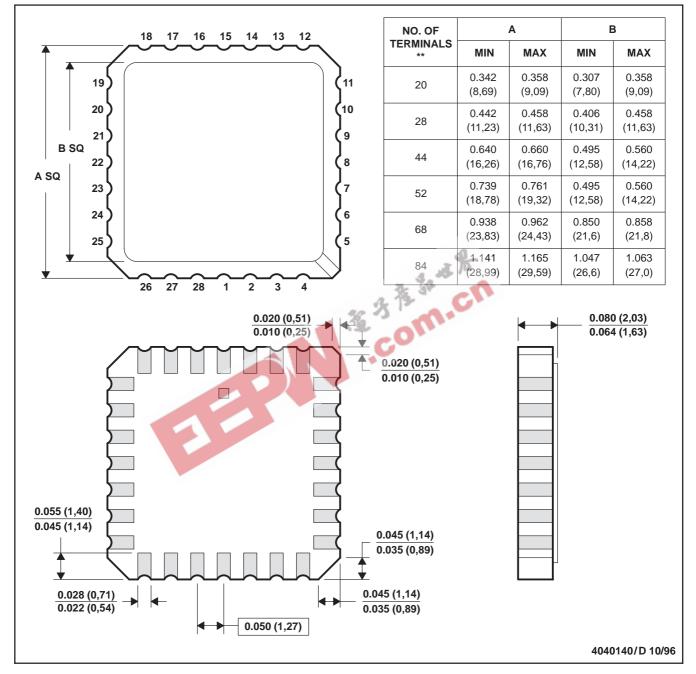
- C. This package can be hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only.
- E. Falls within MIL STD 1835 GDFP1-F14 and JEDEC MO-092AB



MLCC006B - OCTOBER 1996

LEADLESS CERAMIC CHIP CARRIER

FK (S-CQCC-N**) 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



PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



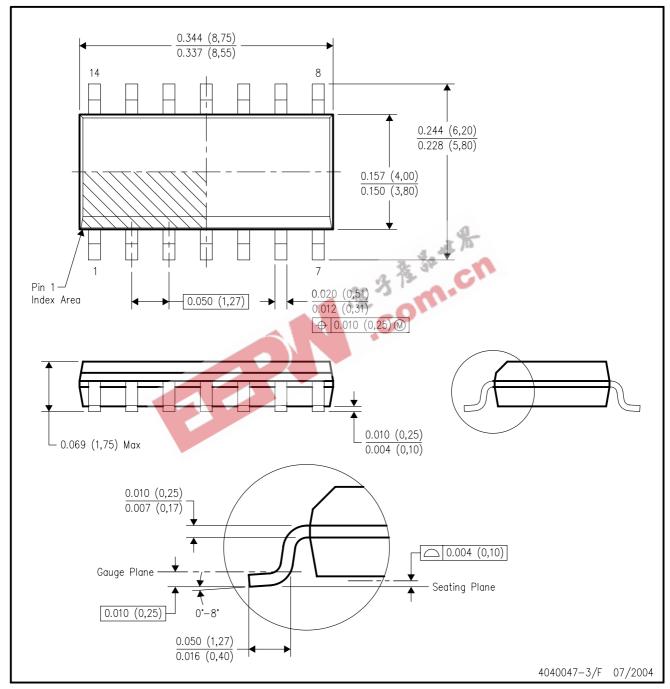
A. All linear dimensions are in inches (millimeters).B. This drawing is subject to change without notice.

- \triangle Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- \triangle The 20 pin end lead shoulder width is a vendor option, either half or full width.



D (R-PDSO-G14)

PLASTIC SMALL-OUTLINE PACKAGE



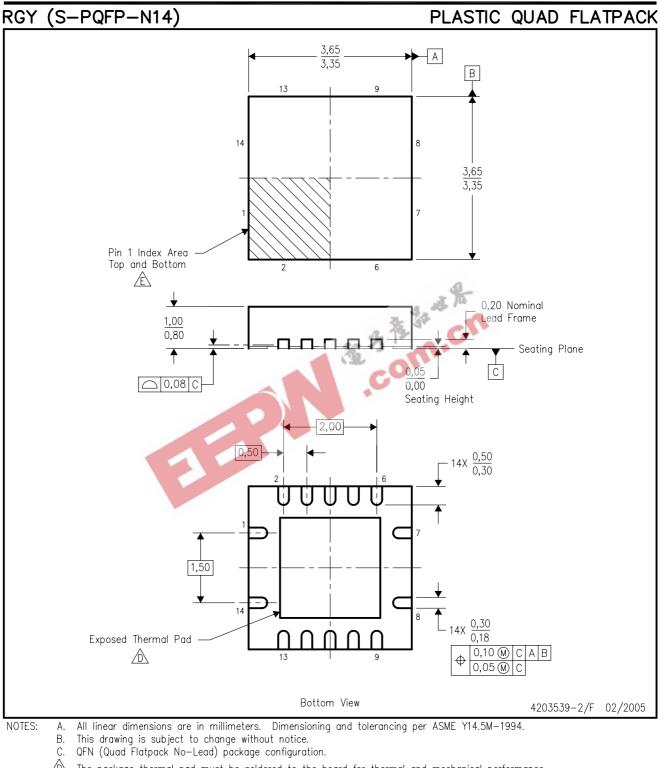
NOTES: A. All linear dimensions are in inches (millimeters).

B. This drawing is subject to change without notice.

C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).

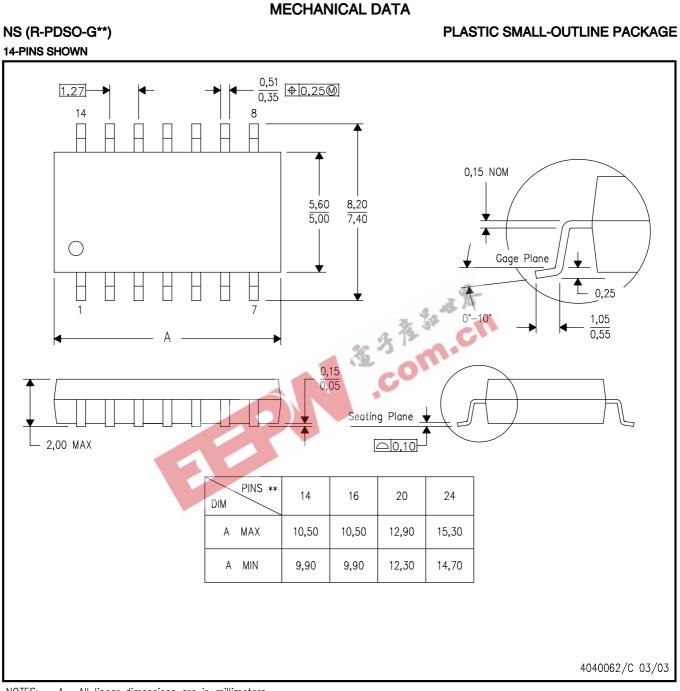
D. Falls within JEDEC MS-012 variation AB.





- 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.
- 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.





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.

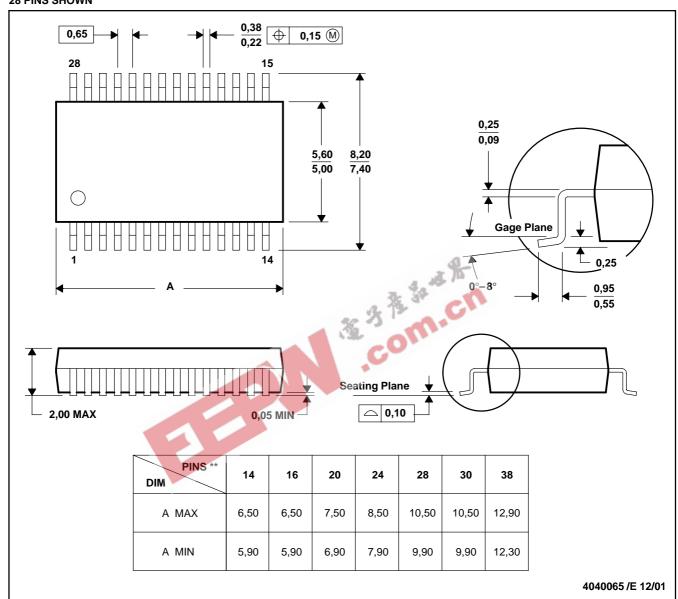


MSSO002E - JANUARY 1995 - REVISED DECEMBER 2001

PLASTIC SMALL-OUTLINE

28 PINS SHOWN

DB (R-PDSO-G**)



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.

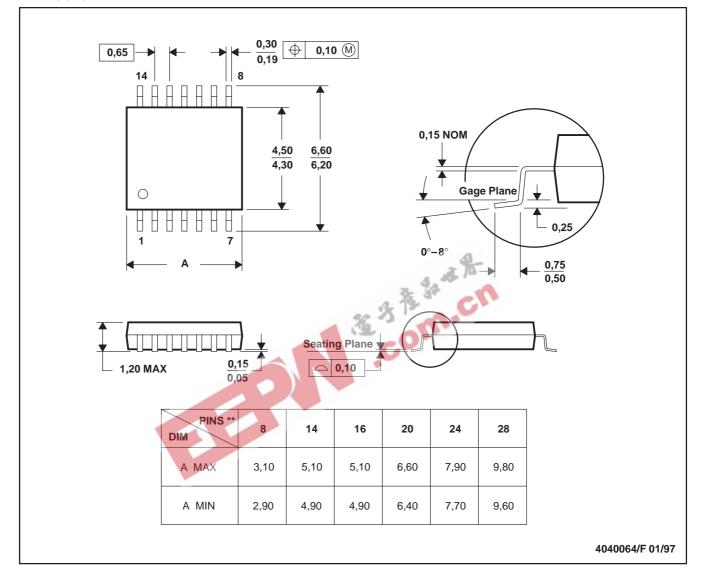
D. Falls within JEDEC MO-150



MTSS001C - JANUARY 1995 - REVISED FEBRUARY 1999

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.
- D. Falls within JEDEC MO-153



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