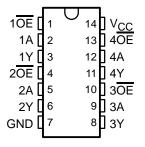
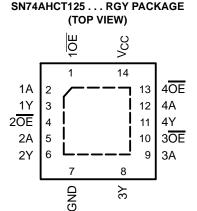
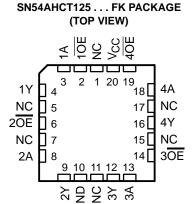
SCLS264O - DECEMBER 1995 - REVISED JULY 2003

- 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)
 - 1000-V Charged-Device Model (C101)

SN54AHCT125...J OR W PACKAGE SN74AHCT125 . . . D, DB, DGV, N, NS, **OR PW PACKAGE** (TOP VIEW)







NC - No internal connection

description/ordering information

The 'AHCT125 devices are quadruple bus buffer gates featuring independent line drivers with 3-state outputs. Each output is disabled when the associated output-enable (\overline{OE}) input is high. When \overline{OE} is low, the respective gate passes the data from the A input to its Y output.

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.

ORDERING INFORMATION

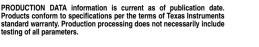
TA	PACKAGET		ORDERABLE PART NUMBER	TOP-SIDE MARKING
	QFN – RGY	Tape and reel	SN74AHCT125RGYR	HB125
	PDIP – N	Tube	SN74AHCT125N	SN74AHCT125N
	SOIC - D	Tube	SN74AHCT125D	AHCT125
	3010-15	Tape and reel	SN74AHCT125DR	AHCT125
–40°C to 85°C	SOP – NS	Tape and reel	SN74AHCT125NSR	AHCT125
	SSOP – DB	Tape and reel	SN74AHCT125DBR	HB125
	TSSOP – PW	Tube	SN74AHCT125PW	HB125
	1330F - FW	Tape and reel	SN74AHCT125PWR	пвтгэ
	TVSOP – DGV	Tape and reel	SN74AHCT125DGVR	HB125
	CDIP – J	Tube	SNJ54AHCT125J	SNJ54AHCT125J
–55°C to 125°C	CFP – W	Tube	SNJ54AHCT125W	SNJ54AHCT125W
	LCCC – FK	Tube	SNJ54AHCT125FK	SNJ54AHCT125FK

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



testing of all parameters.

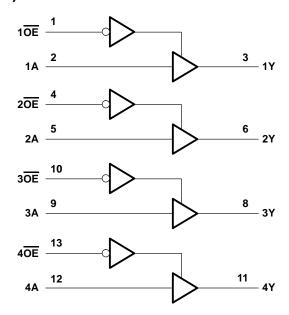
Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.



FUNCTION TABLE (each buffer)

INPU	JTS	OUTPUT
OE	Α	Y
L	Н	Н
L	L	L
Н	Χ	Z

logic diagram (positive logic)



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



SN54AHCT125, SN74AHCT125 QUADRUPLE BUS BUFFER GATES WITH 3-STATE OUTPUTS

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

Supply voltage range, V _{CC}	–0.5 V to 7 V
Input voltage range, V _I (see Note 1)	–0.5 V to 7 V
Output voltage range, VO (see Note 1)	0.5 V to V _{CC} + 0.5 V
Input clamp current, $I_{ K }(V_{ } < 0)$	–20 mA
Output clamp current, I _{OK} (V _O < 0 or V _O > V _{CC})	±20 mA
Continuous output current, $I_O(V_O = 0 \text{ to } V_{CC})$	±25 mA
Continuous current through V _{CC} or GND	±50 mA
Package thermal impedance, θ_{JA} (see Note 2): D package	86°C/W
(see Note 2): DB package	96°C/W
(see Note 2): DGV package	127°C/W
(see Note 2): N package	80°C/W
(see Note 2): NS package	76°C/W
(see Note 2): PW package	113°C/W
(see Note 3): RGY package	47°C/W
Storage temperature range, T _{stq}	–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 voltage ratings may be exceeded if the input and output 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)

		SN54AHCT125		SN74AH	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
V _{IL}	Low-level input voltage		0.8		0.8	V
٧ _I	Input voltage	0	5.5	0	5.5	V
٧o	Output voltage	0	VCC	0	VCC	V
loh	High-level output current		-8		-8	mA
loL	Low-level output current		8		8	mA
Δt/Δν	Input transition rise or fall rate		20		20	ns/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.



SN54AHCT125, SN74AHCT125 QUADRUPLE BUS BUFFER GATES WITH 3-STATE OUTPUTS

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

PARAMETER	TEST CONDITIONS	Vaa	T _A = 25°C			SN54AHCT125		SN74AHCT125		UNIT
PARAMETER	TEST CONDITIONS	VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNII
Vari	I _{OH} = -50 μA	4.5 V	4.4	4.5		4.4		4.4		V
VOH	$I_{OH} = -8 \text{ mA}$	4.5 V	3.94			3.8		3.8		V
Vai	I _{OL} = 50 μA	4.5 V			0.1		0.1		0.1	V
VOL	I _{OL} = 8 mA	4.5 V			0.36		0.44		0.44	v
lį	V _I = 5.5 V or GND	0 V to 5.5 V			±0.1		±1*		±1	μΑ
loz	$V_O = V_{CC}$ or GND	5.5 V			±0.25		±2.5		±2.5	μΑ
Icc	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			2		20		20	μΑ
ΔI _{CC} †	One input at 3.4 V, Other inputs at V _{CC} or GND	5.5 V			1.35		1.5		1.5	mA
C _i	V _I = V _{CC} or GND	5 V		4	10				10	pF
Co	$V_O = V_{CC}$ or GND	5 V		15						pF

 $^{^{*}}$ On products compliant to MIL-PRF-38535, this parameter is not production tested at $V_{CC} = 0 \text{ V}$.

switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V \pm 0.5 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM	FROM TO		O LOAD TA = 25		T _A = 25°C SN54AHCT12		CT125	SN74AHCT125		UNIT	
PARAMETER	ER (INPUT) (OUTPUT)	CAPACITANCE	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT		
t _{PLH}	А	Y	C _I = 15 pF		3.8**	5.5**	1**	6.5**	1	6.5	ns	
^t PHL	ζ.	'	CL = 13 pr		3.8**	5.5**	1**	6.5**	1	6.5	115	
^t PZH	ŌĒ	Y	C _L = 15 pF		3.6**	5.1**	1**	6**	1	6	ns	
^t PZL	OE	•	CL = 13 pr		3.6**	5.1**	1**	6**	1	6	115	
^t PHZ	ŌE	Y	C _L = 15 pF		4.6**	6.8**	1**	8**	1	8	ns	
^t PLZ	OL	'	OL = 13 pi		4.6**	6.8**	1**	8**	1	8	113	
^t PLH	^	Y	C: 50 pF		5.3	7.5	1	8.5	1	8.5		
t _{PHL}	Α	Ť	C _L = 50 pF		5.3	7.5	1	8.5	1	8.5	ns	
^t PZH	ŌĒ	Y	C _L = 50 pF		5.1	7.1	1	8	1	8	no	
tPZL	OE	OE Y		CL = 50 pr		5.1	7.1	1	8	1	8	ns
^t PHZ	OE	Y	C _L = 50 pF		6.1	8.8	1	10	1	10	ns	
t _{PLZ}	OL .	OE Y	CL = 50 pr		6.1	8.8	1	10	1	10	115	
tsk(o)			C _L = 50 pF			1***				1	ns	

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

noise characteristics, V_{CC} = 5 V, C_L = 50 pF, T_A = 25°C (see Note 5)

	PARAMETER -		SN74AHCT125		
			MAX	UNIT	
VOL(P)	Quiet output, maximum dynamic V _{OL}		0.8	V	
V _{OL(V)}	Quiet output, minimum dynamic V _{OL}		-0.8	V	
V _{OH(V)}	Quiet output, minimum dynamic V _{OH}	4.4		V	
VIH(D)	High-level dynamic input voltage	2		V	
V _{IL(D)}	Low-level dynamic input voltage		8.0	V	

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



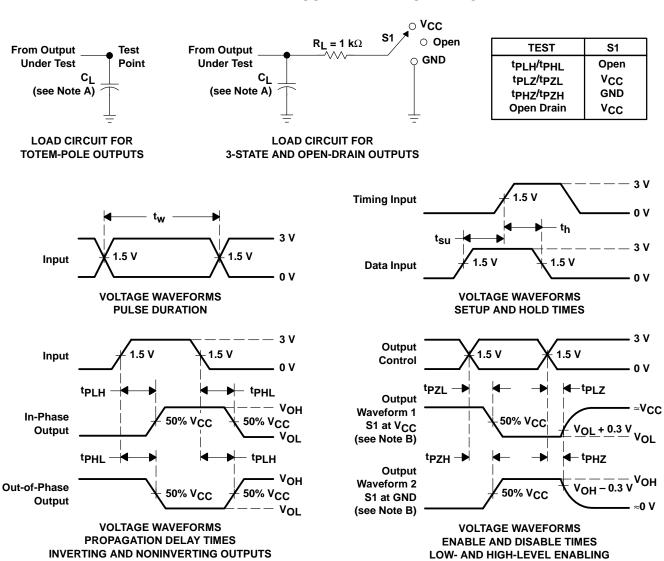
 $[\]dagger$ This is the increase in supply current for each input at one of the specified TTL voltage levels, rather than 0 V or V $_{
m CC}$.

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

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

PARAMETER	TEST CONDITIONS	TYP	UNIT
C _{pd} Power dissipation capacitance	No load, f = 1 MHz	14	pF

PARAMETER MEASUREMENT INFORMATION



- 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 1 MHz, $Z_O = 50 \Omega$, $t_f \leq$ 3 ns. $t_f \leq$ 3 ns.
 - D. The outputs are measured one at a time with one input transition per measurement.
 - E. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms





PACKAGING INFORMATION

5962-9686901Q2A ACTIVE LCCC FK 20 1 5962-9686901QCA ACTIVE CDIP J 14 1 5962-9686901QDA ACTIVE CFP W 14 1 SN74AHCT125D ACTIVE SOIC D 14 50 SN74AHCT125DBLE OBSOLETE SSOP DB 14	
5962-9686901QDA ACTIVE CFP W 14 1 SN74AHCT125D ACTIVE SOIC D 14 50	TBD Call TI Level-NC-NC
SN74AHCT125D ACTIVE SOIC D 14 50	TBD Call TI Level-NC-NC
	TBD Call TI Level-NC-NC
SN74AHCT125DBLE OBSOLETE SSOP DB 14	O Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
333333333333333333333333333333333333333	TBD Call TI Call TI
SN74AHCT125DBR ACTIVE SSOP DB 14 200	00 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125DBRE4 ACTIVE SSOP DB 14 200	00 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125DE4 ACTIVE SOIC D 14 50	O Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125DGVR ACTIVE TVSOP DGV 14 200	00 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125DGVRE4 ACTIVE TVSOP DGV 14 200	00 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125DR ACTIVE SOIC D 14 250	00 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125DRE4 ACTIVE SOIC D 14 250	00 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125N ACTIVE PDIP N 14 25	5 Pb-Free CU NIPDAU Level-NC-NC-NC (RoHS)
SN74AHCT125NE4 ACTIVE PDIP N 14 25	5 Pb-Free CU NIPDAU Level-NC-NC-NC (RoHS)
SN74AHCT125NSR ACTIVE SO NS 14 200	00 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125NSRE4 ACTIVE SO NS 14 200	00 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125PW ACTIVE TSSOP PW 14 90	0 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125PWE4 ACTIVE TSSOP PW 14 90	0 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125PWG4 ACTIVE TSSOP PW 14 90	0 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125PWLE OBSOLETE TSSOP PW 14	TBD Call TI Call TI
SN74AHCT125PWR ACTIVE TSSOP PW 14 200	00 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125PWRE4 ACTIVE TSSOP PW 14 200	00 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125PWRG4 ACTIVE TSSOP PW 14 200	00 Green (RoHS & CU NIPDAU Level-1-260C-UNLIM no Sb/Br)
SN74AHCT125RGYR ACTIVE QFN RGY 14 100	00 Green (RoHS & CU NIPDAU Level-2-260C-1YEAR no Sb/Br)
SN74AHCT125RGYRG4 ACTIVE QFN RGY 14 100	00 Green (RoHS & CU NIPDAU Level-2-260C-1YEAR no Sb/Br)
SNJ54AHCT125FK ACTIVE LCCC FK 20 1	•
SNJ54AHCT125J ACTIVE CDIP J 14 1	
SNJ54AHCT125W ACTIVE CFP W 14 1	TBD Call TI Level-NC-NC



PACKAGE OPTION ADDENDUM

24-Oct-2005

⁽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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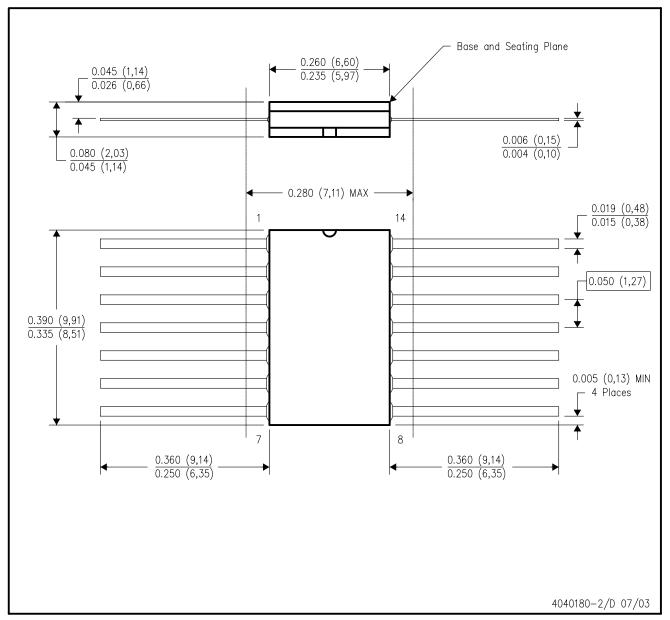
14 LEADS SHOWN



- 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



- 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



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. The terminals are gold plated.
- E. Falls within JEDEC MS-004



N (R-PDIP-T**)

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.
- 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**)

24 PINS SHOWN

PLASTIC SMALL-OUTLINE



NOTES: A. All linear dimensions are in millimeters.

B. This drawing is subject to change without notice.

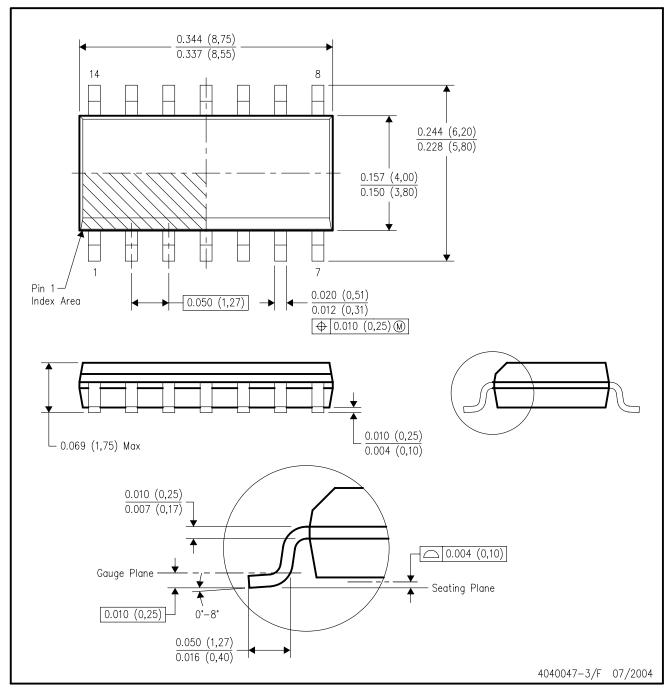
C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15 per side.

D. Falls within JEDEC: 24/48 Pins – MO-153 14/16/20/56 Pins – MO-194



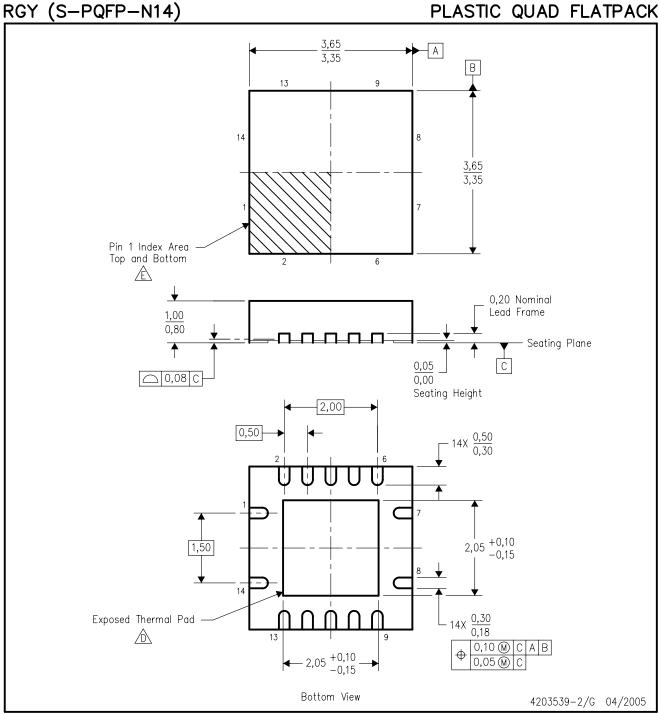
D (R-PDSO-G14)

PLASTIC SMALL-OUTLINE PACKAGE



- 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.





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.
- The package thermal pad must be soldered to the board for thermal and mechanical performance.
- 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.



MECHANICAL DATA

NS (R-PDSO-G**)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



- 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**)

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.

D. Falls within JEDEC MO-153

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