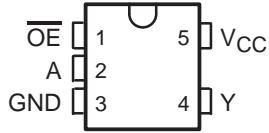
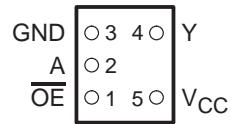


- Available in the Texas Instruments NanoStar™ and NanoFree™ Packages
- Optimized for 1.8-V Operation and Is 3.6-V I/O Tolerant to Support Mixed-Mode Signal Operation
- I_{off} Supports Partial-Power-Down Mode Operation
- Sub 1-V Operable
- Max t_{pd} of 2.5 ns at 1.8 V
- Low Power Consumption, 10- μ A Max I_{CC}
- ± 8 -mA Output Drive at 1.8 V
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)

DBV OR DCK PACKAGE
(TOP VIEW)



YEA, YEP, YZA, OR YZP PACKAGE
(BOTTOM VIEW)



description/ordering information

This bus buffer gate is operational at 0.8-V to 2.7-V V_{CC} , but is designed specifically for 1.65-V to 1.95-V V_{CC} operation.

The SN74AUC1G125 is a single line driver with a 3-state output. The output is disabled when the output-enable (\overline{OE}) input is high.

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	PACKAGE [†]	ORDERABLE PART NUMBER	TOP-SIDE MARKING [‡]
–40°C to 85°C	NanoStar™ WCSP (DSBGA) – YEA	Tape and reel	SN74AUC1G125YEAR SN74AUC1G125YZAR SN74AUC1G125YEPR SN74AUC1G125YZPR
	NanoFree™ WCSP (DSBGA) – YZA (Pb-free)		
	NanoStar™ – WCSP (DSBGA) 0.23-mm Large Bump – YEP		
	NanoFree™ – WCSP (DSBGA) 0.23-mm Large Bump – YZP (Pb-free)		
	SOT (SOT-23) – DBV	Tape and reel	SN74AUC1G125DBVR U25_
	SOT (SC-70) – DCK	Tape and reel	SN74AUC1G125DCKR UM_

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

[‡] DBV/DCK: The actual top-side marking has one additional character that designates the assembly/test site.

YEA/YZA, YEP/YZP: The actual top-side marking has three preceding characters to denote year, month, and sequence code, and one following character to designate the assembly/test site.



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SN74AUC1G125
SINGLE BUS BUFFER GATE
WITH 3-STATE OUTPUT

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description/ordering information (continued)

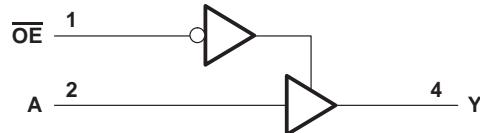
NanoStar™ and NanoFree™ package technology is a major breakthrough in IC packaging concepts, using the die as the package.

This device is fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

FUNCTION TABLE

INPUTS		OUTPUT
OE	A	Y
L	H	H
L	L	L
H	X	Z

logic diagram (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 negative-voltage 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.

recommended operating conditions (see Note 3)

		MIN	MAX	UNIT
V_{CC}	Supply voltage	0.8	2.7	V
V_{IH}	High-level input voltage	$V_{CC} = 0.8\text{ V}$	V_{CC}	V
		$V_{CC} = 1.1\text{ V to }1.95\text{ V}$	$0.65 \times V_{CC}$	
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.7	
V_{IL}	Low-level input voltage	$V_{CC} = 0.8\text{ V}$	0	V
		$V_{CC} = 1.1\text{ V to }1.95\text{ V}$	$0.35 \times V_{CC}$	
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	0.7	
V_I	Input voltage	0	3.6	V
V_O	Output voltage	0	V_{CC}	V
I_{OH}	High-level output current	$V_{CC} = 0.8\text{ V}$	-0.7	mA
		$V_{CC} = 1.1\text{ V}$	-3	
		$V_{CC} = 1.4\text{ V}$	-5	
		$V_{CC} = 1.65\text{ V}$	-8	
		$V_{CC} = 2.3\text{ V}$	-9	
I_{OL}	Low-level output current	$V_{CC} = 0.8\text{ V}$	0.7	mA
		$V_{CC} = 1.1\text{ V}$	3	
		$V_{CC} = 1.4\text{ V}$	5	
		$V_{CC} = 1.65\text{ V}$	8	
		$V_{CC} = 2.3\text{ V}$	9	
$\Delta t/\Delta v$	Input transition rise or fall rate	$V_{CC} = 0.8\text{ V to }1.6\text{ V}$	20	ns/V
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	10	
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	3	
TA	Operating free-air temperature	-40	85	°C

NOTE 3: 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.

SN74AUC1G125
SINGLE BUS BUFFER GATE
WITH 3-STATE OUTPUT
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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	V _{CC}	MIN	TYP†	MAX	UNIT
V _{OH}	I _{OH} = -100 µA	0.8 V to 2.7 V	V _{CC} -0.1			V
	I _{OH} = -0.7 mA	0.8 V		0.55		
	I _{OH} = -3 mA	1.1 V		0.8		
	I _{OH} = -5 mA	1.4 V		1		
	I _{OH} = -8 mA	1.65 V		1.2		
	I _{OH} = -9 mA	2.3 V		1.8		
V _{OL}	I _{OL} = 100 µA	0.8 V to 2.7 V		0.2		V
	I _{OL} = 0.7 mA	0.8 V		0.25		
	I _{OL} = 3 mA	1.1 V		0.3		
	I _{OL} = 5 mA	1.4 V		0.4		
	I _{OL} = 8 mA	1.65 V		0.45		
	I _{OL} = 9 mA	2.3 V		0.6		
I _I	A or \overline{OE} input	V _I = V _{CC} or GND	0 to 2.7 V		±5	µA
I _{off}	V _I or V _O = 2.7 V		0		±10	µA
I _{OZ}	V _O = V _{CC} or GND		2.7 V		±10	µA
I _{CC}	V _I = V _{CC} or GND, I _O = 0		0.8 V to 2.7 V		10	µA
C _i	V _I = V _{CC} or GND		2.5 V		2.5	pF
C _o	V _O = V _{CC} or GND		2.5 V		5.5	pF

† All typical values are at T_A = 25°C.

switching characteristics over recommended operating free-air temperature range, C_L = 15 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 0.8 V	V _{CC} = 1.2 V ± 0.1 V	V _{CC} = 1.5 V ± 0.1 V	V _{CC} = 1.8 V ± 0.15 V			V _{CC} = 2.5 V ± 0.2 V			UNIT
			TYP	MIN	MAX	MIN	TYP	MAX	MIN	MAX		
t _{pd}	A	Y	4.7	0.8	3.6	0.4	2.3	‡	‡	‡	‡	‡
t _{en}	\overline{OE}	Y	5.4	0.7	4.1	0.5	2.6	‡	‡	‡	‡	ns
t _{dis}	\overline{OE}	Y	4.8	1.4	4.3	1.4	4	‡	‡	‡	‡	ns

‡ This information was not available at the time of publication.

switching characteristics over recommended operating free-air temperature range, C_L = 30 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 1.8 V ± 0.15 V			V _{CC} = 2.5 V ± 0.2 V			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
t _{pd}	A	Y	0.7	1.5	2.5	0.9	1.7	ns	
t _{en}	\overline{OE}	Y	1	1.6	2.6	1.1	1.9	ns	
t _{dis}	\overline{OE}	Y	1.8	2.2	3.1	0.8	1.7	ns	

SN74AUC1G125
SINGLE BUS BUFFER GATE
WITH 3-STATE OUTPUT
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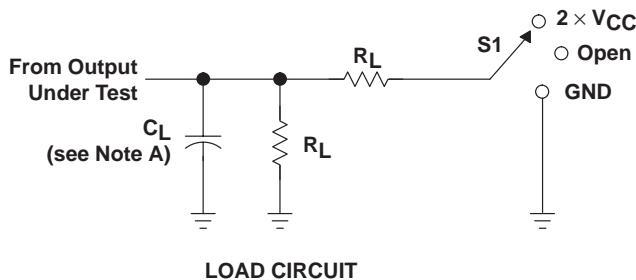
operating characteristics, $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	$V_{CC} = 0.8 \text{ V}$	$V_{CC} = 1.2 \text{ V}$	$V_{CC} = 1.5 \text{ V}$	$V_{CC} = 1.8 \text{ V}$	$V_{CC} = 2.5 \text{ V}$	UNIT
		TYP	TYP	TYP	TYP	TYP	
C_{pd} Power dissipation capacitance	Outputs enabled	14	14	14	15	16	pF
	Outputs disabled	1.5	1.5	1.5	2	2.5	

SN74AUC1G125
SINGLE BUS BUFFER GATE
WITH 3-STATE OUTPUT

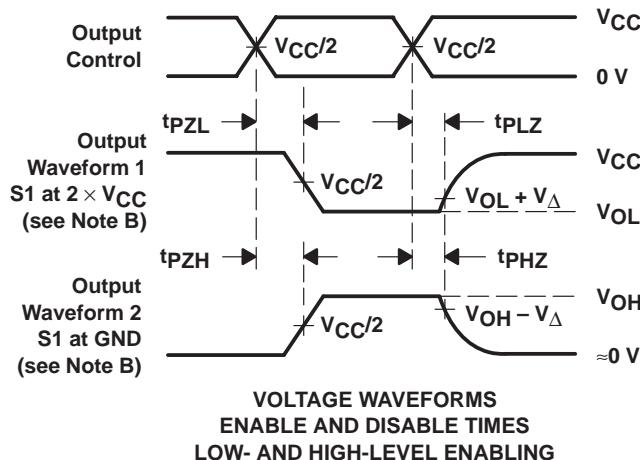
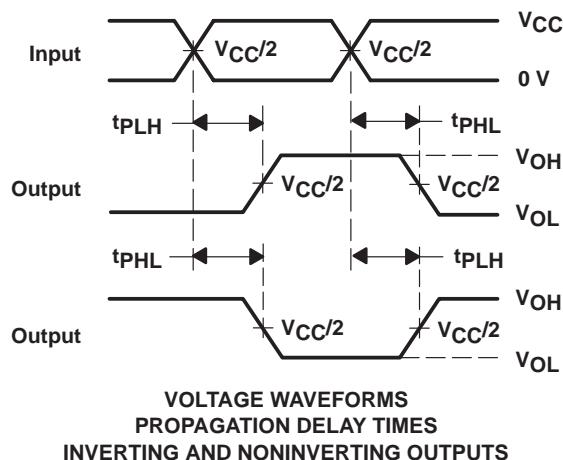
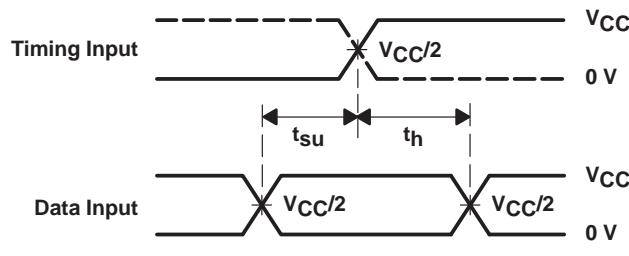
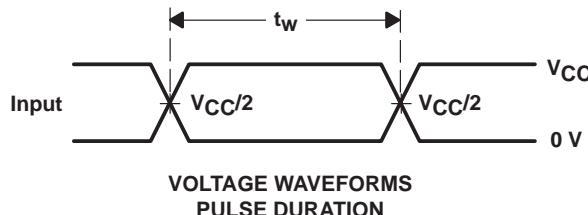
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PARAMETER MEASUREMENT INFORMATION



TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	$2 \times V_{CC}$
t_{PHZ}/t_{PZH}	GND

V_{CC}	C_L	R_L	V_{Δ}
0.8 V	15 pF	2 k Ω	0.1 V
1.2 V \pm 0.1 V	15 pF	2 k Ω	0.1 V
1.5 V \pm 0.1 V	15 pF	2 k Ω	0.1 V
1.8 V \pm 0.15 V	15 pF	2 k Ω	0.15 V
2.5 V \pm 0.2 V	15 pF	2 k Ω	0.15 V
1.8 V \pm 0.15 V	30 pF	1 k Ω	0.15 V
2.5 V \pm 0.2 V	30 pF	500 Ω	0.15 V



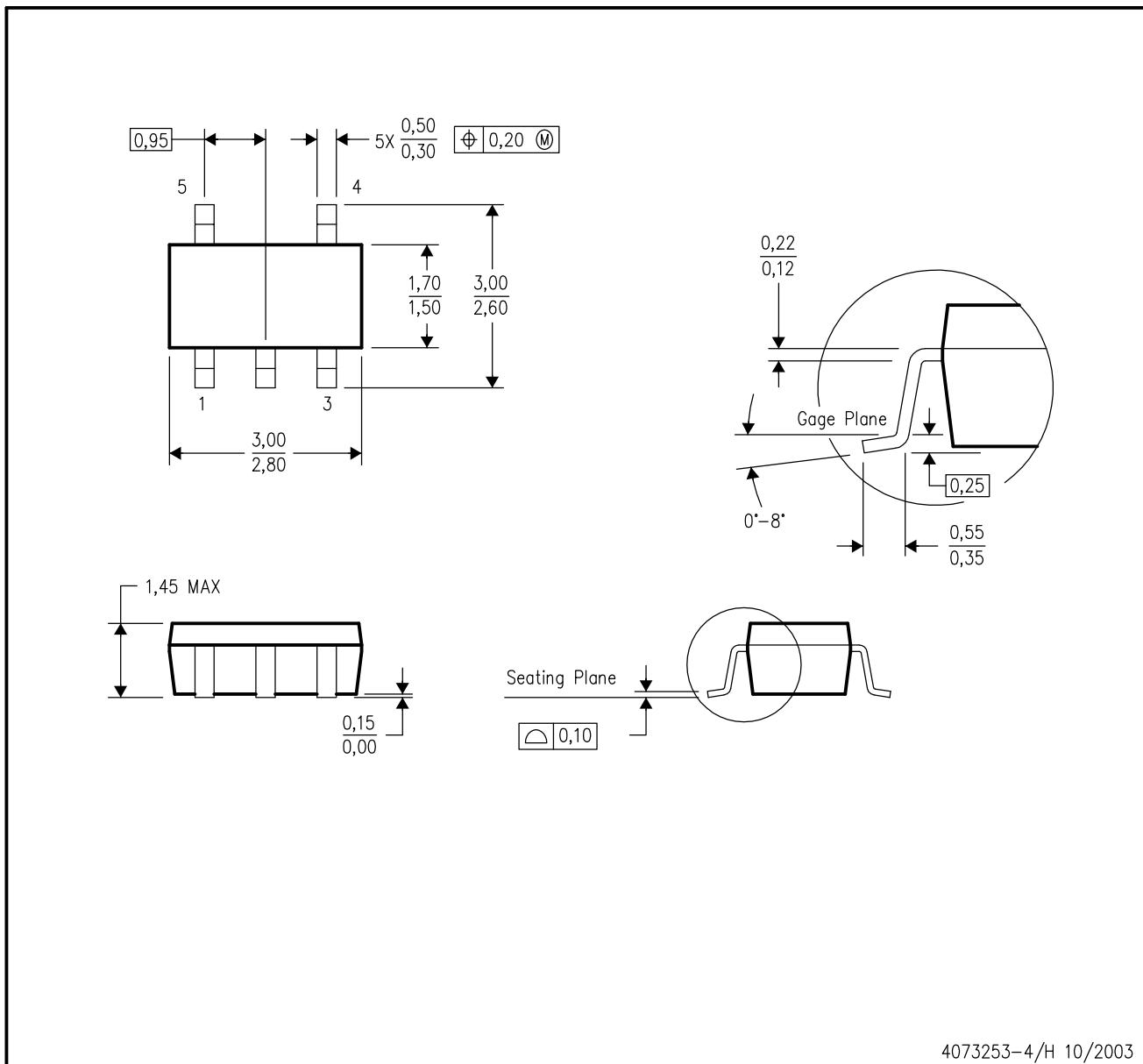
NOTES:

- 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 10 MHz, $Z_O = 50\Omega$, slew rate $\geq 1\text{ V/ns}$.
- The outputs are measured one at a time with one transition per measurement.
- t_{PLZ} and t_{PHZ} are the same as t_{dis} .
- t_{PZL} and t_{PZH} are the same as t_{en} .
- t_{PLH} and t_{PHL} are the same as t_{pd} .
- All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms

DBV (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE



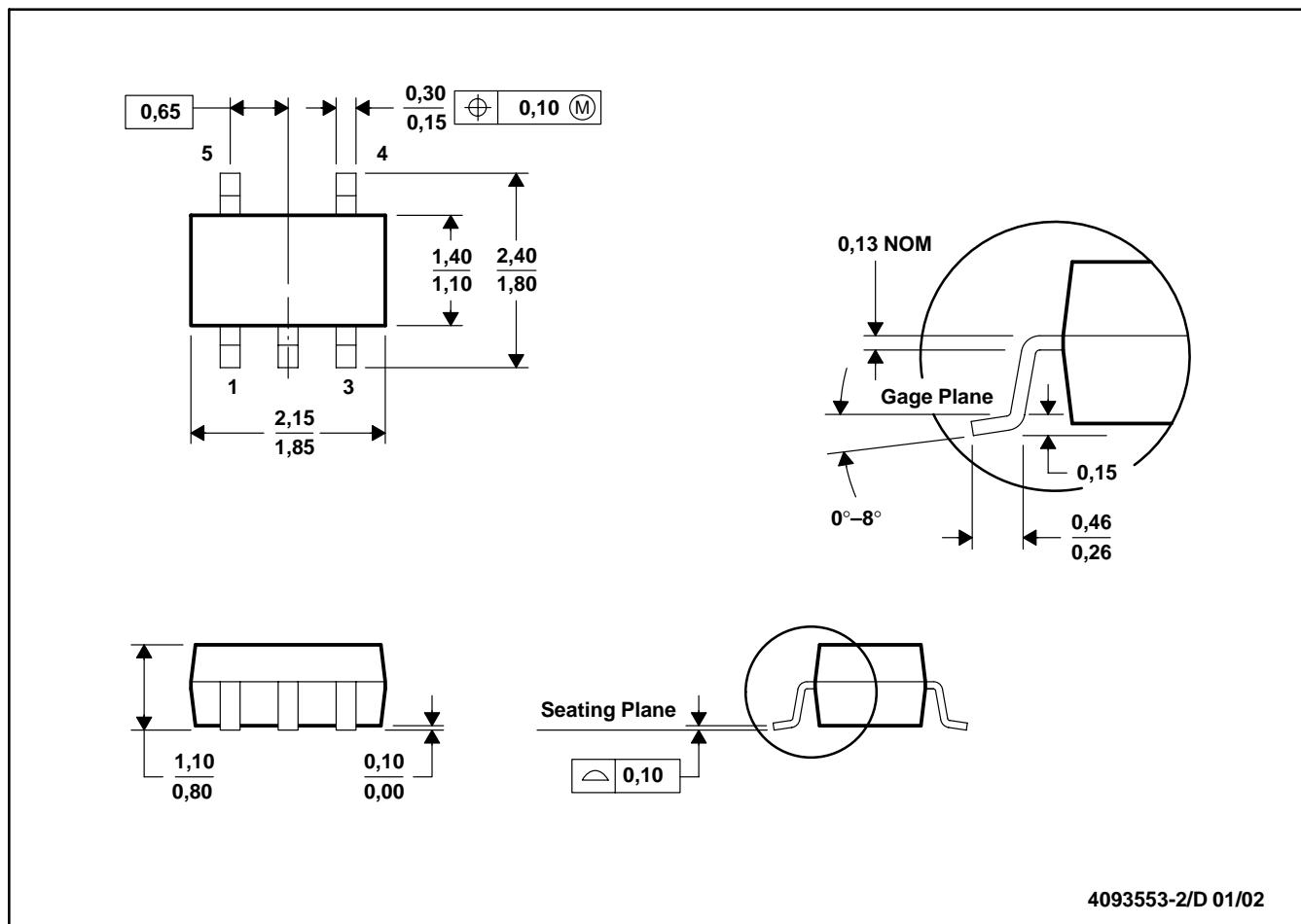
4073253-4/H 10/2003

NOTES:

- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- Body dimensions do not include mold flash or protrusion.
- Falls within JEDEC MO-178 Variation AA.

DCK (R-PDSO-G5)

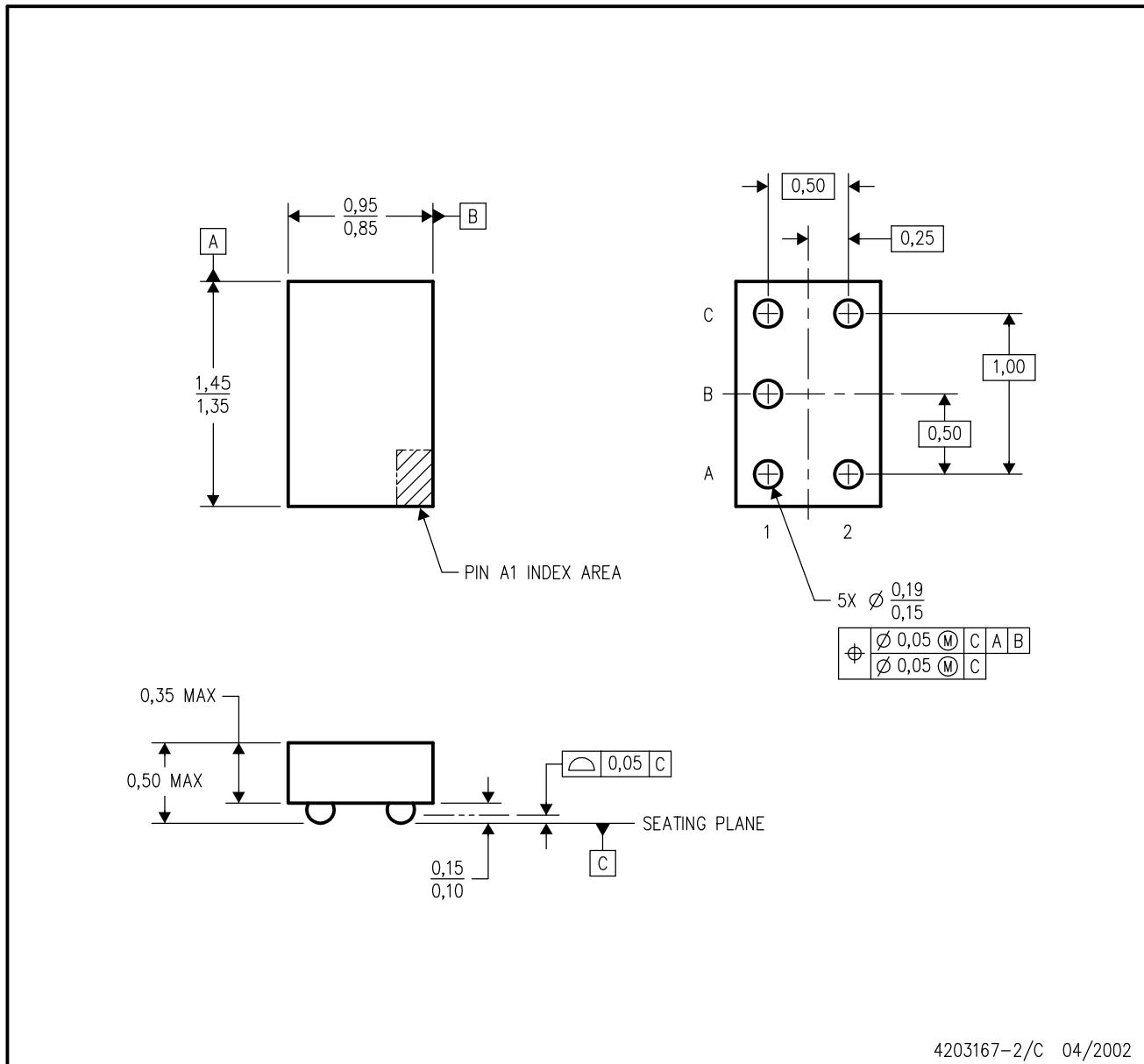
PLASTIC SMALL-OUTLINE PACKAGE



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.
 D. Falls within JEDEC MO-203

YEA (R-XBGA-N5)

DIE-SIZE BALL GRID ARRAY



4203167-2/C 04/2002

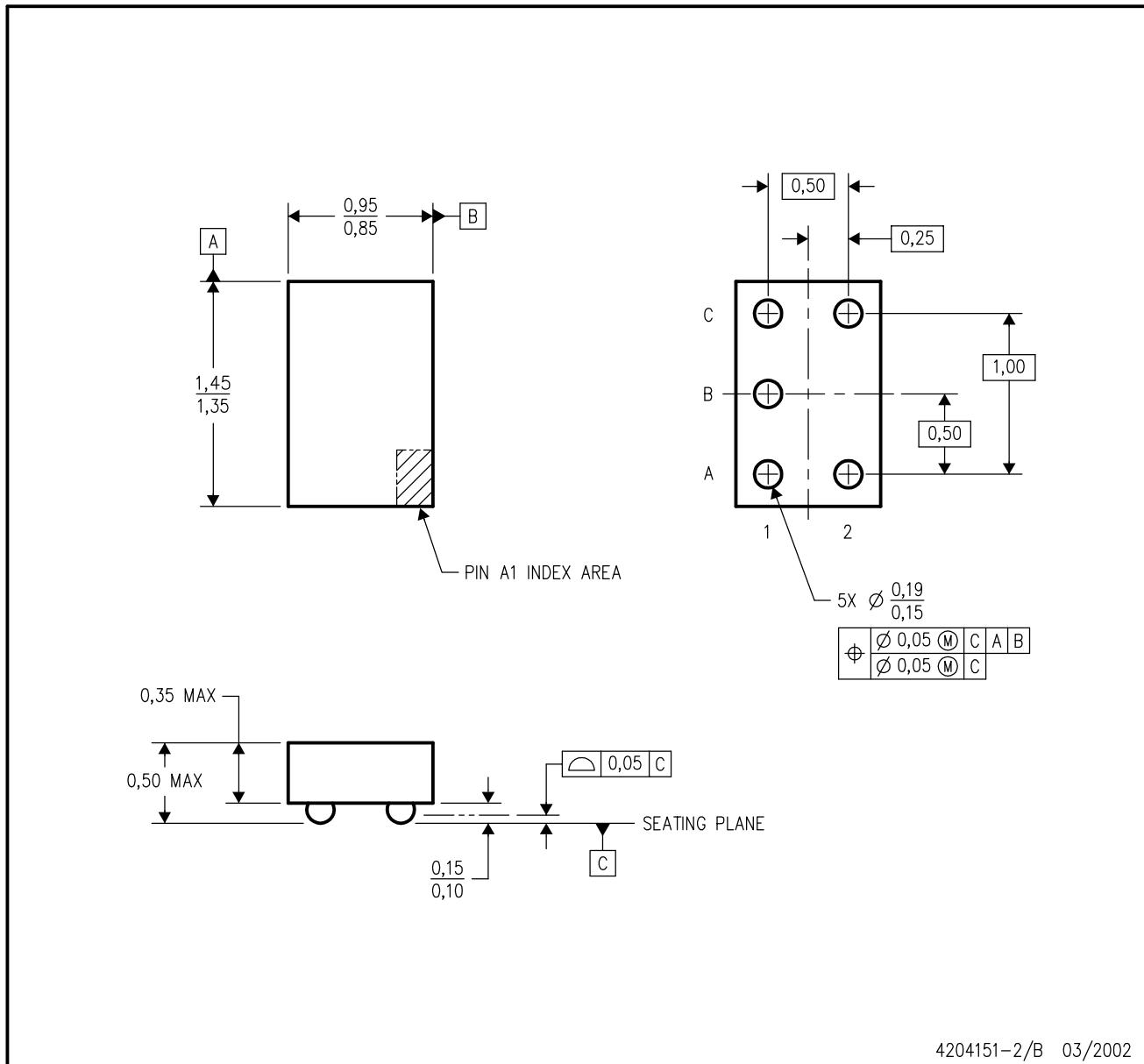
NOTES:

- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- NanoStar™ package configuration.
- Package complies to JEDEC MO-211 variation EA.
- This package is tin-lead (SnPb). Refer to the 5 YZA package (drawing 4204151) for lead-free.

NanoStar is a trademark of Texas Instruments.

YZA (R-XBGA-N5)

DIE-SIZE BALL GRID ARRAY



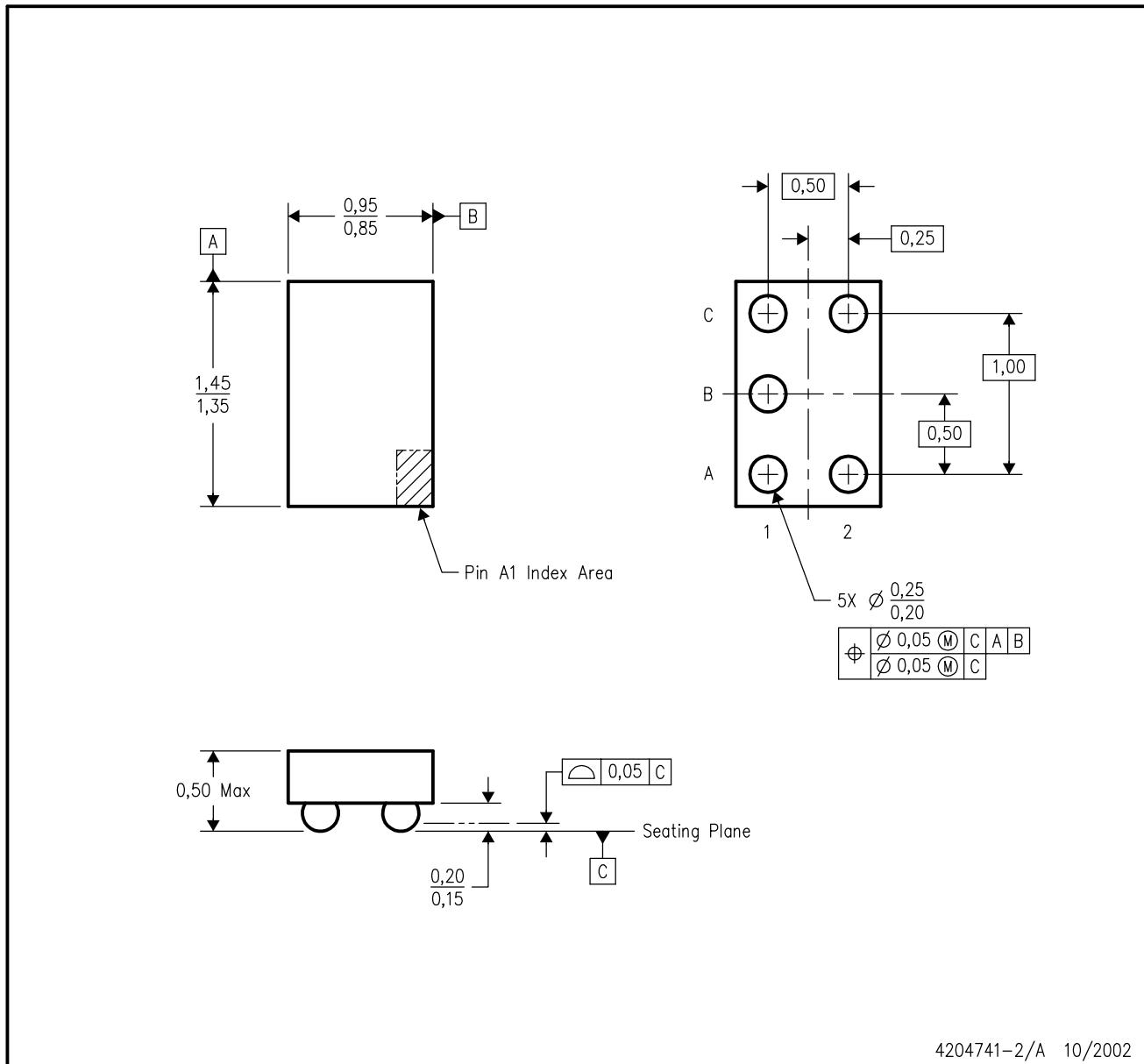
NOTES:

- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- NanoFree™ package configuration.
- Package complies to JEDEC MO-211 variation EA.
- This package is lead-free. Refer to the 5 YEA package (drawing 4203167) for tin-lead (SnPb).

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YZP (R-XBGA-N5)

DIE-SIZE BALL GRID ARRAY



4204741-2/A 10/2002

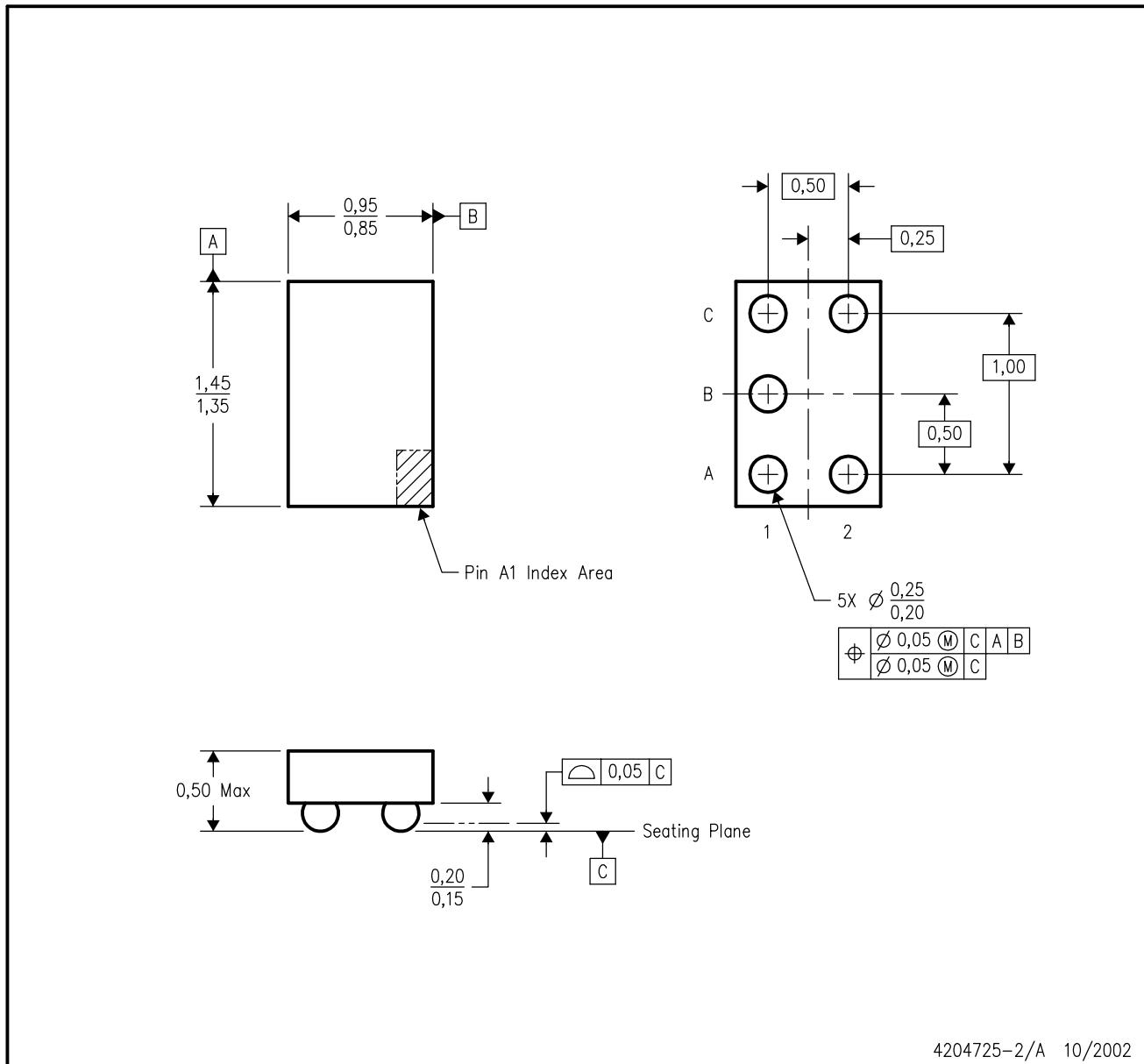
NOTES:

- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- NanoFree™ package configuration.
- This package is lead-free. Refer to the 5 YEP package (drawing 4204725) for tin-lead (SnPb).

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YEP (R-XBGA-N5)

DIE-SIZE BALL GRID ARRAY



4204725-2/A 10/2002

NOTES:

- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- NanoStar™ package configuration.
- This package is tin-lead (SnPb). Refer to the 5 YZP package (drawing 4204741) for lead-free.

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