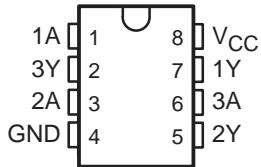
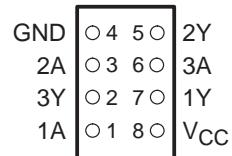


- Available in the Texas Instruments NanoStar™ and NanoFree™ Packages
- Supports 5-V  $V_{CC}$  Operation
- Max  $t_{pd}$  of 3.7 ns at 3.3 V
- Low Power Consumption, 10- $\mu$ A Max  $I_{CC}$
- $\pm 24$ -mA Output Drive at 3.3 V
- Input and Open-Drain Output Accepts Voltages Up To 5.5 V
- Typical  $V_{OLP}$  (Output Ground Bounce) <0.8 V at  $V_{CC}$  = 3.3 V,  $T_A$  = 25°C
- Typical  $V_{OHV}$  (Output  $V_{OH}$  Undershoot) >2 V at  $V_{CC}$  = 3.3 V,  $T_A$  = 25°C
- $I_{off}$  Supports Partial-Power-Down Mode Operation
- 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)

DCT OR DCU PACKAGE  
(TOP VIEW)



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



### description/ordering information

This triple buffer/driver is designed for 1.65-V to 5.5-V  $V_{CC}$  operation.

### ORDERING INFORMATION

$T_A$	PACKAGE <sup>†</sup>	ORDERABLE PART NUMBER	TOP-SIDE MARKING <sup>‡</sup>
–40°C to 85°C	NanoStar™ – WCSP (DSBGA) 0.17-mm Small Bump – YEA	Reel of 3000	SN74LVC3G07YEAR
	NanoFree™ – WCSP (DSBGA) 0.17-mm Small Bump – YZA (Pb-free)		SN74LVC3G07YZAR
	NanoStar™ – WCSP (DSBGA) 0.23-mm Large Bump – YEP		SN74LVC3G07YEPR
	NanoFree™ – WCSP (DSBGA) 0.23-mm Large Bump – YZP (Pb-free)		SN74LVC3G07YZPR
	SSOP – DCT	Reel of 3000	SN74LVC3G07DCTR C07_
VSSOP – DCU		Reel of 3000	SN74LVC3G07DCUR
		Reel of 250	SN74LVC3G07DCUT C07_

<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).

<sup>‡</sup> DCT: The actual top-side marking has three additional characters that designate the year, month, and assembly/test site.

DCU: 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. Pin 1 identifier indicates solder-bump composition (1 = SnPb, • = Pb-free).



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# **SN74LVC3G07**

## **TRIPLE BUFFER/DRIVER**

## **WITH OPEN-DRAIN OUTPUTS**

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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.

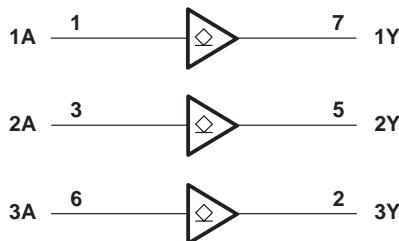
The output of the SN74LVC3G07 is open drain and can be connected to other open-drain outputs to implement active-low wired-OR or active-high wired-AND functions. The maximum sink current is 32 mA.

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 (each buffer/driver)

INPUT	OUTPUT
A	Y
H	H
L	L

## 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 value of  $V_{CC}$  is provided in the recommended operating conditions table.  
 3. The package thermal impedance is calculated in accordance with JESD 51-7.



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

			MIN	MAX	UNIT
V <sub>CC</sub>	Supply voltage	Operating	1.65	5.5	V
		Data retention only	1.5		
V <sub>IH</sub>	High-level input voltage	V <sub>CC</sub> = 1.65 V to 1.95 V	0.65 × V <sub>CC</sub>		V
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7		
		V <sub>CC</sub> = 3 V to 3.6 V	2		
		V <sub>CC</sub> = 4.5 V to 5.5 V	0.7 × V <sub>CC</sub>		
V <sub>IL</sub>	Low-level input voltage	V <sub>CC</sub> = 1.65 V to 1.95 V	0.35 × V <sub>CC</sub>		V
		V <sub>CC</sub> = 2.3 V to 2.7 V	0.7		
		V <sub>CC</sub> = 3 V to 3.6 V	0.8		
		V <sub>CC</sub> = 4.5 V to 5.5 V	0.3 × V <sub>CC</sub>		
V <sub>I</sub>	Input voltage		0	5.5	V
V <sub>O</sub>	Output voltage		0	5.5	V
I <sub>OL</sub>	Low-level output current	V <sub>CC</sub> = 1.65 V		4	mA
		V <sub>CC</sub> = 2.3 V		8	
		V <sub>CC</sub> = 3 V		16	
				24	
		V <sub>CC</sub> = 4.5 V		32	
Δt/ΔV	Input transition rise or fall rate	V <sub>CC</sub> = 1.8 V ± 0.15 V, 2.5 V ± 0.2 V		20	ns/V
		V <sub>CC</sub> = 3.3 V ± 0.3 V		10	
		V <sub>CC</sub> = 5 V ± 0.5 V		5	
T <sub>A</sub>	Operating free-air temperature		-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>	MIN	TYP†	MAX	UNIT
V <sub>OL</sub>	I <sub>OL</sub> = 100 μA	1.65 V to 5.5 V		0.1		V
	I <sub>OL</sub> = 4 mA	1.65 V		0.45		
	I <sub>OL</sub> = 8 mA	2.3 V		0.3		
	I <sub>OL</sub> = 16 mA	3 V		0.4		
	I <sub>OL</sub> = 24 mA			0.55		
	I <sub>OL</sub> = 32 mA	4.5 V		0.55		
I <sub>I</sub>	A inputs	V <sub>I</sub> = 5.5 V or GND	0 to 5.5 V	±5		μA
I <sub>off</sub>		V <sub>I</sub> or V <sub>O</sub> = 5.5 V	0	±10		μA
I <sub>CC</sub>	V <sub>I</sub> = 5.5 V or GND, I <sub>O</sub> = 0	1.65 V to 5.5 V		10		μA
ΔI <sub>CC</sub>	One input at V <sub>CC</sub> – 0.6 V, Other inputs at V <sub>CC</sub> or GND	3 V to 5.5 V		500		μA
C <sub>i</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	3.3 V		3.5		pF

† All typical values are at V<sub>CC</sub> = 3.3 V, T<sub>A</sub> = 25°C.

**SN74LVC3G07**  
**TRIPLE BUFFER/DRIVER**  
**WITH OPEN-DRAIN OUTPUTS**  
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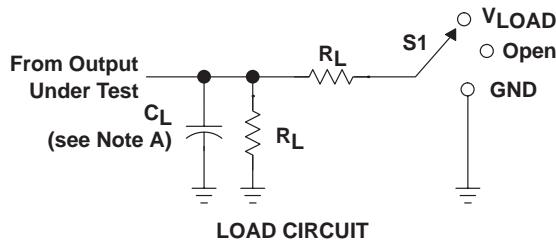
switching characteristics over recommended operating free-air temperature range (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 1.8 V ± 0.15 V		V <sub>CC</sub> = 2.5 V ± 0.2 V		V <sub>CC</sub> = 3.3 V ± 0.3 V		V <sub>CC</sub> = 5 V ± 0.5 V		
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t <sub>pd</sub>	A	Y	1.5	7.8	1	4.3	1.1	3.7	1	2.9	ns

operating characteristics, T<sub>A</sub> = 25°C

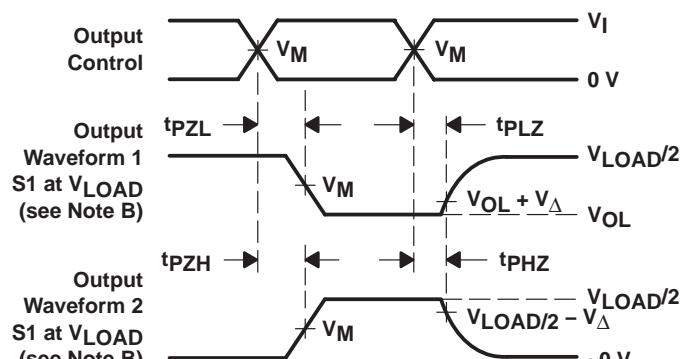
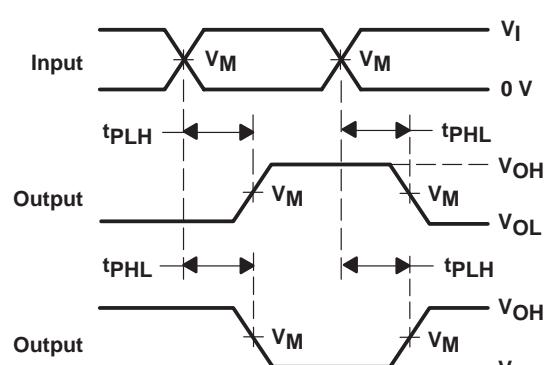
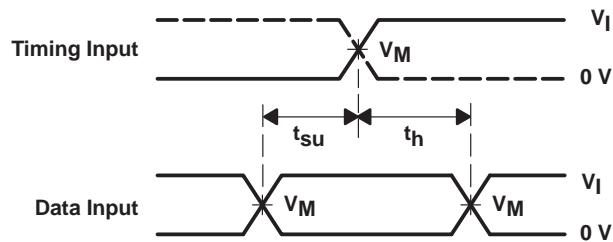
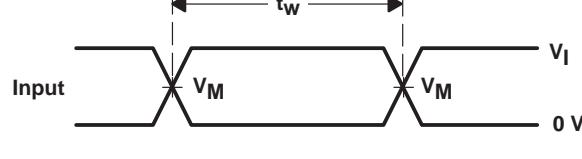
PARAMETER	TEST CONDITIONS	V <sub>CC</sub> = 1.8 V		V <sub>CC</sub> = 2.5 V		V <sub>CC</sub> = 3.3 V		V <sub>CC</sub> = 5 V		UNIT
		TYP	TYP	TYP	TYP	TYP	TYP	TYP	TYP	
C <sub>pd</sub> Power dissipation capacitance	f = 10 MHz	3	3	4	5	4	5	5	5	pF

PARAMETER MEASUREMENT INFORMATION  
(OPEN DRAIN)



TEST	S1
$t_{PZL}$ (see Notes E and F)	$V_{LOAD}$
$t_{PLZ}$ (see Notes E and G)	$V_{LOAD}$
$t_{PHZ}/t_{PZH}$	$V_{LOAD}$

$V_{CC}$	INPUT		$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_\Delta$
	$V_I$	$t_r/t_f$					
$1.8 \text{ V} \pm 0.15 \text{ V}$	$V_{CC}$	$\leq 2 \text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	1 k $\Omega$	0.15 V
$2.5 \text{ V} \pm 0.2 \text{ V}$	$V_{CC}$	$\leq 2 \text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	500 $\Omega$	0.15 V
$3.3 \text{ V} \pm 0.3 \text{ V}$	3 V	$\leq 2.5 \text{ ns}$	1.5 V	6 V	50 pF	500 $\Omega$	0.3 V
$5 \text{ V} \pm 0.5 \text{ V}$	$V_{CC}$	$\leq 2.5 \text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	50 pF	500 $\Omega$	0.3 V



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  $\leq 10 \text{ MHz}$ ,  $Z_O = 50 \Omega$ .
- D. The outputs are measured one at a time with one transition per measurement.
- E. Since this device has open-drain outputs,  $t_{PLZ}$  and  $t_{PZL}$  are the same as  $t_{pd}$ .
- F.  $t_{PZL}$  is measured at  $V_M$ .
- G.  $t_{PLZ}$  is measured at  $V_{OL} + V_\Delta$ .
- H. All parameters and waveforms are not applicable to all devices.

**SN74LVC3G07**  
**TRIPLE BUFFER/DRIVER**  
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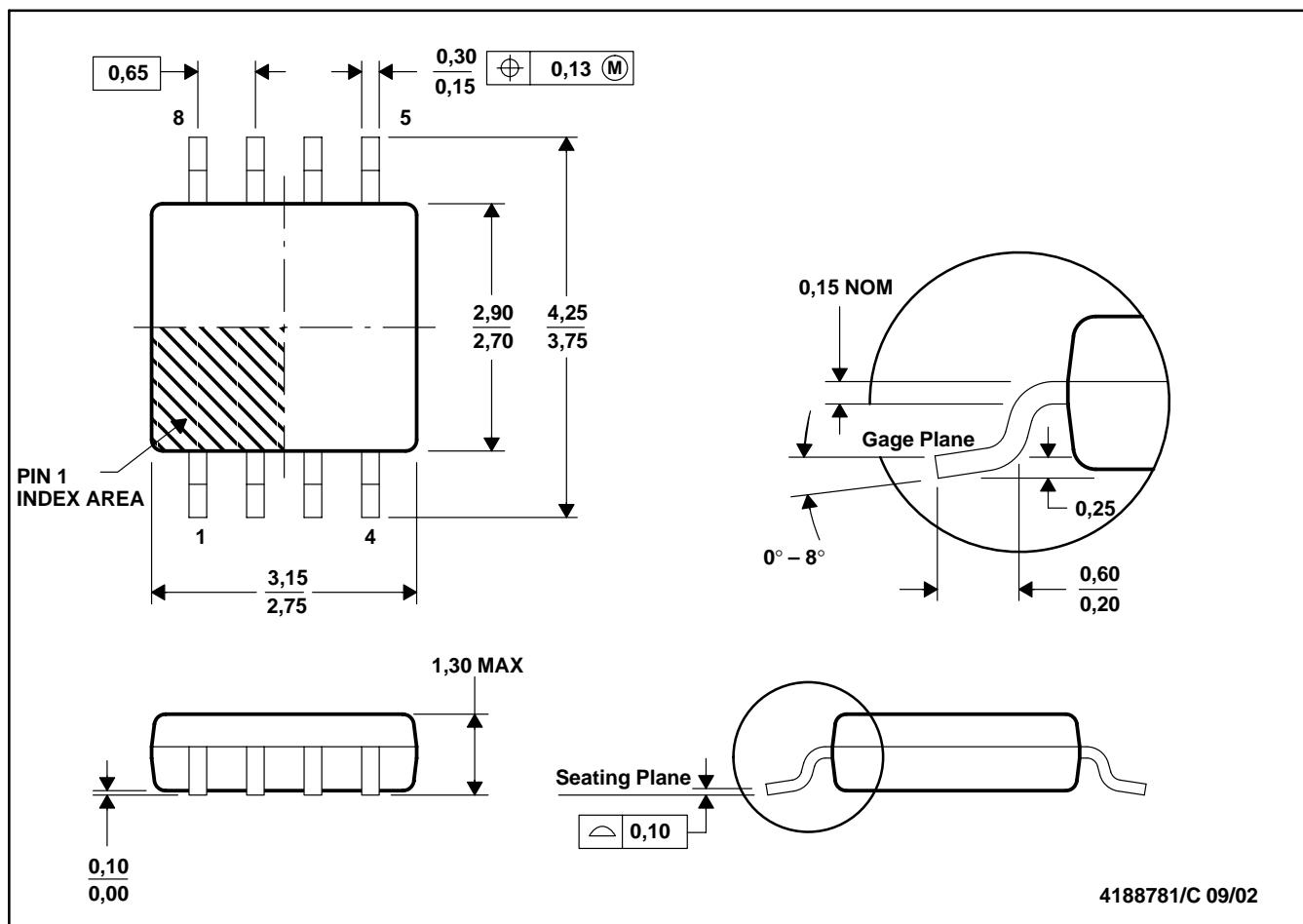
**Figure 1. Load Circuit and Voltage Waveforms**



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## DCT (R-PDSO-G8)

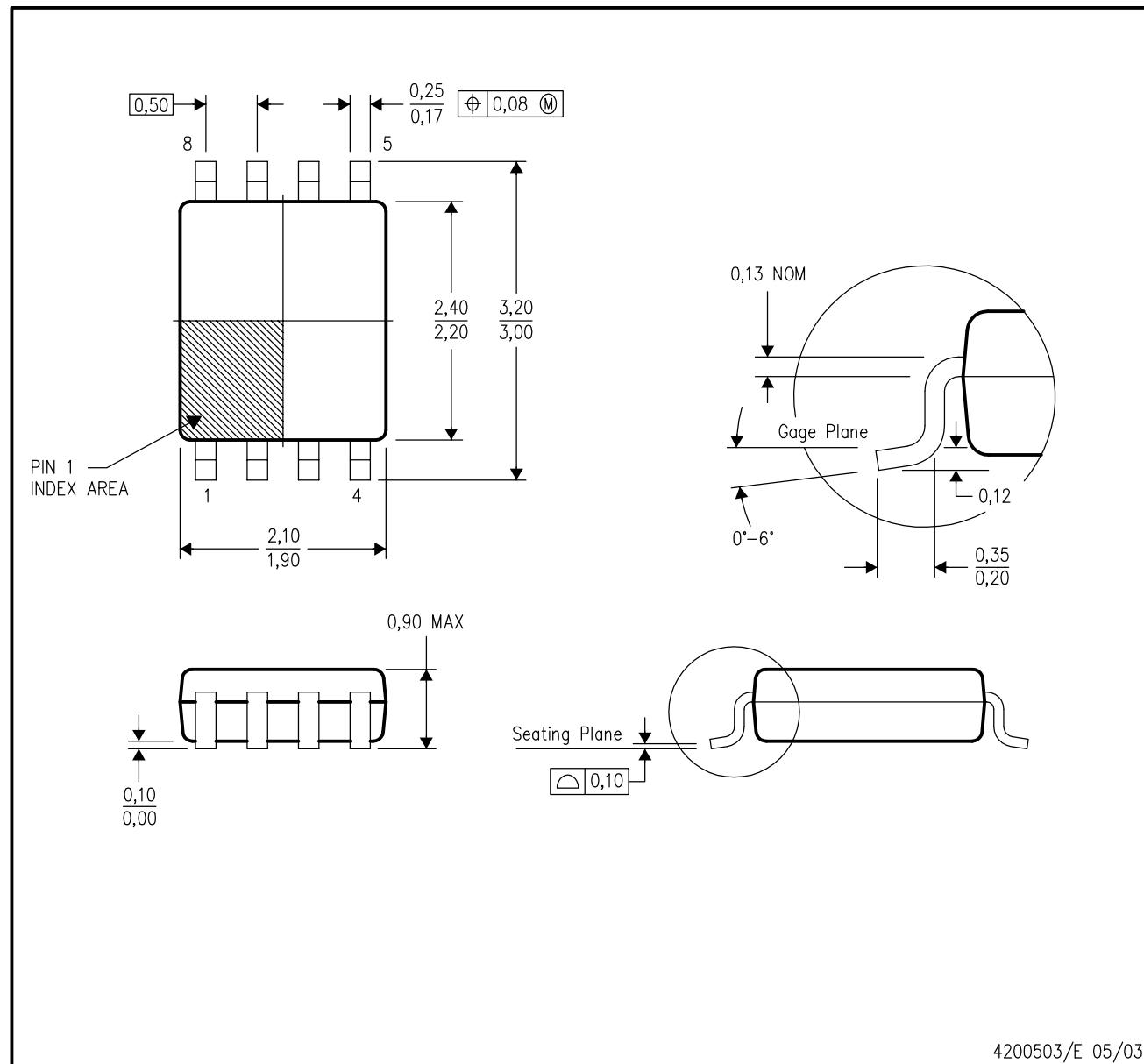
## PLASTIC SMALL-OUTLINE PACKAGE



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-187 variation DA.

## DCU (R-PDSO-G8)

## PLASTIC SMALL-OUTLINE PACKAGE (DIE DOWN)



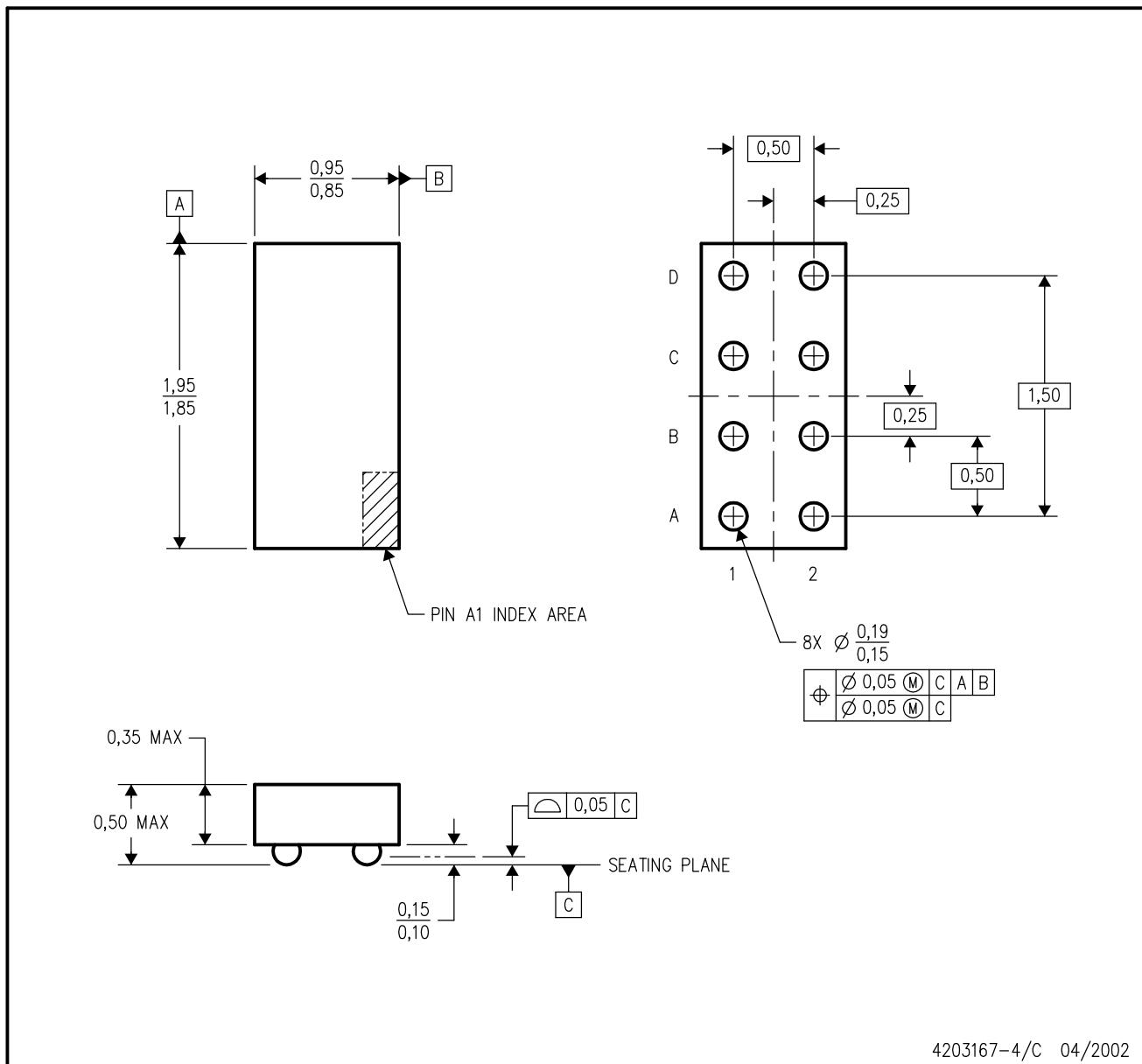
4200503/E 05/03

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-187 variation CA.

YEA (R-XBGA-N8)

## DIE-SIZE BALL GRID ARRAY



4203167-4/C 04/2002

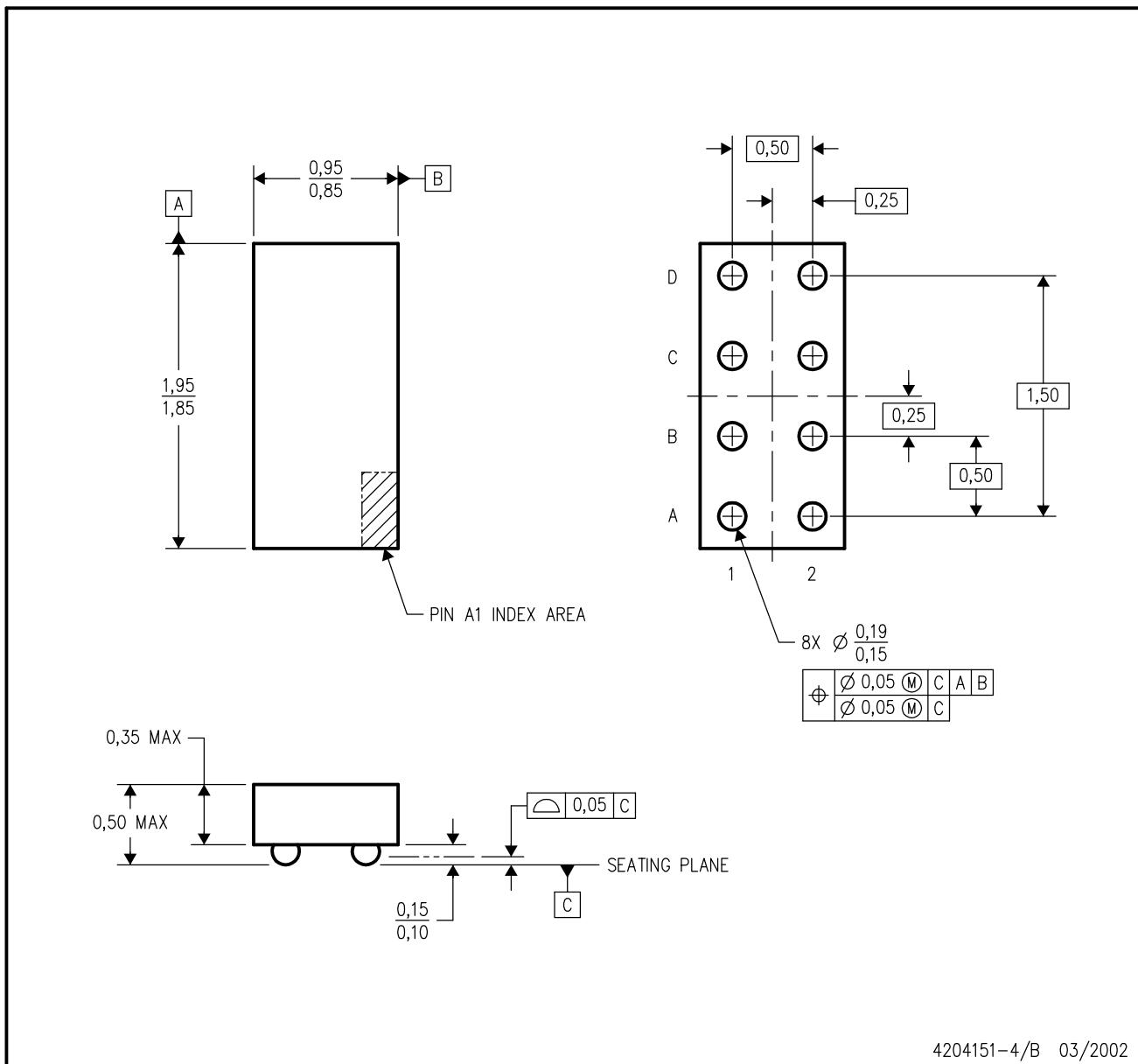
NOTES:

- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. NanoStar™ package configuration.
- D. Package complies to JEDEC M0-211 variation EB.
- E. This package is tin-lead (SnPb). Refer to the 8 YZA package (drawing 4204151) for lead-free.

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YZA (R-XBGA-N8)

## DIE-SIZE BALL GRID ARRAY



4204151-4/B 03/2002

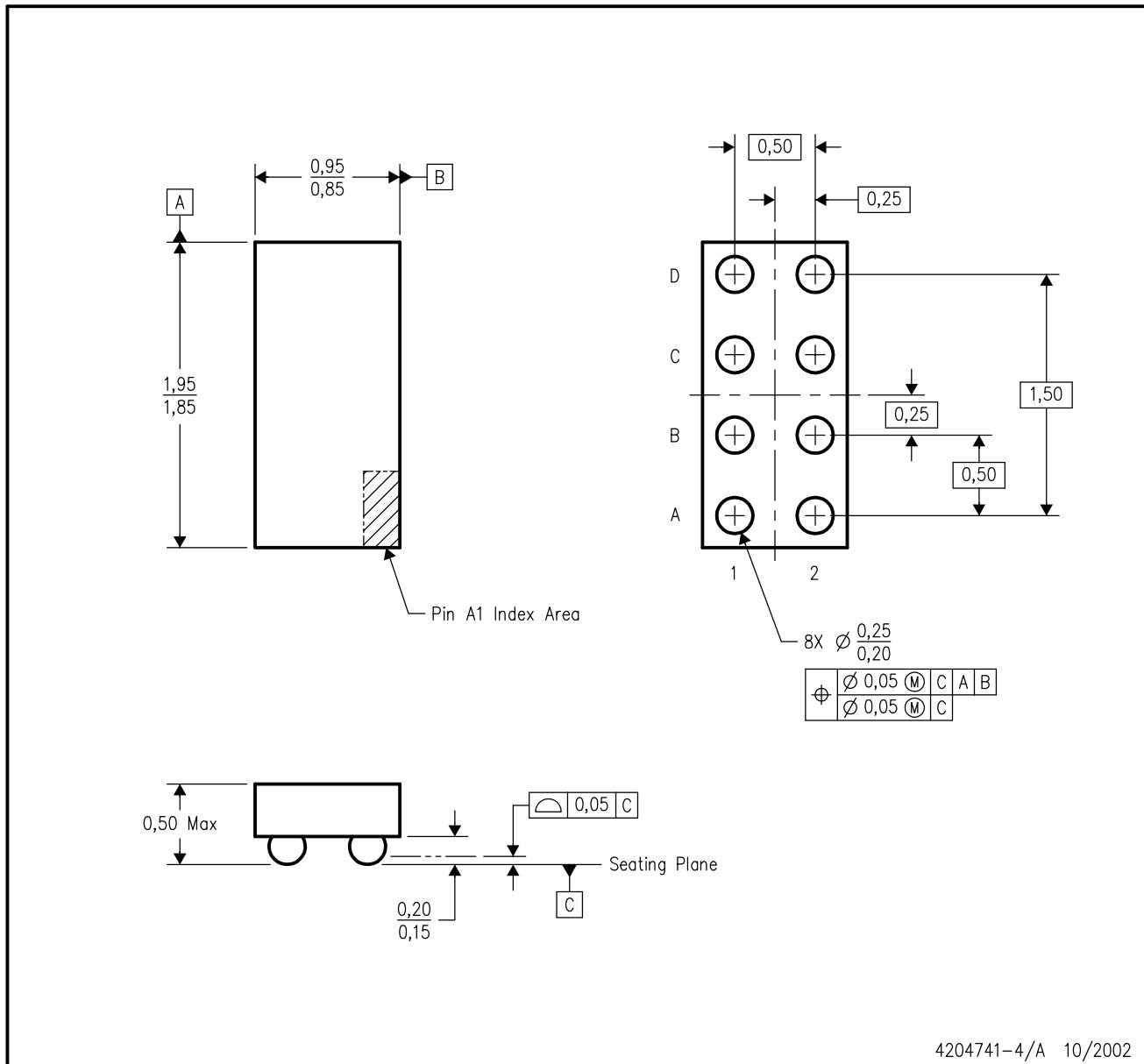
NOTES:

- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. NanoFree™ package configuration.
- D. Package complies to JEDEC MO-211 variation EB.
- E. This package is lead-free. Refer to the 8 YEA package (drawing 4203167) for tin-lead (SnPb).

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## YZP (R-XBGA-N8)

## DIE-SIZE BALL GRID ARRAY



4204741-4/A 10/2002

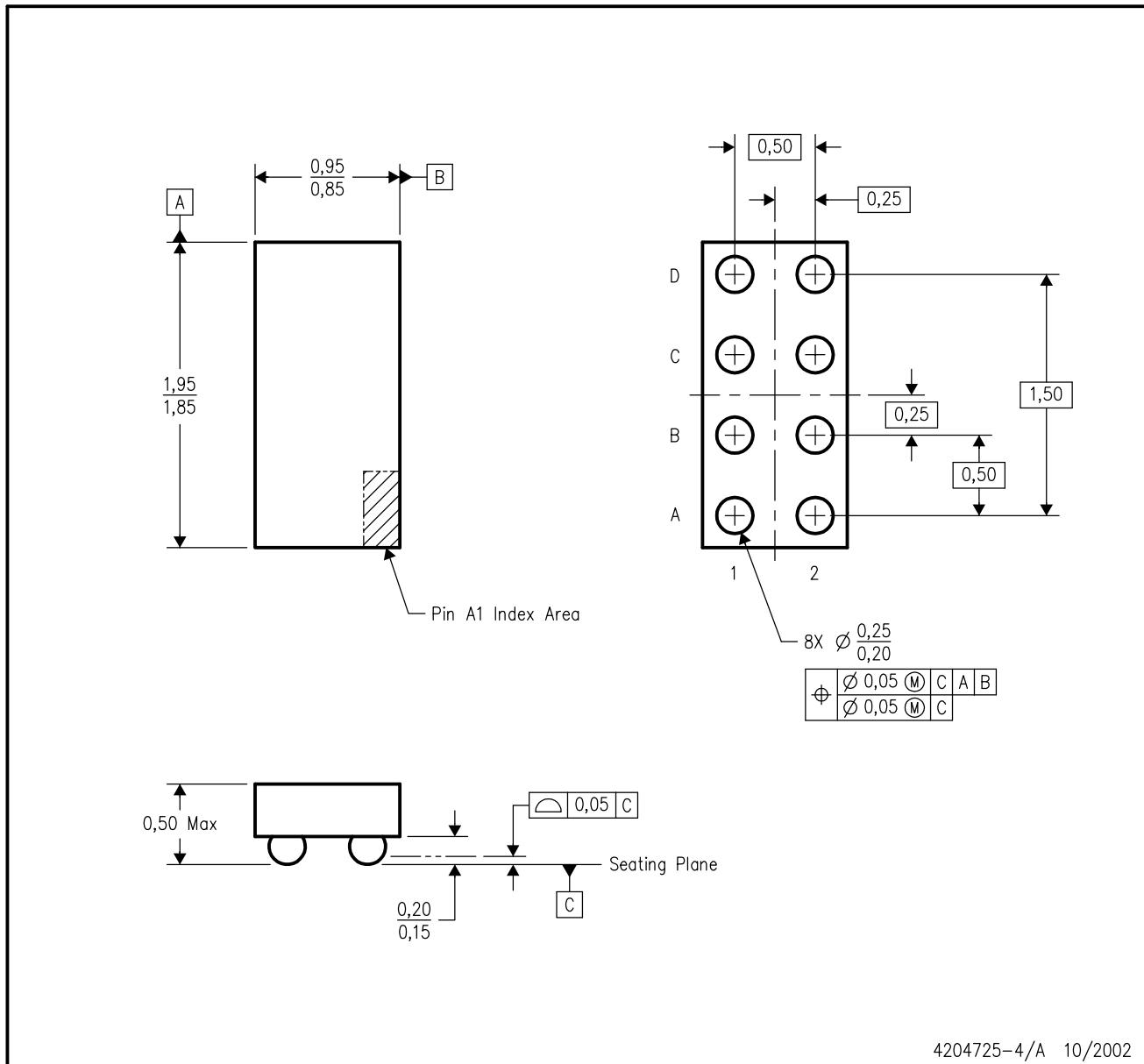
NOTES:

- 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 8 YEP package (drawing 4204725) for tin-lead (SnPb).

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## YEP (R-XBGA-N8)

## DIE-SIZE BALL GRID ARRAY



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 8 YZP package (drawing 4204741) for lead-free.

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