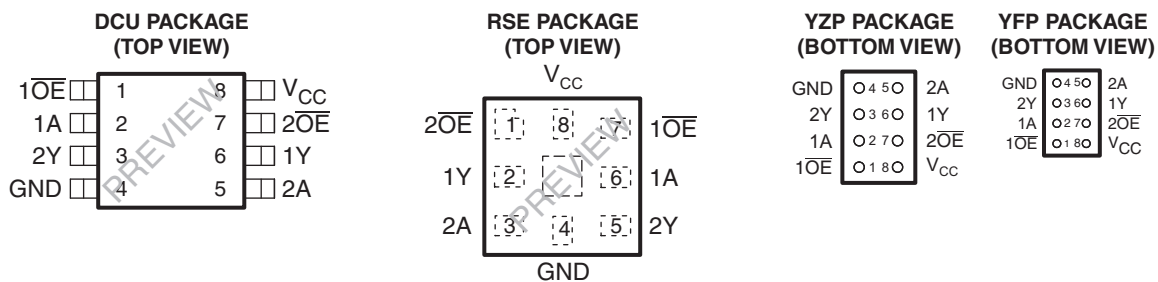


## LOW-POWER DUAL BUS BUFFER GATE WITH 3-STATE OUTPUTS

### FEATURES

- Available in the Texas Instruments NanoFree™ Package
- Low Static-Power Consumption ( $I_{CC} = 0.9 \mu\text{A Max}$ )
- Low Dynamic-Power Consumption ( $C_{pd} = 4 \text{ pF Typ at } 3.3 \text{ V}$ )
- Low Input Capacitance ( $C_i = 1.5 \text{ pF Typ}$ )
- Low Noise – Overshoot and Undershoot <math><10\% \text{ of } V\_{CC}</math>
- Input-Disable Feature Allows Floating Input Conditions
- $I_{off}$  Supports Partial-Power-Down Mode Operation
- Input Hysteresis Allows Slow Input Transition and Better Switching Noise Immunity at Input
- Wide Operating  $V_{CC}$  Range of 0.8 V to 3.6 V
- Optimized for 3.3-V Operation
- 3.6-V I/O Tolerant to Support Mixed-Mode Signal Operation
- $t_{pd} = 4.6 \text{ ns Max at } 3.3 \text{ V}$
- Suitable for Point-to-Point Applications
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Performance Tested Per JESD 22
  - 2000-V Human-Body Model (A114-B, Class II)
  - 200-V Machine Model (A115-A)
  - 1000-V Charged-Device Model (C101)



The exposed center pad, if used, must be connected only as a secondary GND or left electrically open.

See mechanical drawings for dimensions.

### DESCRIPTION/ORDERING INFORMATION

The AUP family is TI's premier solution to the industry's low-power needs in battery-powered portable applications. This family ensures a very low static and dynamic power consumption across the entire  $V_{CC}$  range of 0.8 V to 3.6 V, resulting in an increased battery life. This product also maintains excellent signal integrity (see [Figure 1](#) and [Figure 2](#)).



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.

NanoFree is a trademark of Texas Instruments.

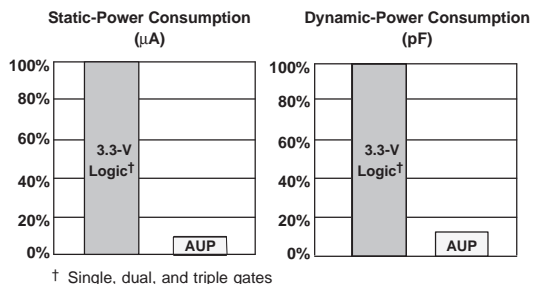


Figure 1. AUP – The Lowest-Power Family

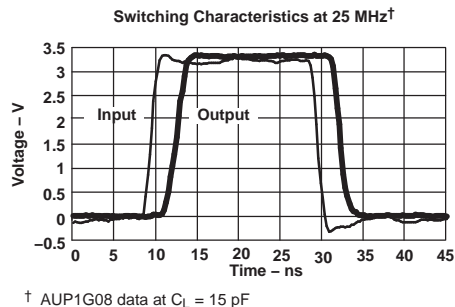


Figure 2. Excellent Signal Integrity

The SN74AUP2G125 is a dual bus buffer gate designed for 0.8-V to 3.6-V  $V_{CC}$  operation. This device features dual line drivers with 3-state outputs. Each output is disabled when the corresponding output-enable ( $\overline{OE}$ ) input is high. This device has the input-disable feature, which allows floating input signals.

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.

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.

ORDERING INFORMATION

$T_A$	PACKAGE <sup>(1)(2)</sup>		ORDERABLE PART NUMBER	TOP-SIDE MARKING <sup>(3)</sup>
-40°C to 85°C	NanoFree™ – WCSP (DSBGA) 0.23-mm Large Bump – YFP (Pb-free)	Reel of 3000	SN74AUP2G125YFPR	___ HM_
	NanoFree™ – WCSP (DSBGA) 0.23-mm Large Bump – YZP (Pb-free)	Reel of 3000	SN74AUP2G125YZPR	___ HM_
	QFN – RSE	Reel of 3000	SN74AUP2G125RSER	PREVIEW
	VSSOP – DCU	Reel of 3000	SN74AUP2G125DCUR	PREVIEW

- (1) Package drawings, thermal data, and symbolization are available at [www.ti.com/packaging](http://www.ti.com/packaging).
- (2) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at [www.ti.com](http://www.ti.com).
- (3) YFP/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). DCU: The actual top-side marking has one additional character to designate the assembly/test site.

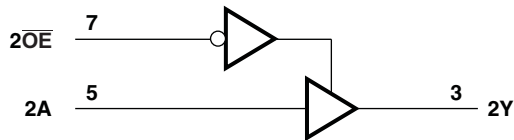
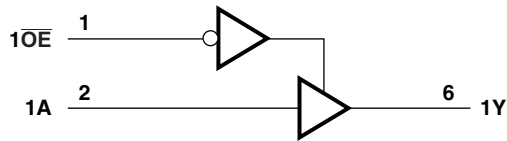
FUNCTION TABLE

INPUTS		OUTPUT Y
$\overline{OE}$	A	
L	H	H
L	L	L
H	$X^{(1)}$	Z

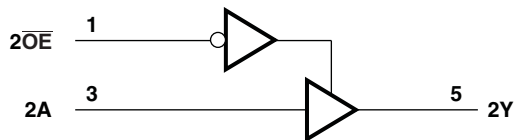
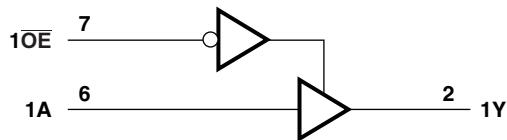
(1) Floating inputs allowed.

LOGIC DIAGRAM (POSITIVE LOGIC)

DCU, YFP, and YZP Packages



RSE Package



ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>

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

		MIN	MAX	UNIT
V <sub>CC</sub>	Supply voltage range	-0.5	4.6	V
V <sub>I</sub>	Input voltage range <sup>(2)</sup>	-0.5	4.6	V
V <sub>O</sub>	Voltage range applied to any output in the high-impedance or power-off state <sup>(2)</sup>	-0.5	4.6	V
V <sub>O</sub>	Output voltage range in the high or low state <sup>(2)</sup>	-0.5	V <sub>CC</sub> + 0.5	V
I <sub>IK</sub>	Input clamp current	V <sub>I</sub> < 0		-50 mA
I <sub>OK</sub>	Output clamp current	V <sub>O</sub> < 0		-50 mA
I <sub>O</sub>	Continuous output current			±20 mA
	Continuous current through V <sub>CC</sub> or GND			±50 mA
θ <sub>JA</sub>	Package thermal impedance <sup>(3)</sup>	DCU package		227
		RSE package		TBD
		YFP package		TBD
		YZP package		102
T <sub>stg</sub>	Storage temperature range	-65	150	°C

- (1) 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.
- (2) The input negative-voltage and output voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) The package thermal impedance is calculated in accordance with JESD 51-7.

**RECOMMENDED OPERATING CONDITIONS<sup>(1)</sup>**

		MIN	MAX	UNIT
$V_{CC}$	Supply voltage	0.8	3.6	V
$V_{IH}$	High-level input voltage	$V_{CC} = 0.8\text{ V}$	$V_{CC}$	3.6
		$V_{CC} = 1.1\text{ V to }1.95\text{ V}$	$0.65 \times V_{CC}$	3.6
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.6	3.6
		$V_{CC} = 3\text{ V to }3.6\text{ V}$	2	3.6
$V_{IL}$	Low-level input voltage	$V_{CC} = 0.8\text{ V}$	0	
		$V_{CC} = 1.1\text{ V to }1.95\text{ V}$	0	$0.35 \times V_{CC}$
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	0	0.7
		$V_{CC} = 3\text{ V to }3.6\text{ V}$	0	0.9
$V_O$	Output voltage	Active state	0	$V_{CC}$
		3-state	0	3.6
$I_{OH}$	High-level output current	$V_{CC} = 0.8\text{ V}$		–20
		$V_{CC} = 1.1\text{ V}$		–1.1
		$V_{CC} = 1.4\text{ V}$		–1.7
		$V_{CC} = 1.65\text{ V}$		–1.9
		$V_{CC} = 2.3\text{ V}$		–3.1
		$V_{CC} = 3\text{ V}$		–4
$I_{OL}$	Low-level output current	$V_{CC} = 0.8\text{ V}$		20
		$V_{CC} = 1.1\text{ V}$		1.1
		$V_{CC} = 1.4\text{ V}$		1.7
		$V_{CC} = 1.65\text{ V}$		1.9
		$V_{CC} = 2.3\text{ V}$		3.1
		$V_{CC} = 3\text{ V}$		4
$\Delta t/\Delta v$	Input transition rise or fall rate	$V_{CC} = 0.8\text{ V to }3.6\text{ V}$		200
$T_A$	Operating free-air temperature		–40	85

(1) 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	V <sub>CC</sub>	T <sub>A</sub> = 25°C			T <sub>A</sub> = –40°C to 85°C		UNIT
			MIN	TYP	MAX	MIN	MAX	
V <sub>OH</sub>	I <sub>OH</sub> = –20 μA	0.8 V to 3.6 V	V <sub>CC</sub> – 0.1			V <sub>CC</sub> – 0.1		V
	I <sub>OH</sub> = –1.1 mA	1.1 V	0.75 × V <sub>CC</sub>			0.7 × V <sub>CC</sub>		
	I <sub>OH</sub> = –1.7 mA	1.4 V	1.11			1.03		
	I <sub>OH</sub> = –1.9 mA	1.65 V	1.32			1.3		
	I <sub>OH</sub> = –2.3 mA	2.3 V	2.05			1.97		
	I <sub>OH</sub> = –3.1 mA		1.9			1.85		
	I <sub>OH</sub> = –2.7 mA	3 V	2.72			2.67		
	I <sub>OH</sub> = –4 mA		2.6			2.55		
V <sub>OL</sub>	I <sub>OL</sub> = 20 μA	0.8 V to 3.6 V				0.1	0.1	V
	I <sub>OL</sub> = 1.1 mA	1.1 V				0.3 × V <sub>CC</sub>	0.3 × V <sub>CC</sub>	
	I <sub>OL</sub> = 1.7 mA	1.4 V				0.31	0.37	
	I <sub>OL</sub> = 1.9 mA	1.65 V				0.31	0.35	
	I <sub>OL</sub> = 2.3 mA	2.3 V				0.31	0.33	
	I <sub>OL</sub> = 3.1 mA					0.44	0.45	
	I <sub>OL</sub> = 2.7 mA	3 V				0.31	0.33	
	I <sub>OL</sub> = 4 mA					0.44	0.45	
I <sub>I</sub>	A or $\overline{OE}$ input	V <sub>I</sub> = GND to 3.6 V	0 V to 3.6 V			0.1	0.5	μA
I <sub>off</sub>		V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V	0 V			0.2	0.6	μA
ΔI <sub>off</sub>		V <sub>I</sub> or V <sub>O</sub> = 0 V to 3.6 V	0 V to 0.2 V			0.2	0.9	μA
I <sub>OZ</sub>		V <sub>O</sub> = V <sub>CC</sub> or GND	3.6 V			0.1	0.5	μA
I <sub>CC</sub>		V <sub>I</sub> = GND or (V <sub>CC</sub> to 3.6 V), $\overline{OE}$ = GND, I <sub>O</sub> = 0	0.8 V to 3.6 V			0.5	0.9	μA
ΔI <sub>CC</sub>	A input	V <sub>I</sub> = V <sub>CC</sub> – 0.6 V <sup>(1)</sup> , I <sub>O</sub> = 0	3.3 V			40	50	μA
	$\overline{OE}$ input					110	120	
	All inputs	V <sub>I</sub> = GND to 3.6 V, $\overline{OE}$ = V <sub>CC</sub> <sup>(2)</sup>	0.8 V to 3.6 V			0	0	
C <sub>I</sub>		V <sub>I</sub> = V <sub>CC</sub> or GND	0 V			2		pF
			3.6 V			2		
C <sub>O</sub>		V <sub>O</sub> = V <sub>CC</sub> or GND	3.6 V			3		pF

 (1) One input at V<sub>CC</sub> – 0.6 V, other input at V<sub>CC</sub> or GND

 (2) To show I<sub>CC</sub> is very low when the input-disable feature is enabled

**SWITCHING CHARACTERISTICS**

over recommended operating free-air temperature range,  $C_L = 5$  pF (unless otherwise noted) (see [Figure 3](#) and [Figure 4](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC}$	$T_A = 25^\circ\text{C}$			$T_A = -40^\circ\text{C to } 85^\circ\text{C}$		UNIT
				MIN	TYP	MAX	MIN	MAX	
$t_{pd}$	A	Y	0.8 V		23.0				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	0.5	7.8	19.5	0.5	20.7	
			$1.5\text{ V} \pm 0.1\text{ V}$	0.5	5.2	11.1	0.5	13.5	
			$1.8\text{ V} \pm 0.15\text{ V}$	0.6	4.0	8.1	0.5	10.5	
			$2.5\text{ V} \pm 0.2\text{ V}$	0.9	2.8	5.0	0.5	7.1	
			$3.3\text{ V} \pm 0.3\text{ V}$	0.9	2.3	3.7	0.5	5.4	
$t_{en}$	$\overline{\text{OE}}$	Y	0.8 V		32.5				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	0.5	8.5	21.7	0.5	23.1	
			$1.5\text{ V} \pm 0.1\text{ V}$	0.7	5.5	11.6	0.5	14.2	
			$1.8\text{ V} \pm 0.15\text{ V}$	1.0	4.3	8.6	0.5	11.1	
			$2.5\text{ V} \pm 0.2\text{ V}$	1.3	3.0	5.4	0.5	7.6	
			$3.3\text{ V} \pm 0.3\text{ V}$	1.3	2.4	4.0	0.5	5.8	
$t_{dis}$	$\overline{\text{OE}}$	Y	0.8 V		13.0				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	1.8	5.0	9.8	1.5	10.2	
			$1.5\text{ V} \pm 0.1\text{ V}$	0.5	3.6	7.3	0.5	7.6	
			$1.8\text{ V} \pm 0.15\text{ V}$	0.5	3.3	5.9	0.5	6.3	
			$2.5\text{ V} \pm 0.2\text{ V}$	0.5	2.2	3.7	0.5	4.1	
			$3.3\text{ V} \pm 0.3\text{ V}$	1.5	2.6	4.3	1.1	4.6	

**SWITCHING CHARACTERISTICS**

over recommended operating free-air temperature range,  $C_L = 10$  pF (unless otherwise noted) (see [Figure 3](#) and [Figure 4](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC}$	$T_A = 25^\circ\text{C}$			$T_A = -40^\circ\text{C to } 85^\circ\text{C}$		UNIT
				MIN	TYP	MAX	MIN	MAX	
$t_{pd}$	A	Y	0.8 V		26.0				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	0.5	8.8	21.5	0.5	22.7	
			$1.5\text{ V} \pm 0.1\text{ V}$	1.2	6.0	12.4	0.5	14.7	
			$1.8\text{ V} \pm 0.15\text{ V}$	1.2	4.7	9.2	0.5	11.5	
			$2.5\text{ V} \pm 0.2\text{ V}$	1.4	3.3	5.8	0.5	7.8	
			$3.3\text{ V} \pm 0.3\text{ V}$	1.4	2.7	4.3	0.5	6.0	
$t_{en}$	$\overline{\text{OE}}$	Y	0.8 V		35.7				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	0.5	9.6	23.8	0.5	25.1	
			$1.5\text{ V} \pm 0.1\text{ V}$	1.5	6.4	12.9	0.5	15.5	
			$1.8\text{ V} \pm 0.15\text{ V}$	1.5	5.0	9.8	0.5	12.2	
			$2.5\text{ V} \pm 0.2\text{ V}$	1.6	3.5	9.6	0.5	12.3	
			$3.3\text{ V} \pm 0.3\text{ V}$	1.6	2.9	4.7	0.5	6.4	
$t_{dis}$	$\overline{\text{OE}}$	Y	0.8 V		14.5				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	0.9	5.8	11.2	0.8	11.5	
			$1.5\text{ V} \pm 0.1\text{ V}$	0.5	4.1	9.0	0.5	9.2	
			$1.8\text{ V} \pm 0.15\text{ V}$	1.3	4.4	7.5	1.1	7.8	
			$2.5\text{ V} \pm 0.2\text{ V}$	1.2	2.9	4.7	1.0	5.0	
			$3.3\text{ V} \pm 0.3\text{ V}$	1.9	3.8	6.1	1.7	6.3	

**SWITCHING CHARACTERISTICS**

 over recommended operating free-air temperature range,  $C_L = 15$  pF (unless otherwise noted) (see [Figure 3](#) and [Figure 4](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC}$	$T_A = 25^\circ\text{C}$			$T_A = -40^\circ\text{C to } 85^\circ\text{C}$		UNIT
				MIN	TYP	MAX	MIN	MAX	
$t_{pd}$	A	Y	0.8 V		28.6				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	0.5	9.8	23.5	0.5	24.6	
			$1.5\text{ V} \pm 0.1\text{ V}$	1.7	4.1	13.5	0.5	15.7	
			$1.8\text{ V} \pm 0.15\text{ V}$	1.6	5.3	10.2	0.5	12.4	
			$2.5\text{ V} \pm 0.2\text{ V}$	1.8	3.8	6.4	0.5	8.4	
			$3.3\text{ V} \pm 0.3\text{ V}$	1.7	3.1	4.8	0.5	6.4	
$t_{en}$	$\overline{\text{OE}}$	Y	0.8 V		38.9				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	0.5	10.7	24.7	0.5	26.0	
			$1.5\text{ V} \pm 0.1\text{ V}$	1.7	7.2	14.1	0.5	16.5	
			$1.8\text{ V} \pm 0.15\text{ V}$	2.0	5.6	10.3	0.5	12.7	
			$2.5\text{ V} \pm 0.2\text{ V}$	2.0	4.0	6.8	0.5	8.9	
			$3.3\text{ V} \pm 0.3\text{ V}$	1.9	3.3	5.2	0.5	6.8	
$t_{dis}$	$\overline{\text{OE}}$	Y	0.8 V		14.8				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	0.5	6.3	13.7	0.5	14.0	
			$1.5\text{ V} \pm 0.1\text{ V}$	0.5	4.6	8.8	0.5	9.1	
			$1.8\text{ V} \pm 0.15\text{ V}$	0.7	4.9	8.1	0.6	8.4	
			$2.5\text{ V} \pm 0.2\text{ V}$	1.1	3.7	6.5	1.0	6.7	
			$3.3\text{ V} \pm 0.3\text{ V}$	1.3	4.8	7.6	1.2	7.7	

**SWITCHING CHARACTERISTICS**

 over recommended operating free-air temperature range,  $C_L = 30$  pF (unless otherwise noted) (see [Figure 3](#) and [Figure 4](#))

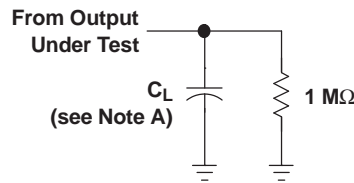
PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC}$	$T_A = 25^\circ\text{C}$			$T_A = -40^\circ\text{C to } 85^\circ\text{C}$		UNIT
				MIN	TYP	MAX	MIN	MAX	
$t_{pd}$	A	Y	0.8 V		37.9				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	0.5	13.0	30.2	0.5	31.1	
			$1.5\text{ V} \pm 0.1\text{ V}$	3.2	8.9	17.2	0.9	19.2	
			$1.8\text{ V} \pm 0.15\text{ V}$	3.0	7.1	13.0	0.8	15.0	
			$2.5\text{ V} \pm 0.2\text{ V}$	3.0	5.2	8.3	1.2	10.2	
			$3.3\text{ V} \pm 0.3\text{ V}$	2.7	4.3	6.5	1.3	7.9	
$t_{en}$	$\overline{\text{OE}}$	Y	0.8 V		49.9				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	0.5	14.1	31.7	0.5	32.8	
			$1.5\text{ V} \pm 0.1\text{ V}$	2.7	9.6	17.8	0.6	20.0	
			$1.8\text{ V} \pm 0.15\text{ V}$	2.5	7.5	13.2	0.5	15.4	
			$2.5\text{ V} \pm 0.2\text{ V}$	2.9	5.5	8.6	1.2	10.6	
			$3.3\text{ V} \pm 0.3\text{ V}$	2.7	4.6	6.7	1.4	8.3	
$t_{dis}$	$\overline{\text{OE}}$	Y	0.8 V		17.9				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	0.5	8.7	17.4	0.5	17.6	
			$1.5\text{ V} \pm 0.1\text{ V}$	0.5	6.5	14.0	0.5	14.0	
			$1.8\text{ V} \pm 0.15\text{ V}$	2.4	8.1	12.9	2.3	13.0	
			$2.5\text{ V} \pm 0.2\text{ V}$	1.8	5.7	10.4	1.7	10.6	
			$3.3\text{ V} \pm 0.3\text{ V}$	3.9	8.6	13.5	3.8	13.6	

**OPERATING CHARACTERISTICS** $T_A = 25^\circ\text{C}$ 

PARAMETER		TEST CONDITIONS	$V_{CC}$	TYP	UNIT	
$C_{pd}$	Power dissipation capacitance	Outputs enabled	$f = 10\text{ MHz}$	0.8 V	3.8	pF
				$1.2\text{ V} \pm 0.1\text{ V}$	3.7	
				$1.5\text{ V} \pm 0.1\text{ V}$	3.7	
				$1.8\text{ V} \pm 0.15\text{ V}$	3.7	
				$2.5\text{ V} \pm 0.2\text{ V}$	3.9	
				$3.3\text{ V} \pm 0.3\text{ V}$	4	
	Outputs disabled	$f = 10\text{ MHz}$	0.8 V	0		
			$1.2\text{ V} \pm 0.1\text{ V}$	0		
			$1.5\text{ V} \pm 0.1\text{ V}$	0		
			$1.8\text{ V} \pm 0.15\text{ V}$	0		
			$2.5\text{ V} \pm 0.2\text{ V}$	0		
			$3.3\text{ V} \pm 0.3\text{ V}$	0		

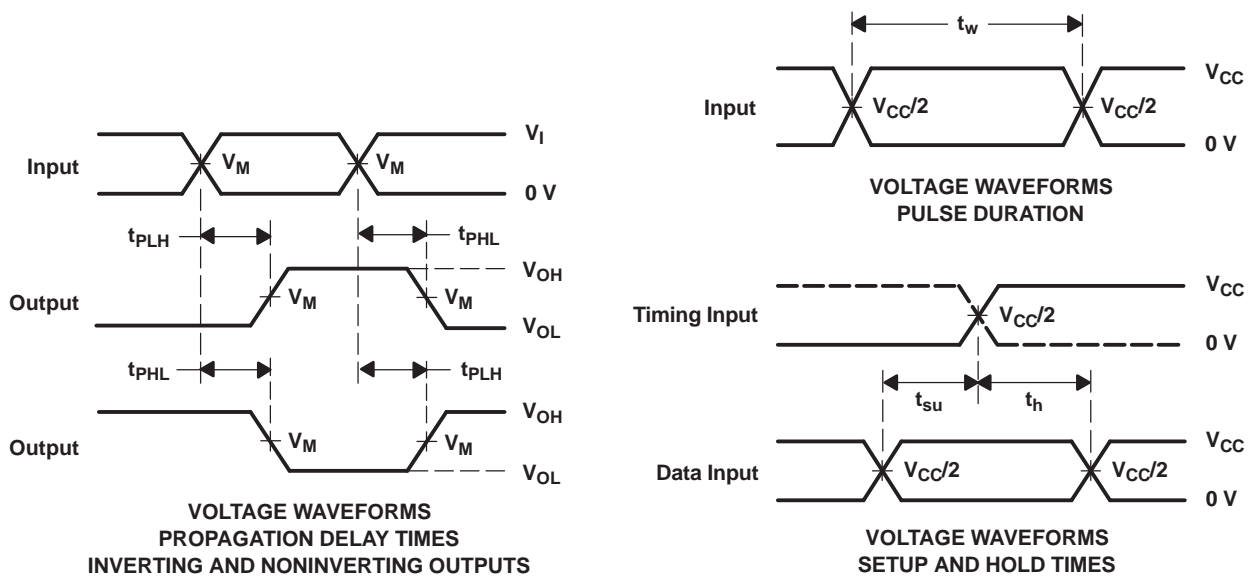


**PARAMETER MEASUREMENT INFORMATION**  
(Propagation Delays, Setup and Hold Times, and Pulse Duration)



LOAD CIRCUIT

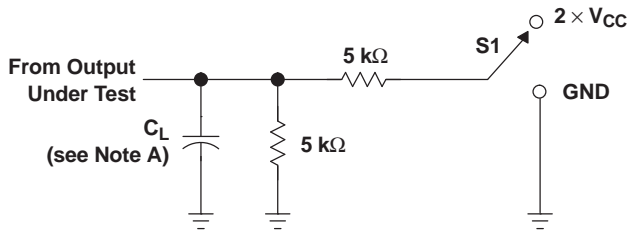
	$V_{CC} = 0.8 \text{ V}$	$V_{CC} = 1.2 \text{ V} \pm 0.1 \text{ V}$	$V_{CC} = 1.5 \text{ V} \pm 0.1 \text{ V}$	$V_{CC} = 1.8 \text{ V} \pm 0.15 \text{ V}$	$V_{CC} = 2.5 \text{ V} \pm 0.2 \text{ V}$	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$
$C_L$	5, 10, 15, 30 pF	5, 10, 15, 30 pF	5, 10, 15, 30 pF	5, 10, 15, 30 pF	5, 10, 15, 30 pF	5, 10, 15, 30 pF
$V_M$	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$
$V_I$	$V_{CC}$	$V_{CC}$	$V_{CC}$	$V_{CC}$	$V_{CC}$	$V_{CC}$



- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. All input pulses are supplied by generators having the following characteristics: PRR  $\leq$  10 MHz,  $Z_O = 50 \Omega$ ,  $t_r/t_f = 3 \text{ ns}$ .  
 C. The outputs are measured one at a time, with one transition per measurement.  
 D.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .  
 E. All parameters and waveforms are not applicable to all devices.

Figure 3. Load Circuit and Voltage Waveforms

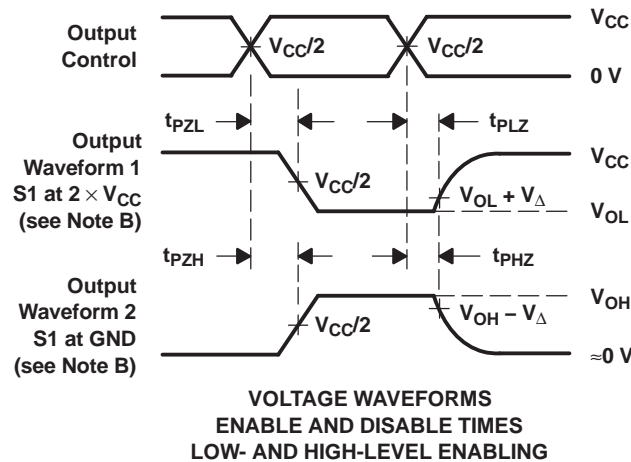
**PARAMETER MEASUREMENT INFORMATION  
(Enable and Disable Times)**



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

LOAD CIRCUIT

	$V_{CC} = 0.8 \text{ V}$	$V_{CC} = 1.2 \text{ V} \pm 0.1 \text{ V}$	$V_{CC} = 1.5 \text{ V} \pm 0.1 \text{ V}$	$V_{CC} = 1.8 \text{ V} \pm 0.15 \text{ V}$	$V_{CC} = 2.5 \text{ V} \pm 0.2 \text{ V}$	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$
$C_L$	5, 10, 15, 30 pF	5, 10, 15, 30 pF	5, 10, 15, 30 pF	5, 10, 15, 30 pF	5, 10, 15, 30 pF	5, 10, 15, 30 pF
$V_M$	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$	$V_{CC}/2$
$V_I$	$V_{CC}$	$V_{CC}$	$V_{CC}$	$V_{CC}$	$V_{CC}$	$V_{CC}$
$V_{\Delta}$	0.1 V	0.1 V	0.1 V	0.15 V	0.15 V	0.3 V



VOLTAGE WAVEFORMS  
ENABLE AND DISABLE TIMES  
LOW- AND HIGH-LEVEL ENABLING

- 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:  $PRR \leq 10 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r/t_f = 3 \text{ ns}$ .  
 D. The outputs are measured one at a time, with one transition per measurement.  
 E.  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .  
 F.  $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{en}$ .  
 G. All parameters and waveforms are not applicable to all devices.

**Figure 4. Load Circuit and Voltage Waveforms**

**PACKAGING INFORMATION**

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
SN74AUP2G125DCUR	PREVIEW	US8	DCU	8	3000	TBD	Call TI	Call TI
SN74AUP2G125RSER	PREVIEW	QFN	RSE	8	3000	TBD	Call TI	Call TI
SN74AUP2G125YFPR	ACTIVE	DSBGA	YFP	8	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM
SN74AUP2G125YZPR	ACTIVE	DSBGA	YZP	8	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM

<sup>(1)</sup> 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.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), 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.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

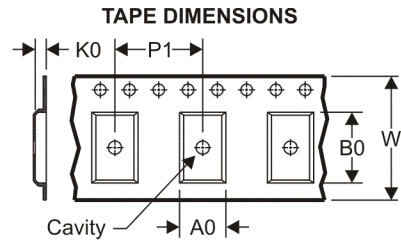
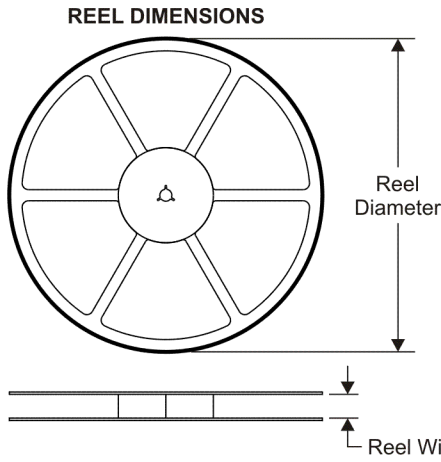
**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

**Important Information and Disclaimer:**The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

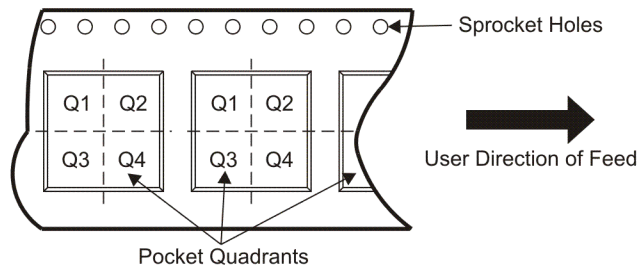
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

**TAPE AND REEL INFORMATION**



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74AUP2G125YFPR	DSBGA	YFP	8	3000	180.0	8.4	0.83	1.63	0.59	4.0	8.0	Q1
SN74AUP2G125YZPR	DSBGA	YZP	8	3000	180.0	8.4	1.1	2.1	0.56	4.0	8.0	Q1

**TAPE AND REEL BOX DIMENSIONS**

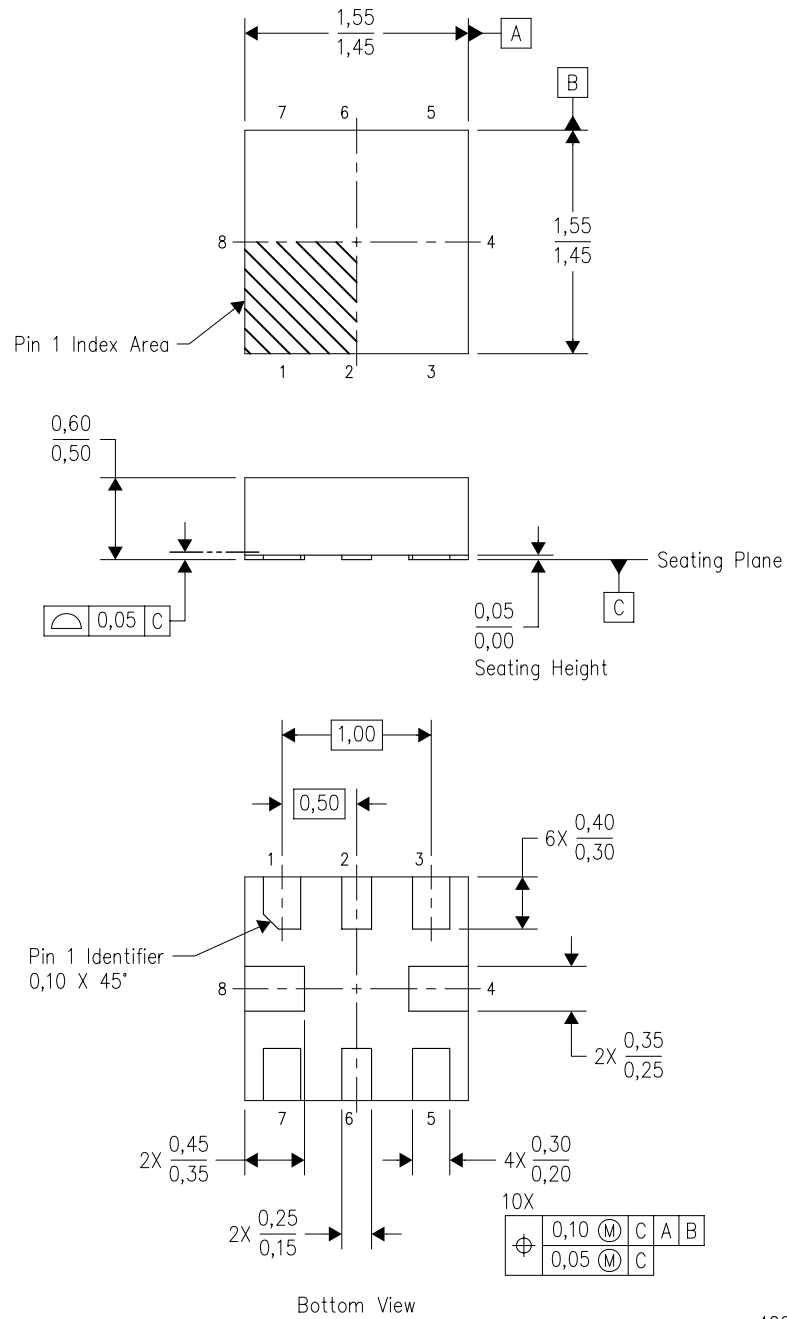


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AUP2G125YFPR	DSBGA	YFP	8	3000	220.0	220.0	34.0
SN74AUP2G125YZPR	DSBGA	YZP	8	3000	220.0	220.0	34.0

RSE (S-PQFP-N8)

PLASTIC QUAD FLATPACK



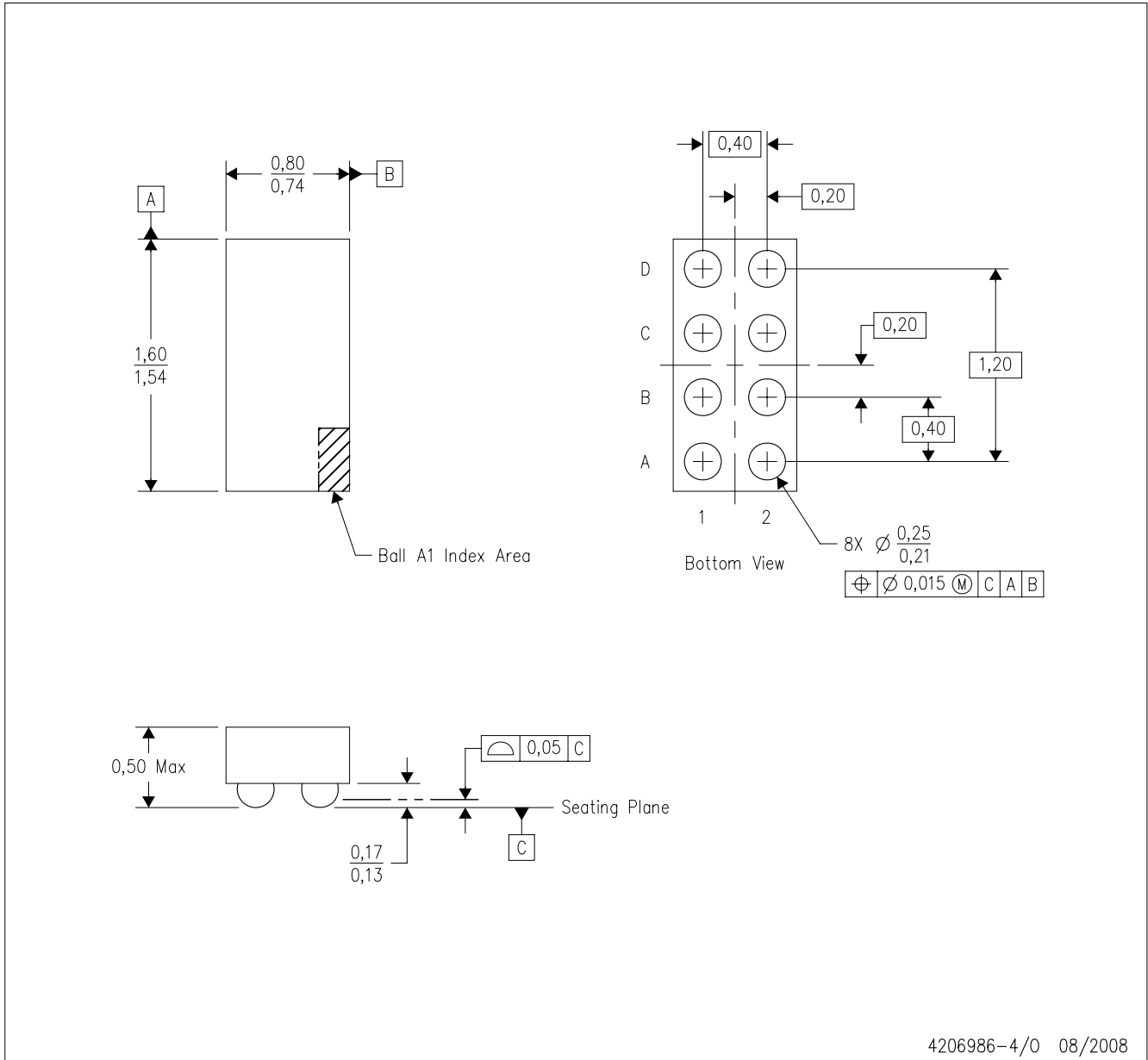
4207268-2/C 01/2008

- NOTES:
- All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - This drawing is subject to change without notice.
  - QFN (Quad Flatpack No-Lead) package configuration.
  - This package complies to JEDEC MO-288 variation UECD.

# MECHANICAL DATA

YFP (R-XBGA-N8)

DIE-SIZE BALL GRID ARRAY

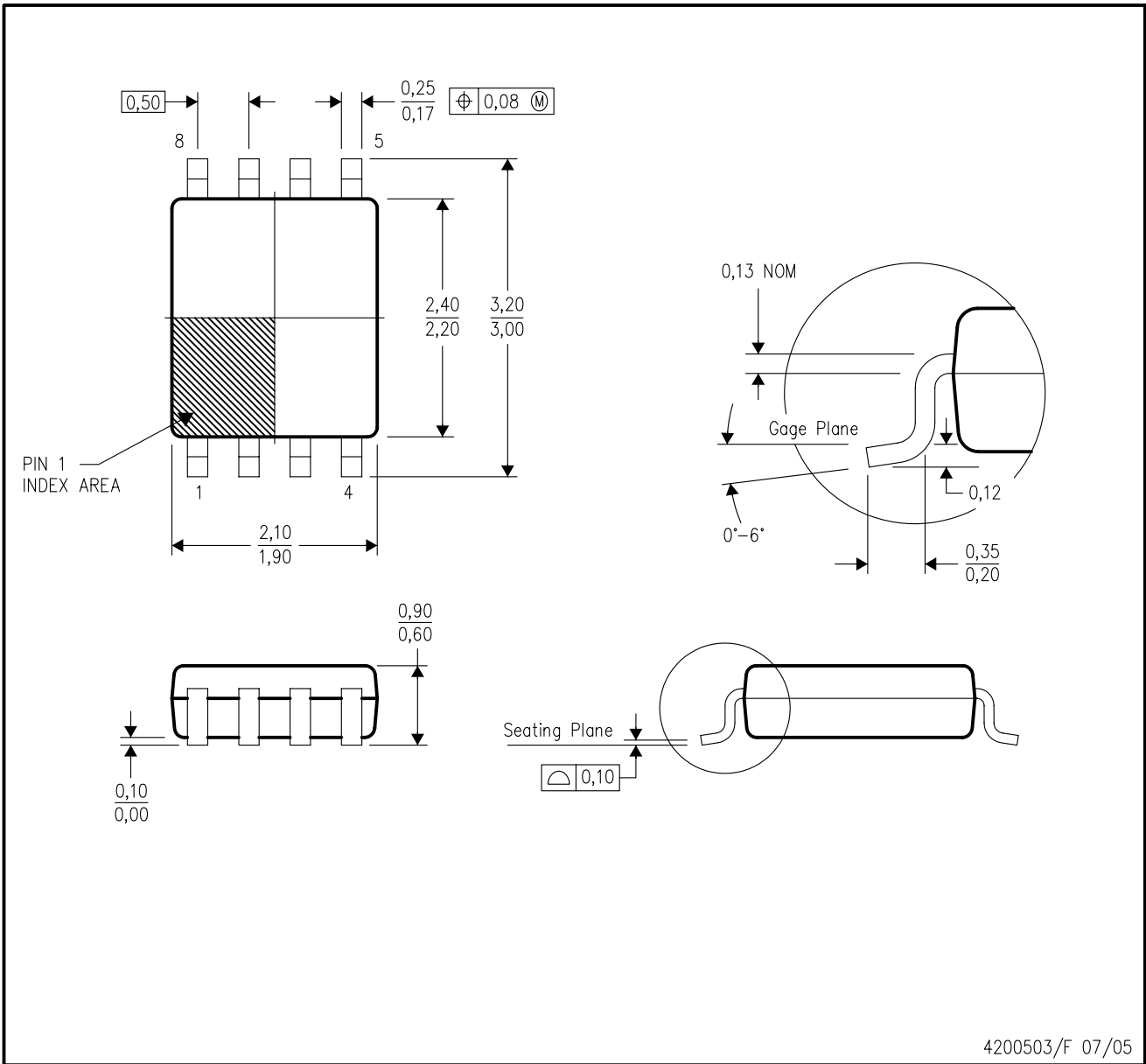


- NOTES:
- All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - This drawing is subject to change without notice.
  - NanoFree™ package configuration.
  - This is a Pb-free solder ball design.

NanoFree is a trademark of Texas Instruments.

DCU (R-PDSO-G8)

PLASTIC SMALL-OUTLINE PACKAGE (DIE DOWN)

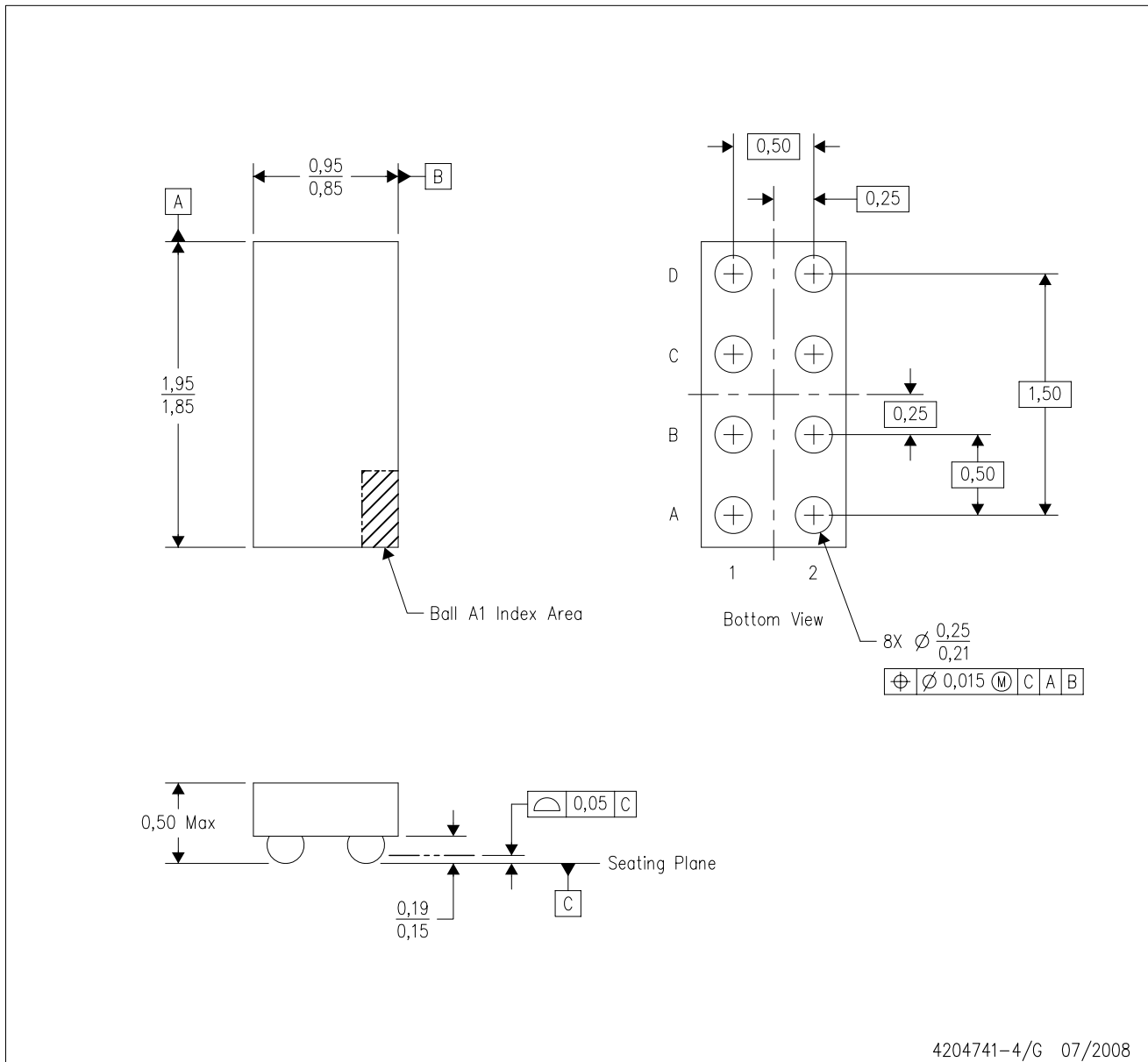


- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
  - D. Falls within JEDEC MO-187 variation CA.



YZP (R-XBGA-N8)

DIE-SIZE BALL GRID ARRAY



- 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. NanoFree™ package configuration.
  - D. This package is lead-free. Refer to the 8 YEP package (drawing 4204725) for tin-lead (SnPb).

NanoFree is a trademark of Texas Instruments.

## IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

### Products

Amplifiers	<a href="http://amplifier.ti.com">amplifier.ti.com</a>
Data Converters	<a href="http://dataconverter.ti.com">dataconverter.ti.com</a>
DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>
Clocks and Timers	<a href="http://www.ti.com/clocks">www.ti.com/clocks</a>
Interface	<a href="http://interface.ti.com">interface.ti.com</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>
RFID	<a href="http://www.ti-rfid.com">www.ti-rfid.com</a>
RF/IF and ZigBee® Solutions	<a href="http://www.ti.com/lprf">www.ti.com/lprf</a>

### Applications

Audio	<a href="http://www.ti.com/audio">www.ti.com/audio</a>
Automotive	<a href="http://www.ti.com/automotive">www.ti.com/automotive</a>
Broadband	<a href="http://www.ti.com/broadband">www.ti.com/broadband</a>
Digital Control	<a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a>
Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
Military	<a href="http://www.ti.com/military">www.ti.com/military</a>
Optical Networking	<a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a>
Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
Telephony	<a href="http://www.ti.com/telephony">www.ti.com/telephony</a>
Video & Imaging	<a href="http://www.ti.com/video">www.ti.com/video</a>
Wireless	<a href="http://www.ti.com/wireless">www.ti.com/wireless</a>

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2008, Texas Instruments Incorporated