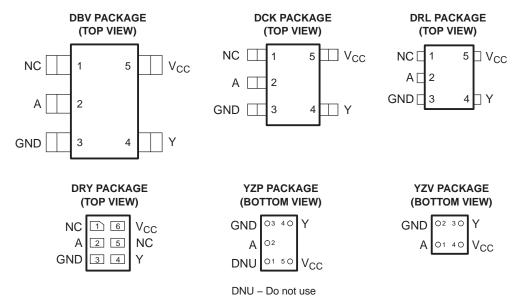


FEATURES

- Available in the Texas Instruments
 NanoFree[™] Package
- Supports 5-V V_{CC} Operation
- Input and Open-Drain Output Accept Voltages up to 5.5 V
- Max t_{nd} of 4.2 ns at 3.3 V
- Low Power Consumption, 10-μA Max I_{CC}

- ±24-mA Output Drive at 3.3 V
- 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)



NC – No internal connection See mechanical drawings for dimensions.

DESCRIPTION/ORDERING INFORMATION

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

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

The output of the SN74LVC1G07 device 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.

₩.

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.

SCES296V-FEBRUARY 2000-REVISED FEBRUARY 2007



ORDERING INFORMATION

T _A	PACKAGE ⁽¹⁾		ORDERABLE PART NUMBER	TOP-SIDE MARKING ⁽²⁾		
	NanoFree™ – WCSP (DSBGA) 0.23-mm Large Bump – YZP (Pb-free)	Reel of 3000	SN74LVC1G07YZPR	CV_		
	NanoFree™ – WCSP (DSBGA) 0.23-mm Large Bump – YZV (Pb-free)	Reel of 3000	SN74LVC1G07YZVR	<u>c</u> v		
	SON - DRY	Reel of 5000	SN74LVC1G07DRYR	CV		
-40 C to 85 C	SON - DRY	Reel of 5000	SN74LVC1G07DRYRG4	CV_		
	SOT (SOT-23) – DBV	Reel of 3000	SN74LVC1G07DBVR	C07		
	SOT (SOT-23)	Reel of 250	SN74LVC1G07DBVT	C07_		
	SOT (SC-70) – DCK	Reel of 3000	SN74LVC1G07DCKR	CV		
	301 (30-70) - DON	Reel of 250	SN74LVC1G07DCKT	CV_		
	SOT (SOT-553) – DRL	Reel of 4000	SN74LVC1G07DRLR	CV_		

- (1) Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.
- (2) DBV/DCK/DRL/DRY: The actual top-side marking has one additional character that designates the assembly/test site. 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). YZV: The actual top-side marking is on two lines. Line 1 has four characters to denote year, month, day, and assembly/test site. Line 2 has two characters which show the family and function code. Pin 1 identifier indicates solder-bump composition (1 = SnPb, = Pb-free).

FUNCTION TABLE

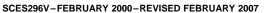
INPUT A	OUTPUT Y
Н	Н
L	L

LOGIC DIAGRAM (POSITIVE LOGIC) (DBV, DCK, DRL, DRY, and YZP Package)



LOGIC DIAGRAM (POSITIVE LOGIC) (YZV Package)







Absolute Maximum Ratings(1)

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

			MIN	MAX	UNIT	
V_{CC}	Supply voltage range		-0.5	6.5	V	
V_{I}	Input voltage range (2)	Input voltage range ⁽²⁾				
Vo	Voltage range applied to any output in the	Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾				
Vo	Voltage range applied to any output in the	high or low state (2)(3)	-0.5	6.5	V	
I _{IK}	Input clamp current	V _I < 0		-50	mA	
I _{OK}	Output clamp current	Output clamp current $V_O < 0$				
Io	Continuous output current		50	mA		
	Continuous current through V _{CC} or GND			100	mA	
		DBV package		206		
		DCK package		252		
0	Dealtogo thermal impedance (4)	DRL package		142	C/W 32	
θ_{JA}	Package thermal impedance ⁽⁴⁾	DRY package		234		
		YZP package		132		
		YZV package		116		
T _{stg}	Storage temperature range		-65	150	С	

⁽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 and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

⁽³⁾ The value of V_{CC} is provided in the recommended operating conditions table.

⁽⁴⁾ The package thermal impedance is calculated in accordance with JESD 51-7.



Recommended Operating Conditions(1)

			MIN	MAX	UNIT		
V	Supply voltage	Operating	1.65	5.5	V		
V_{CC}	Supply voltage	Data retention only	1.5		V		
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	$0.65 \times V_{CC}$				
V	Lligh lovel input voltage	$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.7		V		
V_{IH}	High-level input voltage	$V_{CC} = 3 \text{ V to } 3.6 \text{ V}$	2		V		
		V _{CC} = 4.5 V to 5.5 V	$0.7 \times V_{CC}$				
		V _{CC} = 1.65 V to 1.95 V		$0.35 \times V_{CC}$			
V	Low-level input voltage	V _{CC} = 2.3 V to 2.7 V		0.7			
V_{IL}		$V_{CC} = 3 \text{ V to } 3.6 \text{ V}$		0.8	V		
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$		$0.3 \times V_{CC}$			
VI	Input voltage	·	0	5.5	V		
Vo	Output voltage		0	5.5	V		
		V _{CC} = 1.65 V		4			
		V _{CC} = 2.3 V		8			
I_{OL}	Low-level output current	V _{CC} = 3 V		16	mA		
		V _{CC} = 3 V		24			
		V _{CC} = 4.5 V		32			
		$V_{CC} = 1.8 \text{ V} \pm 0.15 \text{ V}, 2.5 \text{ V} \pm 0.2 \text{ V}$		20			
$\Delta t/\Delta v$	Input transition rise or fall rate	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$		ns/V			
		$V_{CC} = 5 V \pm 0.5 V$		5			
T _A	Operating free-air temperature		-40	85	°C		

⁽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)

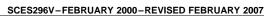
PARAMETER	TEST CONDITIONS	V _{cc}	MIN TYP(1) MAX	UNIT	
	I _{OL} = 100 μA	1.65 V to 5.5 V	0.1		
	I _{OL} = 4 mA	1.65 V	0.45		
V _{OL}	I _{OL} = 8 mA	2.3 V	0.3	V	
	I _{OL} = 16 mA	2.1/	0.4	V	
	I _{OL} = 24 mA	3 V	0.55		
	I _{OL} = 32 mA	4.5 V	0.55		
I _I A input	V _I = 5.5 V or GND	0 to 5.5 V	±5	μΑ	
I _{off}	V_I or $V_O = 5.5 \text{ V}$	0	±10	μΑ	
I _{cc}	$V_I = 5.5 \text{ V or GND}, \qquad I_O = 0$	1.65 V to 5.5 V	10	μΑ	
ΔI_{CC}	One input at $V_{CC} - 0.6 \text{ V}$, Other inputs at V_{CC} or GND	3 V to 5.5 V	500	μΑ	
C _i	$V_I = V_{CC}$ or GND	3.3 V	4	pF	
Co	$V_O = V_{CC}$ or GND	3.3 V	5	pF	

⁽¹⁾ All typical values are at V_{CC} = 3.3 V, T_A = 25°C.

Switching Characteristics

over recommended operating free-air temperature range (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = ± 0.7		V _{CC} = ± 0.		V _{CC} = ± 0.		V _{CC} = ± 0.		UNIT
	(INFOT)	(001F01)	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{pd}	Α	Υ	2.4	8.3	1	5.5	1.5	4.2	1	3.5	ns





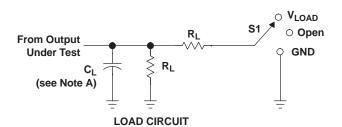
Operating Characteristics

 $T_A = 25^{\circ}C$

PA	RAMETER	TEST CONDITIONS	V _{CC} = 1.8 V TYP	V _{CC} = 2.5 V TYP	V _{CC} = 3.3 V TYP	V _{CC} = 5 V TYP	UNIT
C _{pd} Power diss	sipation capacitance	f = 10 MHz	3	3	4	6	pF

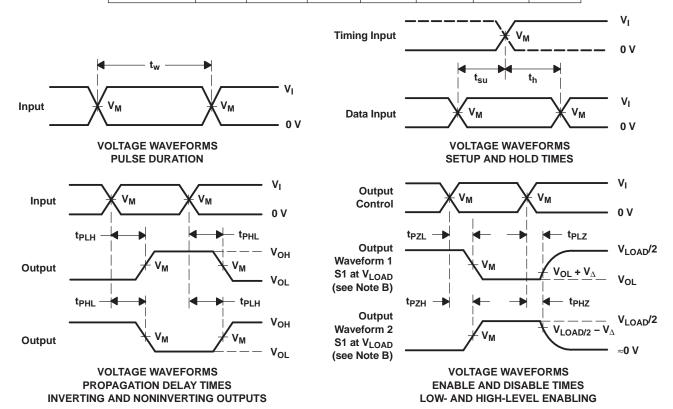


PARAMETER MEASUREMENT INFORMATION (OPEN DRAIN)



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}

	INPUT				_		
V _{CC}	VI	t _r /t _f	V _M	V _{LOAD}	CL	R _L	$oldsymbol{V}_{\Delta}$
1.8 V \pm 0.15 V	V _{CC}	≤ 2 ns	V _{CC} /2	2×V _{CC}	30 pF	1 k Ω	0.15 V
2.5 V \pm 0.2 V	V _{CC}	≤ 2 ns	V _{CC} /2	2×V _{CC}	30 pF	500 Ω	0.15 V
3.3 V \pm 0.3 V	3 V	≤ 2.5 ns	1.5 V	6 V	50 pF	500 Ω	0.3 V
5 V \pm 0.5 V	V _{CC}	≤ 2.5 ns	V _{CC} /2	2×V _{CC}	50 pF	500 Ω	0.3 V



NOTES: A. C₁ 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 MHz, Z_O = 50 Ω
- 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.

Figure 1. Load Circuit and Voltage Waveforms





om 22-Oct-2007

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	e Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SN74LVC1G07DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DBVRE4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DBVTE4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DCKR	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DCKRE4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DCKRG4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DCKT	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DCKTE4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DCKTG4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DRLR	ACTIVE	SOT	DRL	5	4000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DRLRG4	ACTIVE	SOT	DRL	5	4000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DRYR	ACTIVE	SON	DRY	6	5000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07DRYRG4	ACTIVE	SON	DRY	6	5000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC1G07YZPR	ACTIVE	WCSP	YZP	5	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM
SN74LVC1G07YZVR	ACTIVE	DSBGA	YZV	4	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM

⁽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.

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

⁽²⁾ 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.



PACKAGE OPTION ADDENDUM

22-Oct-2007

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)

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

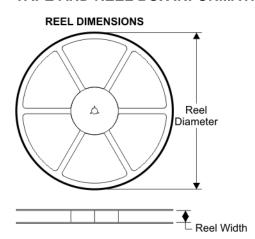
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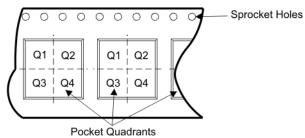
TAPE AND REEL BOX INFORMATION



TAPE DIMENSIONS KO P1 BO W Cavity A0

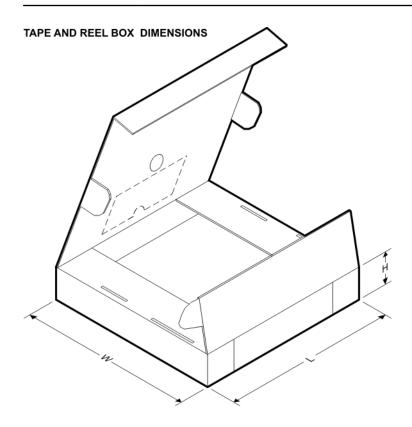
_		
		Dimension designed to accommodate the component width
	B0	Dimension designed to accommodate the component length
		Dimension designed to accommodate the component thickness
	W	Overall width of the carrier tape
ı	P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



Device	Package	Pins	Site	Reel Diameter (mm)	Reel Width (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LVC1G07DBVR	DBV	5	SITE 34	180	9	3.23	3.17	1.37	4	8	Q3
SN74LVC1G07DBVR	DBV	5	SITE 45	0	0	3.23	3.17	1.37	4	8	Q3
SN74LVC1G07DBVT	DBV	5	SITE 34	180	9	3.23	3.17	1.37	4	8	Q3
SN74LVC1G07DBVT	DBV	5	SITE 45	330	16	10.6	15.8	4.9	16	24	Q3
SN74LVC1G07DCKR	DCK	5	SITE 34	180	9	2.24	2.34	1.22	4	8	Q3
SN74LVC1G07DCKT	DCK	5	SITE 34	180	9	2.24	2.34	1.22	4	8	Q3
SN74LVC1G07DRLR	DRL	5	SITE 35	180	9	1.78	1.78	0.69	4	8	Q3
SN74LVC1G07DRYR	DRY	6	SITE 48	179	8	1.2	1.65	0.7	4	8	Q1
SN74LVC1G07YZPR	YZP	5	SITE 12	180	8	1.02	1.52	0.66	4	8	Q1
SN74LVC1G07YZVR	YZV	4	SITE 12	180	8	1.02	1.02	0.56	4	8	Q1





Device	Package	Pins	Site	Length (mm)	Width (mm)	Height (mm)
SN74LVC1G07DBVR	DBV	5	SITE 34	205.0	200.0	33.0
SN74LVC1G07DBVR	DBV	5	SITE 45	0.0	185.0	220.0
SN74LVC1G07DBVT	DBV	5	SITE 34	201.0	192.0	26.0
SN74LVC1G07DBVT	DBV	5	SITE 45	0.0	0.0	0.0
SN74LVC1G07DCKR	DCK	5	SITE 34	205.0	200.0	33.0
SN74LVC1G07DCKT	DCK	5	SITE 34	201.0	192.0	26.0
SN74LVC1G07DRLR	DRL	5	SITE 35	202.0	201.0	28.0
SN74LVC1G07DRYR	DRY	6	SITE 48	220.0	205.0	50.0
SN74LVC1G07YZPR	YZP	5	SITE 12	220.0	220.0	0.0
SN74LVC1G07YZVR	YZV	4	SITE 12	220.0	220.0	0.0

DBV (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. Mold flash and protrusion shall not exceed 0.15 per side.
- D. 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. Mold flash and protrusion shall not exceed 0.15 per side.
- D. Falls within JEDEC MO-203 variation AA.



DRL (R-PDSO-N5)

PLASTIC SMALL OUTLINE

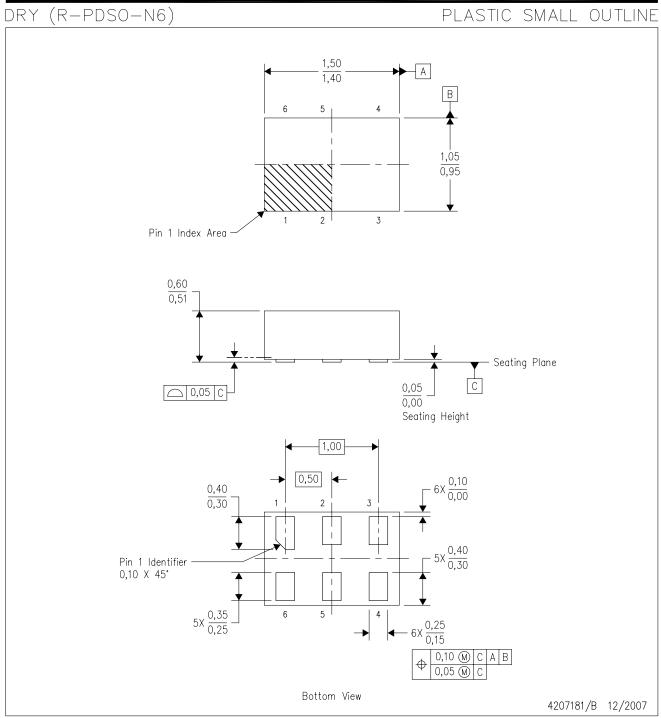


NOTES:

- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M—1994.
- B. This drawing is subject to change without notice.
- Body dimensions do not include mold flash, interlead flash, protrusions, or gate burrs.

 Mold flash, interlead flash, protrusions, or gate burrs shall not exceed 0,15 per end or side.
- D. JEDEC package registration is pending.





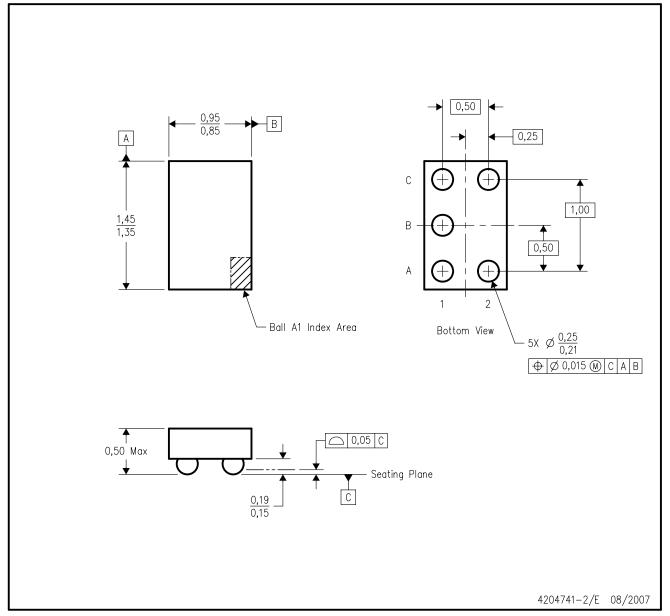
NOTES: All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.

- B. This drawing is subject to change without notice.
 C. SON (Small Outline No-Lead) package configuration.
 D. This package complies to JEDEC MO-287 variation UFAD.



YZP (R-XBGA-N5)

DIE-SIZE BALL GRID ARRAY



NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.

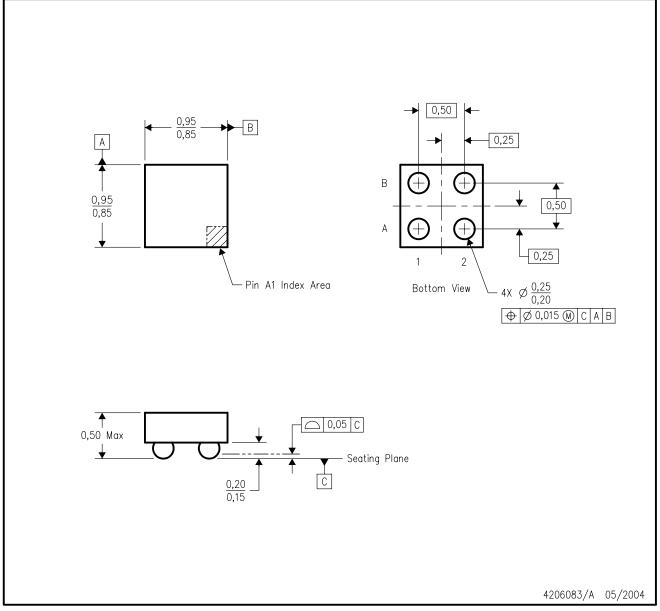
- B. This drawing is subject to change without notice.
- C. NanoFree $^{\text{TM}}$ package configuration.
- D. This package is lead-free. Refer to the 5 YEP package (drawing 4204725) for tin-lead (SnPb).

NanoFree is a trademark of Texas Instruments.



YZV (S-XBGA-N4)

DIE-SIZE BALL GRID ARRAY



NOTES: A. All linear dimensions are in millimeters.

- B. This drawing is subject to change without notice.
- C. NanoFree $^{\text{TM}}$ package configuration.
- D. This package contains lead—free balls. Refer to the 4 YEV package (drawing 4206082) for tin—lead (SnPb) balls.

NanoFree is a trademark of Texas Instruments.



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