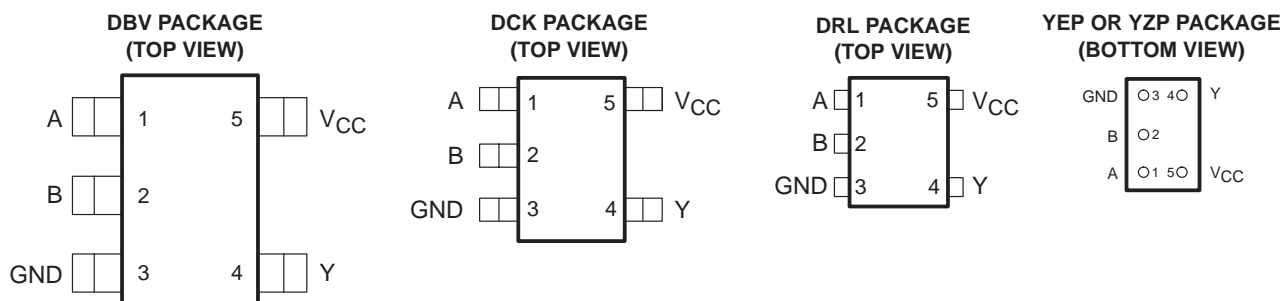


# SN74AUP1G32

## LOW-POWER SINGLE 2-INPUT POSITIVE-OR GATE

SCES580C – JUNE 2004 – REVISED JUNE 2005

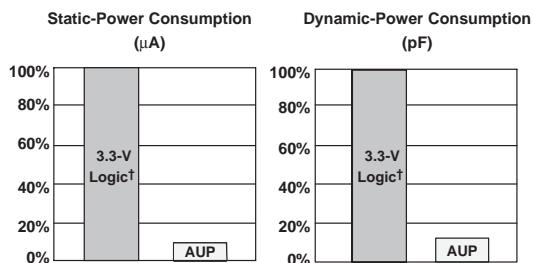
- Available in the Texas Instruments NanoStar™ and NanoFree™ Packages
- Low Static-Power Consumption;  $I_{CC} = 0.9\text{-}\mu\text{A}$  Max
- Low Dynamic-Power Consumption;  $C_{pd} = 4.3\text{ pF}$  Typ at 3.3 V
- Low Input Capacitance;  $C_i = 1.5\text{ pF}$  Typ
- Low Noise – Overshoot and Undershoot  $<10\%$  of  $V_{CC}$
- $I_{off}$  Supports Partial-Power-Down Mode Operation
- Input Hysteresis Allows Slow Input Transition and Better Switching Noise Immunity at the Input ( $V_{hys} = 250\text{ mV}$  Typ at 3.3 V)
- 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 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)
- ESD Protection Exceeds  $\pm 5000\text{ V}$  With Human-Body Model



See mechanical drawings for dimensions.

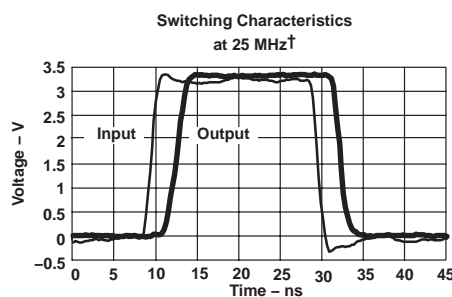
### description/ordering information

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 increased battery life. This product also maintains excellent signal integrity (see Figures 1 and 2).



† Single, dual, and triple gates

Figure 1. AUP–The Lowest-Power Family



† AUP1G08 data at  $C_L = 15\text{ pF}$

Figure 2. Excellent Signal Integrity



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.

NanoStar and NanoFree are trademarks of Texas Instruments.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



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LOW-POWER SINGLE 2-INPUT POSITIVE-OR GATE

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description/ordering information (continued)

This single 2-input positive-OR gate performs the Boolean function Y = A + B or Y = A-bar • B-bar in positive logic.
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 Ioff. The Ioff circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

ORDERING INFORMATION

Table with 4 columns: TA, PACKAGE†, ORDERABLE PART NUMBER, TOP-SIDE MARKING‡. It lists various package types like NanoStar™, NanoFree™, SOT, and their corresponding part numbers and markings.

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.
‡ DBV/DCK/DRL: The actual top-side marking has one additional character that designates the assembly/test site.
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).

FUNCTION TABLE

Table with 3 columns: INPUTS (A, B) and OUTPUT (Y). It shows the logic for the OR gate with inputs L, H and output L, H.

logic diagram (positive logic)



# SN74AUP1G32

## LOW-POWER SINGLE 2-INPUT POSITIVE-OR GATE

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### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>†</sup>

Supply voltage range, $V_{CC}$	–0.5 V to 4.6 V
Input voltage range, $V_I$ (see Note 1)	–0.5 V to 4.6 V
Voltage range applied to any output in the high-impedance or power-off state, $V_O$ (see Note 1)	–0.5 V to 4.6 V
Output voltage range in the high or low state, $V_O$ (see Note 1)	–0.5 V to $V_{CC} + 0.5$ V
Input clamp current, $I_{IK}$ ( $V_I < 0$ )	–50 mA
Output clamp current, $I_{OK}$ ( $V_O < 0$ )	–50 mA
Continuous output current, $I_O$	±20 mA
Continuous current through $V_{CC}$ or GND	±50 mA
Package thermal impedance, $\theta_{JA}$ (see Note 2): DBV package	206°C/W
DCK package	252°C/W
DRL package	142°C/W
YEP/YZP package	132°C/W
Storage temperature range, $T_{stg}$	–65°C to 150°C

<sup>†</sup> 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 negative-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.



# SN74AUP1G32

## LOW-POWER SINGLE 2-INPUT POSITIVE-OR GATE

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### recommended operating conditions (see Note 3)

		MIN	MAX	UNIT
$V_{CC}$	Supply voltage	0.8	3.6	V
$V_{IH}$	High-level input voltage	$V_{CC} = 0.8\text{ V}$	$V_{CC}$	V
		$V_{CC} = 1.1\text{ V to }1.95\text{ V}$	$0.65 \times V_{CC}$	
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.6	
		$V_{CC} = 3\text{ V to }3.6\text{ V}$	2	
$V_{IL}$	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	
		$V_{CC} = 3\text{ V to }3.6\text{ V}$	0.9	
$V_I$	Input voltage	0	3.6	V
$V_O$	Output voltage	0	$V_{CC}$	V
$I_{OH}^\dagger$	High-level output current	$V_{CC} = 0.8\text{ V}$	–20	$\mu\text{A}$
		$V_{CC} = 1.1\text{ V}$	–1.1	mA
		$V_{CC} = 1.4\text{ V}$	–1.7	
		$V_{CC} = 1.65\text{ V}$	–1.9	
		$V_{CC} = 2.3\text{ V}$	–3.1	
		$V_{CC} = 3\text{ V}$	–4	
$I_{OL}^\dagger$	Low-level output current	$V_{CC} = 0.8\text{ V}$	20	$\mu\text{A}$
		$V_{CC} = 1.1\text{ V}$	1.1	mA
		$V_{CC} = 1.4\text{ V}$	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	ns/V
$T_A$	Operating free-air temperature	–40	85	°C

<sup>†</sup> Defined by the signal-integrity requirements and design-goal priorities

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.

# SN74AUP1G32

## LOW-POWER SINGLE 2-INPUT POSITIVE-OR GATE

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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 B 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		0.6		μA
I <sub>CC</sub>		V <sub>I</sub> = GND or (V <sub>CC</sub> to 3.6 V)	I <sub>O</sub> = 0	0.8 V to 3.6 V		0.5		0.9		μA
ΔI <sub>CC</sub>		V <sub>I</sub> = V <sub>CC</sub> – 0.6 V <sup>†</sup>	I <sub>O</sub> = 0	3.3 V		40		50		μA
C <sub>i</sub>		V <sub>I</sub> = V <sub>CC</sub> or GND		0 V		1.5				pF
				3.6 V		1.5				
C <sub>O</sub>		V <sub>O</sub> = GND		0 V		3				pF

<sup>†</sup> One input at V<sub>CC</sub> – 0.6 V, other input at V<sub>CC</sub> or GND

switching characteristics over recommended operating free-air temperature range, C<sub>L</sub> = 5 pF (unless otherwise noted) (see Figures 3 and 4)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	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	
t <sub>pd</sub>	A or B	Y	0.8 V	18					ns
			1.2 V ± 0.1 V	2.6	7.3	13.5	2.1	16.8	
			1.5 V ± 0.1 V	1.4	5.2	9.1	0.9	11	
			1.8 V ± 0.15 V	1	4.2	7	0.5	8.8	
			2.5 V ± 0.2 V	1	3	4.7	0.5	6	
			3.3 V ± 0.3 V	1	2.4	3.7	0.5	4.6	



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## LOW-POWER SINGLE 2-INPUT POSITIVE-OR GATE

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switching characteristics over recommended operating free-air temperature range,  $C_L = 10$  pF (unless otherwise noted) (see Figures 3 and 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 or B	Y	0.8 V		21				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	1.5	8.5	15.4	1	18.4	
			$1.5\text{ V} \pm 0.1\text{ V}$	1	6.2	10.4	0.5	12	
			$1.8\text{ V} \pm 0.15\text{ V}$	1	5	8.1	0.5	9.6	
			$2.5\text{ V} \pm 0.2\text{ V}$	1	3.6	5.5	0.5	6.6	
			$3.3\text{ V} \pm 0.3\text{ V}$	1	2.9	4.4	0.5	5	

switching characteristics over recommended operating free-air temperature range,  $C_L = 15$  pF (unless otherwise noted) (see Figures 3 and 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 or B	Y	0.8 V		24				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	3.6	9.9	17	3.1	21.1	
			$1.5\text{ V} \pm 0.1\text{ V}$	2.3	7.2	11.5	1.8	13.9	
			$1.8\text{ V} \pm 0.15\text{ V}$	1.6	5.8	9.1	1.1	11.2	
			$2.5\text{ V} \pm 0.2\text{ V}$	1	4.3	6.2	0.5	7.8	
			$3.3\text{ V} \pm 0.3\text{ V}$	1	3.4	5	0.5	6.2	

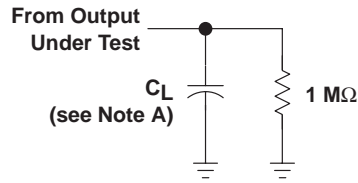
switching characteristics over recommended operating free-air temperature range,  $C_L = 30$  pF (unless otherwise noted) (see Figures 3 and 4)

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 or B	Y	0.8 V		32.8				ns
			$1.2\text{ V} \pm 0.1\text{ V}$	4.9	13.1	21.6	4.4	26.7	
			$1.5\text{ V} \pm 0.1\text{ V}$	3.4	9.5	14.6	2.9	17.6	
			$1.8\text{ V} \pm 0.15\text{ V}$	2.5	7.7	11.4	2	14.1	
			$2.5\text{ V} \pm 0.2\text{ V}$	1.8	5.7	7.9	1.3	9.9	
			$3.3\text{ V} \pm 0.3\text{ V}$	1.5	4.7	6.4	1	7.8	

operating characteristics,  $T_A = 25^\circ\text{C}$

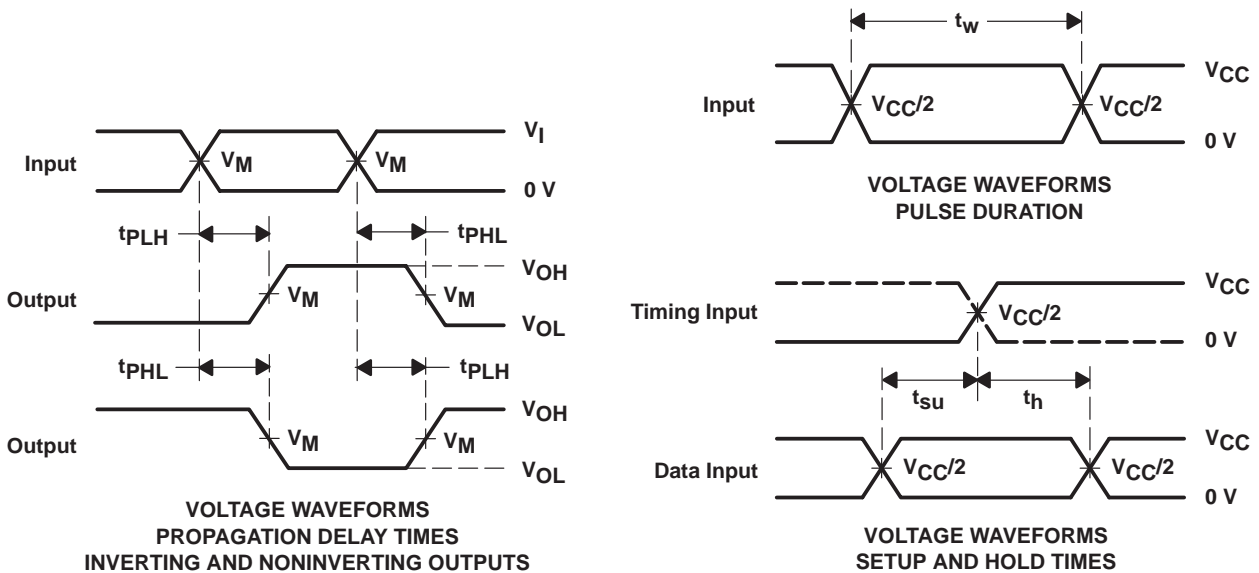
PARAMETER		TEST CONDITIONS	$V_{CC}$	TYP	UNIT
$C_{pd}$	Power dissipation capacitance	$f = 10\text{ MHz}$	0.8 V	4.1	pF
			$1.2\text{ V} \pm 0.1\text{ V}$	4.1	
			$1.5\text{ V} \pm 0.1\text{ V}$	4.1	
			$1.8\text{ V} \pm 0.15\text{ V}$	4.1	
			$2.5\text{ V} \pm 0.2\text{ V}$	4.2	
			$3.3\text{ V} \pm 0.3\text{ V}$	4.3	

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



**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:  $PRR \leq 10 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r/t_f = 3 \text{ ns}$ .  
 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.

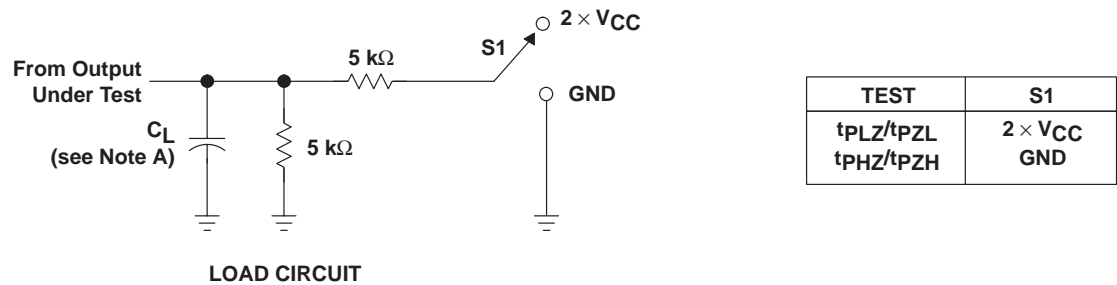
**Figure 3. Load Circuit and Voltage Waveforms**

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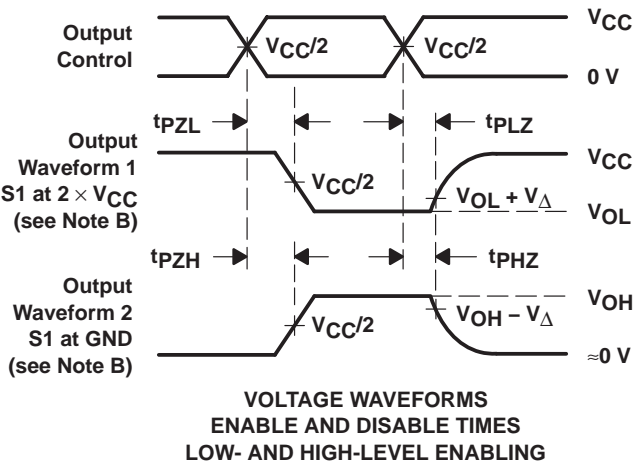
## LOW-POWER SINGLE 2-INPUT POSITIVE-OR GATE

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



	$V_{CC} = 0.8\text{ V}$	$V_{CC} = 1.2\text{ V}$ $\pm 0.1\text{ V}$	$V_{CC} = 1.5\text{ V}$ $\pm 0.1\text{ V}$	$V_{CC} = 1.8\text{ V}$ $\pm 0.15\text{ V}$	$V_{CC} = 2.5\text{ V}$ $\pm 0.2\text{ V}$	$V_{CC} = 3.3\text{ V}$ $\pm 0.3\text{ V}$
$C_L$	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



- 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:  $PRR \leq 10\text{ MHz}$ ,  $Z_O = 50\text{ }\Omega$ ,  $t_r/t_f = 3\text{ ns}$ .
  - 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>
SN74AUP1G32DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUP1G32DBVRE4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUP1G32DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUP1G32DBVTE4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUP1G32DCKR	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUP1G32DCKRE4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUP1G32DCKT	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUP1G32DCKTE4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUP1G32DRLR	ACTIVE	SOP	DRL	5	4000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUP1G32DRLRG4	ACTIVE	SOP	DRL	5	4000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUP1G32YEPR	ACTIVE	WCSP	YEP	5	3000	TBD	SNPB	Level-1-260C-UNLIM
SN74AUP1G32YZPR	ACTIVE	WCSP	YZP	5	3000	Pb-Free (RoHS)	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) 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)

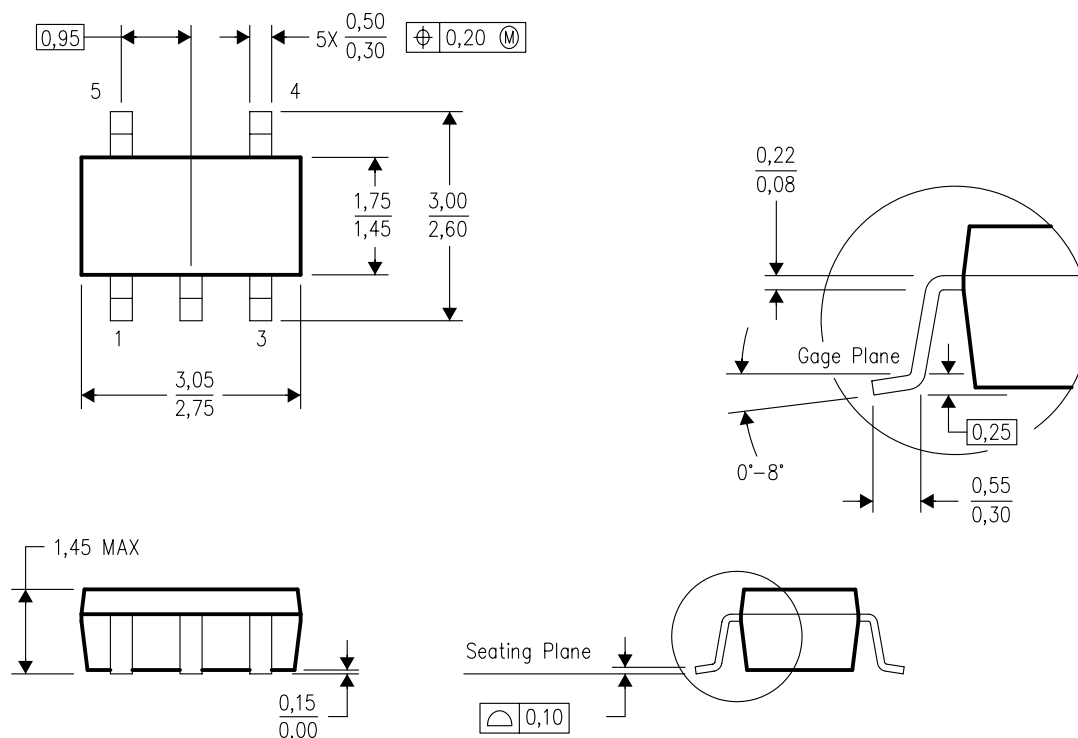
<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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## DBV (R-PDSO-G5)

## PLASTIC SMALL-OUTLINE PACKAGE

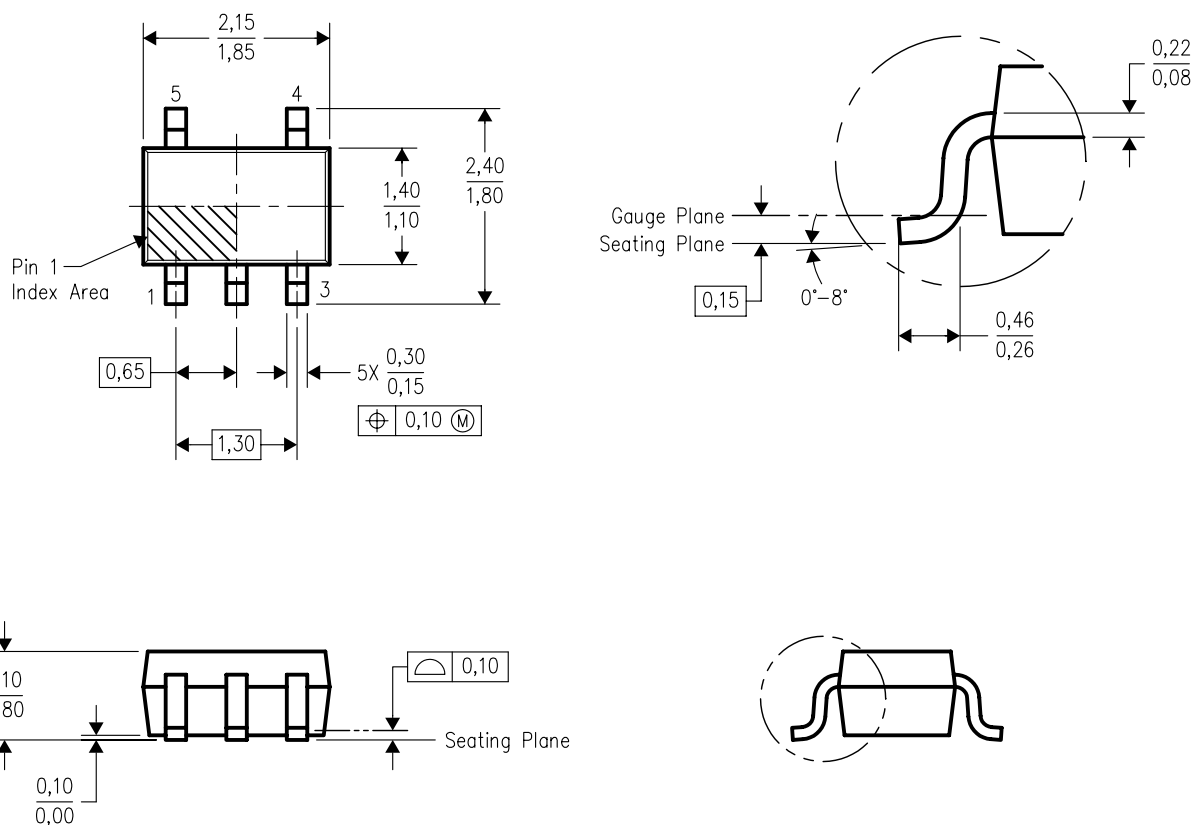


4073253-4/J 10/2005

- 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.

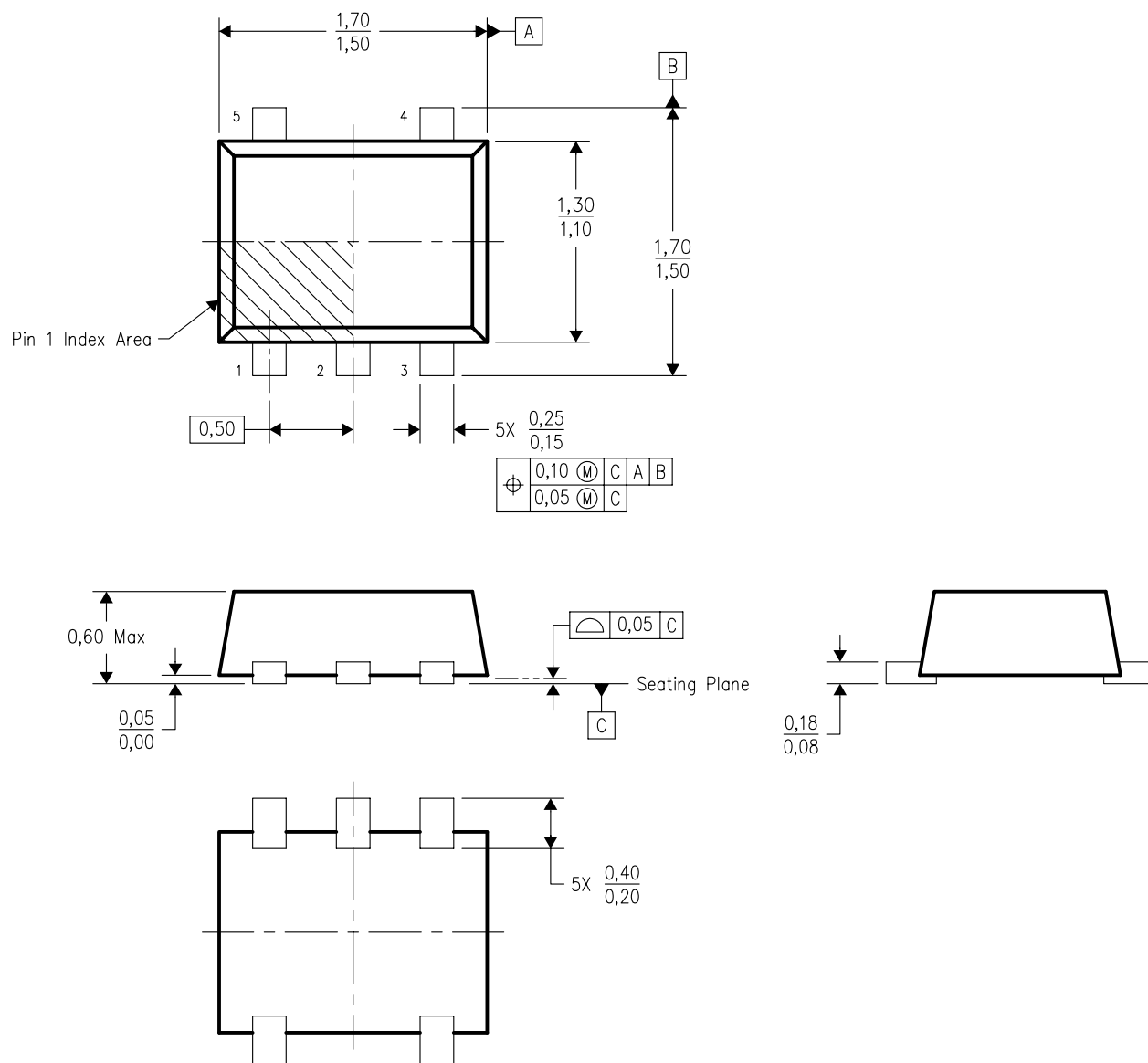
## DCK (R-PDSO-G5)

## PLASTIC SMALL-OUTLINE PACKAGE



4093553-2/E 10/2005

- NOTES:
- All linear dimensions are in millimeters.
  - This drawing is subject to change without notice.
  - Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
  - Falls within JEDEC MO-203 variation AA.

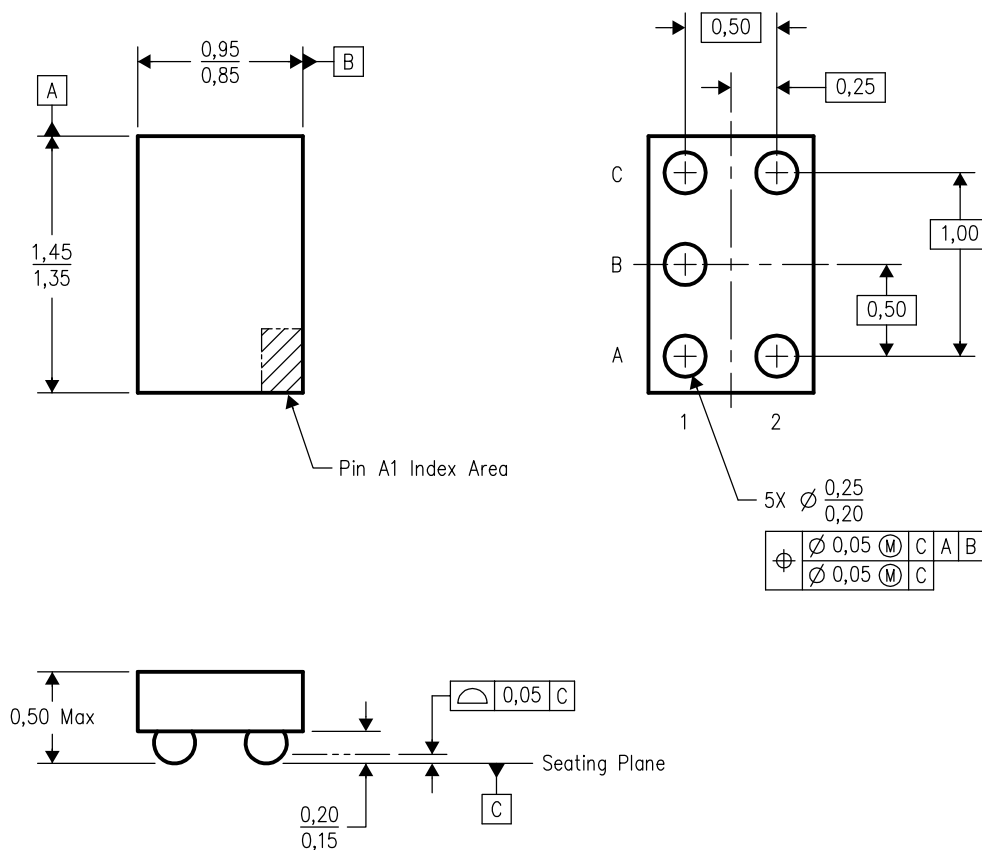


4205622-2/B 07/2004

- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. JEDEC package registration is pending.

## YZP (R-XBGA-N5)

## DIE-SIZE BALL GRID ARRAY



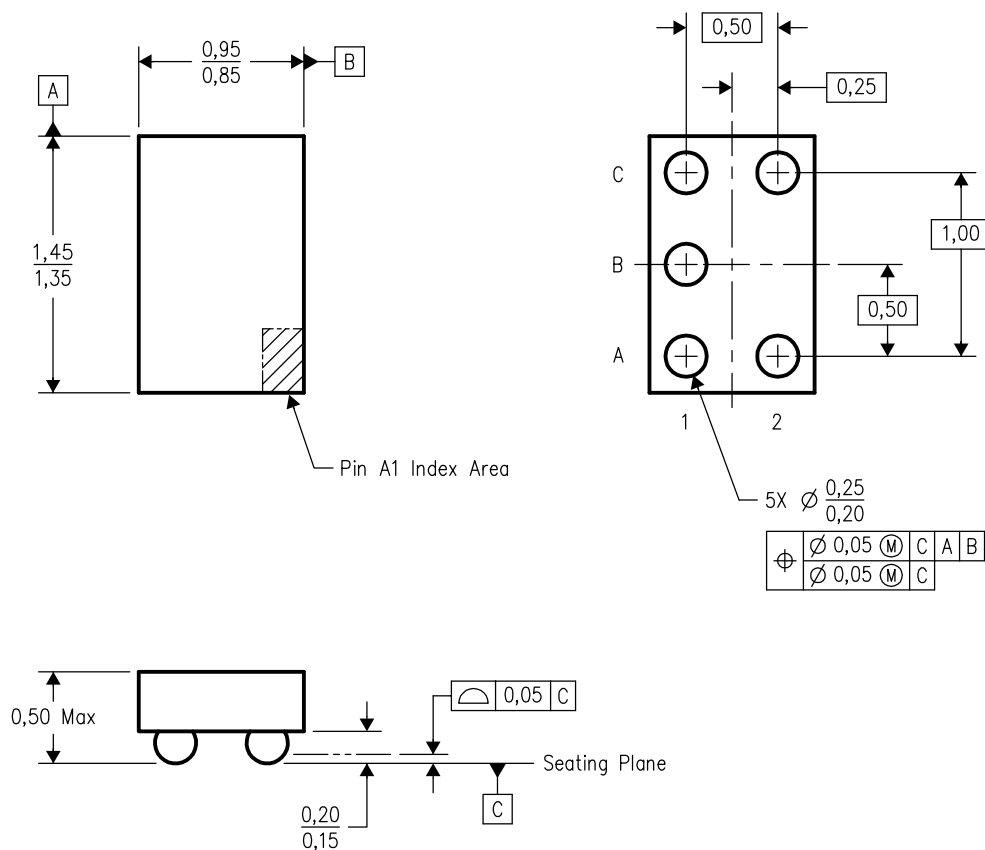
4204741-2/A 10/2002

- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. NanoFree™ 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.

YEP (R-XBGA-N5)

DIE-SIZE BALL GRID ARRAY



4204725-2/A 10/2002

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

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