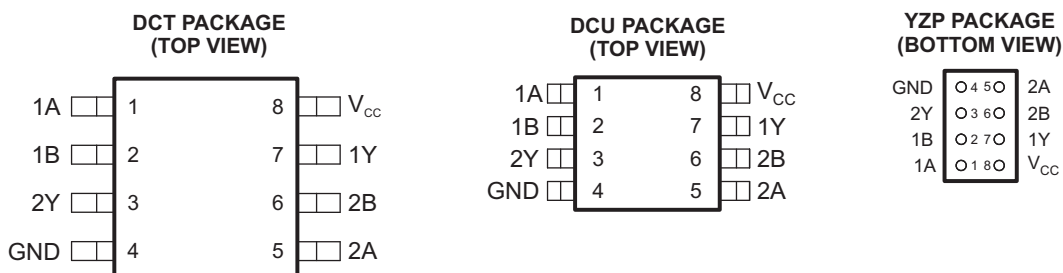


FEATURES

- Available in the Texas Instruments NanoFree™ Package
- 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 1.5 ns at 1.8 V
- Low Power Consumption, 10 μ A at 1.8 V
- ± 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)



See mechanical drawings for dimensions.

DESCRIPTION/ORDERING INFORMATION

This dual 2-input positive-OR 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 SN74AUC2G32 performs the Boolean function $Y = A + B$ or $Y = \bar{A} \times \bar{B}$ in positive logic.

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.

For more information about AUC Little Logic devices, please refer to the TI application report, *Applications of Texas Instruments AUC Sub-1-V Little Logic Devices*, literature number [SCEA027](#).

ORDERING INFORMATION

T_A	PACKAGE ⁽¹⁾		ORDERABLE PART NUMBER	TOP-SIDE MARKING ⁽²⁾
–40°C to 85°C	NanoFree – WCSP (DSBGA) 0.23-mm Large Bump – YZP (Pb-free)	Reel of 3000	SN74AUC2G32YZPR	___UG_
	SSOP – DCT	Reel of 3000	SN74AUC2G32DCTR	U32___
	VSSOP – DCU	Reel of 3000	SN74AUC2G32DCUR	U32_

(1) Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

(2) 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.

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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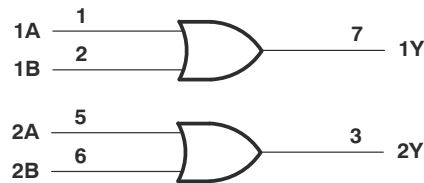
SN74AUC2G32 DUAL 2-INPUT POSITIVE-OR GATE

SCES478C–AUGUST 2003–REVISED JANUARY 2007

**FUNCTION TABLE
(each gate)**

INPUTS		OUTPUT
A	B	Y
H	X	H
X	H	H
L	L	L

LOGIC DIAGRAM (POSITIVE LOGIC)



Absolute Maximum Ratings⁽¹⁾

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

		MIN	MAX	UNIT
V_{CC}	Supply voltage range	-0.5	3.6	V
V_I	Input voltage range ⁽²⁾	-0.5	3.6	V
V_O	Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾	-0.5	3.6	V
V_O	Output voltage range ⁽²⁾	-0.5	$V_{CC} + 0.5$	V
I_{IK}	Input clamp current	$V_I < 0$	-50	mA
I_{OK}	Output clamp current	$V_O < 0$	-50	mA
I_O	Continuous output current		±20	mA
	Continuous current through V_{CC} or GND		±100	mA
θ_{JA}	Package thermal impedance ⁽³⁾	DCT package	220	°C/W
θ_{JA}	Package thermal impedance ⁽³⁾	DCU package	227	°C/W
θ_{JA}	Package thermal impedance ⁽³⁾	YZP package	102	°C/W
T_{stg}	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⁽¹⁾

		MIN	MAX	UNIT
V _{CC}	Supply voltage	0.8	2.7	V
V _{IH}	High-level input voltage	V _{CC} = 0.8 V	V _{CC}	V
		V _{CC} = 1.1 V to 1.95 V	0.65 × V _{CC}	
		V _{CC} = 2.3 V to 2.7 V	1.7	
V _{IL}	Low-level input voltage	V _{CC} = 0.8 V	0	V
		V _{CC} = 1.1 V to 1.95 V	0.35 × V _{CC}	
		V _{CC} = 2.3 V to 2.7 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 V	–0.7	mA
		V _{CC} = 1.1 V	–3	
		V _{CC} = 1.4 V	–5	
		V _{CC} = 1.65 V	–8	
		V _{CC} = 2.3 V	–9	
I _{OL}	Low-level output current	V _{CC} = 0.8 V	0.7	mA
		V _{CC} = 1.1 V	3	
		V _{CC} = 1.4 V	5	
		V _{CC} = 1.65 V	8	
		V _{CC} = 2.3 V	9	
Δt/ΔV	Input transition rise or fall rate		20	ns/V
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
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 B inputs	V _I = V _{CC} or GND	0 V to 2.7 V		±5	μA
I _{off}		V _I or V _O = 2.7 V	0 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

(1) All typical values are at T_A = 25°C.

SN74AUC2G32

DUAL 2-INPUT POSITIVE-OR GATE

SCES478C–AUGUST 2003–REVISED JANUARY 2007

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	MAX	MIN	TYP	MAX	MIN	MAX	
t_{pd}	A or B	Y	7.5	0.7	3.3	0.6	1.9	0.5	1	1.5	0.4	1.1	ns

Switching Characteristics

over recommended operating free-air temperature range, $C_L = 30$ pF (unless otherwise noted) (see [Figure 1](#))

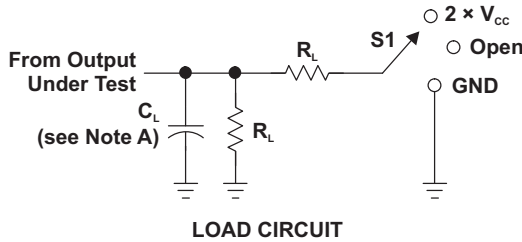
PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 1.8$ V ± 0.15 V			$V_{CC} = 2.5$ V ± 0.2 V		UNIT
			MIN	TYP	MAX	MIN	MAX	
t_{pd}	A or B	Y	1.2	1.6	2.1	1	1.7	ns

Operating Characteristics

$T_A = 25^\circ\text{C}$

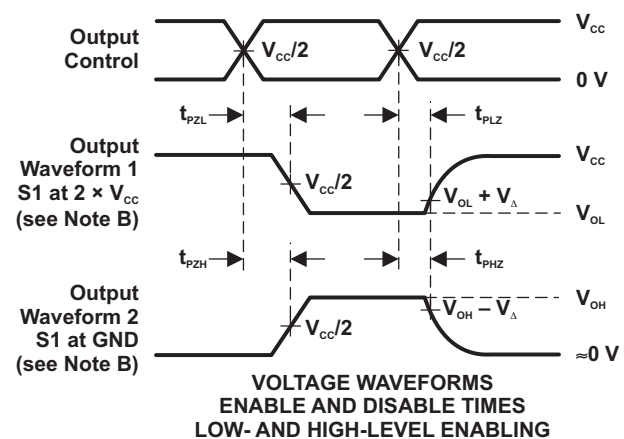
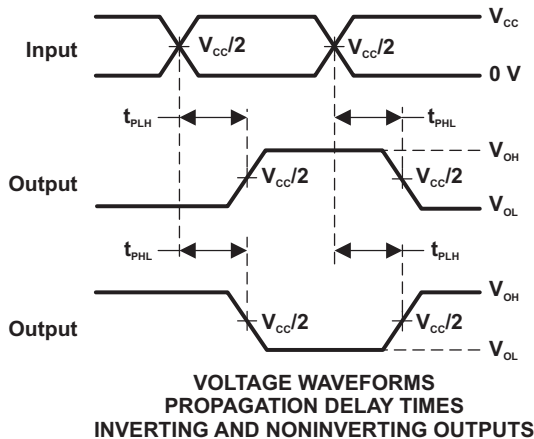
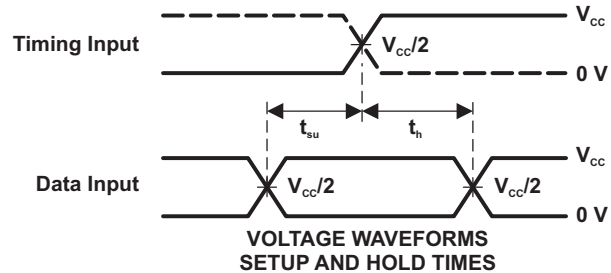
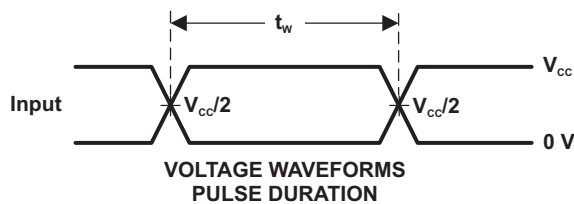
PARAMETER	TEST CONDITIONS	$V_{CC} = 0.8$ V	$V_{CC} = 1.2$ V	$V_{CC} = 1.5$ V	$V_{CC} = 1.8$ V	$V_{CC} = 2.5$ V	UNIT
		TYP	TYP	TYP	TYP	TYP	
C_{pd} Power dissipation capacitance	$f = 10$ MHz	13	13	13	13	14	pF

PARAMETER MEASUREMENT INFORMATION



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

V_{CC}	C_L	R_L	V_A
0.8 V	15 pF	2 kΩ	0.1 V
1.2 V ± 0.1 V	15 pF	2 kΩ	0.1 V
1.5 V ± 0.1 V	15 pF	2 kΩ	0.1 V
1.8 V ± 0.15 V	15 pF	2 kΩ	0.15 V
2.5 V ± 0.2 V	15 pF	2 kΩ	0.15 V
1.8 V ± 0.15 V	30 pF	1 kΩ	0.15 V
2.5 V ± 0.2 V	30 pF	500 Ω	0.15 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 ≤ 10 MHz, $Z_o = 50 \Omega$, slew rate ≥ 1 V/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. t_{PLH} and t_{PHL} are the same as t_{pd} .

Figure 1. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
SN74AUC2G32DCTR	Active	Production	SSOP (DCT) 8	3000 LARGE T&R	Yes	NIPDAU SN NIPDAU	Level-1-260C-UNLIM	-40 to 85	(2XC5, U32) (R, Z)
SN74AUC2G32DCTR.Z	Active	Production	SSOP (DCT) 8	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	(2XC5, U32) (R, Z)
SN74AUC2G32DCUR	Active	Production	VSSOP (DCU) 8	3000 LARGE T&R	Yes	NIPDAU SN	Level-1-260C-UNLIM	-40 to 85	(U32Q, U32R) UR
SN74AUC2G32DCUR.Z	Active	Production	VSSOP (DCU) 8	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	(U32Q, U32R) UR
SN74AUC2G32DCUR1G4.Z	Active	Production	VSSOP (DCU) 8	3000 LARGE T&R	-	Call TI	Call TI	-40 to 85	

⁽¹⁾ **Status:** For more details on status, see our [product life cycle](#).

⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

⁽⁴⁾ **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

⁽⁵⁾ **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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TAPE AND REEL INFORMATION

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
SN74AUC2G32DCTR	SSOP	DCT	8	3000	180.0	12.4	3.15	4.35	1.55	4.0	12.0	Q3
SN74AUC2G32DCUR	VSSOP	DCU	8	3000	178.0	9.5	2.25	3.35	1.05	4.0	8.0	Q3
SN74AUC2G32DCUR	VSSOP	DCU	8	3000	180.0	8.4	2.25	3.35	1.05	4.0	8.0	Q3

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AUC2G32DCTR	SSOP	DCT	8	3000	190.0	190.0	30.0
SN74AUC2G32DCUR	VSSOP	DCU	8	3000	202.0	201.0	28.0
SN74AUC2G32DCUR	VSSOP	DCU	8	3000	202.0	201.0	28.0

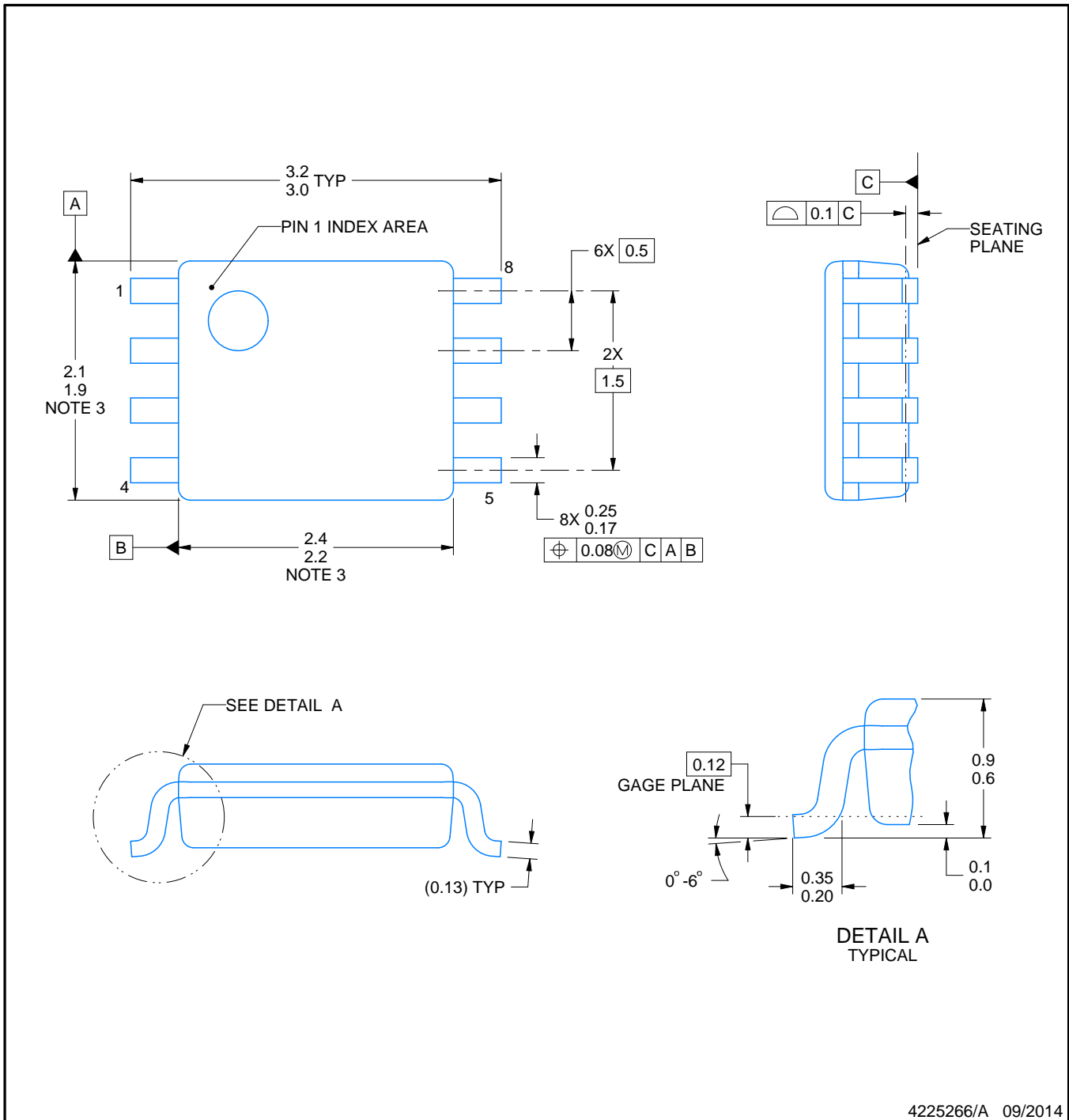
DCU0008A



PACKAGE OUTLINE

VSSOP - 0.9 mm max height

SMALL OUTLINE PACKAGE



4225266/A 09/2014

NOTES:

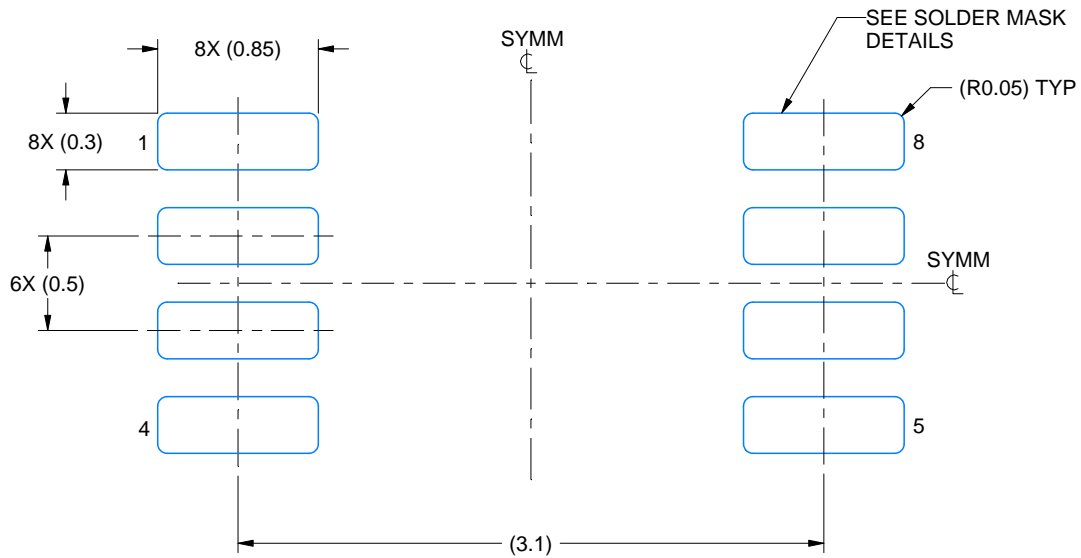
- All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
- This drawing is subject to change without notice.
- This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
- Reference JEDEC registration MO-187 variation CA.

EXAMPLE BOARD LAYOUT

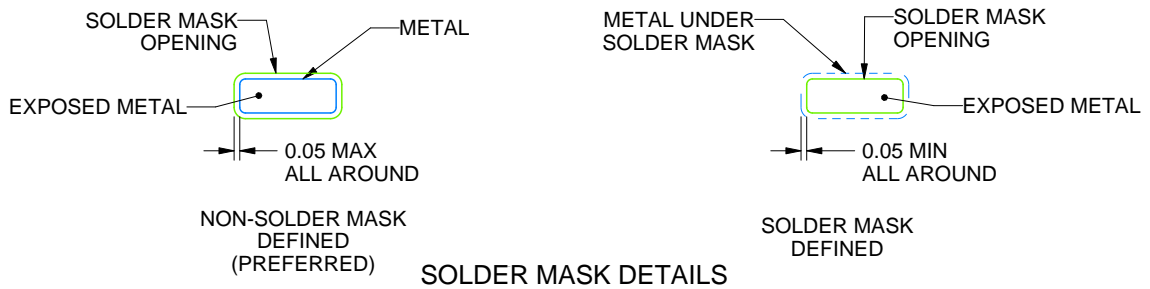
DCU0008A

VSSOP - 0.9 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 25X



4225266/A 09/2014

NOTES: (continued)

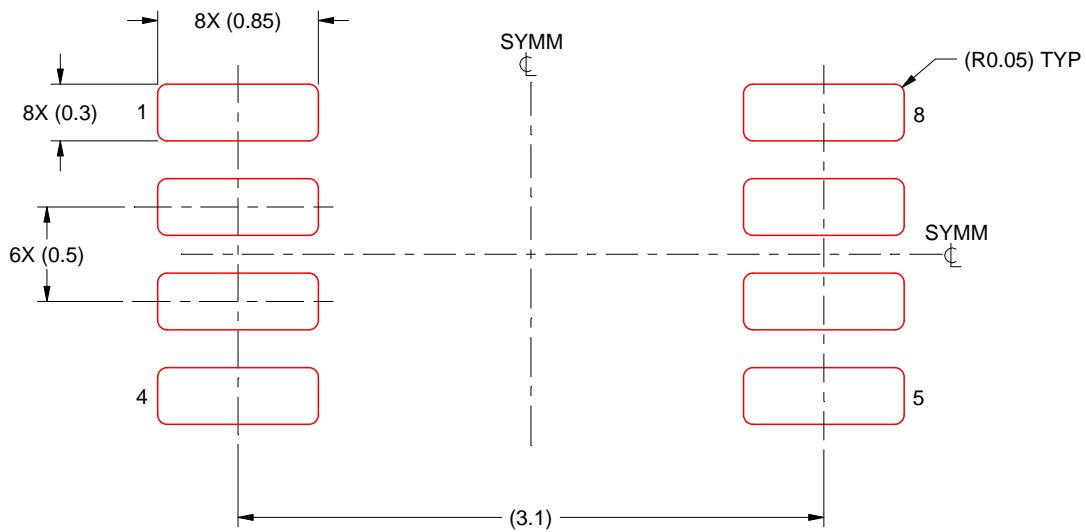
- 5. Publication IPC-7351 may have alternate designs.
- 6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DCU0008A

VSSOP - 0.9 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 25X

4225266/A 09/2014

NOTES: (continued)

7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

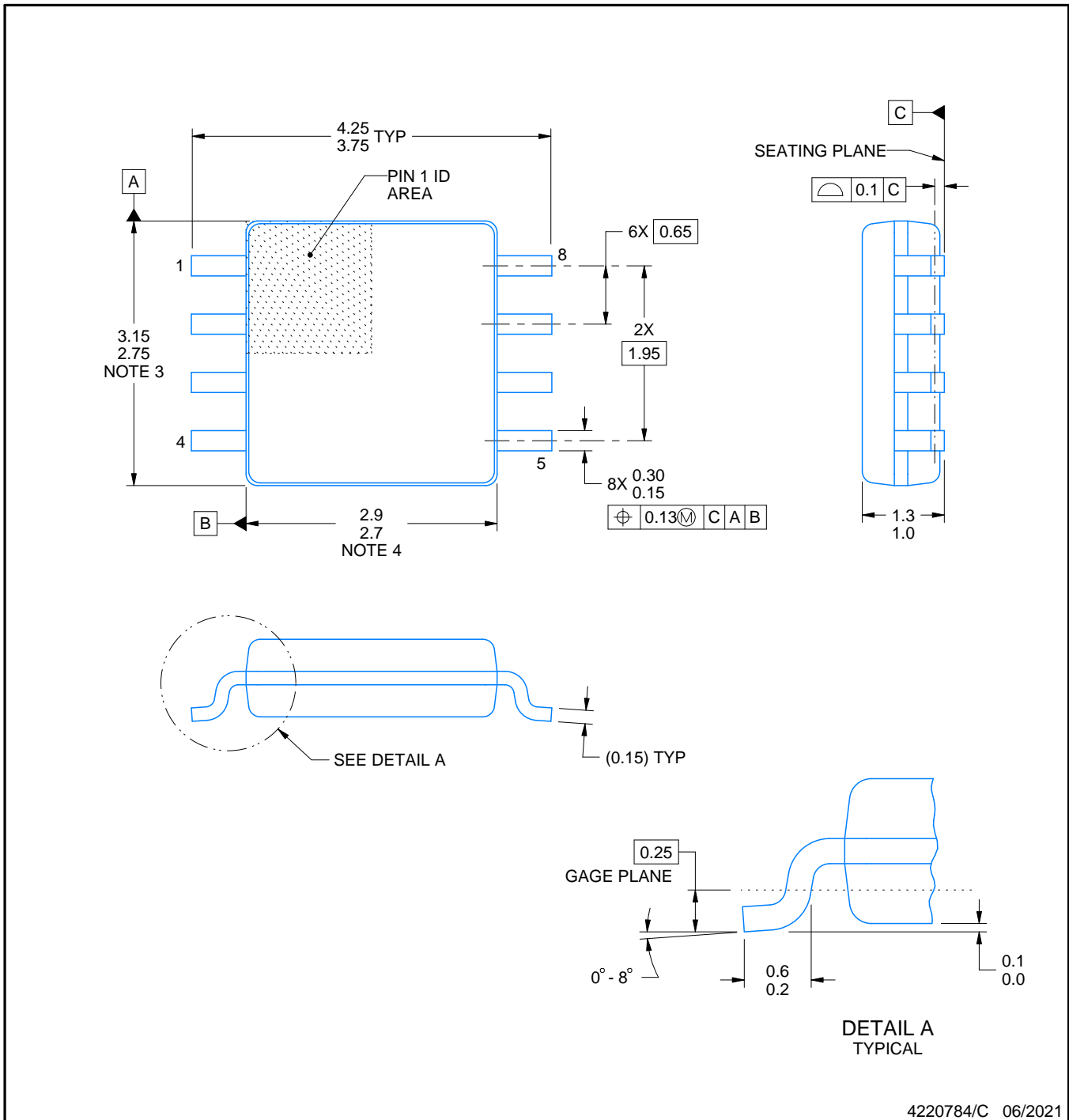


DCT0008A

PACKAGE OUTLINE

SSOP - 1.3 mm max height

SMALL OUTLINE PACKAGE



4220784/C 06/2021

NOTES:

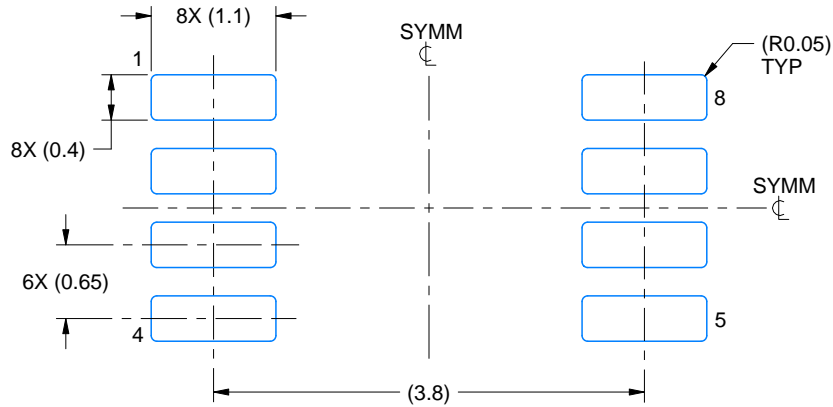
1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.

EXAMPLE BOARD LAYOUT

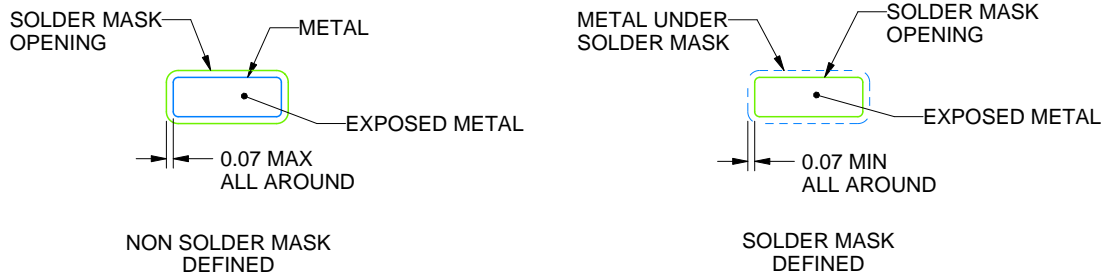
DCT0008A

SSOP - 1.3 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X



SOLDER MASK DETAILS

4220784/C 06/2021

NOTES: (continued)

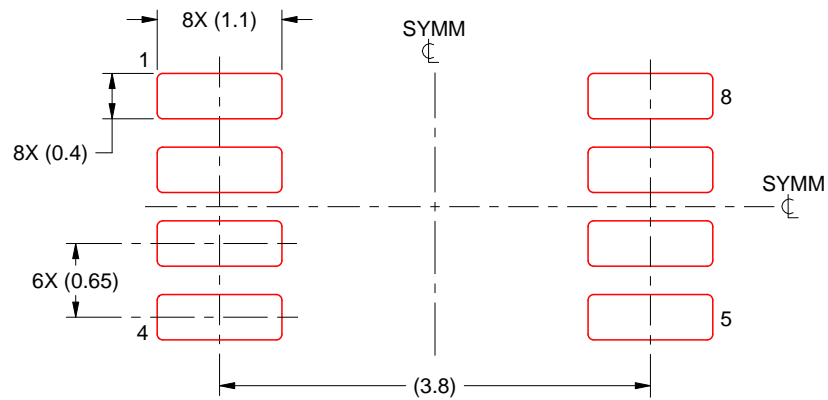
- 5. Publication IPC-7351 may have alternate designs.
- 6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DCT0008A

SSOP - 1.3 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:15X

4220784/C 06/2021

NOTES: (continued)

7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

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