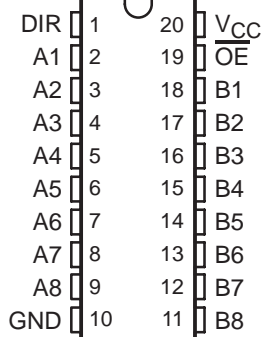


# SN54LV245A, SN74LV245A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

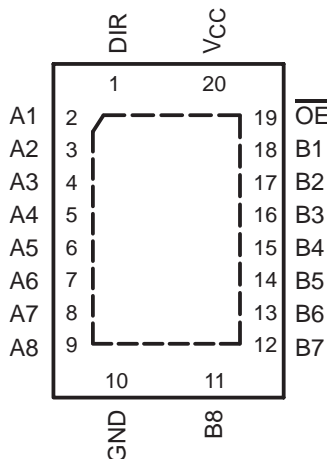
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- 2-V to 5.5-V  $V_{CC}$  Operation
- Max  $t_{pd}$  of 6.5 ns at 5 V
- Typical  $V_{OLP}$  (Output Ground Bounce)  $<0.8$  V at  $V_{CC} = 3.3$  V,  $T_A = 25^\circ\text{C}$
- Typical  $V_{OHV}$  (Output  $V_{OH}$  Undershoot)  $>2.3$  V at  $V_{CC} = 3.3$  V,  $T_A = 25^\circ\text{C}$
- Support Mixed-Mode Voltage Operation on All Ports
- $I_{off}$  Supports Partial-Power-Down Mode Operation
- Latch-Up Performance Exceeds 250 mA Per JESD 17
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 200-V Machine Model (A115-A)
  - 1000-V Charged-Device Model (C101)

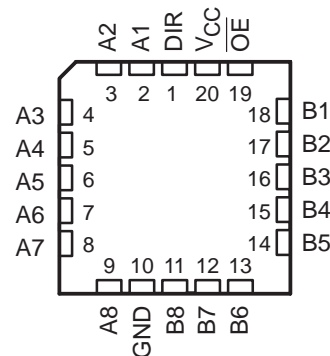
SN54LV245A . . . J OR W PACKAGE  
SN74LV245A . . . DB, DGV, DW, NS,  
OR PW PACKAGE  
(TOP VIEW)



SN74LV245A . . . RGY PACKAGE  
(TOP VIEW)



SN54LV245A . . . FK PACKAGE  
(TOP VIEW)



## description/ordering information

These octal bus transceivers are designed for 2-V to 5.5-V  $V_{CC}$  operation.

## ORDERING INFORMATION

$T_A$	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 85°C	QFN – RGY	Reel of 1000	SN74LV245ARGYR	LV245A
	SOIC – DW	Tube of 25	SN74LV245ADW	LV245A
		Reel of 2000	SN74LV245ADWR	
	SOP – NS	Reel of 2000	SN74LV245ANSR	74LV245A
	SSOP – DB	Reel of 2000	SN74LV245ADBR	LV245A
	TSSOP – PW	Tube of 70	SN74LV245APW	LV245A
		Reel of 2000	SN74LV245APWR	
		Reel of 250	SN74LV245APWT	
TVSOP – DGV	Reel of 2000	SN74LV245ADGVR	LV245A	
VFBGA – GQN	Reel of 1000	SN74LV245AGQNR	LV245A	
-55°C to 125°C	CDIP – J	Tube of 20	SNJ54LV245AJ	SNJ54LV245AJ
	CFP – W	Tube of 85	SNJ54LV245AW	SNJ54LV245AW
	LCCC – FK	Tube of 55	SNJ54LV245AFK	SNJ54LV245AFK

† 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).



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UNLESS OTHERWISE NOTED this document contains PRODUCTION DATA information 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.

 **TEXAS  
INSTRUMENTS**

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# SN54LV245A, SN74LV245A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

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

Supply voltage range, $V_{CC}$ .....	-0.5 V to 7 V
Input voltage range, $V_I$ : Except I/O ports (see Note 1) .....	-0.5 V to 7 V
I/O ports (see Notes 1 and 2) .....	-0.5 V to 7 V
Voltage range applied to any output in the high-impedance or power-off state, $V_O$ (see Note 1) .....	-0.5 V to 7 V
Output voltage range applied in the high or low state, $V_O$ (see Notes 1 and 2) .....	-0.5 V to $V_{CC} + 0.5$ V
Input clamp current, $I_{IK}$ ( $V_I < 0$ ) .....	-20 mA
Output clamp current, $I_{OK}$ ( $V_O < 0$ ) .....	-50 mA
Continuous output current, $I_O$ ( $V_O = 0$ to $V_{CC}$ ) .....	$\pm 35$ mA
Continuous current through $V_{CC}$ or GND .....	$\pm 70$ mA
Package thermal impedance, $\theta_{JA}$ (see Note 3): DB package .....	70°C/W
(see Note 3): DGV package .....	92°C/W
(see Note 3): DW package .....	58°C/W
(see Note 3): GQN package .....	78°C/W
(see Note 3): NS package .....	60°C/W
(see Note 3): PW package .....	83°C/W
(see Note 4): RGY package .....	37°C/W
Storage temperature range, $T_{stg}$ .....	-65°C to 150°C

† 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. This value is limited to 5.5 V maximum.  
 3. The package thermal impedance is calculated in accordance with JESD 51-7.  
 4. The package thermal impedance is calculated in accordance with JESD 51-5.



# SN54LV245A, SN74LV245A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

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## recommended operating conditions (see Note 5)

		SN54LV245A		SN74LV245A		UNIT	
		MIN	MAX	MIN	MAX		
$V_{CC}$	Supply voltage	2	5.5	2	5.5	V	
$V_{IH}$	High-level input voltage	$V_{CC} = 2\text{ V}$	1.5	1.5		V	
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	$V_{CC} \times 0.7$	$V_{CC} \times 0.7$			
		$V_{CC} = 3\text{ V to }3.6\text{ V}$	$V_{CC} \times 0.7$	$V_{CC} \times 0.7$			
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	$V_{CC} \times 0.7$	$V_{CC} \times 0.7$			
$V_{IL}$	Low-level input voltage	$V_{CC} = 2\text{ V}$	0.5	0.5		V	
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	$V_{CC} \times 0.3$	$V_{CC} \times 0.3$			
		$V_{CC} = 3\text{ V to }3.6\text{ V}$	$V_{CC} \times 0.3$	$V_{CC} \times 0.3$			
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	$V_{CC} \times 0.3$	$V_{CC} \times 0.3$			
$V_I$	Input voltage	0	5.5	0	5.5	V	
$V_O$	Output voltage	High or low state	0	$V_{CC}$	0	$V_{CC}$	V
		3-state	0	5.5	0	5.5	
$I_{OH}$	High-level output current	$V_{CC} = 2\text{ V}$		-50	-50	$\mu\text{A}$	
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$		-2	-2	mA	
		$V_{CC} = 3\text{ V to }3.6\text{ V}$		-8	-8		
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$		-16	-16		
$I_{OL}$	Low-level output current	$V_{CC} = 2\text{ V}$		50	50	$\mu\text{A}$	
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$		2	2	mA	
		$V_{CC} = 3\text{ V to }3.6\text{ V}$		8	8		
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$		16	16		
$\Delta t/\Delta v$	Input transition rise or fall rate	$V_{CC} = 2.3\text{ V to }2.7\text{ V}$		200	200	ns/V	
		$V_{CC} = 3\text{ V to }3.6\text{ V}$		100	100		
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$		20	20		
$T_A$	Operating free-air temperature	-55	125	-40	85	$^{\circ}\text{C}$	

NOTE 5: 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.

PRODUCT PREVIEW information concerns products in the formative or design phase of development. Characteristic data and other specifications are design goals. Texas Instruments reserves the right to change or discontinue these products without notice.



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# SN54LV245A, SN74LV245A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

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

PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	SN54LV245A			SN74LV245A			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
V <sub>OH</sub>	I <sub>OH</sub> = -50 μA	2 V to 5.5 V	V <sub>CC</sub> -0.1			V <sub>CC</sub> -0.1			V
	I <sub>OH</sub> = -2 mA	2.3 V	2			2			
	I <sub>OH</sub> = -8 mA	3 V	2.48			2.48			
	I <sub>OH</sub> = -16 mA	4.5 V	3.8			3.8			
V <sub>OL</sub>	I <sub>OL</sub> = 50 μA	2 V to 5.5 V				0.1			V
	I <sub>OL</sub> = 2 mA	2.3 V				0.4			
	I <sub>OL</sub> = 8 mA	3 V				0.44			
	I <sub>OL</sub> = 16 mA	4.5 V				0.55			
I <sub>I</sub>	Control inputs	V <sub>I</sub> = 5.5 V or GND	0 to 5.5 V			±1			μA
I <sub>OZ</sub>	A or B port	V <sub>O</sub> = V <sub>CC</sub> or GND	5.5 V			±5			μA
I <sub>CC</sub>		V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0	5.5 V			20			μA
I <sub>off</sub>		V <sub>I</sub> or V <sub>O</sub> = 0 to 5.5 V	0			5			μA
C <sub>i</sub>	Control inputs	V <sub>I</sub> = V <sub>CC</sub> or GND	3.3 V			3			pF
			5 V			3			
C <sub>io</sub>	A or B port	V <sub>O</sub> = V <sub>CC</sub> or GND	3.3 V			5.5			pF
			5 V			5.5			

switching characteristics over recommended operating free-air temperature range, V<sub>CC</sub> = 2.5 V ± 0.2 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	T <sub>A</sub> = 25°C			SN54LV245A		SN74LV245A		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>pd</sub>	A or B	B or A	C <sub>L</sub> = 15 pF	8.3*	13*		1*	15*	1	15	ns
t <sub>en</sub>	$\overline{\text{OE}}$	A or B		11.8*	19.9*		1*	22*	1	22	
t <sub>dis</sub>	$\overline{\text{OE}}$	A or B		11.8*	18.1*		1*	20*	1	20	
t <sub>pd</sub>	A or B	B or A	C <sub>L</sub> = 50 pF	11.2	15.9		1	18	1	18	ns
t <sub>en</sub>	$\overline{\text{OE}}$	A or B		14.1	22.7		1	26	1	26	
t <sub>dis</sub>	$\overline{\text{OE}}$	A or B		17.6	23.1		1	25	1	25	
t <sub>sk(o)</sub>						2				2	

\* On products compliant to MIL-PRF-38535, this parameter is not production tested.

switching characteristics over recommended operating free-air temperature range, V<sub>CC</sub> = 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	T <sub>A</sub> = 25°C			SN54LV245A		SN74LV245A		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>pd</sub>	A or B	B or A	C <sub>L</sub> = 15 pF	5.9*	8.4*		1*	10*	1	10	ns
t <sub>en</sub>	$\overline{\text{OE}}$	A or B		8.2*	13.2*		1*	15.5*	1	15.5	
t <sub>dis</sub>	$\overline{\text{OE}}$	A or B		9.6*	16.5*		1*	19.5*	1	19.5	
t <sub>pd</sub>	A or B	B or A	C <sub>L</sub> = 50 pF	7.9	11.9		1	13.5	1	13.5	ns
t <sub>en</sub>	$\overline{\text{OE}}$	A or B		9.9	16.7		1	19	1	19	
t <sub>dis</sub>	$\overline{\text{OE}}$	A or B		13.9	19.8		1	22	1	22	
t <sub>sk(o)</sub>						1.5				1.5	

\* On products compliant to MIL-PRF-38535, this parameter is not production tested.

PRODUCT PREVIEW information concerns products in the formative or design phase of development. Characteristic data and other specifications are design goals. Texas Instruments reserves the right to change or discontinue these products without notice.



# SN54LV245A, SN74LV245A OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

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switching characteristics over recommended operating free-air temperature range,  $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$  (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	$T_A = 25^\circ\text{C}$			SN54LV245A		SN74LV245A		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
$t_{pd}$	A or B	B or A	$C_L = 15\text{ pF}$	4.3*	5.5*	1*	6.5*	1	6.5	ns	
$t_{en}$	$\overline{OE}$	A or B		5.7*	8.5*	1*	10.6*	1	10		
$t_{dis}$	$\overline{OE}$	A or B		7.8*	12.8*	1*	14.7*	1	14.2		
$t_{pd}$	A or B	B or A	$C_L = 50\text{ pF}$	5.6	7.5	1	8.5	1	8.5	ns	
$t_{en}$	$\overline{OE}$	A or B		7	10.6	1	12	1	12		
$t_{dis}$	$\overline{OE}$	A or B		10.9	14.7	1	16	1	16		
$t_{sk(o)}$						1			1		

\* On products compliant to MIL-PRF-38535, this parameter is not production tested.

noise characteristics,  $V_{CC} = 3.3\text{ V}$ ,  $C_L = 50\text{ pF}$ ,  $T_A = 25^\circ\text{C}$  (see Note 6)

PARAMETER	SN74LV245A			UNIT
	MIN	TYP	MAX	
$V_{OL(P)}$ Quiet output, maximum dynamic $V_{OL}$		0.5	0.8	V
$V_{OL(V)}$ Quiet output, minimum dynamic $V_{OL}$		-0.4	-0.8	V
$V_{OH(V)}$ Quiet output, minimum dynamic $V_{OH}$		2.9		V
$V_{IH(D)}$ High-level dynamic input voltage	2.31			V
$V_{IL(D)}$ Low-level dynamic input voltage			0.99	V

NOTE 6: Characteristics are for surface-mount packages only.

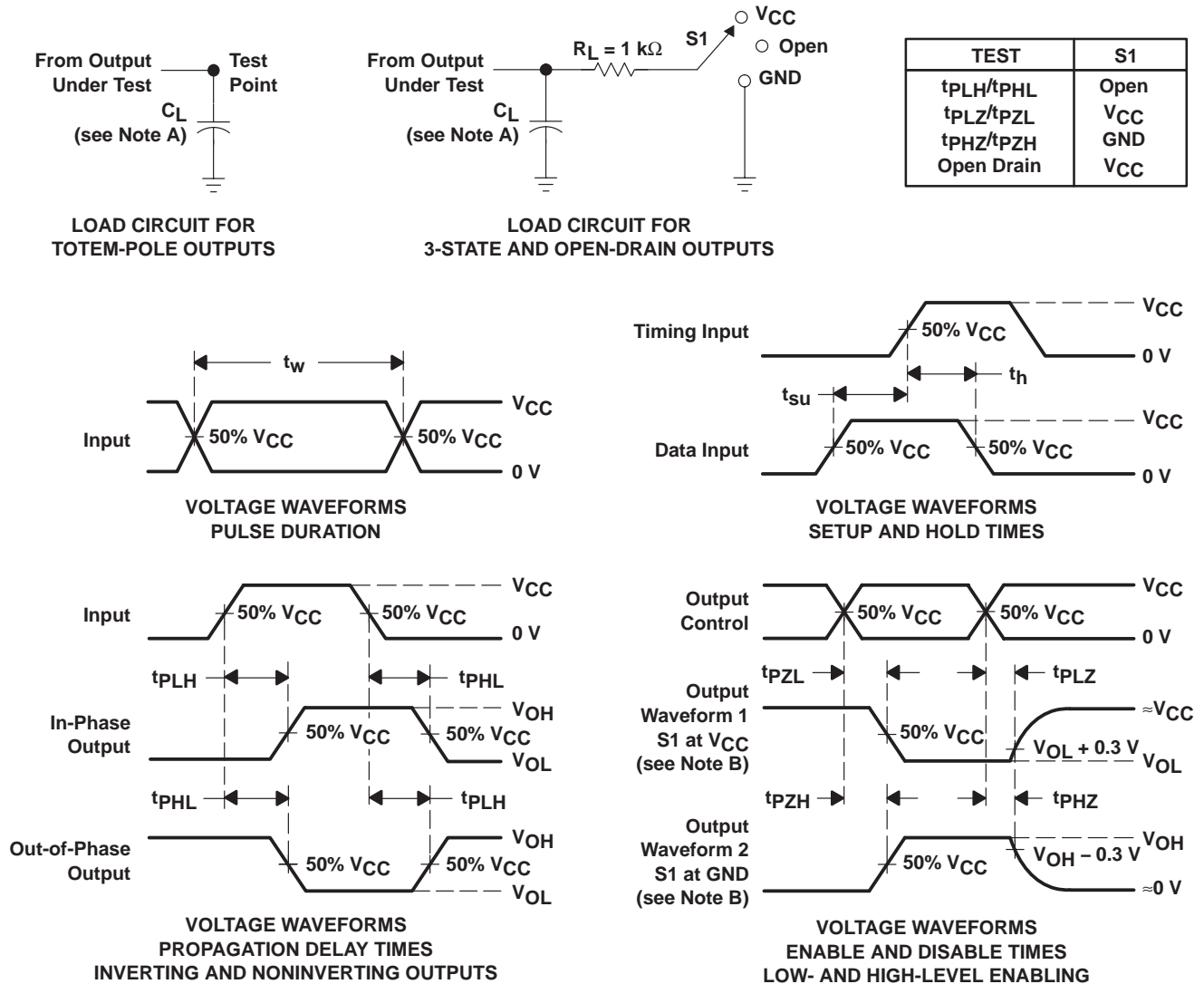
operating characteristics,  $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	$V_{CC}$	TYP	UNIT
$C_{pd}$ Power dissipation capacitance	Outputs enabled	$C_L = 50\text{ pF}$ , $f = 10\text{ MHz}$	3.3 V	20	pF
			5 V	25	

PRODUCT PREVIEW information concerns products in the formative or design phase of development. Characteristic data and other specifications are design goals. Texas Instruments reserves the right to change or discontinue these products without notice.



PARAMETER MEASUREMENT INFORMATION



- 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:  $PRR \leq 1\text{ MHz}$ ,  $Z_O = 50\ \Omega$ ,  $t_r \leq 3\text{ ns}$ ,  $t_f \leq 3\text{ ns}$ .
  - D. The outputs are measured one at a time, with one input 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.  $t_{PHL}$  and  $t_{PLH}$  are the same as  $t_{pd}$ .
  - H. All parameters and waveforms are not applicable to all devices.

Figure 1. 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>
SN74LV245ADBLE	OBSOLETE	SSOP	DB	20		TBD	Call TI	Call TI
SN74LV245ADBR	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245ADBRE4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245ADBRG4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245ADGVR	ACTIVE	TVSOP	DGV	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245ADGVRE4	ACTIVE	TVSOP	DGV	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245ADGVRG4	ACTIVE	TVSOP	DGV	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245ADW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245ADWE4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245ADWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245ADWR	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245ADWRE4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245ADWRG4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245AGQNR	NRND	BGA MICROSTAR JUNIOR	GQN	20	1000	TBD	SNPB	Level-1-240C-UNLIM
SN74LV245ANSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245ANSRG4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245APW	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245APWE4	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245APWG4	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245APWLE	OBSOLETE	TSSOP	PW	20		TBD	Call TI	Call TI
SN74LV245APWR	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245APWRE4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245APWRG4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245APWT	ACTIVE	TSSOP	PW	20	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245APWTE4	ACTIVE	TSSOP	PW	20	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

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>
SN74LV245APWTG4	ACTIVE	TSSOP	PW	20	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LV245ARGYR	ACTIVE	QFN	RGY	20	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
SN74LV245ARGYRG4	ACTIVE	QFN	RGY	20	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
SN74LV245AZQNR	ACTIVE	BGA MI CROSTA R JUNI OR	ZQN	20	1000	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.

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**TAPE AND REEL INFORMATION**



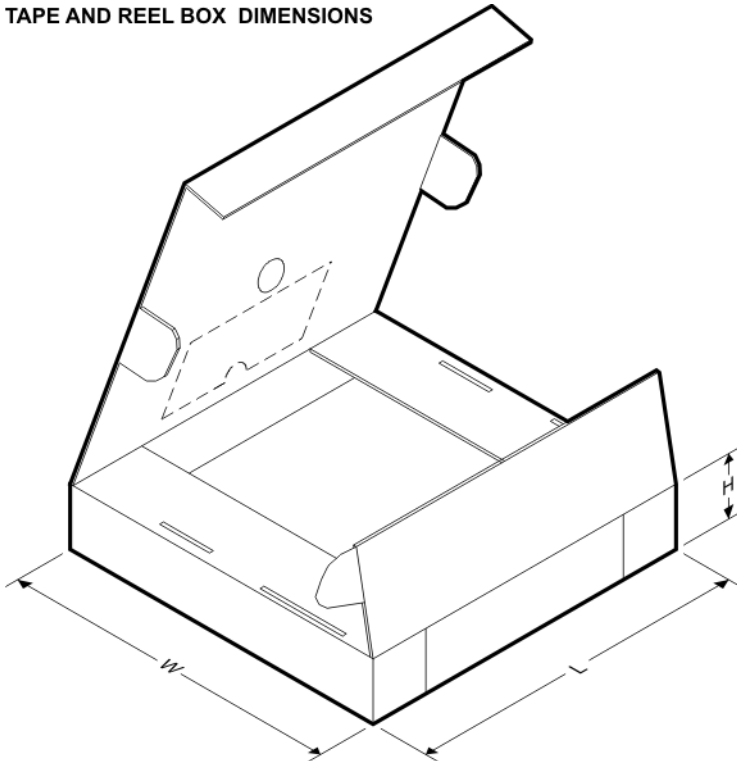
**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**



\*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
SN74LV245ADBR	SSOP	DB	20	2000	330.0	16.0	8.0	8.0	3.0	12.0	16.0	Q1
SN74LV245ADGVR	TVSOP	DGV	20	2000	330.0	12.0	7.0	6.0	2.0	8.0	12.0	Q1
SN74LV245ADWR	SOIC	DW	20	2000	330.0	24.0	11.0	13.0	3.0	12.0	24.0	Q1
SN74LV245AGQNR	BGA MICROSTAR JUNIOR	GQN	20	1000	330.0	12.0	3.0	4.0	2.0	8.0	12.0	Q1
SN74LV245AGQNR	BGA MICROSTAR JUNIOR	GQN	20	1000	330.0	12.0	3.0	4.0	2.0	8.0	12.0	Q1
SN74LV245APWR	TSSOP	PW	20	2000	330.0	16.0	7.0	7.0	2.0	8.0	16.0	Q1
SN74LV245ARGYR	QFN	RGY	20	1000	180.0	12.0	4.0	5.0	2.0	8.0	12.0	Q1
SN74LV245AZQNR	BGA MICROSTAR JUNIOR	ZQN	20	1000	330.0	12.0	3.0	4.0	2.0	8.0	12.0	Q1
SN74LV245AZQNR	BGA MICROSTAR JUNIOR	ZQN	20	1000	330.0	12.0	3.0	4.0	2.0	8.0	12.0	Q1

**TAPE AND REEL BOX DIMENSIONS**

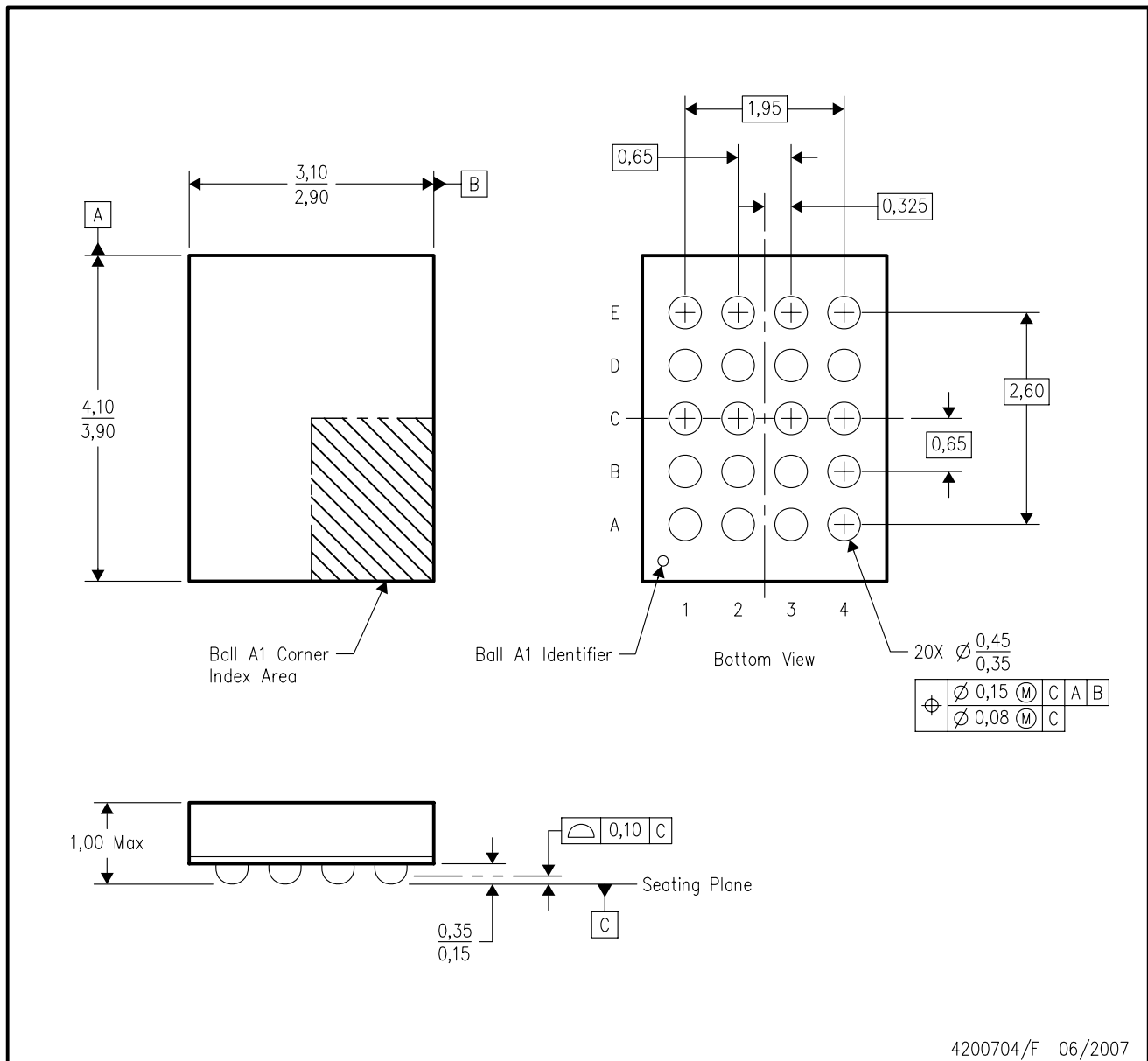


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LV245ADBR	SSOP	DB	20	2000	346.0	346.0	33.0
SN74LV245ADGVR	TVSOP	DGV	20	2000	346.0	346.0	29.0
SN74LV245ADWR	SOIC	DW	20	2000	346.0	346.0	41.0
SN74LV245AGQNR	BGA MICROSTAR JUNIOR	GQN	20	1000	346.0	346.0	29.0
SN74LV245AGQNR	BGA MICROSTAR JUNIOR	GQN	20	1000	343.0	338.0	21.0
SN74LV245APWR	TSSOP	PW	20	2000	346.0	346.0	33.0
SN74LV245ARGYR	QFN	RGY	20	1000	191.0	213.0	32.0
SN74LV245AZQNR	BGA MICROSTAR JUNIOR	ZQN	20	1000	346.0	346.0	29.0
SN74LV245AZQNR	BGA MICROSTAR JUNIOR	ZQN	20	1000	343.0	338.0	21.0

GQN (R-PBGA-N20)

PLASTIC BALL GRID ARRAY

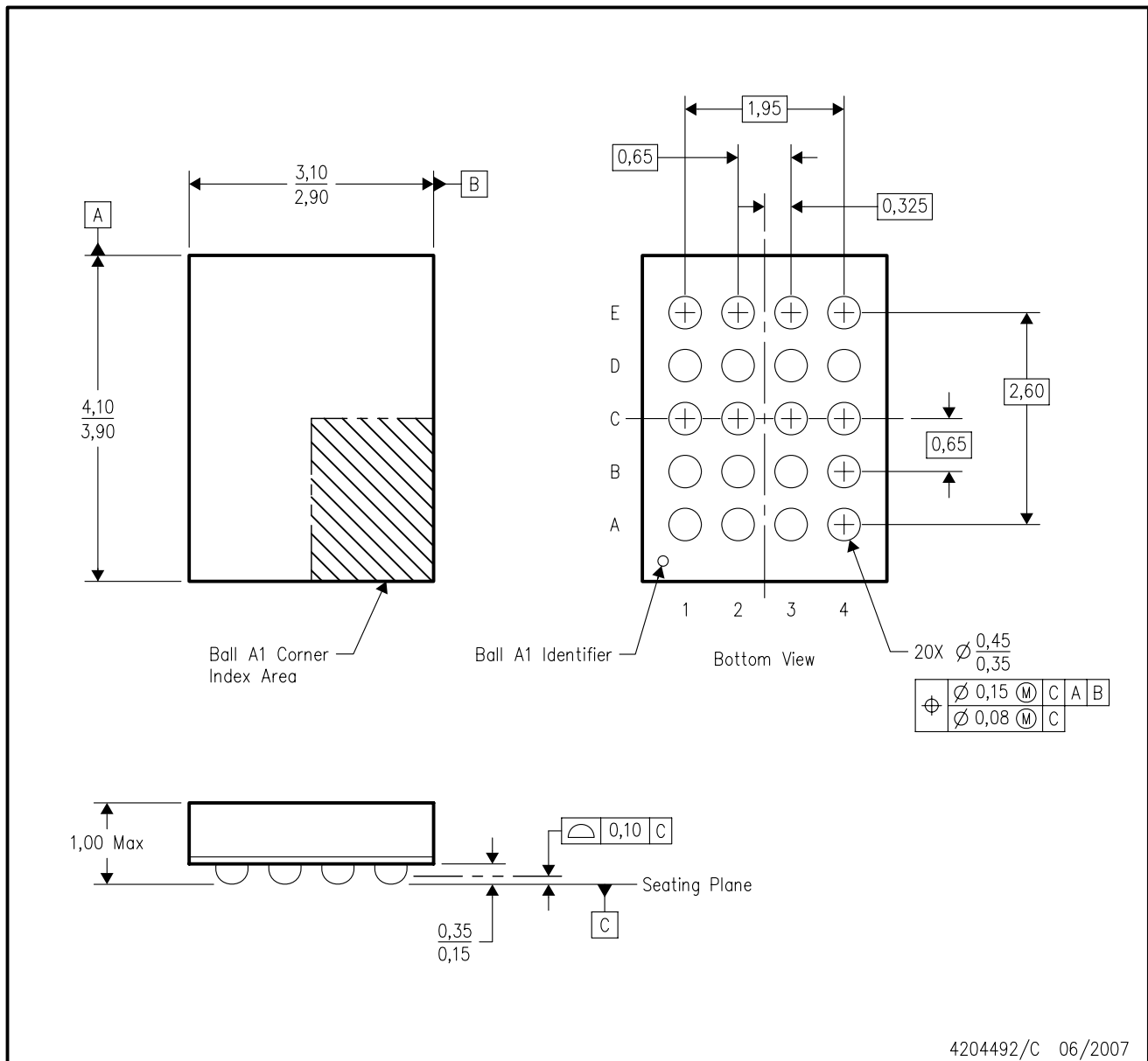


4200704/F 06/2007

- 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. Falls within JEDEC MO-285 variation BC-2.
  - D. This package is tin-lead (SnPb). Refer to the 20 ZQN package (drawing 4204492) for lead-free.

ZQN (R-PBGA-N20)

PLASTIC 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. Falls within JEDEC MO-285 variation BC-2.
  - D. This package is lead-free. Refer to the 20 GQN package (drawing 4200704) for tin-lead (SnPb).

DGV (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE

24 PINS SHOWN



- 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, not to exceed 0,15 per side.  
 D. Falls within JEDEC: 24/48 Pins – MO-153  
 14/16/20/56 Pins – MO-194

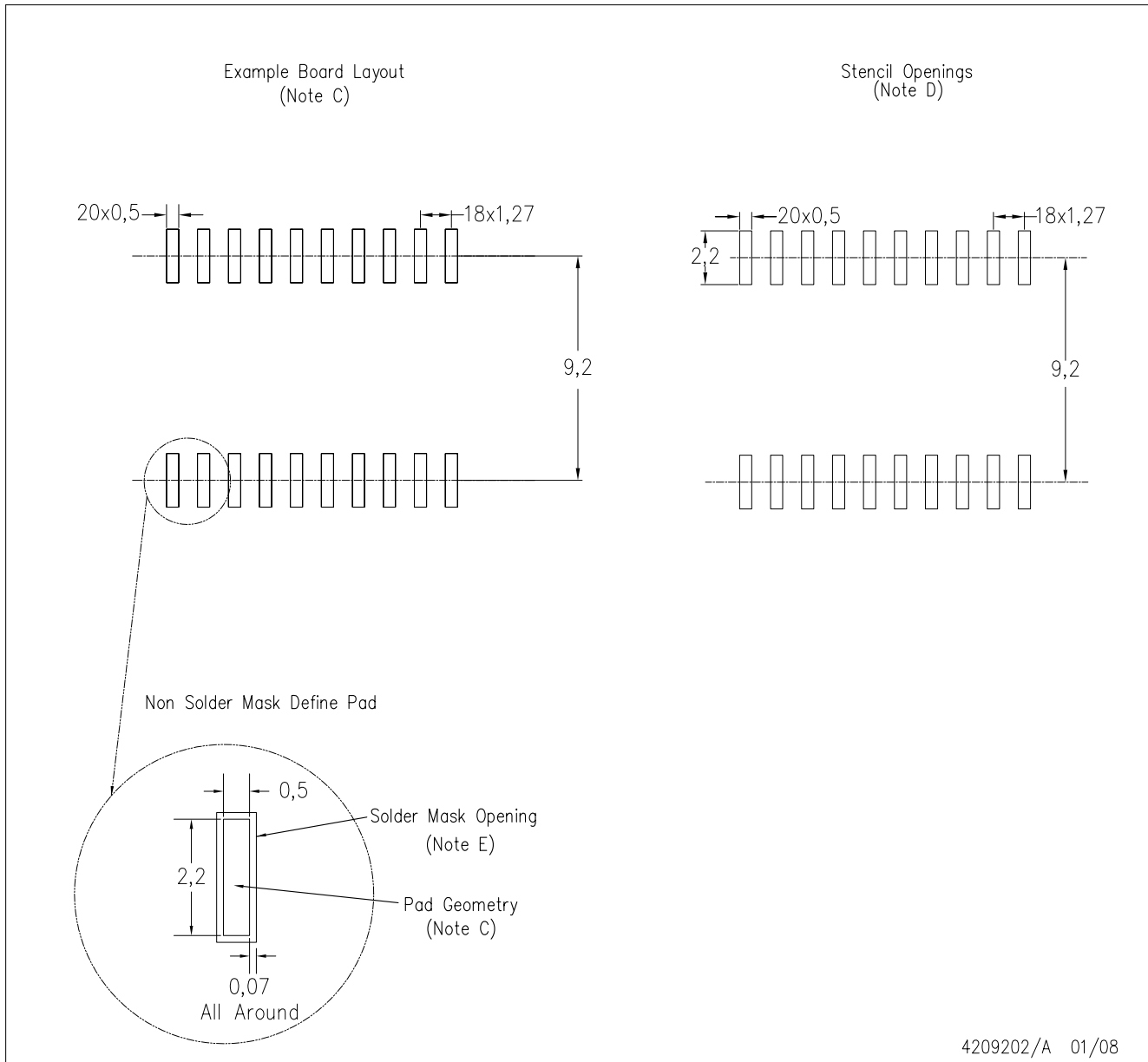
DW (R-PDSO-G20)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
  - D. Falls within JEDEC MS-013 variation AC.

DW (R-PDSO-G20)

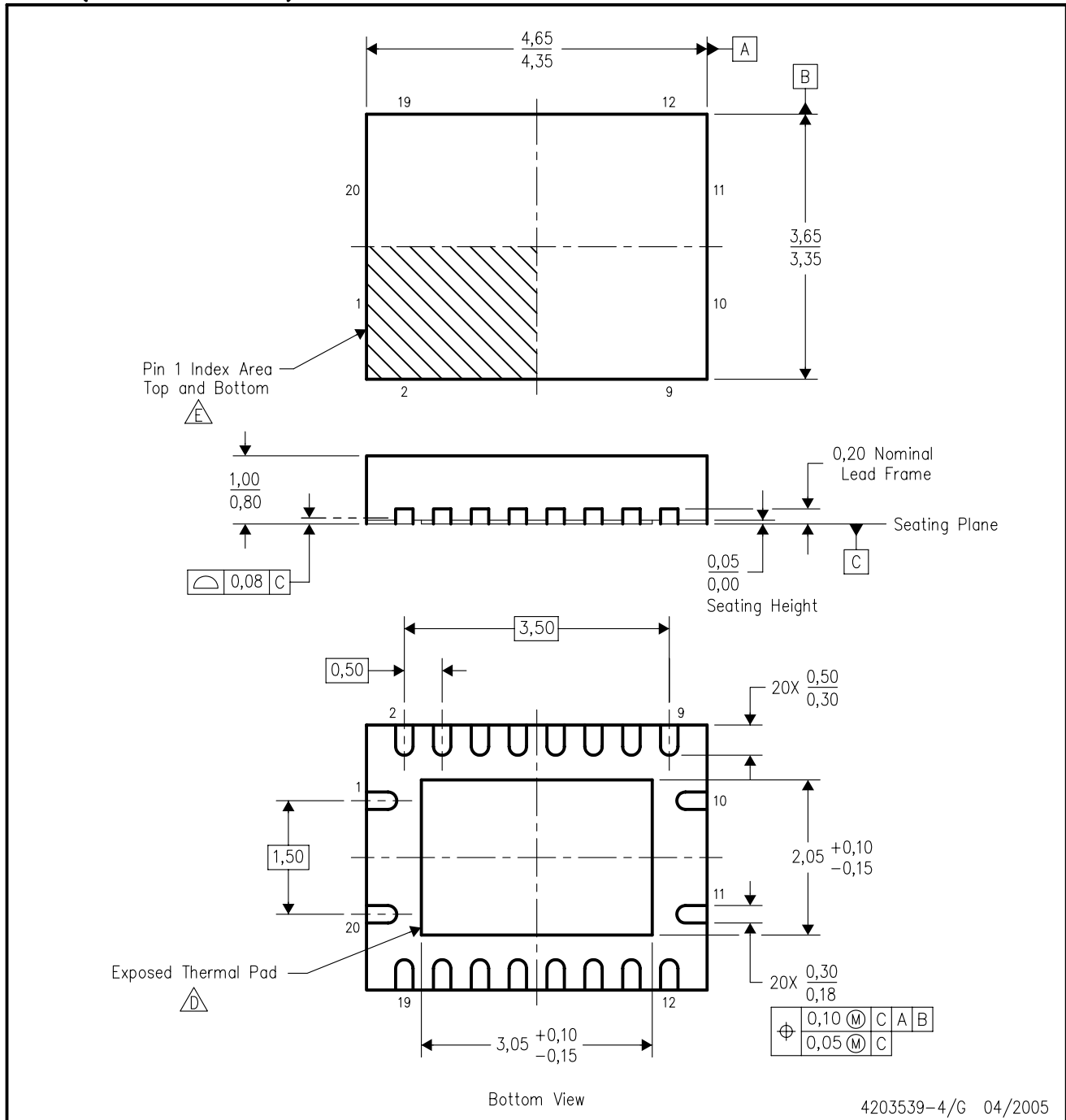


4209202/A 01/08

- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
  - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525
  - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

RGY (R-PQFP-N20)

PLASTIC QUAD FLATPACK



4203539-4/G 04/2005

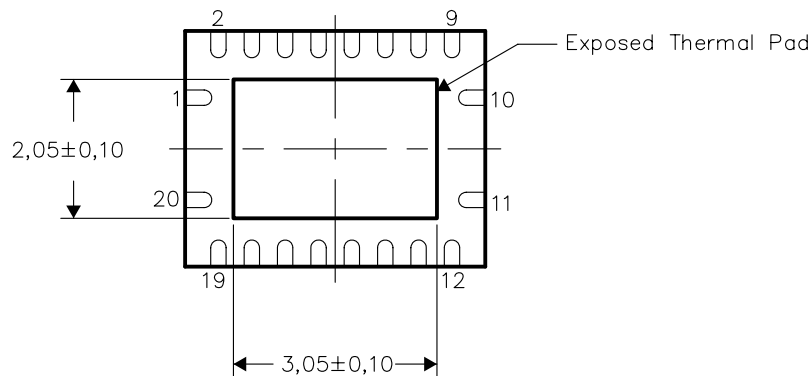
- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
  - B. This drawing is subject to change without notice.
  - C. QFN (Quad Flatpack No-Lead) package configuration.
  - D. The package thermal pad must be soldered to the board for thermal and mechanical performance.
  - E. Pin 1 identifiers are located on both top and bottom of the package and within the zone indicated. The Pin 1 identifiers are either a molded, marked, or metal feature.
  - F. Package complies to JEDEC MO-241 variation BC.

THERMAL INFORMATION

This package incorporates an exposed thermal pad that is designed to be attached directly to an external heatsink. The thermal pad must be soldered directly to the printed circuit board (PCB). After soldering, the PCB can be used as a heatsink. In addition, through the use of thermal vias, the thermal pad can be attached directly to the appropriate copper plane shown in the electrical schematic for the device, or alternatively, can be attached to a special heatsink structure designed into the PCB. This design optimizes the heat transfer from the integrated circuit (IC).

For information on the Quad Flatpack No-Lead (QFN) package and its advantages, refer to Application Report, Quad Flatpack No-Lead Logic Packages, Texas Instruments Literature No. SCBA017. This document is available at [www.ti.com](http://www.ti.com).

The exposed thermal pad dimensions for this package are shown in the following illustration.

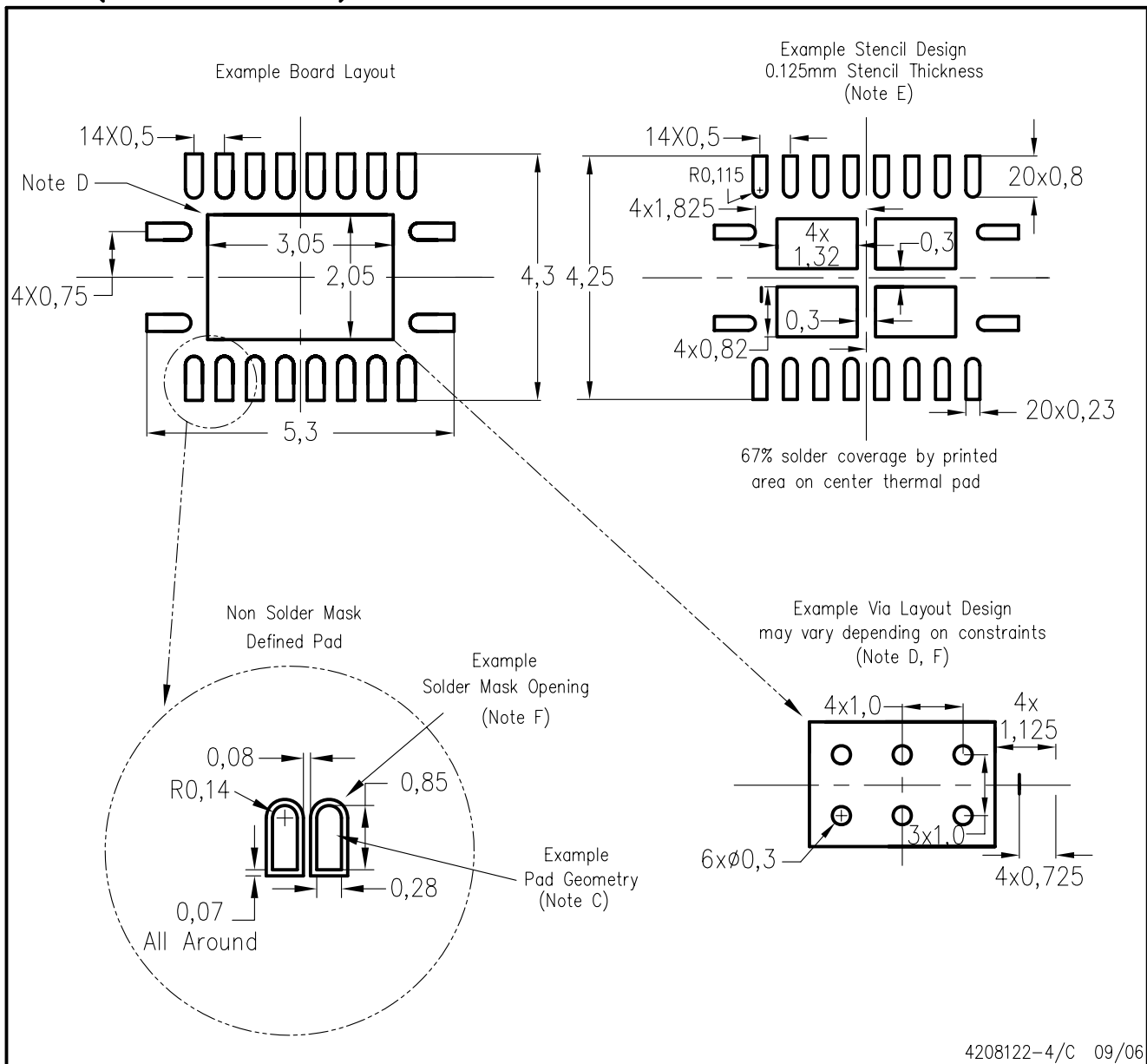


Bottom View

NOTE: All linear dimensions are in millimeters

Exposed Thermal Pad Dimensions

RGY (R-PQFP-N20)



4208122-4/C 09/06

- NOTES:
- All linear dimensions are in millimeters.
  - This drawing is subject to change without notice.
  - Publication IPC-7351 is recommended for alternate designs.
  - This package is designed to be soldered to a thermal pad on the board. Refer to Application Note, Quad Flat-Pack Packages, Texas Instruments Literature No. SCBA017, SLUA271, and also the Product Data Sheets for specific thermal information, via requirements, and recommended board layout. These documents are available at [www.ti.com](http://www.ti.com) <<http://www.ti.com>>.
  - Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC 7525 for stencil design considerations.
  - Customers should contact their board fabrication site for minimum solder mask web tolerances between signal pads.

# MECHANICAL DATA

NS (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



- 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, not to exceed 0,15.

DB (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE

28 PINS SHOWN



- 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 not to exceed 0,15.  
 D. Falls within JEDEC MO-150

4040065 /E 12/01

PW (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



4040064/F 01/97

- 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 not to exceed 0,15.  
 D. Falls within JEDEC MO-153

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Telephony	<a href="http://www.ti.com/telephony">www.ti.com/telephony</a>
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