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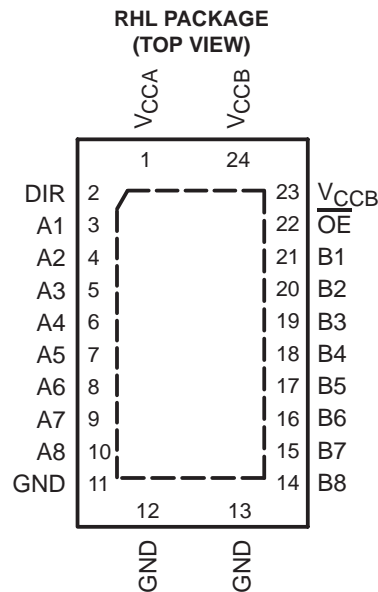
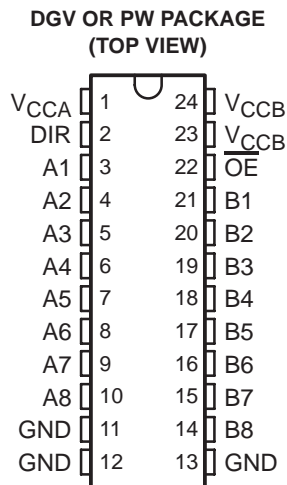
# SN74AVC8T245

## 8-BIT DUAL-SUPPLY BUS TRANSCEIVER

### WITH CONFIGURABLE VOLTAGE TRANSLATION AND 3-STATE OUTPUTS

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- Control Inputs  $V_{IH}/V_{IL}$  Levels Are Referenced to  $V_{CCA}$  Voltage
- $V_{CC}$  Isolation Feature – If Either  $V_{CC}$  Input Is at GND, All I/O Ports Are in the High-Impedance State
- $I_{off}$  Supports Partial-Power-Down Mode Operation
- Fully Configurable Dual-Rail Design Allows Each Port to Operate Over the Full 1.4-V to 3.6-V Power-Supply Range
- I/Os Are 4.6-V Tolerant
- Max Data Rates:
  - 170 Mbps ( $1.2\text{ V} \leq (V_{CCA} \text{ or } V_{CCB}) \leq 3.3\text{ V}$ )
  - 320 Mbps ( $1.8\text{ V} \leq (V_{CCA} \text{ or } V_{CCB}) \leq 3.3\text{ V}$ )
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
  - 8000-V Human-Body Model (A114-A)
  - 200-V Machine Model (A115-A)
  - 1000-V Charged-Device Model (C101)



### description/ordering information

This 8-bit noninverting bus transceiver uses two separate configurable power-supply rails. The SN74AVC8T245 is optimized to operate with  $V_{CCA}/V_{CCB}$  set at 1.4 V to 3.6 V. It is operational with  $V_{CCA}/V_{CCB}$  as low as 1.2 V. The A port is designed to track  $V_{CCA}$ .  $V_{CCA}$  accepts any supply voltage from 1.2 V to 3.6 V. The B port is designed to track  $V_{CCB}$ .  $V_{CCB}$  accepts any supply voltage from 1.2 V to 3.6 V. This allows for universal low-voltage bidirectional translation between any of the 1.2-V, 1.5-V, 1.8-V, 2.5-V, and 3.3-V voltage nodes.

### ORDERING INFORMATION

$T_A$	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	QFN – RHL	Tape and reel	SN74AVC8T245RHLR	WE245
	TSSOP – PW	Tube	SN74AVC8T245PW	WE245
		Tape and reel	SN74AVC8T245PWR	
	TVSOP – DGV	Tape and reel	SN74AVC8T245DGVR	WE245

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

Supply voltage range, $V_{CCA}$ and $V_{CCB}$ .....	-0.5 V to 4.6 V
Input voltage range, $V_I$ (see Note 1): I/O ports (A port) .....	-0.5 V to 4.6 V
I/O ports (B port) .....	-0.5 V to 4.6 V
Control inputs .....	-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): A port .....	-0.5 V to 4.6 V
B port .....	-0.5 V to 4.6 V
Voltage range applied to any output in the high or low state, $V_O$ (see Notes 1 and 2): A port .....	-0.5 V to $V_{CCA} + 0.5$ V
B port .....	-0.5 V to $V_{CCB} + 0.5$ V
Input clamp current, $I_{IK}$ ( $V_I < 0$ ) .....	-50 mA
Output clamp current, $I_{OK}$ ( $V_O < 0$ ) .....	-50 mA
Continuous output current, $I_O$ .....	$\pm 50$ mA
Continuous current through $V_{CCA}$ , $V_{CCB}$ , or GND .....	$\pm 100$ mA
Package thermal impedance, $\theta_{JA}$ (see Note 3): DGV package .....	86°C/W
PW package .....	88°C/W
RHL package .....	43°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 voltage and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.  
 2. The output positive-voltage rating may be exceeded up to 4.6 V maximum if the output current rating is observed.  
 3. The package thermal impedance is calculated in accordance with JESD 51-7.



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#### recommended operating conditions (see Notes 4 through 6)

		V <sub>CCI</sub>	V <sub>CCO</sub>	MIN	MAX	UNIT
V <sub>CCA</sub>	Supply voltage			1.2	3.6	V
V <sub>CCB</sub>	Supply voltage			1.2	3.6	V
V <sub>IH</sub>	High-level input voltage	Data inputs	1.2 V to 1.95 V	V <sub>CCI</sub> × 0.65		V
			1.95 V to 2.7 V	1.6		
			2.7 V to 3.6 V	2		
V <sub>IL</sub>	Low-level input voltage	Data inputs	1.2 V to 1.95 V	V <sub>CCI</sub> × 0.35		V
			1.95 V to 2.7 V	0.7		
			2.7 V to 3.6 V	0.8		
V <sub>IH</sub>	High-level input voltage	DIR (referenced to V <sub>CCA</sub> )	1.2 V to 1.95 V	V <sub>CCA</sub> × 0.65		V
			1.95 V to 2.7 V	1.6		
			2.7 V to 3.6 V	2		
V <sub>IL</sub>	Low-level input voltage	DIR (referenced to V <sub>CCA</sub> )	1.2 V to 1.95 V	V <sub>CCA</sub> × 0.35		V
			1.95 V to 2.7 V	0.7		
			2.7 V to 3.6 V	0.8		
V <sub>I</sub>	Input voltage			0	3.6	V
V <sub>O</sub>	Output voltage	Active state		0	V <sub>CCO</sub>	V
		3-state		0	3.6	
I <sub>OH</sub>	High-level output current		1.2 V	-3		mA
			1.4 V to 1.6 V	-6		
			1.65 V to 1.95 V	-8		
			2.3 V to 2.7 V	-9		
			3 V to 3.6 V	-12		
I <sub>OL</sub>	Low-level output current		1.2 V	3		mA
			1.4 V to 1.6 V	6		
			1.65 V to 1.95 V	8		
			2.3 V to 2.7 V	9		
			3 V to 3.6 V	12		
Δt/Δv	Input transition rise or fall rate				5	ns/V
T <sub>A</sub>	Operating free-air temperature			-40	85	°C

- NOTES: 4. V<sub>CCI</sub> is the V<sub>CC</sub> associated with the data input port.  
5. V<sub>CCO</sub> is the V<sub>CC</sub> associated with the output port.  
6. All unused data inputs of the device must be held at V<sub>CCI</sub> or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.



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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted) (see Notes 7 and 8)

PARAMETER	TEST CONDITIONS		V <sub>CCA</sub>	V <sub>CCB</sub>	T <sub>A</sub> = 25°C			-40°C to 85°C		UNIT
					MIN	TYP	MAX	MIN	MAX	
V <sub>OH</sub>		V <sub>I</sub> = V <sub>IH</sub>	1.2 V to 3.6 V	1.2 V to 3.6 V				V <sub>CCO</sub> - 0.2 V		V
			1.2 V	1.2 V	0.95					
			1.4 V	1.4 V				1.05		
			1.65 V	1.65 V				1.2		
			2.3 V	2.3 V				1.75		
			3 V	3 V				2.3		
V <sub>OL</sub>		V <sub>I</sub> = V <sub>IL</sub>	1.2 V to 3.6 V	1.2 V to 3.6 V				0.2		V
			1.2 V	1.2 V	0.15					
			1.4 V	1.4 V				0.35		
			1.65 V	1.65 V				0.45		
			2.3 V	2.3 V				0.55		
			3 V	3 V				0.7		
I <sub>I</sub>	Contr ol inputs	V <sub>I</sub> = V <sub>CCA</sub> or GND	1.2 V to 3.6 V	1.2 V to 3.6 V		±0.025	±0.25		±1	μA
I <sub>off</sub>	A or B port	V <sub>I</sub> or V <sub>O</sub> = 0 to 3.6 V	0 V	0 to 3.6 V		±0.1	±1		±5	μA
	A or B port		0 to 3.6 V	0 V		±0.1	±1		±5	
I <sub>OZ</sub> †	A or B port	V <sub>O</sub> = V <sub>CCO</sub> or GND, V <sub>I</sub> = V <sub>CCI</sub> or GND, $\overline{OE} = V_{IH}$	3.6 V	3.6 V		±0.5	±2.5		±5	μA
I <sub>CCA</sub>		V <sub>I</sub> = V <sub>CCI</sub> or GND, I <sub>O</sub> = 0	1.2 V to 3.6 V	1.2 V to 3.6 V				15		μA
			0 V	3.6 V				-2		
			3.6 V	0 V				15		
I <sub>CCB</sub>		V <sub>I</sub> = V <sub>CCI</sub> or GND, I <sub>O</sub> = 0	1.2 V to 3.6 V	1.2 V to 3.6 V				15		μA
			0 V	3.6 V				15		
			3.6 V	0 V				-2		
I <sub>CCA</sub> + I <sub>CCB</sub>		V <sub>I</sub> = V <sub>CCI</sub> or GND, I <sub>O</sub> = 0	1.2 V to 3.6 V	1.2 V to 3.6 V				25		μA
C <sub>i</sub>	Contr ol inputs	V <sub>I</sub> = 3.3 V or GND	3.3 V	3.3 V		3.5			4.5	pF
C <sub>io</sub>	A or B port	V <sub>O</sub> = 3.3 V or GND	3.3 V	3.3 V		6			7	pF

† For I/O ports, the parameter I<sub>OZ</sub> includes the input leakage current.

NOTES: 7. V<sub>CCO</sub> is the V<sub>CC</sub> associated with the output port.

8. V<sub>CCI</sub> is the V<sub>CC</sub> associated with the input port.



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switching characteristics over recommended operating free-air temperature range,  
**V<sub>CCA</sub> = 1.2 V (see Figure 10)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CCB</sub> = 1.2 V	V <sub>CCB</sub> = 1.5 V	V <sub>CCB</sub> = 1.8 V	V <sub>CCB</sub> = 2.5 V	V <sub>CCB</sub> = 3.3 V	UNIT
			TYP	TYP	TYP	TYP	TYP	
t <sub>PLH</sub>	A	B	3.1	2.6	2.5	3	3.5	ns
t <sub>PHL</sub>			3.1	2.6	2.5	3	3.5	
t <sub>PLH</sub>	B	A	3.1	2.7	2.5	2.4	2.3	ns
t <sub>PHL</sub>			3.1	2.7	2.5	2.4	2.3	
t <sub>PZH</sub>	$\overline{OE}$	A	5.3	5.3	5.3	5.3	5.3	ns
t <sub>PZL</sub>			5.3	5.3	5.3	5.3	5.3	
t <sub>PZH</sub>	$\overline{OE}$	B	5.1	4	3.5	3.2	3.1	ns
t <sub>PZL</sub>			5.1	4	3.5	3.2	3.1	
t <sub>PHZ</sub>	$\overline{OE}$	A	4.8	4.8	4.8	4.8	4.8	ns
t <sub>PLZ</sub>			4.8	4.8	4.8	4.8	4.8	
t <sub>PHZ</sub>	$\overline{OE}$	B	4.7	4	4.1	4.3	5.1	ns
t <sub>PLZ</sub>			4.7	4	4.1	4.3	5.1	

switching characteristics over recommended operating free-air temperature range,  
**V<sub>CCA</sub> = 1.5 V ± 0.1 V (see Figure 10)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CCB</sub> = 1.2 V	V <sub>CCB</sub> = 1.5 V ± 0.1 V		V <sub>CCB</sub> = 1.8 V ± 0.15 V		V <sub>CCB</sub> = 2.5 V ± 0.2 V		V <sub>CCB</sub> = 3.3 V ± 0.3 V		UNIT
			TYP	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A	B	2.7	0.5	5.4	0.5	4.6	0.5	4.9	0.5	6.8	ns
t <sub>PHL</sub>			2.7	0.5	5.4	0.5	4.6	0.5	4.9	0.5	6.8	
t <sub>PLH</sub>	B	A	2.6	0.5	5.4	0.5	5.1	0.5	4.7	0.5	4.5	ns
t <sub>PHL</sub>			2.6	0.5	5.4	0.5	5.1	0.5	4.7	0.5	4.5	
t <sub>PZH</sub>	$\overline{OE}$	A	3.7	1.1	8.7	1.1	8.7	1.1	8.7	1.1	8.7	ns
t <sub>PZL</sub>			3.7	1.1	8.7	1.1	8.7	1.1	8.7	1.1	8.7	
t <sub>PZH</sub>	$\overline{OE}$	B	4.8	1.1	7.6	1.1	7.1	1	5.6	1	5.2	ns
t <sub>PZL</sub>			4.8	1.1	7.6	1.1	7.1	1	5.6	1	5.2	
t <sub>PHZ</sub>	$\overline{OE}$	A	3.1	0.5	8.6	0.5	8.6	0.5	8.6	0.5	8.6	ns
t <sub>PLZ</sub>			3.1	0.5	8.6	0.5	8.6	0.5	8.6	0.5	8.6	
t <sub>PHZ</sub>	$\overline{OE}$	B	4.1	0.5	8.4	0.5	7.6	0.5	7.2	0.5	7.8	ns
t <sub>PLZ</sub>			4.1	0.5	8.4	0.5	7.6	0.5	7.2	0.5	7.8	



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switching characteristics over recommended operating free-air temperature range,  
 $V_{CCA} = 1.8\text{ V} \pm 0.15\text{ V}$  (see Figure 10)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.2\text{ V}$	$V_{CCB} = 1.5\text{ V} \pm 0.1\text{ V}$		$V_{CCB} = 1.8\text{ V} \pm 0.15\text{ V}$		$V_{CCB} = 2.5\text{ V} \pm 0.2\text{ V}$		$V_{CCB} = 3.3\text{ V} \pm 0.3\text{ V}$		UNIT
			TYP	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
$t_{PLH}$	A	B	2.5	0.5	5.1	0.5	4.4	0.5	4	0.5	3.9	ns
$t_{PHL}$			2.5	0.5	5.1	0.5	4.4	0.5	4	0.5	3.9	
$t_{PLH}$	B	A	2.5	0.5	4.6	0.5	4.4	0.5	3.9	0.5	3.7	ns
$t_{PHL}$			2.5	0.5	4.6	0.5	4.4	0.5	3.9	0.5	3.7	
$t_{PZH}$	$\overline{OE}$	A	3	1	6.8	1	6.8	1	6.8	1	6.8	ns
$t_{PZL}$			3	1	6.8	1	6.8	1	6.8	1	6.8	
$t_{PZH}$	$\overline{OE}$	B	4.6	1.1	8.2	1	6.7	0.5	5.1	0.5	4.5	ns
$t_{PZL}$			4.6	1.1	8.2	1	6.7	0.5	5.1	0.5	4.5	
$t_{PHZ}$	$\overline{OE}$	A	2.8	0.5	7.1	0.5	7.1	0.5	7.1	0.5	7.1	ns
$t_{PLZ}$			2.8	0.5	7.1	0.5	7.1	0.5	7.1	0.5	7.1	
$t_{PHZ}$	$\overline{OE}$	B	3.9	0.5	7.8	0.5	6.9	0.5	6	0.5	5.8	ns
$t_{PLZ}$			3.9	0.5	7.8	0.5	6.9	0.5	6	0.5	5.8	

switching characteristics over recommended operating free-air temperature range,  
 $V_{CCA} = 2.5\text{ V} \pm 0.2\text{ V}$  (see Figure 10)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.2\text{ V}$	$V_{CCB} = 1.5\text{ V} \pm 0.1\text{ V}$		$V_{CCB} = 1.8\text{ V} \pm 0.15\text{ V}$		$V_{CCB} = 2.5\text{ V} \pm 0.2\text{ V}$		$V_{CCB} = 3.3\text{ V} \pm 0.3\text{ V}$		UNIT
			TYP	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
$t_{PLH}$	A	B	2.4	0.5	4.7	0.5	3.9	0.5	3.1	0.5	2.8	ns
$t_{PHL}$			2.4	0.5	4.7	0.5	3.9	0.5	3.1	0.5	2.8	
$t_{PLH}$	B	A	3	0.5	4.9	0.5	4	0.5	3.1	0.5	2.9	ns
$t_{PHL}$			3	0.5	4.9	0.5	4	0.5	3.1	0.5	2.9	
$t_{PZH}$	$\overline{OE}$	A	2.2	0.5	4.8	0.5	4.8	0.5	4.8	0.5	4.8	ns
$t_{PZL}$			2.2	0.5	4.8	0.5	4.8	0.5	4.8	0.5	4.8	
$t_{PZH}$	$\overline{OE}$	B	4.5	1.1	7.9	0.5	6.4	0.5	4.6	0.5	4	ns
$t_{PZL}$			4.5	1.1	7.9	0.5	6.4	0.5	4.6	0.5	4	
$t_{PHZ}$	$\overline{OE}$	A	1.8	0.5	5.1	0.5	5.1	0.5	5.1	0.5	5.1	ns
$t_{PLZ}$			1.8	0.5	5.1	0.5	5.1	0.5	5.1	0.5	5.1	
$t_{PHZ}$	$\overline{OE}$	B	3.6	0.5	7.1	0.5	6.3	0.5	5.1	0.5	3.9	ns
$t_{PLZ}$			3.6	0.5	7.1	0.5	6.3	0.5	5.1	0.5	3.9	

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switching characteristics over recommended operating free-air temperature range,  
 $V_{CCA} = 3.3 \text{ V} \pm 0.3 \text{ V}$  (see Figure 10)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.2 \text{ V}$	$V_{CCB} = 1.5 \text{ V} \pm 0.1 \text{ V}$		$V_{CCB} = 1.8 \text{ V} \pm 0.15 \text{ V}$		$V_{CCB} = 2.5 \text{ V} \pm 0.2 \text{ V}$		$V_{CCB} = 3.3 \text{ V} \pm 0.3 \text{ V}$		UNIT
			TYP	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A	B	2.3	0.5	4.5	0.5	3.7	0.5	2.9	0.5	2.5	ns
t <sub>PHL</sub>			2.3	0.5	4.5	0.5	3.7	0.5	2.9	0.5	2.5	
t <sub>PLH</sub>	B	A	3.5	0.5	6.8	0.5	3.9	0.5	2.8	0.5	2.5	ns
t <sub>PHL</sub>			3.5	0.5	6.8	0.5	3.9	0.5	2.8	0.5	2.5	
t <sub>PZH</sub>	$\overline{\text{OE}}$	A	2	0.5	4	0.5	4	0.5	4	0.5	4	ns
t <sub>PZL</sub>			2	0.5	4	0.5	4	0.5	4	0.5	4	
t <sub>PZH</sub>	$\overline{\text{OE}}$	B	4.5	1.1	7.8	0.5	6.2	0.5	4.5	0.5	3.9	ns
t <sub>PZL</sub>			4.5	1.1	7.8	0.5	6.2	0.5	4.5	0.5	3.9	
t <sub>PHZ</sub>	$\overline{\text{OE}}$	A	1.7	0.5	4	0.5	4	0.5	4	0.5	4	ns
t <sub>PLZ</sub>			1.7	0.5	4	0.5	4	0.5	4	0.5	4	
t <sub>PHZ</sub>	$\overline{\text{OE}}$	B	3.4	0.5	6.9	0.5	6	0.5	4.8	0.5	4.2	ns
t <sub>PLZ</sub>			3.4	0.5	6.9	0.5	6	0.5	4.8	0.5	4.2	

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

PARAMETER			TEST CONDITIONS	$V_{CCA} = V_{CCB} = 1.2 \text{ V}$	$V_{CCA} = V_{CCB} = 1.5 \text{ V}$	$V_{CCA} = V_{CCB} = 1.8 \text{ V}$	$V_{CCA} = V_{CCB} = 2.5 \text{ V}$	$V_{CCA} = V_{CCB} = 3.3 \text{ V}$	UNIT
				TYP	TYP	TYP	TYP	TYP	
$C_{pdA}^\dagger$	A to B	Outputs Enabled	$C_L = 0,$ $f = 10 \text{ MHz},$ $t_r = t_f = 1 \text{ ns}$	1	1	1	1	1	pF
		Outputs Disabled		1	1	1	1	1	
	B to A	Outputs Enabled		12	12	12	13	14	
		Outputs Disabled		1	1	1	1	1	
$C_{pdB}^\dagger$	A to B	Outputs Enabled	$C_L = 0,$ $f = 10 \text{ MHz},$ $t_r = t_f = 1 \text{ ns}$	12	12	12	13	14	pF
		Outputs Disabled		1	1	1	1	1	
	B to A	Outputs Enabled		1	1	1	1	1	
		Outputs Disabled		1	1	1	1	1	

<sup>†</sup> Power-dissipation capacitance per transceiver



**SN74AVC8T245**  
**8-BIT DUAL-SUPPLY BUS TRANSCEIVER**  
**WITH CONFIGURABLE VOLTAGE TRANSLATION AND 3-STATE OUTPUTS**  
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typical total static power consumption ( $I_{CCA} + I_{CCB}$ )

Table 1

V <sub>CCB</sub>	V <sub>CCA</sub>						UNIT
	0 V	1.2 V	1.5 V	1.8 V	2.5 V	3.3 V	
0 V	0	<0.5	<0.5	<0.5	<0.5	<0.5	μA
1.2 V	<0.5	<1	<1	<1	<1	1	
1.5 V	<0.5	<1	<1	<1	<1	1	
1.8 V	<0.5	<1	<1	<1	<1	<1	
2.5 V	<0.5	1	<1	<1	<1	<1	
3.3 V	<0.5	1	<1	<1	<1	<1	

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**TYPICAL CHARACTERISTICS**

**TYPICAL PROPAGATION DELAY (A to B) vs LOAD CAPACITANCE**  
 $T_A = 25^\circ\text{C}, V_{CCA} = 1.2\text{ V}$

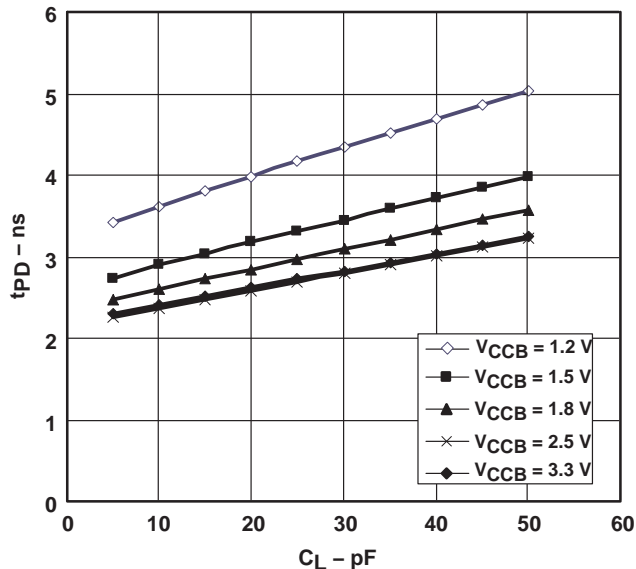


Figure 1

**TYPICAL PROPAGATION DELAY (A to B) vs LOAD CAPACITANCE**  
 $T_A = 25^\circ\text{C}, V_{CCA} = 1.5\text{ V}$

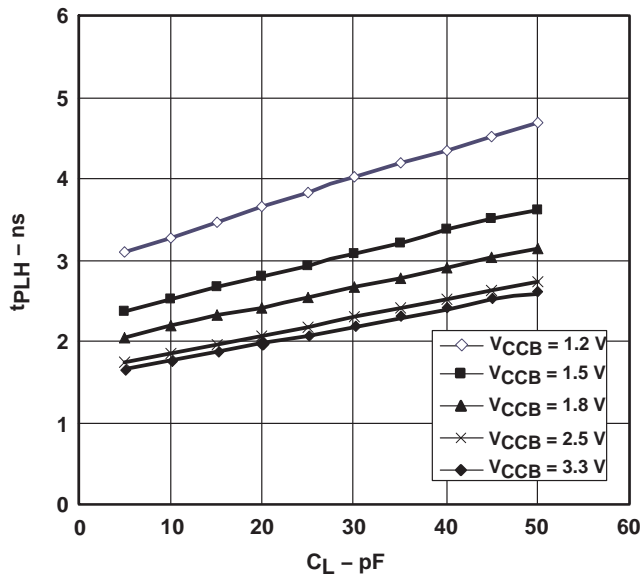


Figure 2

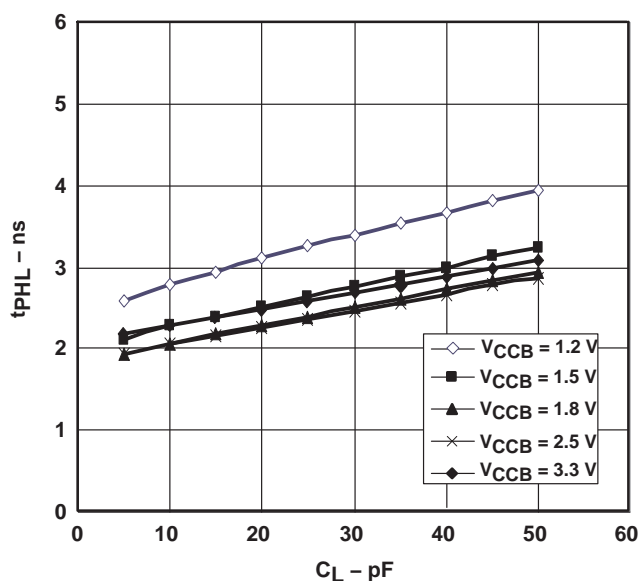


Figure 3

**SN74AVC8T245**  
**8-BIT DUAL-SUPPLY BUS TRANSCEIVER**  
**WITH CONFIGURABLE VOLTAGE TRANSLATION AND 3-STATE OUTPUTS**

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**TYPICAL PROPAGATION DELAY (A to B) vs LOAD CAPACITANCE**  
 $T_A = 25^\circ\text{C}$ ,  $V_{CCA} = 1.8\text{ V}$

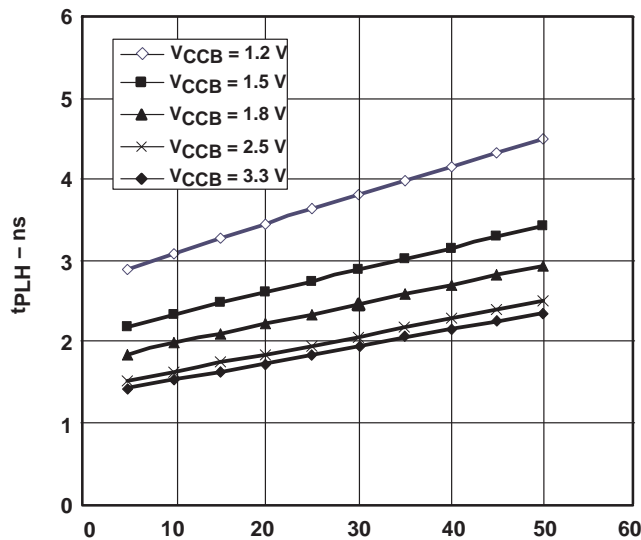


Figure 4

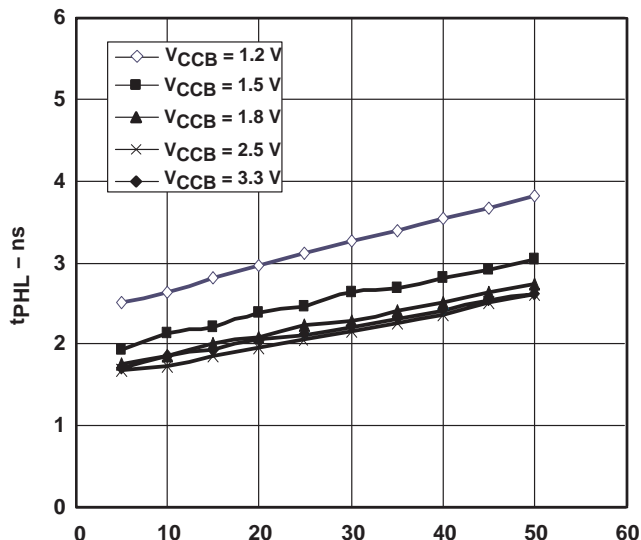


Figure 5

**TYPICAL PROPAGATION DELAY (A to B) vs LOAD CAPACITANCE**  
 $T_A = 25^\circ\text{C}$ ,  $V_{CCA} = 2.5\text{ V}$

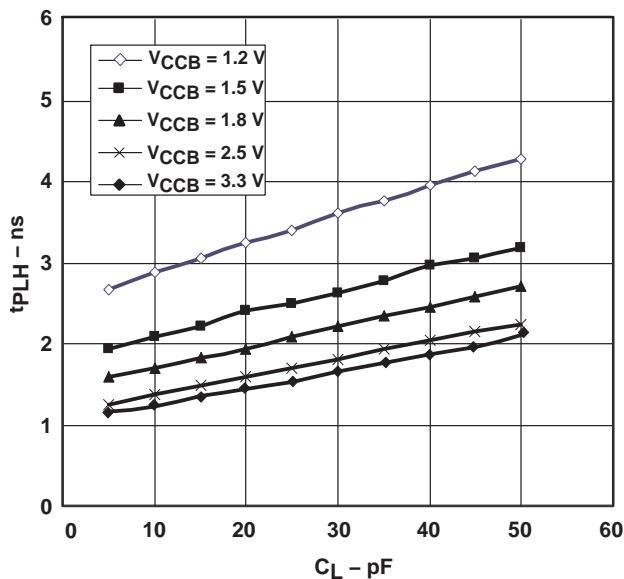


Figure 6

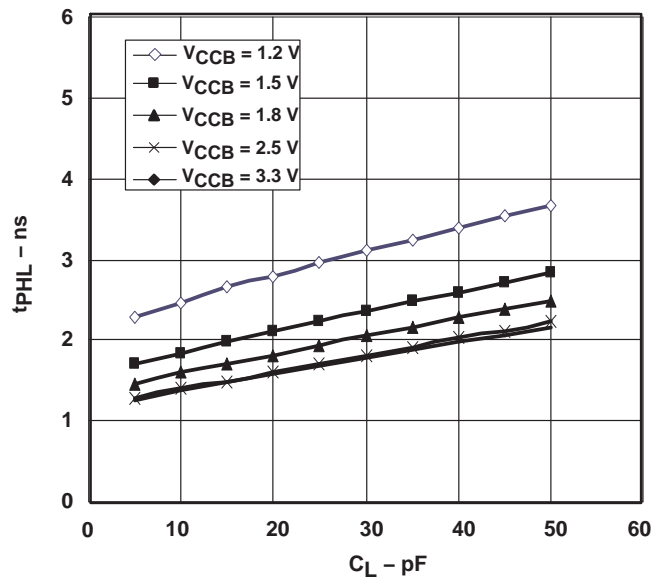
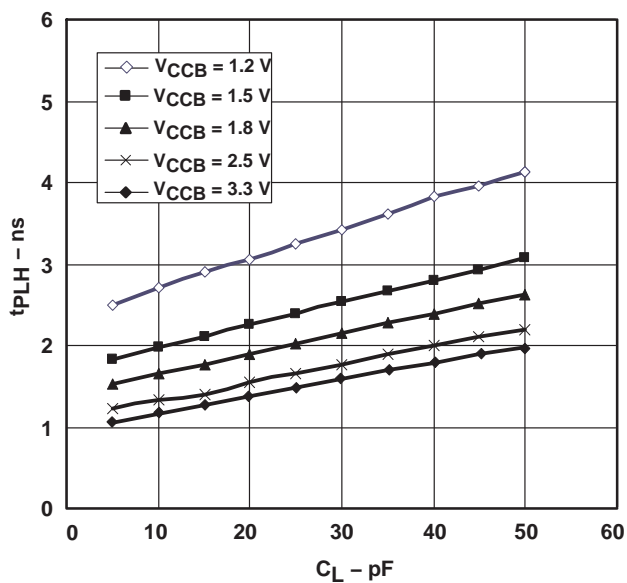


Figure 7

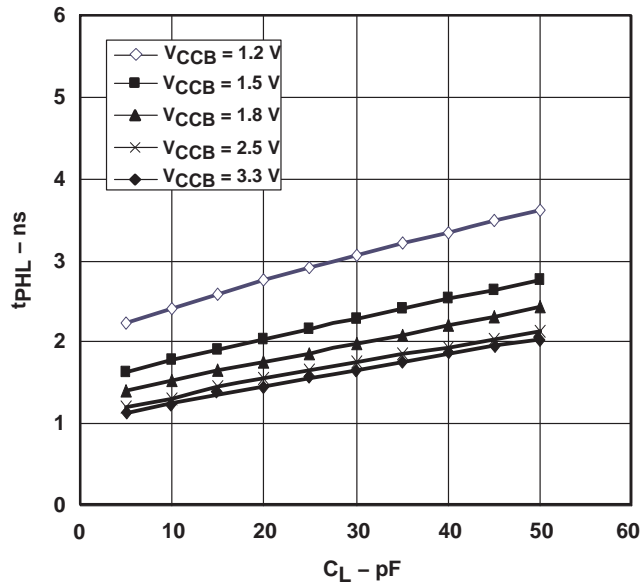
**SN74AVC8T245**  
**8-BIT DUAL-SUPPLY BUS TRANSCEIVER**  
**WITH CONFIGURABLE VOLTAGE TRANSLATION AND 3-STATE OUTPUTS**

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**TYPICAL PROPAGATION DELAY (A to B) vs LOAD CAPACITANCE**  
 $T_A = 25^\circ\text{C}, V_{CCA} = 3.3\text{ V}$



**Figure 8**

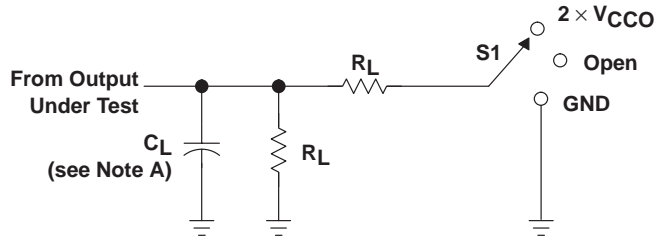


**Figure 9**

**SN74AVC8T245**  
**8-BIT DUAL-SUPPLY BUS TRANSCEIVER**  
**WITH CONFIGURABLE VOLTAGE TRANSLATION AND 3-STATE OUTPUTS**

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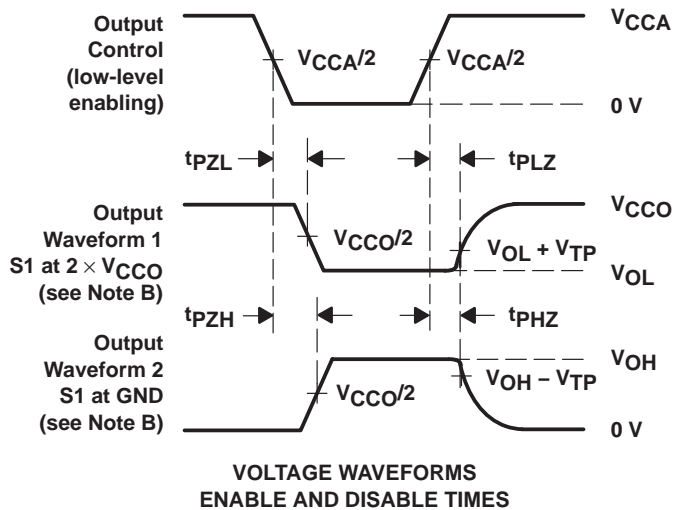
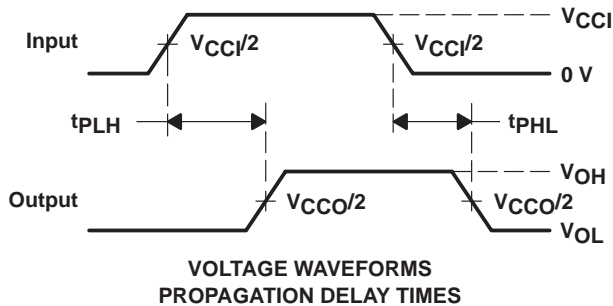
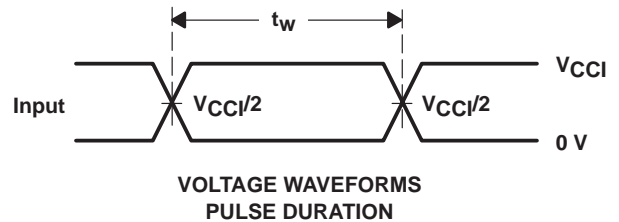
**PARAMETER MEASUREMENT INFORMATION**



**LOAD CIRCUIT**

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

$V_{CCO}$	$C_L$	$R_L$	$V_{TP}$
1.2 V	15 pF	2 k $\Omega$	0.1 V
1.5 V $\pm$ 0.1 V	15 pF	2 k $\Omega$	0.1 V
1.8 V $\pm$ 0.15 V	15 pF	2 k $\Omega$	0.15 V
2.5 V $\pm$ 0.2 V	15 pF	2 k $\Omega$	0.15 V
3.3 V $\pm$ 0.3 V	15 pF	2 k $\Omega$	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 MHz,  $Z_O = 50 \Omega$ ,  $dv/dt \geq 1$  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  $t_{pd}$ .
  - H.  $V_{CCI}$  is the  $V_{CC}$  associated with the input port.
  - I.  $V_{CCO}$  is the  $V_{CC}$  associated with the output port.

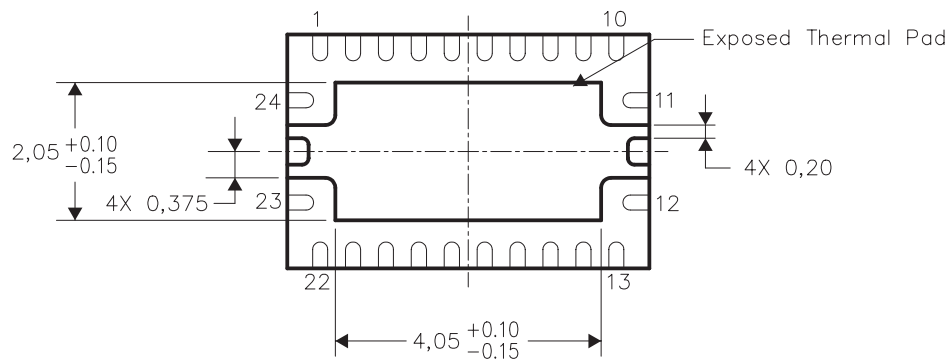
**Figure 10. Load Circuit and Voltage Waveforms**

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), the PCB can be used as a heatsink. In addition, through the use of thermal vias, the thermal pad can be attached directly to a ground plane or 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

**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>
74AVC8T245DGVRE4	ACTIVE	TVSOP	DGV	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AVC8T245RHLRG4	ACTIVE	QFN	RHL	24	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1YEAR
SN74AVC8T245DGVR	ACTIVE	TVSOP	DGV	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AVC8T245PW	ACTIVE	TSSOP	PW	24	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AVC8T245PWE4	ACTIVE	TSSOP	PW	24	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AVC8T245PWR	ACTIVE	TSSOP	PW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AVC8T245PWRE4	ACTIVE	TSSOP	PW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AVC8T245RHLR	ACTIVE	QFN	RHL	24	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1YEAR

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

PLASTIC SMALL-OUTLINE

24 PINS SHOWN

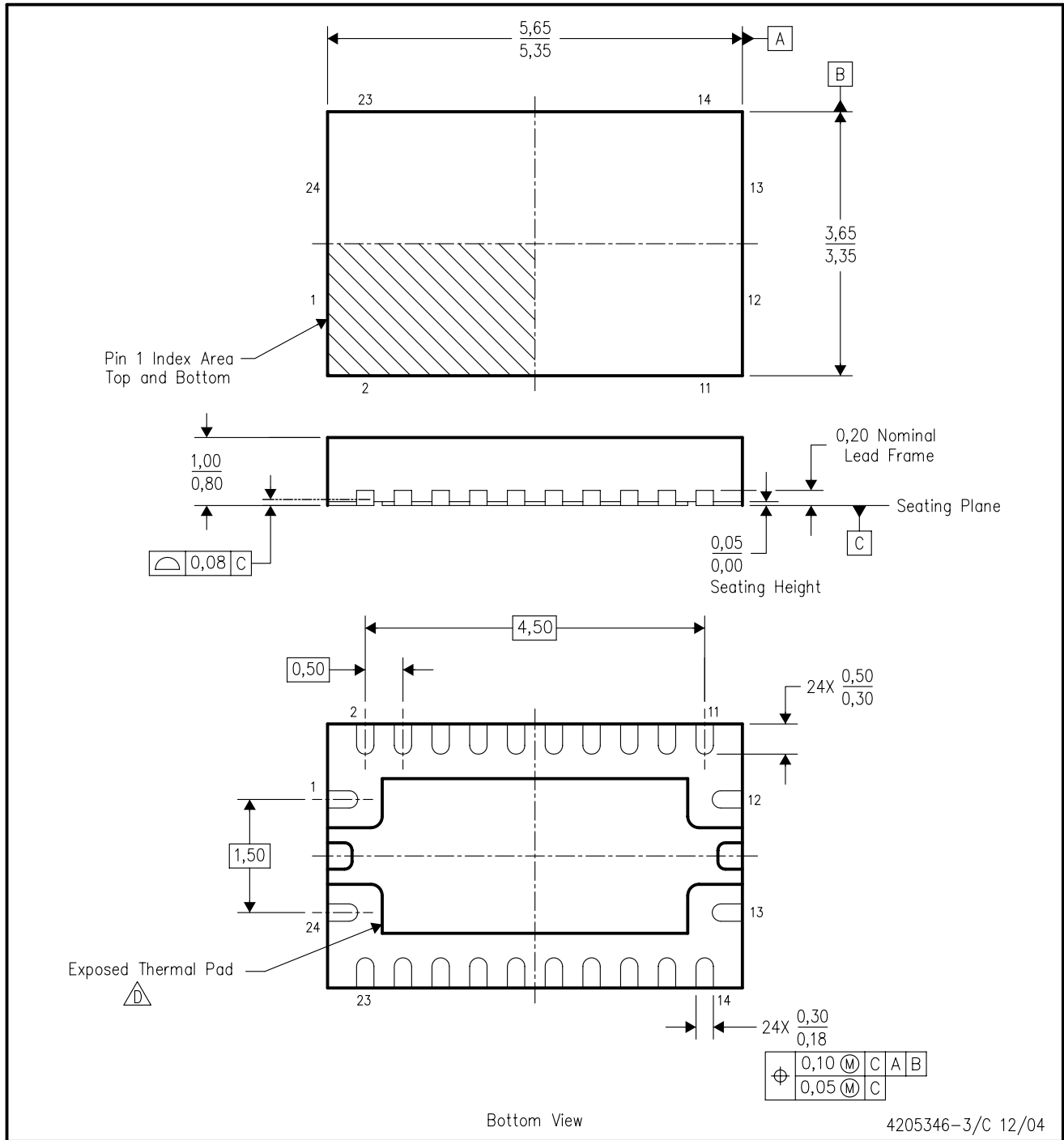


4073251/E 08/00

- 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

RHL (R-PQFP-N24)

PLASTIC QUAD FLATPACK



- 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. See the Product Data Sheet for details regarding the exposed thermal pad dimensions.
  - E. JEDEC MO-241 package registration pending.

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

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



4040064/F 01/97

- NOTES: A. All linear dimensions are in millimeters.  
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 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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