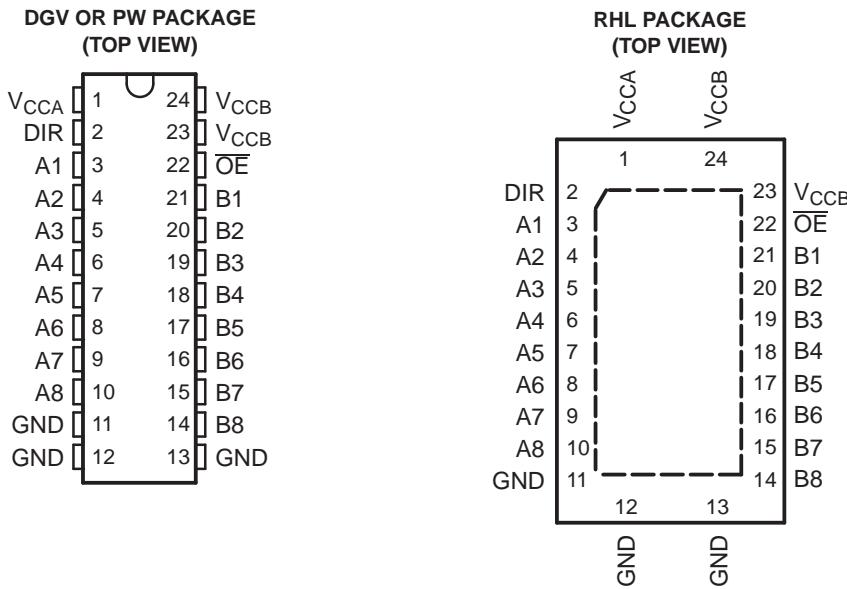


FEATURES

- 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 ($V_{CCA} < 1.8$ V or $V_{CCB} < 1.8$ V)
 - 320 Mbps ($V_{CCA} \geq 1.8$ V and $V_{CCB} \geq 1.8$ 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 ⁽¹⁾		ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 85°C	QFN – RHL	Reel of 1000	SN74AVC8T245RHLR	WE245
	TSSOP – PW	Tube of 60	SN74AVC8T245PW	WE245
		Reel of 2000	SN74AVC8T245PWR	
	TVSOP – DGV	Reel of 2000	SN74AVC8T245DGVR	WE245

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at www.ti.com.



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.

DESCRIPTION/ORDERING INFORMATION (CONTINUED)

The SN74AVC8T245 is designed for asynchronous communication between data buses. The device transmits data from the A bus to the B bus or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input. The output-enable (\overline{OE}) input can be used to disable the outputs so the buses are effectively isolated.

The SN74AVC8T245 is designed so the control pins (DIR and \overline{OE}) are supplied by V_{CCA} .

The SN74AVC8T245 solution is compatible with a single-supply system and can be replaced later with a '245 function, with minimal printed circuit board redesign.

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.

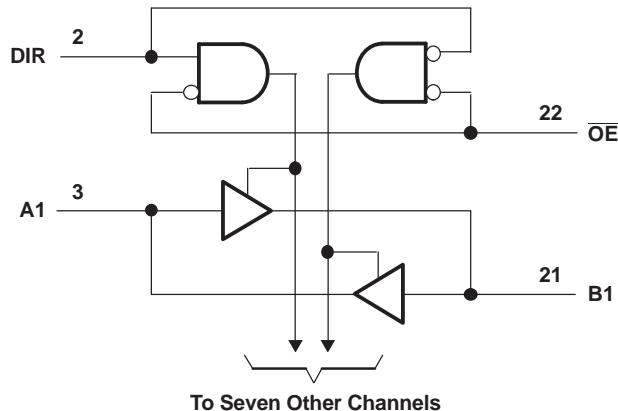
The V_{CC} isolation feature ensures that if either V_{CC} input is at GND, both ports are in the high-impedance state.

To ensure the high-impedance state during power up or power down, \overline{OE} shall be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

FUNCTION TABLE
(each 8-bit section)

INPUTS		OPERATION
\overline{OE}	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	All outputs Hi-Z

LOGIC DIAGRAM (POSITIVE LOGIC)



Absolute Maximum Ratings⁽¹⁾

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

		MIN	MAX	UNIT
V_{CCA}	Supply voltage range	-0.5	4.6	V
V_I	Input voltage range ⁽²⁾	I/O ports (A port)	-0.5	4.6
		I/O ports (B port)	-0.5	4.6
		Control inputs	-0.5	4.6
V_O	Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾ ⁽³⁾	A port	-0.5	4.6
		B port	-0.5	4.6
V_O	Voltage range applied to any output in the high or low state ⁽²⁾ ⁽³⁾	A port	-0.5 V_{CCA} + 0.5	V
		B port	-0.5 V_{CCB} + 0.5	
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		± 50	mA
	Continuous current through V_{CCA} , V_{CCB} , or GND		± 100	mA
θ_{JA}	Package thermal impedance ⁽⁴⁾	DGV package	86	
		PW package	88	$^{\circ}\text{C}/\text{W}$
		RHL package	43	
T_{stg}	Storage temperature range	-65	150	$^{\circ}\text{C}$

- (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 voltage and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) The output positive-voltage rating may be exceeded up to 4.6 V maximum if the output current rating is observed.
- (4) The package thermal impedance is calculated in accordance with JESD 51-7.

Recommended Operating Conditions⁽¹⁾⁽²⁾⁽³⁾

		V_{CCI}	V_{CCO}	MIN	MAX	UNIT
V_{CCA}	Supply voltage			1.2	3.6	V
V_{CCB}	Supply voltage			1.2	3.6	V
V_{IH}	High-level input voltage	Data inputs	1.2 V to 1.95 V	$V_{CCI} \times 0.65$	V	
			1.95 V to 2.7 V	1.6		
			2.7 V to 3.6 V	2		
V_{IL}	Low-level input voltage	Data inputs	1.2 V to 1.95 V	$V_{CCI} \times 0.35$	V	
			1.95 V to 2.7 V	0.7		
			2.7 V to 3.6 V	0.8		
V_{IH}	High-level input voltage	DIR (referenced to V_{CCA})	1.2 V to 1.95 V	$V_{CCA} \times 0.65$	V	
			1.95 V to 2.7 V	1.6		
			2.7 V to 3.6 V	2		
V_{IL}	Low-level input voltage	DIR (referenced to V_{CCA})	1.2 V to 1.95 V	$V_{CCA} \times 0.35$	V	
			1.95 V to 2.7 V	0.7		
			2.7 V to 3.6 V	0.8		
V_I	Input voltage			0	3.6	V
V_O	Output voltage	Active state		0	V_{CCO}	V
		3-state		0	3.6	
I_{OH}	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_{OL}	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	
$\Delta t/\Delta v$	Input transition rise or fall rate				5	ns/V
T_A	Operating free-air temperature			-40	85	°C

(1) V_{CCI} is the V_{CC} associated with the input port.(2) V_{CCO} is the V_{CC} associated with the output port.(3) All unused data inputs of the device must be held at V_{CCI} 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⁽¹⁾⁽²⁾

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

PARAMETER	TEST CONDITIONS	V _{CCA}	V _{CCB}	T _A = 25°C			–40°C to 85°C		UNIT
				MIN	TYP	MAX	MIN	MAX	
V _{OH}	I _{OH} = –100 µA	V _I = V _{IH}	1.2 V to 3.6 V	1.2 V to 3.6 V			V _{CCO} – 0.2		V
	I _{OH} = –3 mA		1.2 V	1.2 V	0.95				
	I _{OH} = –6 mA		1.4 V	1.4 V			1.05		
	I _{OH} = –8 mA		1.65 V	1.65 V			1.2		
	I _{OH} = –9 mA		2.3 V	2.3 V			1.75		
	I _{OH} = –12 mA		3 V	3 V			2.3		
V _{OL}	I _{OL} = 100 µA	V _I = V _{IL}	1.2 V to 3.6 V	1.2 V to 3.6 V			0.2		V
	I _{OL} = 3 mA		1.2 V	1.2 V	0.15				
	I _{OL} = 6 mA		1.4 V	1.4 V			0.35		
	I _{OL} = 8 mA		1.65 V	1.65 V			0.45		
	I _{OL} = 9 mA		2.3 V	2.3 V			0.55		
	I _{OL} = 12 mA		3 V	3 V			0.7		
I _I	Control inputs	V _I = V _{CCA} or GND	1.2 V to 3.6 V	1.2 V to 3.6 V	±0.025	±0.25		±1	µA
I _{off}	A or B port	V _I or V _O = 0 to 3.6 V	0 V	0 V to 3.6 V	±0.1	±1		±5	µA
			0 V to 3.6 V	0 V	±0.1	±1		±5	
I _{OZ} ⁽³⁾	A or B port	V _O = V _{CCO} or GND, V _I = V _{CCI} or GND, OE = V _{IH}	3.6 V	3.6 V	±0.5	±2.5		±5	µA
I _{CCA}		V _I = V _{CCI} or GND, I _O = 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 _{CCB}		V _I = V _{CCI} or GND, I _O = 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 _{<Subscript>C CA</Subscript> + I_{<Subscript>C CB</Subscript>}}		V _I = V _{CCI} or GND, I _O = 0	1.2 V to 3.6 V	1.2 V to 3.6 V			25		µA
C _i	Control inputs	V _I = 3.3 V or GND	3.3 V	3.3 V	3.5		4.5		pF
C _{io}	A or B port	V _O = 3.3 V or GND	3.3 V	3.3 V	6		7		pF

 (1) V_{CCO} is the V_{CC} associated with the output port.

 (2) V_{CCI} is the V_{CC} associated with the input port.

 (3) For I/O ports, the parameter I_{OZ} includes the input leakage current.

Switching Characteristics

over recommended operating free-air temperature range, $V_{CCA} = 1.2\text{ V}$ (see [Figure 10](#))

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

Switching Characteristics

over recommended operating free-air temperature range, $V_{CCA} = 1.5\text{ V} \pm 0.1\text{ V}$ (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			
t_{PLH}	A	B	2.7	0.5	5.4	0.5	4.6	0.5	6.8	ns
t_{PHL}			2.7	0.5	5.4	0.5	4.6	0.5	6.8	
t_{PLH}	B	A	2.6	0.5	5.4	0.5	5.1	0.5	4.7	ns
t_{PHL}			2.6	0.5	5.4	0.5	5.1	0.5	4.7	
t_{PZH}	\overline{OE}	A	3.7	1.1	8.7	1.1	8.7	1.1	8.7	ns
t_{PZL}			3.7	1.1	8.7	1.1	8.7	1.1	8.7	
t_{PZH}	\overline{OE}	B	4.8	1.1	7.6	1.1	7.1	1	5.6	ns
t_{PZL}			4.8	1.1	7.6	1.1	7.1	1	5.6	
t_{PHZ}	\overline{OE}	A	3.1	0.5	8.6	0.5	8.6	0.5	8.6	ns
t_{PLZ}			3.1	0.5	8.6	0.5	8.6	0.5	8.6	
t_{PHZ}	\overline{OE}	B	4.1	0.5	8.4	0.5	7.6	0.5	7.2	ns
t_{PLZ}			4.1	0.5	8.4	0.5	7.6	0.5	7.2	

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	

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_{PLH}	A	B	2.3	0.5	4.5	0.5	3.7	0.5	2.9	0.5	2.5	ns
t_{PHL}			2.3	0.5	4.5	0.5	3.3	0.5	2.9	0.5	2.5	
t_{PLH}	B	A	3.5	0.5	6.8	0.5	3.9	0.5	2.8	0.5	2.5	ns
t_{PHL}			3.5	0.5	6.8	0.5	3.9	0.5	2.8	0.5	2.5	
t_{PZH}	\overline{OE}	A	2	0.5	4	0.5	4	0.5	4	0.5	4	ns
t_{PZL}			2	0.5	4	0.5	4	0.5	4	0.5	4	
t_{PZH}	\overline{OE}	B	4.5	1.1	7.8	0.5	6.2	0.5	4.5	0.5	3.9	ns
t_{PZL}			4.5	1.1	7.8	0.5	6.2	0.5	4.5	0.5	3.9	
t_{PHZ}	\overline{OE}	A	1.7	0.5	4	0.5	4	0.5	4	0.5	4	ns
t_{PLZ}			1.7	0.5	4	0.5	4	0.5	4	0.5	4	
t_{PHZ}	\overline{OE}	B	3.4	0.5	6.9	0.5	6	0.5	4.8	0.5	4.2	ns
t_{PLZ}			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	
$C_{pdA}^{(1)}$	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	
$C_{pdB}^{(1)}$	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	

(1) Power dissipation capacitance per transceiver

Table 1. Typical Total Static Power Consumption ($I_{CCA} + I_{CCB}$)

V_{CCB}	V_{CCA}						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	
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	

TYPICAL CHARACTERISTICS

Typical Propagation Delay (A to B) vs Load Capacitance
 $T_A = 25^\circ\text{C}$, $V_{CCA} = 1.2\text{ V}$

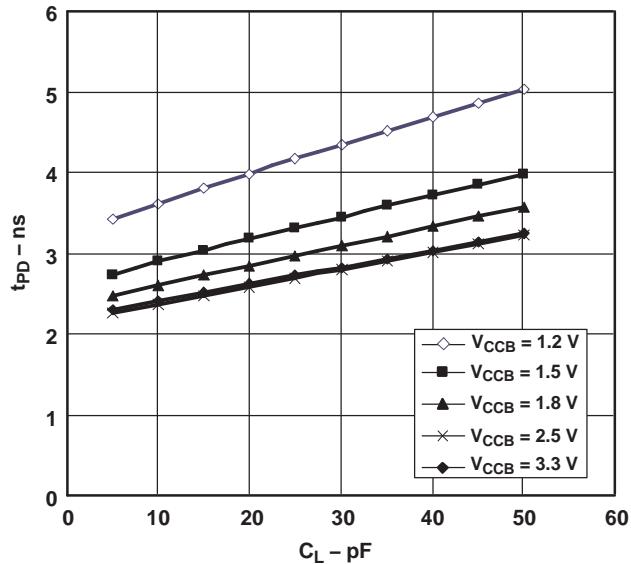


Figure 1.

Typical Propagation Delay (A to B) vs Load Capacitance
 $T_A = 25^\circ\text{C}$, $V_{CCA} = 1.5\text{ V}$

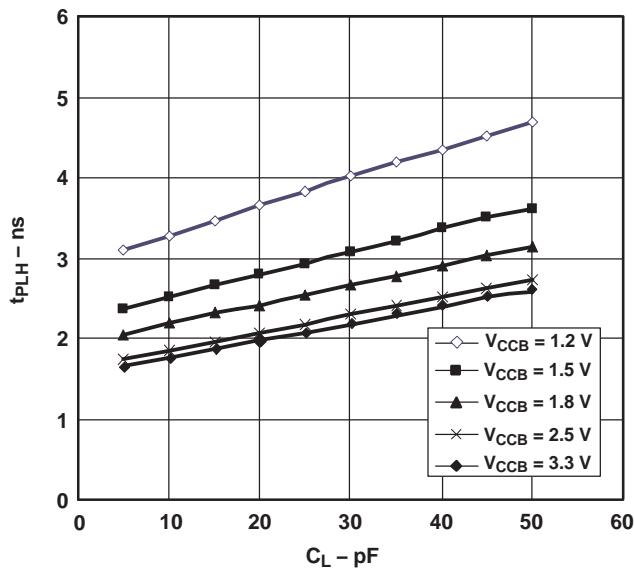


Figure 2.

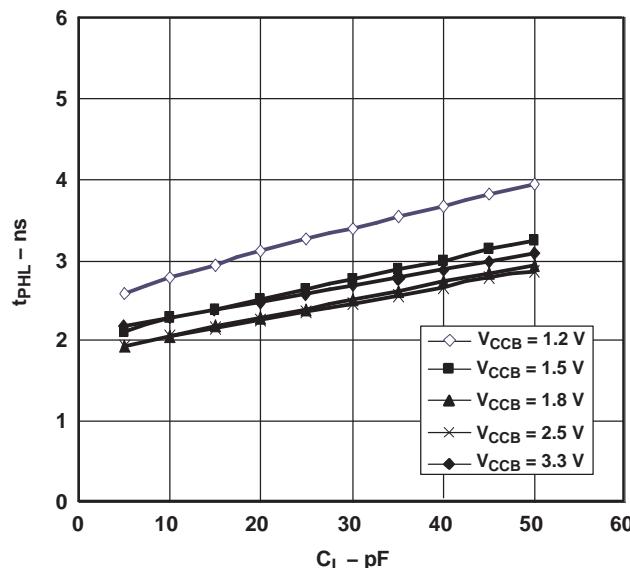


Figure 3.

TYPICAL CHARACTERISTICS (continued)

Typical Propagation Delay (A to B) vs Load Capacitance
 $T_A = 25^\circ\text{C}$, $V_{CCA} = 1.8\text{ V}$

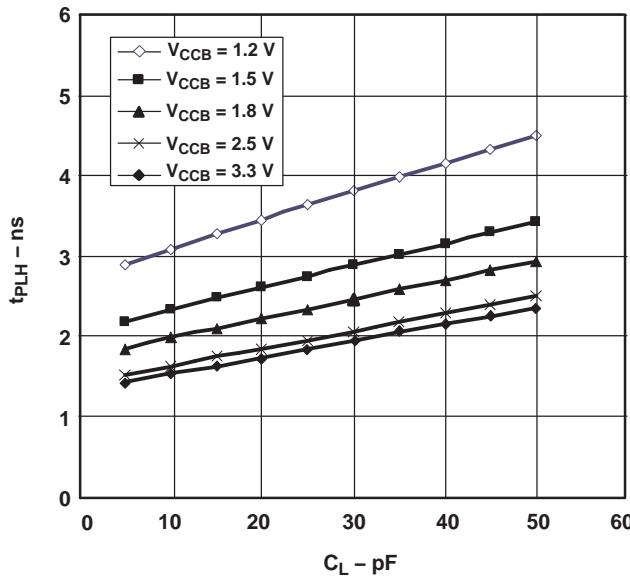


Figure 4.

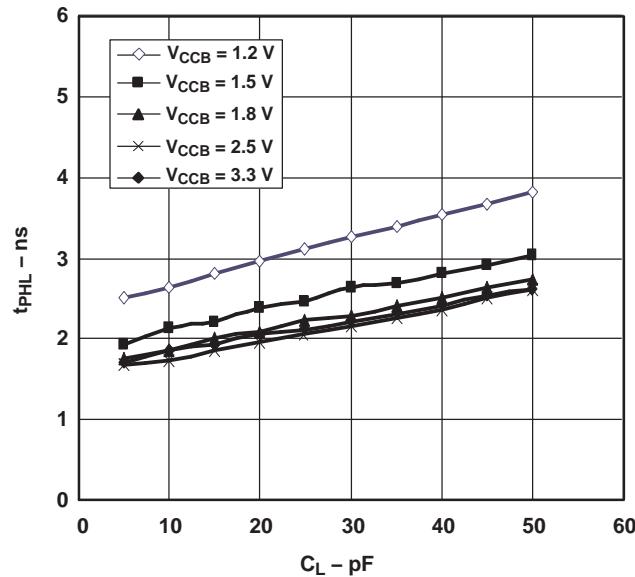


Figure 5.

Typical Propagation Delay (A to B) vs Load Capacitance
 $T_A = 25^\circ\text{C}$, $V_{CCA} = 2.5\text{ V}$

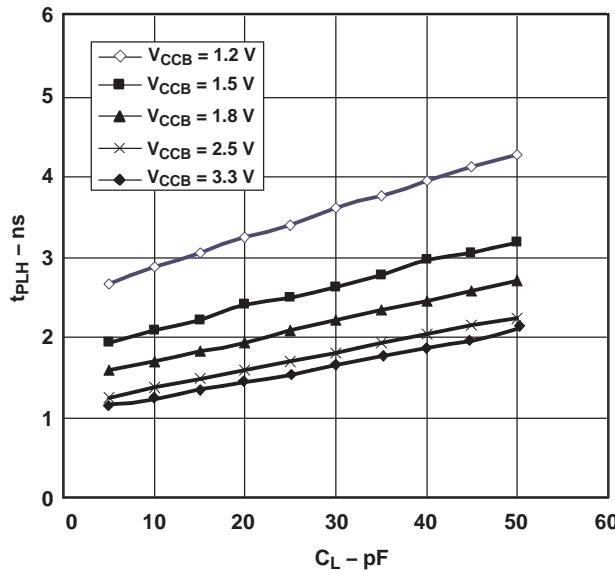


Figure 6.

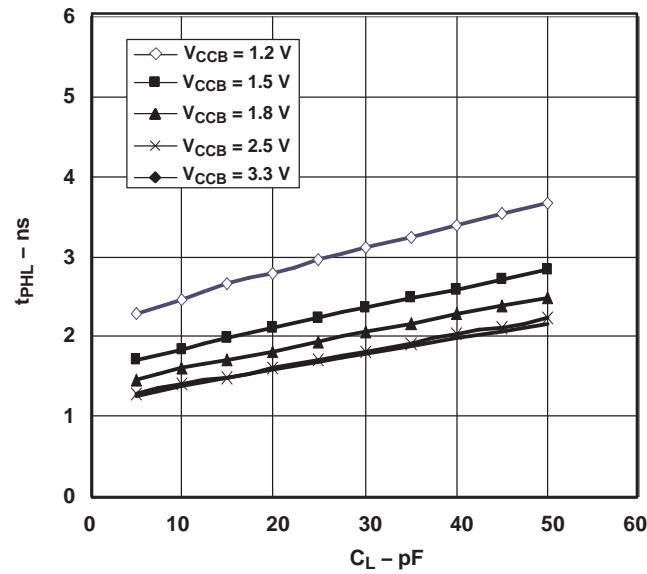


Figure 7.

TYPICAL CHARACTERISTICS (continued)

Typical Propagation Delay (A to B) vs Load Capacitance
 $T_A = 25^\circ\text{C}$, $V_{CCA} = 3.3\text{ V}$

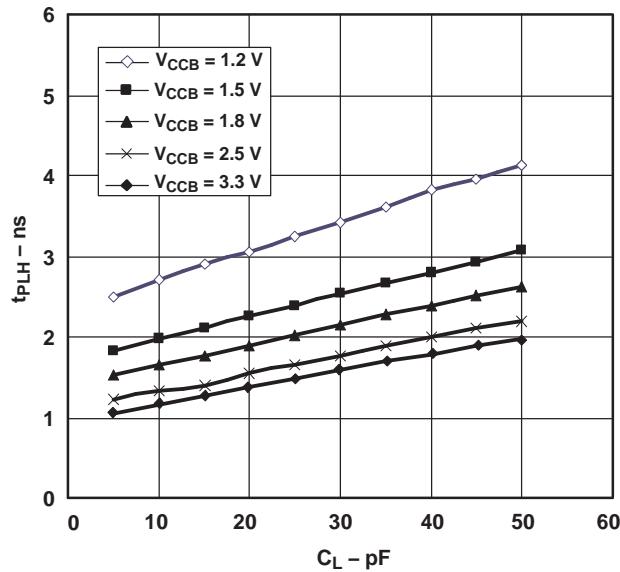


Figure 8.

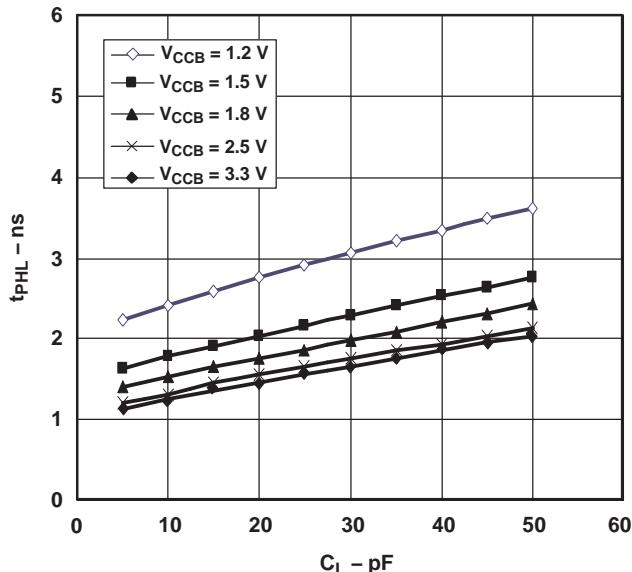
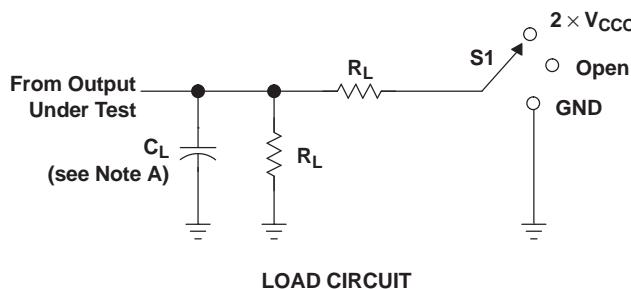


Figure 9.

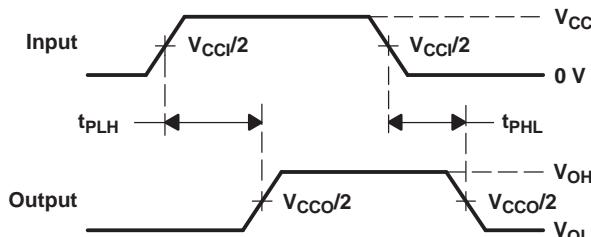
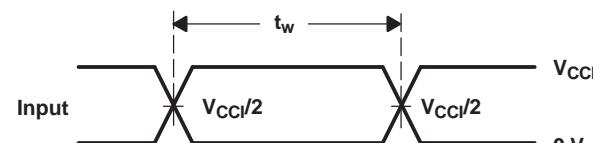
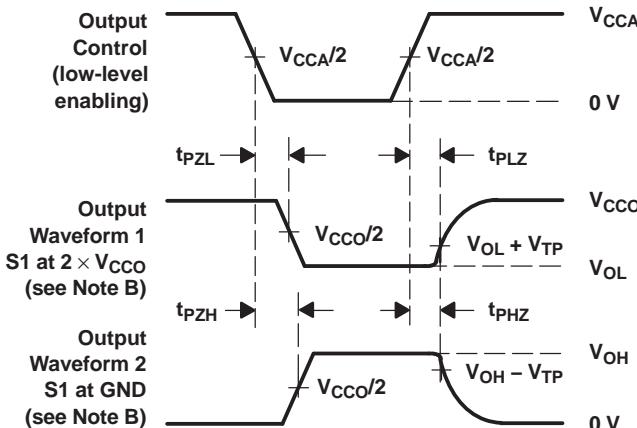
PARAMETER MEASUREMENT INFORMATION



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

LOAD CIRCUIT

V _{CCO}	C _L	R _L	V _{TP}
1.2 V	15 pF	2 k Ω	0.1 V
1.5 V \pm 0.1 V	15 pF	2 k Ω	0.1 V
1.8 V \pm 0.15 V	15 pF	2 k Ω	0.15 V
2.5 V \pm 0.2 V	15 pF	2 k Ω	0.15 V
3.3 V \pm 0.3 V	15 pF	2 k Ω	0.3 V

VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMESVOLTAGE WAVEFORMS
PULSE DURATIONVOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES

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, $Z_O = 50 \Omega$, $dv/dt \geq 1 \text{ V/ns}$.
 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

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
74AVC8T245DGVR4	ACTIVE	TVSOP	DGV	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AVC8T245DGVRG4	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-1 YEAR
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
SN74AVC8T245PWG4	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
SN74AVC8T245PWRG4	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-1 YEAR

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

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)

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

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI

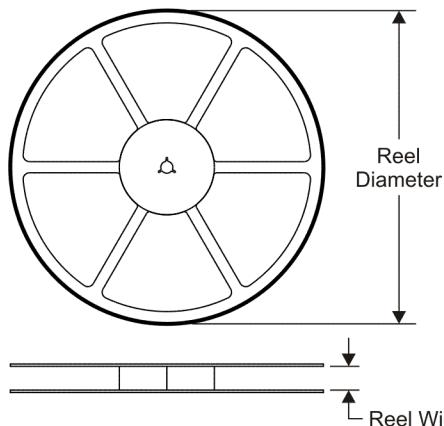
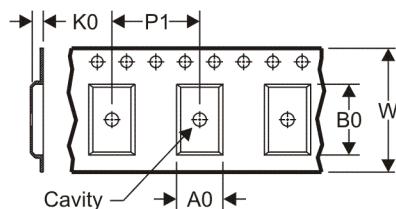
to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF SN74AVC8T245 :

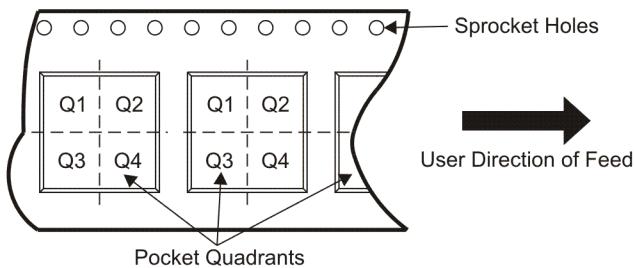
- Automotive: [SN74AVC8T245-Q1](#)

NOTE: Qualified Version Definitions:

- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

TAPE AND REEL INFORMATION
REEL DIMENSIONS

TAPE DIMENSIONS


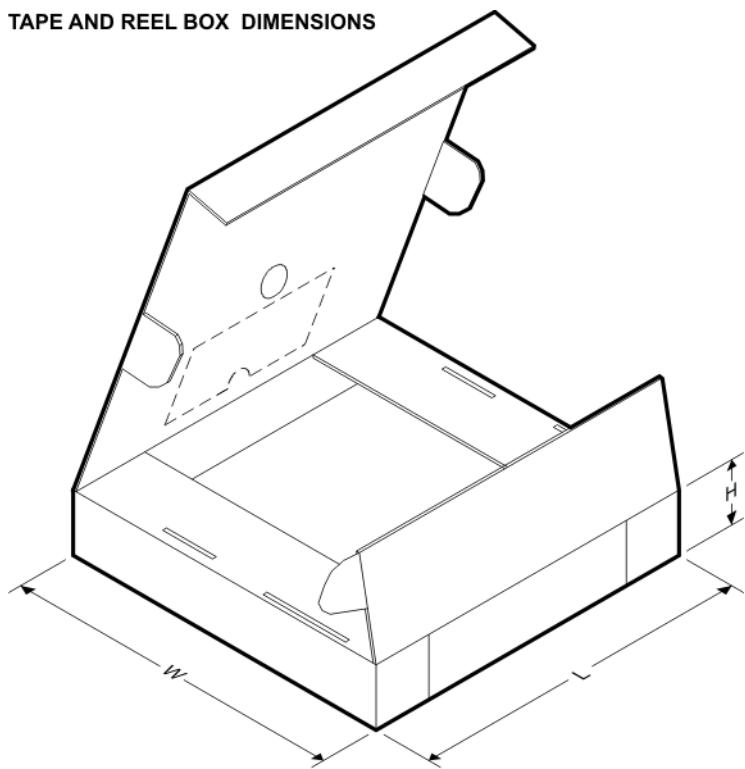
A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

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
SN74AVC8T245DGVR	TVSOP	DGV	24	2000	330.0	12.4	7.0	5.6	1.6	8.0	12.0	Q1
SN74AVC8T245PWR	TSSOP	PW	24	2000	330.0	16.4	6.95	8.3	1.6	8.0	16.0	Q1
SN74AVC8T245RHLR	QFN	RHL	24	1000	180.0	12.4	3.8	5.8	1.2	8.0	12.0	Q1

TAPE AND REEL BOX DIMENSIONS



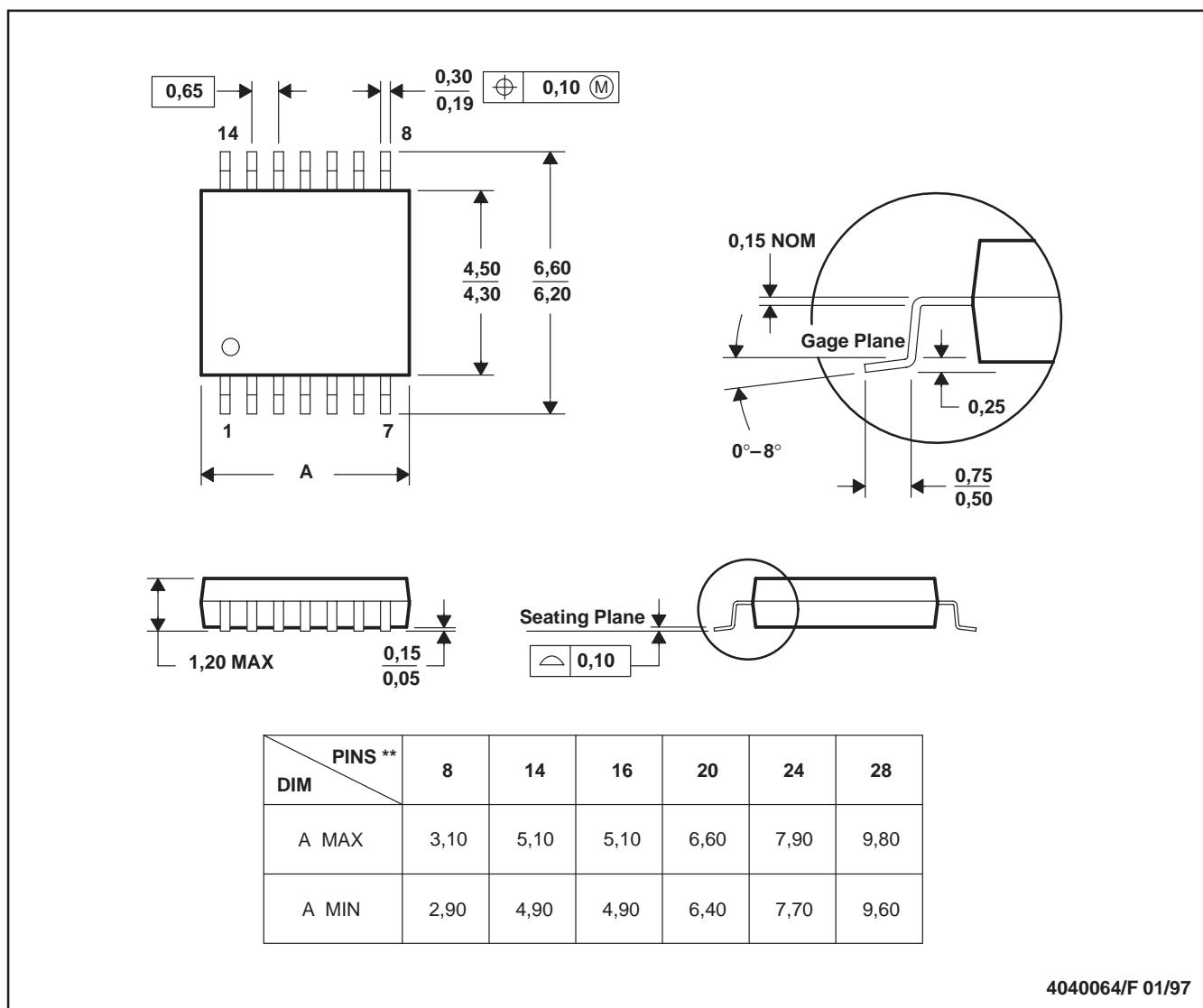
*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AVC8T245DGVR	TVSOP	DGV	24	2000	346.0	346.0	29.0
SN74AVC8T245PWR	TSSOP	PW	24	2000	346.0	346.0	33.0
SN74AVC8T245RHLR	QFN	RHL	24	1000	190.5	212.7	31.8

PW (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



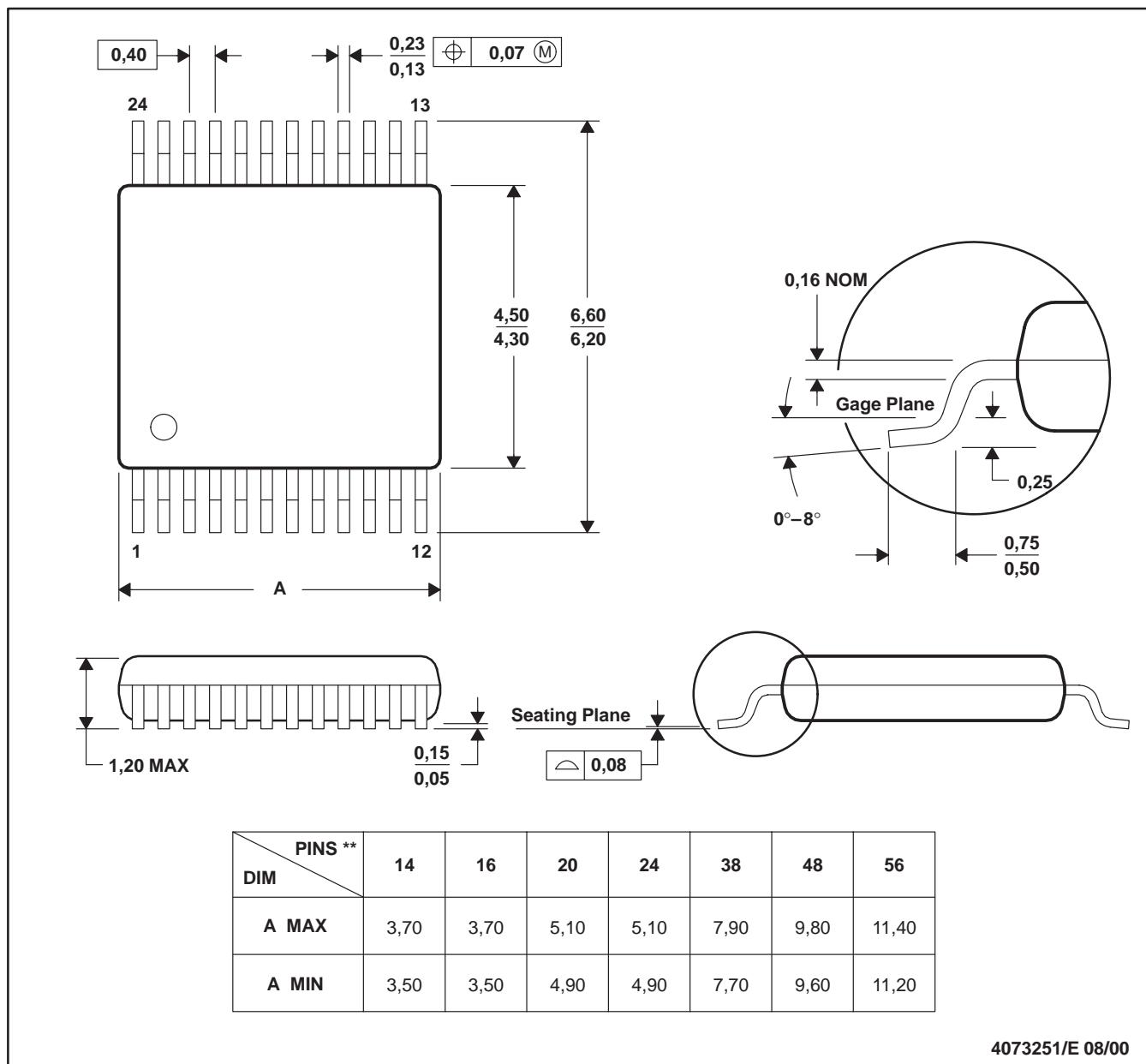
NOTES:

- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- Body dimensions do not include mold flash or protrusion not to exceed 0,15.
- Falls within JEDEC MO-153

DGV (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

24 PINS SHOWN

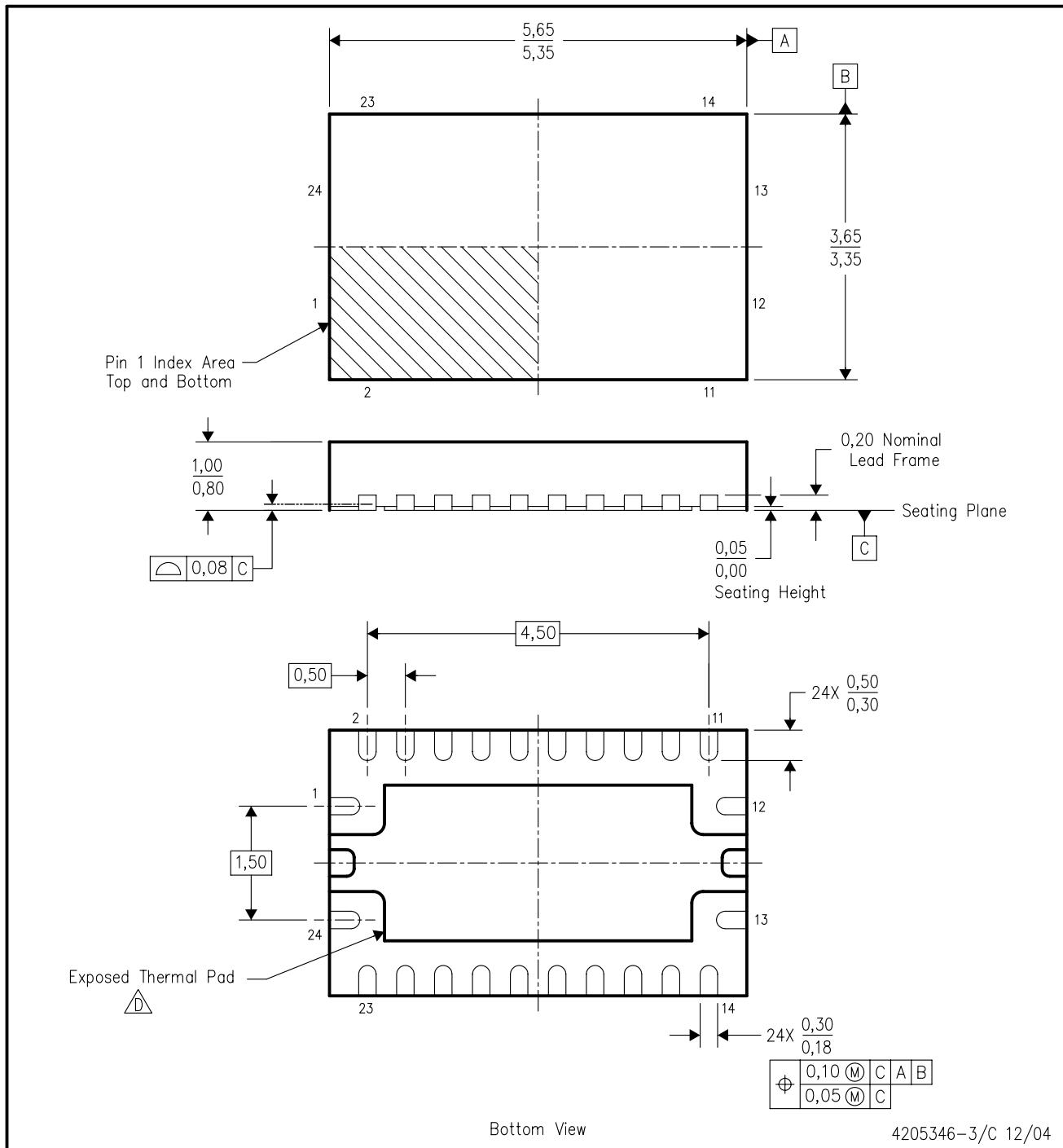


NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15 per side.
 D. Falls within JEDEC: 24/48 Pins – MO-153
 14/16/20/56 Pins – MO-194

MECHANICAL DATA

RHL (R-PQFP-N24)

PLASTIC QUAD FLATPACK



4205346-3/C 12/04

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.

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.

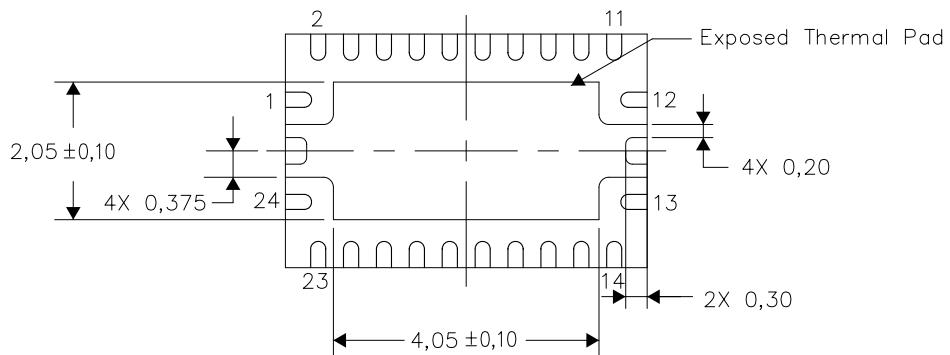
E. JEDEC MO-241 package registration pending.

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, QFN/SON PCB Attachment, Texas Instruments Literature No. SLUA271. This document is available at www.ti.com.

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

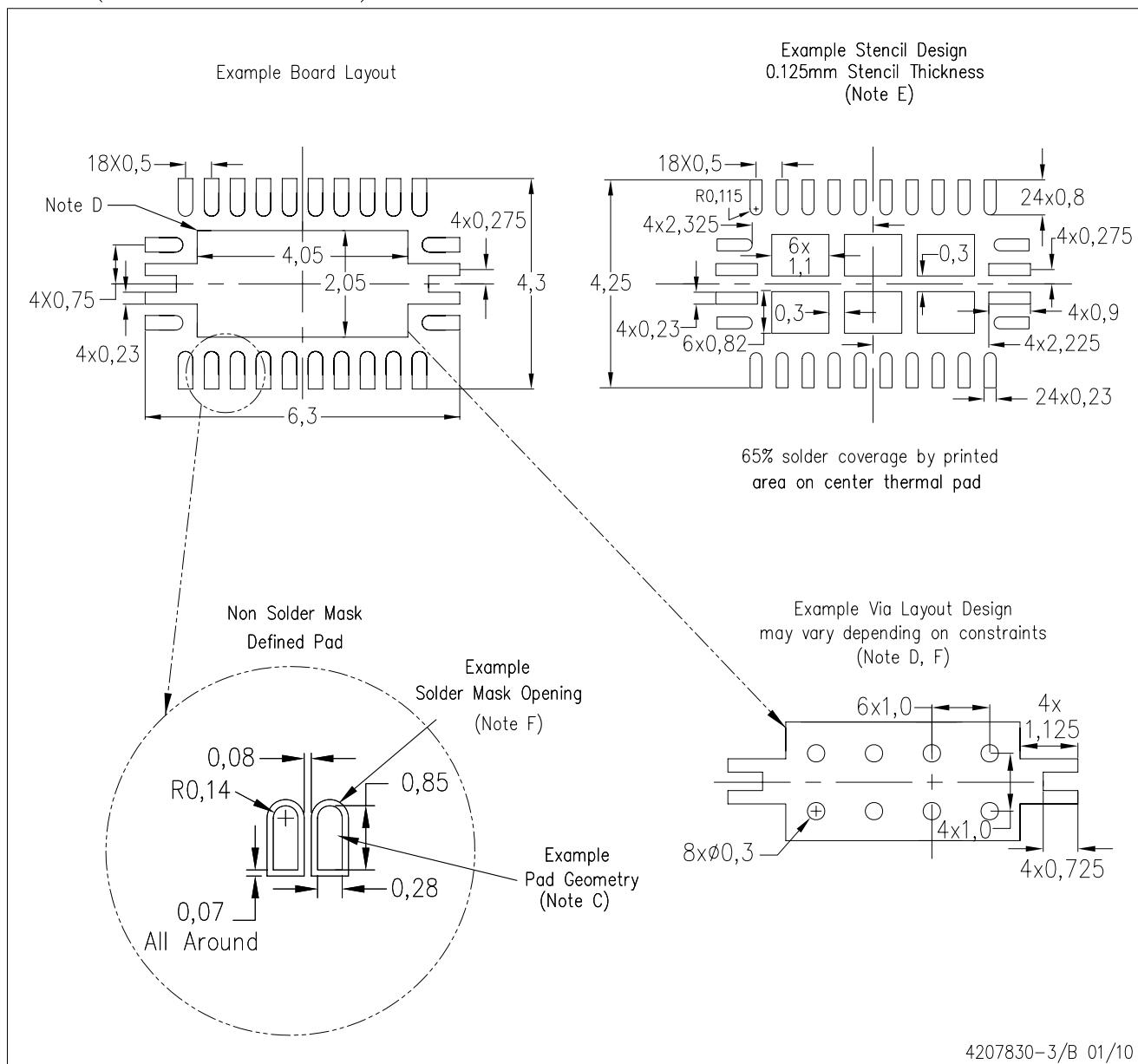


Bottom View

NOTE: All linear dimensions are in millimeters

Exposed Thermal Pad Dimensions

RHL (R-PVQFN-N24)



NOTES:

- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. 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. 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>>.
- E. 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.
- F. Customers should contact their board fabrication site for minimum solder mask web tolerances between signal pads.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products	Applications
Amplifiers amplifier.ti.com	Audio www.ti.com/audio
Data Converters dataconverter.ti.com	Automotive www.ti.com/automotive
DLP® Products www.dlp.com	Communications and Telecom www.ti.com/communications
DSP dsp.ti.com	Computers and Peripherals www.ti.com/computers
Clocks and Timers www.ti.com/clocks	Consumer Electronics www.ti.com/consumer-apps
Interface interface.ti.com	Energy www.ti.com/energy
Logic logic.ti.com	Industrial www.ti.com/industrial
Power Mgmt power.ti.com	Medical www.ti.com/medical
Microcontrollers microcontroller.ti.com	Security www.ti.com/security
RFID www.ti-rfid.com	Space, Avionics & Defense www.ti.com/space-avionics-defense
RF/IF and ZigBee® Solutions www.ti.com/lprf	Video and Imaging www.ti.com/video
	Wireless www.ti.com/wireless-apps