SN74LVC8T245 8-BIT DUAL-SUPPLY BUS TRANSCEIVER

WITH CONFIGURABLE VOLTAGE TRANSLATION AND 3-STATE OUTPUTS

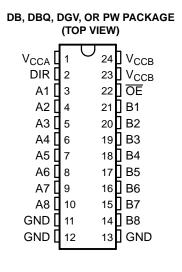
SCES584A-JUNE 2005-REVISED AUGUST 2005

FEATURES

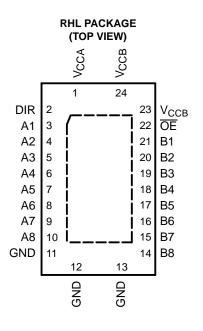
RUMENTS

www.ti.com

- 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 Are in the High-Impedance State
- Fully Configurable Dual-Rail Design Allows Each Port to Operate Over the Full 1.65-V to 5.5-V Power-Supply Range



- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
 - 4000-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 SN74LVC8T245 is optimized to operate with V_{CCA} and V_{CCB} set at 1.65 V to 5.5 V. The A port is designed to track V_{CCA} . V_{CCA} accepts any supply voltage from 1.65 V to 5.5 V. The B port is designed to track V_{CCB} . V_{CCB} accepts any supply voltage from 1.65 V to 5.5 V. The B port is designed to track V_{CCB} . V_{CCB} accepts any supply voltage from 1.65 V to 5.5 V. The B port is designed to track V_{CCB} . V_{CCB} accepts any supply voltage from 1.65 V to 5.5 V. This allows for universal low-voltage bidirectional translation between any of the 1.8-V, 2.5-V, 3.3-V, and 5.5-V voltage nodes.

ORDERING INFORMATION

T _A	PACKAGE	(1)	ORDERABLE PART NUMBER	TOP-SIDE MARKING
	QFN – RHL	Tape and reel	SN74LVC8T245RHLR	NH245
	SSOP – DBR	Tape and reel	SN74LVC8T245DBR	NH245
40°C to 95°C	SSOP (QSOP) – DBQ	Tape and reel	SN74LVC8T245DBQR	NH245
–40°C to 85°C	TSSOP – PW	Tube	SN74LVC8T245PW	NUD4E
	1550P - PW	Tape and reel	SN74LVC8T245PWR	- NH245
	TVSOP – DGV	Tape and reel	SN74LVC8T245DGVR	NH245

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



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.



SCES584A-JUNE 2005-REVISED AUGUST 2005

DESCRIPTION/ORDERING INFORMATION (CONTINUED)

The SN74LVC8T245 is designed for asynchronous communication between two data buses. The logic levels of the direction-control (DIR) input and the output-enable (OE) input activate either the B-port outputs or the A-port outputs or place both output ports into the high-impedance mode. The device transmits data from the A bus to the B bus when the B-port outputs are activated, and from the B bus to the A bus when the A-port outputs are activated. The input circuitry on both A and B ports is always active and must have a logic HIGH or LOW level applied to prevent excess I_{CC} and I_{CCZ}.

The SN74LVC8T245 is designed so that the control pins (DIR and \overline{OE}) are supplied by V_{CCA}.

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, all outputs are in the high-impedance state.

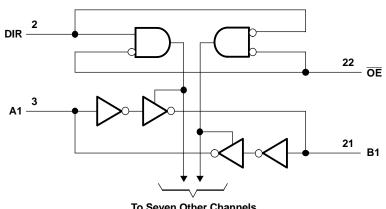
To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

CONTRO	L INPUTS	OUTPUT C	CIRCUITS	
ŌĒ	DIR	A PORT	B PORT	OPERATION
L	L	Enabled	Hi-Z	B data to A bus
L	Н	Hi-Z	Enabled	A data to B bus
Н	Х	Hi-Z	Hi-Z	Isolation

LOGIC DIAGRAM (POSITIVE LOGIC)

FUNCTION TABLE⁽¹⁾ (EACH 8-BIT SECTION)

(1) Input circuits of the data I/Os are always active.



To Seven Other Channels

SCES584A-JUNE 2005-REVISED AUGUST 2005

Absolute Maximum Ratings⁽¹⁾

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

			MIN	MAX	UNIT
V_{CCA} V_{CCB}	Supply voltage range		-0.5	6.5	V
		I/O ports (A port)	-0.5	6.5	
VI	Input voltage range ⁽²⁾	I/O ports (B port)	-0.5	6.5	V
		Control inputs	-0.5	6.5	
V	Voltage range applied to any output	A port	-0.5	6.5	V
Vo	in the high-impedance or power-off state ⁽²⁾	B port	-0.5	6.5	v
V	Voltage range applied to any output in the high or low state $\binom{2}{3}$	A port	-0.5 V	_{CCA} + 0.5	V
Vo	Voltage range applied to any output in the high or low state $^{(2)(3)}$	B port	-0.5 V	_{ССВ} + 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			±50	mA
	Continuous current through each V_{CCA} , V_{CCB} , and GND			±100	mA
		DB package		63	
		DBQ package		61	
θ_{JA}	Package thermal impedance ⁽⁴⁾	DGV package		86	°C/W
		PW package		88	
		RHL package	43		
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.

The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed. (2)

(3) The output positive-voltage rating may be exceeded up to 6.5 V maximum if the output current rating is observed.
 (4) The package thermal impedance is calculated in accordance with JESD 51-7.

SCES584A-JUNE 2005-REVISED AUGUST 2005



Recommended Operating Conditions⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾

			V _{CCI}	V _{cco}	MIN	MAX	UNIT
V _{CCA}	O				1.65	5.5	
V _{CCB}	Supply voltage				1.65	5.5	V
			1.65 V to 1.95 V		$V_{CCI} imes 0.65$		
. ,	High-level	D () (5)	2.3 V to 2.7 V		1.7		
VIH	input voltage	Data inputs ⁽⁵⁾	3 V to 3.6 V		2		V
			4.5 V to 5.5 V		$V_{CCI} imes 0.7$		
			1.65 V to 1.95 V			$V_{CCI} imes 0.35$	
. ,	Low-level		2.3 V to 2.7 V			0.7	
V _{IL}	input voltage	Data inputs ⁽⁵⁾	3 V to 3.6 V			0.8	V
			4.5 V to 5.5 V			$V_{CCI} imes 0.3$	
			1.65 V to 1.95 V		$V_{CCA} imes 0.65$		
. ,	High-level	Control inputs	2.3 V to 2.7 V		1.7		
V _{IH}	input voltage	(referenced to V _{CCA}) ⁽⁶⁾	3 V to 3.6 V		2		V
			4.5 V to 5.5 V		$V_{CCA} imes 0.7$		
			1.65 V to 1.95 V			$V_{CCA} imes 0.35$	
. ,	Low-level input voltage	Control inputs	2.3 V to 2.7 V			0.7	
V _{IL}		(referenced to V_{CCA}) ⁽⁶⁾	3 V to 3.6 V			0.8	V
			4.5 V to 5.5 V			$V_{CCA} imes 0.3$	
VI	Input voltage	Control inputs			0	5.5	V
. /	Input/output	Active state			0	V _{CCO}	V
V _{I/O}	voltage	3-State			0	5.5	V
		<u>.</u>		1.65 V to 1.95 V		-4	
	Lich lovel output	autrant		2.3 V to 2.7 V		-8	~ ^
I _{ОН}	High-level output	current		3 V to 3.6 V		-24	mA
				4.5 V to 5.5 V		-32	
				1.65 V to 1.95 V		4	
		ourroot		2.3 V to 2.7 V		8	mA
l _{OL}	Low-level output	current		3 V to 3.6 V		24	mA
				4.5 V to 5.5 V		32	
			1.65 V to 1.95 V			20	
	Input transition	Data innuta	2.3 V to 2.7 V			20	n=^/
∆t/∆v	rise or fall rate	Data inputs	3 V to 3.6 V			10	ns/V
			4.5 V to 5.5 V			5	
T _A	Operating free-ai	r temperature			-40	85	°C

(1) V_{CCI} is the V_{CC} associated with the data input port. (2) V_{CCO} is the V_{CC} associated with the output port.

All unused or driven (floating) data inputs (I/Os) of the device must be held at logic HIGH or LOW (preferably V_{CCI} or GND) to ensure proper device operation and minimize power. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature (3) number SCBA004.

(4) All unused control inputs must be held at V_{CCA} or GND to ensure proper device operation and minimize power comsumption. (5) For V_{CCI} values not specified in the data sheet, V_{IH} min = $V_{CCI} \times 0.7$ V, V_{IL} max = $V_{CCI} \times 0.3$ V. (6) For V_{CCA} values not specified in the data sheet, V_{IH} min = $V_{CCA} \times 0.7$ V, V_{IL} max = $V_{CCA} \times 0.3$ V.

SCES584A-JUNE 2005-REVISED AUGUST 2005

Electrical Characteristics⁽¹⁾⁽²⁾

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

PAR	METER	TEST CONDIT	IONS	V _{CCA}	V _{CCB}	MIN TYP	MAX	MIN	MAX	UNIT
		I _{OH} = −100 μA,	$V_{I} = V_{IH}$	1.65 V to 4.5 V	1.65 V to 4.5 V			V _{CCO} – 0.1		
		I _{OH} = -4 mA,	$V_I = V_{IH}$	1.65 V	1.65 V			1.2		
V _{ОН}		I _{OH} = -8 mA,	$V_I = V_{IH}$	2.3 V	2.3 V			1.9		V
		I _{OH} = -24 mA,	$V_I = V_{IH}$	3 V	3 V			2.4		
		I _{OH} = -32 mA,	$V_I = V_{IH}$	4.5 V	4.5 V			3.8		
		I _{OL} = 100 μA,	$V_{I} = V_{IL}$	1.65 V to 4.5 V	1.65 V to 4.5 V				0.1	
		$I_{OL} = 4 \text{ mA},$	$V_{I} = V_{IL}$	1.65 V	1.65 V				0.45	
V _{OL}		I _{OL} = 8 mA,	$V_{I} = V_{IL}$	2.3 V	2.3 V				0.3	V
		I _{OL} = 24 mA,	$V_{I} = V_{IL}$	3 V	3 V				0.55	
		I _{OL} = 32 mA,	$V_{I} = V_{IL}$	4.5 V	4.5 V				0.55	
I _I	DIR	$V_I = V_{CCA}$ or GND		1.65 V to 5.5 V	1.65 V to 5.5 V		±1		±2	μΑ
	A or B		,	0 V	0 to 5.5 V		±1		±2	A
off	port	$V_{\rm I}$ or $V_{\rm O} = 0$ to 5.5 V	/	0 to 5.5 V	0 V		±1		±2	μA
l _{oz}	A or B port	$\frac{V_{O}}{OE} = V_{CCO} \text{ or GND},$ $\frac{V_{O}}{OE} = V_{IH}$		1.65 V to 5.5 V	1.65 V to 5.5 V		±1		±2	μΑ
				1.65 V to 5.5 V	1.65 V to 5.5 V				15	
CCA		$V_I = V_{CCI}$ or GND,	$I_{O} = 0$	5 V	0 V				15	μA
				0 V	5 V				-2	
				1.65 V to 5.5 V	1.65 V to 5.5 V				15	
I _{ССВ}		$V_I = V_{CCI}$ or GND,	$I_{O} = 0$	5 V	0 V				-2	μA
				0 V	5 V				15	
I _{CCA} +	I _{CCB}	$V_I = V_{CCI}$ or GND,	$I_{O} = 0$	1.65 V to 5.5 V	1.65 V to 5.5 V				25	μA
	A port	One A port at V_{CCA} DIR at V_{CCA} , B port	– 0.6 V, = open						50	
∆I _{CCA}	DIR	DIR at $V_{CCA} - 0.6 V$ B port = open, A port at V_{CCA} or G		3 V to 5.5 V	3 V to 5.5 V				50	μA
ΔI_{CCB}	B port	One B port at V _{CCB} DIR at GND, A port		3 V to 5.5 V	3 V to 5.5 V				50	μA
C _i	Control inputs	$V_{I} = V_{CCA} \text{ or } GND$		3.3 V	3.3 V	2	1		5	pF
C _{io}	A or B port	$V_{O} = V_{CCA/B}$ or GNE)	3.3 V	3.3 V	8.8	5		10	pF

 $\begin{array}{ll} \mbox{(1)} & V_{CCO} \mbox{ is the } V_{CC} \mbox{ associated with the output port.} \\ \mbox{(2)} & V_{CCI} \mbox{ is the } V_{CC} \mbox{ associated with the input port.} \end{array}$



SCES584A-JUNE 2005-REVISED AUGUST 2005

Switching Characteristics

over recommended operating free-air temperature range, V_{CCA} = 1.8 V ± 0.15 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{ССВ} = ± 0.1		V_{CCB} = 2.5 V \pm 0.2 V		V_{CCB} = 3.3 V ± 0.3 V		V_{CCB} = 5 V ± 0.5 V		UNIT
	(INPUT)	(001701)	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	A	В	1.7	21.9	1.3	9.2	1	7.4	0.8	7.1	ns
t _{PHL}	~	b b	1.7	21.9	1.5	9.2		7.4	0.0	7.1	115
t _{PLH}	В	А	0.9	23.8	0.8	23.6	0.7	23.4	0.7	23.4	ns
t _{PHL}	В	~	0.5	23.0	0.0	23.0	0.7	20.4	0.7	23.4	115
t _{PHZ}	OE	A	1.5	29.6	1.5	29.4	1.5	29.3	1.4	29.2	ns
t _{PLZ}	OL	A	1.5	29.0	1.5	29.4	1.5	29.5	1.4	29.2	115
t _{PHZ}	OE	В	2.4	32.2	1.9	13.1	1.7	12	1.3	10.3	ns
t _{PLZ}	OL	D	2.4	JZ.Z	1.9	13.1	1.7	12	1.5	10.5	115
t _{PZH}	OE	А	0.4	24	0.4	23.8	0.4	23.7	0.4	23.7	ns
t _{PZL}	UL	Α.	0.4	24	0.4	23.0	0.4	23.1	0.4	23.1	115
t _{PZH}	OE	В	1.8	32	1.5	16	1.2	12.6	0.9	10.8	ns
t _{PZL}	UE	D	1.0	32	1.5	10	1.2	12.0	0.9	10.0	115

Switching Characteristics

over recommended operating free-air temperature range, V_{CCA} = 2.5 V ± 0.2 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTBUT)	V _{CCB} = ± 0.1			$\begin{array}{c} \mathrm{V_{CCB}} = 2.5 \ \mathrm{V} \\ \pm \ 0.2 \ \mathrm{V} \end{array}$		= 3.3 V 3 V	V _{ССВ} ± 0.		UNIT
	(INPUT)	(OUTPUT)	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	A	В	1.5	21.4	1.2	9	0.8	6.2	0.6	4.8	ns
t _{PHL}	A	D	1.5	21.4	1.2	9	0.0	0.2	0.0	4.0	115
t _{PLH}	В	А	1.2	9.3	1	9.1	1	8.9	0.9	8.8	ns
t _{PHL}	6	~	1.2	5.5	1	3.1	ļ	0.3	0.9	0.0	115
t _{PHZ}	ŌĒ	A	1.4	9	1.4	9	1.4	9	1.4	9	ns
t _{PLZ}	UL	~	1.4	5	1.4	3	1.4	3	1.4	3	115
t _{PHZ}	OE	В	2.3	29.6	1.8	11	1.7	9.3	0.9	6.9	ns
t _{PLZ}	UL	D	2.5	23.0	1.0	11	1.7	5.5	0.5	0.3	115
t _{PZH}	OE	А	1	10.9	1	10.9	1	10.9	1	10.9	ns
t _{PZL}	UL	~	1	10.9	I	10.9	I	10.9	1	10.9	113
t _{PZH}	OE	В	1.7	28.2	1.5	12.9	1.2	9.4	1	6.9	ns
t _{PZL}	UL	B	1.7	20.2	1.5	12.9	1.2	9.4	I	0.9	115

TEXAS INSTRUMENTS www.ti.com

SCES584A-JUNE 2005-REVISED AUGUST 2005

Switching Characteristics

over recommended operating free-air temperature range, V_{CCA} = 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CCB} = ± 0.15		V_{CCB} = 2.5 V \pm 0.2 V		$\begin{array}{c} {\sf V}_{\sf CCB} = 3.3 \ {\sf V} \\ \pm \ 0.3 \ {\sf V} \end{array}$		V_{CCB} = 5 V ± 0.5 V		UNIT
	(INFOT)	(001701)	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	A	В	1.5	21.2	1.1	8.8	0.8	6.3	0.5	4.4	ns
t _{PHL}	~	D	1.5	21.2	1.1	0.0	0.0	0.5	0.5	4.4	115
t _{PLH}	в	А	0.8	7.2	0.8	6.2	0.7	6.1	0.6	6	ns
t _{PHL}	В	~	0.0	1.2	0.0	0.2	0.7	0.1	0.0	0	115
t _{PHZ}	OE	A	1.6	8.2	1.6	8.2	1.6	8.2	1.6	8.2	ns
t _{PLZ}	OL	~	1.0	0.2	1.0	0.2	1.0	0.2	1.0	0.2	115
t _{PHZ}	OE	В	2.1	29	1.7	10.3	1.5	8.6	0.8	6.3	ns
t _{PLZ}	OL	D	2.1	29	1.7	10.5	1.5	0.0	0.0	0.5	115
t _{PZH}	OE	А	0.8	8.1	0.8	8.1	0.8	8.1	0.8	8.1	ns
t _{PZL}	UE	A	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	115
t _{PZH}	OE	В	1.8	27.7	1.4	12.4	1.1	8.5	0.9	6.4	ns
t _{PZL}	UE	D	1.0	21.1	1.4	12.4	1.1	0.5	0.9	0.4	115

Switching Characteristics

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = ± 0.1		V_{CC} = 2.5 V ± 0.2 V		V_{CC} = 3.3 V ± 0.3 V		$V_{CC} = 5 V \\ \pm 0.5 V$		UNIT
	(INPOT)	(001201)	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	A	В	1.5	21.4	1	8.8	0.7	6	0.4	4.2	ns
t _{PHL}	~	D	1.5	21.4	1	0.0	0.7	0	0.4	4.2	115
t _{PLH}	В	А	0.7	7	0.4	4.8	0.3	4.5	0.3	4.3	ns
t _{PHL}	В	~	0.7	1	0.4	4.0	0.5	4.5	0.5	4.5	115
t _{PHZ}	OE	A	0.3	5.4	0.3	5.4	0.3	5.4	0.3	5.4	ns
t _{PLZ}	UE	A	0.5	5.4	0.5	5.4	0.5	5.4	0.5	5.4	115
t _{PHZ}	OE	В	2	28.7	1.6	9.7	1.4	8	0.7	5.7	ns
t _{PLZ}	UE	Б	2	20.1	1.0	9.7	1.4	0	0.7	5.7	115
t _{PZH}	OE	А	0.7	6.4	0.7	6.4	0.7	6.4	0.7	6.4	ns
t _{PZL}	UE	A	0.7	0.4	0.7	0.4	0.7	0.4	0.7	0.4	115
t _{PZH}	ŌĒ	В	1.5	27.6	1.3	11.4	1	0 1	0.9	6	20
t _{PZL}		В	1.5	27.6	1.3	11.4	1	8.1	0.9	0	ns

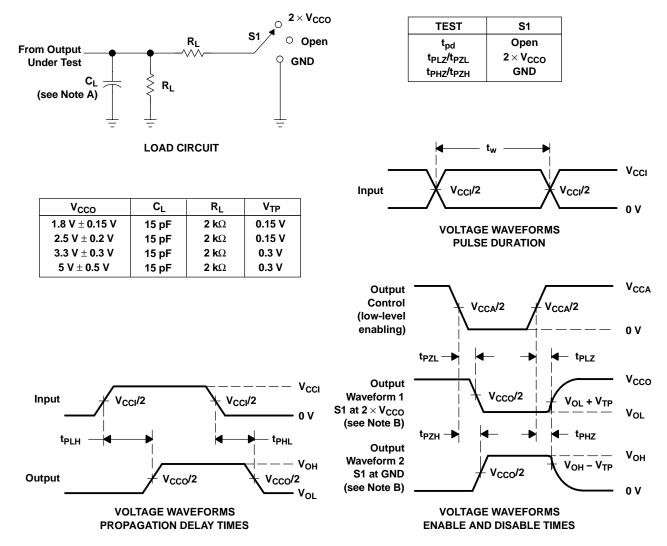
Operating Characteristics

 $T_A = 25^{\circ}C$

	PARAMETER	TEST CONDITIONS	V _{CCA} = V _{CCB} = 1.8 V TYP	V _{CCA} = V _{CCB} = 2.5 V TYP	V _{CCA} = V _{CCB} = 3.3 V TYP	V _{CCA} = V _{CCB} = 5 V TYP	UNIT
C (1)	A-port input, B-port output		2	2	2	3	
C _{pdA} ⁽¹⁾	B-port input, A-port output	$C_L = 0,$	12	13	13	16	~ -
C (1)	A-port input, B-port output	f = 10 MHz, t _r = t _f = 1 ns	13	13	14	16	pF
C _{pdB} ⁽¹⁾	B-port input, A-port output		2	2	2	3	Ţ

(1) Power dissipation capacitance per transceiver

SCES584A-JUNE 2005-REVISED AUGUST 2005



PARAMETER MEASUREMENT INFORMATION

Texas

ISTRUMENTS www.ti.com

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 Ω , dv/dt \geq 1 V/ns.
- D. The outputs are measured one at a time, with one transition per measurement.
- E. t_{PL7} and t_{PH7} 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.
- J. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms



www.ti.com

30-Jan-2012

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/ Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
74LVC8T245DBQRG4	ACTIVE	SSOP/QSOP	DBQ	24	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	
74LVC8T245RHLRG4	ACTIVE	QFN	RHL	24	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	
SN74LVC8T245DBQR	ACTIVE	SSOP/QSOP	DBQ	24	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	
SN74LVC8T245DBR	ACTIVE	SSOP	DB	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245DBRE4	ACTIVE	SSOP	DB	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245DBRG4	ACTIVE	SSOP	DB	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245DGVR	ACTIVE	TVSOP	DGV	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245DGVRG4	ACTIVE	TVSOP	DGV	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245DWR	ACTIVE	SOIC	DW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245DWRG4	ACTIVE	SOIC	DW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245NSR	ACTIVE	SO	NS	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245NSRG4	ACTIVE	SO	NS	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245PW	ACTIVE	TSSOP	PW	24	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245PWE4	ACTIVE	TSSOP	PW	24	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245PWG4	ACTIVE	TSSOP	PW	24	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245PWR	ACTIVE	TSSOP	PW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245PWRE4	ACTIVE	TSSOP	PW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	



30-Jan-2012

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/ Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
SN74LVC8T245PWRG4	ACTIVE	TSSOP	PW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74LVC8T245RHLR	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 SN74LVC8T245 :

Automotive: SN74LVC8T245-Q1

Enhanced Product: SN74LVC8T245-EP

NOTE: Qualified Version Definitions:

PACKAGE OPTION ADDENDUM



www.ti.com

30-Jan-2012

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

• Enhanced Product - Supports Defense, Aerospace and Medical Applications

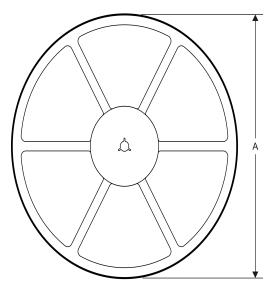
PACKAGE MATERIALS INFORMATION

www.ti.com

TAPE AND REEL INFORMATION

REEL DIMENSIONS

TEXAS INSTRUMENTS





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

TAPE AND REEL INFORMATION

*All dimensions are nominal

Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LVC8T245DBQR	SSOP/ QSOP	DBQ	24	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74LVC8T245DBR	SSOP	DB	24	2000	330.0	16.4	8.2	8.8	2.5	12.0	16.0	Q1
SN74LVC8T245DGVR	TVSOP	DGV	24	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74LVC8T245DWR	SOIC	DW	24	2000	330.0	24.4	10.75	15.7	2.7	12.0	24.0	Q1
SN74LVC8T245NSR	SO	NS	24	2000	330.0	24.4	8.2	15.4	2.5	12.0	24.0	Q1
SN74LVC8T245PWR	TSSOP	PW	24	2000	330.0	16.4	6.95	8.3	1.6	8.0	16.0	Q1
SN74LVC8T245RHLR	QFN	RHL	24	1000	180.0	12.4	3.8	5.8	1.2	8.0	12.0	Q1

TEXAS INSTRUMENTS

www.ti.com

PACKAGE MATERIALS INFORMATION

28-Jan-2012



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LVC8T245DBQR	SSOP/QSOP	DBQ	24	2500	346.0	346.0	33.0
SN74LVC8T245DBR	SSOP	DB	24	2000	346.0	346.0	33.0
SN74LVC8T245DGVR	TVSOP	DGV	24	2000	346.0	346.0	29.0
SN74LVC8T245DWR	SOIC	DW	24	2000	346.0	346.0	41.0
SN74LVC8T245NSR	SO	NS	24	2000	346.0	346.0	41.0
SN74LVC8T245PWR	TSSOP	PW	24	2000	346.0	346.0	33.0
SN74LVC8T245RHLR	QFN	RHL	24	1000	210.0	185.0	35.0

MECHANICAL DATA

PLASTIC SMALL-OUTLINE

MPDS006C - FEBRUARY 1996 - REVISED AUGUST 2000

DGV (R-PDSO-G**)

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-G24)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M-1994.

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 AD.



DBQ (R-PDSO-G24)

PLASTIC SMALL-OUTLINE PACKAGE



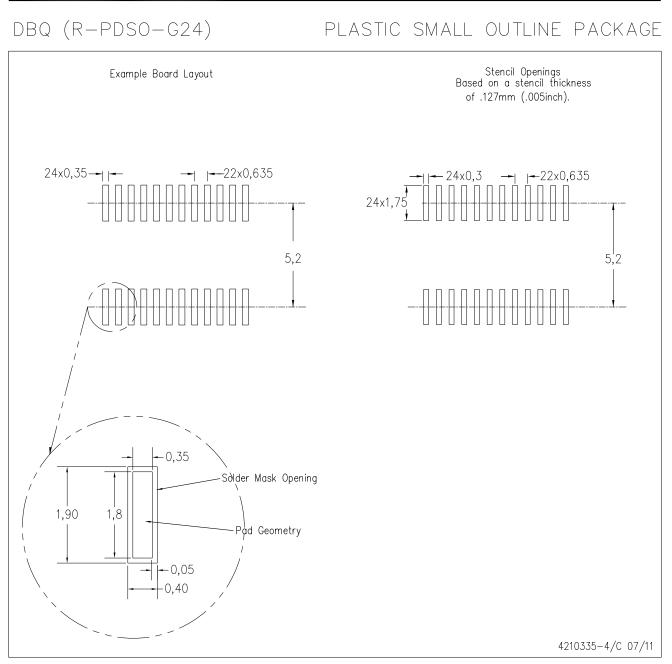
NOTES: A. All linear dimensions are in inches (millimeters).

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) per side.

D. Falls within JEDEC MO-137 variation AE.





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. Publication IPC-7351 is recommended for alternate designs.
- 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. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.



PW (R-PDSO-G24)

PLASTIC SMALL OUTLINE



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.

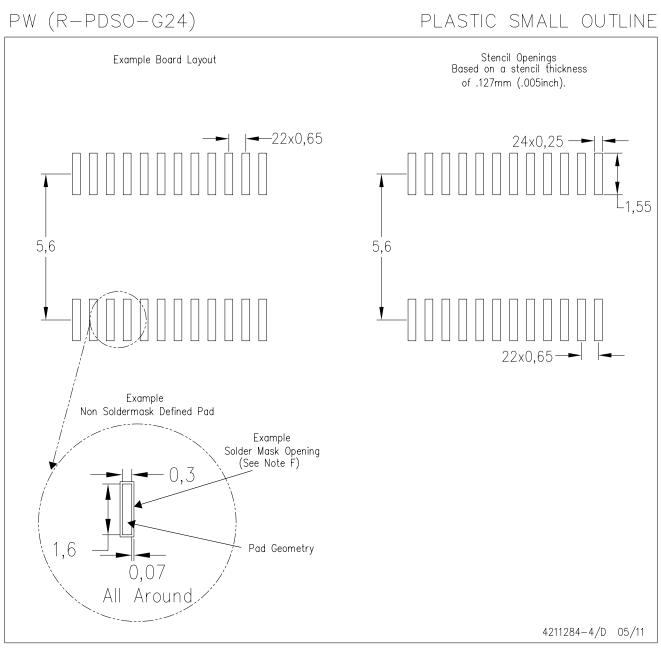
Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.

Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.

E. Falls within JEDEC MO-153



LAND PATTERN DATA

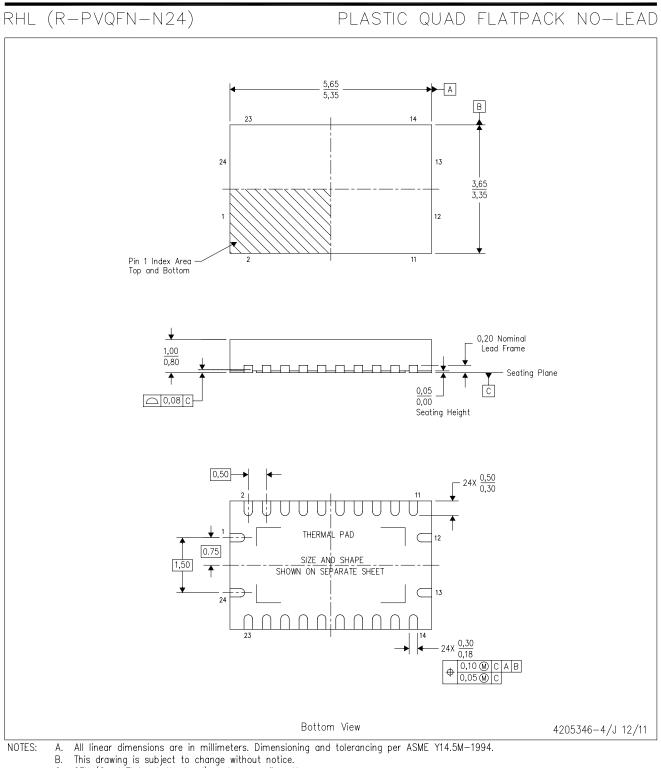


NOTES: A. All linear dimensions are in millimeters.

- B. This drawing is subject to change without notice.
- C. Publication $\ensuremath{\mathsf{IPC-7351}}$ is recommended for alternate design.
- 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 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



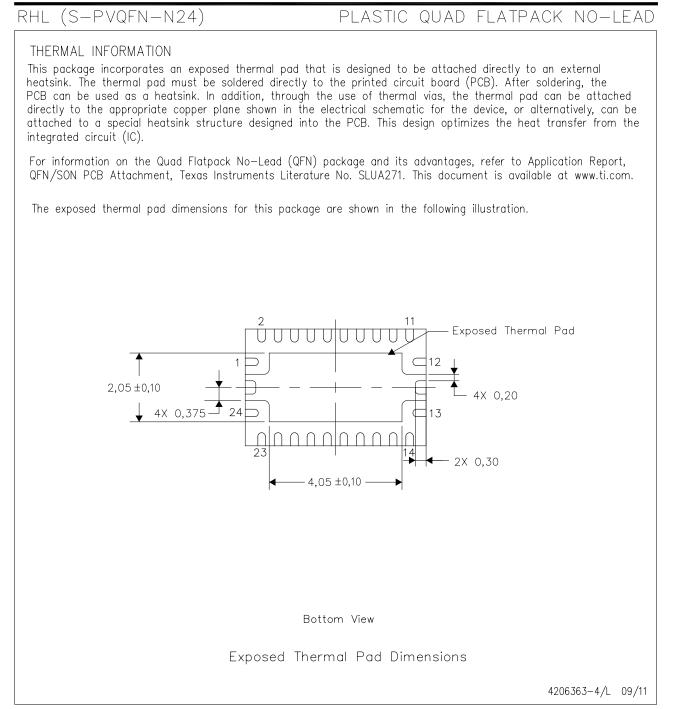
MECHANICAL DATA



- 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. See the additional figure in the Product Data Sheet for details regarding the exposed thermal pad features and dimensions.
- F. JEDEC MO-241 package registration pending.

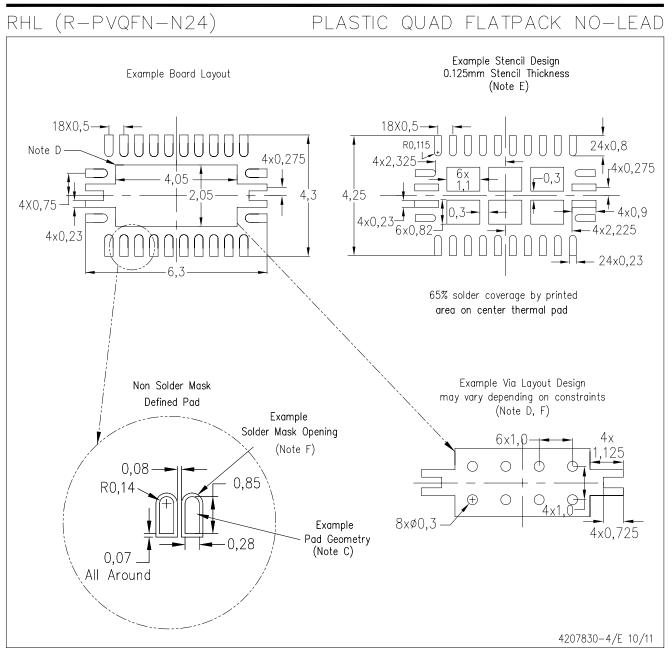


THERMAL PAD MECHANICAL DATA



NOTE: All linear dimensions are in millimeters





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.



MECHANICAL DATA

PLASTIC SMALL-OUTLINE PACKAGE

0,51 0,35 ⊕0,25⊛ 1,27 8 14 0,15 NOM 5,60 8,20 5,00 7,40 \bigcirc Gage Plane ₽ 0,25 7 1 1,05 0,55 0°-10° Δ 0,15 0,05 Seating Plane — 2,00 MAX 0,10PINS ** 14 16 20 24 DIM 10,50 10,50 12,90 15,30 A MAX A MIN 9,90 9,90 12,30 14,70 4040062/C 03/03

NOTES: A. All linear dimensions are in millimeters.

NS (R-PDSO-G**)

14-PINS SHOWN

- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



MECHANICAL DATA

MSSO002E - JANUARY 1995 - REVISED DECEMBER 2001

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



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			
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive		
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications		
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers		
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps		
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy		
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial		
Interface	interface.ti.com	Medical	www.ti.com/medical		
Logic	logic.ti.com	Security	www.ti.com/security		
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense		
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video		
RFID	www.ti-rfid.com				
OMAP Mobile Processors	www.ti.com/omap				
Wireless Connectivity	www.ti.com/wirelessconnectivity				
	TI 505 0				

TI E2E Community Home Page

e2e.ti.com

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265 Copyright © 2012, Texas Instruments Incorporated