

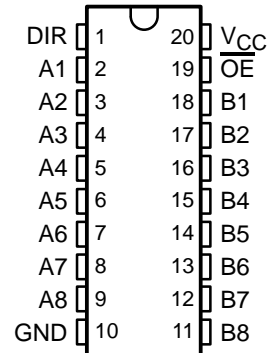
SN54LS245, SN74LS245 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SDLS146A – OCTOBER 1976 – REVISED FEBRUARY 2002

- 3-State Outputs Drive Bus Lines Directly
- PNP Inputs Reduce dc Loading on Bus Lines
- Hysteresis at Bus Inputs Improves Noise Margins
- Typical Propagation Delay Times Port to Port, 8 ns

TYPE	I _{OL} (SINK CURRENT)	I _{OH} (SOURCE CURRENT)
SN54LS245	12 mA	-12 mA
SN74LS245	24 mA	-15 mA

SN54LS245 . . . J OR W PACKAGE
SN74LS245 . . . DB, DW, N, OR NS PACKAGE
(TOP VIEW)

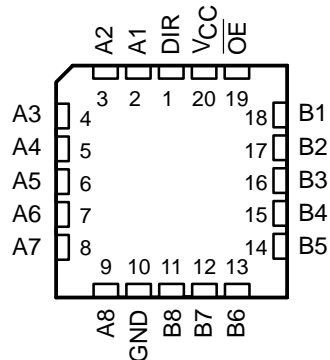


description

These octal bus transceivers are designed for asynchronous two-way communication between data buses. The control-function implementation minimizes external timing requirements.

The devices allow data transmission 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 disable the device so that the buses are effectively isolated.

SN54LS245 . . . FK PACKAGE
(TOP VIEW)



ORDERING INFORMATION

T _A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 70°C	PDIP – N	Tube	SN74LS245N	SN74LS245N
	SOIC – DW	Tube	SN74LS245DW	LS245
		Tape and reel	SN74LS245DWR	
	SOP – NS	Tape and reel	SN74LS245NSR	74LS245
	SSOP – DB	Tape and reel	SN74LS245DBR	LS245
-55°C to 125°C	CDIP – J	Tube	SN54LS245J	SN54LS245J
		Tube	SNJ54LS245J	SNJ54LS245J
	CFP – W	Tube	SNJ54LS245W	SNJ54LS245W
	LCCC – FK	Tube	SN54LS245FK	SN54LS245FK

† 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.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS
INSTRUMENTS**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 2002, Texas Instruments Incorporated
On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

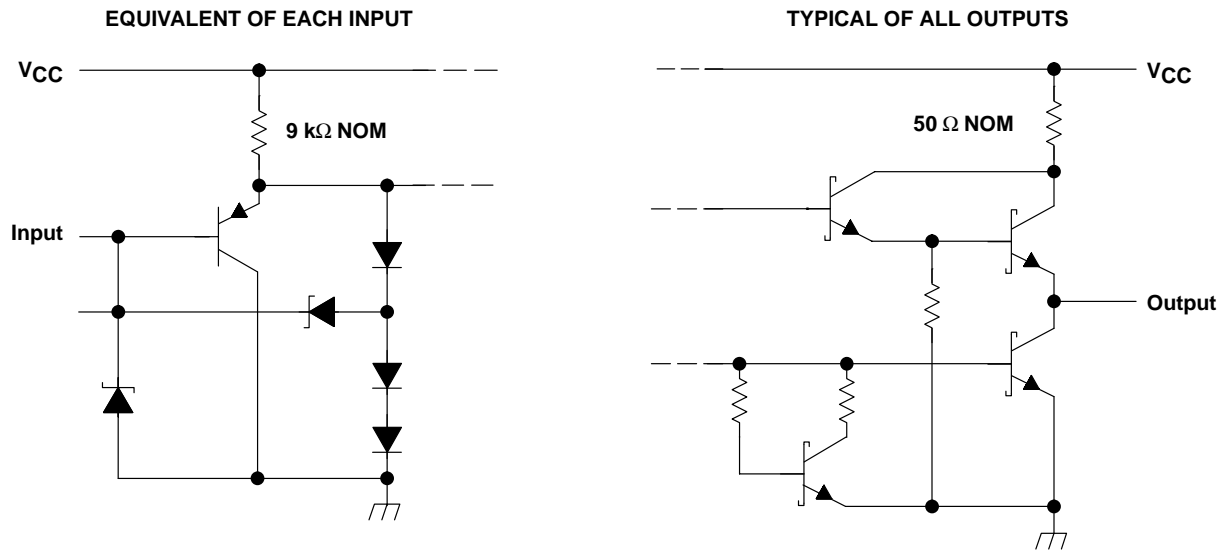
SN54LS245, SN74LS245 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SDLS146A – OCTOBER 1976 – REVISED FEBRUARY 2002

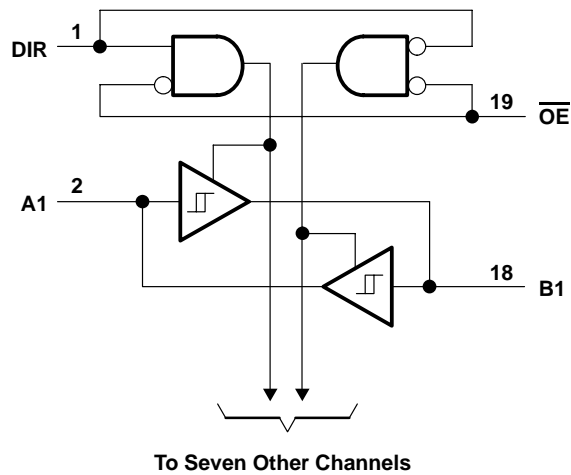
FUNCTION TABLE

INPUTS		OPERATION
\overline{OE}	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

schematics of inputs and outputs



logic diagram (positive logic)



SN54LS245, SN74LS245 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SDLS146A – OCTOBER 1976 – REVISED FEBRUARY 2002

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

Supply voltage, V_{CC}	7 V
Input voltage, V_I (see Note 1)	7 V
Package thermal impedance, θ_{JA} (see Note 2):	
DB package	70°C/W
DW package	58°C/W
N package	69°C/W
NS package	60°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. All voltage values are with respect to GND.
 2. The package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions

	SN54LS245			SN74LS245			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
I_{OH} High-level output current			–12			–15	mA
I_{OL} Low-level output current			12			24	mA
T_A Operating free-air temperature	–55		125	0		70	°C



SN54LS245, SN74LS245 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SDLS146A – OCTOBER 1976 – REVISED FEBRUARY 2002

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

PARAMETER		TEST CONDITION†	SN54LS245			SN74LS245			UNIT	
			MIN	TYP‡	MAX	MIN	TYP‡	MAX		
V _{IH}	High-level input voltage		2			2			V	
V _{IL}	Low-level input voltage				0.7			0.8	V	
V _{IK}	Input clamp voltage	V _{CC} = MIN, I _I = -18 mA			-1.5			-1.5	V	
Hysteresis (V _{T+} - V _{T-})		A or B V _{CC} = MIN	0.2	0.4		0.2	0.4		V	
V _{OH}	High-level output voltage	V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = V _{IL(max)}	I _{OH} = -3 mA		2.4	3.4	2.4	3.4	V	
			I _{OH} = MAX		2		2			
V _{OL}	Low-level output voltage	V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = V _{IL(max)}	I _{OL} = 12 mA				0.4	0.4	V	
			I _{OL} = 24 mA					0.5		
I _{OZH}	Off-state output current, high-level voltage applied	V _{CC} = MAX, OE at 2 V	V _O = 2.7 V				20	20	μA	
I _{OZL}	Off-state output current, low-level voltage applied	V _{CC} = MAX, OE at 2 V	V _O = 0.4 V				-200	-200	μA	
I _I	Input current at maximum input voltage	A or B DIR or OE	V _{CC} = MAX	V _I = 5.5 V				0.1	0.1	mA
				V _I = 7 V				0.1	0.1	
I _{IH}	High-level input current	V _{CC} = MAX, V _{IH} = 2.7 V			20			20	μA	
I _{IL}	Low-level input current	V _{CC} = MAX, V _{IL} = 0.4 V			-0.2			-0.2	mA	
I _{OS}	Short-circuit output current§	V _{CC} = MAX	-40		-225	40		-225	mA	
I _{CC}	Supply current	Total, outputs high Total, outputs low Outputs at high Z	V _{CC} = MAX	Outputs open		48	70	48	70	mA
						62	90	62	90	
						64	95	64	95	

† For conditions shown as MIN or MAX, use the appropriate values specified under recommended operating conditions.

‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.

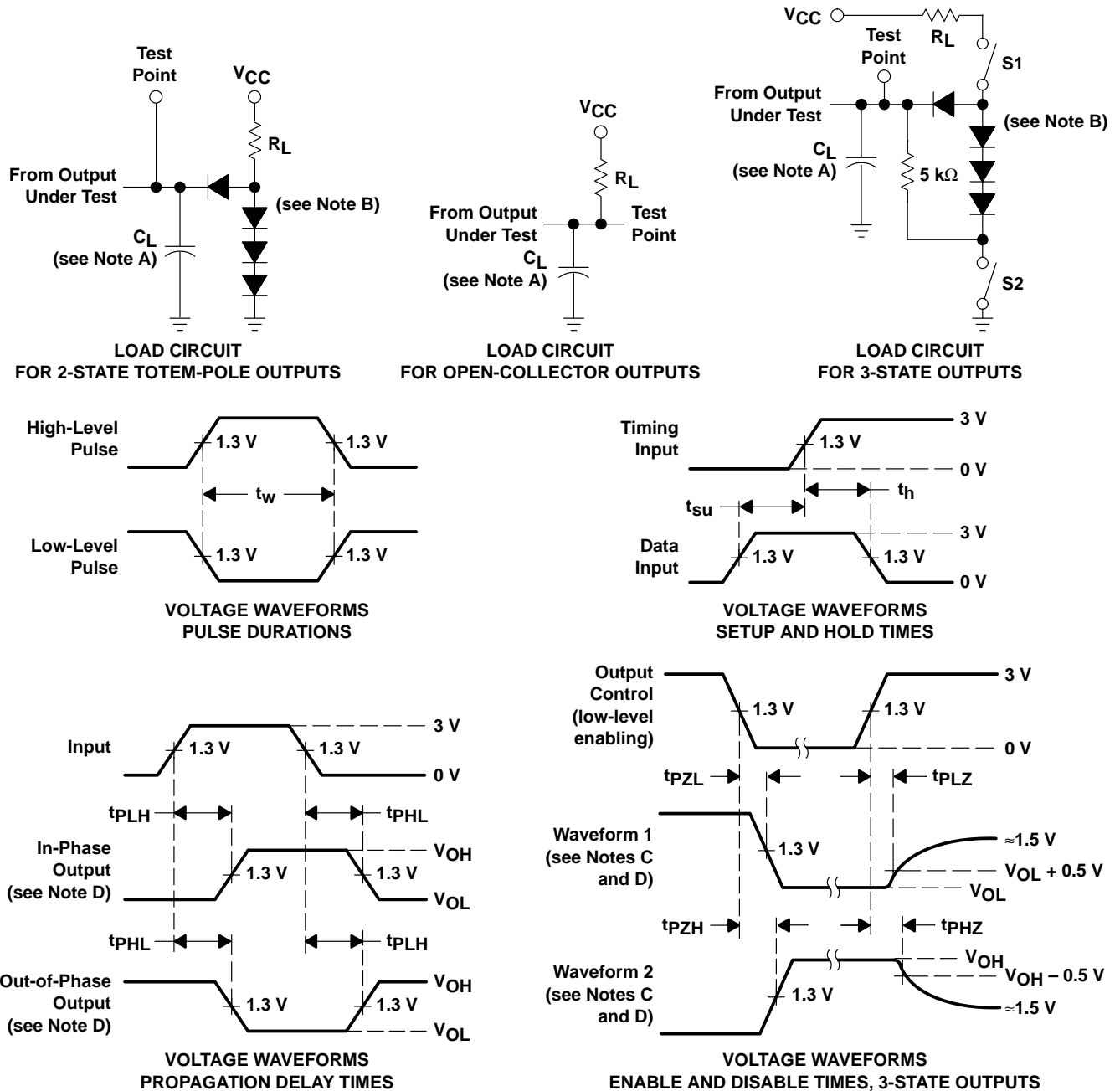
§ Not more than one output should be shorted at a time, and duration of the short circuit should not exceed one second.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see Figure 1)

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
t _{PLH}	Propagation delay time, low- to high-level output	C _L = 45 pF, R _L = 667 Ω			8	12	ns
t _{PHL}	Propagation delay time, high- to low-level output				8	12	
t _{PZL}	Output enable time to low level	C _L = 45 pF, R _L = 667 Ω			27	40	ns
t _{PZH}	Output enable time to high level				25	40	
t _{PLZ}	Output disable time from low level	C _L = 5 pF, R _L = 667 Ω			15	25	ns
t _{PHZ}	Output disable time from high level				15	28	



PARAMETER MEASUREMENT INFORMATION
SERIES 54LS/74LS DEVICES



- NOTES: A. C_L includes probe and jig capacitance.
 B. All diodes are 1N3064 or equivalent.
 C. 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.
 D. S1 and S2 are closed for t_{PLH} , t_{PHL} , t_{PHZ} , and t_{PLZ} ; S1 is open and S2 is closed for t_{pZH} ; S1 is closed and S2 is open for t_{pZL} .
 E. Phase relationships between inputs and outputs have been chosen arbitrarily for these examples.
 F. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1$ MHz, $Z_O \approx 50 \Omega$, $t_r \leq 1.5$ ns, $t_f \leq 2.6$ ns.
 G. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuits 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⁾
5962-8002101VRA	ACTIVE	CDIP	J	20	1	None	Call TI	Level-NC-NC-NC
5962-8002101VSA	ACTIVE	CFP	W	20	1	None	Call TI	Level-NC-NC-NC
80021012A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
8002101SA	ACTIVE	CFP	W	20	1	None	Call TI	Level-NC-NC-NC
JM38510/32803B2A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
JM38510/32803BRA	ACTIVE	CDIP	J	20	1	None	Call TI	Level-NC-NC-NC
JM38510/32803BSA	ACTIVE	CFP	W	20	1	None	Call TI	Level-NC-NC-NC
SN54LS245J	ACTIVE	CDIP	J	20	1	None	Call TI	Level-NC-NC-NC
SN74LS245DBR	ACTIVE	SSOP	DB	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS245DW	ACTIVE	SOIC	DW	20	25	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN74LS245DWR	ACTIVE	SOIC	DW	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN74LS245J	OBSOLETE	CDIP	J	20		None	Call TI	Call TI
SN74LS245N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS245N3	OBSOLETE	PDIP	N	20		None	Call TI	Call TI
SN74LS245NSR	ACTIVE	SO	NS	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SNJ54LS245FK	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
SNJ54LS245J	ACTIVE	CDIP	J	20	1	None	Call TI	Level-NC-NC-NC
SNJ54LS245W	ACTIVE	CFP	W	20	1	None	Call TI	Level-NC-NC-NC

⁽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 - May not be currently available - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

None: Not yet available Lead (Pb-Free).

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.

Green (RoHS & no Sb/Br): TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

⁽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.

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 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.

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.

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
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Interface	interface.ti.com	Digital Control	www.ti.com/digitalcontrol
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
		Telephony	www.ti.com/telephony
		Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265