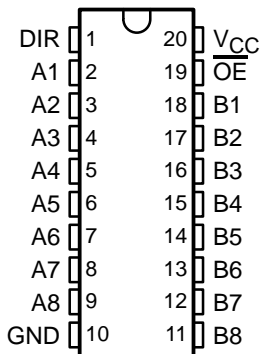


SN54ALS245A, SN54AS245, SN74ALS245A, SN74AS245 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

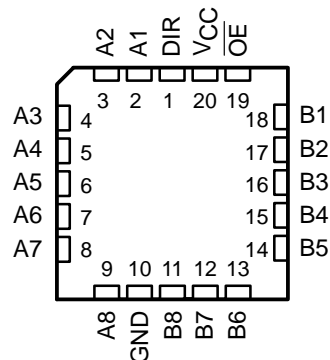
SDAS272A – NOVEMBER 1994 – REVISED JANUARY 2003

- 4.5-V to 5.5-V V_{CC} Operation
- Max t_{pd} of 5.5 ns at 5 V
- 3-State Outputs Drive Bus Lines Directly
- pnp Inputs Reduce dc Loading

SN54ALS245A . . . J OR W PACKAGE
SN54AS245 . . . J PACKAGE
SN74ALS245A . . . DB, DW, N, OR NS PACKAGE
SN74AS245 . . . DW, N, OR NS PACKAGE
(TOP VIEW)



SN54ALS245A, SN54AS245 . . . FK PACKAGE
(TOP VIEW)



description/ordering information

ORDERING INFORMATION

T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 70°C	PDIP – N	Tube	SN74ALS245A-1N	SN74ALS245A-1N
			SN74ALS245AN	SN74ALS245AN
			SN74AS245N	SN74AS245N
	SOIC – DW	Tube	SN74ALS245ADW	ALS245A
			Tape and reel	
		Tube	SN74ALS245A-1DW	ALS245A-1
			Tape and reel	
		Tube	SN74AS245DW	AS245
			Tape and reel	
	SOP – NS	Tape and reel	SN74ALS245ANSR	ALS245A
			SN74ALS245A-1NSR	ALS245A-1
SN74AS245NSR			74AS245	
	SSOP – DB	Tape and reel	SN74ALS245ADBR	G245A
–55°C to 125°C	CDIP – J	Tube	SNJ54ALS245AJ	SNJ54ALS245AJ
			SNJ54AS245J	SNJ54AS245J
	CFP – W	Tube	SNJ54ALS245AW	SNJ54ALS245AW
	LCCC – FK	Tube	SNJ54ALS245AFK	SNJ54ALS245AFK
SNJ54AS245FK			SNJ54AS245FK	



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 © 2003, 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.

SN54ALS245A, SN54AS245, SN74ALS245A, SN74AS245 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SDAS272A – NOVEMBER 1994 – REVISED JANUARY 2003

description/ordering information(continued)

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

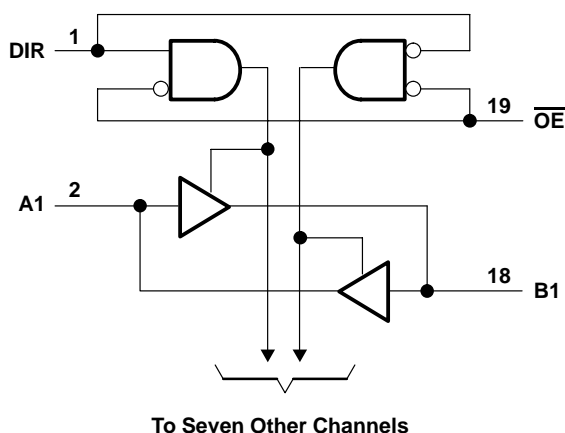
The devices allow data transmission from the A bus to the B bus or from the B bus to the A bus, depending upon the logic level at the direction-control (DIR) input. The output-enable (\overline{OE}) input can be used to disable the device so that the buses are effectively isolated.

The -1 version of the SN74ALS245A is identical to the standard version, except that the recommended maximum I_{OL} is increased to 48 mA. There is no -1 version of the SN54ALS245A.

FUNCTION TABLE

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

logic diagram, each gate (positive logic)



absolute maximum ratings over operating free-air temperature range (SN54ALS245A, SN74ALS245A) (unless otherwise noted)†

Supply voltage, V_{CC}	7 V
Input voltage, V_I : All inputs	7 V
I/O ports	5.5 V
Package thermal impedance, θ_{JA} (see Note 1): DB package	70°C/W
DW package	58°C/W
N package	69°C/W
NS package	60°C/W
Storage temperature range	-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.

NOTE 1: The package thermal impedance is calculated in accordance with JESD 51-7.



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

SN54ALS245A, SN54AS245, SN74ALS245A, SN74AS245 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SDAS272A – NOVEMBER 1994 – REVISED JANUARY 2003

recommended operating conditions (see Note 2)

		SN54ALS245A			SN74ALS245A			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.7			0.8	V
I_{OH}	High-level output current			-12			-15	mA
I_{OL}	Low-level output current			12			24	mA
							48†	
T_A	Operating free-air temperature	-55		125	0		70	°C

† Applies only to the -1 version and only if V_{CC} is between 4.75 V and 5.25 V

NOTE 2: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

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

PARAMETER		TEST CONDITIONS		SN54ALS245A			SN74ALS245A			UNIT
				MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IK}		$V_{CC} = 4.5\text{ V}$,	$I_I = -18\text{ mA}$			-1.5			-1.5	V
V_{OH}		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$,	$I_{OH} = -0.4\text{ mA}$	$V_{CC} - 2$			$V_{CC} - 2$			V
		$V_{CC} = 4.5\text{ V}$	$I_{OH} = -3\text{ mA}$	2.4	3.2		2.4	3.2		
			$I_{OH} = -12\text{ mA}$	2						
			$I_{OH} = -15\text{ mA}$				2			
V_{OL}		$V_{CC} = 4.5\text{ V}$	$I_{OL} = 12\text{ mA}$	0.25	0.4		0.25	0.4	V	
			$I_{OL} = 24\text{ mA}$				0.35 0.5			
			$I_{OL} = 48\text{ mA}^\dagger$				0.35 0.5			
I_I	Control inputs	$V_{CC} = 5.5\text{ V}$	$V_I = 7\text{ V}$				0.1			mA
	A or B ports		$V_I = 5.5\text{ V}$				0.1			
I_{IH}	Control inputs	$V_{CC} = 5.5\text{ V}$,	$V_I = 2.7\text{ V}$	20			20			μA
	A or B ports§			20			20			
I_{IL}	Control inputs	$V_{CC} = 5.5\text{ V}$,	$V_I = 0.4\text{ V}$	-0.1			-0.1			mA
	A or B ports§			-0.1			-0.1			
I_{O}^\parallel		$V_{CC} = 5.5\text{ V}$,	$V_O = 2.25\text{ V}$	-20		-112	-30		-112	mA
I_{CC}		$V_{CC} = 5.5\text{ V}$	Outputs high	30	48		30	45	mA	
			Outputs low	36	60		36	55		
			Outputs disabled	38	63		38	58		

† Applies only to the -1 version and only if V_{CC} is between 4.75 V and 5.25 V

‡ All typical values are $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$.

§ For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.

¶ The output conditions have been chosen to produce a current that closely approximates one-half of the true short-circuit output current, I_{OS} .



SN54ALS245A, SN54AS245, SN74ALS245A, SN74AS245

OCTAL BUS TRANSCEIVERS

WITH 3-STATE OUTPUTS

SDAS272A – NOVEMBER 1994 – REVISED JANUARY 2003

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R ₁ = 500 Ω, R ₂ = 500 Ω, T _A = MIN to MAX†				UNIT
			SN54ALS245A		SN74ALS245A		
			MIN	MAX	MIN	MAX	
t _{PLH}	A or B	B or A	1	19	3	10	ns
t _{PHL}			1	14	3	10	
t _{PZH}	\overline{OE}	A or B	2	30	5	20	ns
t _{PZL}			2	29	5	20	
t _{PHZ}	\overline{OE}	A or B	2	14	2	10	ns
t _{PLZ}			2	30	4	15	

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

absolute maximum ratings over operating free-air temperature range (SN54AS245, SN74AS245) (unless otherwise noted)‡

Supply voltage, V _{CC}	7 V
Input voltage, V _I : All inputs	7 V
I/O ports	5.5 V
Package thermal impedance, θ _{JA} (see Note 1): DW package	58°C/W
N package	69°C/W
NS package	60°C/W
Storage temperature range	–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.

NOTE 1: The package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions (see Note 2)

		SN54AS245			SN74AS245			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V _{IH}	High-level input voltage	2			2			V
V _{IL}	Low-level input voltage			0.8			0.8	V
I _{OH}	High-level output current			–12			–15	mA
I _{OL}	Low-level output current			48			64	mA
T _A	Operating free-air temperature	–55		125	0		70	°C

NOTE 2: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.



SN54ALS245A, SN54AS245, SN74ALS245A, SN74AS245 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SDAS272A – NOVEMBER 1994 – REVISED JANUARY 2003

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

PARAMETER	TEST CONDITIONS		SN54AS245		SN74AS245		UNIT	
			MIN	TYP†	MAX	MIN		TYP†
V_{IK}	$V_{CC} = 4.5\text{ V}$, $I_I = -18\text{ mA}$		-1.2		-1.2		V	
V_{OH}	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$, $I_{OH} = -2\text{ mA}$		$V_{CC} - 2$		$V_{CC} - 2$		V	
	$V_{CC} = 4.5\text{ V}$	$I_{OH} = -3\text{ mA}$	2.4	3.2	2.4	3.2		
		$I_{OH} = -12\text{ mA}$	2					
V_{OL}	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 48\text{ mA}$	0.3 0.55				V	
		$I_{OL} = 64\text{ mA}$			0.35	0.55		
I_I	Control inputs	$V_{CC} = 5.5\text{ V}$	$V_I = 7\text{ V}$	0.1		0.1		mA
	A or B ports		$V_I = 5.5\text{ V}$	0.1		0.1		
I_{IH}	Control inputs	$V_{CC} = 5.5\text{ V}$, $V_I = 2.7\text{ V}$	50		20		μA	
	A or B ports‡		70		70			
I_{IL}	Control inputs	$V_{CC} = 5.5\text{ V}$, $V_I = 0.4\text{ V}$	-0.5		-0.5		mA	
	A or B ports‡		-0.75		-0.75			
I_O^{\S}	$V_{CC} = 5.5\text{ V}$, $V_O = 2.25\text{ V}$		-50	-150	-50	-150	mA	
I_{CC}	$V_{CC} = 5.5\text{ V}$		Outputs high	62	97	62	97	mA
			Outputs low	95	143	95	143	
			Outputs disabled	79	123	79	123	

† All typical values are $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$.

‡ For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.

§ The output conditions have been chosen to produce a current that closely approximates one-half of the true short-circuit output current, I_{OS} .

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$, $C_L = 50\text{ pF}$, $R_1 = 500\ \Omega$, $R_2 = 500\ \Omega$, $T_A = \text{MIN to MAX}^{\parallel}$				UNIT
			SN54AS245		SN74AS245		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	2	9.5	2	7.5	ns
t_{PHL}			2	9	2	7	
t_{PZH}	\overline{OE}	A or B	2	11	2	9	ns
t_{PZL}			2	10.5	2	8.5	
t_{PHZ}	\overline{OE}	A or B	2	7.5	2	5.5	ns
t_{PLZ}			2	12	2	9.5	

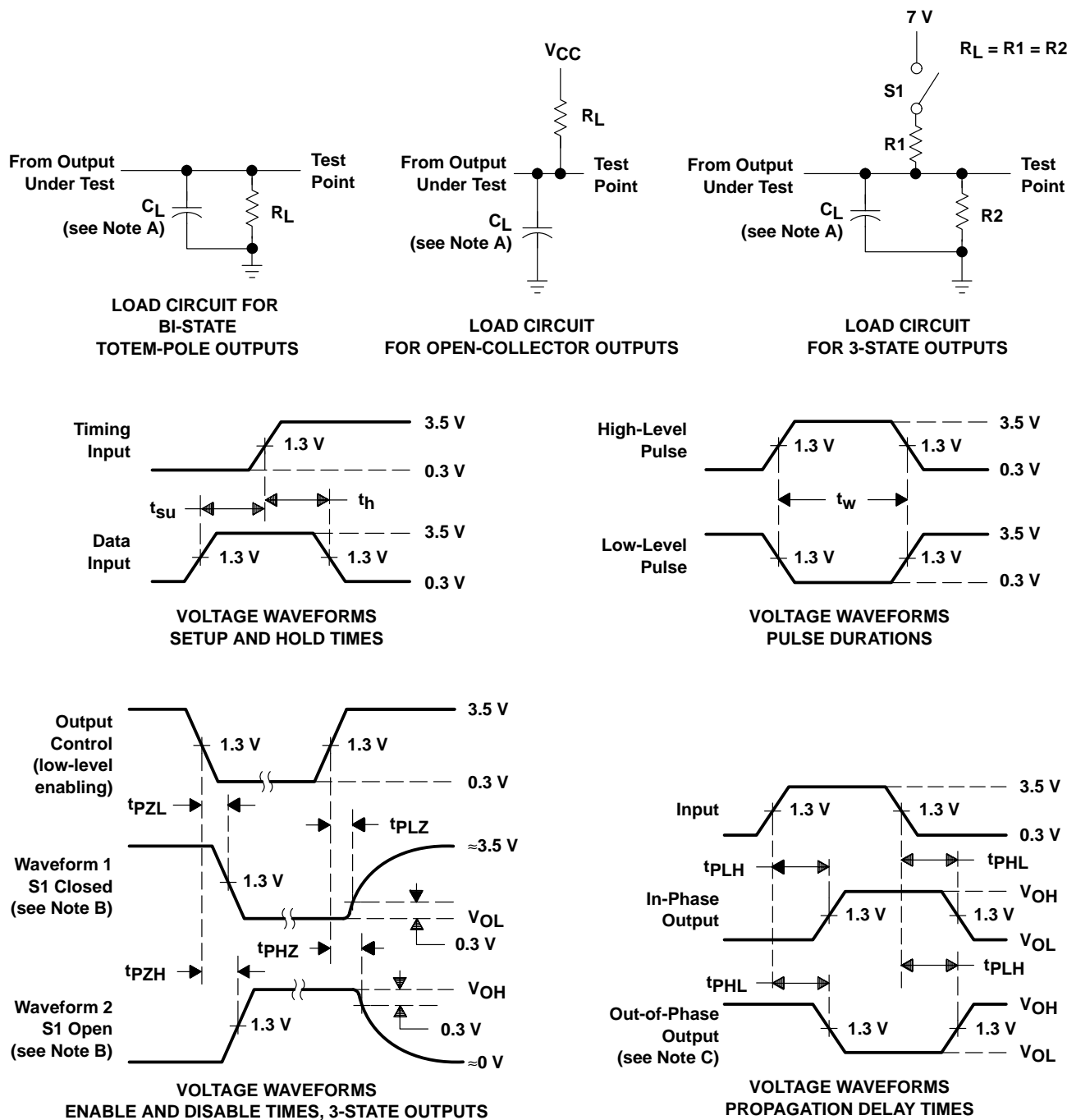
[¶] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.



SN54ALS245A, SN54AS245, SN74ALS245A, SN74AS245 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SDAS272A – NOVEMBER 1994 – REVISED JANUARY 2003

PARAMETER MEASUREMENT INFORMATION SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



- 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. When measuring propagation delay items of 3-state outputs, switch S1 is open.
 D. All input pulses have the following characteristics: $PRR \leq 1$ MHz, $t_r = t_f = 2$ ns, duty cycle = 50%.
 E. The outputs are measured one at a time with one 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⁾
84030012A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
8403001RA	ACTIVE	CDIP	J	20	1	TBD	A42 SNPB	N / A for Pkg Type
8403001SA	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type
SN54ALS245AJ	ACTIVE	CDIP	J	20	1	TBD	A42 SNPB	N / A for Pkg Type
SN54AS245J	ACTIVE	CDIP	J	20	1	TBD	A42 SNPB	N / A for Pkg Type
SN74ALS245A-1DW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245A-1DWE4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245A-1DWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245A-1DWR	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245A-1DWRE4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245A-1DWRG4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245A-1N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74ALS245A-1NE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74ALS245A-1NSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245A-1NSRE4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245A-1NSRG4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245ADBLE	OBSOLETE	SSOP	DB	20		TBD	Call TI	Call TI
SN74ALS245ADBR	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245ADBRE4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245ADBRG4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245ADW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245ADWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245ADWR	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245ADWRE4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245ADWRG4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245AN	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74ALS245AN3	OBSOLETE	PDIP	N	20		TBD	Call TI	Call TI
SN74ALS245ANE4	ACTIVE	PDIP	N	20	20	Pb-Free	CU NIPDAU	N / A for Pkg Type

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
(RoHS)								
SN74ALS245ANSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245ANSRE4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS245ANSRG4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS245DW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS245DWE4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS245DWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS245DWR	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS245DWRE4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS245DWRG4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS245N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74AS245NE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74AS245NSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS245NSRE4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS245NSRG4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SNJ54ALS245AFK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
SNJ54ALS245AJ	ACTIVE	CDIP	J	20	1	TBD	A42 SNPB	N / A for Pkg Type
SNJ54ALS245AW	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type
SNJ54AS245FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
SNJ54AS245J	ACTIVE	CDIP	J	20	1	TBD	A42 SNPB	N / A for Pkg Type

⁽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.

TAPE AND REEL INFORMATION



QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74ALS245A-1DWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1
SN74ALS245A-1NSR	SO	NS	20	2000	330.0	24.4	8.2	13.0	2.5	12.0	24.0	Q1
SN74ALS245ADBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
SN74ALS245ADWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1
SN74ALS245ANSR	SO	NS	20	2000	330.0	24.4	8.2	13.0	2.5	12.0	24.0	Q1
SN74AS245DWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1
SN74AS245NSR	SO	NS	20	2000	330.0	24.4	8.2	13.0	2.5	12.0	24.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74ALS245A-1DWR	SOIC	DW	20	2000	346.0	346.0	41.0
SN74ALS245A-1NSR	SO	NS	20	2000	346.0	346.0	41.0
SN74ALS245ADBR	SSOP	DB	20	2000	346.0	346.0	33.0
SN74ALS245ADWR	SOIC	DW	20	2000	346.0	346.0	41.0
SN74ALS245ANSR	SO	NS	20	2000	346.0	346.0	41.0
SN74AS245DWR	SOIC	DW	20	2000	346.0	346.0	41.0
SN74AS245NSR	SO	NS	20	2000	346.0	346.0	41.0

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

MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

J (R-GDIP-T**)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



4040083/F 03/03

- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - This package is hermetically sealed with a ceramic lid using glass frit.
 - Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
 - Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package can be hermetically sealed with a metal lid.
 - D. The terminals are gold plated.
 - E. Falls within JEDEC MS-004

W (R-GDFP-F20)

CERAMIC DUAL FLATPACK



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package can be hermetically sealed with a ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal identification only.
 - E. Falls within Mil-Std 1835 GDFP2-F20

DW (R-PDSO-G20)

PLASTIC SMALL-OUTLINE PACKAGE



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

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
 - The 20 pin end lead shoulder width is a vendor option, either half or full width.

4040049/E 12/2002

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

Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
RF/IF and ZigBee® Solutions	www.ti.com/lprf

Applications

Audio	www.ti.com/audio
Automotive	www.ti.com/automotive
Broadband	www.ti.com/broadband
Digital Control	www.ti.com/digitalcontrol
Medical	www.ti.com/medical
Military	www.ti.com/military
Optical Networking	www.ti.com/opticalnetwork
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
Copyright © 2008, Texas Instruments Incorporated