- **5-Ω Switch Connection Between Two Ports**
- **TTL-Compatible Input Levels**

description

The SN74CBTS3384 provides ten bits of high-speed TTL-compatible bus switching with Schottky diodes on the I/Os to clamp undershoot. The low on-state resistance of the switch allows connections to be made with minimal propagation delay.

The device is organized as two 5-bit bus switches with separate output-enable ($\overline{OE}$) inputs. When $\overline{OE}$ is low, the switch is on, and port A is connected to port B. When $\overline{OE}$ is high, the switch is open, and the high-impedance state exists between the two ports.

DB, DBQ, DGV, DW, OR PW PACKAGE
(TOP VIEW)

1$\overline{OE}$	1	24	V$_{CC}$
1B1	2	23	2B5
1A1	3	22	2A5
1A2	4	21	2A4
1B2	5	20	2B4
1B3	6	19	2B3
1A3	7	18	2A3
1A4	8	17	2A2
1B4	9	16	2B2
1B5	10	15	2B1
1A5	11	14	2A1
GND	12	13	2$\overline{OE}$
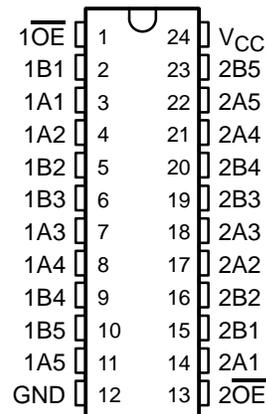
ORDERING INFORMATION

T$_A$	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
−40°C to 85°C	SOIC – DW	Tube	SN74CBTS3384DW	CBTS3384
		Tape and reel	SN74CBTS3384DWR	
	SSOP – DB	Tape and reel	SN74CBTS3384DBR	CR384
	SSOP (QSOP) – DBQ	Tape and reel	SN74CBTS3384DBQR	CBTS3384
	TSSOP – PW	Tape and reel	SN74CBTS384PWR	CR384
	TVSOP – DGV	Tape and reel	SN74CBTS3834DGVR	CR384

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

FUNCTION TABLE
(each 5-bit bus switch)

INPUTS		INPUTS/OUTPUTS	
1$\overline{OE}$	2$\overline{OE}$	1B1–1B5	2B1–2B5
L	L	1A1–1A5	2A1–2A5
L	H	1A1–1A5	Z
H	L	Z	2A1–2A5
H	H	Z	Z

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.

TEXAS INSTRUMENTS

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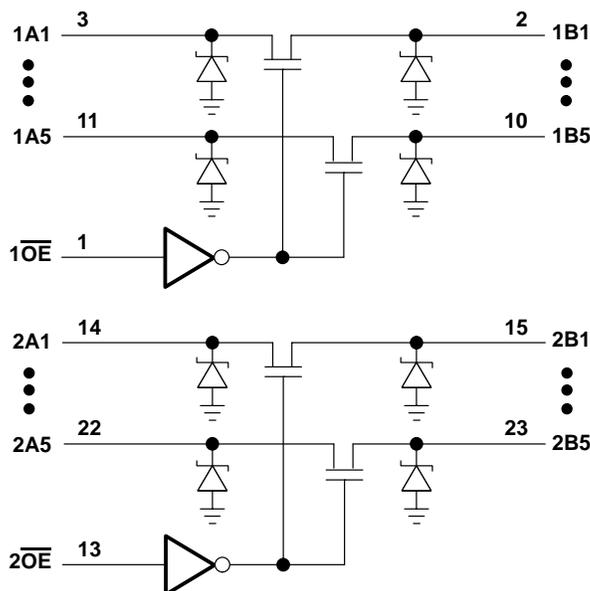
absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, V_{CC} .... −0.5 V to 7 V
Input voltage range, V_I (see Note 1) .... −0.5 V to 7 V
Continuous channel current .... 128 mA
Input clamp current, I_{IK} ($V_{I/O} < 0$) .... −50 mA
Package thermal impedance, θ_{JA} (see Note 2): DB package .... 63°C/W
                                    DBQ package .... 61°C/W
                                    DGV package .... 86°C/W
                                    DW package .... 46°C/W
                                    PW package .... 88°C/W
Storage temperature range, T_{stg} .... −65°C to 150°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
2. The package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions (see Note 3)

		MIN	MAX	UNIT
V_{CC}	Supply voltage	4	5.5	V
V_{IH}	High-level control input voltage	2		V
V_{IL}	Low-level control input voltage		0.8	V
T_A	Operating free-air temperature	−40	85	°C

NOTE 3: All unused control 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			MIN	TYP[†]	MAX	UNIT
V_{IK}	A or B inputs	V_{CC} = 4.5 V,	I_I = –18 mA				–0.6	V
	Control inputs						–1.2	
I_I	I_{IL}	V_{CC} = 5.5 V,	V_I = GND				–1	μA
	I_{IH}	V_{CC} = 5.5 V,	V_I = 5.5 V				150	
I_{CC}		V_{CC} = 5.5 V,	I_O = 0,	V_I = V_{CC} or GND			3	μA
ΔI_{CC}[‡]	Control inputs	V_{CC} = 5.5 V,	One input at 3.4 V,	Other inputs at V_{CC} or GND			2.5	mA
C_i	Control inputs	V_I = 3 V or 0					6	pF
$C_{io(OFF)}$		V_O = 3 V or 0,	$\overline{OE}$ = V_{CC}				6.5	pF
r_{on}[§]		V_{CC} = 4 V, TYP at V_{CC} = 4 V	V_I = 2.4 V,	I_I = 15 mA		14	20	Ω
		V_{CC} = 4.5 V	V_I = 0	I_I = 64 mA		5	7	
				I_I = 30 mA		5	7	
			V_I = 2.4 V,	I_I = 15 mA		10	15	

[†] All typical values are at V_{CC} = 5 V (unless otherwise noted), T_A = 25°C.
[‡] This is the increase in supply current for each input that is at the specified TTL voltage level rather than V_{CC} or GND.
[§] Measured by the voltage drop between the A and B terminals at the indicated current through the switch. On-state resistance is determined by the lowest voltage of the two (A or B) terminals.

switching characteristics over recommended operating free-air temperature range, C_L = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4 V		V_{CC} = 5 V ± 0.5 V		UNIT
			MIN	MAX	MIN	MAX	
t_{pd}[¶]	A or B	B or A		0.35		0.25	ns
t_{en}	$\overline{OE}$	A or B		6.2	1.9	5.7	ns
t_{dis}	$\overline{OE}$	A or B		5.5	2.1	5.2	ns

[¶] The propagation delay is the calculated RC time constant of the typical on-state resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).

SN74CBTS3384
10-BIT FET BUS SWITCH
WITH SCHOTTKY DIODE CLAMPING

SCDS024L – MAY 1995 – REVISED NOVEMBER 2001

PARAMETER MEASUREMENT INFORMATION

TEST	S1
t_{pd}	Open
t_{PLZ}/t_{PZL}	7 V
t_{PHZ}/t_{PZH}	Open

LOAD CIRCUIT

VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES

VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
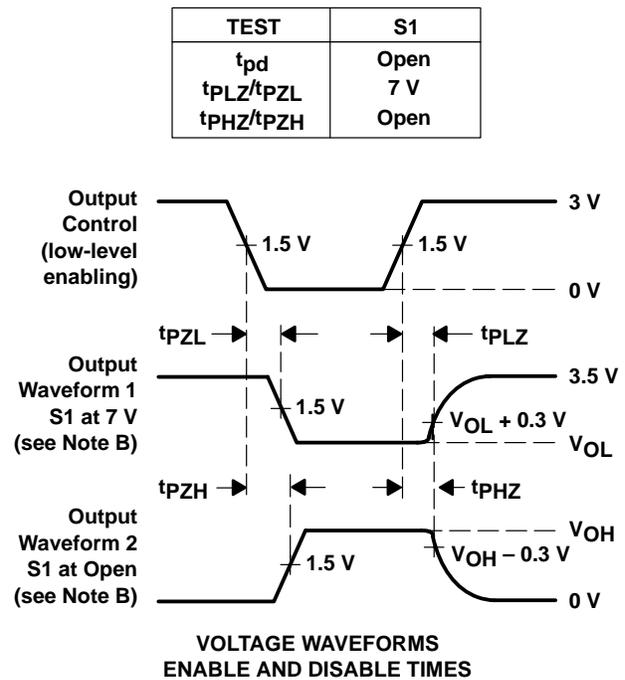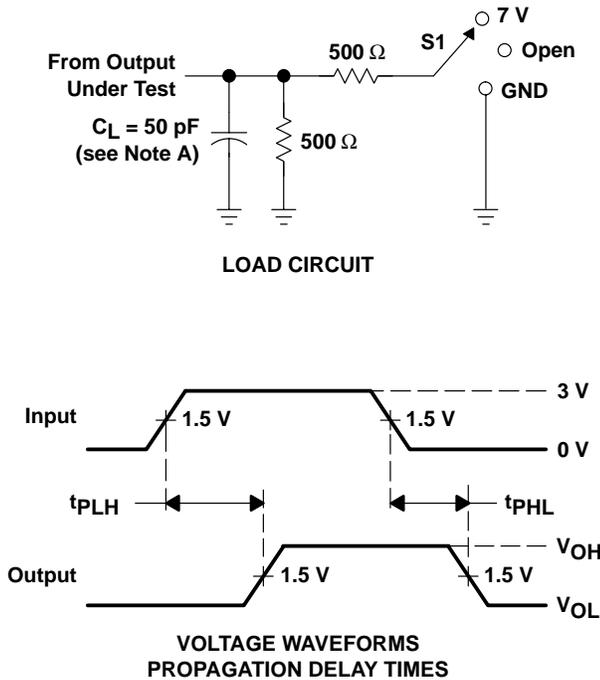
NOTES: A. C_L includes probe and jig capacitance.
       B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
          Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
       C. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 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}.

Figure 1. Load Circuit and Voltage Waveforms

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.

Mailing Address:

Texas Instruments
Post Office Box 655303
Dallas, Texas 75265

Product Folder: SN74CBTS3384, 10-Bit FET Bus Switch With Schottky Diode Clamping

Contact Us | Buy ⊿ | About TI ⊿ | TI Worldwide | my.TI

Products⊿   Applications⊿   Support⊿

Search
:: Advanced Search
Keyword
Part Number

PRODUCT FOLDER | PRODUCT INFO: FEATURES | DESCRIPTION | DATASHEETS | PRICING/AVAILABILITY/PKG | SAMPLES | APPLICATION NOTES | USER GUIDES | MORE LITERATURE

PRODUCT SUPPORT: TRAINING

SN74CBTS3384, 10-Bit FET Bus Switch With Schottky Diode Clamping
DEVICE STATUS: **ACTIVE**

PARAMETER NAME	SN74CBTS3384
Voltage Nodes (V)	4, 5
Vcc range (V)	4.0 to 5.5
No. of Bits	10
ron(max) (ohms)	7
tpd max (ns)	0.25

FEATURES   ▲Back to Top

- 5-Ω Switch Connection Between Two Ports
- TTL-Compatible Input Levels

DESCRIPTION   ▲Back to Top

The SN74CBTS3384 provides ten bits of high-speed TTL-compatible bus switching with Schottky diodes on the I/Os to clamp undershoot. The low on-state resistance of the switch allows connections to be made with minimal propagation delay.

The device is organized as two 5-bit bus switches with separate output-enable (OE\) inputs. When OE\ is low, the switch is on, and port A is connected to port B. When OE\ is high, the switch is open, and the high-impedance state exists between the two ports.

TECHNICAL DOCUMENTS   ▲Back to Top

To view the following documents, Acrobat Reader 4.0 is required.
To download a document to your hard drive, right-click on the link and choose 'Save'.

DATASHEET   ▲Back to Top

Full datasheet in Acrobat PDF: sn74cbts3384.pdf (71 KB, Rev.L) (Updated: 11/13/2001)

APPLICATION NOTES   ▲Back to Top

View Application Notes for Digital Logic

- 16-Bit Widebus Logic Families in 56-Ball, 0.65-mm Pitch Very Thin Fine-Pitch BGA (Rev. B) (SZZA029B - Updated: 05/22/2002)
- 3.3-V to 2.5-V Translation with Texas Instruments Crossbar Technology (Rev. A) (SCDA004A - Updated: 04/03/1998)
- 5-V To 3.3-V Translation With the SN74CBTD3384 (Rev. B) (SCDA003B - Updated: 03/01/1997)
- Bus FET Switch Solutions for Live Insertion Applications (SCDA009 - Updated: 02/07/2003)
- Evaluation of Nickel/Palladium/Gold-Finished Surface-Mount Integrated Circuits (SZZA026 - Updated: 06/20/2001)
- Flexible Voltage-Level Translation With CBT Family Devices (SCDA006 - Updated: 07/20/1999)
- Implications of Slow or Floating CMOS Inputs (Rev. C) (SCBA004C - Updated: 02/01/1998)
- Low-Voltage Bus-Switch Technology and Applications (SCDA005 - Updated: 12/01/1997)
- Migration From 3.3-V To 2.5-V Power Supplies For Logic Devices (SCEA005 - Updated: 12/01/1997)
- SN74CBTS3384 Bus Switches Provide Fast Connection and Ensure Isolation (Rev. A) (SCDA002A - Updated: 08/01/1996)
- Selecting the Right Texas Instruments Signal Switch (SZZA030 - Updated: 09/07/2001)
- TI IBIS File Creation, Validation, and Distribution Processes (SZZA034 - Updated: 08/29/2002)

Product Folder: SN74CBTS3384, 10-Bit FET Bus Switch With Schottky Diode Clamping

- [TI Logic Solutions for Memory Interleaving With the Intel440BX Chipset](#) (SCCA001 - Updated: 04/08/1999)
- [Texas Instruments Crossbar Switches (Rev. A)](#) (SCDA001A - Updated: 06/01/1995)
- [Texas Instruments Little Logic Application Report](#) (SCEA029 - Updated: 11/01/2002)
- [Texas Instruments Solution for Undershoot Protection for Bus Switches](#) (SCDA007 - Updated: 04/13/2000)
- [Understanding Advanced Bus-Interface Products Design Guide](#) (SCAA029, 253 KB - Updated: 05/01/1996)
- [Understanding and Interpreting Texas Instruments Standard-Logic Products Data Sh (Rev. A)](#) (SZZA036A - Updated: 02/27/2003)

MORE LITERATURE	▲Back to Top

- [Enhanced Plastic Portfolio Brochure](#) (SGZB004, 387 KB - Updated: 08/19/2002)
- [Logic Reference Guide](#) (SCYB004, 1032 KB - Updated: 10/23/2001)
- [MicroStar Junior BGA Design Summary](#) (SCET004, 167 KB - Updated: 07/28/2000)
- [Military Brief](#) (SGYN138, 803 KB - Updated: 10/10/2000)
- [Overview of IEEE Std 91-1984, Explanation of Logic Symbols Training Booklet (Rev. A)](#) (SDYZ001A, 138 KB - Updated: 07/01/1996)
- [Palladium Lead Finish User's Manual](#) (SDYV001, 2041 KB - Updated: 11/01/1996)
- [QML Class V Space Products Military Brief (Rev. A)](#) (SGZN001A, 257 KB - Updated: 10/07/2002)
- [Standard Linear & Logic for PCs, Servers & Motherboards](#) (SCYB005, 3997 KB - Updated: 06/13/2002)

USER GUIDES	▲Back to Top

- [CBT (5-V) And CBTLV (3.3-V) Bus Switches Data Book (Rev. B)](#) (SCDD001B, 5433 KB - Updated: 12/01/1998)
- [LOGIC Pocket Data Book](#) (SCYD013, 4837 KB - Updated: 12/05/2002)
- [Signal Switch Data Book](#) (SCDD003, 10259 KB - Updated: 03/19/2001)

SAMPLES ▲Back to Top

ORDERABLE DEVICE	PACKAGE INDUSTRY (TI)	PINS	TEMP (ºC)	STATUS	PRODUCT CONTENT	SAMPLES
SN74CBTS3384DBQR	SSOP (DBQ)	24	-40 TO 85	ACTIVE	View Product Content	Request Samples
SN74CBTS3384DBR	SSOP (DB)	24	-40 TO 85	ACTIVE	View Product Content	Request Samples
SN74CBTS3384DW	SOIC (DW)	24	-40 TO 85	ACTIVE	View Product Content	Request Samples
SN74CBTS3384PWR	TSSOP (PW)	24	-40 TO 85	ACTIVE	View Product Content	Request Samples

PRICING/AVAILABILITY/PKG ▲Back to Top

DEVICE INFORMATION Updated Daily							TI INVENTORY STATUS As Of 09:00 AM GMT, 17 Apr 2003			REPORTED DISTRIBUTOR INVENTORY As Of 09:00 AM GMT, 17 Apr 2003		
ORDERABLE DEVICE	STATUS	PACKAGE TYPE | PINS	TEMP (ºC)	PRODUCT CONTENT	BUDGETARY PRICING QTY | $US	STD PACK QTY	IN STOCK	IN PROGRESS QTY | DATE	LEAD TIME	DISTRIBUTOR COMPANY | REGION	IN STOCK	PURCHASE
SN74CBTS3384DBLE	OBSOLETE	SSOP (DB) | 24	-40 TO 85	View Contents	1KU |		0*		Call**	None Reported View Distributors		
SN74CBTS3384DBQR	ACTIVE	SSOP (DBQ) | 24	-40 TO 85	View Contents	1KU | 0.31	2500	>10k*	>10k | 17 Apr	2 WKS	DigiKey | Americas	967	BUY NOW
SN74CBTS3384DBR	ACTIVE	SSOP (DB) | 24	-40 TO 85	View Contents	1KU | 0.31	2000	0*	>10k | 12 May	4 WKS	DigiKey | Americas	>1k	BUY NOW
SN74CBTS3384DGVR	ACTIVE	TVSOP (DGV) | 24		View Contents	1KU | 0.31	2000	0*	>10k | 05 May	4 WKS	None Reported View Distributors		

Product Folder: SN74CBTS3384, 10-Bit FET Bus Switch With Schottky Diode Clamping

SN74CBTS3384DW	ACTIVE	SOIC (DW)	| 24	-40 TO 85	View Contents	1KU | 0.31	25	0*	6225 | 30 Apr	4 WKS	DigiKey | Americas	646	BUY NOW
									>10k | 12 May				
SN74CBTS3384DWR	ACTIVE	SOIC (DW)	| 24	-40 TO 85	View Contents	1KU | 0.31	2000	0*	>10k | 12 May	4 WKS	None Reported View Distributors		
SN74CBTS3384PW	ACTIVE	TSSOP (PW)	| 24	-40 TO 85	View Contents	1KU | 0.98	60	0*	4067 | 16 Apr	4 WKS	Arrow | Americas	230	BUY NOW
									>10k | 01 May				
SN74CBTS3384PWLE	OBSOLETE	TSSOP (PW)	| 24	-40 TO 85	View Contents	1KU |		0*		Call**	None Reported View Distributors		
SN74CBTS3384PWR	ACTIVE	TSSOP (PW)	| 24	-40 TO 85	View Contents	1KU | 0.31	2000	0*	767 | 28 Apr	4 WKS	Avnet | Americas	>1k	BUY NOW
									>10k | 08 May		DigiKey | Americas	>1k	BUY NOW

Table Data Updated on: 4/17/2003