

# SN74CBT3384 10-BIT CROSSBAR SWITCH

SCDS004B – NOVEMBER 1992 – REVISED JUNE 1994

- Functionally Equivalent to QS3384 and QS3L384
- 5-Ω Switch Connection Between Two Ports
- TTL-Compatible Input and Output Levels
- Package Options Include Plastic Small-Outline (DW), Shrink Small-Outline (DB), and Thin Shrink Small-Outline (PW) Packages

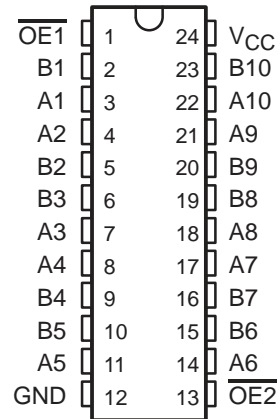
## description

The SN74CBT3384 provides ten bits of high-speed TTL-compatible bus switching. The low on resistance of the switch allows connections to be made without adding propagation delay.

The device is organized as two 5-bit 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 a high-impedance state exists between the two ports.

The SN74CBT3384 is characterized for operation from 0°C to 70°C.

DB, DW, OR PW PACKAGE  
(TOP VIEW)



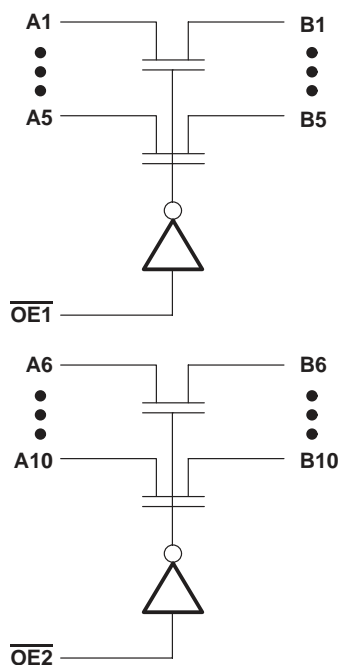
FUNCTION TABLE

$\overline{OE1}$	$\overline{OE2}$	B1 – B5	B6 – B10
L	L	A1 – A5	A6 – A10
L	H	A1 – A5	Z
H	L	Z	A6 – A10
H	H	Z	Z

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## logic diagram



## 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 6 V
Continuous channel current .....	128 mA
Input clamp current, $I_{IK}$ ( $V_{I/O} < 0$ ) .....	-50 mA
Maximum power dissipation at $T_A = 55^\circ\text{C}$ (in still air) (see Note 2):	
DB package .....	0.6 W
DW package .....	1.6 W
PW package .....	0.7 W
Storage temperature range .....	$-65^\circ\text{C}$ to $150^\circ\text{C}$

† 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 maximum package power dissipation is calculated using a junction temperature of  $150^\circ\text{C}$  and a board trace length of 750 mils. For more information, refer to the *Package Thermal Considerations* application note.

## recommended operating conditions

		MIN	MAX	UNIT
$V_{CC}$	Supply voltage	4.75	5.25	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	0	70	$^\circ\text{C}$

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

PARAMETER		TEST CONDITIONS		MIN	TYP†	MAX	UNIT
$V_{IK}$		$V_{CC} = 4.5\text{ V}$ ,	$I_I = -18\text{ mA}$			-1.2	V
$I_I$		$V_{CC} = 5.25\text{ V}$ ,	$V_I = 5.25\text{ V}$ or GND			±5	μA
$I_{OS}$		$V_{CC} = 4.75\text{ V}$ ,	$V_{I(A)} = 0$ , $V_{I(B)} = 4.75\text{ V}$		250		mA
$I_{CC}$		$V_{CC} = 5.5\text{ V}$ ,	$I_O = 0$ , $V_I = V_{CC}$ or GND			50	μA
$\Delta I_{CC}‡$	Control pins	$V_{CC} = 5.25\text{ V}$ ,	One input at 3.4 V, Other inputs at $V_{CC}$ or GND			2.5	mA
$C_i$	Control pins	$V_I = 3\text{ V}$ or 0			3		pF
$C_{io(OFF)}$		$V_O = 3\text{ V}$ or 0,	$\overline{OE} = V_{CC}$		6		pF
$r_{on}§$		$V_{CC} = 4.75\text{ V}$	$V_I = 0$ ,	$I_I = 64\text{ mA}$	5	7	Ω
			$V_I = 0$ ,	$I_I = 30\text{ mA}$	5	7	
			$V_I = 2.4\text{ V}$ ,	$I_I = 15\text{ mA}$	10	15	

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

‡ 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 pin at the indicated current through the switch. On resistance is determined by the lower of the voltages of the two (A or B) pins.

**switching characteristics over recommended operating free-air temperature range,  $C_L = 50\text{ pF}$  (unless otherwise noted) (see Note 3)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	MIN	MAX	UNIT
$t_{pd}¶$	A or B	B or A		0.25	ns
$t_{en}$	$\overline{OE}$	A or B	1	8.5	ns
$t_{dis}$	$\overline{OE}$	A or B	1	8.5	ns

¶ This parameter is characterized but not tested. This propagation delay is based on the RC time constant of the typical on resistance of the switch and a load capacitance of 50 pF.

NOTE 3: Load circuit and voltage waveforms are shown in Section 1.



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