

# LOW-VOLTAGE 10-BIT BUS-EXCHANGE SWITCH

# IDT74CBTLV3383

### **FEATURES**:

- 5Ω A/B bi-directional bus switch
- · Isolation under power-off conditions
- · Over-voltage tolerant
- · Latch-up performance exceeds 100mA
- Vcc = 2.3V 3.6V, Normal Range
- ESD > 2000V per MIL-STD-883, Method 3015;
   > 200V using machine model (C = 200pF, R = 0)
- · Available in SSOP, QSOP and TSSOP packages

## **APPLICATIONS:**

- 3.3V High Speed Bus Switching and Bus Isolation
- · Crossbar Switching

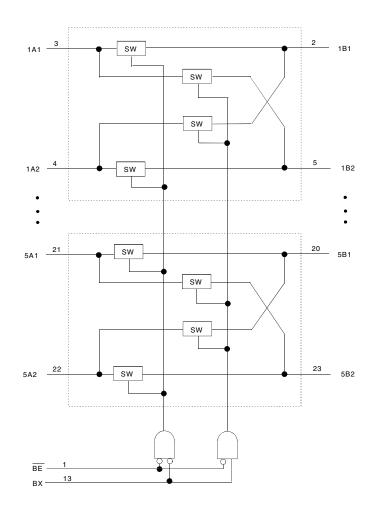
### **DESCRIPTION:**

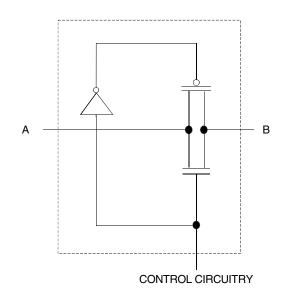
The CBTLV3383 provides ten bits of high-speed bus switching or exchanging with low on-switch resistance of the switch allowing connections to be made with minimal propagation delay.

The device operates as a 10-bit bus switch or a 5-bit bus exchanger, which provides swapping of the A and B pairs of signals. The bus-exchange function is selected when BX is high and  $\overline{BE}$  is low.

### FUNCTIONAL BLOCK DIAGRAM

# SIMPLIFIED SCHEMATIC, EACH SWITCH



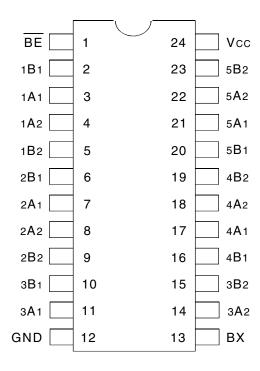


 $The \, IDT \, logo \, is \, a \, registered \, trademark \, of \, Integrated \, Device \, Technology, \, Inc. \,$ 

INDUSTRIAL TEMPERATURE RANGE

AUGUST 2002

### **PIN CONFIGURATION**



SSOP/ QSOP/ TSSOP TOP VIEW

# ABSOLUTE MAXIMUM RATINGS(1)

Symbol	Description	Max	Unit
Vcc	SupplyVoltage Range	-0.5 to +4.6	V
Vı	Input Voltage Range	-0.5 to +4.6	V
	Continuous Channel Current	128	mA
lıĸ	Input Clamp Current, VI/O < 0	-50	mA
Tstg	Storage Temperature	-65 to +150	°C

### NOTE:

1. Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

# FUNCTION TABLE(1)

Inp	out	Inputs/Outputs		
BE	ВХ	1 <b>A</b> 1 - 5 <b>A</b> 1	1 <b>A</b> 2 - 5 <b>A</b> 2	
L	L	1B1 - 5B1	1B2 - 5B2	
L	Н	1B2 - 5B2	1B1 - 5B1	
Н	X	Z	Z	

#### NOTE:

1. H = HIGH Voltage Level

X = Don't Care

L = LOW Voltage Level

Z = High Impedance

# OPERATING CHARACTERISTICS, TA = 25°C(1)

Symbol	Parameter	Test Conditions	Min.	Max.	Unit
Vcc	Supply Voltage		2.3	3.6	V
VIH	High-Level Control Input Voltage	Vcc = 2.3V to 2.7V	1.7	_	V
		Vcc = 2.7V to 3.6V	2	_	
VIL	Low-Level Control Input Voltage	Vcc = 2.3V to 2.7V	_	0.7	V
		Vcc = 2.7V to 3.6V	_	0.8	
TA	Operating Free-Air Temperature		-40	85	°C

### NOTE:

1. All unused control inputs of the device must be held at Vcc or GND to ensure proper device operation.

# DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:

Operating Conditions:  $TA = -40^{\circ}C$  to  $+85^{\circ}C$ 

Symbol	Parameter	Test Conditions		Min.	Typ. <sup>(1)</sup>	Max.	Unit
Vik	Control Inputs, Data Inputs	Vcc = 3V, II = -18mA		<u> </u>	_	-1.2	V
lı	Control Inputs	Vcc = 3.6V, VI = Vcc or GND		_	_	±1	μA
loz	Data I/O	Vcc = 3.6V, Vo = 0 or 3.6V, sv	vitch disabled	_	_	5	μA
loff		Vcc = 0, Vi or Vo = 0 to 3.6V		_	_	10	μA
Icc		Vcc = 3.6V, Io = 0, VI = Vcc or GND		_	_	10	μA
$\Delta$ Icc $^{(2)}$	Control Inputs	Vcc = 3.6V, one input at 3V, other inputs at Vcc or GND		_	_	300	μA
Сі	Control Inputs	VI = 3V or 0		_	3.5	_	pF
CIO(OFF)		Vo = 3V or 0, $\overline{BE}$ = Vcc		_	13.5	_	pF
	Vcc = 2.3V	VI = 0	Io = 64mA	_	5	8	
	Typ. at Vcc = 2.5V		Io = 24mA		5	8	
Ron <sup>(3)</sup>		VI = 1.7V	Io = 15mA	-	27	40	Ω
		VI = 0	Io = 64mA	T -	5	7	]
	Vcc = 3V		Io = 24mA	T -	5	7	]
		VI = 2.4V	Io = 15mA	_	10	15	1

#### NOTES:

- 1. Typical values are at Vcc = 3.3V, +25°C ambient.
- 2. The increase in supply current is attributable to each current that is at the specified voltage level rather than Vcc or GND.
- 3. This is 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 lower of the voltages of the two (A or B) terminals.

# **SWITCHING CHARACTERISTICS**

		Vcc = 2.5V ± 0.2V		$Vcc = 3.3V \pm 0.3V$				
Symbol	Parameter	Min.	Тур.	Max.	Min.	Тур.	Max.	Unit
tpD <sup>(1)</sup>	Propagation Delay	-	_	0.15	_	_	0.25	ns
	A to B or B to A							
<b>t</b> PD	Propagation Delay	1.5	-	5.8	1.5	-	4.7	ns
	BX to A or B							
ten	Output Enable Time	1.5	_	5.3	1.5	_	4.7	ns
	BE to A or B							
tois	Output Disable Time	1	_	6	1	_	6	ns
	BE to A or B							

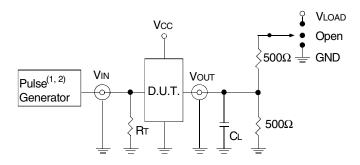
#### NOTE:

<sup>1.</sup> The propagation delay is the calculated RC time constant of the typical on-state resistance of the switch and the specified load capacitance driven by an ideal voltage source (zero output impedance).

# TEST CIRCUITS AND WAVEFORMS

# **TEST CONDITIONS**

Symbol	Vcc <sup>(1)</sup> = 3.3V±0.3V	Vcc <sup>(2)</sup> = 2.5V±0.2V	Unit
VLOAD	6	2 x Vcc	V
VIH	3	Vcc	V
VT	1.5	Vcc / 2	V
VLZ	300	150	mV
VHZ	300	150	mV
CL	50	30	pF



Test Circuits for All Outputs

#### **DEFINITIONS:**

CL = Load capacitance: includes jig and probe capacitance.

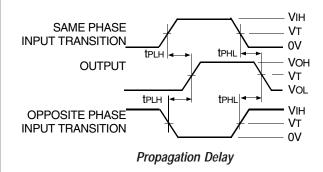
RT = Termination resistance: should be equal to ZouT of the Pulse Generator.

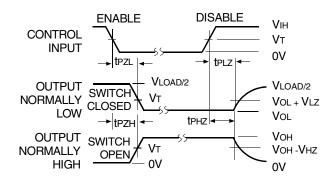
### NOTES:

- 1. Pulse Generator for All Pulses: Rate  $\leq$  10MHz; tr  $\leq$  2.5ns; tr  $\leq$  2.5ns.
- 2. Pulse Generator for All Pulses: Rate  $\leq$  10MHz; tr  $\leq$  2ns; tr  $\leq$  2.5ns.

# **SWITCH POSITION**

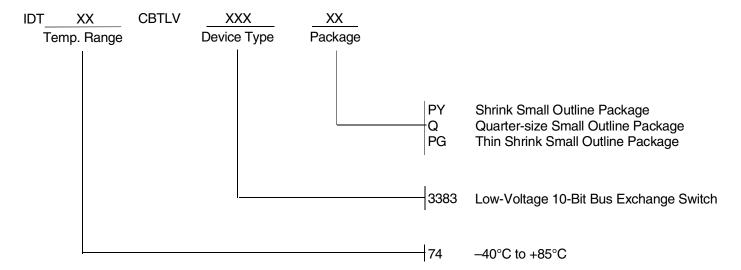
Test	Switch
tplz/tpzl	Vload
tphz/tpzh	GND
teo	Open





**Enable and Disable Times** 

# ORDERING INFORMATION





CORPORATE HEADQUARTERS
6024 Silver Creek Valley Poad

6024 Silver Creek Valley Road San Jose, CA 95138 for SALES: 800-345-7015 or 408-284-8200 fax: 408-284-2775 www.idt.com for Tech Support: logichelp@idt.com