

LOW-VOLTAGE 20-BIT BUS SWITCH

FEATURES:

- 5Ω A/B bi-directional 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 TSSOP package

DESCRIPTION:

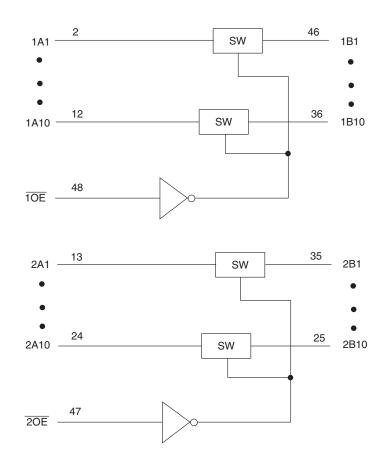
The CBTLV16210 operates as a single 20-bit bus switch or as a dual 10-bit bus switch, which provides high-speed switching. This device has very low ON resistance, resulting in under 250ps propagation delay through the switch. When Output Enable (\overline{OE}) is low, the corresponding 10-bit bus switch is on and port A is connected to Port B. When \overline{OE} is high, the switch is off and a high impedance exists between Port A and Port B. To ensure the high-impedance state during power up or power down,

OE should be tied to VCC through a pullup resistor.

APPLICATIONS:

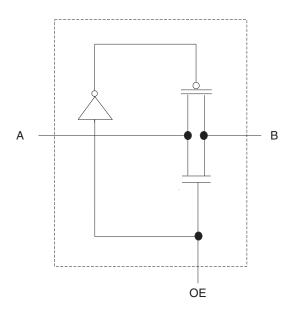
3.3V High Speed Bus Switching and Bus Isolation

FUNCTIONAL BLOCK DIAGRAM



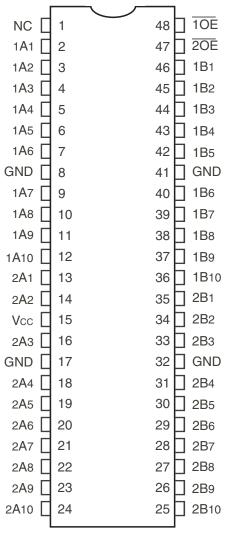
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SIMPLIFIED SCHEMATIC, EACH SWITCH



DECEMBER 2014

PIN CONFIGURATION



TSSOP TOP VIEW

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

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

NOTE:

 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.

PIN DESCRIPTION

Pin Names	Description	
XOE	Output Enable (Active LOW)	
xAx	Port A Inputs or Outputs	
xBx	Port B Inputs or Outputs	

FUNCTION TABLE⁽¹⁾

Input OE	Operation
L	A-Port = B-Port
Н	Disconnect

NOTE:

1. H = HIGH Voltage Level L = LOW Voltage Level

OPERATING CHARACTERISTICS⁽¹⁾

Symbol	Parameter	Test Conditions	Min.	Max.	Unit
Vcc	Supply Voltage		2.3	3.6	V
Viн	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 Condition: TA = -40°C to +85°C

Symbol	Parameter	Test Conditions		Min.	Typ. ⁽¹⁾	Max.	Unit
Vik	Control Inputs, Data I/O	Vcc = 3V, li = -18mA		_	—	-1.2	V
li	Control Inputs	Vcc = 3.6V, VI = Vcc or GNE)	_	—	±1	μA
loz	Data I/O	Vcc = 3.6V, Vo = 0V or 3.6V	switch disabled	_	—	5	μA
loff		Vcc = 0V, VI or Vo = 0V or 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		_	4	_	pF
CIO(OFF)		Vo = 3V or 0, \overline{OE} = Vcc		_	6.5	_	pF
	Max. at Vcc = 2.3V	VI = 0	Io = 64mA	_	5	8	
	Typ. at Vcc = 2.5V		lo = 24mA	—	5	8]
Ron ⁽³⁾		VI = 1.7V	Io = 15mA	_	27	40	Ω
		VI = 0	Io = 64mA	—	5	7]
	Vcc = 3V		Io = 24mA	_	5	7	
		VI = 2.4V	Io = 15mA	_	10	15	

NOTES:

1. Typical values are at 3.3V, +25°C ambient.

2. The increase in supply current is attributable to each input 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.

SWITCHING CHARACTERISTICS

		$Vcc = 2.5V \pm 0.2V$		$Vcc = 3.3V \pm 0.3V$		
Symbol	Parameter	Min.	Max.	Min.	Max.	Unit
tPD ⁽¹⁾	Propagation Delay	—	0.15	—	0.25	ns
	A to B or B to A					
ten	Output Enable Time	1	6.8	1	6	ns
	OE to A or B					
tois	Output Disable time	1	7.3	1	7.4	ns
	OE to A or B					

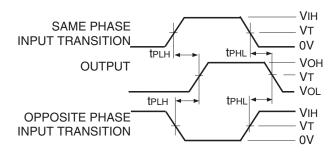
NOTE:

1. 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 impededance).

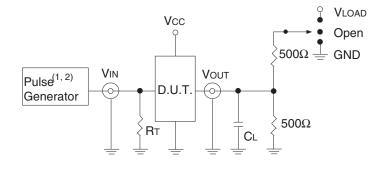
TEST CIRCUITS AND WAVEFORMS

TEST CONDITIONS

Symbol	Vcc ⁽¹⁾ =3.3V±0.3V	Vcc ⁽²⁾ =2.5V±0.2V	Unit
VLOAD	2 x Vcc	2 x Vcc	V
Vih	3	Vcc	V
Vτ	1.5	Vcc/2	V
Vlz	300	150	mV
VHZ	300	150	mV
CL	50	30	pF



Propagation Delay



Test Circuits for All Outputs

DEFINITIONS:

CL = Load capacitance: includes jig and probe capacitance.

 $\mathsf{R} \mathsf{T}$ = Termination resistance: should be equal to $\mathsf{Z} \mathsf{O} \mathsf{U} \mathsf{T}$ of the Pulse Generator.

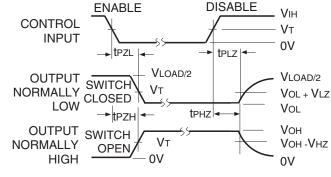
NOTES:

1. Pulse Generator for All Pulses: Rate \leq 10MHz; tF \leq 2.5ns; tR \leq 2.5ns.

2. Pulse Generator for All Pulses: Rate \leq 10MHz; tF \leq 2ns; tR \leq 2ns.

SWITCH POSITION

Test	Switch
tplz/tpzL	VLOAD
tphz/tpzh	GND
ted	Open

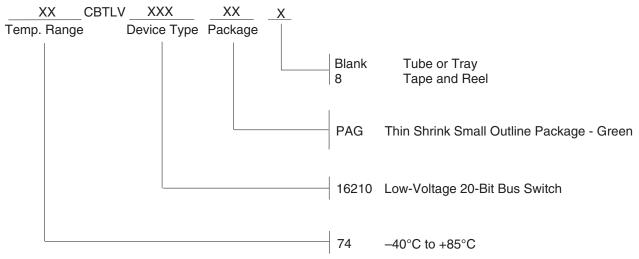


NOTE:

1. Diagram shown for input Control Enable-LOW and input Control Disable-HIGH.

Enable and Disable Times

ORDERING INFORMATION



Datasheet Document History

12/01/2014 Pg. 5 Updated the ordering information by adding Tape and Reel information.



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