

# LOW-VOLTAGE DUAL 1-OF-4 MULTIPLEXER/ DEMULTIPLEXER

## IDT74CBTLV3253

## **FEATURES**:

- · Functionally equivalent to QS3253
- $5\Omega$  switch connection between two ports
- · 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 QSOP and TSSOP packages

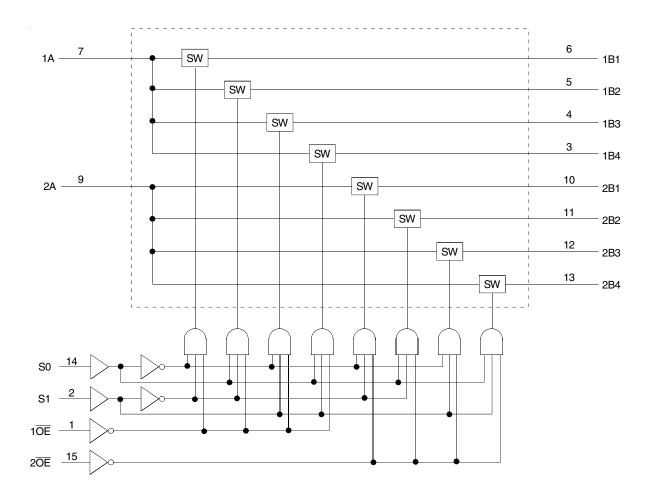
## **DESCRIPTION:**

The CBTLV3253 is a dual 1-of-4 high-speed multiplexer/demultiplexer. The low on-state resistance of the switch allows connections to be made with minimal propagation delay.

The select (S0, S1) input controls the data flow. The multiplexer/demultiplexer switches are disabled when the output-enable  $(\overline{OE})$  input is high.

To ensure that the device is in high-impedance state during power up or power down,  $\overline{OE}$  should be tied to Vcc through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

## FUNCTIONAL BLOCK DIAGRAM

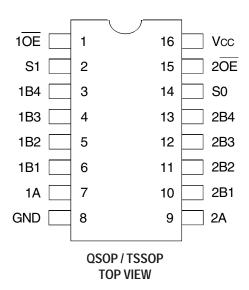


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INDUSTRIAL TEMPERATURE RANGE

**JUNE 2006** 

## **PIN CONFIGURATION**



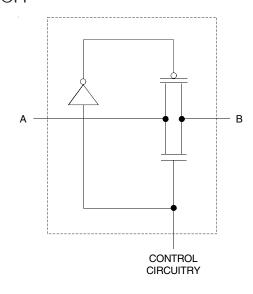
## ABSOLUTE MAXIMUM RATINGS(1)

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.

# SIMPLIFIED SCHEMATIC, EACH SWITCH



## FUNCTION TABLE(1)

ONE OF TWO 1:4 MUX/DEMUX BANKS

ŌĒ	<b>S</b> 1	S0	Function
L	L	L	A Port = B1 Port
L	L	Н	A Port = B2 Port
L	Н	L	A Port = B3 Port
L	Н	Н	A Port = B4 Port
Н	Х	Х	Disconnect

#### NOTE:

1. H = HIGH Voltage Level

L = LOW Voltage Level

X = Don't Care

# 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		T -	_	-1.2	V
lı .	Control Inputs	Vcc = 3.6V, VI = Vcc or GND		T -	_	±1	μΑ
loz	Data I/O	Vcc = 3.6V, Vo = 0 or 3.6V, swi	tch disabled	T -	_	5	μA
loff		Vcc = 0, Vi or Vo = 0 to 3.6V		T -	_	50	μA
Icc		Vcc = 3.6V, lo = 0, VI = Vcc o	r GND	T -	_	10	μΑ
∆ICC <sup>(2)</sup>	Control Inputs	Vcc = 3.6V, one input at 3V, other	Vcc = 3.6V, one input at 3V, other inputs at Vcc or GND		_	300	μA
Сі	Control Inputs	VI = 3V or 0	VI = 3V or 0		4	_	pF
CIO(OFF)	A Port	$Vo = 3V \text{ or } 0, \overline{OE} = Vcc = 3.3V$		_	20	_	pF
	B Port		7		6	_	
	Vcc = 2.3V	VI = 0	Io = 64mA	_	5	8	
	Typ. at Vcc = 2.5V		Io = 24mA	_	5	8	
Ron <sup>(3)</sup>	1	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	<u> </u>	10	15	

#### 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 ± 0.3V		
Symbol	Parameter	Min.	Мах.	Min.	Max.	Unit
t <sub>PD</sub> <sup>(1)</sup>	Propagation Delay	-	0.15	-	0.25	ns
	A to B or B to A					
tsel	Select Time	1	4.8	1	4.5	ns
	S to A or B					
ten	Enable Time	1	4.8	1	4.5	ns
	S to B					
tois	Disable Time	1	5.1	1	5.3	ns
	S to B					
ten	Output Enable Time	1	5	1	4.8	ns
	OE to A or B					
tois	Output Disable Time	1	5.5	1	5.4	ns
	OE to A or B					

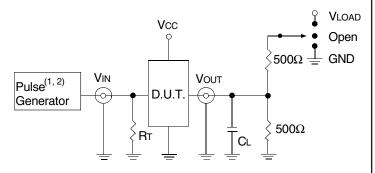
#### NOTE:

<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	$Vcc^{(1)} = 3.3V \pm 0.3V$	Vcc <sup>(2)</sup> = 2.5V±0.2V	Unit
VLOAD	6	2 x Vcc	V
ViH	3	Vcc	V
VT	1.5	Vcc / 2	٧
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.

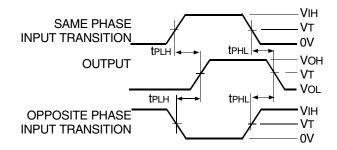
RT = Termination resistance: should be equal to ZouT of the Pulse Generator.

#### NOTES:

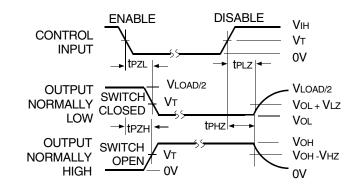
- 1. Pulse Generator for All Pulses: Rate  $\leq$  10MHz; tr  $\leq$  2.5ns; tr  $\leq$  2.5ns.
- 2. Pulse Generator for All Pulses: Rate  $\leq$  10MHz; tr  $\leq$  2ns; tr  $\leq$  2.5ns.

## **SWITCH POSITION**

Test	Switch
tplz/tpzl	Vload
tpнz/tpzн	GND
tsel	Open
t <sub>PD</sub>	Open

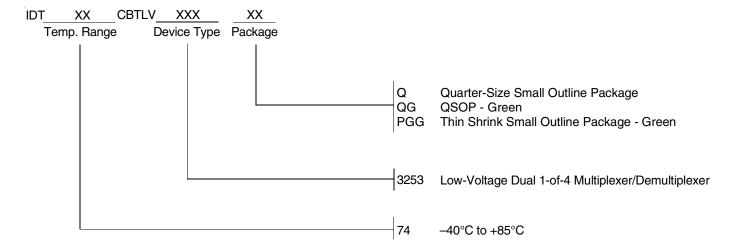


Propagation Delay



**Enable and Disable Times** 

## ORDERING INFORMATION





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