FEATURES:

- **Functionally equivalent to QS3257**
- **5Ω bi-directional switch connection between two ports**
- **Isolation under power-off conditions**
- **Over-voltage tolerant**
- **Latch-up performance exceeds 100mA**
- **V_{CC} = 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**

APPLICATIONS:

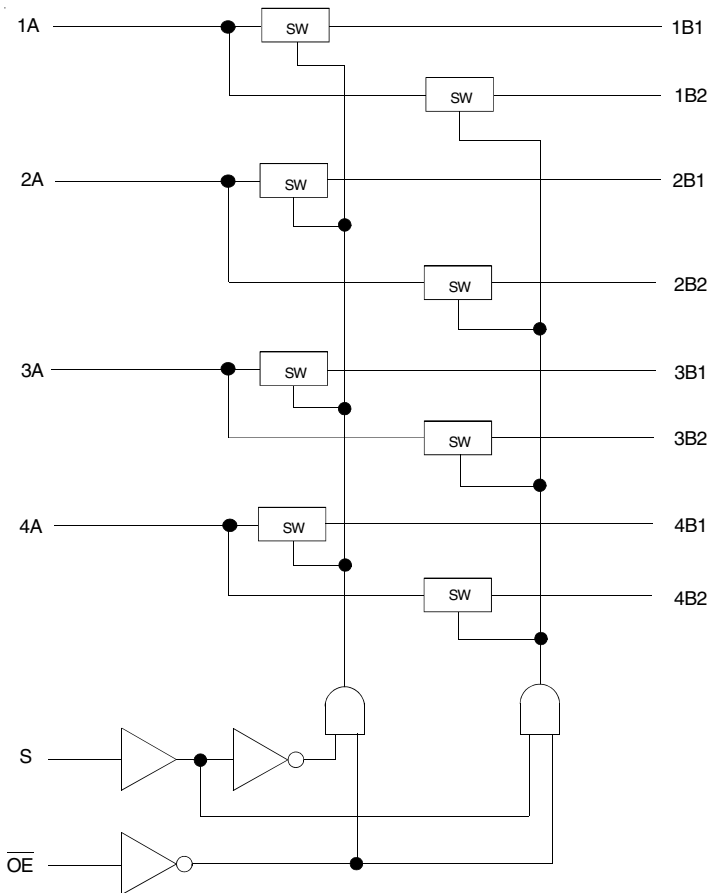- **3.3V High Speed Bus Switching, Multiplexing, and Bus Isolation**

DESCRIPTION:

The CBTLV3257 is a quad 2:1 multiplexer/demultiplexer. The low on-state resistance of the switch allows connections to be made with minimal propagation delay.

The select (S) input controls the data flow. The multiplexers/demultiplexers are enabled when the output-enable ($\overline{OE}$) input is low.

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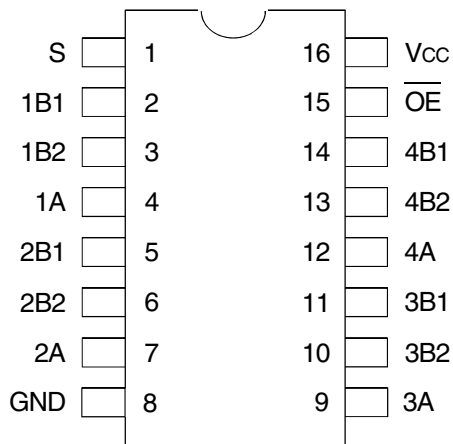
FUNCTIONAL BLOCK DIAGRAM

SIMPLIFIED SCHEMATIC, EACH SWITCH

FROM ENABLE CIRCUITRY

INDUSTRIAL TEMPERATURE RANGE

MAY 2019

DSC-5744/6

PIN CONFIGURATION

S	1		16	Vcc
1B1	2		15	$\overline{OE}$
1B2	3		14	4B1
1A	4		13	4B2
2B1	5		12	4A
2B2	6		11	3B1
2A	7		10	3B2
GND	8		9	3A

TOP VIEW

Package Type	Package Code	Order Code
TSSOP	PGG16	PGG
QSOP	PCG16	QG

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
Iik	Input Clamp Current, $V_{I/O}$ < 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]

Inputs		Function
$\overline{OE}$	S	
L	L	A Port = B1 Port
L	H	A Port = B2 Port
H	X	Disconnect

NOTE:
1. H = HIGH Voltage Level
   L = LOW Voltage Level
   X = Don't Care

OPERATING CHARACTERISTICS, T_A = 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: $T_A = -40°C$ to $+85°C$

Symbol	Parameter	Test Conditions		Min.	Typ.[1]	Max.	Unit
V_{IK}	Control Inputs, Data Inputs	$V_{CC} = 3V$, $I_I = -18mA$		—	—	−1.2	V
I_I	Control Inputs	$V_{CC} = 3.6V$, $V_I = V_{CC}$ or GND		—	—	±1	µA
I_{OZ}	Data I/O	$V_{CC} = 3.6V$, $V_O = 0$ or 3.6V, switch disabled		—	—	20	µA
I_{OFF}		$V_{CC} = 0$, V_I or $V_O = 0$ to 3.6V		—	—	50	µA
I_{CC}		$V_{CC} = 3.6V$, $I_O = 0$, $V_I = V_{CC}$ or GND		—	—	10	µA
ΔI_{CC}[2]	Control Inputs	$V_{CC} = 3.6V$, one input at 3V, other inputs at V_{CC} or GND		—	—	300	µA
C_I	Control Inputs	$V_I = 3V$ or 0		—	4	—	pF
$C_{IO(OFF)}$	A Port	$V_O = 3V$ or 0, $\overline{OE} = V_{CC} = 3.3V$		—	13	—	pF
	B Port			—	6	—	
R_{ON}[3]	$V_{CC} = 2.3V$ Typ. at $V_{CC} = 2.5V$	$V_I = 0$	$I_O = 64mA$	—	5	8	Ω
			$I_O = 24mA$	—	5	8	
		$V_I = 1.7V$	$I_O = 15mA$	—	27	40	
	$V_{CC} = 3V$	$V_I = 0$	$I_O = 64mA$	—	5	7	
			$I_O = 24mA$	—	5	7	
		$V_I = 2.4V$	$I_O = 15mA$	—	10	15	

NOTES:
1. Typical values are at $V_{CC} = 3.3V$, $+25°C$ ambient.
2. The increase in supply current is attributable to each current that is at the specified voltage level rather than V_{CC} 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

Symbol	Parameter	$V_{CC} = 2.5V \pm 0.2V$		$V_{CC} = 3.3V \pm 0.3V$		Unit
		Min.	Max.	Min.	Max.	
t_{PD}[1]	Propagation Delay A to B or B to A	–	0.15	–	0.25	ns
t_{SEL}	Select Time S to A or B	1	6.1	1	5.3	ns
t_{EN}	Enable Time S to B	1	6.1	1	5.3	ns
t_{DIS}	Disable Time S to B	1	4.8	1	4.5	ns
t_{EN}	Output Enable Time $\overline{OE}$ to A or B	1	5.6	1	5	ns
t_{DIS}	Output Disable Time $\overline{OE}$ to A or B	1	5.5	1	5.5	ns

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 driven by an ideal voltage source (zero output impedance).

TEST CIRCUITS AND WAVEFORMS

TEST CONDITIONS

Symbol	$V_{CC}^{(1)} = 3.3V \pm 0.3V$	$V_{CC}^{(2)} = 2.5V \pm 0.2V$	Unit
V_{LOAD}	6	$2 \times V_{CC}$	V
V_{IH}	3	V_{CC}	V
V_T	1.5	$V_{CC}/2$	V
V_{LZ}	300	150	mV
V_{HZ}	300	150	mV
C_L	50	30	pF
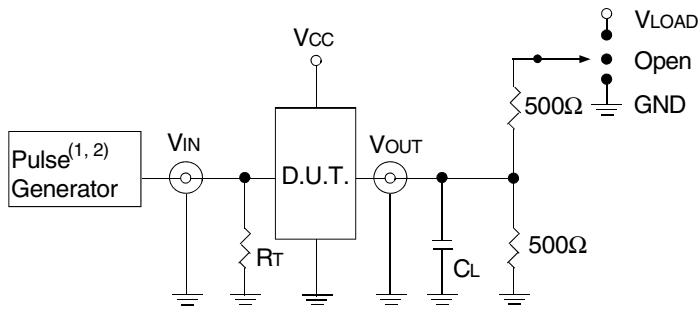
Test Circuits for All Outputs

DEFINITIONS:

C_L = Load capacitance: includes jig and probe capacitance.

R_T = Termination resistance: should be equal to Z_{OUT} of the Pulse Generator.

NOTES:

1. Pulse Generator for All Pulses: Rate ≤ 10MHz; t_F ≤ 2.5ns; t_R ≤ 2.5ns.
2. Pulse Generator for All Pulses: Rate ≤ 10MHz; t_F ≤ 2ns; t_R ≤ 2.5ns.

SWITCH POSITION

Test	Switch
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND
t_{SEL}	Open
t_{PD}	Open
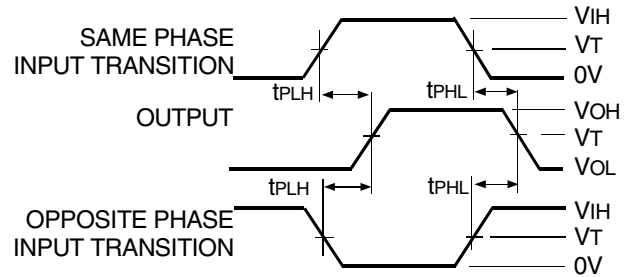
Propagation Delay
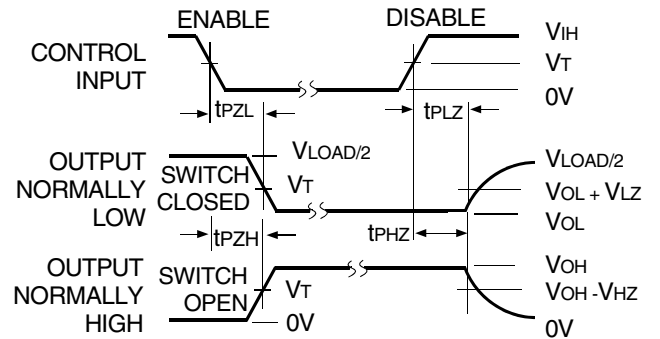
Enable and Disable Times

ORDERING INFORMATION

<u>XX</u> CBTLV <u>XXX</u> <u>XX</u> <u>X</u> <u>X</u>
Temp. Range   Device Type Package

Blank   Tube
8   Tape and Reel

G   Green

Q   Quarter-Size Small Outline Package (PCG16)
PG   Thin Shrink Small Outline Package (PGG16)

3257   Low-Voltage Quad 2:1 Mux/Demux Bus Switch

74   −40°C to +85°C
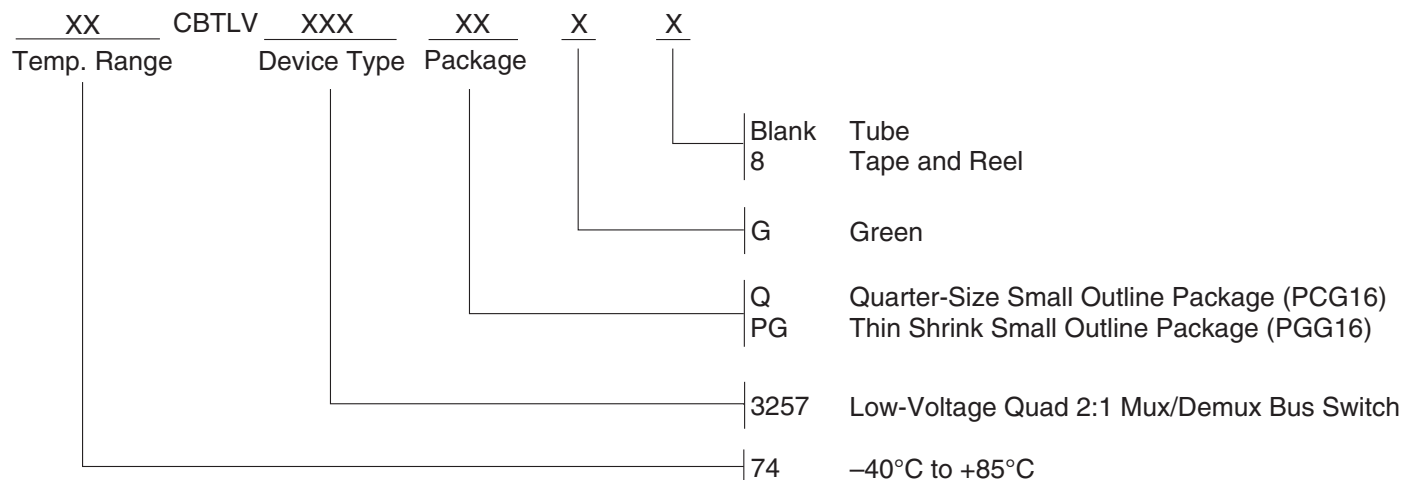
Orderable Part Information

Speed (ns)	Orderable Part ID	Pkg. Code	Pkg. Type	Temp. Grade
	74CBTLV3257PGG	PGG16	TSSOP	I
	74CBTLV3257PGG8	PGG16	TSSOP	I
	74CBTLV3257QG	PCG16	QSOP	I
	74CBTLV3257QG8	PCG16	QSOP	I

Datasheet Document History

12/18/2014   Pg. 5   Updated the ordering information by removing non RoHS part and by adding Tape and Reel information.

05/10/2019   Pg. 2,5   Added table under pin configuration diagram with detailed package information and orderable part information table. Updated the ordering information diagram in clearer detail.

IMPORTANT NOTICE AND DISCLAIMER

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.

Contact Information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit:
www.renesas.com/contact/

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Multiplexer Switch ICs *category:*

Click to view products by Renesas *manufacturer:*

Other Similar products are found below :

NLV74HC4066ADR2G HEF4051BP MC74HC4067ADTG DG508AAK/883B NLV14051BDG 016400E PI3V512QE 7705201EC
PI2SSD3212NCE NLAS3257CMX2TCG PI3DBS12412AZLEX PI3V512QEX PI3DBS16213ZLEX PI3DBS16415ZHEX
MUX36S16IRSNR TC7W53FK,LF CD4053BM96 MC74HC4053ADWR2G SN74LV4051APWR HEF4053BT.653 PI3L720ZHEX
ADG5408BRUZ-REEL7 ADG1404YRUZ-REEL7 ADG1208YRZ-REEL7 MAX4704EUB+T ADG1406BRUZ-REEL7
LTC4305IDHD#PBF CD4053BPWRG4 74HC4053D.653 74HCT4052PW.118 74LVC2G53DP.125 74HC4052DB.112 74HC4052PW.112
74HC4053DB.112 74HC4067DB.112 74HC4351DB.112 74HCT4052D.112 74HCT4052DB.112 74HCT4053DB.112 74HCT4067D.112
74HCT4351D.112 74LV4051PW.112 FSA1256L8X_F113 PI5V330QE PI5V331QE 5962-8771601EA 5962-87716022A ADG5249FBRUZ
ADG1438BRUZ AD7506JNZ