



BCT4340

USB 3.1 SuperSpeed 10 Gbps Switch

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GENERAL DESCRIPTION

The BCT4340 is a 2:1 data switch for USB SuperSpeed Gen1 and Gen2, 5 Gbps and 10 Gbps data. It is targeted at the mobile device market and for use in Type-C applications where a reversible cable requires a switch.

The BCT4340 data switch offers superior performance various high speed data transmission protocols:

- USB 3.1 SuperSpeed (Gen 2), 10 Gbps
- PCI Express, Gen 3
- SATA
- Fibre Channel
- Display Port 1.3

FEATURES

- 10 GHz Typical Bandwidth
- USB 3.1 SuperSpeed 5 Gbps and 10 Gbps Switch
- -1.0dB Typical Insertion Loss at 2.5 GHz
- Low Active Power of 12μA Typical
- Low Shutdown Power of < 1μA Max.
- 2kV HBM ESD Protection
- QFN2.0x2.8-18L Small Package
- Wide VCC Operating Range, 1.5V-5.0V

APPLICATIONS

- Smart phones
- Tablets
- Notebooks

ORDERING INFORMATION

Order Number	Package Type	Temperature Range	Marking	QTY/Reel
BCT4340EGN-TR	QFN2.8x2.0-18L	-40°C to +85°C	ABXX	3000

Mark Note: "XX" in Marking will be appeared as the batch code.

BLOCK DIAGRAM

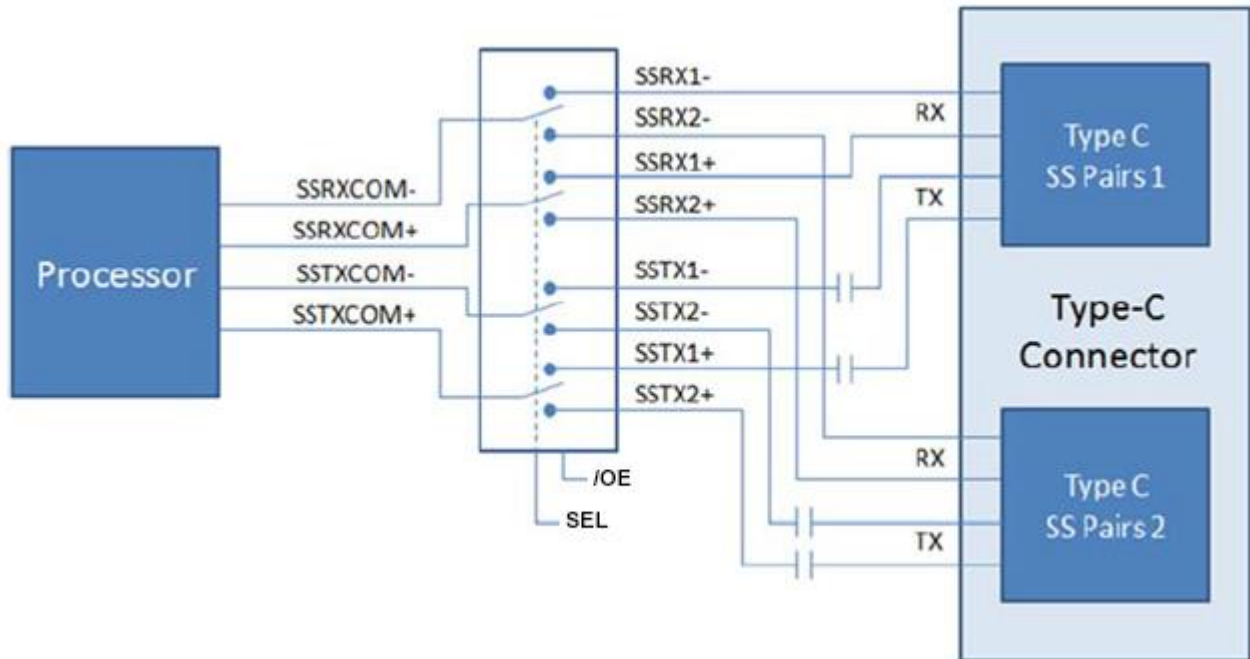


Figure1. Block Diagram

PIN CONFIGURATION (Top View)

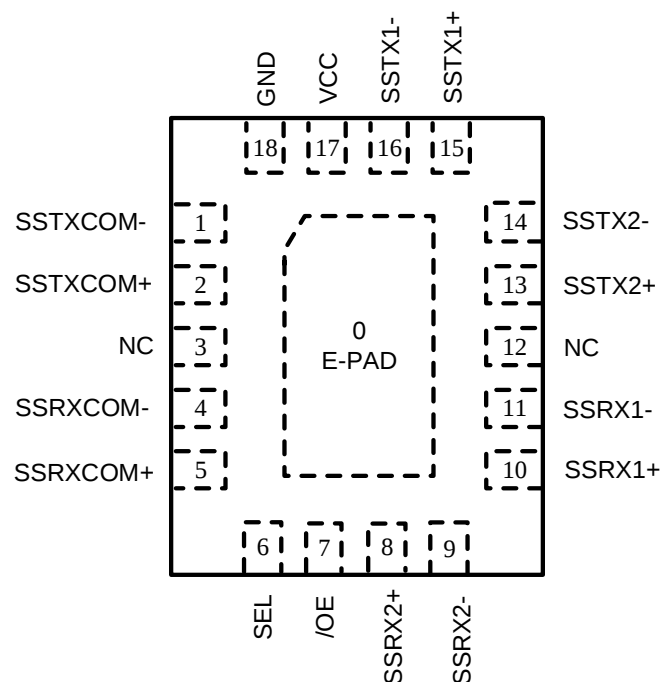


Figure2. Pin Assignment



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PIN DESCRIPTIONS

Pin #	Name	Type	Description
1	SSTXCOM-	SW	SuperSpeed TX- Common
2	SSTXCOM+	SW	SuperSpeed TX+ Common
3	NC	---	Ground or Floating (Internal connect to Pin12 & Pin0)
4	SSRXCOM-	SW	SuperSpeed RX- Common
5	SSRXCOM+	SW	SuperSpeed RX+ Common
6	SEL	Input	Switch Select (0=SW1, 1=SW2)
7	/OE	Input	Output Enable (0=Switches Enabled, 1=Switches Disabled)
8	SSRX2+	SW	SuperSpeed RX2+
9	SSRX2-	SW	SuperSpeed RX2-
10	SSRX1+	SW	SuperSpeed RX1+
11	SSRX1-	SW	SuperSpeed RX1-
12	NC	---	Ground or Floating (Internal connect to Pin3 & Pin0)
13	SSTX2+	SW	SuperSpeed TX2+
14	SSTX2-	SW	SuperSpeed TX2-
15	SSTX1+	SW	SuperSpeed TX1+
16	SSTX1-	SW	SuperSpeed TX1-
17	VCC	POWER	Device Power
18	GND	GND	Ground
0	E-Pad	---	Ground or Floating (Internal connect to Pin3 & Pin12)

TRUTH TABLE

SEL	/OE	Function
LOW	LOW	Port 1 is Active
HIGH	LOW	Port 2 is Active
X	HIGH	All Ports High Impedance

TYPICAL APPLICATION CIRCUIT

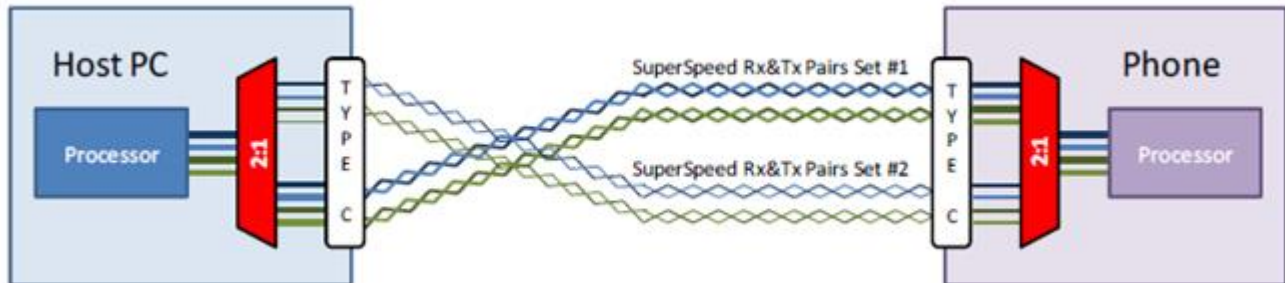


Figure 3. Typical Application

ABSOLUTE MAXIMUM RATINGS

Supply Voltage (V_{CC})	-0.5V to +6.0V
DC Input Voltage (SEL, /OE) ⁽¹⁾	-0.5V to V_{CC}
DC Switch I/O Voltage	-0.3V to 2.1V
DC Input Diode Current	-50mA
DC Output Current	25mA
Storage Temperature Range	-65°C to +150°C
Junction Temperature	150°C
Operating Temperature Range	-40°C to +85°C
Lead Temperature (Soldering, 10 sec)	260°C
ESD Susceptibility	
All Pins	2kV

CAUTION

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. Broadchip recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

Broadchip reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time. Please contact Broadchip sales office to get the latest datasheet.

RECOMMENDED OPERATING CONDITONS

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications.

Symbol	Parameter	Min.	Max.	Unit
V_{CC}	Supply Voltage	1.5	5.0	V
V_{CTRL}	Control Input Voltage(SEL, /OE) ⁽²⁾	0	5.0	V
V_{SW}	Switch I/O Voltage	0	2.0	V
T_A	Operating Temperature	-40	+85	°C

Notes:

- The input and output negative ratings maybe exceed if the input and output diode current ratings are observed.
- The control input must be held HIGH or LOW; it must not float.

DC ELECTRICAL CHARACTERISTICS

(All typical values are $T_A = 25^\circ\text{C}$, unless otherwise specified.)

PARAMETER	SYM	CONDITIONS	V_{CC} (V)	MIN	TYP	MAX	UNITS
Control Input Leakage (SEL, /OE)	I_{IN}	$V_{CTRL}=0$ to V_{CC}	1.5 to 5.0	-1		1	μA
Input Voltage High (SEL, /OE)	V_{IH}		1.5 to 5.0	1.5			V
Input Voltage Low (SEL, /OE)	V_{IL}		1.5 to 5.0			0.4	V
Off leakage Current of Open Data Paths	I_{OZ}	$0.0 \leq V_{SW} \leq 2.0$ V	5.0	-1		1	μA
On leakage Current of Close Data Paths	I_{CL}	$0.0 \leq V_{SW} \leq 2.0$ V	5.0	-1		1	μA
Power-Off Leakage Current	I_{OFF}	$0.0 \leq V_{SW} \leq 2.0$ V	0	-1		1	μA
Switch On Resistance	R_{ON}	$V_{SW}=0\text{V}$, $I_{SW}=8\text{mA}$, /OE=0V, SEL= V_{CC} or 0V	1.5		5.4	8.0	Ω
On Resistance Matching Between Channels	ΔR_{ON}	$V_{SW}=0\text{V}$, $I_{SW}=8\text{mA}$	1.5		0.1		Ω
Flatness for On Resistance	ΔR_{ONF}	$0.0 \leq V_{SW} \leq 2.0$ V, $I_{SW}=8\text{mA}$	1.5		0.9		Ω
Quiescent Hi-Z Supply Current	I_{CCZ}	$V_{/OE}=V_{CC}$, $V_{SEL}=0\text{V}$ or V_{CC} , $I_{OUT}=0$	5.0			1	μA
Quiescent Supply Current	I_{CC}	$V_{/OE}=0\text{V}$, $V_{SEL}=0\text{V}$ or V_{CC} , $I_{OUT}=0$	5.0		12	30	μA
Increase in I_{CC} Current Per Control Voltage and V_{CC}	I_{CCT}	$V_{SEL, /OE}=1.5\text{V}$	5.0		5	15	μA

AC ELECTRICAL CHARACTERISTICS

(All values are for $V_{CC}=3.6V$ at $T_A=25^{\circ}C$ unless otherwise specified.)

PARAMETER	SYM	CONDITIONS	V_{CC} (V)	MIN	TYP	MAX	UNITS
Turn-On Time SEL to Output	t_{ON}	$R_L=50\Omega$, $V_{SW}=0$ to $0.6V$	1.5 to 5.0		350	600	ns
Turn-Off Time SEL to Output	t_{OFF}	$R_L=50\Omega$, $V_{SW}=0$ to $0.6V$	1.5 to 5.0		125	300	ns
Enable Turn-On Time, /OE to Output	t_{EN}	$R_L=50\Omega$, $V_{SW}=0$ to $0.6V$	1.5 to 5.0		60	150	ns
Disable Turn-off Time, /OE to Output	t_{DIS}	$R_L=50\Omega$, $V_{SW}=0$ to $0.6V$	1.5 to 5.0		35	240	ns
Propagation Delay	t_{PD}	$R_L=50\Omega$	1.5 to 5.0		60		ps
Break-Before-Make Time	t_{BBM}	$R_L=50\Omega$, $V_{SW}=0.6V$	3.6	100		350	ns
Differential Off Isolation ⁽¹⁾	DO_{IRR}	$V_S=0dBm$, $f=2.5GHz$, $R_L=50\Omega$	3.6		-28		dB
Differential Crosstalk ⁽¹⁾	DX_{TALK}	$V_S=0dBm$, $f=2.5GHz$, $R_L=50\Omega$	3.6		-44		dB
Differential Insertion Loss	DIL	$V_S=0dBm$, $f=2.5GHz$ $R_L=50\Omega$ $f=5.0GHz$	3.6		-1.0 -2.1		dB
Differential -3db Bandwidth ⁽¹⁾	BW	$V_S=0dBm$, $R_L=50\Omega$, $C_L=0pF$	3.6		10		GHz
Control Pin Input Capacitance ⁽¹⁾	C_{IN}	$V_{CC}=0V$, $f=1MHz$	0		2.7		pF
Output On Capacitance ⁽¹⁾	C_{ON}	/OE=0V, $f=1MHz$	3.3		0.5		
Output Off Capacitance ⁽¹⁾	C_{OFF}	/OE=3.3V, $f=1MHz$	3.3		0.4		

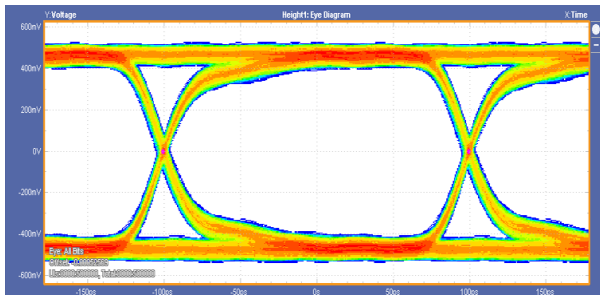
Note:

1. Guaranteed by characterization.

EYE DIAGRAMS

(All plots below are for Vcc= 3.6V and TA = 25°C)

Before Switch



After Switch

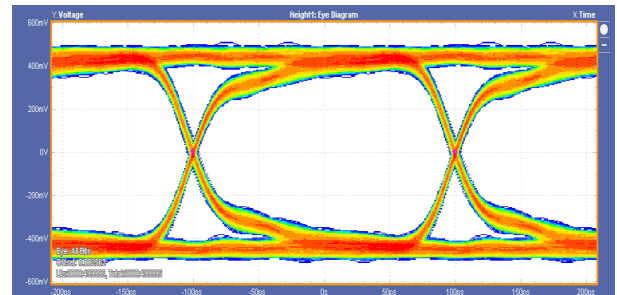
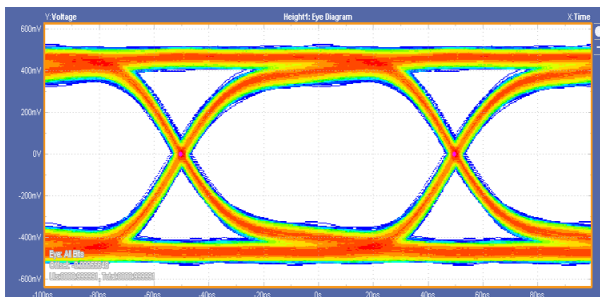


Figure 4. 5 Gbps Eye Diagram with Eye Mask

Before Switch



After Switch

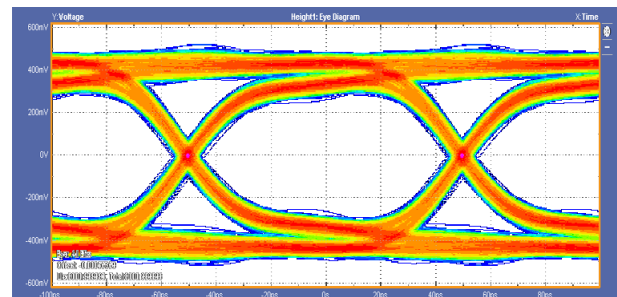
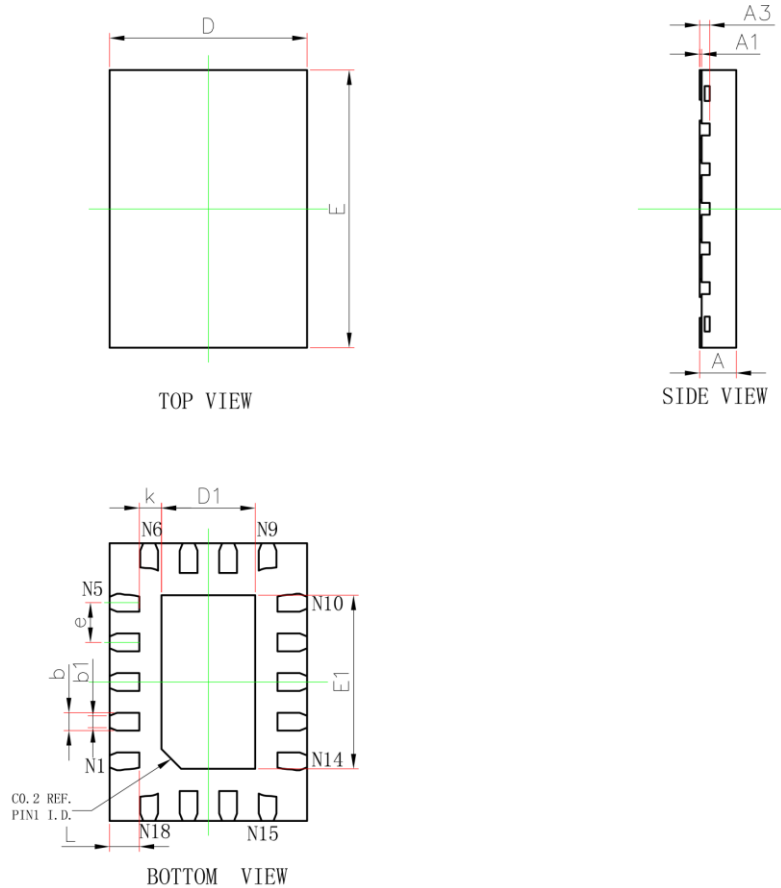


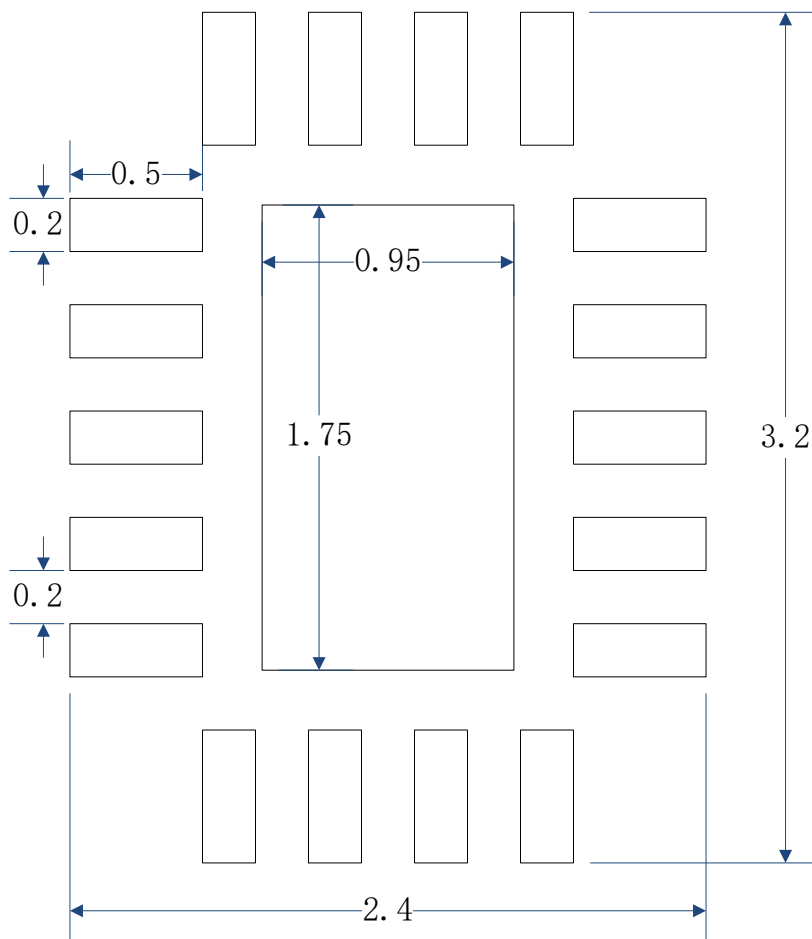
Figure 5. 10 Gbps Eye Diagram with Eye Mask

PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.320	0.400	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.102REF.		0.004REF.	
D	1.950	2.050	0.077	0.081
E	2.750	2.850	0.108	0.112
D1	0.900	1.000	0.035	0.039
E1	1.700	1.800	0.067	0.071
k	0.225REF.		0.009REF.	
b	0.130	0.230	0.005	0.009
b1	0.120REF.		0.005REF.	
e	0.400BSC.		0.016BSC.	
L	0.250	0.350	0.010	0.014

RECOMMENDED LAND PATTERN



Unit: mm