

Descriptions

The is a USB Type-C high speed 8:8 differential channels bi-directional crossbar passive Mux for high-speed USB3.1 10 Gbps and/or DP1.4 8.1 Gbps signals. Combined with TPG3USB42YU, the can also provides side band switching of AUX and other signals over SBU1 and SBU2. The is configurable through the GPIO interface. For DisplayPort Alt Mode applications, the multiplexes either 1 lane of USB and 2 channels of DP1.4 or 4 channels of DP1.4 to a USB Type-C connector. With an excellent signal integrity for high-speed signals, the provides up to 5.1 GHz -3 dB bandwidth for USB3.1 high-speed channels. The is applicable for various devices, such as PCs, tablets, smart phones, dockings, and monitors.

The is a generic analog differential passive switch that can work for any high-speed interface applications requiring a common mode voltage range of 0 to 2 V and differential signaling with differential amplitude up to 1.8Vpp. It employs adaptive tracking that ensures the channel remains unchanged for the entire common mode voltage range. Excellent dynamic characteristics of the device allow high-speed switching with minimum attenuation to the signal eye diagram with very little added jitter. It consumes <2mW of power when operational and has a shutdown mode exercisable by _EN pin resulting <20uW. The is available in QFN3x3-20L with Pb-free and Halogen-free making it a perfect candidate for mobile and space constrained applications.

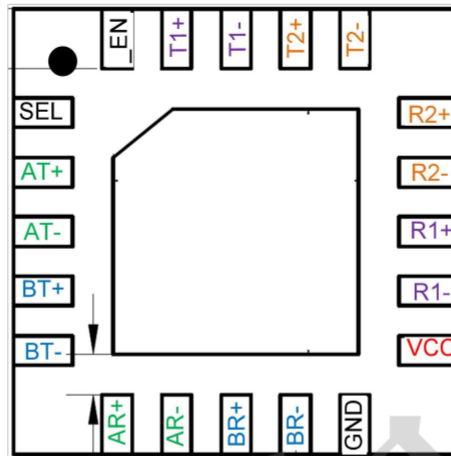
Features

- Functional Replacement of VL171, WHS3804, HD3SS460
- Wide Supply Range 1.5 V to 5.5 V
- USB 3.1 Super Speed 10 Gbps Crossbar MUX
- High Bandwidth: 5.1GHz @ -3dB Bandwidth
- Isolation: -24dB @ 1.25 GHz
- Crosstalk: -34dB @ 1.25 GHz
- Low bit-to-bit skew, Bidirectional
- ESD Tolerance: 2kV HBM

Applications

- USB Type-C Ecosystem
- Desktop and Notebook PCs
- Server/Storage Area Networks
- PCI Express Backplanes
- Docking Stations, Shared I/O Ports

Pin Configuration

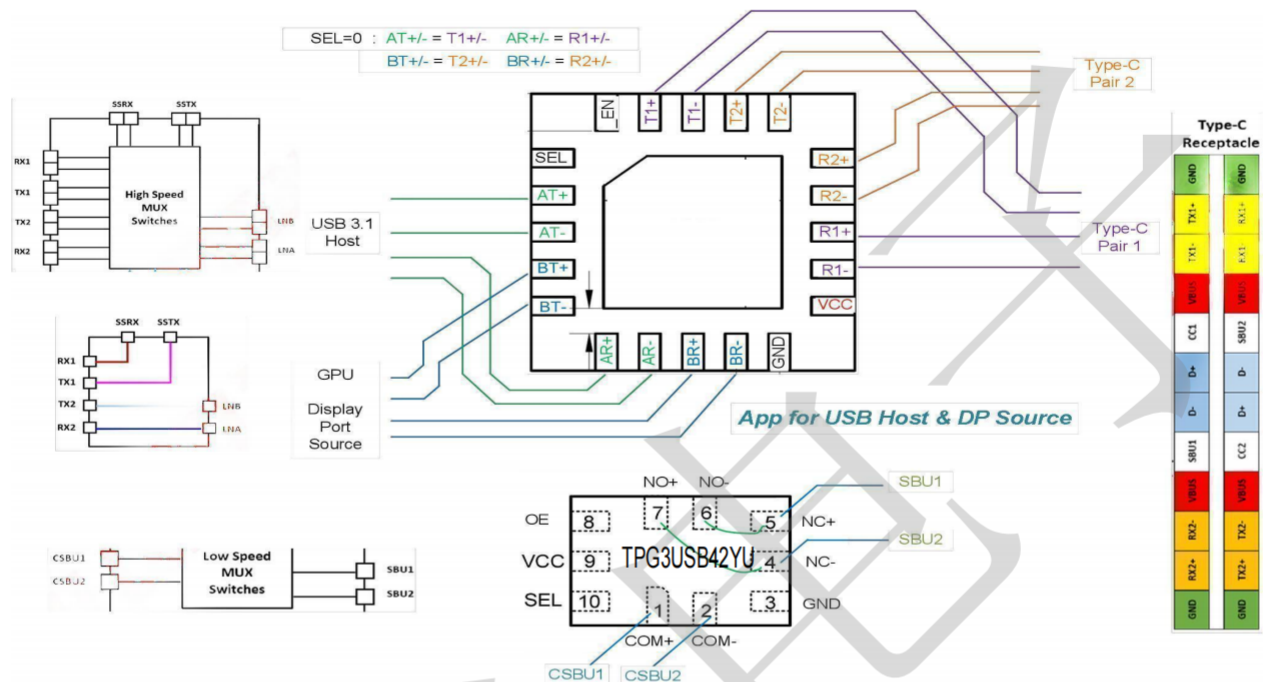


Pin Description

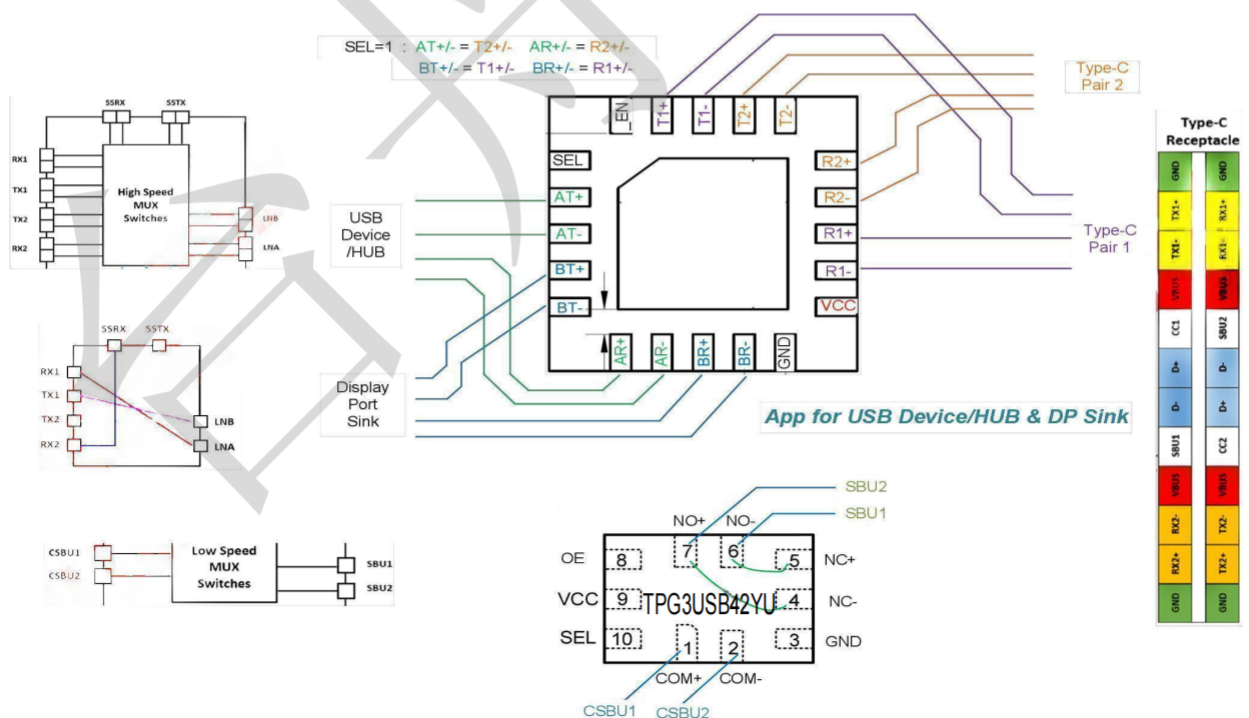
QFN3x3-20L

Pin#	Pin Name	Signal Type	Description
1	SEL	I	Switch logic control
2	AT+	I/O	Super Speed TX+ Common A
3	AT-	I/O	Super Speed TX- Common A
4	BT+	I/O	Super Speed TX+ Common B
5	BT-	I/O	Super Speed TX- Common B
6	AR+	I/O	Super Speed RX+ Common A
7	AR-	I/O	Super Speed RX- Common A
8	BR+	I/O	Super Speed RX+ Common B
8	BR-	I/O	Super Speed RX- Common B
10	GND	GND	Ground
11	VCC	Power	Supply Voltage
12	R1-	I/O	Super Speed R1-
13	R1+	I/O	Super Speed R1+
14	R2-	I/O	Super Speed R2-
15	R2+	I/O	Super Speed R2+
16	T2-	I/O	Super Speed T2-
17	T2+	I/O	Super Speed T2+
18	T1-	I/O	Super Speed T1-
19	T1+	I/O	Super Speed T1+
20	_EN	I	Chip Enable, Active Low

Typical Application



Typical Application



Typical Application

Truth Table

_EN	SEL	AT+/-	AR+/-	BT+/-	BR+/-
High	X	Hi-Z	Hi-Z	Hi-Z	Hi-Z
Low	Low	T1+/-	R1+/-	T2+/-	R2+/-
Low	High	T2+/-	R2+/-	T1+/-	R1+/-

Maximum Ratings

(Above which useful life may be impaired. For user guidelines, not tested.)

Storage Temperature	-65°C to +150°C
Junction Temperature	125°C
Supply Voltage to Ground Potential	-0.5V to +5.5V
Super Speed Data Channel TX / RX	-0.5V to 3.8V
DC Input Voltage	-0.5V to VCC
DC Output Current	50mA
Power Dissipation	300mW

Notes:

Stresses greater than those listed under 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.

Electrical Characteristics (Ta=25°C, VCC=1.8V, unless otherwise specified)

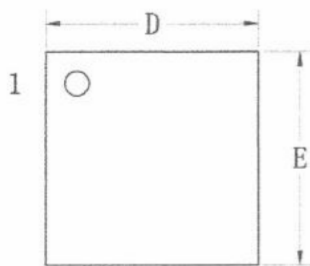
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
POWER SUPPLY						
VCC Quiescent Current	I _Q	SEL=0 or VCC, _EN=0		28		uA
Power-down Current	I _{PD}	SEL=0 or VCC, _EN=VCC			1	uA
DC CHARACTERISTICS						
Input logic high	V _{IH}	VCC=1.8~4.5V	1.6			V
Input logic low	V _{IL}	VCC=1.8~4.5V			0.4	V
_EN Internal pull-up resistor	R _{UP}			2		MΩ
SEL Internal pull-down resistor	R _{DN}			2		MΩ
On-Resistance for TX/RX	R _{ON_HS}	V _{IS} = 0.2V I _{ON} =8mA		6.7	8	Ω
R _{ON} Flatness for TX/RX	R _{FLAT_LP}	V _{IS} = 0 to 1.2V I _{ON} =8mA		0.8	1	Ω
R _{ON} Flatness for TX/RX	R _{FLAT_LP}	V _{IS} = 0 to 0.2V I _{ON} =8mA		0.2	0.3	Ω
R _{ON} Matching Between Channels	R _{MATCH}	V _{IS} = 0 to 1.2V I _{ON} =8mA		0.1		Ω
Switch Off Leakage Current	I _{OFF}	_EN=VCC, Tx, Rx =VCC TX1, TX2, RX1, RX2=0	-0.5		0.5	uA
AC CHARACTERISTICS						
Enable Time _EN to Output	t _{EN}	R _L =50Ω C _L =0pF V _{IS} = 0.6V		80	150	uS
Disable Time _EN to Output	t _{DIS}	R _L =50Ω C _L =0pF V _{IS} = 0.6V		40	250	nS
Turn-On Time SEL to Output	t _{ON}	R _L =50Ω C _L =0pF V _{IS} = 0.6V		400	1200	nS
Turn-Off Time SEL to Output	t _{OFF}	R _L =50Ω C _L =0pF V _{IS} = 0.6V		130	800	nS
Break-Before-Make Time	t _{BBM}	R _L =50Ω C _L =0pF V _{IS} = 0.6V		250	500	nS
Propagation Delay	t _{PD}	R _L =50Ω C _L =0pF V _{IS} = 0.6V		0.25		nS
Off Isolation	Off	R _L = 50Ω f = 1.2GHz V _{IS} = 0.2V _{PP}		-27		dB
Crosstalk	X _{TALK}	R _L = 50Ω f = 1.2GHz V _{IS} = 0.2V _{PP}		-43		dB
-3dB Bandwidth	BW _{-3dB}	R _L =50Ω C _L =0pF Signal 0dBm	4.5	5.1		GHz
CAPACITANCE						
Switch On Capacitance	C _{ON}	V _{Bias} = 0.2V, f = 1.5GHz		1.5		pF
Switch Off Capacitance	C _{OFF}	V _{Bias} = 0.2V, f = 1.5GHz		1.0		pF

Note:

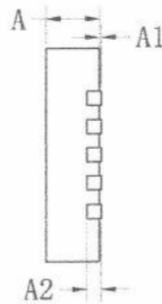
- (1) Flatness is defined as the difference between maximum and minimum value of ON-resistance at the specified analog signal voltage points.
- (2) R_{ON} matching between channels is calculated by subtracting the channel with the lowest max Ron value from the channel with the highest max Ron value.
- (3) Crosstalk is inversely proportional to source impedance

Package Outline Dimensions

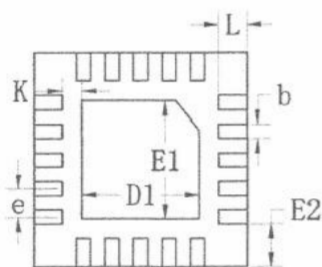
QFN3x3-20L



顶视图



侧视图



底视图

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.50	0.55	0.60
	0.70	0.75	0.80
A1	0.00	—	0.05
A2	0.203 TYP		
b	0.15	0.20	0.25
D	2.95	3.00	3.05
D1	1.55	1.65	1.75
E	2.95	3.00	3.05
E1	1.55	1.65	1.75
E2	0.60 REF		
e	0.40 BSC		
K	0.275 REF		
L	0.35	0.40	0.45