



Descriptions

The DIO3340QN18 is a high-speed bidirectional passive switch in mux or demux configurations suited for USB Type-C™ application supporting USB 3.1 Gen 1 and Gen 2 data rates. Based on control pin SEL, the device provides switching on differential channels between Port L0 or Port L1 to Port C0. The DIO3340QN18 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 DIO3340QN18 is available in QFN 2 x 3 with Pb-free and Halogen-free making it a perfect candidate for mobile and space constrained applications.

Features

- Wide Supply Range 1.5 V to 5.5 V
- Differential 2:1 or 1:2 Switch/Multiplexer
- USB 3.1 Super Speed 10Gbps Switch
- 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
- Powered Off Protection When VDD = 0 V
- 1.8-V Compatible Logic Inputs

Applications

- USB Type-C Ecosystem
- Desktop and Notebook PCs
- Server/Storage Area Networks
- PCI Express Backplanes
- Shared I/O Ports
- FPD LinkII and FPD LinkIII Switching

Order Information

Part Number	Package	
DIO3340QN18	QFN2X3	Tape and Reel



Block Diagram

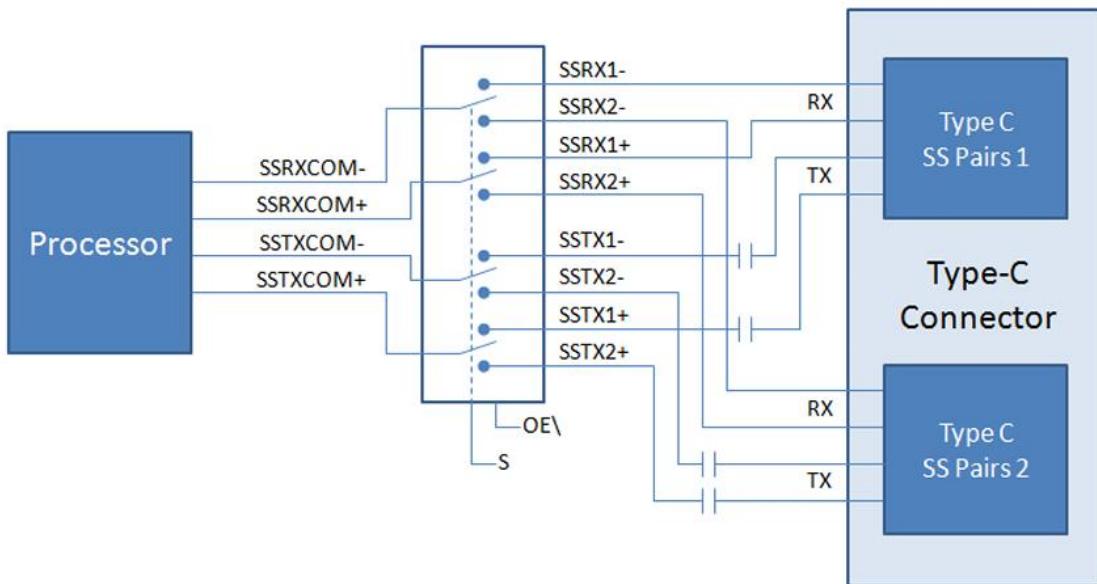


Fig.1 Block Diagram

Typical Application

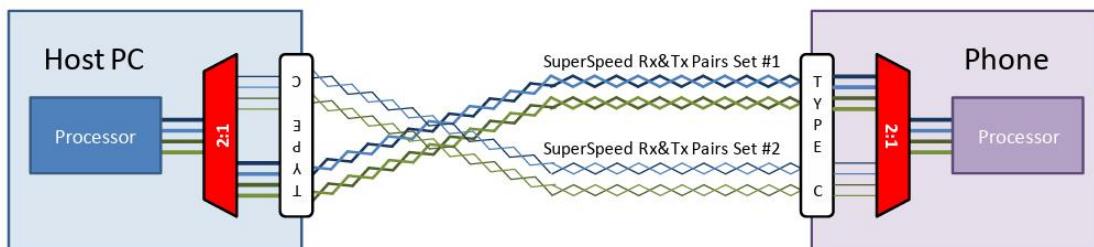


Fig.2 Typical Application



Pin Configuration

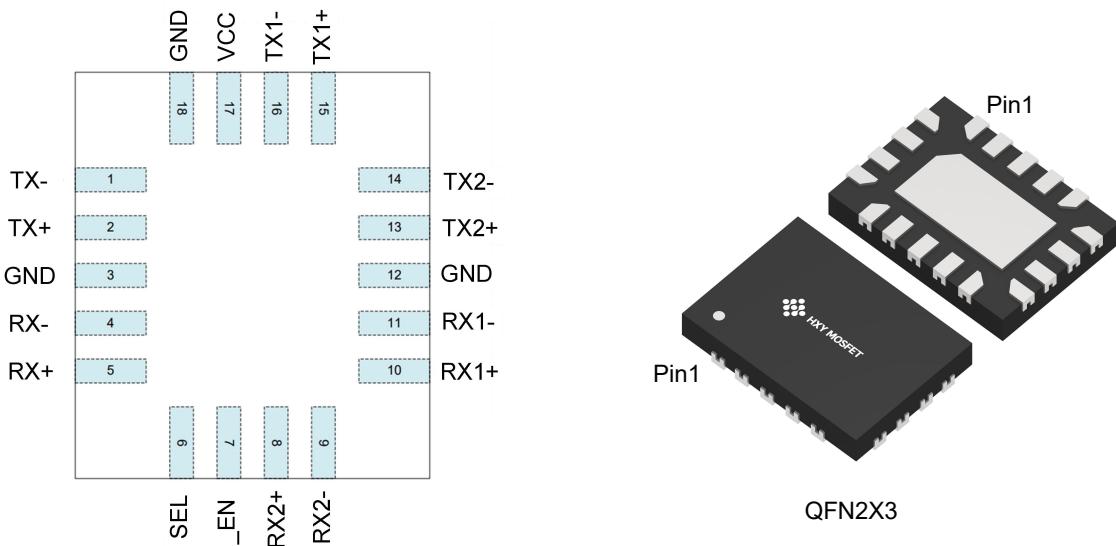


Fig.3 Pin Configuration

Pin Description

Pin#	Pin Name	Signal Type	Description
1	TX-	I/O	Super Speed TX- Common
2	TX+	I/O	Super Speed TX+ Common
3,12,18	GND	GND	Ground
4	RX-	I/O	Super Speed RX- Common
5	RX+	I/O	Super Speed RX+ Common
6	SEL	I	Switch logic control
7	_EN	I	Chip Enable, Active Low
8	RX2+	I/O	Super Speed RX2+
9	RX2-	I/O	Super Speed RX2-
10	RX1+	I/O	Super Speed RX1+
11	RX1-	I/O	Super Speed RX1-
13	TX2+	I/O	Super Speed TX2+
14	TX2-	I/O	Super Speed TX2-
15	TX1+	I/O	Super Speed TX1+
16	TX1-	I/O	Super Speed TX1-
17	VCC	Power	Supply Voltage

Table-1 Pin Description

Truth Table

_EN	SEL	TX+	TX-	RX+	RX-
High	X	Hi-Z	Hi-Z	Hi-Z	Hi-Z
Low	Low	TX1+	TX1-	RX1+	RX1-
Low	High	TX2+	TX2-	RX2+	RX2-

Table-2 Truth Table



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

Table-3 Maximum Description

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
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
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
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
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

Table-4 Electrical Characteristics



Typical Performance Curves (Ta=25°C, VCC=3.0V, CAP=0.1uF, unless otherwise noted)

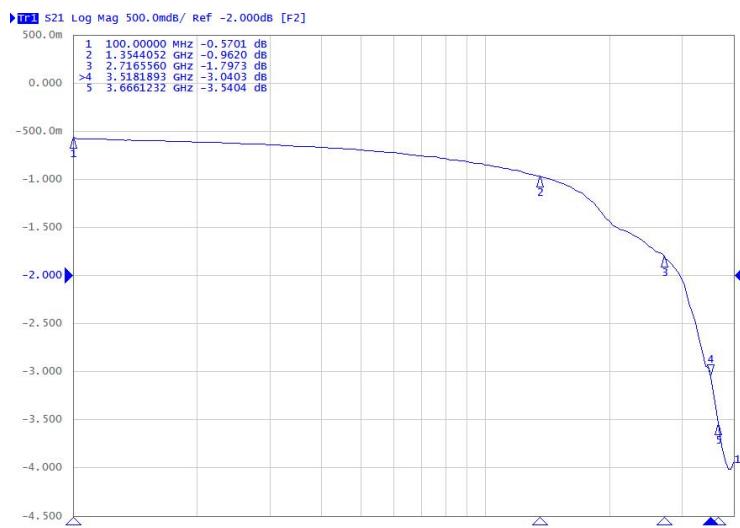


Fig.4 Switch Bandwidth or Insertion Loss

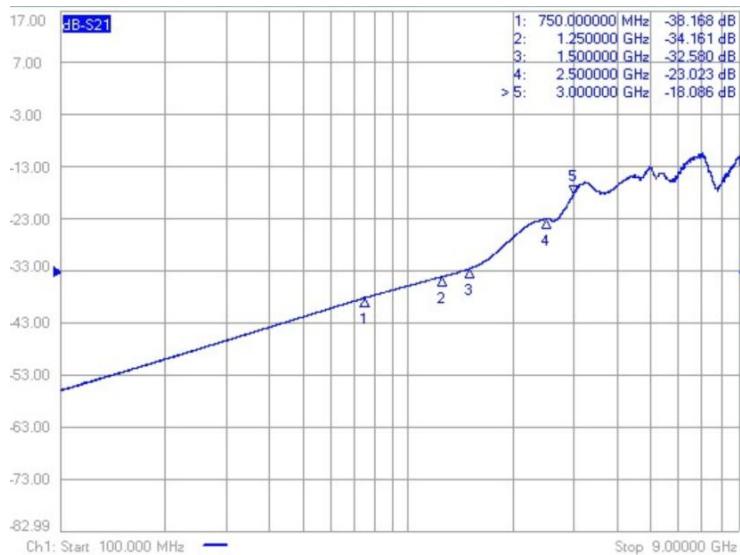


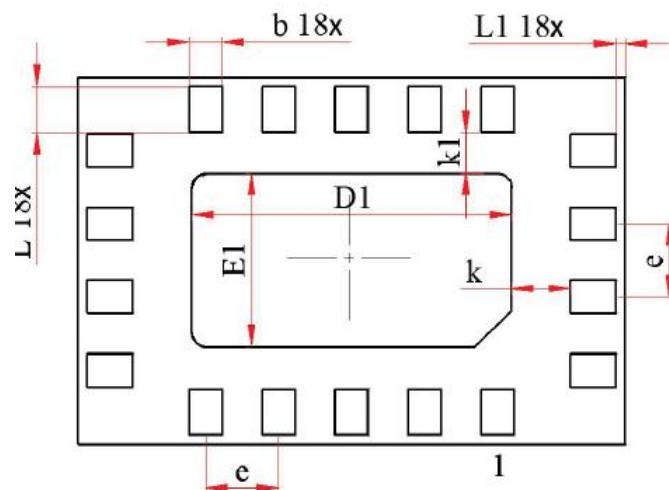
Fig.5 Switch Channel to Channel Cross-Talk



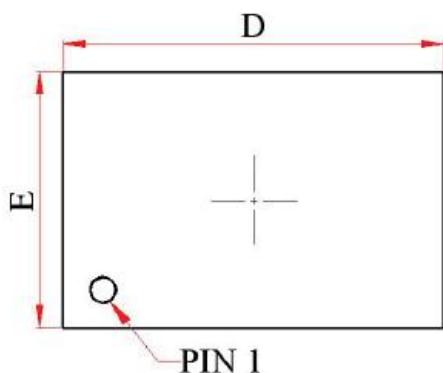
Fig.6 Switch Off Isolation



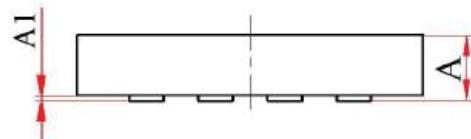
Package Outline Dimensions



Bottom View



Top View



Side View

Symbol	Dimension In Millimeters			Dimension In Inches		
	Normal	Min	Max	Normal	Min	Max
A	--	0.340	0.400	--	0.013	0.016
A1	--	0.010	0.050	--	0.000	0.002
D	3.000	2.950	3.050	0.118	0.116	0.120
E	2.000	1.950	2.050	0.079	0.077	0.081
D1	1.750	1.700	1.800	0.069	0.067	0.071
E1	0.950	0.900	1.000	0.037	0.035	0.039
b	0.180	0.150	0.210	0.007	0.006	0.008
L	0.250	0.200	0.300	0.010	0.008	0.012
L1	0.050	0.010	0.090	0.002	0.000	0.004
k	0.325 REF			0.013 REF		
k1	0.225 REF			0.009 REF		
e	0.400 BSC			0.016 BSC		



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