



Features

- 4 independent full-duplex channels
- Up to 28Gb/s data rate per channel
- QSFP MSA compliant
- Up to 100m OM3 MMF transmission
- Operating case temperature: 0 to 70°C
- Single 3.3V power supply
- Maximum power consumption 3.5W each terminal
- RoHS-6 compliant

Applications

- 100G Ethernet
- Infiniband EDR

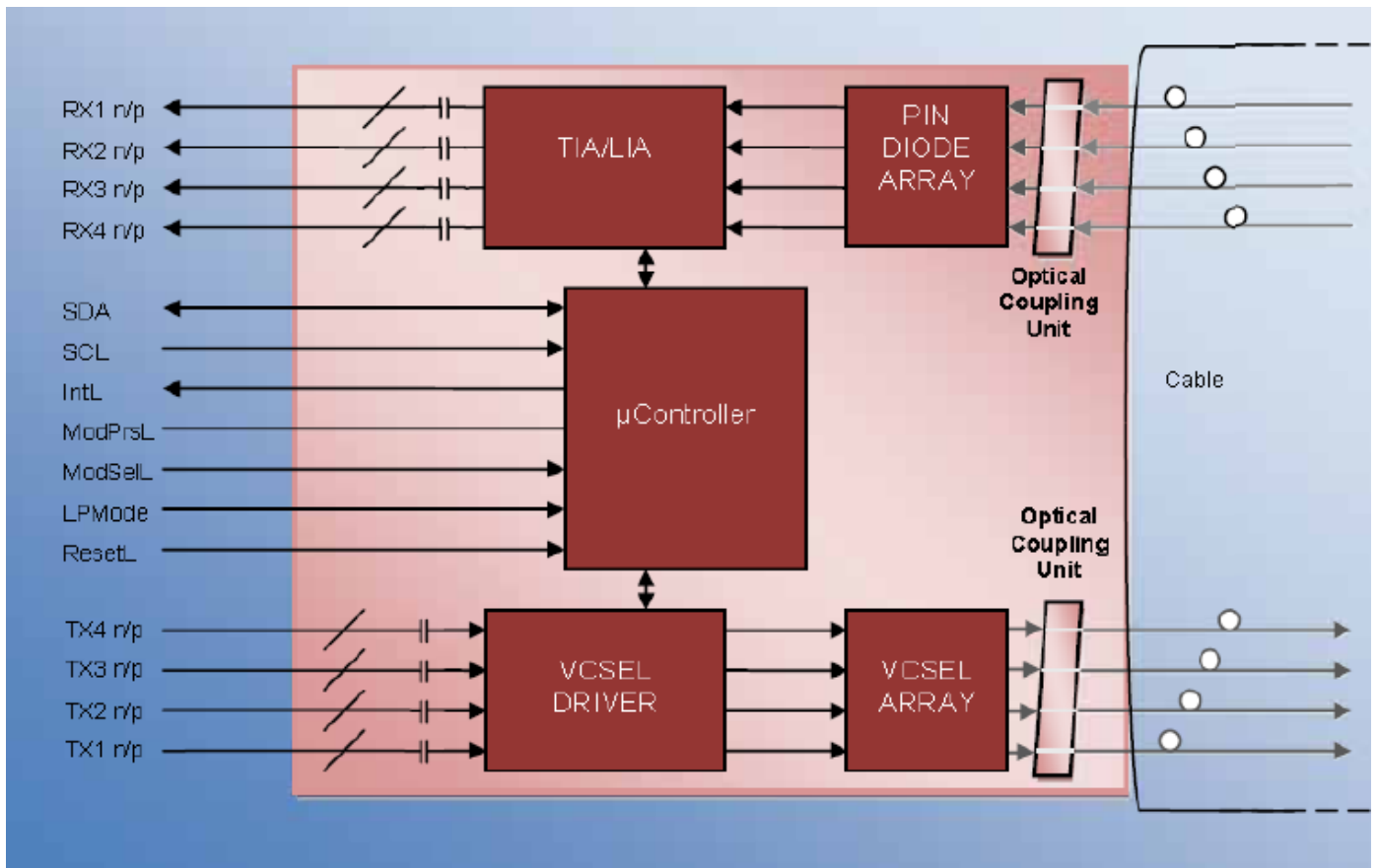
Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Note
Storage Temperature	T _s	-40	85	°C	
Operating Case Temperature	T _{OP}	0	70	°C	
Power Supply Voltage	V _{CC}	-0.5	3.6	V	
Relative Humidity (non-condensation)	RH	0	85	%	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Units	Note
Operating Case Temperature	T_{OP}	0		70	°C	
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Data Rate, each Lane			25.78125	28.05	Gb/s	
Control Input Voltage High		2		V_{CC}	V	
Control Input Voltage Low		0		0.8	V	

AOC Block Diagram



Block Diagram of One of the QSFP28 End Modules

Electrical Characteristics

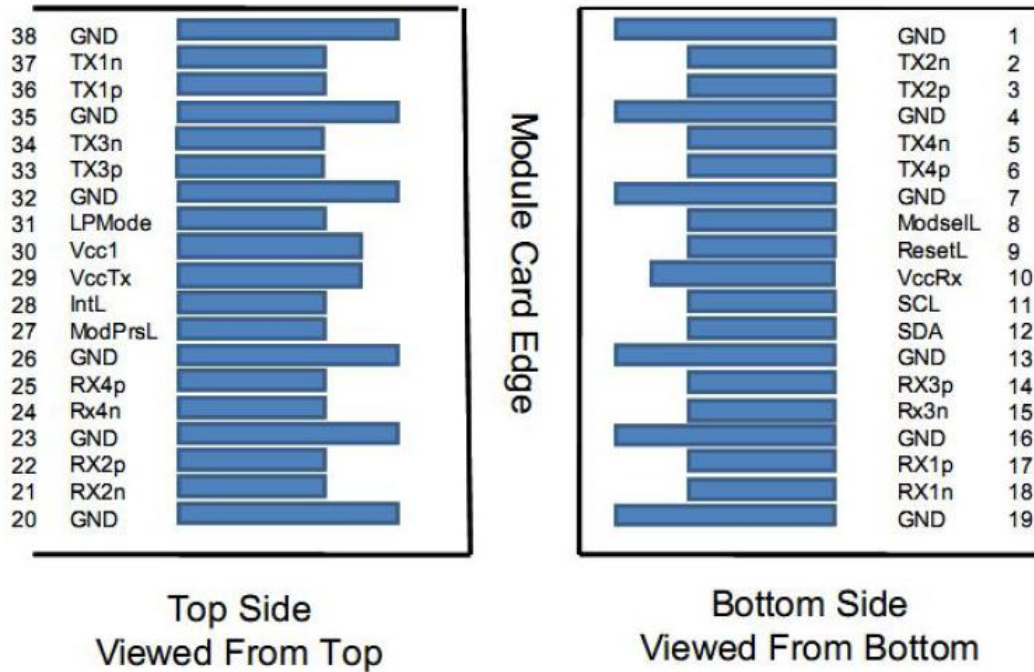
Parameter	Symbol	Min	Typ	Max	Units	Notes
Power Consumption, each Terminal				3.5	W	
Supply Current, each Terminal	I _{cc}			1060	mA	
Transceiver Power-on Initialization Time				2000	ms	1
Transmitter (each Lane)						
Single Ended Input Voltage Tolerance (Note 2)		-0.3		3.6	V	
AC Common Mode Input Voltage Tolerance		15			mV	RMS
Differential Input Voltage Swing Threshold		50			mV _{pp}	LOSA Threshold
Differential Input Voltage Swing	V _{in,pp}	180		1000	mV _{pp}	
Differential Input Impedance	Z _{in}	90	100	110	Ohm	
Total Jitter				0.40	UI	
Deterministic Jitter				0.15	UI	
Receiver (each Lane)						
Single Ended Output Voltage		-0.3		4	V	
AC Common Mode Output Voltage				7.5	mV	RMS
Differential Output Voltage Swing	V _{out,pp}	300		1000	mV _{pp}	
Differential Output Impedance	Z _{out}	90	100	110	Ohm	
Total Jitter				0.3	UI	
Deterministic Jitter				0.15	UI	

Notes:

1. Power-on Initialization Time is the time from when the power supply voltages reach and remain above the minimum recommended operating supply voltages to the time when the module is fully functional.
2. The single ended input voltage tolerance is the allowable range of the instantaneous input signals.

Pin Assignment

QSFP Module Pad Layout (Top View)



Pin Description

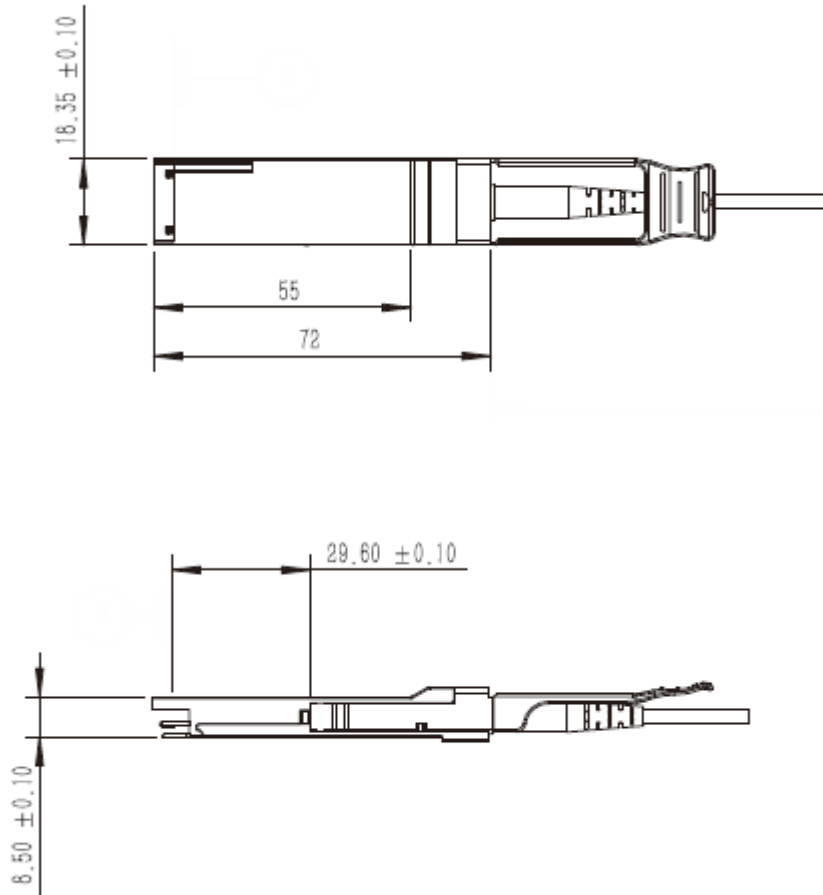
Pin	Logic	Symbol	Description	Note
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-inverted Data Input	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-inverted Data Input	
7		GND	Ground	1
8	LVTTL-I	ModSelL	Module Select	
9	LVTTL-I	ResetL	Module Reset	
10		VccRx	+3.3V Power Supply Receiver	2
11	LVC MOS-I/O	SCL	2-Wire Serial Interface Clock	
12	LVC MOS-I/O	SDA	2-Wire Serial Interface Data	
13		GND	Ground	

Pin	Logic	Symbol	Description	Note
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	1
24	CML-O	Rx4n	Receiver Inverted Data Output	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		VccTx	+3.3V Power Supply Transmitter	2
30		Vcc1	+3.3V Power Supply	2
31	LVTTL-1	LPMODE	Low Power Mode	
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Input	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Input	
38		GND	Ground	1

Notes:

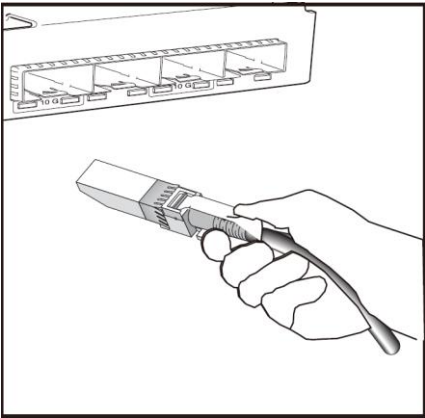
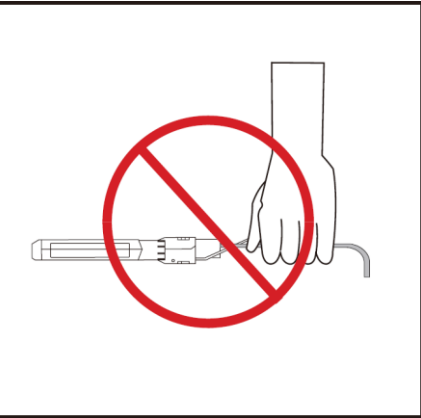
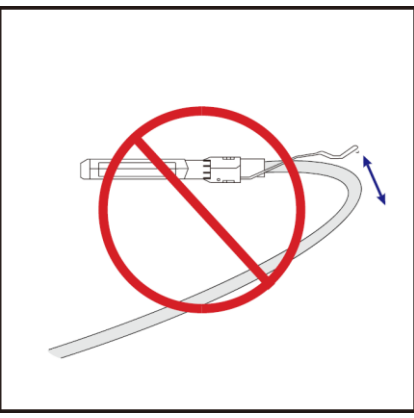


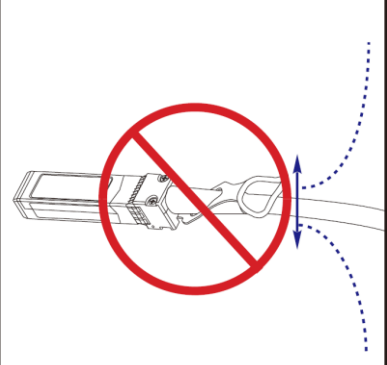
- GND is the symbol for signal and supply (power) common for QSFP28 modules. All are common within the QSFP28 module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.
- VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown in Figure 3 below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 1000mA.

Dimensions

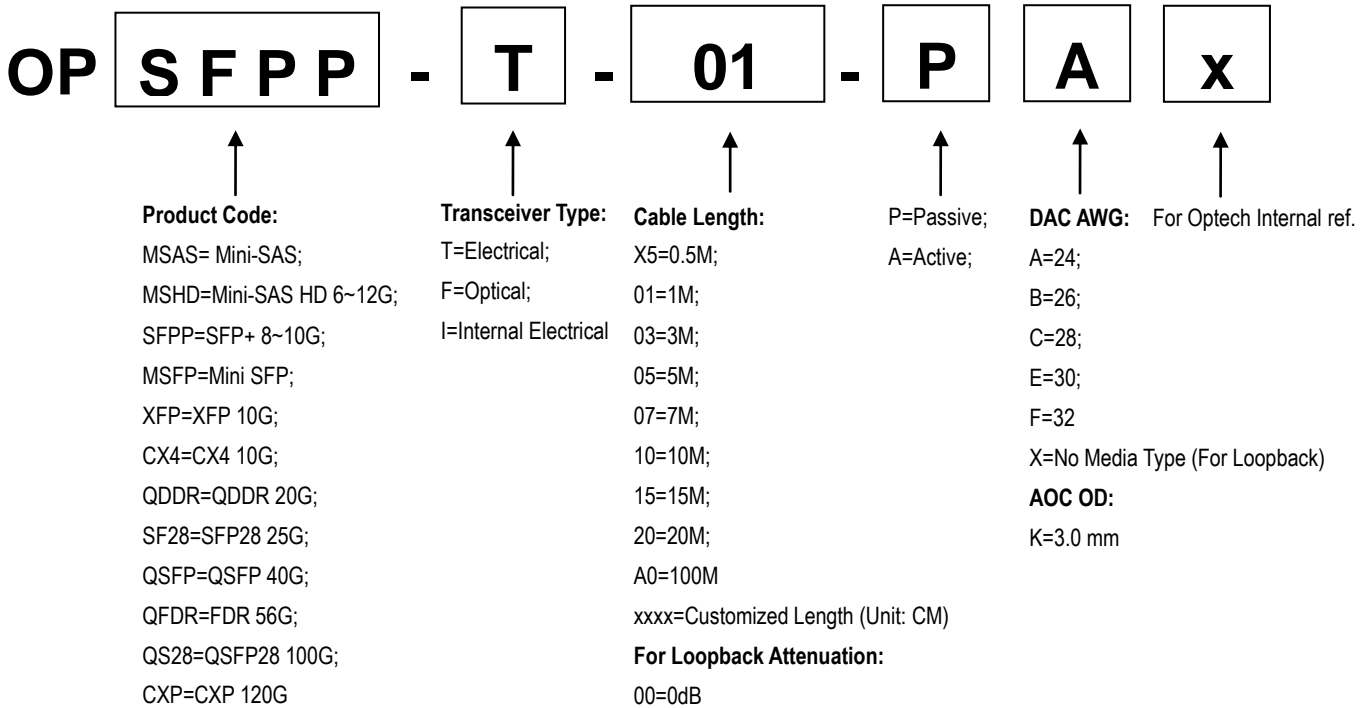


No.	Optech P/N	Length(CM)	Cable
1	OPQS28-F-03-AKT	300 ±20	OM3 OD: 3.0mm
2	OPQS28-F-05-AKT	500 ±20	
3	OPQS28-F-10-AKT	1000 ±50	
4	OPQS28-F-20-AKT	2000 ±50	
5	OPQS28-F-30-AKT	3000 ±50	
6	OPQS28-F-50-AKT	5000 ±50	
7	OPQS28-F-A0-AKT	10000 ±100	

Important Notice

		
<p>Holding the SFP+ connector by its sides, insert the connector into the port on the switch</p>	<p>Do not handle by cable</p>	<p>DO NOT Over-bend the cable behind the connector</p>
		
<p>DO NOT twist the cable</p>	<p>DO NOT kink the cable</p>	<p>DO NOT bend up and down the cable</p>

Ordering Information



Part Number	Model Number	Length (M)	Voltage	Temperature
OPQS28-F-03-AKT	Active Optical Cable	3	3.3V	0°C ~ 70°C
OPQS28-F-05-AKT	Active Optical Cable	5	3.3V	0°C ~ 70°C
OPQS28-F-10-AKT	Active Optical Cable	10	3.3V	0°C ~ 70°C
OPQS28-F-50-AKT	Active Optical Cable	50	3.3V	0°C ~ 70°C
OPQS28-F-A0-AKT	Active Optical Cable	100	3.3V	0°C ~ 70°C

Note: All information contained in this document is subject to change without notice.