

QSP-100DOxx-25CL

Single-Mode QSFP28 100G O-Band DWDM Transceiver

Features

- Single-lambda 100Gbps transmission
- O-band DWDM with 200GHz channel spacing
- Aligned to 800GHz spacing LAN-WDM grid
- Up to 25km over G.652 SMF
- Duplex LC connector
- PAM4 optical signal with integrated FEC
- 4x25.78Gbps CAUI-4 host interface
- Compliant with QSFP28 MSA SFF-8636
- QSFP28 MSA digital monitoring functions
- Safety Certification: TUV/UL/FDA*Note1
- RoHS Compliant



Applications

- 100GbE multiple channel transmissions using O-band DWDM wavelengths

Description

AscentOptics's QSP-100DOxx-25CL series single mode transceivers are designed for multiple channel 100GbE transmissions for up to 25km distance over standard G.652 single mode optical fibers (SMF).

The transmitter side converts the multi-lane host electrical signals to a single-lane PAM4 optical signal. The module's optical interface utilizes a single wavelength in the O-band with wavelengths aligned to the LAN-WDM grid with 200GHz channel spacing. The module is Laser Class 1 compliant according to International Safety Standard IEC-60825. The receiver section uses a wideband APD detector and is WDM channel independent. Digital diagnostics functions are available via the I2C interface as specified by QSFP28 MSA specification SFF-8636.

Absolute Maximum Ratings

Table 1- Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage temperature	Ts	-40	85	°C
Operating case temperature	Top	-5	75	°C
Supply voltage	Vcc	0	3.6	V
Operating relative humidity	RH	5	85	%
Damage threshold	Rxdmg	-2		dBm
ESD sensitivity		500		V

Recommended Operating Conditions

Table 2- Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Units
Operating case temperature	Top	0	25	70	°C
Power supply voltage	Vcc	3.135	3.3	3.47	V
Power dissipation	PD		4.7	5.5	W

Notes:

Power supply specifications, instantaneous, sustained and steady state current are compliant with QSFP28 MSA Power Classification.

Optical Characteristics

Table 3- Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
Data rate*Note4	BR	103.125			Gbps
Data rate variation		-100		100	ppm
Transmitter					
Central wavelength	λ_c	See Ordering Information			nm
Center wavelength stability		$\lambda_c-0.1$		$\lambda_c+0.1$	nm
Average optical output power*Note5	Po	0		5.6	dBm
Transmitter and dispersion penalty eye closure for PAM4*Note4	TDECQ			3.6	dB
Extinction ratio*Note4	ER	6			dB
Average output power, Tx:OFF	Poff			-20	dBm
Transmitter reflectance				-26	dBm
Receiver					
Operating wavelength		1290		1325	nm

Damage threshold*Note6	Rxdmg	-2.4			dBm
Rx overload, average power*Note7	Rxsat	-3			
Rx sensitivity, average power*Note7	RxOMA		-15		dBm
Receiver reflectance				-26	dB
LOS assert	LOSA	-18			dBm
LOS De-assert	LOSD			-15	dBm
LOS hysteresis			1		dB

Note:

1. The optical signal data rate is 103.125 Gbps 100GE data rate plus FEC code. The TDECQ and ER are specified for 106.25 Gbps signal.
2. Average optical output power is specified for beginning of life (BOL) with clean fiber connector.
3. The Rx shall be able to tolerate, without damage, continuous exposure to an optical signal having this average power level. The Rx does not have to operate correctly at this input power.
4. Rx average power overload and sensitivity are for post-FEC BER<1E-15 with integrated FEC without dispersion at BOL.

Electrical Characteristics

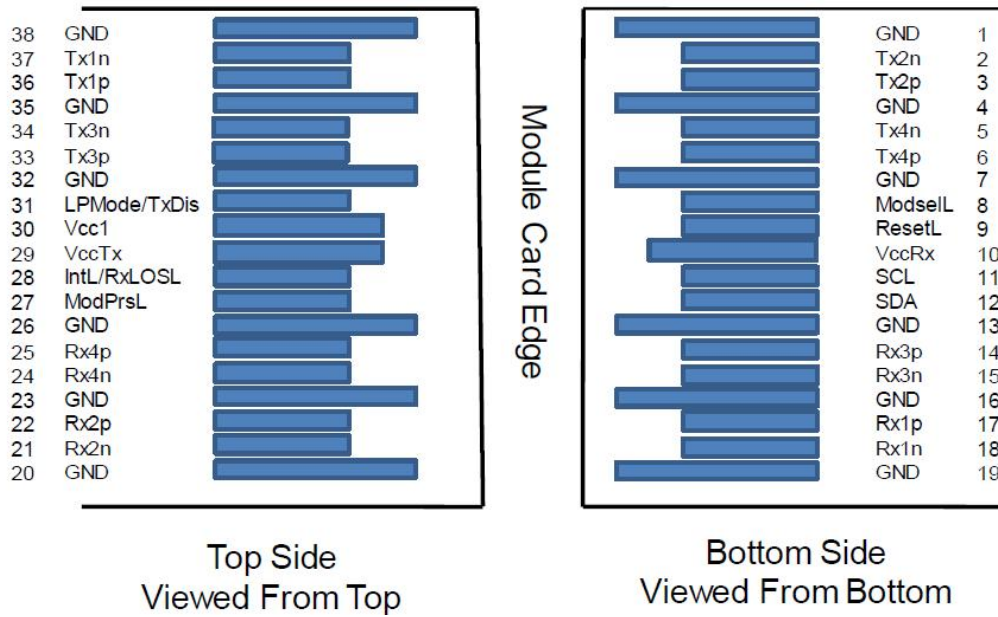
The host 4x25.78 Gbps electrical interface complies with the CAUI-4 standard.

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Data rate per lane (host side)	BRavg		25.78125		Gbps	
Data rate variation		-100		100	ppm	
Transmitter						
Differential data input swing per lane	Vin			900	mVp-p	AC coupled
Differential input impedance	Zin	90	100	110	ohm	
Receiver						
Differential output amplitude	Vout			900	mVp-p	AC coupled
Differential output impedance	Zout	90	100	110	ohm	
Low Speed Signals						
LPMode, Reset, ModSel	VIL	-0.3		0.8	V	
	VIH	2		Vcc+0.3		
ModPrs, Int	VOL	0		0.4	V	IOL=2mA
	VOH	Vcc-0.5		Vcc+0.3		
SCL, SDA	VIL	-0.3		0.3*Vcc	V	
	VIH	0.7*Vcc		Vcc+0.5		
SCL, SDA	VOL	0		0.4	V	IOLmax=3mA
	VOH	Vcc-0.5		Vcc+0.3		

Notes:

1. Vcm is generated by the host. Specification includes effects of ground offset voltage.

QSFP28 Transceiver Electrical Pad Layout



Pin Arrangement and Definition

Table 4- Pin Definition

Pin	Logic	Symbol	Description	Notes
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
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	1
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	1
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL/ RxLOSL	Interrupt. Optionally Configurable As RxLOSL Via The Management Interface (SFF-8636).	
29		VccTx	+3.3V Power supply transmitter	2
30		Vcc1	+3.3V Power supply	2
31	LVTTL-I	LPMoDe/TxDis	Low Power Mode. Optionally Configurable As TxDis Via The Management Interface (SFF-8636).	
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:

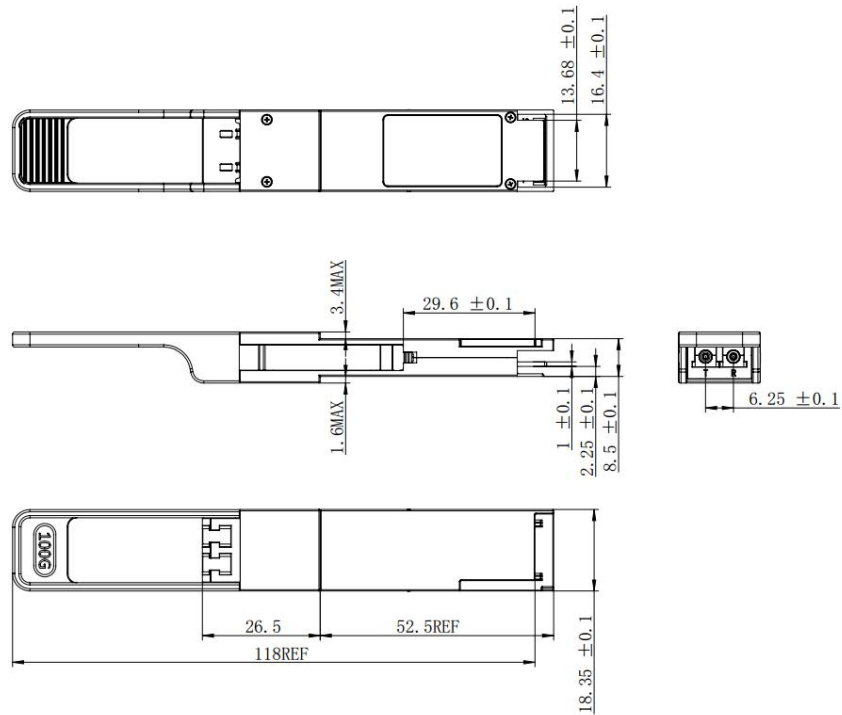
1. GND is the symbol for signal and supply (power) common for QSFP28 modules. All are common within the QSFP28 module and all module voltages are referenced to this potential unless otherwise noted.

Connect these directly to the host board signal common ground plane.

2. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. 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.

Mechanical Specifications



Laser Safety

The transceiver is a class 1 laser product per IEC 60825-1:2014. It is considered non-hazardous when operated within the limits of this specification. This device complies with 21 CFR 1040.10. Operating this product in a manner inconsistent with specifications and intended usage may result in hazardous radiation exposure.

Ordering Information

Table 6- Ordering Information

Part Number	Product Description
QSP-100DOxx-25CL	Single-Mode QSFP28 100G O-Band DWDM Transceiver

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E-mail: sales@ascentoptics.com

Web : <http://www.ascentoptics.com>