

QSFP28 BIDI 100 Gb/s SR Transceiver 100m



QSFP Series

- **QSFP28 MSA Specification Compliant, including new functions per SFF-8636**
- **100G Link Distances up to 70m over OM3, 100m over OM4**
- **Hot Pluggable**
- **Interface with Digital monitoring and maskable Interrupts for Ex-panded functionality**
- **RoHS II Compliance**
- **Operating Mode**

Ascent's QSFP28 100G SR BIDI is a parallel Quad Small Form-factor Pluggable (QSFP28) Bi-Direction optical module which can support 100Gb/s bit rates in an optical communication application compliant to SFF-8636, IEEE802.3bm standards.

The module integrates four host electrical data into two optical lanes (by Dual Wavelength VCSEL Bi-Directional Optical Interface, 850nm and 900nm) to allow optical communication over a 2-fiber duplex LC optical multi-mode fiber. Reversely, on the receiver side, the module demultiplexes 2 sets of optical input signal and converts them to 4 channels of electrical data.

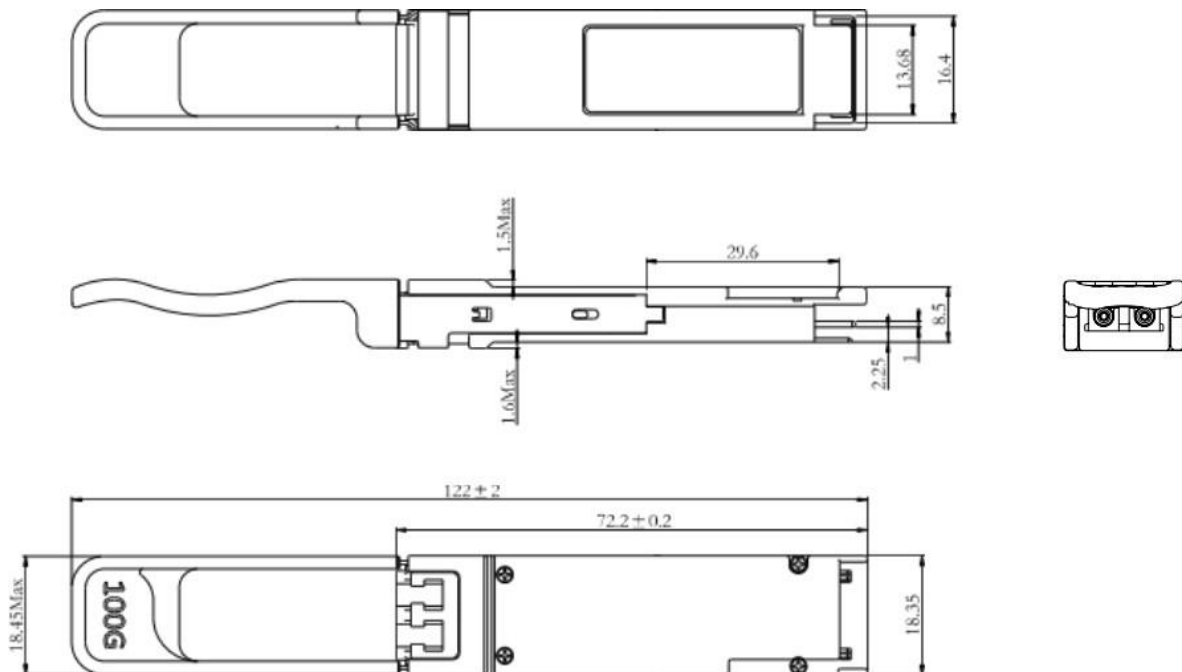
An optical fiber ribbon cable with an LC connector can be plugged into the QSFP28 module receptacle. Proper alignment is ensured by the guide pins inside the receptacle. The cable usually cannot be twisted for proper channel to channel alignment. Electrical connection is achieved through an MSA-compliant 38-pin edge type connector.

The product is designed with form factor, optical/electrical connection, and digital diagnostic interface according to the QSFP+ Multi-Source Agreement (MSA). It has been designed to meet the harshest external operating conditions including temperature, humidity, and EMI interference.

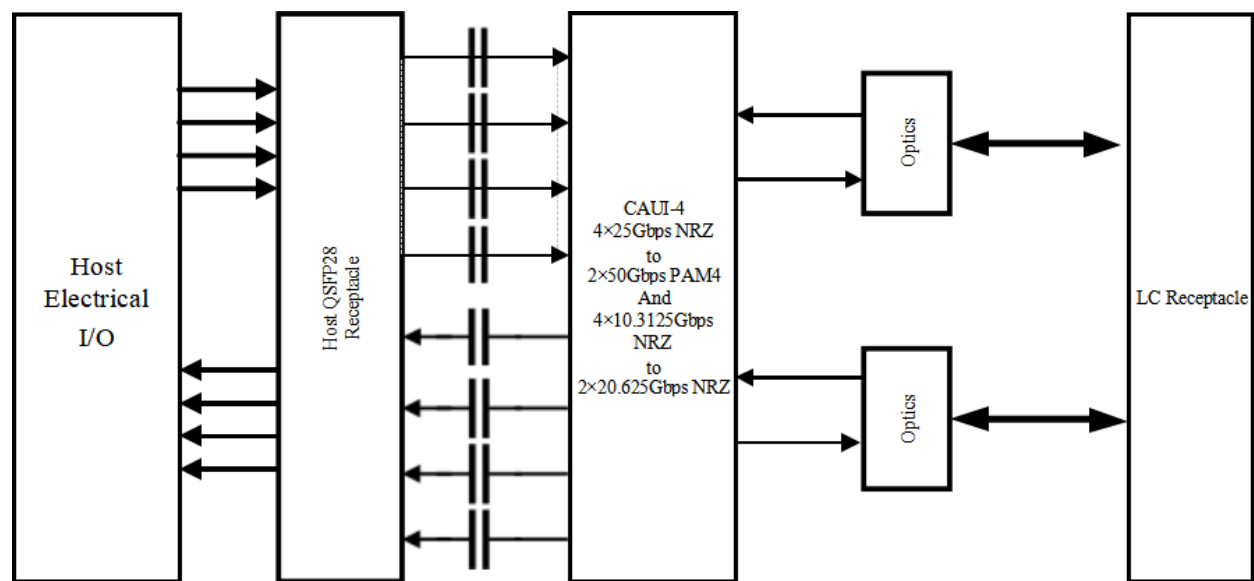
Key Features

- QSFP28 MSA Specification Compliant, including new functions per SFF-8636
- 100G Link Distances up to 70m over OM3, 100m over OM4
- Hot Pluggable
- Dual Wavelength VCSEL Bi-Directional Optical Interface, PAM4 2x50Gbps 850nm/908nm
- Interface with Digital monitoring and maskable Interrupts for Ex-panded functionality
- Case Operating Temperature:
Range: 0 to 70°C
- RoHS II Compliance
- Operating Mode

Mechanical Dimension



Functional Diagram



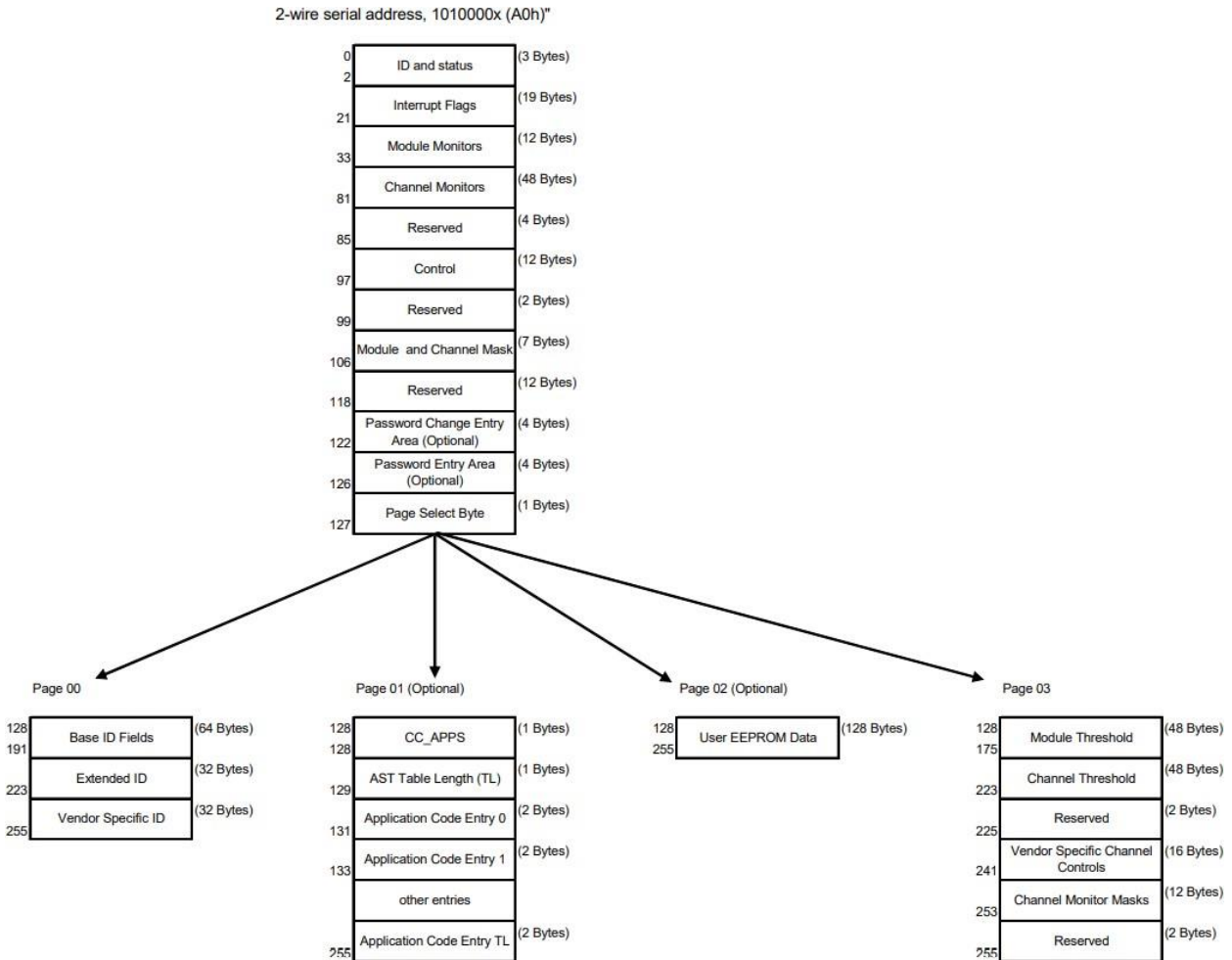
Optical Interface Instruction



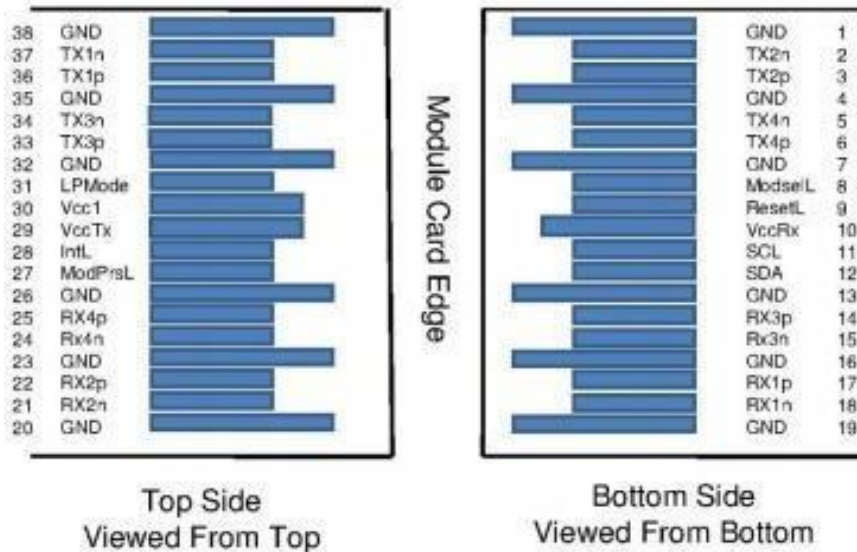
$\lambda 1$	844-863nm	T1,R1
$\lambda 2$	900-918nm	T2,R2

EEPROM Information

EEPROM memory map specific data field description is as below



Pin Assignment



Pin	Symbol	Name/Description	Note
1	GND	Ground	
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non Inverted Data Input	
4	GND	Ground	
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non Inverted Data Input	
7	GND	Ground	
8	ModselL	Module Select	
9	ResetL	Module Reset	
10	VCC Rx	Receiver +3.3V DC Power Supply	
11	SCL	I2C Serial Clock	
12	SDA	I2C Serial Data	
13	GND	Ground	
14	Rx3p	Receiver Non Inverted Differential Output	
15	Rx3n	Receiver Inverted Differential Output	
16	GND	Ground	
17	Rx1p	Receiver Non Inverted Differential Output	
18	Rx1n	Receiver Inverted Differential Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Differential Output	
22	Rx2p	Receiver Non Inverted Differential Output	
23	GND	Ground	
24	Rx4n	Receiver Inverted Differential Output	
25	Rx4p	Receiver Non Inverted Differential Output	
26	GND	Ground	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	VCC Tx	Transmitter +3.3V DC Power Supply	

Pin	Symbol	Name/Description	Note
30	VCC1	+3.3V DC Power Supply	
31	LPMoD	Low Power Mode	
32	GND	Ground	
33	Tx3p	Transmitter Non Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	
36	Tx1p	Transmitter Non Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	

Specifications

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Notes
Storage Ambient Temperature	Tstg	-40	+85	°C	
Relative Humidity - Storage	RHS	0	95	%	
Relative Humidity - Operating	RHO	0	85	%	
Module Supply Voltage	Vcc	-0.5	3.6	V	

Notes:

- Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device. RH is Non-condensing condition.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Case Operating Temperature	Tcase	0	+25	+70	°C	
Module Supply Voltage	VCC	3.135	3.3	3.465	V	
Signaling Speed Per Electrical Channel(4x25G NRZ)	S	-	25.78	-	Gb/s	
Power Consumption	P	-	-	4	W	

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Tx_Data Differential Input Voltage	VIN	200	-	900	mV	
Tx_Data Differential Input Impedance	ZIN	-	100	-	Ω	
Receiver						
Rx_Data Differential Output Voltage	VOUT	-	-	1200	mV	
Rx_Data Differential Output Impedance	ZOUT	-	100	-	Ω	
Timing Requirement of Control and Status I/O						
Tx Squelch Deassert Time	toff_Txsq	-	-	1	s	
Rx Squelch Deassert Time	toff_Rxsq	-	-	2	s	
Non-Volatile Memory Specification						
Complete Single or Sequential Write	twr	-	-	80	ms	
Soft Control and Status Timing Requirements						
Application or Rate Select Change Time	t_ratesel	-	-	600	ms	

100G Transmitter & Receiver Optical Characteristics

Parameter	Symbol	Test Point	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Average Launch Power ,each Lane	POUT	TP2	-6.2	-	4	dBm	Average Optical Output
Optical modulation Amplitude , each Lane	OMA	TP2	-4.2	-	3	dBm	
Extinction Ratio	ER	TP2	3	-	-	dB	
Launch power in OMAouter Minus TDECQ, each Lane	OMA-TDECQ	TP2	-5.9	-	-	dB	
Optical Output with Tx OFF	POFF	TP2	-	-	-30	dBm	
Center Wavelength 1	λ	TP2	844	850	863	nm	
Center Wavelength 2	λ	TP2	900	908	918	nm	
RMS Spectral Width1	$\Delta\lambda$	TP2	-	-	0.6	nm	
RMS Spectral Width2	$\Delta\lambda$	TP2	-	-	0.65	nm	
Optical Return Loss Tolerance	ORL	TP2	-	-	12	dB	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each Lane	TDECQ	TP2			4.9	dB	
Receiver							
Average Power at Receive Input, PIN each Lane		TP3	-7.9	-	4	dBm	Note1
Receive Power, each Lane (OMAouter)	PIN(OMA)	TP3	-5.9	-	3	dBm	
Unstressed Receiver Sensitivity (OMAouter), each Lane	Sen	TP3	-	-	max(-6.6, SECC - 8)	dBm	Note2
Center Wavelength1	λ	TP3	844	850	863	nm	
Center Wavelength2	λ	TP3	900	908	918	nm	
Receiver Reflectance	RFL	TP3	-	-	-12	dB	
Rx_LOS of Signal - Assert	PA	TP3	-30	-	-	dBm	
Rx_LOS of Signal - Deassert	PD	TP3	-	-	-5.9	dBm	
Rx_LOS of Signal - Hysteresis	PHy	TP3	0.5	-	-	dB	

Notes:

1. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
2. Sensitivity where the BER=2.4E-4 measured with a PRBS 31Q test pattern@26.56GBaud.

Ordering Information

Product Name	Product Description
Q28-100G-BD-SR01	QSFP28 Plug-in, 100GBASE-SR BiDi MMF 850nm 100m OM4 DOM Duplex LC

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