

100G QSFP28 FR 2km Transceiver

QSFP28 Series



- **IEEE 100GBASE-FR compliant**
- **100GE Single Protocol**
- **RS-FEC (544,514) FEC
coder/decoder function**
- **Power Consumption < 3.5 W**
- **Operating case temperature:
0 °C to +70 °C**
- **Single cooled 100Gb/s 1310nm
EML**

Ascent's QSFP28 FR 100Gb/s transceiver is a compact, high-performance single-lambda optical module designed for 2 km transmission over single-mode fiber. Compliant with IEEE 100GBASE-FR, it delivers a reliable 100G Ethernet link in a QSFP28 form factor, making it ideal for high-density data center and enterprise network deployments.

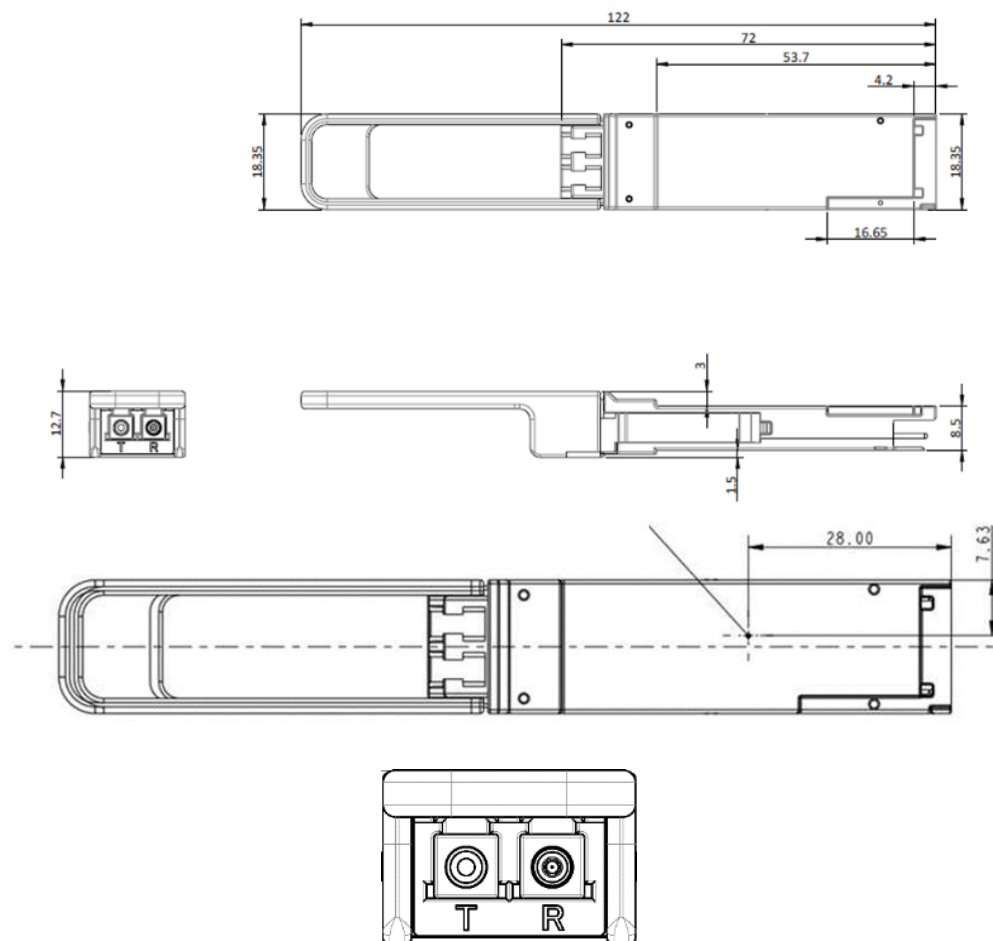
Leveraging PAM4 modulation and integrated DSP technology, the module converts four high-speed electrical lanes into a single 1310 nm optical wavelength, enabling efficient, cost-optimized short-reach connectivity. A cooled EML laser on the transmit side and a PIN photodiode receiver ensure stable signal performance and excellent link margin, while RS-FEC support enhances transmission robustness.

Designed for operational efficiency, the product offers low power consumption (<3.5 W) and supports standard digital diagnostic monitoring (DDM) for real-time performance visibility. With its proven reliability and compact footprint, it is well suited for switch-to-switch, router interconnect, and 100G data center networking applications.

Key Features

- IEEE 100GBASE-FR compliant
- 100GE Single Protocol (103.125Gb/s)
- CAUI-4 compliant – 4 x 25.78Gb/s
- 100GAUI-4 compliant – 4 x 26.562Gb/s
- RS-FEC (544,514) FEC coder/decoder function
- Power Consumption < 3.5 W Max
- Operating case temperature: 0 °C to +70 °C
- Single cooled 100Gb/s 1310nm EML
- Single PIN PD + low-power TIA
- SFF-8636 management interface

Outline Diagram



Specifications

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V _{cc}	0	+3.6	V	+3.3 V
Storage Temperature		-40	85	°C	
Optical Receiver Input		-	+5.5	dBm	Average

Operating Environment

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	V _{cc}	3.135	3.3	3.465	V	
Supply Voltage Noise Tolerance	PSNR	-	-	66	mV	10 Hz to 10 MHz
Maximum Power Consumption		-	-	3.5	W	Target
Power Supply Current		--	-	1010.1	mA	Steady state
Operating Case Temperature T _c		0	25	70	°C	

Optical Characteristics

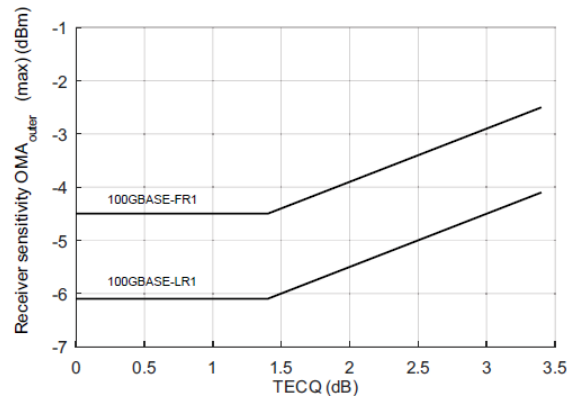
Parameter	Min.	Typ.	Max.	Unit	Note
Transmitter					
PAM4 Signaling Rate		53.125 ± 100 ppm		GBd	
Lane Wavelengths		1304.5 to 1317.5		nm	
Side-Mode Suppression Ratio (SMSR)	30			dB	
Average Launch Power	-3.1		4	dBm	1
Outer Optical Modulation Amplitude (OMA _{outer}) for TDECQ < 1.4 dB	-0.1		4.2	dBm	
Outer Optical Modulation Amplitude (OMA _{outer}) for 1.4 dB ≤ TDECQ ≤ 3.4 dB	-1.5 + TDECQ			dBm	
Transmitter and Dispersion Penalty Eye Closure for PAM4 (TDECQ)			3.4	dB	
TDECQ – TECQ			2.5	dB	
Over/Under-Shoot			22	%	
Transmitter Power Excursion			2	dBm	
Average Launch Power of OFF Transmitter			-15	dBm	
Extinction Ratio	3.5			dB	
Optical Return Loss Tolerance			17.1	dB	
Transmitter Reflectance			-26	dB	2
Transmitter Transition Time RIN15.5 OMA			17	ps	
			-136	dB/Hz	
Receiver					
PAM4 Signaling Rate		53.125 ± 100 ppm		GBd	
Lane Wavelengths		1304.5 to 1317.5		nm	
Damage Threshold	5			dBm	3
Average Receive Power	-7.1		4	dBm	4
Receive Power (OMA _{outer})			4.2	dBm	
Receiver Reflectance			-26	dB	
Receiver Sensitivity (OMA _{outer})			-4.5, TECQ	dBm	
Stressed Receiver Sensitivity (OMA _{outer})			-2.5	dBm	5

Parameter	Min.	Typ.	Max.	Unit	Note
Conditions of Stressed Receiver Sensitivity Test					6
Stressed Eye Closure for PAM4 (SECQ)		3.4		dB	
SECQ – 10*Log10(Ceq)			-	dB	7

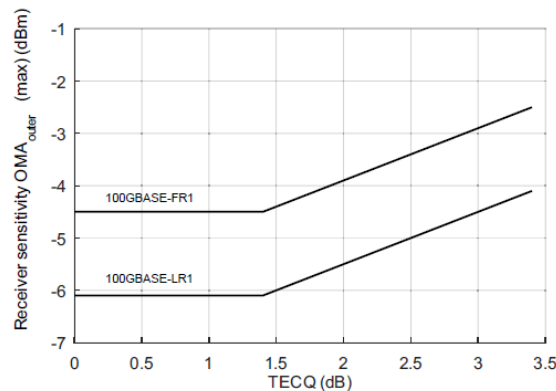
Notes:

1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.
2. Transmitter reflectance is defined looking into the transmitter.
3. The receiver shall be able to tolerate, without damage, continuous exposure to an optical signal having this average power level.
4. Average receive power, each lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
5. Measured with conformance test signal at TP3 (see 100G Lambda MSA 100G-FR - "Technical Specification, Rev. 2.0 clause 3.11) for the BER specified in IEEE Std 802.3cd clause 140.1.1.
6. These test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.
7. Ceq is a coefficient defined in IEEE Std 802.3-2018 clause 121.8.5.3 which accounts for reference equalizer noise enhancement.

OMA Outer



Receiver Sensitivity



RX_LOS Characteristics

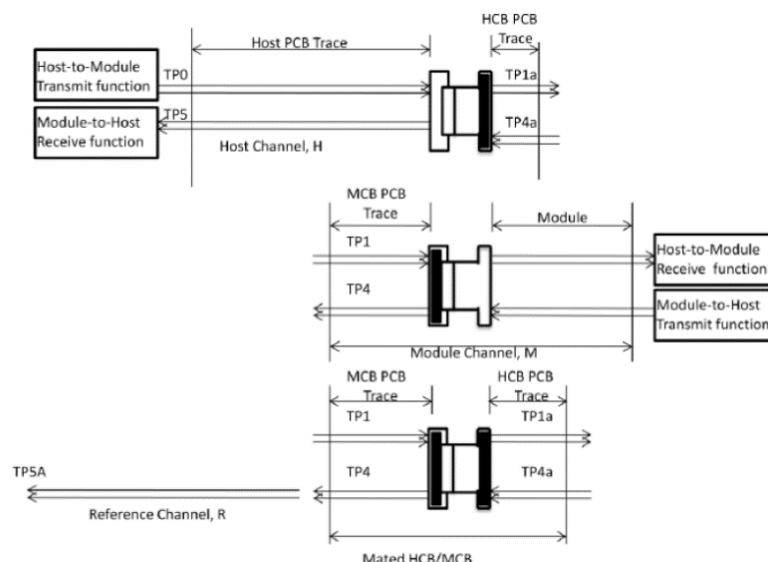
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Receiver Loss of Signal Indicator Assert Level	RX_LOS	-30	-	-7.5	dBm	Average power
Receiver Loss of Signal Indicator De-assert Level	RX_LOS	-	-	-7	dBm	Average power

Electrical Characteristics

Parameter	Min.	Typ.	Max.	Unit	Notes
Transmitter (Each Lane)					
Differential Pk-Pk Input Voltage Tolerance	900	-	-	mV	at TP1a
Differential Termination Mismatch	-	-	10	%	at TP1
Single-Ended Input Voltage Tolerance Range	-0.4 to -3.3	-	-	V	at TP1a
DC Common Mode Voltage	-350	-	2850	mV	at TP1
Receiver (Each Lane, at TP4)					
AC Common-Mode Output Voltage (RMS)	-	-	17.5	mV	
Differential Output Voltage	-	-	900	mV	
Eye Width	0.57	-	-	UI	
Eye Height, Differential	228	-	-	mV	
Vertical Eye Closure	-	-	5.5	dB	
Differential Termination Mismatch	-	-	10	%	
Transition Time (20% to 80%)	12	-	-	ps	
DC Common Mode Voltage	-350	-	2850	mV	

Note: Electrical Rx output is squelched for loss of optical input signal.

Reference Test Points



Ordering Information

Product Name

QSFP28-100G-FR02

Product Description

QSFP28 Plug-in, 100GBASE-FR, Single Channel 1310nm, SMF 2km Optical Transceiver, LC, DOM

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