

# 8G-ZR-Cxx-BR1

SFP+, 8/4/2/1 Gbps FC/FICON, CWDM, SM, DDM, 23dB, 70km

## OVERVIEW

The 8GFC-ZR-Cxx-BR1 fiber optical SFP+ (small form pluggable) transceivers include an APD receiver and temperature stabilized DFB-EML transmitter. The modules operate at data-rates up to 8.5 Gbps CWDM modules operate at nominal Coarse Wavelength Division Multiplexing (CWDM) wavelengths. Eight center wavelengths available from 1471 nm to 1611 nm with each step being 20 nm. The CWDM characteristics are fully compliant to the wavelength parameters specified in ITU standards G.694.2 and G.695. The transceiver is compliant to wavelength requirements from ITU-T G.695. The module has a duplex LC optical interface and all mechanical characteristics are compliant with the current SFP+ specification (SFF-8431 and SFF-8432). All SFP modules fulfill the content of the serial EEPROM described in the SFP MSA, Appendix B4, table 3.1, at base data fields (defined as addresses 0 to 63) and extended data fields (DEFINED AS ADDRESSES 64 TO 95). The nominal transmitter output wavelength is stated at the reserved addresses 60-61 according to SFF document SFF-8472 rev 10.4, "Digital Diagnostics Monitoring Interface". Wavelengths stated in the specification are measured in vacuum. All requirements in this specification are valid throughout the specified lifetime and operational environmental temperature range unless otherwise stated. The transceiver modules are compliant to RoHS-6/6

## PRODUCT FEATURES

- Brocade layer 1 tested and approved
- Up to 8.5 Gbps data-rates
- Up to 70km on 9/125um SMF (G.652)
- Duplex LC connector
- Compliant with SFP+ MSA
- Hot-pluggable SFP footprint
- Built-in digital diagnostic functions
- Single power supply 3.3V
- RoHS6 compliant
- Class 1 laser product complies with EN 60825-1
- Operating temperature range: 0°C to 70°C.
- Power consumption <1.5W

## APPLICATIONS

- 8/4/2/1 Gbps Fibre Channel / Ficon
- CWDM, SAN, WAN connectivity
- Used with M-Series for multichannel 400km connectivity

## ORDERING INFORMATION

Part Number	Description
8G-ZR-Cxx-BR1	SFP+, 8/4/2/1 Gbps FC/FICON, CWDM 1470nm-1610nm, SM, DDM, 23dB, 70km

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## GENERAL SPECIFICATIONS

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Data Rate	DR			8.5	Gbps	
Bit Error Rate	BER			10-12		
Operating Temperature	TOP	0		70	°C	Case temperature
Storage Temperature	TSTO	-40		85	°C	Ambient temperature
Supply Current	IS		330	450	mA	For electrical power interface
Input Voltage	VCC	3.13	3.3	3.47	V	
Maximum Voltage	VMAX	-0.5		3.6	V	For electrical power interface
Total Power Dissipation			1.2	1.5	W/1	

## OPTICAL CHARACTERISTICS – TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Output Optical Power	PTX	-0.5		+4	dBm	Average, coupled into 9/125um SMF
Extinction ratio	Er	8.2			dB	
Optical Center Wavelength	$\lambda_c$	ITU-6.5	ITU	ITU+6.5	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Transmitter and Dispersion Penalty	TDP			3	dB	1600ps/nm, 8.5Gbps
Relative Intensity noise	RIN			-128	dB/Hz	Peak-to-Peak
Launch Power OFF	Poff			-30	dBm	Average

## OPTICAL CHARACTERISTICS – RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Optical Receiver Power	PRX			-7	dBm	Average
Optical Center Wavelength	$\lambda_c$	1260		1620	nm	
Receiver Sensitivity @ 10.3Gbps	RX_SENS			-23.5	dBm	BER<10 <sup>-12</sup> , PRBS 2 <sup>31</sup> -1
Loss of Signal-Asserted	PLOS_A	-32			dBm	
Loss of Signal-Deasserted	PLOS_D			-24	dBm	

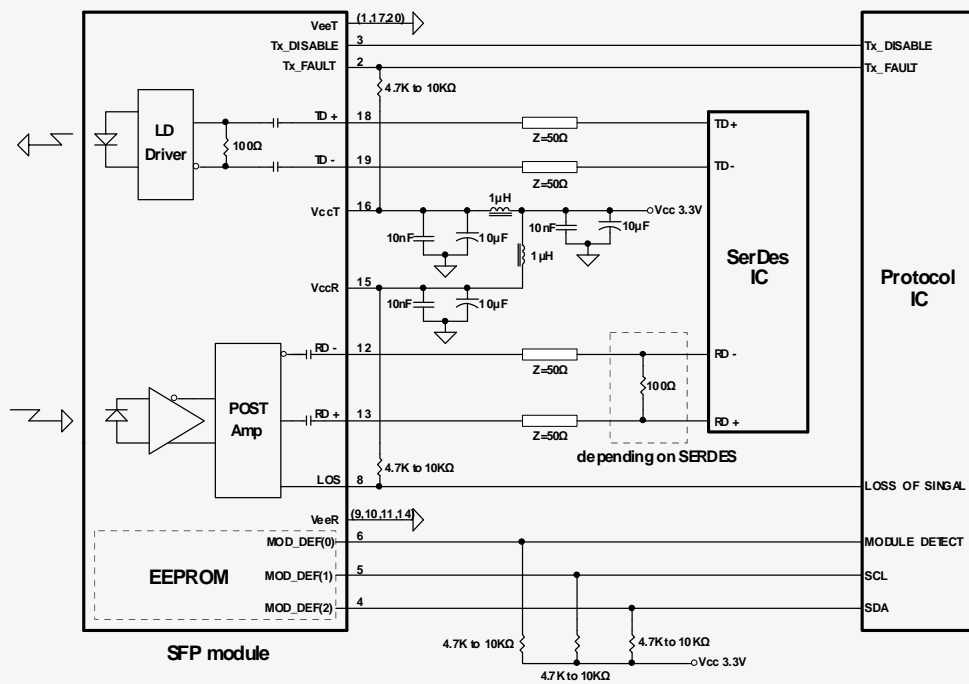
### ELECTRICAL CHARACTERISTICS – HIGH-SPEED SIGNAL INTERFACE (CML)

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Differential Input Impedance	<i>RIN</i>		100		Ω	
Differential data input swing	<i>VIN_PP</i>	150		1200	mVpp	Internally AC coupled
Differential Output Impedance	<i>ROUT</i>		100		Ω	
Differential data output swing	<i>VOUT_PP</i>	350		700	mVpp	Internally AC coupled

### ELECTRICAL CHARACTERISTICS – LOW-SPEED SIGNAL INTERFACE (LVTTTL)

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Input High Voltage		2.0		VCC+0.3	V	TX-DIS, TX-FAULT
Input Low Voltage		GND		0.8	V	
Output High Voltage		2.4		Vcc	V	RX-LOS
Output Low Voltage		GND		0.5	V	

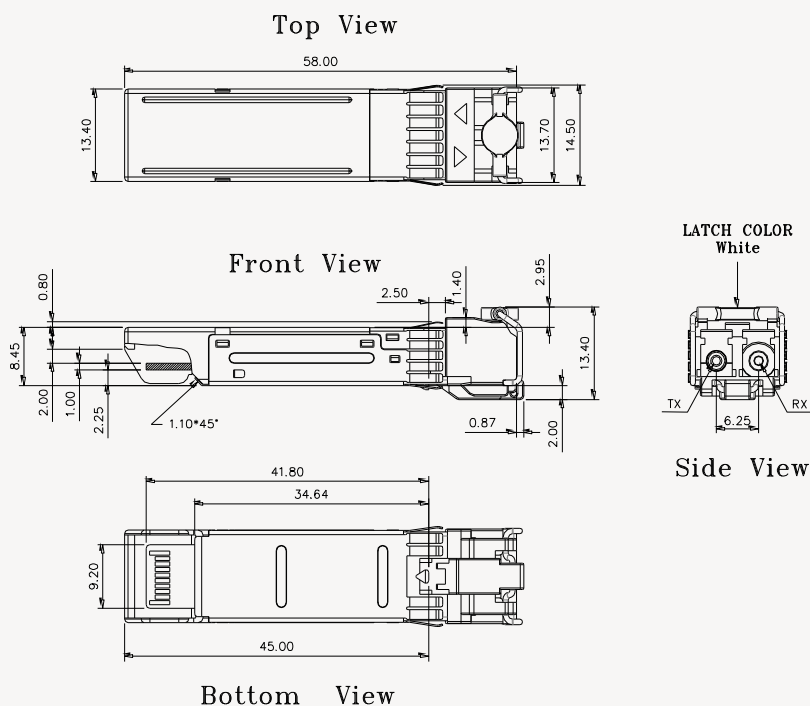
### RECOMMENDED CIRCUIT SCHEMATIC



### PIN FUNCTION DEFINITIONS

PIN	Signal Name	Description	PIN	Signal Name	Description
1	V <sub>EE</sub> T	Transmitter Signal Ground	11	V <sub>EE</sub> R	Receiver Signal Ground
2	TX_Fault	Transmitter Fault Indication. Logic "1" Output = Laser Fault. Logic "0" Output = Normal Operation	12	RD-	Inverse Receiver Data Out
3	TX_Disable	Logic "1" Input (or no connection) = Laser off, Logic "0" = Laser on.	13	RD+	Receiver Data Out
4	SDA	Modulation Definition 2 – Two wires serial ID Interface	14	V <sub>EE</sub> R	Receiver Signal Ground
5	SDL	Modulation Definition 1 – Two wires serial ID Interface	15	V <sub>CC</sub> R	Receiver Power – 3.3V±5%
6	MOD-ABS	Modulation Definition 0 – Ground in Module	16	V <sub>CC</sub> T	Transmitter Power – 3.3V±5%
7	RS0	RX Rate Select (LVTTTL). This pin has an internal 30k pulldown to ground. A signal on this pin will not affect module performance.	17	V <sub>EE</sub> T	Transmitter Signal Ground
8	RX_LOS	Loss of Signal Out (OC).	18	TD+	Transmitter Data In
9	RS1	TX Rate Select (LVTTTL). This pin has an internal 30k pulldown to ground. A signal on this pin will not affect module performance.	19	TD-	Inverse Transmitter Data In
10	V <sub>EE</sub> R	Receiver Signal Ground	20	V <sub>EE</sub> T	Transmitter Signal Ground

### MECHANICAL DRAWING



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