

8G-ZR-Dxxx-BR1

SFP+, 8/4/2/1 Gbps FC/FICON, CWDM, SM, DDM, 23dB, 80km



8G-ZR-Dxxx-BR1 OVERVIEW

The 8G-ZR-Dxxx-BR1 fiber optical SFP+ (small form pluggable) transceivers are layer 1 tested and approved by Brocade. They include an APD receiver and temperature stabilized DFB-EML transmitter. The modules operate at data-rates up to 8.5 Gbps. The DWDM modules operate at nominal Dense Wavelength Division Multiplexing (DWDM) wavelengths on the 100GHz grid as defined in the ITU-T 694.1 standard. 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

- Up to 8.5 Gbps data-rates
- Up to 80km 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 Gbps Fibre Channel / 10G Ethernet / Fibre Channel
- DWDM, SAN, WAN connectivity

ORDERING INFORMATION

Part Number	Description
8G-ZR-Dxxx-BR1	SFP+, 8G/4G/2G FC/FICON, 10G FC, 10GBASE-ZR, DWDM (ITU 918 to 960), SM, DDM, 80km, LC

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GENERAL SPECIFICATIONS

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Data Rate	DR			10.5	Gbps	
Bit Error Rate	BER			10^{-12}		
Operating Temperature	T_{OP}	0		70	°C	Case temperature
Storage Temperature	T_{STO}	-40		85	°C	Ambient temperature
Supply Current	I_S		320	450	mA	For electrical power interface
Input Voltage	V_{CC}	3.15	3.3	3.45	V	
Maximum Voltage	V_{MAX}	-0.5		3.6	V	For electrical power interface
Total Power Dissipation			1.2	1.5	W/1	

OPTICAL CHARACTERISTICS – TRANSMITTER

End of Life, overall operating conditions

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Output Optical Power	P_{TX}	-1		+3	dBm	Average, coupled into 9/125um SMF
	$P_{TX,OMA}$	-1.7			dBm	
Extinction ratio	Er	8.2			dB	
Optical center wavelength	λ_C	According to ITU694.1			nm	± 100 pm
Spectral width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	$SMSR$	30			dB	
Transmitter and Dispersion Penalty				3	dB	-500 - 1600ps/nm, 8.5Gb/s
Relative Intensity noise	RIN			-130	dB/Hz	Peak-to-Peak
Launch Power OFF	P_{off}			-30	dBm	Average

OPTICAL CHARACTERISTICS – RECEIVER

End of Life, overall operating conditions

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Optical Receiver Power	P_{RX}			-7	dBm	Average
Optical Center Wavelength	λ_C	1480		1580	nm	
Receiver Sensitivity @ 10.3GBps	RX_SENS			-24	dBm	$BER < 10^{-12}$, PRBS $2^{31}-1$
Loss of Signal-Asserted	P_{LOS_A}	-35			dBm	
Loss of Signal-Deasserted	P_{LOS_D}			-27	dBm	

ELECTRICAL CHARACTERISTICS – HIGH-SPEED SIGNAL INTERFACE (CML)

End of Life, overall operating conditions

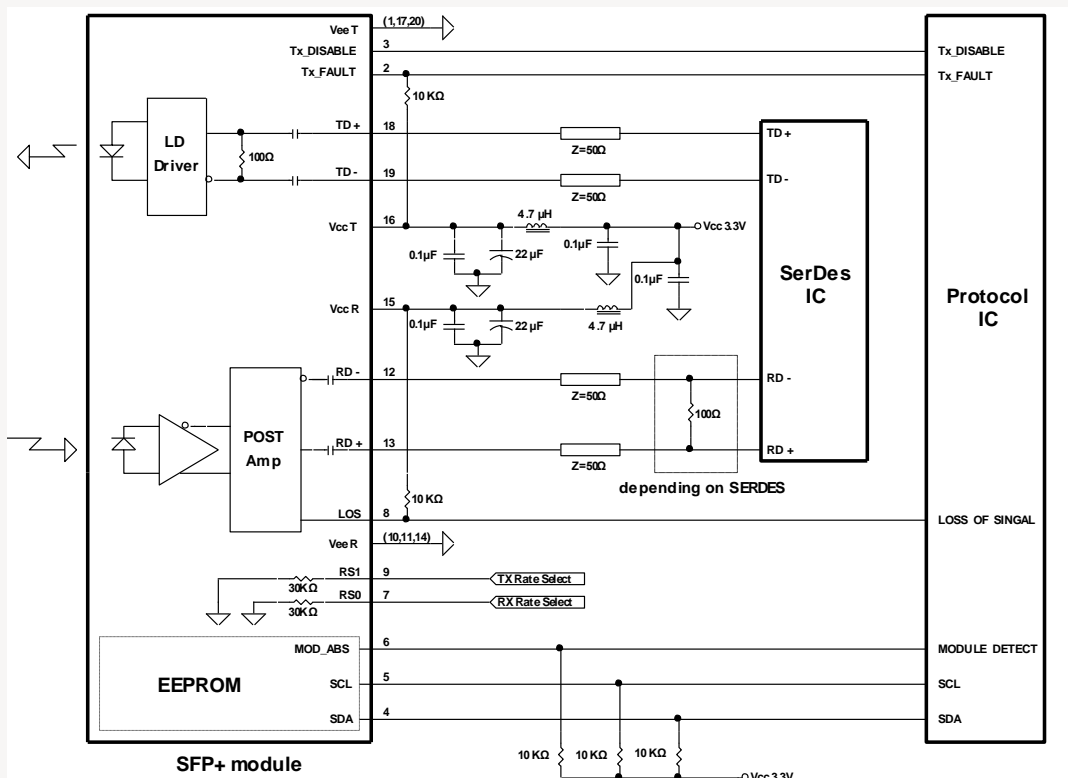
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Differential Input Impedance	R_{IN}		100		Ω	
Differential data input amplitude	V_{IN_PP}	150		1200	mVpp	Internally AC coupled
Differential Output Impedance	R_{OUT}		100		Ω	
Differential data output amplitude	V_{OUT_PP}	350		700	mVpp	Internally AC coupled

ELECTRICAL CHARACTERISTICS – LOW-SPEED SIGNAL INTERFACE (LVTTTL)

End of Life, overall operating conditions

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Input High Voltage		2.0		$V_{CC}+0.3$	V	TX-DIS, TX-FAULT
Input Low Voltage		GND		0.8	V	
Output High Voltage		2.4		V_{CC}	V	RX-LOS
Output Low Voltage		GND		0.5	V	

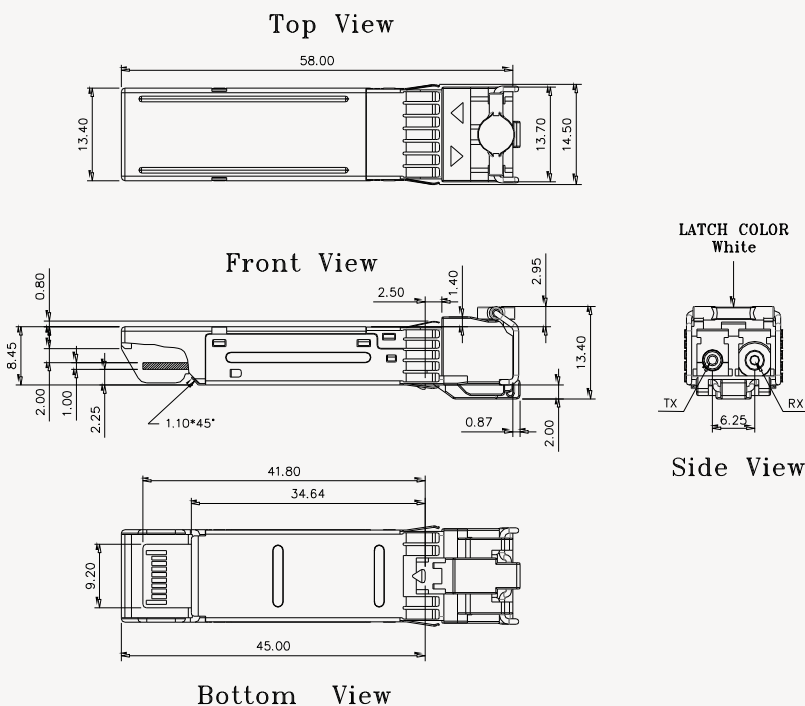
FUNCTIONAL DIAGRAM OF TRANSCEIVER AND RECOMMENDED CIRCUIT SCHEMATIC



PIN FUNCTION DEFINITIONS ACCORDING TO MSA

PIN	Signal Name	Description	PIN	Signal Name	Description
1	V _{EE} T	Transmitter Signal Ground	11	V _{EE} 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 _{EE} R	Receiver Signal Ground
5	SDL	Modulation Definition 1 – Two wires serial ID Interface	15	V _{CC} R	Receiver Power – 3.3V±5%
6	MOD-ABS	Modulation Definition 0 – Ground in Module	16	V _{CC} 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 _{EE} 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 _{EE} R	Receiver Signal Ground	20	V _{EE} T	Transmitter Signal Ground

MECHANICAL DRAWING



ORDERING INFORMATION

Label part number	Frequency (THz)	Center Wavelength (nm)
8G-ZR-D200-BR1	192.0	1561.42
8G-ZR-D210-BR1	192.1	1560.61
8G-ZR-D220-BR1	192.2	1559.79
8G-ZR-D230-BR1	192.3	1558.98
8G-ZR-D240-BR1	192.4	1558.17
8G-ZR-D250-BR1	192.5	1557.36
8G-ZR-D260-BR1	192.6	1556.55
8G-ZR-D270-BR1	192.7	1555.75
8G-ZR-D280-BR1	192.8	1554.94
8G-ZR-D290-BR1	192.9	1554.13
8G-ZR-D300-BR1	193.0	1553.33
8G-ZR-D310-BR1	193.1	1552.52
8G-ZR-D320-BR1	193.2	1551.72
8G-ZR-D330-BR1	193.3	1550.92
8G-ZR-D340-BR1	193.4	1550.12
8G-ZR-D350-BR1	193.5	1549.32
8G-ZR-D360-BR1	193.6	1548.51
8G-ZR-D370-BR1	193.7	1547.72
8G-ZR-D380-BR1	193.8	1546.92
8G-ZR-D390-BR1	193.9	1546.12
8G-ZR-D400-BR1	194.0	1545.32
8G-ZR-D410-BR1	194.1	1544.53
8G-ZR-D420-BR1	194.2	1543.73
8G-ZR-D430-BR1	194.3	1542.94
8G-ZR-D440-BR1	194.4	1542.14
8G-ZR-D450-BR1	194.5	1541.35
8G-ZR-D460-BR1	194.6	1540.56
8G-ZR-D470-BR1	194.7	1539.77
8G-ZR-D480-BR1	194.8	1538.98
8G-ZR-D490-BR1	194.9	1538.19
8G-ZR-D500-BR1	195.0	1537.40
8G-ZR-D510-BR1	195.1	1536.61
8G-ZR-D520-BR1	195.2	1535.82
8G-ZR-D530-BR1	195.3	1535.04
8G-ZR-D540-BR1	195.4	1534.25
8G-ZR-D550-BR1	195.5	1533.47
8G-ZR-D560-BR1	195.6	1532.68
8G-ZR-D570-BR1	195.7	1531.90
8G-ZR-D580-BR1	195.8	1531.12
8G-ZR-D590-BR1	195.9	1530.33
8G-ZR-D600-BR1	196.0	1529.55

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