

# SO-SFP-10GE-ZR-Cxx

SFP+, 10GBase-ZR, CWDM 1470nm-1610nm, SM, DDM, 23dB, 70km

## OVERVIEW

The SO-SFP-10GE-ZR-Cxx series optical transceiver is designed for fiber communications application up to 10G, which fully compliant with the specification of SFP+ MSA SFF-8431. This module is designed for single mode fiber and operates at a nominal wavelength of CWDM wavelength. There are eight center wavelengths available from 1470nm to 1610nm, with each step 20nm. A guaranteed optical link budget of 23 dB is offered. The module is with the SFP+ connector to allow hot plug capability. Only single 3.3V power supply is needed. The optical output can be disabled by LVTTTL logic high-level input of TX\_DIS. Loss of signal (RX\_LOS) output is provided to indicate the loss of an input optical signal of receiver. This module provides digital diagnostic functions via a 2-wire serial interface as defined by the SFF-8472 specification.

## PRODUCT FEATURES

- Hot-Pluggable SFP+ footprint
- 8-Wavelengths CWDM EML transmitter from 1470 nm to 1610 nm, with step 20 nm
- With high sensitivity APD
- 23dB power budget
- Duplex LC connector
- Power dissipation < 1.5W
- Dispersion tolerance 1600p s/nm
- Case operation temperature  
Standard: 0°C to 70°C
- Compliant with SFF-8431 MSA
- Compliant with SFF-8432 MSA
- Compliant with SFF-8472 MSA

## APPLICATIONS

- 10GBASE-ER/EW
- 10G FC
- Other optical links

## ORDERING INFORMATION

Part Number	Description
SO-SFP-10GE-ZR-Cxx	SFP+, 10GBase-ZR, CWDM 1470nm-1610nm, SM, DDM, 23dB, 70km

\*xx = Refers to notation for frequency data. Please see extended order information on last page for additional information.

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Maximum Supply Voltage 1	V <sub>cc</sub>	-0.5	4.0	V
Storage Temperature	T <sub>S</sub>	-40	85	°C

## RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Case Operating Temperature	T <sub>c</sub>	0		70	°C
Supply Voltage	V <sub>cc</sub>	3.13	3.3	3.45	V
Supply Current	I <sub>cc</sub>			455	mA
Data Rate	SO-SFP-10GE-ZR-Cxx			10.3	Gbps

## PERFORMANCE SPECIFICATIONS – ELECTRICAL TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Inputs(Differential)	V <sub>IN</sub>	180		1000	mVpp	After internal AC coupling
Input Impedance (Differential)	Z <sub>IN</sub>	85	100	115	ohms	
Tx_DISABLE Input Voltage – High		2		V <sub>cc</sub> +0.3	V	
Tx_DISABLE Input Voltage – Low		0		0.8	V	
Tx_FAULT Output Voltage – High		2		V <sub>cc</sub> +0.3	V	
Tx_FAULT Output Voltage – Low		0		0.8	V	

## PERFORMANCE SPECIFICATIONS – ELECTRICAL RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Outputs (Differential)	V <sub>out</sub>	350		700	mVpp	After internal AC coupling
Output Impedance (Differential)	Z <sub>out</sub>	85	100	115	ohm	
Rx_LOS Output Voltage – High		2		V <sub>cc</sub> +0.3	V	
Rx_LOS Output Voltage – Low		0		0.8	V	
MOD_DEF ( 2:0 )	VoH	2.5			V	Reference the SFF-8472 MSA
	VoL	0		0.5	V	

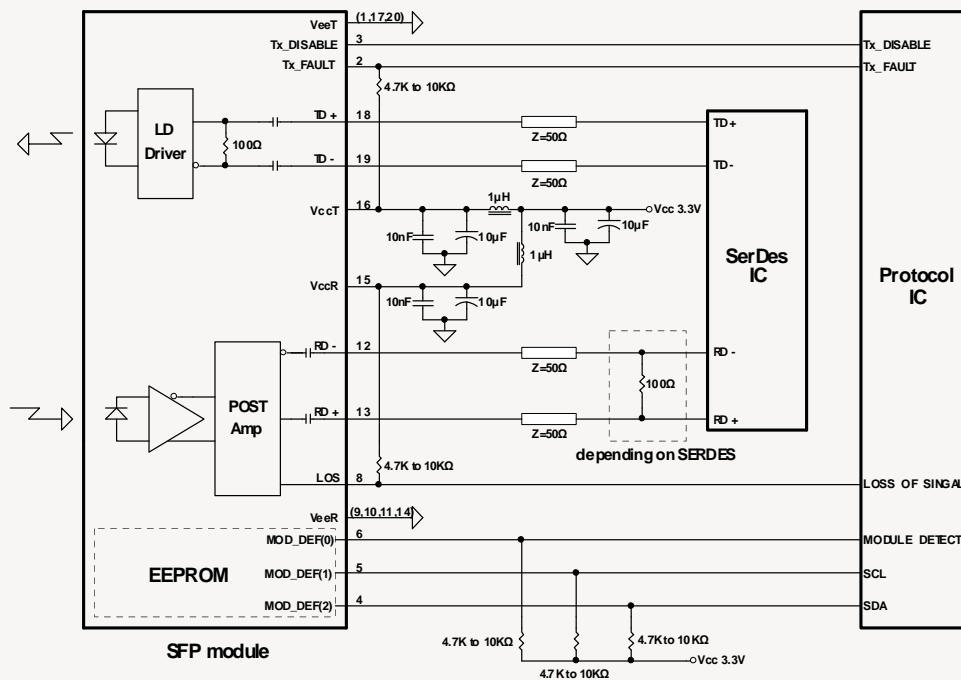
## OPTICAL AND ELECTRICAL CHARACTERISTICS TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit
Output Opt. Pwr: 9/125 SMF	$P_{out}$	0		+4	dBm
Extinction Ratio, EOLP-1696-14XN	ER	3.5			dB
Optical Wavelength	$\lambda$	$\lambda_c - 5.5$	$\lambda_c$	$\lambda_c + 7.5$	nm
-20dB Spectrum Width	$\Delta\lambda$			1	nm
Side Mode Suppression Ratio	SMSR	30			dB
Average Launch Power of OFF Transmitter	$POFF$			-30	dBm
Transmitter Dispersion Penalty	TDP			3,5	dB
TX Jitter	$TX_j$	Per 802.3ae requirements			
Relative Intensity Noise	RIN			-128	dB/Hz

## OPTICAL AND ELECTRICAL CHARACTERISTICS RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit
Receiver Sensitivity	$P_{min}$			-23	dBm
Input Overload	$P_{max}$	-8			dBm
Optical Center Wavelength	$\lambda$	1260		1620	Nm
Receiver Reflectance	$R_{rf}$			-12	dB
LOS De-Assert	LOSD			-24	dBm
LOS Assert	LOSA	-37			dBm
LOS Hysteresis		1			dB

## RECOMMENDED CIRCUIT SCHEMATIC



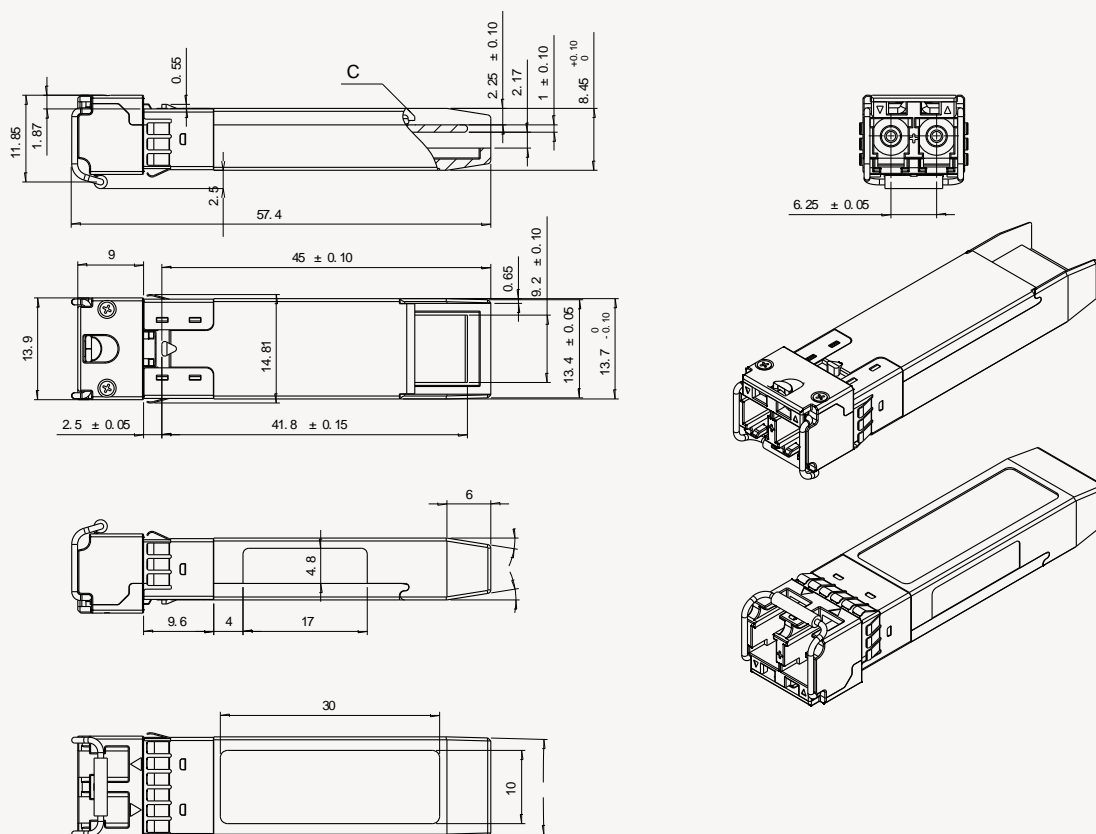
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For more information, visit [smartoptics.com](http://smartoptics.com).

### 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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**EXTENDED ORDERING INFORMATION**

Part Number	Description
SO-SFP-10GE-ZR-C47	SFP+, 10GBase-ZR, CWDM 1470nm, SM, DDM, 23dB, 70km
SO-SFP-10GE-ZR-C49	SFP+, 10GBase-ZR, CWDM 1490nm, SM, DDM, 23dB, 70km
SO-SFP-10GE-ZR-C51	SFP+, 10GBase-ZR, CWDM 1510nm, SM, DDM, 23dB, 70km
SO-SFP-10GE-ZR-C53	SFP+, 10GBase-ZR, CWDM 1530nm, SM, DDM, 23dB, 70km
SO-SFP-10GE-ZR-C55	SFP+, 10GBase-ZR, CWDM 1550nm, SM, DDM, 23dB, 70km
SO-SFP-10GE-ZR-C57	SFP+, 10GBase-ZR, CWDM 1570nm, SM, DDM, 23dB, 70km
SO-SFP-10GE-ZR-C59	SFP+, 10GBase-ZR, CWDM 1590nm, SM, DDM, 23dB, 70km
SO-SFP-10GE-ZR-C61	SFP+, 10GBase-ZR, CWDM 1610nm, SM, DDM, 23dB, 70km

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