Professional high-speed optical transceiver

OPN-SH127-133-20LC2 / OPN-SH127-133-20LC2I

10.3 Gbps / 20km / 1270 nm & 1330 nm Digital Diagnostic 2-CH CSFP+ LC SM Transceiver

PRODUCT FEATURES

- 2-Fiber Bi-Directional CSFP+ Optical Transceiver
- Up to 10.3 Gbps Bi-directional Data Links
- Compliant with CSFP MSA 2.0 (Option2)
- Compliant to IEEE 802.3ae 10GBASE-BX
- SFF-8472 Digital Diagnostic Function
- Duplex LC Connector
- CH1: 1270 nm DFB TX/1330nm RX
- CH2: 1330 nm DFB TX/1270nm RX
- Distance Up to 20 km
- AC/AC Coupling according to MSA
- Single +3.3 V Power Supply
- RoHS Compliant
- 0 to 70ºC Operating: OPN-SH127-133-20LC2
- -50 to 85ºC Operating: OPN-SH127-133-20LC2I
- Class 1 Laser International Safety Standard IEC 60825Compliant

APPLICATIONS

- 10G Ethernet Links

PRODUCT DESCRIPTION

The OPN-SH127-133-20LC2I series single mode transceiver is a smallform factor pluggable module for bi-directional serial optical data communications such as IEEE 802.3ae 10GBASE-BXby using 1270/1330 nm transmitter and 1330/1270 nm receiver. It is with the SFP 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I^2C series bus specified in the SFP MSA SFF-8472. Thetransmitter section uses a multiple quantum well 1270 nm DFB laser and is a class 1 laser compliant according to International Safety Standard IEC 60825. The receiversection uses an integrated 1330 nm detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

ORDER INFORMATION

P/No.	Bit Rate (Gb/s)	10GBASE	Distance (km)	TX (nm)	RX (nm)	Package	Temp (ºC)	RoHS Compliant
OPN-SH127-133-20LC2	10.3	BX	20	CH1: 1270 DFB CH2: 1330 DFB	CH1: 1330 CH2: 1270	LC CSFP+ with DMI	0 to 70	Yes
OPN-SH127-133-20LC2I	10.3	BX	20	CH1: 1270 DFB CH2: 1330 DFB	CH1: 1330 CH2: 1270	LC CSFP+ with DMI	-50 to 85	Yes

Absolute Maximum Ratings					
Parameter	**Symbol**	**Min**	**Max**	**Units**	**Notes**
Storage Temperature	Tstg	-50	85	ºC	
Operating Case Temperature	Topr	0 -50	70 85	ºC	OPN-SH127-133-20LC2 OPN-SH127-133-20LC2I
Relative Humidity	RH	0	85	%	Non condensing
Power Supply Voltage	Vcc	0	3.6	V	
Input Voltage	---	GND	Vcc	V	
Output Current	Iout	0	30	mA	

Professional high-speed optical transceiver

Recommended Operating Conditions					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units / Notes**
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Power Supply Current	$I_{CC\,(TX+RX)}$			600	mA / 2 Channels
Operating Case Temperature	Topr	0 -50		70 85	ºC / OPN-SH127-133-20LC2 ºC / OPN-SH127-133-20LC2I
Data Rate			10.3125		Gb/s

Transmitter Optical Specifications (0ºC < Topr < 70ºC, 3.13V < Vcc < 3.47V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Average Launch Power	$Po_{,\,Avg}$	-2		+3	dBm	1
Extinction Ratio	ER	3.5				
Output Center Wavelength	λc	1260 1320	1270 1330	1280 1340	nm	CH1 CH2
Output Spectrum Width	σ_λ			1	nm	-20 dB width
Side Mode Suppression Ratio	SMSR	30			dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Average Launch Power of OFF Transmitter				-30	dBm	

1. Output power is power coupled into a 9/125 μm single-mode fiber.

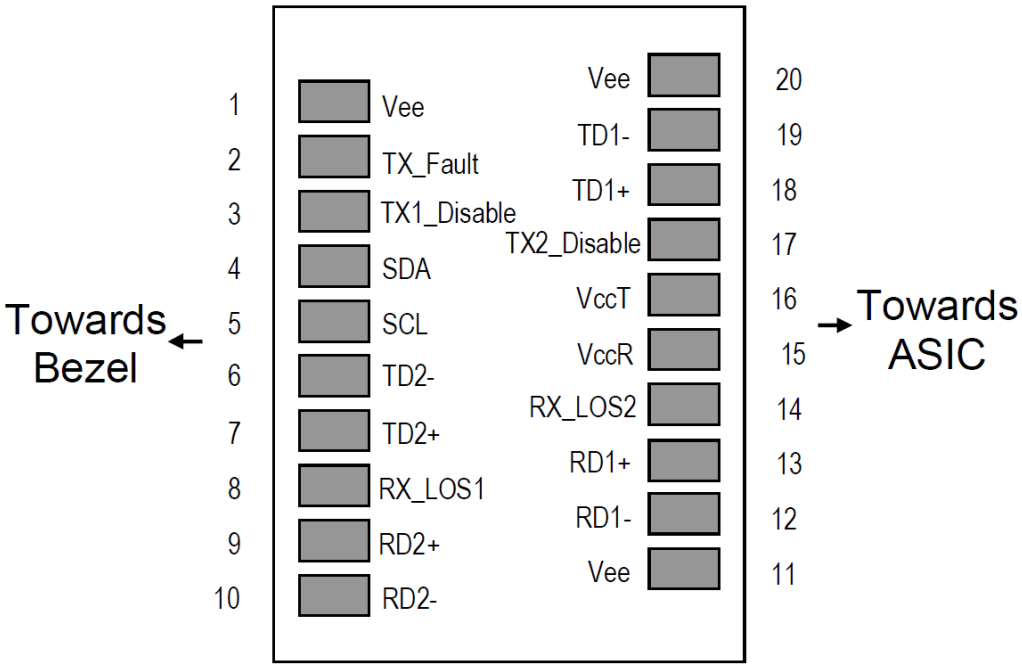
Receiver Optical Specifications (0ºC < Topr < 70ºC, 3.13V < Vcc < 3.47V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Sensitivity at 10.3 Gb/s				-13	dBm	2, Average Power
Receiver Overload	P_{MAX}	0.5	---		dBm	
LOS -- Deasserted	LOS_D	---	---	-14	dBm	Transition: high to low
LOS -- Asserted	LOS_A	-35	---	---	dBm	Transition: low to high
Wavelength of Operation	λc	1320 1260		1340 1280	nm	CH1 CH2

2. Measured with average power; BER < 10^{-12} and PRBS 2^{31}-1.

Electrical Characteristics						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
High-Speed Signal (CML) Interface Specification						
Input Data Rate			10.3125		Gb/s	
Differential Input Impedance	Rin		100		Ω	
Differential Data Input Amplitude		80		1000	mVpp	Internally AC coupled
Output Data Rate			10.3125		Gb/s	
Differential Output Impedance	Rout		100		Ω	
Differential Data Output Amplitude		300		850	mVpp	Internally AC coupled
Low-Speed Signal (LVTTL) Interface Specification						
Input High Voltage		2.0		Vcc	V	
Input Low Voltage		GND		0.8	V	
Output High Voltage		2.0		Vcc	V	
Output Low Voltage		GND		0.8	V	

Professional high-speed optical transceiver

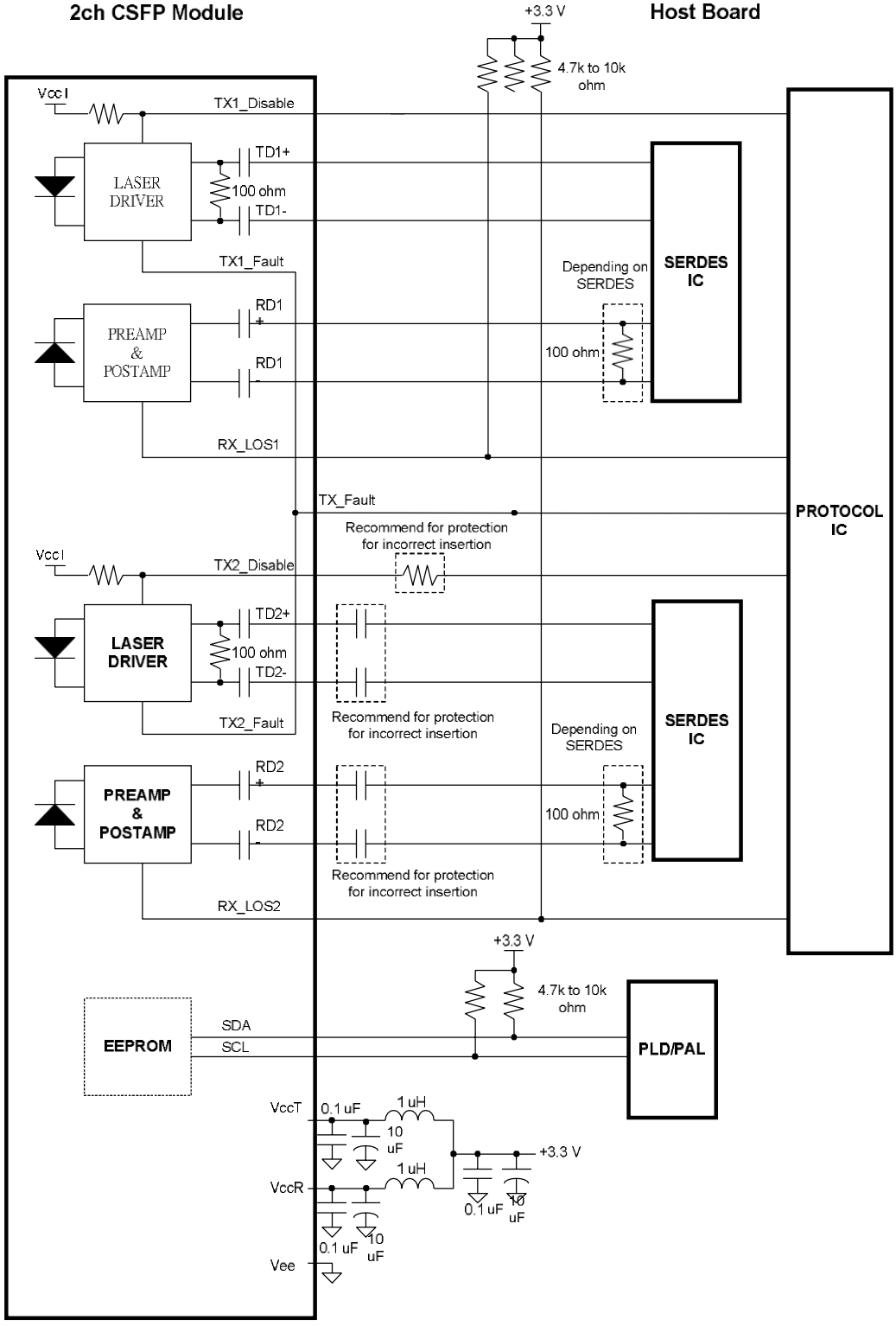
CONNECTION DIAGRAM



PIN	Signal Name	Description	PIN	Signal Name	Description
1	V_{EE}	Transmitter Signal Ground	11	V_{EE}	Receiver Signal Ground
2	TX_Fault	Transmitter Fault Indication. Logic "1" Output = Laser Fault. Logic "0" Output = Normal Operation	12	RD1-	Inverse Receiver Data Out Ch1
3	TX1_Disable	Logic "1" Input (or no connection) = Laser off, Logic "0" = Laser on.	13	RD1+	Receiver Data Out Ch1
4	SDA	Modulation Definition 2 – Two wires serial ID Interface	14	RX_LOS2	Loss of Signal Out Ch 2(OC).
5	SCL	Modulation Definition 1 – Two wires serial ID Interface	15	$V_{CC}R$	Receiver Power – 3.3V±5%
6	TD2-	Transmitter Data In Ch2	16	$V_{CC}T$	Transmitter Power – 3.3V±5%
7	TD2+	Inverse Transmitter Data In Ch2	17	TX2_Disable	Logic "1" Input (or no connection) = Laser off, Logic "0" = Laser on.
8	RX_LOS1	Loss of Signal Out Ch1(OC).	18	TD1+	Transmitter Data In Ch1
9	RD2+	Receiver Data Out Ch2	19	TD1-	Inverse Transmitter Data In Ch1
10	RD2-	Inverse Receiver Data Out Ch2	20	V_{EE}	Transmitter Signal Ground

Professional high-speed optical transceiver

RECOMMENDED CIRCUIT SCHEMATIC



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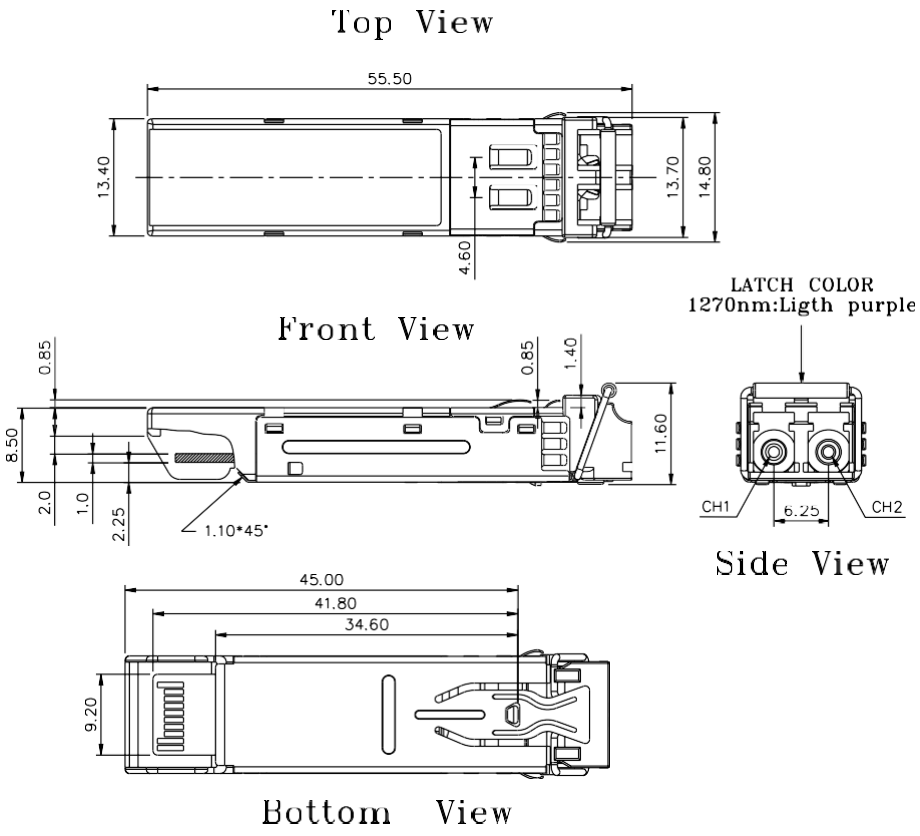
PACKAGE DIAGRAM

Units in mm



Note: Specifications subject to change without notice.