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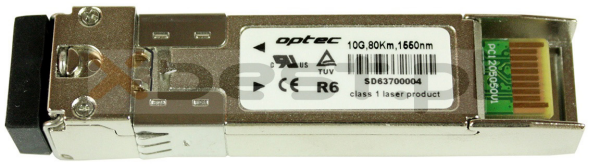
SFP+ OPTEC, 10G, SM LC, 23dB EML (80km), TX1550, DDM

Decription:

The SFP+ OPTEC, 10G, SM LC, 23dB EML (80km), TX1550 series single mode transceiver is small form factor pluggable module for duplex optical data communications of 10G. It is with the SFP+ 20-pin connector to allow hot plug capability.

This module is designed for single mode fiber and operates at a nominal wavelength of 1550 nm. The transmitter section uses a 1550nm EML, which is class 1 laser compliant according to International Safety Standard IEC-60825.
The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.



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Ordering Information								
Name	**Rate**	**Temp. [°C]**	**Wavelength**	**Distance**	**Laser**	**Connector**	**Fibre Type**	**Dispersion Tolerance**
SFP+ OPTEC, 10G, SM LC, 11.1dB EML (40km), TX1550, DDM	Up To 10.3Gbps	0 ~ +70	1550nm	80km	EML/PIN	LC	SMF	1600ps/nm

Regulatory Compliance		
Feature	**Standard**	**Performance**
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883G Method 3015.7	Class 1C (>1000 V)
Electrostatic Discharge to the enclosure	EN 55024:1998+A1+A2 IEC-61000-4-2 GR-1089-CORE	Compliant with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022:2006 CISPR 22B :2006 VCCI Class B	Compliant with standards. Noise frequency range: 30MHz to 6GHz. Good system EMI design practice required to achieve Class B margins. System margins are dependent on customer host board and chassis design.
Immunity	EN 55024:1998+A1+A2 IEC 61000-4-3	Compliant with standards. 1KHz sine-wave, 80% AM, from 80MHz to 1GHz. No effect on transmitter/ receiver performance is detectable between these limits.
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1:2007 EN (IEC) 60825-2:2004+A1	CDRH compliant and Class I laser product. TüV Certificate No. 50135086
Component Recognition	UL and CUL EN60950-1:2006	UL File E317337 TüV Certificate No. 50135086 (CB scheme)
RoHS6	2002/95/EC 4.1&4.2 2005/747/EC 5&7&13	Compliant with standards

Absolute Maximum Ratings					
Parameter	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**
Storage Tempreature	TS	-40		+85	°C
Supply Voltage	Vcc	-0.5		3.6	V

Recommend operating conditions					
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**
Case operating Temperature, Standard	TC	0		+70	°C
Power Supply Voltage	Vcc	3.15	3.3	3.45	V
Power Supply Current	Icc			455	mA
Surge Current	ISurge			+30	mA
Baud Rate	SFP+ Optec 1550Tx, EML(80km)			10.3	Gbit/s

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Electrical Characteristics						
Parameter	**Symbol**	**Min**	**Typ.**	**Max**	**Unit**	**Note**
Transmitter						
CML Inputs (Differential)	Vin	150		1200	mVpp	AC coupled inputs
Input Impedence (Differential)	Zin	85	100	115	ohm	Rin > 100 kohms @ DC
Tx_DISABLE Input Voltage – High		2		Vcc+0.3	V	
Tx_DISABLE Input Voltage – Low		0		0.8	V	
Tx_FAULT Output Voltage – High		2		Vcc+0.3	V	Io = 400µA; Host Vcc
Tx_FAULT Output Voltage – Low		0		0.5	V	Io = -4.0Ma
Receiver						
CML Outputs (Differential)	Vout	350		700	mVpp	AC coupled outputs
Output Impedance (Differential)	Zout	85	100	115	ohm	
Differential Output S-parameter	SD22	-	-	-10	dB	
Rx_LOS Output Voltage – High		2		Vcc+0.3	V	Io = 400µA; Host Vcc
Rx_LOS Output Voltage – Low		0		0.8	V	Io = -4.0mA
MOD_DEF (0:2)	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	

Optical Characteristics					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
9µm Core Diameter SMF			40		km
Transmitter					
Centre Wavelength	λC	1528	1550	1565	nm
Spectral Width (-20dB)	Δλ			1	nm
Average Output Power	POUT, AVG	0		5	dBm
Extinction Ratio	ER	3.5			dB
Average Power of OFF Transmitter	Poff			-30	dBm
Side Mode Suppression Ratio	SMSR	30			dB
Transmitter and Dispersion Penalty	TDP			3	dB
Input Differential Impedance	ZIN	90	100	110	Ω
Relative Intensity Noise	Rin			-128	dB/Hz
TX Disable Assert Time	t_off			10	us
Receiver					
Centre Wavelength	λc	1260		1600	nm
Sensitivity	Pin			-23	dBm
Receiver Overload	Pmax	-8			dBm
Output Differential Impedance	PIN	90	100	110	Ω
LOS De-Assert	LOSD			-24	dBm
LOS Assert	LOSA	-36			dBm

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Pin Descriptions

Pin	Name	FUNCTION	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	Note 5
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	SDA	Module Definition 2	3	2-wire Serial Interface Data Line.
5	SCL	Module Definition 1	3	2-wire Serial Interface Clock.
6	MOD-ABS	Module Definition 0	3	Note 3
7	RS0	RX Rate Select (LVTTL).	3	Rate Select 0, optionally controls SFP+ module receiver. This pin is pulled low to VeeT with a >30K resistor.
8	LOS	Loss of Signal	3	Note 4
9	RS1	TX Rate Select (LVTTL).	1	Rate Select 1, optionally controls SFP+ module transmitter. This pin is pulled low to VeeT with a >30K resistor.
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 7
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3V ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3V ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

Notes:

1. TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10K resistor on the host board. Pull up voltage between 2.0V and VccT/R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

2. TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7K – 10 K resistor.

Its states are:Low (0 – 0.8V): Transmitter on

(>0.8, < 2.0V): Undefined

High (2.0 – 3.465V): Transmitter Disabled

Open: Transmitter Disabled

3. Modulation Absent, connected to VeeT or VeeR in the module.

4. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K –10K Ω resistor. Pull up voltage between 2.0V and VccT/R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

5. VeeR and VeeT may be internally connected within the SFP+ module.

6. RD-/+: These are the differential receiver outputs. They are AC coupled 100 differential lines which should be terminated with 100 (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 350 and 700 Mv differential (175 –350 Mv single ended) when properly terminated.

7. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP+ connector pin. Maximum supply current is 680Ma. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the required voltage at the SFP+ input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP+ transceiver module will result in an inrush current of no more than 30Ma greater than the steady state value. VccR and VccT may be internally connected within the SFP+ transceiver module.

8. TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 150 – 1200 Mv (75 – 600Mv single-ended).

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EEPROM:

The serial interface uses the 2-wire serial CMOS EEPROM protocol defined for the ATMEL AT24C02/04 family of components. When the serial protocol is activated, the host generates the serial clock signal (SCL). The positive edge clocks data into those segments of the EEPROM that are not writing protected within the SFP+ transceiver. The negative edge clocks data from the SFP+ transceiver. The serial data signal (SDA) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented. If the module is defined as external calibrated, the diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56 – 95 at wire serial bus address A2h. The digital diagnostic memory map specific data field define as following.

Ever since its foundation, Optec Technologies Limited has been putting a lot of effort on quality control and employee treatment to try the best to offer our clients with stable good quality products, Our fiber optic factory first gained the ISO 9001:2008. Optec Technology has passed many quality system verifications, established an internationally standardized quality assurance system and strictly implemented standardized management and control in the course of design, development, production, installation and service.

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