

SO-SFP-L160DH-Cxx

SFP, 1.25 Gbps GigE, CWDM, SM/MM, DDM, 41dB, 160km

OVERVIEW

The SO-SFP-L160DH-Cxx fiber optical SFP+ (Small Form Pluggable) transceivers include an APD diode and uncooled CWDM DFB transmitter. The modules operate at multiple data-rates up to 1.25 Gbps and supports protocols like Gigabit Ethernet 1000BASE, Fibre Channel 1G. The CWDM modules operate at nominal Coarse Wavelength Division Multiplexing (CWDM) wavelengths on the 20nm grid as defined in the ITU-T 694.2 standard. There are eighteen center wavelengths available from 1270nm to 1610nm, with each step 20nm. 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

- Operating data-rate up to 1.25 Gbps
- 18 CWDM wavelengths available from 1270nm - 1610nm
- APD receiver for extended reach
- Duplex LC connector
- Hot-pluggable SFP footprint
- Built-in digital diagnostic functions
- Up to 160km on 9/125um SMF (G.652)
- Single power supply 3.3V
- RoHS6 compliant
- Class 1 laser product complies with EN 60825-1
- Operating temperature range: 0°C to 70°C. Extended -20°C to +85°C.
- Compliant with SFF-8472 (DDMI)

ORDERING INFORMATION

Part Number	Description
SO-SFP-L160DH-Cxx	SFP, 1.25 Gbps GigE, CWDM, SM/MM, DDM, 41dB, 160km
SO-SFP-L160DH-Cxx-E	SFP, 1.25 Gbps GigE, CWDM, SM/MM, DDM, 41dB, 160km, ext. temp

APPLICATIONS

- 1G Fibre Channel FC100
- 1000Base-X Gigabit Ethernet

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- CWDM and WAN networking

GENERAL SPECIFICATIONS

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate	DR	0.1		1.25	Gbps	
Bit Error Rate	BER			10^{-12}		
Operating Temperature	T_{OP}	0		70	°C	Case temperature
		-20		+85		Extended temperature
Operating Relative Humidity				95	%	
Storage Temperature	T_{STO}	-40		85	°C	Ambient temperature
Supply Current	I_S		200	300	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

OPTICAL CHARACTERISTICS – TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Output Optical Power	P_{TX}	+4		+7	dBm	Average, coupled into 9/125um SMF
Extinction ratio	E_r	8.2			dB	
Optical Center Wavelength	λ_C	According to ITU-T 694.2			nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Rise/Fall Time	t_r/t_f			260	psec	20% to 80%
Output Optical Eye	ANSI Fibre Channel and Gigabit Ethernet Compliant					
TX-DISABLE Assert Time	t_{off}			10	µsec	Average
Launch Power OFF	Poff			-45	dBm	Average

OPTICAL CHARACTERISTICS – RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Optical Receiver Power	P_{RX}			-10	dBm	Average
Optical Center Wavelength	λ_C	1260		1620	nm	
Receiver Sensitivity	R_{X_SENS}			-35	dBm	BER< 10^{-12} , PRBS 2 ³¹ -1
Loss of Signal-Asserted	P_{LOS_A}	-42			dBm	
Loss of Signal-Deasserted	P_{LOS_D}			-38	dBm	
Optical Return Loss	ORL	12			dB	
LOS Hysteresis		0.5			dB	

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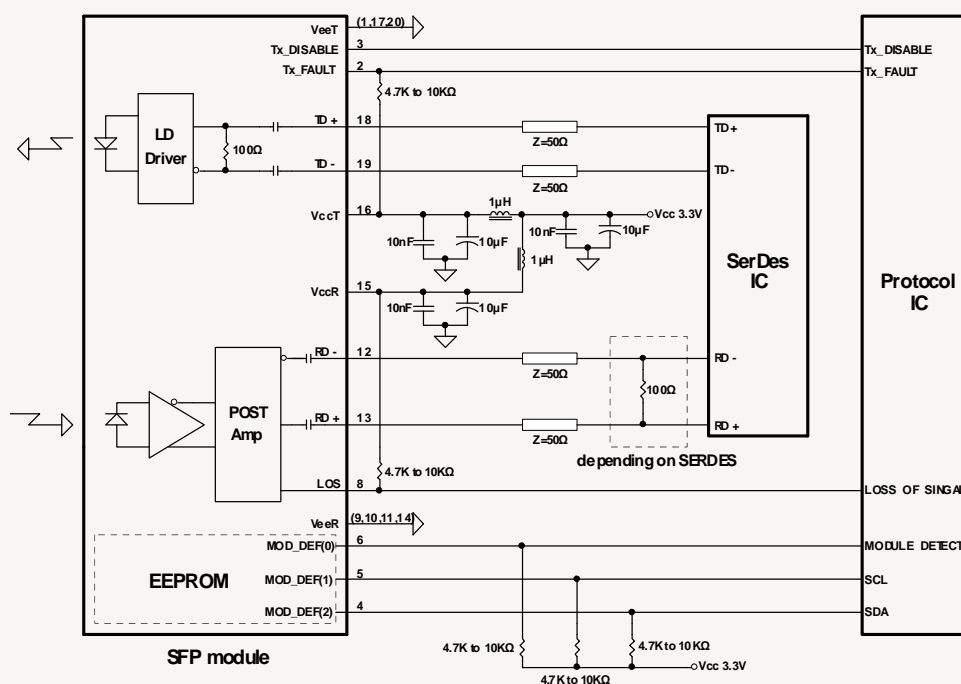
ELECTRICAL CHARACTERISTICS – HIGH-SPEED SIGNAL INTERFACE (CML)

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Differential Input Impedance	R_{IN}	85	100	115	Ω	
Differential data input swing	V_{IN_PP}	400		2000	mVpp	Internally AC coupled
Differential Output Impedance	R_{OUT}	85	100	115	Ω	
Differential data output swing	V_{OUT_PP}	400		2000	mVpp	Internally AC coupled

ELECTRICAL CHARACTERISTICS – LOW-SPEED SIGNAL INTERFACE (LVTTTL)

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
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	

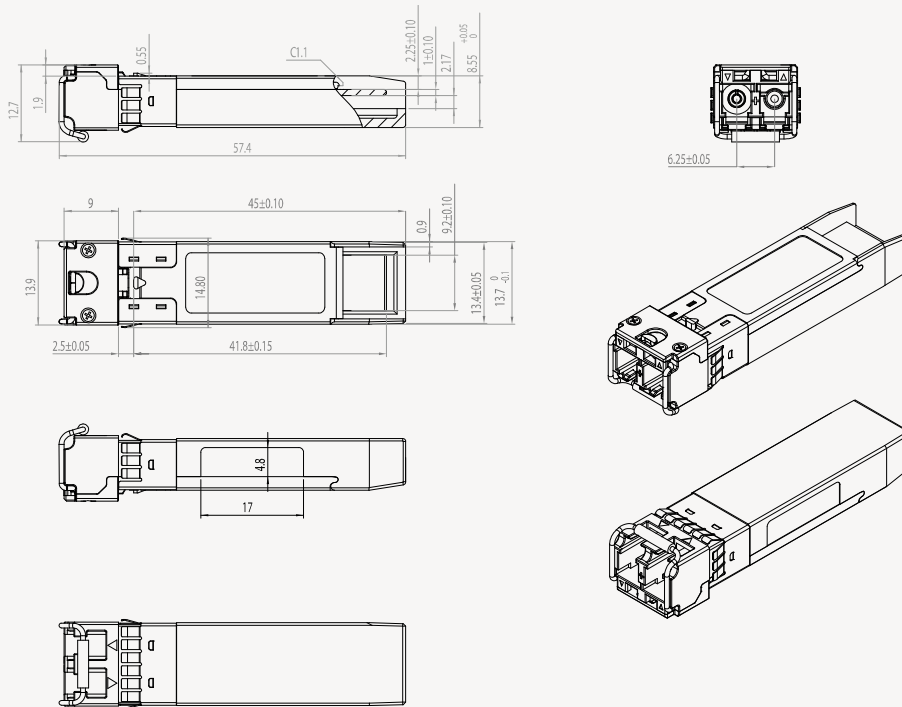
FUNCTIONAL DIAGRAM OF TRANSCEIVER



PIN ASSIGNMENT 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 pull-down 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 pull-down 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 DIMENSIONS



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ORDERING INFORMATION

NORMAL VERSIONS

Part Number	Center Wavelength (nm)
SO-SFP-L160DH-C27	1270
SO-SFP-L160DH-C29	1290
SO-SFP-L160DH-C31	1310
SO-SFP-L160DH-C33	1330
SO-SFP-L160DH-C35	1350
SO-SFP-L160DH-C37	1370
SO-SFP-L160DH-C39	1390
SO-SFP-L160DH-C41	1410
SO-SFP-L160DH-C43	1430
SO-SFP-L160DH-C45	1450
SO-SFP-L160DH-C47	1470
SO-SFP-L160DH-C49	1490
SO-SFP-L160DH-C51	1510
SO-SFP-L160DH-C53	1530
SO-SFP-L160DH-C55	1550
SO-SFP-L160DH-C57	1570
SO-SFP-L160DH-C59	1590
SO-SFP-L160DH-C61	1610

EXTENDED TEMPERATURE VERSIONS

Part Number	Center Wavelength (nm)
SO-SFP-L160DH-C27-E	1270
SO-SFP-L160DH-C29-E	1290
SO-SFP-L160DH-C31-E	1310
SO-SFP-L160DH-C33-E	1330
SO-SFP-L160DH-C35-E	1350
SO-SFP-L160DH-C37-E	1370
SO-SFP-L160DH-C39-E	1390
SO-SFP-L160DH-C41-E	1410
SO-SFP-L160DH-C43-E	1430
SO-SFP-L160DH-C45-E	1450
SO-SFP-L160DH-C47-E	1470
SO-SFP-L160DH-C49-E	1490
SO-SFP-L160DH-C51-E	1510
SO-SFP-L160DH-C53-E	1530
SO-SFP-L160DH-C55-E	1550
SO-SFP-L160DH-C57-E	1570
SO-SFP-L160DH-C59-E	1590
SO-SFP-L160DH-C61-E	1610

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