

SO-SFP-10GE-LR20

SFP+, 10GBase-LR, 1310nm, SM, DDM, 11.4dB, 20km

OVERVIEW

The SO-SFP-10GE-LR20 series single mode transceiver is small form factor pluggable module for serial optical data communications such as IEEE 802.3ae 10GBASE-LR/LW. 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 1310 nm. The transmitter section uses a 1310nm multiple quantum well DFB laser and is a 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.

PRODUCT FEATURES

- Operating data rate up to 10.3Gbps
- 1310nm DFB-LD transmitter
- Distance up to 20km
- Single 3.3V power supply and TTL logic interface
- Duplex LC connector interface
- Hot-Pluggable
- Power dissipation < 1.5W
- Compliant with MSA SFP+ specification SFF-8431
- Compliant with IEEE 802.3ae 10GBASE-LR/LW
- Case operation temperature:
Standard: -5°C to 70°C
Extended: -40°C TO +85°C

APPLICATIONS

- 10GBASE-LR at 10.31Gbps
- 10GBASE-LW at 9.95Gbps
- Other optical links

ORDERING INFORMATION

Part Number	Description
SO-SFP-10GE-LR20	SFP+, 10GBase-LR, 1310nm, SM, DDM, 11.4dB, 20km
SO-SFP-10GE-LR20-I	SFP+, 10GBase-LR, 1310nm, SM, DDM, 11.4dB, 20km ind.temp.

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ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Storage Temperature	TS	-40	+85	°C
Supply Voltage	VCC	-0.5	3.6	V
Input Voltage	Vin	-0.5	Vcc	V
Output Current	Io		50	mA

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit	
Case Operating Temperature	Tc	SO-SFP-10GE-LR20	-5		+70	°C
		SO-SFP-10GE-LR20-I	-40		+85	
Power Supply Voltage	Vcc	3.15	3.3	3.45	V	
Power Supply Current	Icc			430	mA	
Surge Current	ISurge			+30	mA	
Baud Rate	10GBASE-LR		10.31		Gbps	
	10GBASE-LW		9.95			

PERFORMANCE SPECIFICATIONS – ELECTRICAL TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Inputs(Differential)	V _{IN}	150		1200	mVpp	AC coupled inputs
Input AC Common Mode Voltage		0		25	mV	RMS
Input Impedance (Differential)	Z _{IN}	85	100	115	ohm	Rin > 100 kohms @ DC
Differential Input S-parameter	SDD11			-10	dB	
Differential to Common Mode Conversion	SDD11			-10	dB	
Tx_DISABLE Input Voltage – High		2		3.45	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

PERFORMANCE SPECIFICATIONS – ELECTRICAL RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Outputs (Differential)	V _{out}	350		700	mVpp	AC coupled outputs
Output AC Common Mode Voltage		0		15	mV	RMS
Output Impedance (Differential)	Z _{out}	90	100	110	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 (2:0)	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	

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OPTICAL AND ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit
9µm Core Diameter SMF			20		Km
Data Rate				10.3	Gbps

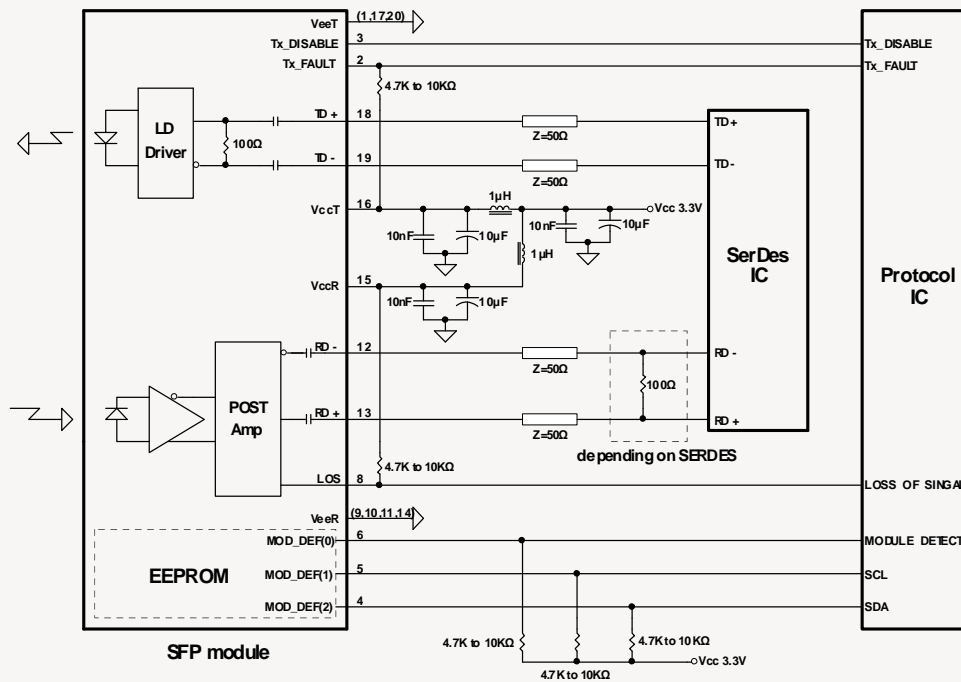
OPTICAL AND ELECTRICAL CHARACTERISTICS TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength	λ_c	1270	1310	1355	nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Average Output Power	P_{out}	-3		+1	dBm
Extinction Ratio	ER	3.5			dB
Average Power of OFF Transmitter	P_{off}			-30	dBm
Side Mode Suppression Ratio	$SMSR$	30			dB
Transmitter Dispersion Penalty	TDP			2	dB
Input Differential Impedance	Z_{IN}	90	100	110	Ω
TX Disable	Disable	2.0		$V_{cc}+0.3$	V
	Enable	0		0.8	
TX Fault	Fault	2.0		$V_{cc}+0.3$	V
	Normal	0		0.8	
TX Disable Assert Time	t_{off}			10	us
TX_DISABLE Negate Time	t_{on}			1	ms
TX_BISABLE time to start reset	t_{reset}	10			us
Time to initialize, include reset of TX_FAULT	t_{init}			300	ms
TX_FAULT from fault to assertion	t_{fault}			100	us
Total Jitter	TJ			0.28	UI(p-p)
Data Dependant Jitter	DDJ			0.1	UI(p-p)
Uncorrelated Jitter	UJ			0.023	RMS

OPTICAL AND ELECTRICAL CHARACTERISTICS RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength	λ	1260		1565	nm
Sensitivity	P_{min}			-14.4	dBm
Receiver Overload	P_{max}	0.5			dBm
Optical Return Loss	ORL			-12	dB
LOS De-Assert	$LOSD$			-15	dBm
LOS Assert	$LOSA$	-25			dBm
LOS	High	2.0		$V_{CC}+0.3$	V
	Low	0		0.8	

RECOMMENDED CIRCUIT SCHEMATIC



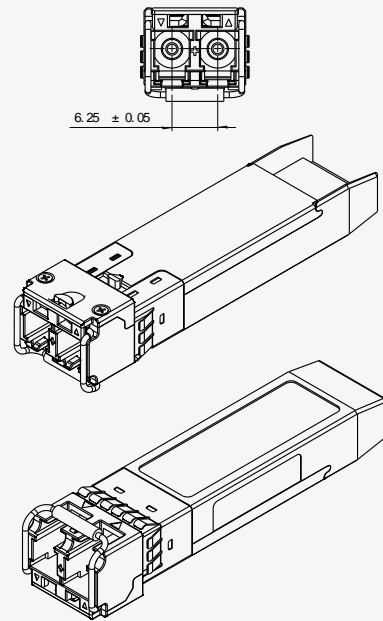
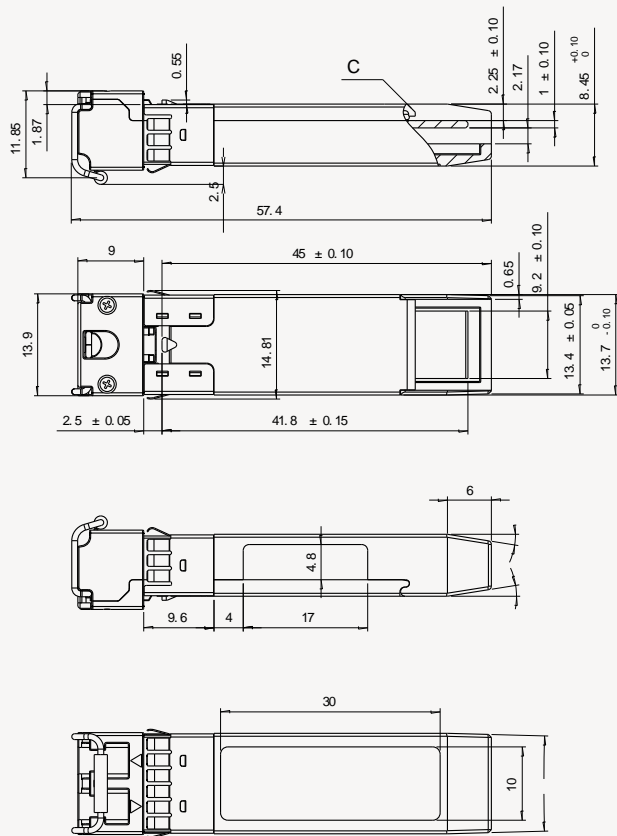
PIN FUNCTION DEFINITIONS

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

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MECHANICAL DRAWING



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