SO-SFP-10GE-SR

SFP+, 10GBase-SR, 850nm, MM, DDM, 5.1dB, 300m@OM3

SO-SFP-10GE-SR OVERVIEW

The SO-SFP-10GE-SR series of multi-mode transceiver is a small form factor pluggable module for serial optical data communications such as IEEE 802.3ae 10GBASE-SR. It is compliant to the SFP+ 20-pin connector to allow hot plug capability. This module is designed for multi-mode fiber and operates at a nominal wavelength of 850 nm. The transmitter section uses an 850nm VCSEL laser. The transceiver is a Class 1 laser compliant according to international safety standard IEC-60825. The receiver section uses an integrated GaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC

PRODUCT FEATURES

- Operating data rate up to 10.5Gbps
- 850nm VCSEL transmitter
- Distance up to 300m @ 50/125µm fiber
- Single 3.3V Power supply and TTL logic interface
- Duplex LC connector interface
- Hot-Pluggable
- Power dissipation < 1.0W
- Compliant with MSA SFP+ specification SFF-8431
- Compliant with IEEE 802.3ae 10GBASE-SR/SW
- Case operation temperature:
  - Standard: -5°C to +70°C
  - Extended: -10°C TO +85°C

APPLICATIONS

- 10GBASE-SR at 10.31Gbps
- 10GBASE-SW at 9.95Gbps
- Other optical links

ORDERING INFORMATION

Part Number	Description
SO-SFP-10GE-SR	SFP+, 10GBase-SR, 850nm, MM, DDM, 5.1dB, 300m@OM3
SO-SFP-10GE-SR-I	SFP+, 10GBase-SR, 850nm, MM, DDM, 5.1dB, 300m@OM3, ext. temp.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Storage Temperature	T_S	-40	+85	°C
Supply Voltage	V_{CC}	-0.5	3.6	V
Input Voltage	V_{in}	-0.5	Vcc	V
Output Current	I_o		50	mA

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol		Min	Typ	Max	Unit
Case Operating Temperature	T_C	*SO-SFP-10GE-SR*	-5		+70	°C
		SO-SFP-10GE-SR-I	-10		+85	
Power Supply Voltage	V_{cc}		3.15	3.3	3.45	V
Power Supply Current	I_{cc}				300	mA
Surge Current	I_{Surge}				+30	mA
Baud Rate			9.9		10.3	Gbps

PERFORMANCE SPECIFICATIONS – ELECTRICAL TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Inputs(Differential)	V_{IN}	150		1200	mVpp	AC coupled inputs
Input Impedance (Differential)	Z_{IN}	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		0.8	V	Io = -4.0mA

PERFORMANCE SPECIFICATIONS – ELECTRICAL RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Outputs (Differential)	*Vout*	350		700	mVpp	AC coupled outputs
Output Impedance (Differential)	*Zout*	85	100	115	ohms	
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	

OPTICAL AND ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit
50/125 µm Core Diameter MMF			300		m
Data Rate			10.3125		Gbps

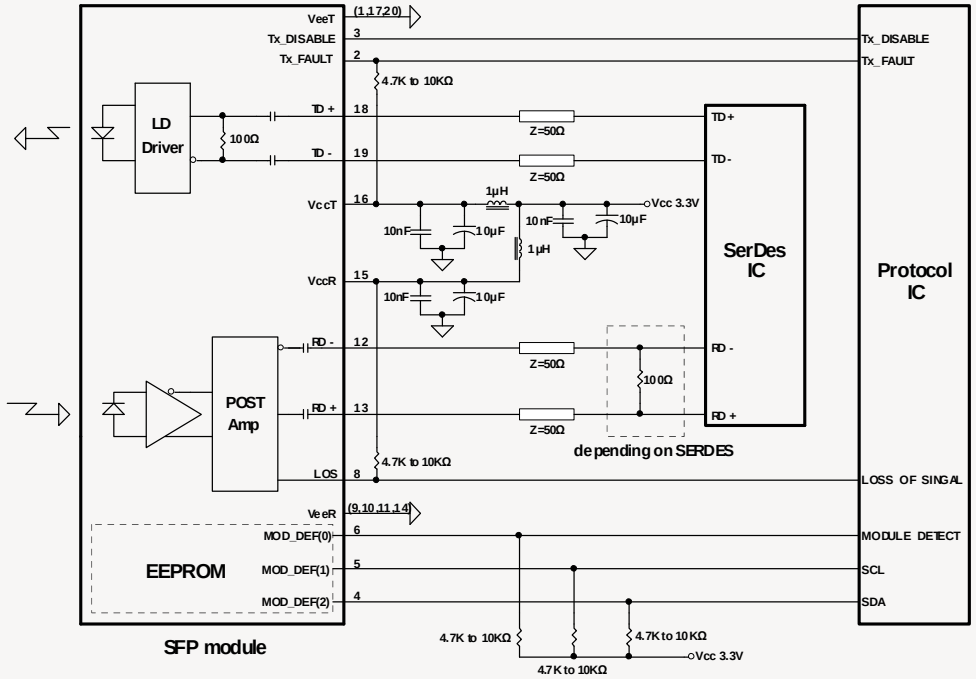
OPTICAL AND ELECTRICAL CHARACTERISTICS TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength	*λc*	840	850	860	nm
Spectral Width (-20dB)	*Δλ*			0.45	nm
Average Output Power	*Pout*	-6		-1	dBm
Extinction Ratio	*ER*	3.0	5.0		dB
Output optical Eye			IEEE 802.3-2005 Compliant		
Transmitter Dispersion Penalty	*TDP*			3.9	dB
TX Disable Assert Time	*t_off*			10	µsec
TX_DISABLE Negate Time	*t_on*			1	msec
TX_BISABLE time to start reset	*t_reset*	10			µsec
Time to initialize, include reset of TX_FAULT	*t_init*			300	msec
TX_FAULT from fault to assertion	*t_fault*			100	µsec
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*	840	850	860	nm
Receiver Sensitivity		P_{min}			-11.1	dBm
Receiver Overload		P_{max}	-1.0			dBm
Optical Return Loss		*ORL*			-12	dB
LOS De-Assert		LOS_D			-12.5	dBm
LOS Assert		LOS_A	-25			dBm
LOS	High		2.0		VCC+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 (LVTTL). 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 (LVTTL). 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

MECHANICAL DRAWING