10G SFP+ SR Transceiver

Overview

The 10G SFP+ SR transceiver delivers high-performance, low-latency optical connectivity for modern data center and enterprise networks. Engineered for reliability, it supports 10.3125Gbps transmission over OM3 multimode fiber up to 300 meters. The module integrates an 850nm VCSEL transmitter and high-sensitivity PIN receiver with TIA, ensuring clean, consistent signal quality. A hot-pluggable SFP+ MSA design and built-in digital diagnostics provide seamless integration, real-time monitoring, and dependable operation across high-density environments.



Features and Benefits

- Hot-pluggable SFP+ MSA module with duplex LC interface
- Supports multi-rate operation up to 10.3125Gbps over 300m (OM3)
- Low-power 3.3V design consuming under 1W
- Integrated digital diagnostics via 2-wire interface
- Industrial-grade reliability with stable operation from 0°C to +70°C

Applications

- 10GBASE-SR and 10GBASE-SW Ethernet links
- High-speed storage and SAN connectivity
- Data center fabric and TOR/SOR switching
- Wireless backhaul and fronthaul systems

Absolute Maximum Rating

Parameter	Symbol	Min	Max	Unit
Storage Temperature	Ts	-40	+85	ºC
Relative Humidity	RH	5	85	%
Supply Voltage	V_{CC3}	0	3.6	V
RX Input Average Power	Pmax		0	dBm

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Tc	0		70	ºC
Power Supply Voltage	V_{CC3}	3.13	3.3	3.47	V
	I_{CC3}			288	mA
Power Dissipation	P_D			1	W
Data Rate			10.3125		Gbps
Transmission Distance (OM3)				300	m

Optical Characteristics (Transmitter)						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Centre Wavelengths	λc	840	850	860	nm	
Spectral Width				0.45	nm	
Laser Off Power	Poff			-30	dBm	
Average Optical Power	Pavg	-7.3		-1	dBm	
Extinction Ratio	ER	3			dB	
Relative Intensity Noise	Rin			-128	dB/Hz	
Optical Return Loss Tolerance				12	dB	
Transmitter Dispersion Penalty	TDP			3.9	dB	
Operating Data Rate			10.3125		Gbps	
Optical Eye Mask	Compliant with IEEE.802.3ae					
Tx Input Diff Voltage	VI	180		700	mV	
Tx Fault	VOL	-0.3		0.4	V	At 0.7mA
	IOH	-50		37.5	uA	Note 1
Tx_Disable	VIL	-0.3		0.8	V	
	VIH	2		VCC+0.3	V	

NOTES:

1. Measured with a 4.7 kΩ load pulled up to Vcc.

Optical Characteristics (Receiver)						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Centre Wavelengths	λr	840	850	860	nm	
Receiver Sensitivity in Average Power	Psens			-9.9	dBm	Note 1
Receiver Sensitivity (OMA)	Psens			-11.1	dBm	Note 1
LOS Assert	LosA	-30			dBm	
LOS De-Assert	LosD			-12	dBm	
LOS Hysteresis	LosH	0.5			dB	
Overload (OMA)	Pin			-1	dBm	
Receiver Reflectance				-12	dB	
Operating Data Rate			10.3125		Gbps	
Rx Output Diff Voltage	Vo	300		850	mV	
Rx_LOS	VOL	-0.3		0.4	V	At 0.7mA
	IOH	-50		37.5	uA	Note 2
RS0, RS1	VIL	-0.3		0.8	V	
	VIH	2		VCC+0.3	V	

NOTES:

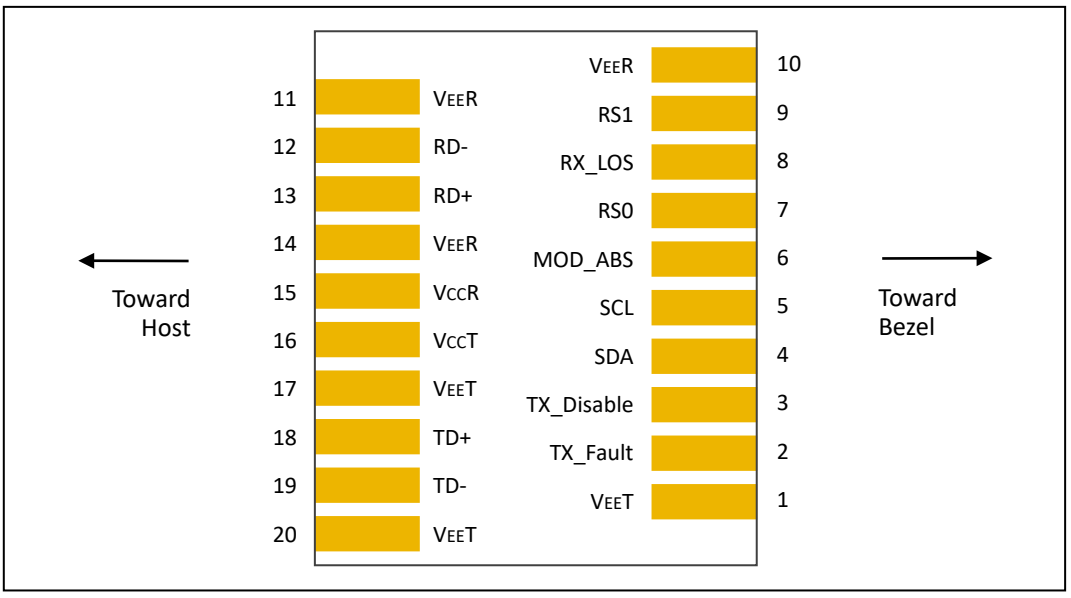
1. Receiver sensitivity is informative. Shall be measured with conformance test signal for BER = $1x10^{-12}$.
2. Measured with a 4.7 kΩ load pulled up to Vcc.

Control and Status I/O Timing						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
TX Disable Assert Time	t_off			100	µs	Note 1
TX Disable Negate Time	t_on			2	ms	Note 2
Time to Initialize	t_init			300	ms	Note 3
TX Fault Assert Time	t_fault			1	ms	Note 4
TX Fault Reset Time	t_reset	10			µs	Note 5
LOS Assert Time	t_loss_on			100	µs	Note 6
LOS De-Assert Time	t_loss_off			100	µs	Note 7
Serial ID Clock Rate	f_serial_clock			400	kHz	

NOTES:

1. Time from rising edge TX Disable to when the optical output falls below 10% of nominal.
2. Time from falling edge TX Disable to when the modulated optical output rises above 90% of nominal.
3. From power on or negation of TX Fault using TX Disable.
4. Time from fault to TX fault on.
5. Time TX Disable must be held high to reset TX_fault.
6. Time from LOS state to RX LOS assert.
7. Time from non-LOS state to RX LOS de-assert.

Pin-Out Definition



Pin Description				
Pin	**Name**	**Symbol**	**Description**	**Notes**
1		VeeT	Module Transmitter Ground	Note 1
2	LVTTL-O	TX_Fault	Module Transmitter Fault	Note 2
3	LVTTL-I	TX_Disable	Transmitter Disable; Turns off transmitter laser output	Note 3
4	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)	Note 4
5	LVTTL-I/O	SCL	2-Wire Serial Interface Clock (Same as MOD-DEF1 as defined in the INF-8074i)	Note 4
6		MOD_ABS	Module Absent, connected to VeeT or VeeR in the module	Note 5
7	LVTTL-I	RS0	Rate Select 0, optionally controls SFP+ module receiver. When High input data rate > 4.25 GBd and when LOW input data rate 4.25 GBd.	Note 6
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication (in FC designated as RX_LOS, in SONET designated as LOS, and in Ethernet designated at Signal Detect)	Note 2
9	LVTTL-I	RS1	Rate Select 1, optionally controls SFP+ module receiver. When High input data rate > 4.25 GBd and when LOW input data rate 4.25 GBd.	Note 6
10		VeeR	Module Receiver Ground	Note 1
11		VeeR	Module Receiver Ground	Note 1
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Non-Inverted Data Output	
14		VeeR	Module Receiver Ground	Note 1
15		VccR	Module Receiver 3.3 V Supply	
16		VccT	Module Transmitter 3.3 V Supply	
17		VeeT	Module Transmitter Ground	Note 1

NOTES:

1. The module signal ground pins, VeeR and VeeT, shall be isolated form the module case.
2. This pin is an open collector/drain output pin and shall be pulled up with 4.7k-10k ohms to host_Vcc on the host board. Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module pin has voltage exceeding module VccT/R + 0.5 V.
3. This pin is an open collector/drain input pin and shall be pulled up with 4.7k-10k ohms to VccT in the module.
4. See sff-8431 4.2 2-wire Electrical Specifications.
5. This pin shall be pulled up with 4.7k-10k ohms to Host_Vcc on the host board.
6. If implementing SFF-8079 pin 7 and 9 are used for AS0 and AS1 respectively.

Standards Compliance

- IEEE 802.3ae-2002
- SFP+ MSA
- RoHS

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