PRODUCT SPECIFICATION

P/N	SFP-10GE
Description	10.3125Gbps 10GBASE-T RJ45 30m SFP+Transceiver
Version	**A0**
Issue Date	**2019.11.07**

Prepared By	Checked By	Approved By

SFP-10GE

10.3125Gbps 10GBASE-T RJ45 30m SFP+ Transceiver

Features

- Up to 11.3Gbps Data Links
- EML transmitter and APD receiver
- RJ45 interface compliant
- Single +3.3V power supply
- Power dissipation < 1.2 W
- Hot-pluggable
- Operating temperature range: Commercial: -5℃~+70℃
  Industry: -40℃~+85℃
- RoHS Compliant
- interface with integrated Digital Diagnostic monitoring
- Up to 30m transmission distance

Application

- 10GBASE-ER/EW & 10G Ethernet
- 10G Fiber Channel

Standard

- Compliant with MSA SFP+ specification(SFF-8431)
- Compliant with SFF-8472
- Compliant to IEEE 802.3ae

Specification

Absolute Maximum Ratings				
Parameter	**Symbol**	**Min**	**Max**	**Unit**
Storage temperature	TS	-40	85	℃
Power Supply Voltage	Vcc3	-0.5	+4	V
Relative Humidity	RH	5	95	%
Signal Input Voltage		Vcc-0.3	Vcc+0.3	V

Recommended Operating Conditions					
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**
Operating Case Temperature (Commercial)	Tc	-5		70	℃
Operating Case Temperature (industry)	Tc	-40		85	℃
Power Supply Voltage	Vcc3	3.13	3.3	3.47	V
Supply Current	Icc3			360	mA
Data Rate			10.3125	11.3	Gbps
Fiber Length 9/125μm core SMF		-	80	-	km

Electrical Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Transmitter differential input voltage	Vin,pp	180		700	mW	
Receiver differential output Voltage	Vout,pp	300		850	mW	
Transmit disable voltage	VIH	2		Vcc	V	LVTTL
Transmit enable voltage	VIL	Vee		Vee+0.8	V	LVTTL
Loss of Signal (LOS)	Voh	2		Vcc	V	LVTTL
	Vol	Vee		Vee+0.8	V	LVTTL

Optical transmitter Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Launched Power (avg.)	Pout	-1		4	dBm	
Operating Wavelength Range	λc	1530	1550	1565	nm	
Spectral Width	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	8.2			dB	2
Transmitter and Dispersion	TDP			3	dB	

Penalty						
Relative Intensity Noise	RIN			-128	dB/Hz	
Optical Rise/Fall Time	Tris/Tfall	30			PS	3
Optical Tx Output disable	P_{dis}			-30	dBm	
Output Eye Diagram	Compliant with ITU-T G.691 eye mask and IEEE802.3ae eye mask					
Optical receiver Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Receiver Sensitivity	S			-23	dBm	4
Wavelength Range	λc	1270		1610	nm	
Receiver Reflectance				-27	dB	
Optical Power Input Overload	P_{in-max}	6			dBm	4
LOS Optical De-assert	Pd			-26	dBm	4
LOS Optical Assert	Pa	-35				
LOS hysteresis		0.5			dB	5

Notes:

1) The supply current is SFP+ module's working current.
2) For the measurements, the device was driven with 10.3125Gbps data pattern with 2^{31}-1 PRBS payload.
3) Optical transition time is the time interval required for the rising or falling edge of an optical pulse to transition between the 20% and 80% amplitudes relative to the logical 1 and 0 levels.
4) Measured with a PRBS 2^{31}-1 test pattern, @10.3125Gbps, ER=8.2dB, BER<10^{-12}.
5) The LOS Hysteresis minimizes 'chatter' on the output line. In principle, Hysteresis alone does not guarantee chatter-free operation.

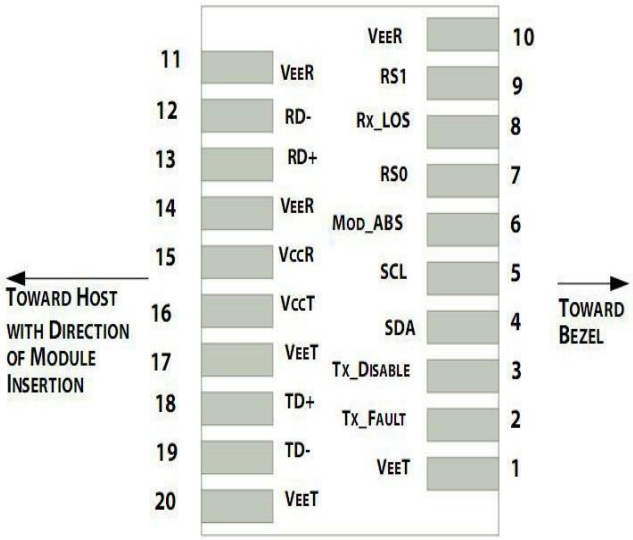
Digital Diagnostic Monitoring Information

SFP+ transceivers support the 2-wire serial communication protocol as defined in the SFP+ MSA. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, LONTE SFP+ transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged.

Pin Descriptions



Pin Assignment

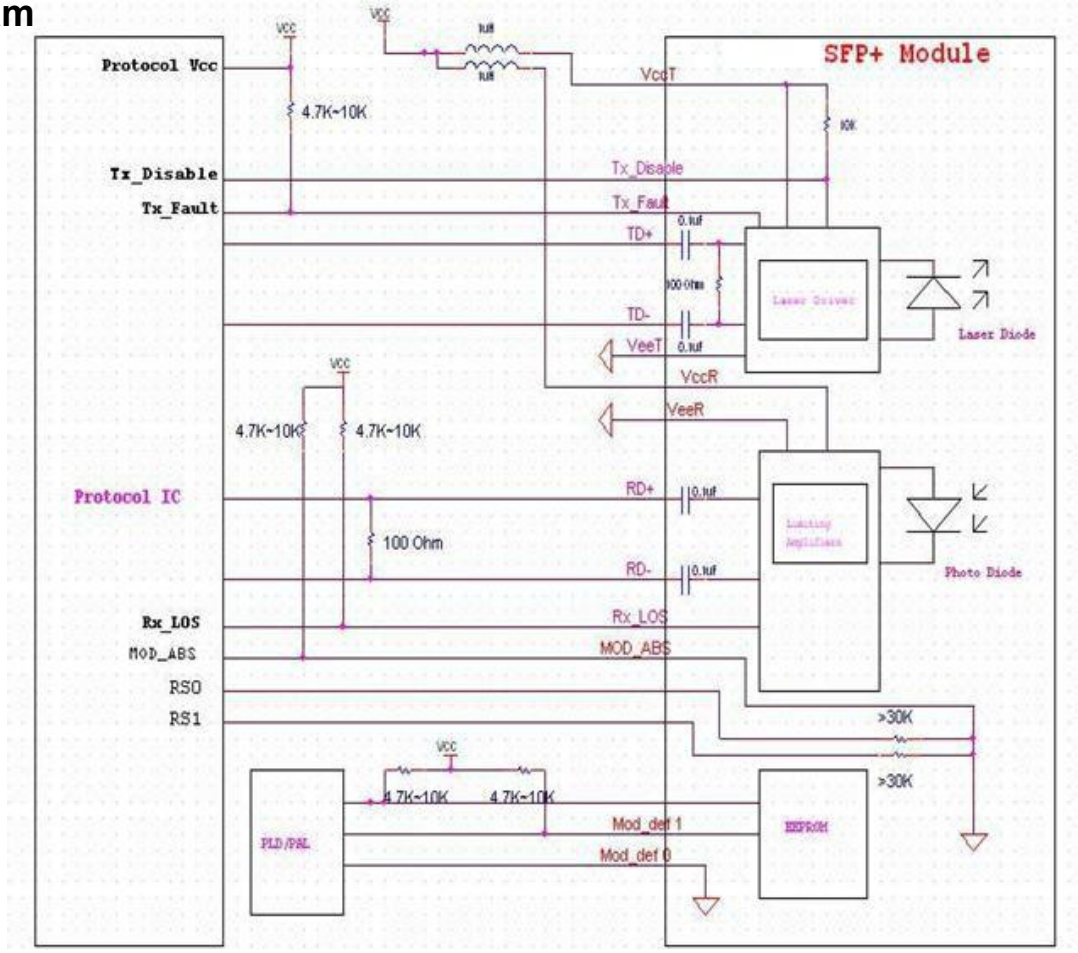
Pin	Power Seq.	Symbol	Description	Ref
1	1st	VeeT	Module Ground(Common with Receiver Ground)	1
2	3rd	TX_Fault	Transmitter Fault, Low: normal; High: abnormal	2
3	3rd	TX_Disable	Transmitter Disable High: Transmitter off Low: Transmitter on	3
4	3rd	SDA	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i)	4
5	3rd	SCL	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i)	4
6	3rd	Mod_ABS	Module Absent, Connect to VeeT or VeeR in Module	5
7	3rd	RS0	Rate Select 0, optionally controls SFP+ module receiver	6
8	3rd	RX_LOS	Receiver Loss of Signal indication High: loss of signal Low: signal detected	7
9	3rd	RS1	Rate Select 1, optionally controls SFP+ module transmitter	8
10	1st	VeeR	Receiver Ground	1
11	1st	VeeR	Receiver Ground	1
12	3rd	RD-	Receiver Inverted DATA out. AC Coupled. CML-O	9
13	3rd	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O	9
14	1st	VeeR	Receiver Ground	1

15	2nd	VccR	Receiver Power Supply	10
16	2nd	VccT	Transmitter Power Supply	10
17	1st	VeeT	Transmitter Ground	1
18	3rd	TD+	Transmitter Non-Inverted DATA in. AC Coupled. CML-I	11
19	3rd	TD-	Transmitter Inverted DATA in. AC Coupled. CML-I	11
20	1st	SDA	Transmitter Ground	1

Notes:

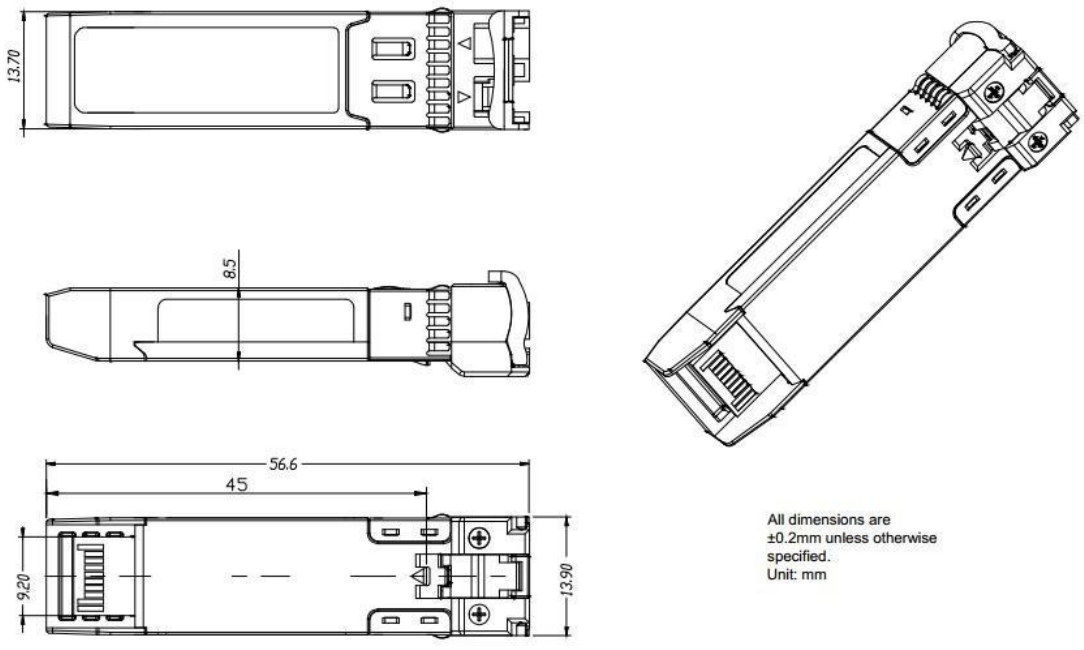
1) The module signal ground contacts.
2) This pin is an open drain/collector and should be pulled up to Vcc-host in the host with a 4.7k~10k Ohm resistor.
3) This pin should be pulled up to Vcct with a 4.7k~10k Ohm resistor in modules.
4) SDA&SCL (IIC) are needed pull up 4.7k~10k Ohm resistors on host board.
5) Mod_ABS is connected to VeeT or VeeR in the SFP+ module.
6) Rate Select 0,Optionally controls SFP+ module receiver , High: RX input signaling rate＞4.25GBd and Low: RX input signaling rate≤4.25GBd.
7) Module RX_Los of signal indication need pull up 4.7k~10k Ohm resistor on host board.
8) Rate Select 1,Optionally controls SFP+ module transmitter, High: Tx input signaling rate＞4.25GBd and Low : Tx input signaling rate≤4.25GBd.
9) RD -/+: These are the differential receiver outputs. They are CML AC-coupled with 100 Ohm terminal resistor matching internal.
10) VccR and VccT are the receiver and transmitter power supplies.
11) TD-/+: These are the differential transmitter inputs. They are CML AC-coupled with 100 Ohm terminal resistor matching internal.

Block Diagram



Package Outline

Dimensions are in millimeters. All dimensions are ±0.2mm unless otherwise specified. (Unit: mm)



Regulatory Compliance

Feature	Test	Method
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000V for SFI pins, >2000Vfor other pins.)
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2	Class 2(>4.0kV)
Electromagnetic Interference (EMI)	CISPR22 ITE Class B FCC Class B CENELEC EN55022 VCCI Class 1	Comply with standard
Immunity	IEC61000-4-3	Comply with standard
Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1,2	Compatible with Class I laser Product

Ordering information

Part. No	Specifications								
	Pack	Rate (Gbps)	Tx (nm)	Po (dBm)	RX	Sen (dBm)	Temp (℃)	Reach (m)	DDM
SFP-10GE	SFP+	10.3125	/	/	/	/	-5~70	30	Y