Type: SAE-TGSD31-1.4km

Technical Specification of: SAE-TGSD31-1.4km

Single mode 1.4KM laser based 10 Gigabit SFP+ Transceiver

- Optical interface compliant to IEEE 802.3ae 10GBASE-ER
- Electrical interface compliant to SFF-8431
- Duplex LC connector
- Up to 1.4km transmission on SMF
- 1310nm DFB transmitter, PIN photo-detector
- Operating case temperature: 0 to 70 °C
- Low power consumption
- Applicable for 1.4km SMF connection
- All-metal housing for superior EMI performance
- 2-wire interface for management
- Single 3.3V power supply
- Cost effective SFP+ solution, enables higher port densities and greater bandwidth
- RoHS6 compliant (lead free)
- Power dissipation < 1.5W

SAE-TGSD31-1.4km is a very reliable and high performance in order to transmit 10G network data on optical cores. The **SAE-TGSD31-1.4km** 1310

nm DFB 10Gigabit SFP+ transceiver is designed to transmit and receive optical data over single mode optical fiber for link length 1.4km. The SFP+ 1.4km module electrical interface is compliant to SFI electrical specifications. The transmitter input and receiver output impedance is 100 Ohms differential. Data lines are internally AC coupled. The module provides differential termination and reduce differential to common mode conversion for quality signal termination and low EMI. SFI typically operates over 200 mm of improved FR4 material or up to about150mm of standard FR4 with one connector.

SAE-TGSD31-1.4km made by high quality of components were rigorous screened, have superior performance in stability, environmental adaptability. The product planned in a way of better resistance and ability tocorrosion and electromagnetic interference.

: Applications

- 10GBASE-ER/EW 10G Ethernet
- 10G Fiber ChanneL

Technical Specification

Product name	SAE-TGSD31-1.4km

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Temperature	Ts	-40	+85	°C
Supply Voltage	Vcc	-0.5	+4	V
Case Operating Temperature	Tcase	-5	70	°C

Table 2- Optical and Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter section						
Centre Wavelength	λ	1260	1310	1355	nm	
Out put Opt.Pwr	POUT	-1		4	dBm	1
Wavelength Temperature Dependence			0.08	0.125	Nm/℃	
Spectral Width (-20dB)	σ			1	nm	
Optical Extinction Ratio	ER	4.5			dB	
Transmitter and Dispersion Penalty	TDP			2	dB	
Optical Rise/Fall Time	Tr/tf		0.1	0.26	ns	
RIN	RIN			-128	dB/Hz	
Output Eye Mask	Compliant with IEEE 0802.3ae					
Receiver section						
Rx Sensitivity	RSENS			-15.8	dBm	2
Input Saturation Power (Overload)	Psat	-3			dBm	
Wavelength Range	λC	1270		1610	nm	
LOS De -Assert	LOSD			-18		
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5	1.0		dB	

Notes:

1) Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.

2) With worst-case extinction ratio. Measured with a PRBS 2^{31}-1 test pattern, @10.325Gb/s, BER<10^{-12} .

Pin Descriptions

pin	Name	Description	Note
1	V-EET	Transmitter Ground (Common with Receiver Ground)	**1**
2	T-FAULT	Transmitter Fault.	2
3	T-DIS	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	No connection required	1
10	VEER	Receiver Ground (Common with Transmitter Ground)	1
11	VEER	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1) Circuit ground is internally isolated from chassis ground.

2) TFAULT is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended
for use. Pull up voltage should be between 2.0V to Vcc + 0.3V.A high output indicates a transmitter fault caused by either the
TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the
low state, the output is pulled to <0.8V.

3) Laser output disabled on T_{DIS}>2.0V or open, enabled on T_{DIS}<0.8V.

4) Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate
module is plugged in.

5) Internally pulled down per SFF-8431 Rev 4.1.

6) LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0
indicates normal operation; logic 1 indicates loss of signal.

Electrical Interface Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter section						
Input differential impedance	Rin		100		Ω	1
Single ended data input swing	Vin,pp	180		700	mV	
Transmit Disable Voltage	VD	Vcc–1.3		Vcc	V	
Transmit Enable Voltage	VEN	Vee		Vee+ 0.8	V	2
Transmit Disable Assert Time				10	us	
Receiver section						
Differential data output swing	Vout,pp	300		850	mV	3
Data output rise time	tr	28			ps	4
Data output fall time	tf	28			ps	4
LOS Fault	VLOS fault	Vcc–1.3		VccHOST	V	5

LOS Normal	VLOS norm	Vee		Vee+0.8	V	5
Power Supply Rejection	PSR	100			mVpp	6

Notes:

1) Connected directly to TX data input pins. AC coupled thereafter.

2) Or open circuit.

3) Into 100 ohms differential termination

4) 20 – 80 %.

5) Loss of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

6) Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to specified value applied
through the recommended power supply filtering network.

Digital Diagnostic Functions

SAE-TGSD31-1.4km transceivers support the 2-wire serial communication protocol as defined in the SFP MSA1. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

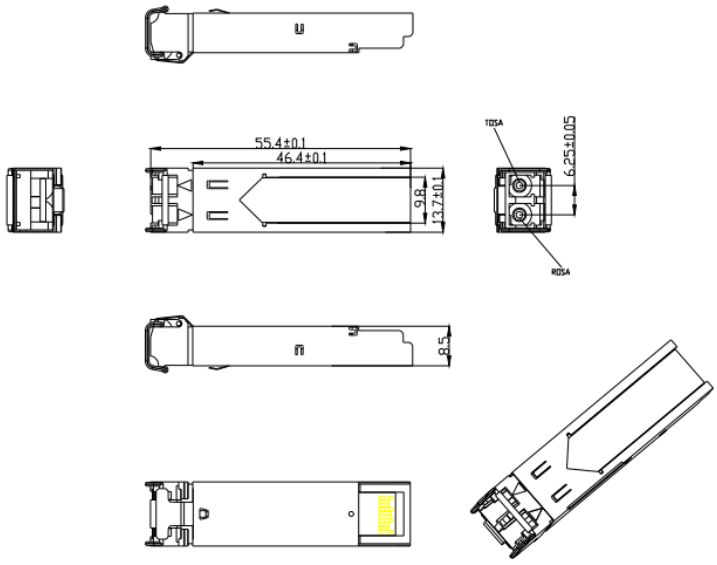
Additionally, SFP+ transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, and received optical power and transceiver supply voltage. It 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.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM
that are not write-protected. The negative edge clocks data from the SFP transceiver.

The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

Product Application Display



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