BS-MM311G-02I

SFP Transceiver for SFP02A module (RTU32M Series)

1.25Gbps SFP Transceiver, Multi-Mode, 2km Reach

Data Sheet

Doc: 40473 v1.00

BRODERSEN

simplifying systems

INTRODUCTION TO SFP TRANSCEIVER

The SFP transceivers are high performance, cost effective modules supporting data rate of 1.25Gbps and 2km transmission distance with MMF.

The transceiver consists of three sections: a FP laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement and SFF-8472 digital diagnostics functions.

PRODUCT FEATURES

- Supports up to 1.25Gbps bit rates
- Hot-pluggable SFP footprint
- 1310nm FP laser and PIN photo detector, Up to 2km for MMF transmission
- Compliant with SFP MSA and SFF-8472 with duplex LC receptacle
- Compatible with RoHS
- Single +3.3V power supply
- Real Time Digital Diagnostic Monitoring
- Operating case temperature:
    - Industrial: -40 to +85°C

APPLICATIONS

- 1.25Gbps Optical systems
- Gigabit Ethernet
- 1.063Gbps Fiber Channel
- Other Optical links

VERSIONS / ORDERING CODES

Hardware basic version

Order code: BS-MM311G-02I

Part Number	Product Description
BS-MM311G-02I	1310nm, 1.25Gbps, LC, 2km(MMF), -40°C~+85°C, with DDM

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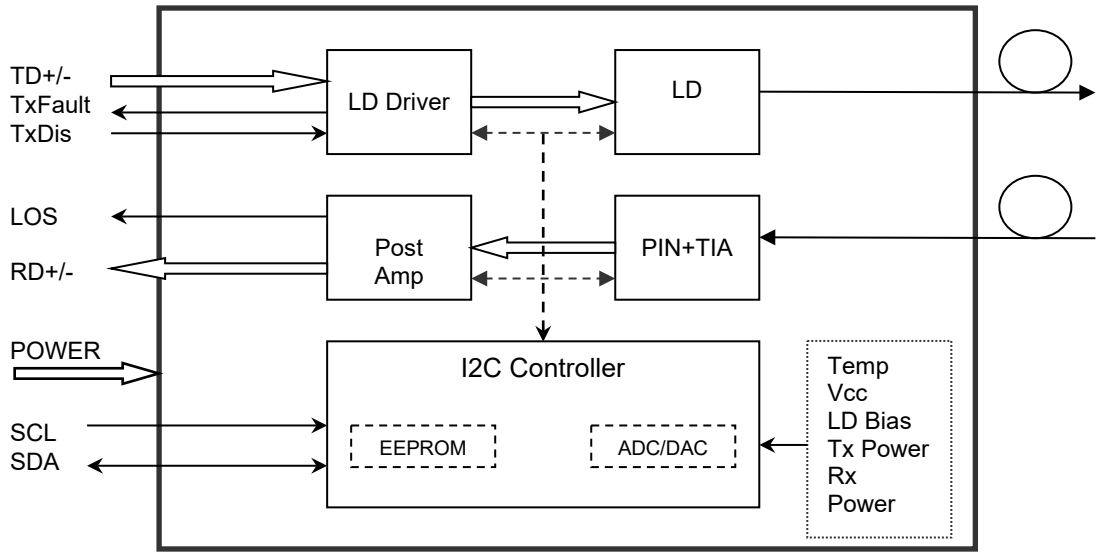
SFP TRANSCEIVER FRONT VIEW

Front view of the SFP Transceiver



Transceiver functional diagram

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ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

RECOMMENDED OPERATING CONDITIONS

Parameter		Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Standard	Tc	0		+70	°C
	Extended		-20		+85	°C
	Industrial		-40		+85	°C
Power Supply Voltage		Vcc	3.135	3.30	3.465	V
Power Supply Current		Icc			300	mA
Data Rate			0.1	1.25		Gbps

OPTICAL AND ELECTRICAL CHARACTERISTICS

Parameter		Symbol	Min	Typical	Max	Unit	Notes
Transmitter							
Centre Wavelength		λc	1260	1310	1360	nm	
Spectral Width（RMS）		Δλ			3	nm	
Side-Mode Suppression Ratio		SMSR	-	-	-	dB	
Average Output Power		Pout	-12		-3	dBm	1
Extinction Ratio		ER	9.0			dB	
Data Input Swing Differential		VIN	180		1200	mV	2
Input Differential Impedance		ZIN	90	100	110	Ω	
TX Disable	Disable		2.0		Vcc	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		Vcc	V	
	Normal		0		0.8	V	

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Receiver						
Centre Wavelength	λc	1260		1610	nm	
Receiver Sensitivity				-23	dBm	3
Receiver Overload		-1			dBm	3
LOS De-Assert	LOSD			-24	dBm	
LOS Assert	LOSA	-38			dBm	
LOS Hysteresis		0.5		4	dB	
Data Output Swing Differential	Vout	600	800	1000	mV	4
LOS	High	2.0		Vcc	V	
	Low			0.8	V	

Notes:
1. The optical power is launched into SMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 2^7-1 test pattern @1250Mbps, BER ≤1×10^{-12}.
4. Internally AC-coupled.

Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_on			1	ms
Tx Disable Assert Time	t_off			10	µs
Time To Initialize, including Reset of Tx Fault	t_init			300	ms
Tx Fault Assert Time	t_fault			100	µs
Tx Disable To Reset	t_reset	10			µs
LOS Assert Time	t_loss_on			100	µs
LOS De-assert Time	t_loss_off			100	µs
Serial ID Clock Rate	f_serial_clock		100	400	KHz
MOD_DEF (0:2)-High	V_H	2		Vcc	V
MOD_DEF (0:2)-Low	V_L			0.8	V

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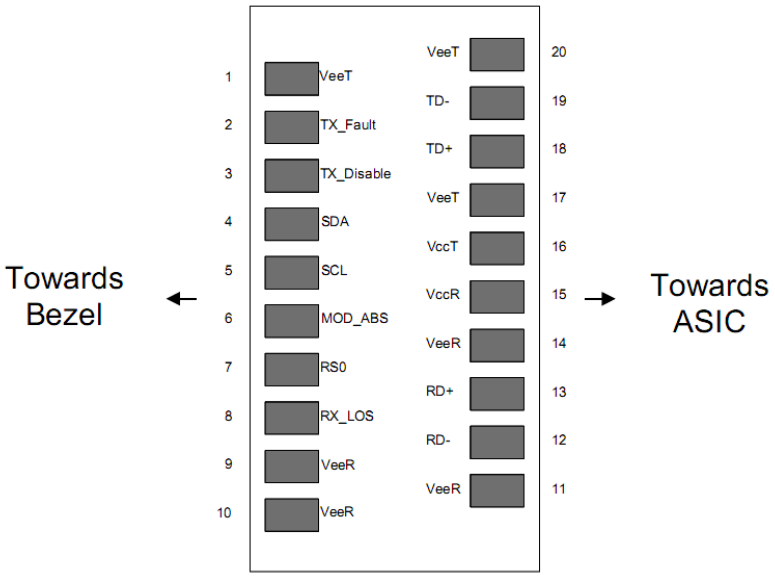
Diagnostics

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	± 3°C	Internal
	-20 to +85			
	-40 to +85			
Voltage	3.0 to 3.6	V	± 3%	Internal
Bias Current	0 to 100	mA	± 10%	Internal
TX Power	-12 to -3	dBm	± 3dB	Internal
RX Power	-23 to -1	dBm	± 3dB	Internal

Pin Descriptions



Pin	Signal Name	Description	Plug Seq.	Notes
1	V_{EET}	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	SDA	SDA Serial Data Signal	3	
5	SCL	SCL Serial Clock Signal	3	
6	MOD_ABS	Module Absent. Grounded within the module	3	
7	RS0	Not Connected	3	
8	LOS	Loss of Signal	3	Note 3
9	V_{EER}	Receiver ground	1	
10	V_{EER}	Receiver ground	1	
11	V_{EER}	Receiver ground	1	

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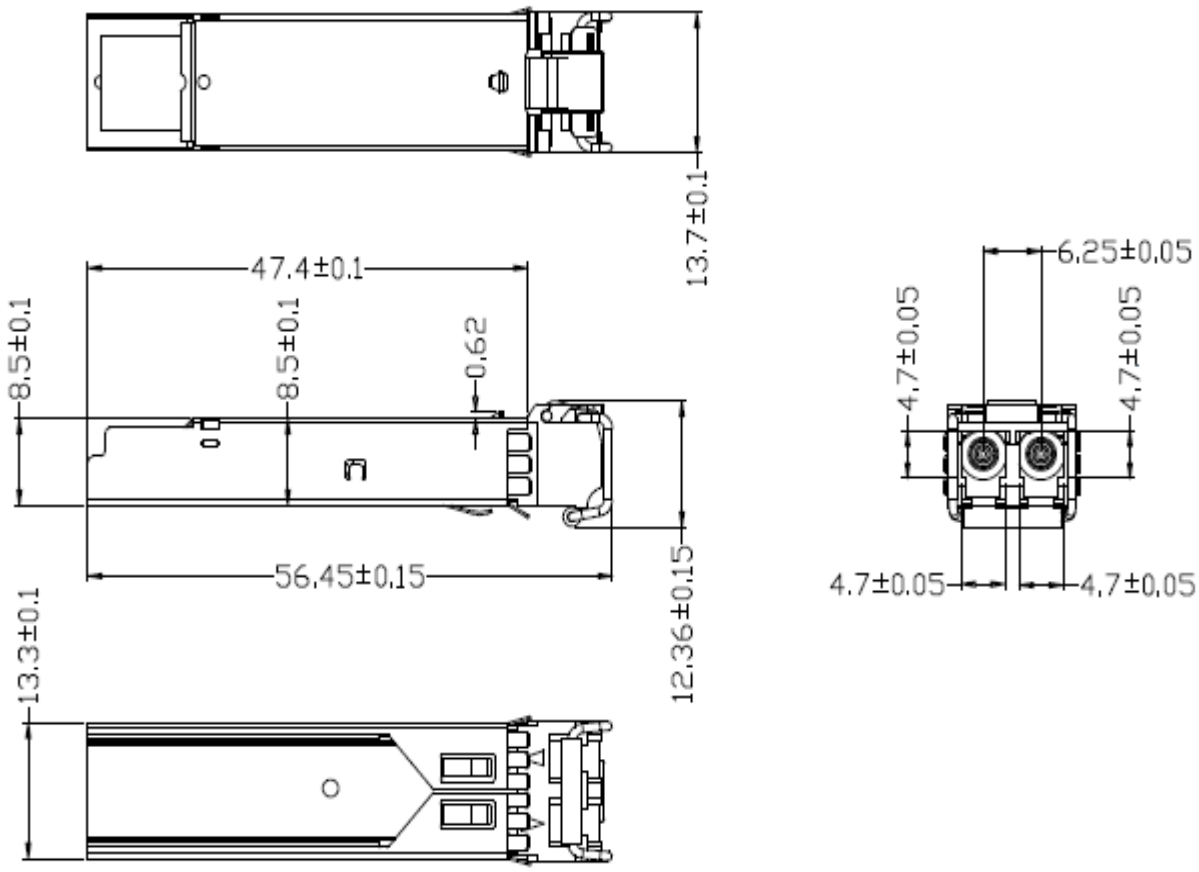
12	RD-	Inv. Received Data Out	3	Note 4
13	RD+	Received Data Out	3	Note 4
14	V_{EER}	Receiver ground	1	
15	V_{CCR}	Receiver Power Supply	2	
16	V_{CCT}	Transmitter Power Supply	2	
17	V_{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 5
19	TD-	Inv. Transmit Data In	3	Note 5
20	V_{EET}	Transmitter Ground	1	

Notes:
Plug Seq.: Pin engagement sequence during hot plugging.
1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
2) Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3) LOS is open collector output. Should be pulled up with 4.7k~10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
4) RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
5) TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

Mechanical Dimensions