Datasheet

SFP Multi Rate Bidirectional Transceivers

SFP-MR-35IR1 and SFP-MR-53IR1



Features

- 100 Mbps-2.7 Gbps data rates
- OC-48/STM-16 standard compliances
- IEEE 802.3ah, 1000Base-BX10 compatibility
- Simplex LC connector
- 13 dB minimum power budget
- 15 km minimum reach
- Single 3.3 V supply
- 1310 nm or 1550 nm DFB laser
- Digital Diagnostic SFF-8472 compliance
- Telcordia GR-468 compliance
- GR 253/STM G.957 compliance
- RoHS and China RoHS compliance
- SFP MSA SFF-8074i compliance
- 21CFP 1040.10 and 1040.11 compliance
- TÜV compliance
- Commercial temperature rating
- Class 1 Laser
- Color coded bail latch: Blue or Yellow

General Operating

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	V_{cc}	3.135	3.3	3.465	V
Total Current	I_{cc}	-	-	300	mA
Power Supply Noise Rejection	PSR	100	-	-	mV_{p-p}
Operating Temperature	T_{op}	-5	-	70	°C
Storage Temperature	T_{st}	-40	-	85	°C
Data Rate	DR	100	-	2700	Mbps

Transmitter Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	P_{op}	-5	-2.5	0	dBm
Optical Crosstalk	XT	-	-	-45	dB
Average Launch Power (Tx: Off)	P_{off}	-	-	-45	dBm
Extinction Ratio	ER	8.2	-	-	dB
Eye Mask	IEEE 802.3 and SONET/SDH compliant				
Optical Rise Time (20% - 80% values)	t_r	-	-	160	ps
Optical Fall Time (20% - 80% values)	t_f	-	-	160	ps
Mean Wavelength: **SFP-MR-35IR1**	λ	1280	1310	1335	nm
SFP-MR-53IR1	λ	1480	1550	1580	nm
Spectral Width (20 dB)	$\Delta\lambda$	-	-	1	nm
Side Mode Suppression Ration	SMSR	30	-	-	dB
Dispersion Penalty (at 15 km)[1]	dp	-	0.5	1	dB
Relative Intensity Noise	RIN	-	-	-120	dB/Hz
Transmitter Reflectance	-	-	-	-12	dB
Reflectance Tolerance	rp	-24	-	-	dB

1) Measured at 2.7 Gbps, BER of 10^{-12}, PRBS of 2^{23}-1, at eye center

Transmitter Specifications (Electical)					
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**
Input Differential Impedence	R_{in}	80	100	120	Ω
PECL Single Ended Data Input Swing	$V_{in,p-p}$	250	-	1200	mV
TxFault_Fault	V_{fault}	2	-	V_{cc}	V
TxFault_Normal	V_{normal}	V_{ee}	-	V_{ee}+0.5	V
TxDisable_Disable	V_d	2	-	V_{cc}	V
TxDisable_Enable	V_{en}	V_{ee}	-	V_{ee}+0.8	V

Receiver Specifications (Optical)					
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**
Receive Power Low[2]	$R_{sens,low}$	-	-20	-18	dBm
Receive Power High[2]	$R_{sens,high}$	0	-	-	dBm
Damage Threshold for Receiver	$P_{in,damage}$	-	-	0	dBm
Wavelength: **SFP-MR-35IR1**	λ	1480	-	1600	nm
SFP-MR-53IR1	λ	1260	-	1360	nm
LOS Assert	-	-28	-	-	dBm
LOS De-assert	-	-	-	-18	dBm
LOS Hysteresis	-	0.5	-	-	dB
Receiver Reflectance	-	-	-	-12	dB

2) Measured at 10^{-10} BER, 2.7 Gbps, 2^{23}-1 PRBS, and 10^{-12} BER, 1250 Mbps, 2^{7}-1 PRBS

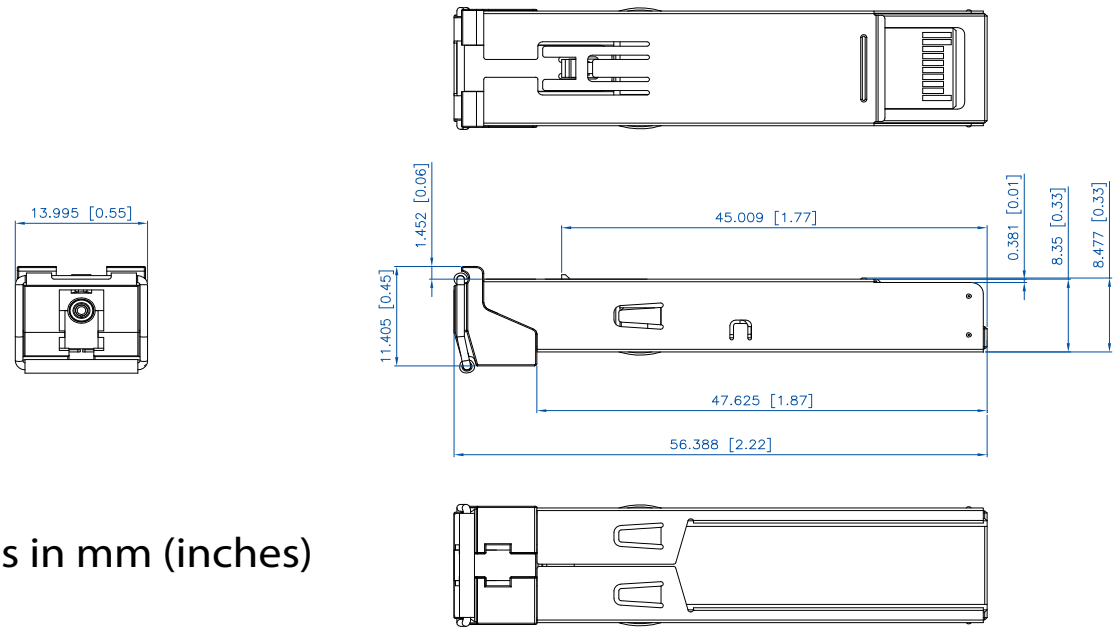
Receiver Specifications (Electrical)					
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**
PECL Single Ended Data Output Swing	$V_{out,p-p}$	185	-	800	mV
Data Output Rise Time	t_r	-	-	175	ps
Data Output Fall Time	t_f	-	-	175	ps

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	KHz
RX_LOS Voltage (High)	RX_LOS_H	2	-	-	V
RX_LOS Voltage (Low)	RX_LOS_L	-	-	0.8	V
LOS Output Voltage-Fault	V_{LOS} fault	2	-	V_{cc}	V
LOS Output Voltage-Normal	V_{LOS}normal	V_{ee}	-	V_{ee}+0.5	V
MOD_DEF (0:2)-High	V_h	2	-	V_{cc}	V
MOD_DEF (0:2)-Low	V_l	V_{ee}	-	V_{ee}+0.5	V

Digital Diagnostics						
Parameter	**Range**	**Accuracy**	**Unit**	**Calibration**	**Bit Value**	**Formula**
Temperature	-5 to 70	± 3	° C	Internal	1/256 C	Tc(C)=Tad(16 bit signed twos complement)/256
Voltage	0 to V_{cc}	0.1	V	Internal	100 µV	V(Volts)=Vad(16 bit unsigned integer)*0.1
Bias Current	0 to 120	5	mA	External	0.002 mA	I(mA)=Islope*Iad(16 bit unsigned integer)+Ioffset
TX Power	-5 to 0	±2 dB	dBm	External	0.1µW	TX_PWR(µW)=TX_PWRslope*TX_PWRad(16 bit unsigned integer +TX_PWRoffset
RX Power	-18 to 0	±2 dB	dBm	External	0.1µW	RX_PWR(µW)=A0+A1*x+A2*x^2+A3*x^3+A4*x^4

Pin	Function	Notes
1	$V_{ee}T$	TX Ground
2	TX_FAULT	Open Collector
3	TX_DISABLE	Internally Pulled High
4	MOD_DEF2	Serial Data Input
5	MOD_DEF1	Serial Clock Input
6	MOD_DEF0	Internally Grounded
7	NC	Not Connected
8	LOS	Open Collector
9	$V_{ee}R$	RX Ground
10	$V_{ee}R$	RX Ground
11	$V_{ee}R$	RX Ground
12	RXD-	RX Data Negative
13	RXD+	RX Data Positive
14	$V_{ee}R$	RX Ground
15	V_{ccR}	RX Power
16	V_{ccT}	TX Power
17	$V_{ee}T$	TX Ground
18	TXD+	TX Data Positive
19	TXD-	TX Data Negative
20	$V_{ee}T$	TX Ground

Outline Drawing



Units in mm (inches)

Ordering Information

Model	Description	Data Rate	Wavelength (nm)	Bail Latch Color	Distance Range (km)
SFP-MR-35IR1	SFP Multi Rate Bidirectional Transceiver	100 - 2700 Mbps	1310/1550	Blue	0 -15
SFP-MR-53IR1	SFP Multi Rate Bidirectional Transceiver	100 - 2700 Mbps	1550/1310	Yellow	0 -15

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