MRV | Connectivity Unlimited™

Datasheet

SFP Dual Rate Bidirectional Transceivers

SFP-DR-35IR1 and SFP-DR-53IR1

Features

- Designed for SFF-8472 compliance (SFP)
- 100 Mbps – 622 Mbps data rates
  - OC-3/STM-1
  - OC-12/STM-4
- Single-mode optics (Simplex LC)
- Single fiber, bi-directional
- Separate Tx and Rx wavelengths
- Class 1 laser (Tx): 1310 nm or 1550 nm
- 24 km distance
- Digital Diagnostics (SFF-8724)
- Commercial temperature rating

General Operating				
Parameter	**Symbol**	**Min.**	**Max.**	**Unit**
Supply Voltage	V_{cc}	3.135	3.465	V
Total Current	I_{cc}	-	300	mA
Power Supply Noise Rejection[a]	PSR	100	-	mV_{p-p}
Operating Temperature of SFP Case[b]	T_{op}	-5	70	°C
Storage Temperature	T_{st}	-40	85	°C
Data Rate OC-3/STM-1	DR	-	155	Mbps
Data Rate OC-12/STM-4	DR	-	622	Mbps
Data Rate Fast Ethernet	DR	-	125	Mbps

a) 20 Hz to 155 MHz
b) Maximum Relative Humidity is 85%, non-condensing

Transmitter Specifications (Optical)				
Parameter	**Symbol**	**Min**	**Max**	**Unit**
Optical Power	P_{op}	-15	-8	dBm
Average Launch Power of Off Tx	P_{off}	-	-45	dBm
Extinction Ratio	ER	8.2	-	dB
Eye Mask	IEEE 802.3 and SONET/SDH compliant			
Optical Rise Time[c]	t_r	-	500	ps
Optical Fall Time[c]	t_f	-	500	ps
Mean Tx Wavelength SFP-DR-35IR1: 1310	λ	1274	1356	nm
Mean Tx Wavelength SFP-DR-35IR1: 1550	λ	1480	1580	nm
Spectral Width (RMS): SFP-DR-35IR1	Δλ	-	4	nm
Spectral Width (RMS): SFP-DR-53IR1	Δλ	-	1	nm
Dispersion Penalty (at 15 km)	-	-	1	dB
Relative Intensity Noise	RIN	-	-120	dB/Hz
Optical Crosstalk	XT	-	-45	dB
Side Mode Suppression Ration	SMSR	30	-	dB
Reflectance Tolerance	rp	-24	-	dB

c) 20% - 80% values

Transmitter Specifications (Electical)				
Parameter	**Symbol**	**Min**	**Max**	**Unit**
Input Differential Impedence	R_{in}	80	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**	**Max**	**Unit**
Receive Power[d]	$R_{sens,low/high}$	-28 (sensitivity)	-8 (saturation)	dBm
Damage Threshold for Receiver	$P_{in,damage}$	-	0	dBm
Mean Rx Wavelength SFP-DR-35IR1: 1550	λ	1480	1600	nm
Mean Rx Wavelength SFP-DR-53IR1: 1310	λ	1260	1360	nm
LOS Assert	-	-38	-	dBm
LOS De-assert	-	-	-28	dBm
LOS Hysteresis	-	0.5	3	dB
Receiver Reflectance	-	-	-12	dB

d) at 10^{-12} BER, FE unbalanced pattern, and 10^{-10} BER, 155.52 Mbps and 622.08 Mbps

Receiver Specifications (Electrical)				
Parameter	**Symbol**	**Min**	**Max**	**Unit**
PECL Single Ended Data Output Swing	$V_{out,\ p-p}$	185	800	mV
Data Output Rise Time	t_r	-	500	ps
Data Output Fall Time	t_f	-	500	ps

Timing and Electrical				
Parameter	**Symbol**	**Min**	**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	-15 to -8	±2 dB	dBm	External	0.1µW	TX_PWR(µW)=TX_PWRslope*TX_PWRad(16 bit unsigned integer) +TX_PWRoffset
RX Power	-28 to -8	±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 GND
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

Ordering Information

Model	Description	Data Rate (Mbps)	Wavelength (nm)		Connector Type	Bail Latch Color	Distance Range (km)
			Tx	Rx			
SFP-DR-35IR1	SFP Dual Rate Bidirectional Transceiver	125 (Fast Ethernet) 155 (OC-3/STM-1) 622 (OC-12/STM-4)	1310	1550	LC	Blue	0 - 24
SFP-DR-53IR1	SFP Dual Rate Bidirectional Transceiver	125 (Fast Ethernet) 155 (OC-3/STM-1) 622 (OC-12/STM-4)	1550	1310	LC	Yellow	0 - 24

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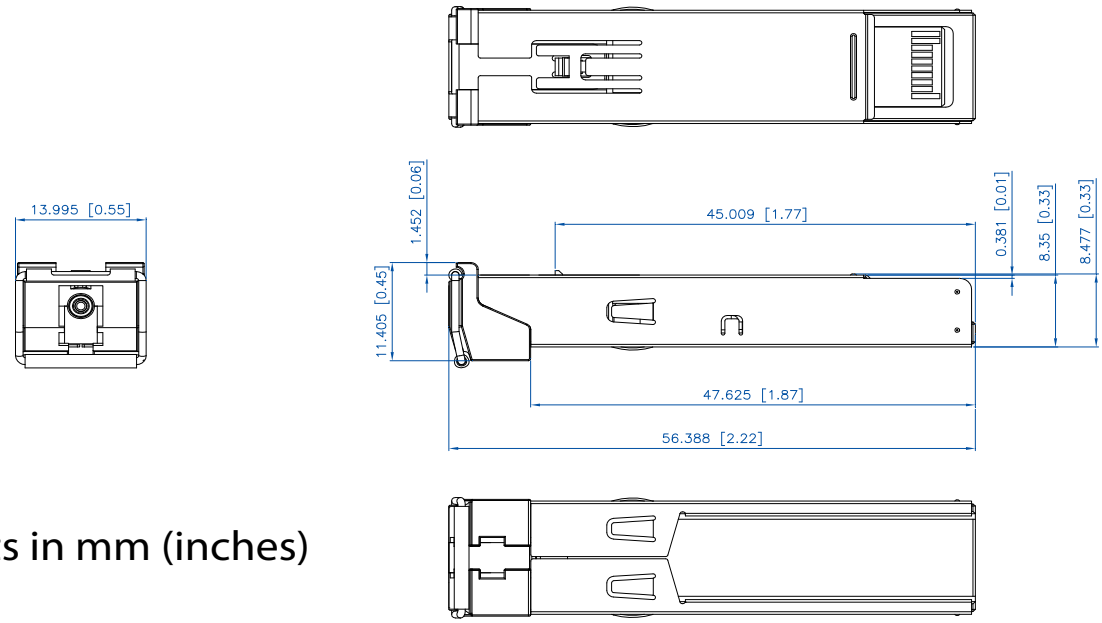
Outline Drawing



Units in mm (inches)

Regulatory Compliances

RoHS directive; China RoHS; California RoHS Law, USA and Canada UL listing; 21CFR 1040.10 and 1040.11; SFP MSA SFF-8074i; SFF-8472; Telecordia GR-468

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic descharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indeirect radiation.

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