



## Datasheet

# Multi-mode Gigabit Ethernet SFP Transceiver

## SFP-GD-MX



### Features

- Data rate 1.062 to 1.25 Gb/s
- Single 3.3 V supply
- 2km reach for 50/125  $\mu$ m MMF (500 MHz $\cdot$ km)  
3km reach for 50/125  $\mu$ m MMF (1000 MHz $\cdot$ km)  
1km reach for 62.5/125  $\mu$ m MMF (500 MHz $\cdot$ km)  
1km reach for 62.5/125  $\mu$ m MMF (1000 MHz $\cdot$ km)
- Gigabit Ethernet IEEE 802.3z compliance
- SFP MSA SFF-8074i compliance
- Telcordia GR-468 compliance
- 21 CFR 1040.10 and 1040.11 compliance
- TÜV compliance
- RoHS 5/6 compliance (Lead Exemption)
- Class 1 Laser
- Color coded bail latch : Grey

### 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 <sup>a</sup>	PSR	100	-	-	mV <sub>p-p</sub>
Operating Temperature	$T_{opr}$	-5	-	70	°C
Storage Temperature	$T_{stg}$	-40	-	85	°C
Data Rate GbE	DR	-	1250	-	Mbps
Data Rate FC	DR	-	1062.5	-	Mbps

a) 20 Hz to 155 MHz

### Transmitter Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	$P_{op}$	-9	-5	-3	dBm
Average Launch Power of Off Tx	$P_{off}$	-	-	-30	dBm
Extinction Ratio (Dynamic)	ER	9	-	-	dB
Eye Mask	IEEE 802.3Z, SONET/SDH compliant				
Total Jitter	TJ	-	-	200	ps
Optical Rise Time <sup>b</sup>	$t_r$	-	-	260	ns
Optical Fall Time <sup>b</sup>	$t_f$	-	-	260	ns
Mean Wavelength	$\lambda$	1270	1310	1355	nm
Spectral Width (RMS)	$\Delta\lambda$	-	-	4	nm
Relative Intensity Noise	RIN	-	-	-120	nm

b) 20% to 80% values


**Transmitter Specifications (Electrical)**

Parameter	Symbol	Min	Typical	Max	Unit
Input Differential Impedance	$R_{in}$	80	100	120	$\Omega$
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 <sup>c</sup>	$R_{sens,low}$	-	-19	-17	dBm
Receive Power High <sup>c</sup>	$R_{sens,high}$	-3	-	-	dBm
Damage Threshold for Receiver	$P_{in,damage}$	6	-	-	dBm
Wavelength <sup>d</sup>	$\lambda$	1270	-	1355	nm
Maximum Reflectance of Receiver	$RX_r$	-	-	-12	dB
LOS Assert	$LOS_A$	-32	-	-	dBm
LOS De-assert	$LOS_D$	-	-	-17	dBm
LOS Hysteresis	$Hys$	0.5	-	-	dB

 b)  $2^{23}-1$  PRBS, BER  $10^{-10}$ 
**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	$t_r$	-	-	260	ps
Data Output Fall Time	$t_f$	-	-	260	ps

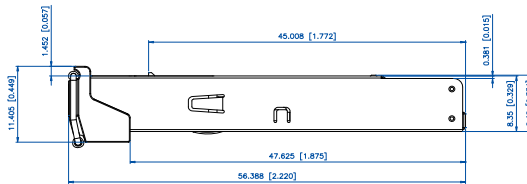
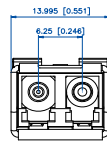
**Timing and Electrical**

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	$t_{on}$	-	-	1	ms
Tx Disable Assert Time	$t_{off}$	-	-	10	$\mu s$
Time To Initialize, Including Reset Of Tx Fault	$t_{init}$	-	-	300	ms
Tx Fault Assert Time	$t_{fault}$	-	-	100	$\mu s$
Tx Disable To Reset	$t_{reset}$	10	-	-	$\mu s$
LOS Assert Time	$t_{loss_{on}}$	-	-	100	$\mu s$
LOS De-assert Time	$t_{loss_{off}}$	-	-	100	$\mu s$
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

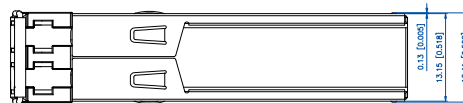


Pin	Function	Notes
1	V <sub>ee</sub> T	TX GND
2	TX_FAULT	Open Collector
3	TX_DISABLE	Internally Pulled High
4	MOD_DEF2	Serial Data Input
5	MOD_DEF1	Serial Clock Input
6	MOD_DEF0	Internally Grounded
7	NC	Not Connected
8	LOS	Open Collector
9	V <sub>ee</sub> R	RX Ground
10	V <sub>ee</sub> R	RX Ground
11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

## Outline Drawing



Units in mm(inch)





## Ordering Information

Model	Description	Protocol	Wavelength (nm)	Output Power (dBm)		Receiver Sensitivity (dBm)	Link Budget (dBm)	Saturation Power (dBm)	Supply Voltage (V)	Connectors	Max. Power Dissipation	Distance Range (km)
				Min.	Max.							
SFP-GD-MX	Multi-mode Gigabit Ethernet SFP Transceiver	GbE / FC	1310	-9	-3	-17	8	-3	3.3	LC	1	0 - 2

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