



## Description

The MTRS-2S60-01 is a very compact 10Gb/s optical transceiver module for serial optical communication applications at 10Gb/s. The MTRS-2S60-01 series converts a 10Gb/s serial electrical data stream to 10Gb/s optical output signal and a 10Gb/s optical input signal to 10Gb/s serial electrical data streams. The high speed 10Gb/s electrical interface is fully compliant with XFI specification (built in CDR on both TX and RX) and allows FR4 host PCB trace up to 200mm. The MTRS-2S60-01 is designed for use in a variety of 10Gb/s equipment SDH/SONET (9.95Gb/s), Ethernet LAN (10.3Gb/s) and FC (10.5Gb/s). The customer can adjust interface electrical level to select 9.95G~11.3G rate section. The high performance 1550nm DFB transmitter coupled with a high sensitivity PIN receiver provide superior performance for applications up to 40km SMF. The fully compliant SFP form factor provides high density applications, hot plug ability easy optical port upgrades and low EMI emission.

The SFP+ ER with CDR module electrical interface is compliant to XFI electrical specifications. The transmitter input and receiver output impedance is 100Ohms 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.

## Features

- 10Gb/s serial optical interface compliant to SONET OC-192/SDH STM-64 and 802.3ae
- Electrical interface compliant to SFF-8431 specifications for 10 Gigabit small form factor pluggable module "SFP+"
- 1550nm cooled EML transmitter with TEC, PIN receiver
- 2-wire interface for management specifications compliant with SFF-8472 digital diagnostic monitoring interface for optical transceivers

- Operating case temperature: 0°C~70°C

## Applications

- SONET(OC-192)/SDH(STM-64) line card
- 10GBASE-ER (10.3125Gbps)
- 10GBASE-EW (9.953Gbps)

## Compliance

- Compliant with IEEE 802.3ae-2002 10G Base-ER
- Compliant with SFF-8431 & SFF-8432 & SFF-8472

## Specification

**Table1-Absolute Maximum Ratings**

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-40	+85	°C
Operating Case Temperature	Tc	-5	+75	°C
Supply Voltage	Vcc	0	+4	V
Relative Humidity	RH	+5	+85	%
Rx Input Average Power	Pmax	-	0	dBm

**Table2-Recommended Operating Conditions**

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	Tc	0	25	+70	°C
Power Supply Voltage	Vcc3	3.135	3.3	3.465	V
Power Supply Current	Icc3	-	-	545	mA
Power Consumption		-	-	1800	mW

**Table3-Transmitter Operating Characteristic-Optical**

Parameter	Symbol	Min	Typical	Max	Unit	Note
Operating Data Rate	DR	9.95	-	11.3	Gb/s	
Output Center Wavelength	$\lambda_c$	1530	1550	1565	nm	
Side Mode Suppression Ratio	SMSR	30		-	dB	
Average Output Power	Po	-1		+2	dBm	
Disabled Power	Poff	-		-30	dBm	
Extinction Ratio	ER	8.2		-	dB	
Eye Mask (@SONET/SDH)	-	5% (1000 consecutive snapshots at typical rate and room temperature)			%	

Generation Jitter 1 (20kHz - 80MHz)	-	-	-	0.3	Ulp-p	
Generation Jitter 2 (4MHz - 80MHz)	-	-	-	0.1	Ulp-p	
Relative Intensity Noise	RIN	-	-	-128	dB/Hz	
Operating Distance	-	-	40	-	km	
Transmitter and dispersion penalty	-	-	-	2	dB	
Spectral Width	-	-	-	0.5	nm	
Dispersion tolerance	Dt	-	-	800	Ps/nm	
Optical return loss tolerance	-	-	-	21	dB	

**Table4-Receiver Operating Characteristic-Optical**

Parameter	Symbol	Min	Typical	Max	Unit	Note
Operating Data Rate	-	9.95	-	11.3	Gb/s	
Input Center Wavelength	Irc	1260		1605	nm	
Overload	Rovl	-1	-	-	dBm	
Minimum Sensitivity	Rsen	-	-	-16	dBm	
RX_LOS Assert Level	RLOSa	-28	-	-	dBm	
RX_LOS Deassert Level	RLOSd	-	-	-18	dBm	
RX_LOS Hysteresis	RLOSh	0.5	-		dB	
Optical Return Loss	ORL	-	-	-27	dB	

**Table 5- Electrical characteristics**

Parameter	Symbol	Min	Typical	Max	Unit	Note
Input differential impedance	-		100		$\Omega$	
Differential data input swing	VI	180		700	mV	
Differential data output swing	0 V	300		850	mV	
Tx Fault, LOS Output Voltage	High Low	-	2.4		Vcc	V
	Low	-	Vee		Vee+ 0.4	V
Tx DisableRS0,RS1	Low High	VIL	Vee-0.3		Vee+ 0.8	V
	High	VIH	2		Vcc+0.3	V

## DITITAL DIAGNOSTIC FUNCTIONS

The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF-8472 Rev10.4 with internal calibration mode. For external calibration mode please contact our sales staff.

**Table 6- Digital diagnostic specification table**

Parameter	Symbol	Min.	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	3	degC	Over operating temp
Laser power monitor absolute error	DMI_TX	-2	2	dB	
RX power monitor absolute error	DMI_RX	-2	2	dB	-1dBm to -16dBm range
Supply voltage monitor absolute error	DMI_VCC	-3	3	%	
Bias current monitor	DMI_Ibias	-10%	10%	mA	