Description

The MTRS-2E30-01 is a very compact 10Gb/s optical transceiver module for serial optical communication applications at 10Gb/s. The MTRS-2E30-01 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-2E30-01 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 8.5G~11.3G rate section. The high performance 1310nm DFB transmitter coupled with a high sensitivity PIN receiver provide superior performance for applications up to 10km with SMF. The fully compliant SFP form factor provides high density applications, hot plug ability easy optical port upgrades and low EMI emission.

The SFP+ LR w/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. XFI typically operates over 200 mm of improved FR4 material or up to about 150mmof standard FR4 with one connector.

Features

- 10Gb/s serial optical interface
- 1310nm DFB transmitter, PIN photo-detector
- Transmission distance up to 10Km with SMF
- LC duplex conector
- Integrated clock and data recovery (CDR) function
- Operating case temperature:0°C~70°C

Applications

- SONET(OC-192)/SDH(STM64)
- 10GBASE-LR (10.3125Gbps)

- 10GBASE-LW (9.953Gbps)

Compliance

- Compliant with IEEE 802.3ae-2002 10G Base-LR
- Compliant with SFF-8431 & SFF-8083 & SFF-8432 & SFF-8472
- Compliant with RoHS

Specification

Table1-Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	Ts	-40	-	+85	℃
Operating Case Temperature	Tc	0	-	+70	℃
Supply Voltage	Vcc	0	-	3.6	V
Relative Humidity	RH	5	-	+95	%
Rx Input Average Power	Pmax	-	-	+3	dBm

Table2-Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T_C	0	25	+70	℃
Power Supply Voltage	V_{CC3}	3.14	3.3	3.46	V
Power Supply Current	I_{CC3}	-	-	430	mA
Power Consumption		-	-	1500	mW

Table3-Transmitter Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Operating Data Rate	DR	8.5	9.953	11.3	Gb/s	1
Output Center Wavelength	λ c	1290	1310	1330	nm	
Spectral Width	⊿λ	-	-	1	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Average Output Power	Po	-6	-	-1	dBm	2
Disabled Power	Poff	-	-	-30	dBm	2
Extinction Ratio	ER	6	-	-	dB	2
Minimum OMA-TDP (10G Ethernet)	OMAtdp	-5.2	-	-	dBm	3

Eye Mask (@SONET/SDH)	GR-253-CORE/ITU-T G.691					2
Eye Mask (@10G Ethernet)	IEEE802.3ae					3
Generation Jitter 1 (20kHz - 80MHz)	-	-	-	0.3	UIp-p	2,4
Generation Jitter 2 (4MHz - 80MHz)	-	-	-	0.1	UIp-p	2,4
Relative Intensity Noise	RIN	-	-	-128	dB/Hz	
Chromatic Dispersion (SONET/SDH)	CD	-	-	6.6	ps/nm	
Operating Distance	-	-	-	10	km	

Attenuation (SONET/SDH)	-	0	-	4	dB	
Channel Insertion Loss (10G Ethernet)	-	0	-	6	dB	
Maximum DGD (SONET/SDH)	DGD	-	-	30	ps	
Single Ended Output Voltage Tolerance	-	-0.3	-	4	V	
Common mode voltage tolerance	-	15	-	-	mV	
Tx Input Diff Voltage	VI	120	-	820	mV	
Tx Fault	Vol	-0.3	-	0.4	V	At 0.7mA
Data Dependent Input Jitter	DDJ	-	-	0.1	UI	
Data Input Total Jitter	TJ	-	-	0.28	UI	

Table4-Receiver Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Operating Data Rate	-	8.5	9.953	11.3	Gb/s	1
Input Center Wavelength	Irc	1260		1620	nm	
Overload	Rovl	0.5	-	-	dBm	
Minimum Sensitivity	Rsen	-	-	-14.4	dBm	2
Sensitivity in OMA	OMA0	-	-	-12.6	dBm	3
Stressed Sensitivity in OMA	OMAst	-	-	-10.3	dBm	3
RX_LOS Assert	RLOSa	-30	-	-	dBm	
RX_LOS Deassert	RLOSd	-	-	-16	dBm	
RX_LOS Hysteresis	RLOSh	0.5	-	5	dB	
Optical Path Penalty	DP	-	-	1	dB	1
Optical Return Loss	ORL		-	-14	dB	
Jitter Tolerance	GR-253-CORE/ITU-T G.783					
Single Ended Output Voltage Tolerance	-	-0.3	-	4	V	
Rx Output Diff Voltage	Vo	340	-	850	mV	
Data output rise/fall time		30			ps	20%~80%

Total Jitter	TJ	-	-	0.7	UI	
Deterministic Jitter	DJ	-	-	0.42	UI	

Notes:

[1]Data rate tolerance 10GBASE-LR/LW: typ.+/-100ppm

[2]Measured at 9.953Gbps,Non-framed PRBS2^31-1,NRZ

[3]Measured by using SFP+ evaluation board.

Table5-Control and Status I/O Timing Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
TX Disable Assert Time	t_off		-	10	μs	1
TX Disable Negate Time	t_on		-	1	ms	2
Time to initialize including reset of TX_Fault	t_init		-	300	ms	3
TX Fault Assert Time	t_fault		-	100	μs	4
TX Disable to Reset	t_reset	10	-		μs	5
LOS Assert Time	t_loss_on		-	100	μs	6
LOS Deassert Time	t_loss_off		-	100	μs	7
Rate-Select Change Time	t_ratesel		-	10	μs	8
Serial ID Clock Rate	f_serial_clock		-	100	kHz	

Notes:

[1] Time from rising edge of TX Disable to when the optical output falls below 10% of nominal

[2] Time from falling edge of TX Disable to when the modulated optical output rises above 90% of nominal

[3] From power on or negation of TX Fault using TX Disable

[4] Time from fault to TX fault on

[5] Time TX Disable must be held high to reset TX_fault

[6] Time from LOS state to RX LOS assert

[7] Time from non-LOS state to RX LOS deassert.

[8] Time from rising or falling edge of Rate Select input until receiver bandwidth is in conformance with appropriate specification

Digital Diagnostic Function

The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF-8472 Rev11.1 with internal calibration mode. For external calibration mode
please contact our sales stuff.

Table6: Digital diagnostic specification table

Parameter	Symbol	Min.	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	3	degC	
Laser power monitor absolute error	DMI_TX	-3	3	dB	
RX power monitor absolute error	DMI_RX	-3	3	dB	
Supply voltage monitor absolute error	DMI_VCC	-3%	-3%	V	
Bias current monitor	DMI_Ibias	-10%	10%	mA	