

Description

MBS-1C41-33 is a high performance, cost effective modules, which is supporting Multi Rate 2.125~11.3Gbps, and transmission distance up to 15km.

The transceiver consists of two sections: The BOSA section incorporates a DFB Laser and a PIN-TIA. The PCB section consists of a MCU and an IC which is made up of LD Driver and post amplifier. The module is hot pluggable into the 20-pin connector. The high-speed electrical interface is based on low voltage logic, with nominal 100 Ohms differential impedance and AC coupled in the module.

The optical output can be disabled by LVTTTL logic high-level input of TX_DIS. Transmit Fault (Tx_Fault) is provided to indicate that the module transmitter has detected a fault condition related to laser operation or safety. Loss of signal (RX_LOS) output is provided to indicate the loss of an input optical signal of receiver. A serial EEPROM in the transceiver allows the user to access transceiver monitoring and configuration data via the 2-wire SFP Management Interface. This interface uses a single address, A0h, with a memory map divided into a lower and upper area. Basic digital diagnostic (DD) data is held in the lower area while specific data is held in a series of tables in the high memory area.

Features

- 10Gb/s serial optical interface compliant to 802.3ae 10GBASE-LR, single LC connector for bi-directional application, over 15km SMF
- Electrical interface compliant to SFF-8431 specifications for enhanced 8.5 and 10 Gigabit small form factor pluggable module "SFP+"
- 1330nm DFB Laser and 1270nm PIN Receiver
- 2-wire interface for management specifications compliant with SFF 8472 digital diagnostic monitoring interface for optical transceivers
- All-metal housing for superior EMI performance Very low EMI and excellent ESD protection
- Advanced firmware allow customer system encryption information to be stored in transceiver
- ROHS compliant
- Operating case temperature: -40~+85°C

Applications

- High-speed storage area networks
- Computer cluster cross-connect
- Custom high-speed data pipes

Compliance

- Compliant with IEEE 802.3ae-2002 10G Base-LR
- Compliant with SFF-8431 & SFF-8083 & SFF-8432 & SFF8472

Operating Conditions

Absolute Maximum Ratings					
Parameter	Symbol	Min.	Max.	Unit	
Storage Temperature	T	-4	+8	°C	
	S	0	5		
Operating Case Temperature	T	-4	+8	°C	
	C	0	5		
Relative Humidity	R	5	+9	%	
	H		5		
Supply Voltage	VCC3	0	3.6	V	
Rx Input Average Power	Pmax	-	1.	dBm	
			5		
Recommended Operating Conditions					
Parameter	Symbol	Min.	Typical	Max.	Unit
Operating	T	-4	-	85	°C
Case Temperature(MBS-1C41-xx)	C	0			

Power Supply Voltage	VCC3	3.135	3.3	3.465	V
Power Supply Current	ICC3	-	-	345	mA
Power Dissipation	PD	-	-	1.2	W
Data Rate	DR	2.125	10.3125	11.3	Gbps
Transmission Distance	TD	-	-	15	Km

Operating Characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Operating Distance	-	2	-	1500	m	
Center Wavelength	λ_c	1320	1330	1340	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Laser Off Power	P _{off}	-	-	-3	dBm	
Average Optical Power	P _{avg}	-5.2	-	0.5	dBm	1
Extinction Ratio	ER	3.5	-	-	dB	
Transmitter Dispersion Penalty	TDP	-	-	3	dB	

				2	B	
Relative Intensity Noise	Ri	-	-	-128	dB/Hz	
	n					
Optical Return Loss Tolerance	ORL	1	-	-	d	
		2			B	
Operating Data Rate	D	-	10.3125	-	Gbps	
	R					
Optical Eye Mask	Compliant with IEEE 802.3ae-2002					
Single Ended Output Voltage Tolerance	-	-0.	-	4	V	
		3				
Common Mode Voltage Tolerance	-	1	-	-	m	
		5			V	

TX Input Diff Voltage	VI	180	-	700	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	

Receiver Operating Characteristic- Optical, Electrical

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Center Wavelength	λ_c	1260	1270	1280	nm	
Receive Sensitivity at Average Power	Psens	-	-	-14.4	dBm	1
Los Assert	LosA	-30	-	-	dBm	
Los Dessert	LosD	-	-	-16	dBm	
Los Hysteresis	LosH	0.5	-	6	dB	
Overload	OL	0.5	-	-	dBm	1

Stressed Eye Jitter	-	0.3	-	-	Ulp-p	2
Receiver electrical 3dB upper cutoff frequency	-	-	-	12.3	GHz	
Vertical Eye Closure Penalty	-	2.2	-	-	d B	3
Receiver Reflectance	-	-	-	-12	d B	
Operating Data Rate	D R	-	10.3125	-	Gbps	
Single Ended Output Voltage Tolerance	-	-0.3	-	4	V	
Rx Output Diff Voltage	V o	300	-	850	mV	
Rx Output Rise and Fall Time(20% to 80%)	Tr/Tf	30	-	-	p s	
Total Jitter	T J	-	-	0.7	U I	
Deterministic Jitter	D J	-	-	0.42	U I	

Notes:

1. Average optical power shall be measured using the methods specified in TIA/EIA-455-95.
2. Receiver sensitivity is informative. Stressed receiver sensitivity shall be measured with conformance test signal for BER =1x 10⁻¹².
3. Vertical eye closure penalty and stressed eye jitter are the test conditions for measuring stressed receiver sensitivity. They are not the required characteristic of the receiver.

Digital Diagnostic Functions					
Parameter	Symbol	Min.	Max.	Unit	Note
Temperature monitor absolute error	DMI_Temp	-3	3	°C	Over operating temp
Laser power monitor absolute error	DMI_TX	-3	3	dB	
RX power monitor absolute error	DMI_RX	-3	3	dB	-1dBm to -15dBm range
Supply voltage monitor absolute error		-0.08	0.08	V	Full operating range

	DMI_VC C				
Bias current monitor absolute error	DMI_lbia s	-10%	10%	mA	

Control and Status I/O Timing Characteristics					
Parameter	Symbol	Min.	Max.	Unit	Note
TX Disable Assert Time	t_o ff		1 0	μ s	1
TX Disable Negate Time	t_o n		1	m s	2
Time to initialize including reset of TX_Fault	t_in it		300	m s	3
TX Fault Assert Time	t_fault		100	μ s	4
TX Disable to Reset	t_reset	1 0		μ s	5
LOS Assert Time	t_loss_on		100	μ s	6
LOS Deassert Time	t_loss_off		100	μ s	7
Rate-Select Change Time	t_ratesel		1 0	μ s	8
Serial ID Clock Rate	f_serial_cloc k		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