

**10G LR 10Gigabit 1310nm DFB Transceiver**

- Hot-pluggable SFP+ footprint
- Supports 9.95 to 10.52Gb/s bit rates
- Power dissipation <1W
- RoHS-6 compliant (lead-free)
- Industrial temperature range: -40°C to 85°C
- Single 3.3V power supply
- Maximum link length of 10km
- Uncooled 1310nm DFB laser
- Receiver limiting electrical interface
- Duplex LC connector
- Built-in digital diagnostic functions

**General Specifications**

Data Rate Specifications	Symbol	Min	Typ.	Max	Units	Ref.
Bit Rate	BR	2.1		10.52	Gb/s	1
Bit Error Ratio	BER			10-12		2
Max. Supported Link Length	L MAX			40	km	1

**Absolute Maximum Ratings**

Parameter	Symbol	Min	Typ.	Max	Units	Ref.
Maximum Supply Voltage	V <sub>CC</sub>	-0.5		4.0	V	
Storage Temperature	T <sub>s</sub>	-40		85	°C	
Case Operating Temperature	T <sub>op</sub>	-40		85	°C	
Relative Humidity	RH	0		85	%	1
Receiver Optical Damage Threshold	RxDamage	5			dBm	

**Electrical Characteristics (TOP = -40 to 85°, VCC = 3.14 to 3.46 V)**

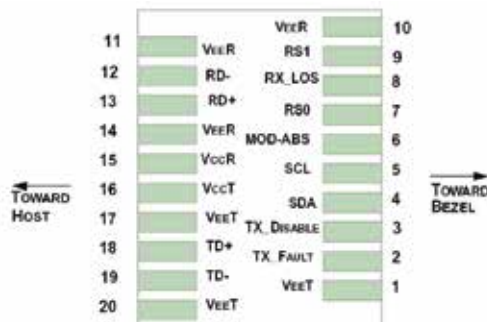
Parameter	Symbol	Min	Typ.	Max	Units	Ref.
Supply Voltage	V <sub>CC</sub>	3.14	3.30	3.46	V	
Supply Current	I <sub>CC</sub>		200	285	mA	
<b>Transmitter</b>						
Input Differential Impedance	R <sub>in</sub>	80	100	700	Ω	1
Differential Data Input Swing	V <sub>in,pp</sub>	180		V <sub>CCHOST</sub>	mVpp	
Transmit Disable Voltage	V <sub>D</sub>	2		V <sub>EE</sub> +0.8	V	
Transmit Enable Voltage	V <sub>EN</sub>	V <sub>EE</sub>		V <sub>CCHOST</sub>	V	
Transmit Fault Assert Voltage	V <sub>FA</sub>	22		3.46	V	
Transmit Fault De-Assert Voltage	V <sub>FDA</sub>	V <sub>EE</sub>		V <sub>EE</sub> +0.4	V	
<b>Receiver</b>						
Differential Data Output Swing	V <sub>OD</sub>	450	600	850	mVp-p	
Output Rise Time and Fall Time	T <sub>r</sub> , T <sub>f</sub>	25			ps	
LOS Fault	V <sub>LOSFT</sub>	2		V <sub>CCHOST</sub>	V	
LOS Normal	V <sub>LOSNR</sub>	V <sub>EE</sub>		V <sub>EE</sub> +0.8	V	

**Optical Characteristics (TOP = -40 to 85°, VCC = 3.14 to 3.46 V)**

Parameter	Symbol	Min	Typ.	Max	Units	Ref.
<b>Transmitter</b>						
Optical Modulation Amplitude (OMA)	P <sub>OMA</sub>	-5.2			dBm	
Average Launch Power	P <sub>AVE</sub>	-8.2		+0.5	dBm	1
Optical Wavelength	λ	1260		1360	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Optical Extinction Ratio	ER	3.5			dB	
Transmitter and Dispersion Penalty	TDP			3.2	dB	
Average Launch Power when Tx is OFF	P <sub>OFF</sub>			-35	dBm	
Relative Intensity Noise	RIN			-128	dB/Hz	
<b>Receiver</b>						
Receiver Sensitivity (OMA) @ 10.3 Gb/s	R <sub>SENS1</sub>			-12.6	dBm	2
Receiver Sensitivity (OMA) @ 10.3 Gb/s	R <sub>SENS2</sub>			-10.3	dBm	3
Average Receive Power	P <sub>AVE</sub>	-14.2		+0.5	dBm	
Optical Center Wavelength	λ <sub>C</sub>	1260		1610	nm	
Receiver Reflectance	R <sub>Rx</sub>	-30		-12	dB	
LOS De-Assert/LOS De-Assert	LOS <sub>D</sub>			-17	dBm	
LOS Assert	LOS <sub>A</sub>				dBm	

**10G LR 10Gigabit 1310nm DFB Transceiver (Continued)**
**Digital Diagnostic Specifications**

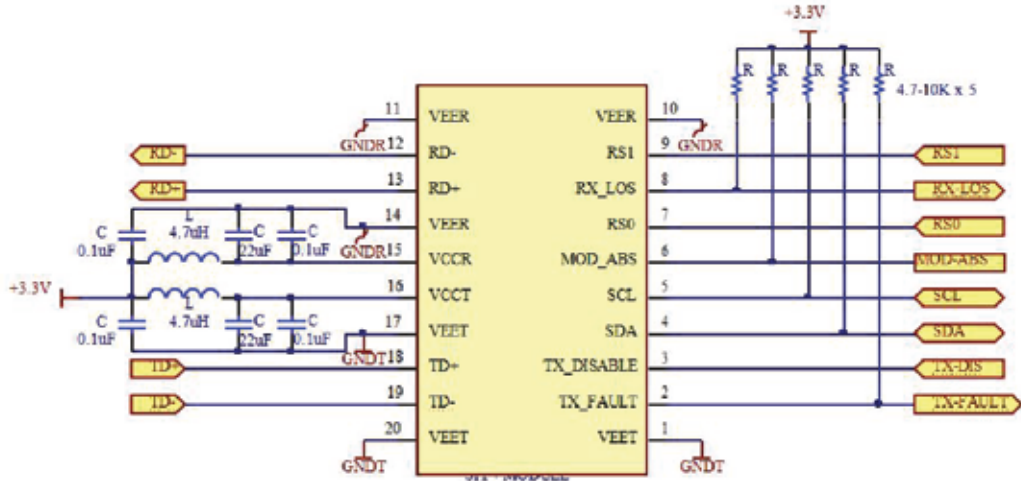
Parameter	Symbol	Min	Typ.	Max	Units	Ref.
<b>Accuracy</b>						
Internally Measured Transceiver Temperature	$\Delta DD_{Temperature}$			3	°C	
Internally Measured Transceiver Supply Voltage	$\Delta DD_{Voltage}$			3	%	
Measured TX Bias Current	$\Delta DD_{Bias}$			10	%	1
Internally Measured Transceiver Supply Voltage	$\Delta DD_{Tx-Power}$			2	dB	
Measured TX Bias Current	$\Delta DD_{Rx-Powe}$			2	dB	
<b>Dynamic Range for Rated Accuracy</b>						
Internally Measured Transceiver Temperature	$DD_{Temperature}$	-40		85	°C	
Internally Measured Transceiver Supply Voltage	$DD_{Voltage}$	3.1		3.5	V	
Measured TX Bias Current	$DD_{Bias}$	10		90	mA	
Internally Measured Transceiver Supply Voltage	$DD_{Tx-Power}$	-8.2		+0.5	dBm	
Measured TX Bias Current	$DD_{Rx-Powe}$	-14.2		+0.5	dBm	
<b>Max Reporting Range</b>						
Internally Measured Transceiver Temperature	$DD_{Temperature}$	-40		125	°C	
Internally Measured Transceiver Supply Voltage	$DD_{Voltage}$	2.8		4.0	V	
Measured TX Bias Current	$DD_{Bias}$	0		20	mA	
Measured TX Bias Power	$DD_{Tx-Power}$	-10		+2	dBm	
Measured RX Received Average Optical Power	$DD_{Rx-Powe}$	-22		+2	dBm	

**Pin Description**


Pin	Symbol	Name/Description	Ref.
1	$V_{EET}$	Transmitter Ground	1
2	$T_{FAULT}$	Transmitter Fault	2
3	$T_{DIS}$	Transmitter Disable. Laser Output Disabled on High or Open	3
4	SDA	2-Wire Serial Interface Data Line	2
5	SCL	2-Wire Serial Interface Clock Line	2
6	MOD_ABS	Module Absent. Grounded Within the Module	2
7	RS0	Rate Select 0	4
8	RS_LOS	Loss of Signal Indication. Logic 0 Indicates Normal Operation	5
9	RS1	Rate Select 1	4
10	$V_{EER}$	Receiver Ground	1
11	$V_{EER}$	Receiver Ground	1
12	RD-	Receiver Inverted DATA Out. AC Coupled.	
13	RD+	Receiver Non-Inverted DATA Out. AC Coupled.	
14	$V_{EER}$	Receiver Ground	1
15	$V_{CCR}$	Receiver Power Supply	
16	$V_{CCT}$	Transmitter Power Supply	
17	$V_{EET}$	Transmitter Ground	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	$V_{EET}$	Transmitter Ground	1

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Typical Application Circuit



Mechanical Specifications

