



RoHS compliant
1550 nm Single-mode XFP Transceiver up to 60km link length
10GBASE-ZW/ZR

Features



- Duplex LC Connector
- Support hot-pluggable
- Metal with lower EMI
- Excellent ESD protection
- XFP MSA compliant
- RoHS Compliant and Lead-Free
- Compliant with IEEE 802.3ae
- ITU-T G.959,G.691 compliant
- Temperature-stabilized EML transmitter and PIN ROSA
- Up to 60KM for single mode fiber
- GR-253-CORE compliant
- +5.0V and +3.3V power supply and power dissipation <2.5W

Applications

10GBASE-ER/EW 10G Ethernet
10G Fibre Channel
SONET OC-192 /SDH STM-64

PART NUMBER	INPUT/OUTPUT	SIGNAL DETECT	VOLTAGE	TEMPERATURE
CL-XFP-ZR-60	AC/AC	TTL	3.3V	-5°C to 70 °C
CL-XFP-ZR-60i	AC/AC	TTL	3.3V	-40°C to 70 °C



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Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-2
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1 & EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS Directive 2011/65/EU

Pin Descriptions

Pin	Symbol	Name/Description	Ref.
1	GND	Module Ground	
2	VEE5	(Not required)	
3	MOD_DESEL	Module De-select; When held low allows the module to respond to 2-wire serial interface. LVTTL-I	
4	/INTERRUPT	Interrupt; Indicates presence of an important condition which can be read via the 2-wire serial interface. LVTTL-O	2
5	TX_DIS	Transmitter Disable. Logic1 indicates laser output disabled, LVTTL-I	
6	VCC5	+5V Power Supply	
7	GND	Module Ground	1
8	VCC3	+3.3V Power Supply	
9	VCC3	+3.3V Power Supply	
10	SCL	2-Wire Serial Interface Clock. LVTTL-I	2
11	SDA	2-Wire Serial Interface Data Line. LVTTL-I/O	2
12	MOD_Abs	Indicates Module is not present. Grounded in the Module. LVTTL-O	2



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13	MOD_NR	Module Not Ready; Indicating Module Operational Fault. Open-collector. LVTTTL-O	2
14	RX_LOS	Loss of Signal indication. Logic 1 indicates loss of Signal. Open-collector. LVTTTL-O	2
15	GND	Module Ground	1
16	GND	Module Ground	1
17	RD-	Receiver Inverted Data Output. CML-O	
18	RD+	Receiver Non-Inverted Data Output. CML-O	
19	GND	Module Ground	1
20	VCC2	+1.8V Power Supply (Not required).	3
21	P_DOWN/R ST	Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode. LVTTTL-I	
		Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle. LVTTTL-I	
22	VCC2	+1.8V Power Supply (Not required)	3
23	GND	Module Ground	1
24	REFCLK+	Reference Clock (Not required)	
25	REFCLK-	Reference Clock (Not required)	
26	GND	Module Ground	1
27	GND	Module Ground	1
28	TD-	Transmitter Inverted Data Input. CML-I	
29	TD+	Transmitter Non-Inverted Data Input. CML-I	
30	GND	Module Ground	1

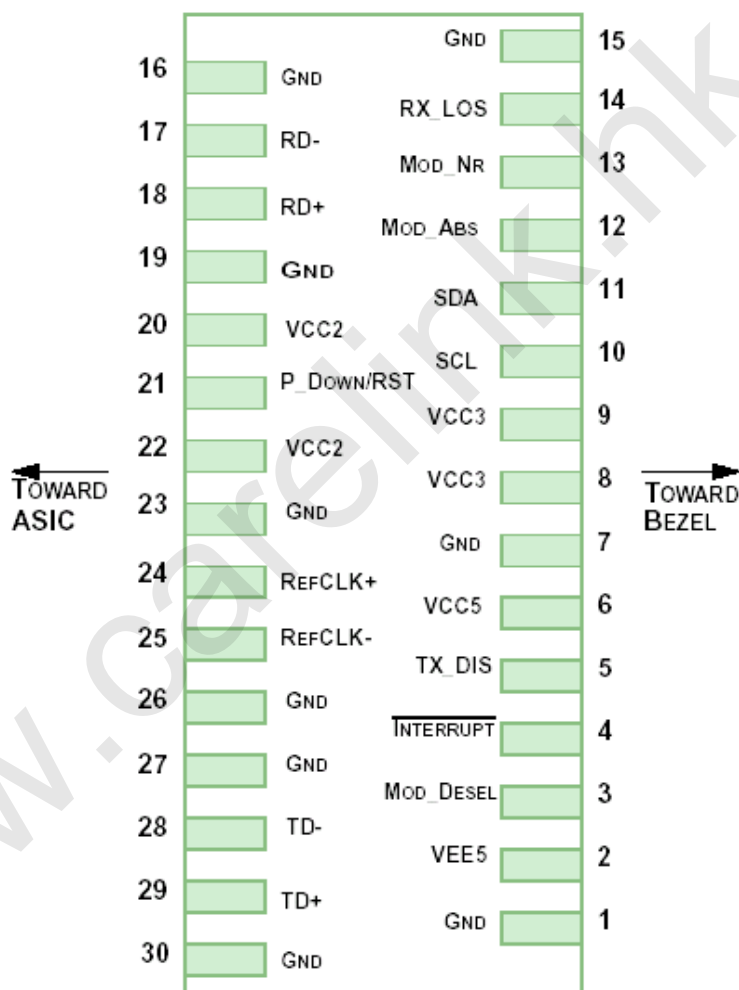


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Notes:

1. Module ground pins GND are isolated from the module case and chassis ground within the module.
2. Open collector; Should be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.6V on the host board.
3. The pins are open within module.

Pin-out of Connector Block on Host Board

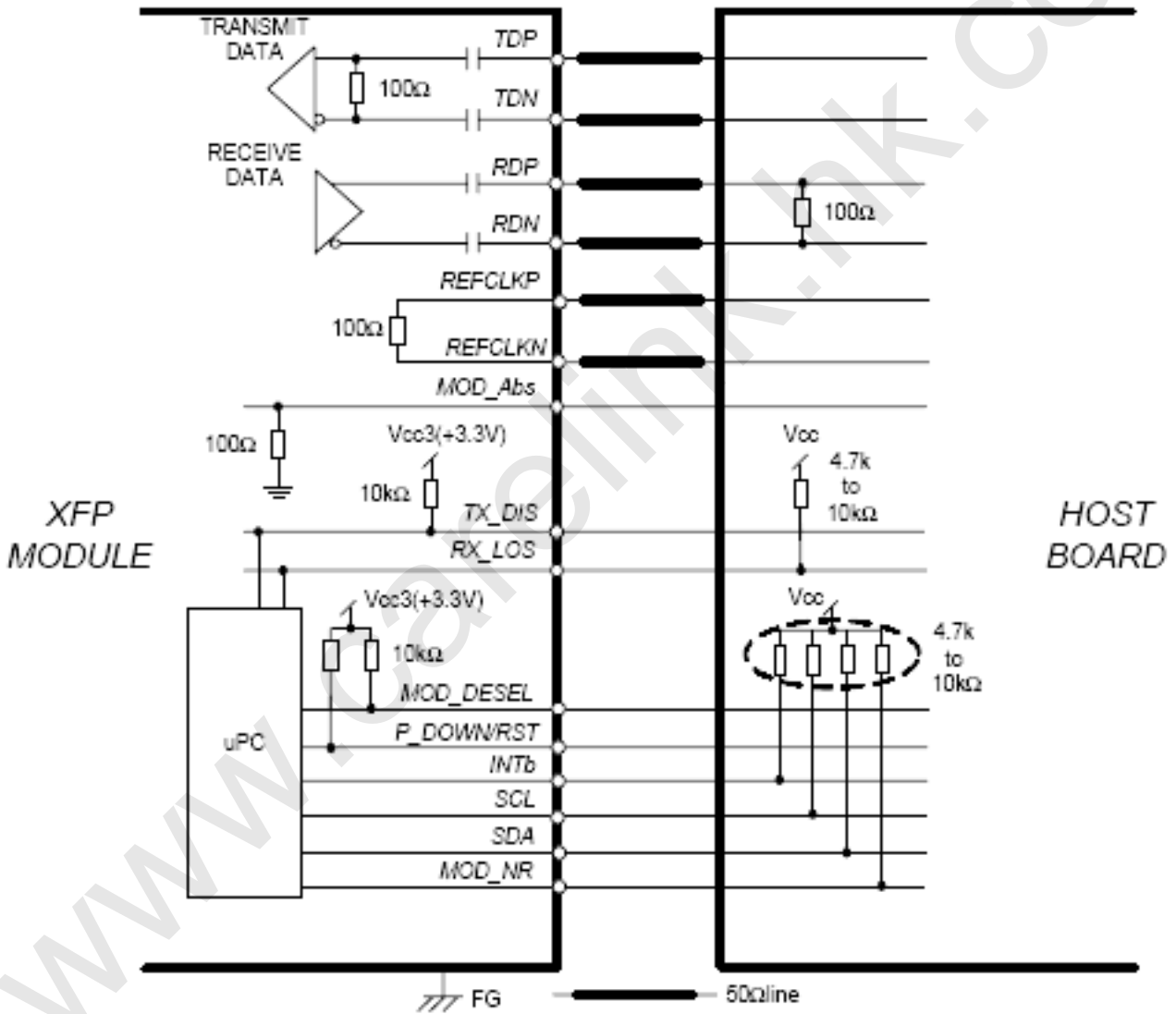


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Typical Interface Circuit





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Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc3	-0.5		+4.0	V	
	Vcc5	-0.5		6.0	V	
Storage Temperature	TS	-40		+85	°C	
Operating Humidity	RH	0		85	%	

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Power Supply Voltage	Vcc3	3.13	3.30	3.47	V	
	Vcc5	4.75	5.0	5.25	V	
Power Supply Current	Icc3	-	-	500	mA	1
	Icc5	-	-	200	mA	
Case Operating Temperature	Tc	-5	-	+70	°C	
Data Rate	-	9.95		11.3	Gbps	
9/125um G.652 SMF	Lmax	-	-	40	km	

Electrical Characteristics (TOP=25°C, Vcc=3.3Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Differential data input swing	V _{in,pp}	120	600	850	mV	
Input differential impedance	Z _{in}	90	100	110	Ω	



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Receiver						
Differential data output swing	Vout, pp	300	600	850	mV	
Output Differential Impedance	Zin	90	100	110	Ω	
Transceiver						
TX Disable-High	-	2.0		Vcc+0.3	V	
TX Disable-Low	-	Vee-0.3		0.8	V	
LOS-High	-	2.0		Vcc+0.3	V	
LOS-Low	-	Vee-0.3		0.8	V	
MOD_DESEL-High	-	2.0	-	Vcc+0.3	V	
MOD_DESEL-Low	-	Vee-0.3	-	0.8	V	
MOD_INT-High	-	2.0	-	Vcc+0.3	V	
MOD_INT-Low	-	Vee-0.3	-	0.8	V	
MOD_NR-High	-	2.0	-	Vcc+0.3	V	
MOD_NR-Low	-	Vee-0.3	-	0.8	V	
P_DOWN/RST-High	-	2.0	-	Vcc+0.3	V	
P_DOWN/RST-Low	-	Vee-0.3	-	0.8	V	

Notes: 1. Maximum total power value is specified across the full temperature and voltage range and the inrush current is included

Optical Characteristics (TOP=25°C, Vcc=3.3 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Output Opt. Power	PO	0	-	4	dBm	
Optical Extinction Ratio	ER	9	-	-	dB	
Optical Wavelength	λ	1528	1550	1565	nm	



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Spectral Width(-20dB)	$\Delta\lambda$	-	-	1	nm	
Side mode Suppression Ratio	SMSR	30			dB	
Generation Jitter 1(20KHZ-80MHZ)				0.3	UIp-p	1
Generation Jitter 2(4MHZ-80MHZ)				0.1	UIp-p	1
Dispersion penalty(@1600ps/nm, non-FEC rate)				3	dB	3
Dispersion penalty(@1300ps/nm, FEC rate)				3	dB	3
Optical Eye Mask 1		ITU-T G.691				1
Optical Eye Mask 2		IEEE802.3ae				2
Receiver						
Overload	Po	-7	-	-	dBm	
Optical Center Wavelength	λ_C	1270	-	1600	nm	
LOS De-Assert	LOSD	-	-	-28	dBm	
LOS Assert	LOSA	-40	-	-	dBm	
LOS Hysteresis	-	0.5	-	5	dB	
Receiver Sensitivity @non-FEC rate	Pmin1			-24	dBm	3
Receiver Sensitivity @ FEC rate	Pmin2			-27	dBm	3

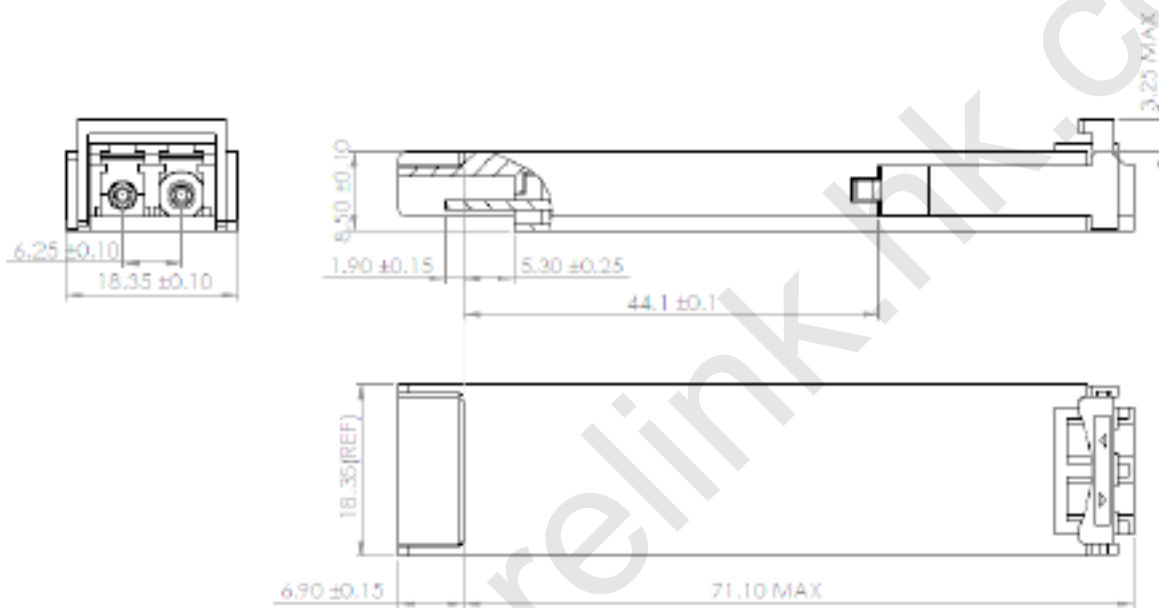


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Notes:

1. Measured at 9.95328Gb/s , PRBS2³¹-1,NRZ,
2. Measured at 10.3125Gb/s,Non-framed PRBS2³¹-1,NRZ
3. non-FEC rate refers 9.9/10.3/10.5Gbps, and FEC rate refers 10.7/11.1/11.3Gbps, BER of 1E-12 for non-FEC rate, and 1E-4 for FEC rate

Mechanical Specifications



Digital Diagnostic Monitoring Interface

Five transceiver parameter values are monitored. The following table defines the monitored parameter's accuracy.

Parameter	Range	Accuracy	Calibration
Temperature	-5 to +70 °C (C)	±3 °C	Internal
Voltage	2.97 to 3.63V 4.73 to 5.25V	±3%	Internal
Bias Current	0 to 100mA	±10%	Internal
TX Power	0 to +4dBm	±2dB	Internal
RX Power	-27 to -7dBm	±3dB	Internal



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Eye Safety Mark

The LM2 series multi-mode transceiver is a class 1 laser product. It complies with EN 60825-1 and FDA 21 CFR 1040.10 and 1040.11. In order to meet laser safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.

Caution

All adjustments have been done at the factory before the shipment of the devices. No maintenance and user serviceable part is required. Tampering with and modifying the performance of the device will result in voided product warranty.

Required Mark

Class 1 Laser Product
Complies with
21 CFR 1040.10 and 1040.11

Note : All information contained in this document is subject to change without notice.