



### Applications

- ❑ SONET OC48 / SDH STM16 (2.488Gbps)
- ❑ In addition the module operates @ 2.048 Mb/s with PRBS 2E7-1 CMI coded
- ❑ CPRI 3 (2467.6 Mbit/s)

### Features

- ❑ SFP Type Dual LC Transceiver
- ❑ CWDM DFB Cooled Laser
- ❑ APD Photo Detector
- ❑ Link budget: 28dB transmission with SMF
- ❑ 3.3V single power supply
- ❑ Compliant with SFP MSA
- ❑ Compliant with ITU-T G.957, Telcordia GR-253-CORE
- ❑ Hot pluggable
- ❑ Serial ID information support
- ❑ Digital diagnostic SFF-8472 compliant
- ❑ Compliant with RoHS
- ❑ Compliant with UL & TUV



**SFP 2.67G Multi Rate 80Km APD I-temp CWDM Transceiver**

**A58LZCxxFDGA0716**

**Ordering Information**

Form Factor	Date Rate	Media	Link Budget	Wavelength (nm)	TX Power (dBm)-EOL	RX Sensitivity (dBm)-EOL	Voltage (V)	Coupling	Signal Detect	DDM (Y/N)	Temperature (°C)	Part Number
SFP-Dual-LC	2.67G	SMF	28dB	1271	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC27FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1291	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC29FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1311	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC31FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1331	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC33FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1351	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC35FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1371	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC37FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1391	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC39FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1411	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC41FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1431	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC43FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1451	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC45FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1471	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC47FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1491	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC49FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1511	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC51FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1531	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC53FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1551	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC55FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1571	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC57FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1591	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC59FDGA0716
SFP-Dual-LC	2.67G	SMF	28dB	1611	0 ~ +5	< -28	3.3	AC/AC	LVTTTL	Y	-40~ +85	A58LZC61FDGA0716



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**Absolute Maximum Ratings**

Parameter	Symbol	Conditions	Min	Max	Unit
Storage Temperature	T <sub>s</sub>	--	-40	85	°C
Storage Relative Humidity	RH	Non Condensing	5	95	%
Supply Voltage	V <sub>CC</sub>	--	0	4.0	V
DDM Temperature		--	Tc-4	Tc+4	°C

**Recommended Operating Conditions**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating Temperature (Case)	T <sub>C</sub>	--	-40	--	85	°C
Supply Voltage	V <sub>CC</sub>	--	3.135	3.3	3.465	V
Supply Current	I <sub>TX</sub> + I <sub>RX</sub>	--	--	--	300	mA
Power dissipation	P <sub>diss</sub>	--	--	--	0.8	W

**Electrical Characteristics**

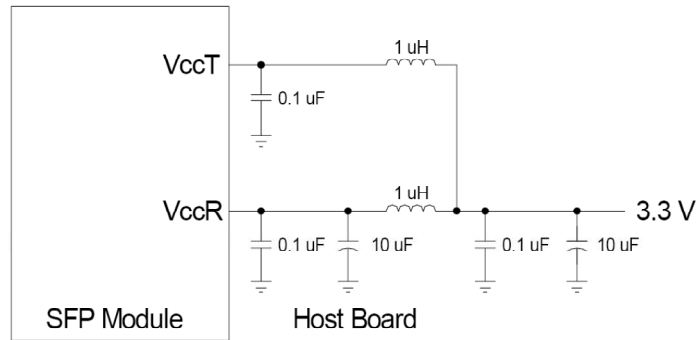
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>Transmitter</b>						
Differential Input Impedance	R <sub>DI</sub>	--	--	100	--	Ohm
Differential Input Voltage	V <sub>DI</sub>	AC-Coupled, peak to peak	0.5	--	2.4	V
Tx Disable Input-High	V <sub>DISH</sub>	--	2.0	--	V <sub>CC</sub> +0.3	V
Tx Disable Input-Low	V <sub>DISL</sub>	--	0	--	0.8	V
Tx Fault Output-High	V <sub>FOH</sub>	--	2.4	--	V <sub>CC</sub> +0.3	V
Tx Fault Output-Low	V <sub>FOL</sub>	--	0	--	0.4	V
<b>Receiver</b>						
Differential Output Impedance	R <sub>DO</sub>	--	--	100	--	Ohm
Differential Output Voltage	V <sub>DO</sub>	AC-Coupled, peak to peak	0.37	--	2.0	V
Rx LOS Output-High	V <sub>LOSH</sub>	--	2.40	--	V <sub>CC</sub> +0.3	V
Rx LOS Output-Low	V <sub>LOSL</sub>	--	0	--	0.4	V

**Optical Characteristics**

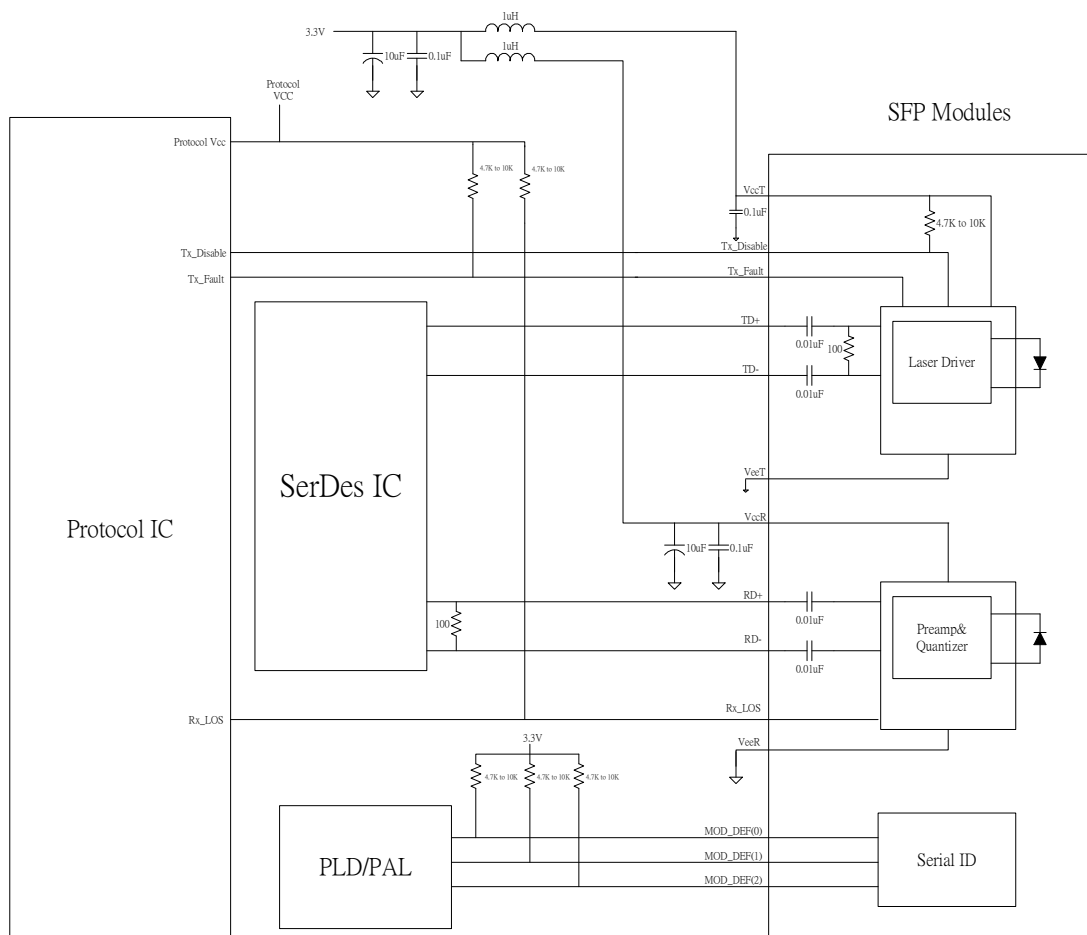
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>Transmitter</b>						
Optical Center Wavelength	λ <sub>c</sub>		λ <sub>c</sub> -6.5	λ <sub>c</sub>	λ <sub>c</sub> +6.5	Nm
Spectral Width		(-20dB)	--	--	1	Nm
Optical Output Power	P <sub>o</sub>		0	--	5	dBm
Output Power for Tx diable			--	--	-40	dBm
Side Mode Suppression Ratio	SMSR		30	--	--	dB
Optical Extinction Ratio	ER		8.2	--	--	dB
Optical Rise/Fall Time	t / t	20 % to 80% Values	--	--	0.16	Ns
Jitter Generation	TJ	Compliant with ITU-T G.783, G.813, G.825				
Eye Mask definition		Compliant with ITU-T G.957, Telcordia GR-253-CORE				
<b>Receiver</b>						
Operating Wavelength	λ	--	1260	--	1620	Nm
Receiver Overload	P <sub>N</sub> MAX		-8	--	--	dBm
Receiver Sensitivity <sup>a</sup>	P <sub>N</sub> MIN		--	--	-28	dBm
Maximum reflectance			--	--	-27	dB
Rx LOS Assert	P <sub>A</sub>		-40	--	-34	dBm
Rx LOS Hysteresis	P <sub>A</sub> -P <sub>D</sub>		0.3	--	6	dB
Maximum Optical Path Penalty		1640ps/nm	--	--	2.5	dB

a. Measured with PRBS 2<sup>7</sup> -1 at 10<sup>-12</sup> BER, not including dispersion penalty

**Recommended Host Board Power Supply Circuit**

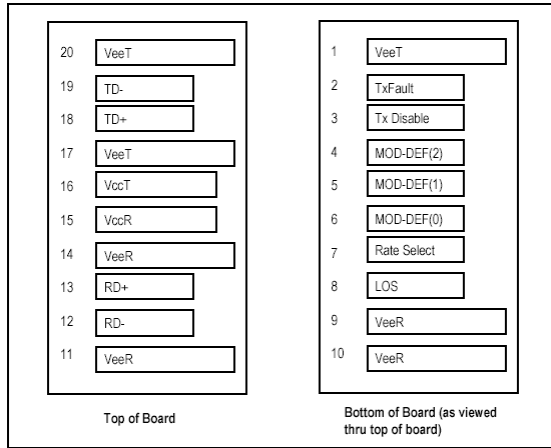


**Recommended Interface Circuit**

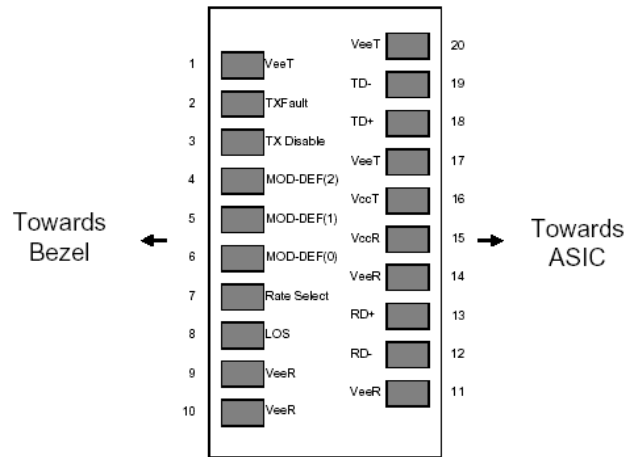




**Pin Description**



**SFP Transceiver Electric Pad Layout**



**Diagram of Host Board Connector Block Pin Numbers and Names**

**Pin Function Definitions**

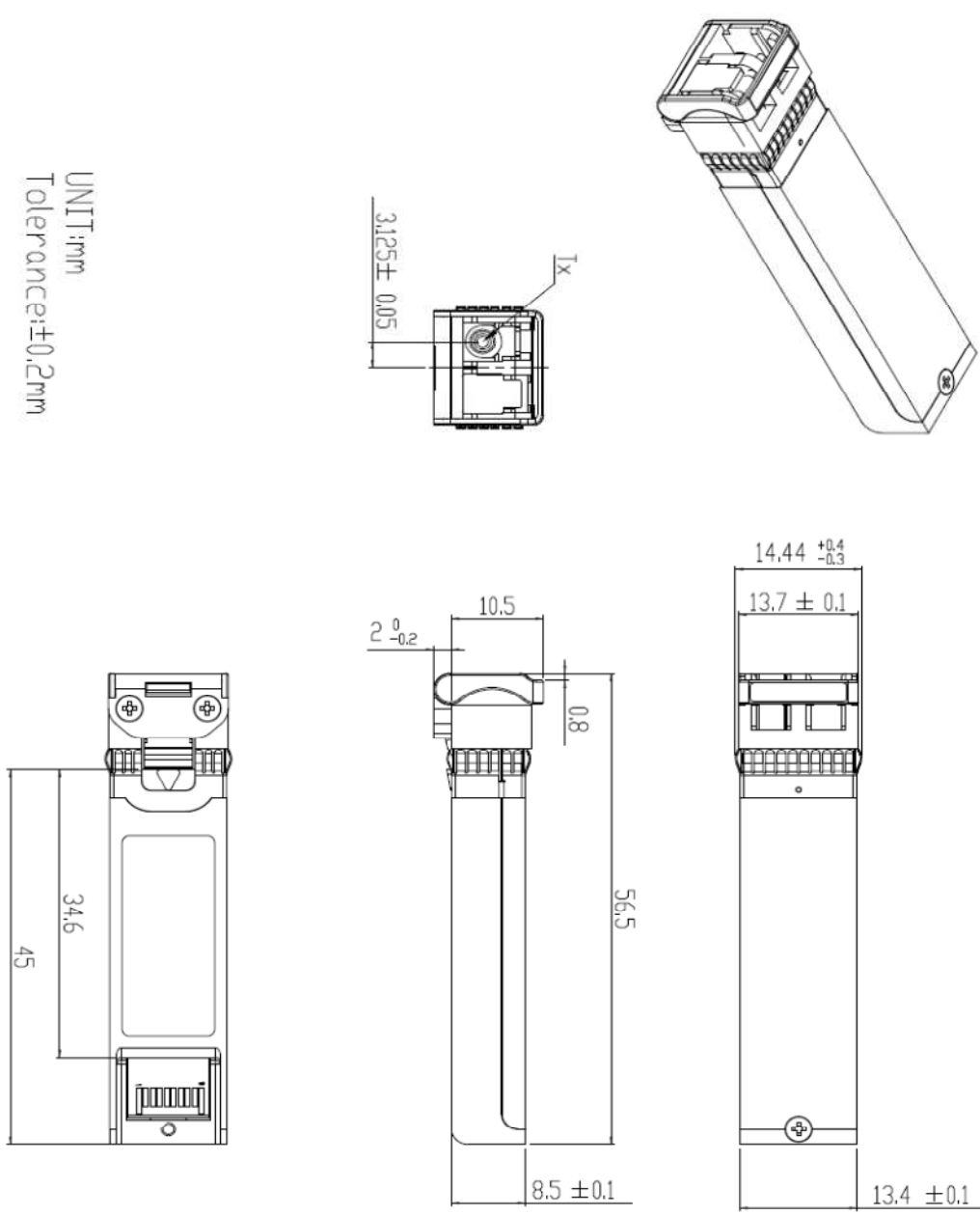
Pin No.	Pin Name	Function	Plug Seq.	Note
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	1
3	TX Disable	Transmitter Disable	3	2
4	MOD_DEF 2	Module Definition 2	3	3
5	MOD_DEF 1	Module Definition 1	3	3
6	MOD_DEF 0	Module Definition 0	3	3
7	Rate Select	No connection	3	4
8	LOS	Loss of Signal	3	5
9	VeeR	Receiver Ground	1	6
10	VeeR	Receiver Ground	1	6
11	VeeR	Receiver Ground	1	6
12	RD -	Inv. Receiver Data Out	3	7
13	RD +	Receiver Data Out	3	7
14	VeeR	Receiver Ground	1	6
15	VccR	Receiver Power	2	8
16	VccT	Transmitter Power	2	8
17	VeeT	Transmitter Ground	1	6
18	TD +	Transmitter Data In	3	9
19	TD -	Inv. Transmitter Data In	3	9
20	VeeT	Transmitter Ground	1	6

**Notes:**

Plug Seq.: Pin engagement sequence during hot plugging.

1. TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10K $\Omega$  resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
2. TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7 – 10 K $\Omega$  resistor. Its states are:
  - Low (below 0.8V): Transmitter on
  - (>0.8, < 2.0V): Undefined
  - High (above 2.0v): Transmitter Disabled
  - Open: Transmitter Disabled
3. Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K - 10K $\Omega$  resistor on the host board. The pull-up voltage shall be VccT or VccR
  - Mod-Def 0 is grounded by the module to indicate that the module is present
  - Mod-Def 1 is the clock line of two wire serial interface for serial ID
  - Mod-Def 2 is the data line of two wire serial interface for serial ID
4. No connection
5. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K -10K $\Omega$  resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
6. VeeR and VeeT may be internally connected within the SFP module.
7. RD-/+ : These are the differential receiver outputs. They are AC coupled 100 $\Omega$  differential lines which should be terminated with 100 $\Omega$  (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
8. VccR and VccT are the receiver and transmitter power supplies. Maximum supply current is 300 mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 $\Omega$  should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30 mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.
9. TD-/+ : These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 $\Omega$  differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

Mechanical Design Diagram





**Regulatory Compliance**

Item	Standard
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B
Electrostatic Discharge to the Electrical Pins (ESD)	MIL-STD-883E Method 3015.7
Electrostatic Discharge to the Receptacle (ESD)	IEC 61000-4-2
RoHS	2011/65/EU
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11
Component Recognition	UL and TUV

**Laser Safety Information**

All versions of this laser are Class 1 laser products per IEC<sup>1</sup>/EN<sup>2</sup> 60825-1. Users should observe safety precautions such as those recommended by ANSI<sup>3</sup> Z136.1, ANSI Z36.2 and IEC 60825-1.

This product conforms to FDA (CDRH) 21 CFR 1040.10 and 1040.11 except for deviations of laser safety class designation pursuant to Laser Notice No.50<sup>1</sup>.

Product labeling:

Class 1 Laser Product  
Compliance with 21 CFR  
1040.10 and 1040.11

If labeling is not affixed to the module due to size constraints; then rather, labeling is placed on the outside of the shipping box.

This product is not shipped with a power supply.

**Caution: use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.**

**Certifications**

UL	60950-1 (E243407)
TUV	EN60950-1, EN 60825-1, EN 60825-2

Documentation is available upon request.

(1) IEC is a registered trademark of the International Electrotechnical Commission

(2) Within Europe the IEC standard has been adopted as a European Normative standard known as EN 60825, and each European country will have its own version of this standard, for example, the British Standards version known as BS EN 60825. There can be small differences between the different countries versions of EN 60825, and these are in part caused by the process of translating the standard into the native language of that country.

(3) ANSI is a registered trademark of the American National Standards Institute

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