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RAYCORE

Q3-S241 V2.1E

Specification of SFP+ 10G Dual LC SMF

40km/80km CWDM Transceiver

Part Number: ATRG-79Cx-xBSDD-00



The SFP+ CWDM Transceiver is a “Limiting module”, designed for 10GBASE Ethernet, and 2G/4G/ 8G/10G Fiber- Channel applications. The transceiver consists of two sections: The transmitter section incorporates a cooled EML laser. And the receiver section consists of a PIN or APD photodiode integrated with a TIA. All modules satisfy class I laser safety requirements. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage.

Features

- Compliant with SFF-8431, SFF-8432 and IEEE802.3ae
- 10GBase Ethernet, and 2G/4G/8G/10G Fiber Channel applications.
- Wavelength selectable to ITU-T standards covering CWDM grid wavelengths
- Cooled EML transmitter and PIN or APD receiver
- link length up to 40km or 80km
- Low Power Dissipation 2W Maximum
- -5°C to 70°C Operating Case Temperature
- Single 3.3V power supply
- Diagnostic Performance Monitoring of module temperature, supply Voltages, laser bias current, transmit optical power, receive optical power
- RoHS compliant and lead free

Applications

- 10GBase Ethernet (with/without FEC)
- 10G Fiber Channel (with/without FEC)

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	3.8	V
Storage Temperature	Tst	-40	85	°C
Relative Humidity	Rh	0	85	%



Specifications

ATRG-79Cx-DBSDD-00: (CWDM DFB and PIN, Link Budget: 15dB, 40km SMF Reach)

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	Vcc	3.13	3.3	3.47	V
Supply current [1]	Icc		360	450	mA
Operating Case temperature	Tca	-5	-	70	°C
Module Power Dissipation	Pm	-	1.2	1.5	W

Notes: [1] Supply current is shared between VCCTX and VCCR_X.

Transmitter Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Center Wavelength	λ_c	1464.5		1617.5	nm
Center wavelength stability [1]	$\Delta\lambda_D$	-6.5	λ_c	6.5	nm
Spectral Width (-20dB)	$\Delta\lambda_{20}$	-	-	0.3	nm
Average Optical Power	Po	0	-	+3	dBm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Optical Transmit Power (disabled)	PTX_DIS	-	-	-30	dBm
Extinction Ratio	ER	8.2	-	-	dB
Relative Intensity Noise	RIN	-	-	-128	dB/Hz
Optical Return Loss Tolerance	Orl	-	-	21	dB

Notes: [1] Wavelength stability is achieved within 60 seconds (max) of power up.

Receiver Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Input Operating Wavelength	λ	1260	-	1620	nm
Maximum Input Power	RX-	-	-	-1	dBm
Average Sensitivity [1]	Rsen	-15.8	-	-	dBm
Loss of Signal Asserted		-28	-	-	dBm
LOS De-Asserted		-	-	-19	dBm
LOS Hysteresis		0.5	-	-	dB

Notes:

[1] Measured with conformance test signal for BER = 10⁻¹². The stressed sensitivity values in the table are for system level BER measurements which include the effects of CDR circuits. It is recommended that at least 0.4 dB additional margin be allocated if component level measurements are made without the effects of CDR circuits.



ATRG-79Cx-ZBSDD-00: (CWDM DFB and APD, Link Budget: 24dB, 80km SMF Reach)

Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	Vcc	3.13	3.3	3.47	V
Supply current [1]	Icc		420	610	mA
Operating Case temperature	Tca	-5	-	70	°C
Module Power Dissipation	Pm	-	1.4	2.0	W

Notes: [1] Supply current is shared between VCCTX and VCCR_X.

Transmitter Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Center Wavelength	λ_c	1464.5		1617.5	nm
Center wavelength stability	$\Delta\lambda_D$	-6.5	λ_c	6.5	nm
Spectral Width (-20dB)	$\Delta\lambda_{20}$	-	-	0.3	nm
Average Optical Power	P _o	0	-	+3	dBm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Optical Transmit Power (disabled)	PTX_DIS	-	-	-30	dBm
Extinction Ratio	ER	9	-	-	dB
Relative Intensity Noise	RIN	-	-	-128	dB/Hz
Optical Return Loss Tolerance	Orl	-	-	21	dB

Notes: [1] Wavelength stability is achieved within 60 seconds (max) of power up.

Receiver Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Input Operating Wavelength	λ	1260	-	1620	nm
Maximum Input Power	RX-	-	-	-7	dBm
Average Sensitivity [1]	Rsen	-24	-	-	dBm
Loss of Signal Asserted		-34	-	-	dBm
LOS De-Asserted		-	-	-24	dBm
LOS Hysteresis		0.5	-	-	dB

Notes: [1] Measured with conformance test signal for BER = 10⁻¹². The stressed sensitivity values in the table are for system level BER measurements which include the effects of CDR circuits. It is recommended that at least 0.4 dB additional margin be allocated if component level measurements are made without the effects of CDR circuits.



Transmitter Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Data Rate	Mra	-	10.3	11.3	Gbps
Input differential impedance	Rim	-	100	-	Ω
Differential data Input	VtxDIFF	120	-	850	mV
Transmit Disable Voltage	VD	2.0	-	Vcc3+0.3	V
Transmit Enable Voltage	Ven	0	-	+0.8	V
Transmit Disable Assert Time	Vn	-	-	100	us

Receiver Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Data Rate	Mra	-	10.3	11.3	Gbps
Differential Output Swing	Vout P-P	350	-	850	mV
Rise/Fall Time	Tr / Tf	24	-	-	ps
Loss of Signal –Asserted	VOH	2	-	Vcc3+0.3-	V
Loss of Signal –Negated	VOL	0	-	+0.4	V

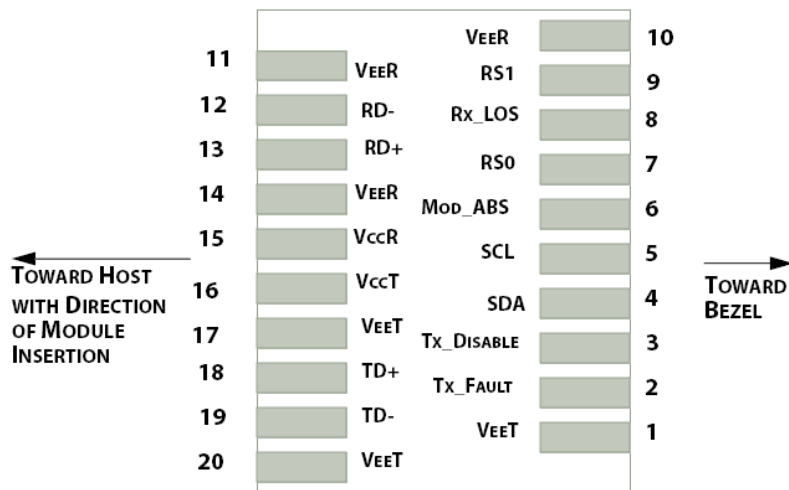


Figure1.Electrical Pin-out Details



Pin Descriptions

Pin	Symbol	Name/Description
1	VEET [1]	Transmitter Ground
2	Tx_FAULT [2]	Transmitter Fault
3	Tx_DIS [3]	Transmitter Disable. Laser output disabled on high or open
4	SDA [2]	2-wire Serial Interface Data Line
5	SCL [2]	2-wire Serial Interface Clock Line
6	MOD_ABS [4]	Module Absent. Grounded within the module
7	RS0 [5]	R Rate Select 0
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1 [5]	No connection required
10	VEER [1]	Receiver Ground
11	VEER [1]	Receiver Ground
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver DATA out. AC Coupled
14	VEER [1]	Receiver Ground
15	VCCR	Receiver Power Supply
16	VCCT	Transmitter Power Supply
17	VEET [1]	Transmitter Ground
18	TD+	Transmitter DATA in. AC Coupled
19	TD-	Transmitter Inverted DATA in. AC Coupled
20	VEET [1]	Transmitter Ground

Notes:

[1] Module circuit ground is isolated from module chassis ground within the module.

[2] Should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.

[3] Tx_Disable is an input contact with a 4.7k ohms to 10 k ohms pullup to VccT inside the module.

[4] Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a Resistor in the range 4.7 k ohms to 10 k ohms. Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.

[5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 k ohms resistors in the module.



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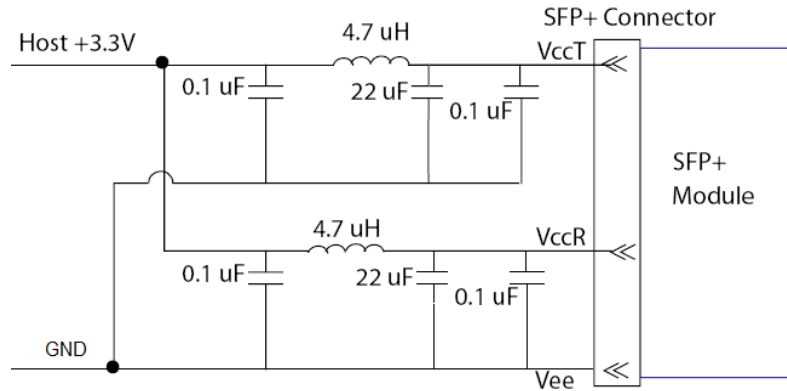


Figure2. Host Board Power Supply Filters Circuit

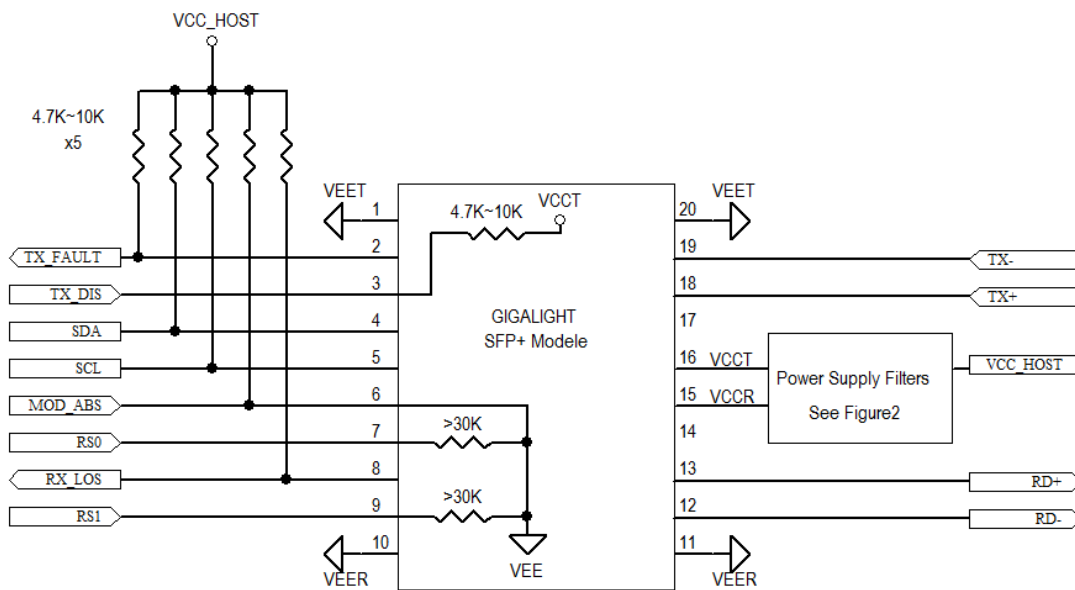


Figure3. Host-Module Interface



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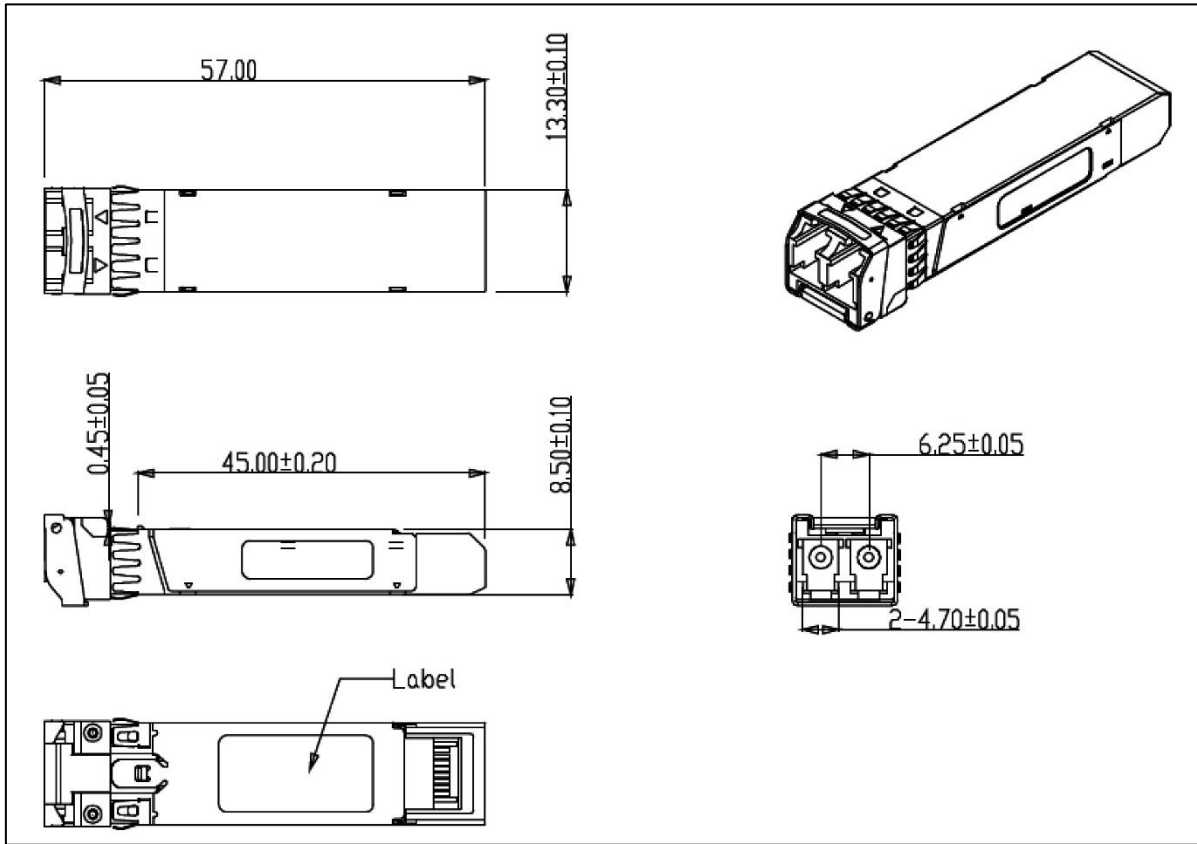


Figure4. Mechanical Specifications



Ordering information

ATR-79Cx-DBSDD-00: (CWDM DFB and PIN, Link Budget: 15dB, 40km SMF Reach)

Form Factor	Date Rate	Media	Link Budget	Wavelength	TX Power (dBm)	RX Sensitivity (dBm)	DDM (Y/N)	Temperature (°C)	Part Number
SFP+-Dual-LC	10G	SMF	15dB	1270nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79CA-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1290nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79CB-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1310nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79CC-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1330nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79CD-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1350nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79CE-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1370nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79CF-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1390nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79CG-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1410nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79CH-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1430nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79CJ-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1450nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79C1-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1470nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79C2-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1490nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79C3-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1510nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79C4-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1530nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79C5-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1550nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79C6-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1570nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79C7-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1590nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79C8-DBSDD-00
SFP+-Dual-LC	10G	SMF	15dB	1610nm	+3 ~ 0	≤ -15.8	Y	-5 ~ +70	ATR-79C9-DBSDD-00



ATRG-79Cx-ZBSDD-00: (CWDM DFB and APD, Link Budget: 24dB, 80km SMF Reach)

Form Factor	Date Rate	Media	Link Budget	Wavelength	TX Power (dBm)	RX Sensitivity (dBm)	DDM (Y/N)	Temperature (°C)	Part Number
SFP+-Dual-LC	10G	SMF	24dB	1270nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79CA-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1290nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79CB-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1310nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79CC-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1330nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79CD-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1350nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79CE-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1370nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79CF-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1390nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79CG-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1410nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79CH-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1430nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79CJ-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1450nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79CI-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1470nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79C2-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1490nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79C3-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1510nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79C4-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1530nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79C5-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1550nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79C6-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1570nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79C7-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1590nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79C8-ZBSDD-00
SFP+-Dual-LC	10G	SMF	24dB	1610nm	+3 ~ 0	≤ -24	Y	-5 ~ +70	ATRG-79C9-ZBSDD-00

