
GPON ONU Triplexer Optical Subassembly with Pigtail

Description

LN0311 series has a 1310(TX)/1490nm(RX)/1550nm(RX) triplexer optical subassembly (Tri-OSA) for GPON ONU and CATV transmission application .

This module contains a 1310nm MQW DFB laser diode as transmitter, a InGaAs/InP PIN and a InGaAs/InP APD as receiver, two edge filter are integrated into a small housing to separate the wavelengths 1310nm 1490nm and 1550nm.

The DFB with an InGaAs monitor PD, it can be used with appropriate feedback control circuitry to set optimal power level for each FP laser, As the current changed above the threshold, the optical power will change accordingly.

The PIN chip has a photosensitivity area diameter of 80um with a InGaAs planar structure, it can be receive the optical signal and convert to analog signal.

The APD-TIA transduces incident light into optical current with high efficiency. The TIA converts the current signal into a digital voltage signal with a very low input noise.

The products has single mode type fiber with a SC/APC optical connector can be selected.

Features

- 1310 nm burst-mode transmitter with uncooled DFB-LD
- 1490nm continuous-mode receiver with High sensitive APD-TIA
- 1550nm PIN diode receiver with low noise and low distortion,
- Low optical crosstalk
- High optical power output up to 1.8mW
- Suitable for ITU G 984.5 standard
- Compact and economical
- operating temperature range: -10°C to 85°C

Application

- PON ONU system application
- Suitable for CATV application

Absolute Maximum Ratings^[1]

Parameter	Symbol	Min	Max	Units	Notes
Reverse Voltage(LD)	V _{RL}	---	2	V	
Forward Current(LD)	IFL	---	120	mA	
Reverse Voltage(MPD)	VRMP	---	10	V	
Forward Current(MPD)	IFMP	---	2	mA	
Reverse Voltage(PIN)	VRP	---	10	V	
Forward Current(PIN)	IR	---	2	mA	
Reverse Voltage(APD)	VRA	---	V _{br}	V	
Reverse Current(APD)	IA	---	2	mA	
Supply Voltage (TIA)	VCC	-0.4	+4	V	
Operating Temperature ^[1]	T _C	-10	+85	°C	Case temperature
Storage Temperature	T _{STG}	-40	+85	°C	Ambient temperature
Relative Humidity	RH	---	80	%	
Lead Soldering Temperature/Time	T _S	---	260/10	°C/S	
Fiber bend radius		30	---	mm	
Fiber yield strength		---	1	kgf	

Note 1: Beyond the scope of absolute maximum ratings can cause permanent damage to the device. If it has been a long time to use the device in the absolute maximum ratings may affect device reliability.

Electric and Optical Characteristics

(All measurements are at Case temperature of 25°C±3°C, @1310±10nm unless stated otherwise.)

Transmitter Operating Characteristic-Optical, Electrical (1310nm TX)						
Parameter	Symbol	Min	Typical	Max	Units	Notes
Fiber Output Power	P _O	1.8	2.4	3.8	mW	CW, I _f =I _{th} +20mA
		1.0	---	---	mW	CW, I _f =I _{th} +20mA, T _c = +85°C
Slope Efficiency	η	0.09	0.12	0.19	W/A	CW
		0.05	---	---	W/A	CW, T _c = +85°C
Center Wavelength	λ	1290	1310	1330	nm	CW, I _f =I _{th} +20mA, T _c =-10~ +85°C
Spectral Width(-20dB)	Δλ	---	0.3	1.0	nm	CW, I _f =I _{th} +20mA, T _c =-10~ +85°C
Side-Mode Suppression Ratio	SMSR	30	---	---	dB	CW, I _f =I _{th} +20mA, T _c =-10~ +85°C
Tracking Error	TE ^[1]	-1.5	---	1.5	dB	I _M hold@P ₀ =1.5mW, 25°C CW, T _c = -10 ~+85°C
Threshold Current	I _{th}	---	8	15	mA	CW
		---	20	35	mA	CW, T _c = +85°C
Operating Voltage	V _F	---	1.2	1.7	V	CW
Monitor Current	I _M	100	---	1200	μA	CW, I _f =I _{th} +20mA, V _{RMP} =1V
Monitor Dark Current	I _d	---	---	100	nA	CW, V _{RMP} =5V

Photodiode Capacitance	C	---	---	20	pF	$V_{RMP}=5V, f=1MHz$
Rise time	Tr	---	---	150	Ps	Unfilter 20%~80%
Fall time	Tf	---	---	150	Ps	Unfilter 20%~80%
Kink Current	Ikink	70	---	---	mA	$Tc=-10\sim+85^{\circ}C$

Receiver Operating Characteristic-Optical, Electrical (1490nm RX)						
Parameter	Symbol	Min	Typical	Max	Units	Notes
Operating Wavelength	λ	1480	1490	1550	nm	
Supply Voltage	VCC	3.0	3.3	3.6	V	
Circuit Current	Icc	---	40	50	mA	
Saturation Power	Psat	-6	---	---	dBm	$\lambda=1490nm, DR=2.5Gbps, ER=10dB,$
Sensitivity	Sen.	---	-33	-31.5	dBm	NRZ, PRBS ²³ -1, BER= 10^{-12} , $Tc=-10\sim+85^{\circ}C$
Breakdown Voltage	Vbr	38	45	53	V	$I_d=10\mu A, V_{cc}$ off
Dark Current	I _d	---	---	20	nA	$V_r=V_{br}-3V$
Responsivity	R	0.75	0.85	---	A/W	$\lambda=1490nm, M=1$
-3dB Bandwidth	BW	1.4	---	---	GHz	-3dB, $R_L=50\Omega$

Receiver Operating Characteristic-Optical, Electrical (1550nm RX)						
Parameter	Symbol	Min	Typical	Max	Units	Notes
Operating Wavelength	λ	1550	1555	1560	nm	
Saturation Power	Psat	3	---	---	dBm	$P_{in}=-30dBm, V_{RP}=5V,$
Responsivity	R	0.8	0.9	---	A/W	$\lambda=1550nm$
Small Signal Bandwidth	BW	3.0	---	---	GHz	-3dB, $V_{RP}=12V$
Dark Current	I _b	---	---	1	nA	$V_{RP}=5V$
Composite Second Order beat	CSO ^[2]	---	---	-70	dBc	
Composite Third Order beat	CTB ^[2]	---	---	-80	dBc	
Capacitance	C	---	---	0.8	PF	$V_{RP}=5V, f=1MHz$

Other Characteristic-Optical, Electrical						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical Crosstalk	CRT	---	---	-45	dB	1310nm/1490nm
		---	---	-45	dB	1310nm/1550nm

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Return Loss	RL	12	---	---	dB	$\lambda=1310\text{nm}$
		20	---	---	dB	$\lambda=1490\text{nm}$
		20	---	---	dB	$\lambda=1550\text{nm}$
Optical Isolation(1490nm RX)	Iso ^[3]	36	---	---	dB	$\lambda=1260 \sim 1441\text{nm}$
		25	---	---	dB	$\lambda=1450\text{nm}$
		25	---	---	dB	$\lambda=1530\text{nm}$
		36	---	---	dB	$\lambda=1539 \sim 1625\text{nm}$
Optical Isolation(1550nm RX)	Iso	40	---	---	dB	$\lambda=1260\sim 1360\text{nm}$
		35	---	---	dB	$\lambda=1480\sim 1500\text{nm}$
		30	---	---	dB	$\lambda=1575\sim 1625\text{nm}$
Optical Connector Return loss	ORL	45	---	---	dB	
Exterior fiber diameter		0.8	0.9	1.0	mm	70°C max temperature
Pigtail Length	L	580	610	640	mm	Outline Dimensions[L]

Notes 1: $TE=10*\log(Pf(Tc)/Pf(25^\circ C))$ @ APC with monitor current is constant.

Notes 2: Two-tone test condition : $f_1=50\text{MHz}$, $f_2=505\text{MHz}$, $f_1\pm f_2$, $VRP=-12\text{V}$, $P_{avg}=0\text{dBm}$, $MI=0.4$, $R_{load}=75\Omega$.

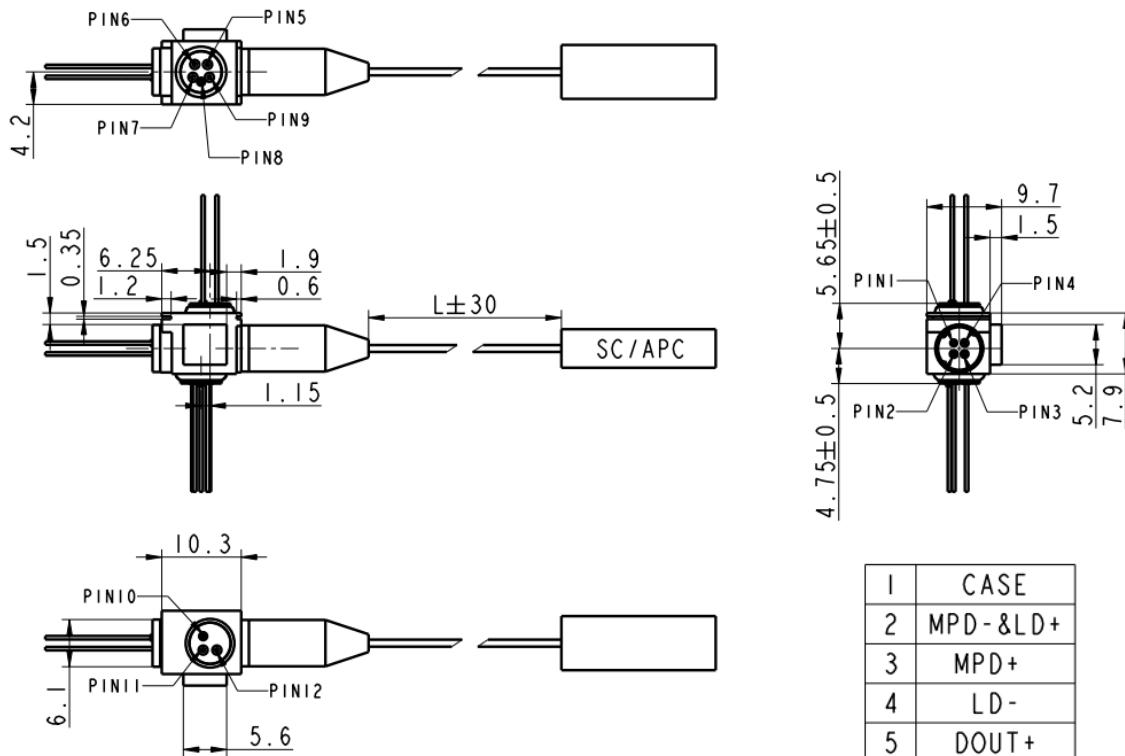
Notes 3: Suitable for ITU G 984.5 standard.

Pigtail parameters

Parameter	Symbol
Optical connector	SC/APC (IEC874/7)
Mode field diameter	9.5±1um
Cladding diameter	125±2um
Outermost Jacket	900±100um
Jacket color	White
Pigtail Length	0.61±0.03m

Outline Dimensions

All dimensions are $\pm 0.1\text{mm}$ unless otherwise specified (Unit: mm). For detail information please contact LinkPhotonic.



1	CASE
2	MPD - & LD+
3	MPD+
4	LD-
5	DOUT+
6	DOUT-
7	VAPD
8	GND
9	VCC
10	CASE
11	PD-
12	PD+

Precautions

Semiconductor chips are sensitive to electro-static damage. The module shall be packed with antistatic material for transportation. The working station and operators shall be grounded. Switching transients can cause electrical overstress (EOS) damage to the chips. EOS may result from improper ESD handling, improper power sequencing, a faulty power supply or an intermittent connection.

- Operators should always use antistatic bands and clothing, electric conductive shoes, and other safety appliances while at work are highly recommended.
- Humidity in working environment should be controlled equal or above 40 percent RH.
- It is recommended that grounding mats be placed on the surfaces of assembly line workbench and the surrounding floor in working area, etc.
- When mounting this product in other parts or materials which can be electrically charged (printed wiring boards, plastic products, etc.), pay close attention to the static electricity in those parts. ESD may damage the product.

Ordering Information

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Customer Information

Operating Temperature:

C: 0~70℃ E: -10~85℃ I: 40~85℃

Optical Connector Type:

A: SC/UPC receptacle

B: SC/APC-SM-0.9-0.61M

Statement

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