JDS Uniphase

Product Bulletin

Waveselect™

WSP 823 T MMM

Optical Networking Monitor with 980/1480 nm Pump Rejection

The WSP 823 T MMM is an integrated PIN photodiode and filter module in a reduced coaxial form factor. WSP 823 provides an accurate reading of the composite DWDM transmission signal in the C-Band while rejecting 980 nm and 1480 nm pump laser emissions. The low responsivity ripple and PDL will provide optical amplifier designers and installers with accurate power readings on test signals that have been sent through single or multiple amplifier chains. This improved measurement accuracy provides a lower error budget. The WSP 823 module requires one less splice compared to a discrete assembly of a filter and monitor. The minimized error budget, fewer splices and small factor sizing result in an overall reduced system cost.

The fiber is reinforced with a rubber boot that relieves fiber bending stresses. The WSP 823 can be procured with or without an industry standard connector. The WSP 823 is available with an optional mounting bracket that allows both vertical panel and flush-to-board mounting.

Key Features

- Integrated filter and photodiode in a single coax module
  - Small form factor
  - Requires fewer splices
- High quality transmission in C-band:
  - Low combined PDL and Ripple 0.3 dB
- High rejection: @ 980 nm -20 dB
  @ 1480 nm -20 dB
- High rejection slope:
  (1450 nm - 1525 nm) 0.45 dB/nm
- Low back reflection: -40 dB
- Low dark current: 1 nA

Applications

- Optical amplifier monitors
- DWDM monitors
- In-line optical network calibration monitors
- High performance test and measurement equipment

Preliminary Specifications (Electro-optical Parameters)

Parameter	Conditions	Unit	Min.	Typ.	Max.	Notes
Responsivity	1529-1569 nm	A/W	0.75	0.90		Responsivity in signal band
Pump Band Attenuation	1440-1480 nm	dB	20			
	970-988 nm	dB	20			
Rejection Slope	1480-1525 nm	dB/nm		0.45		
Responsivity Ripple	1535-1545 nm	dB		0.10	0.30	
	1545-1565 nm	dB		0.04	0.15	
	1565-1568 nm	dB		0.08	0.20	
Polarization Dependence (PDL)	1535-1545 nm	dB		0.10	0.30	
	1545-1565 nm	dB		0.05	0.15	
	1565-1568 nm	dB		0.05	0.20	
Back Reflection	1550 nm	dB			-40	Back reflection
	980 nm	dB			-20	Back reflection (980 nm pump)
	1480 nm	dB			-20	Back reflection (1480 nm pump)
Dark Current	-5V, 23°C	nA			1.0	
Capacitance	-5V, 1 MHz	pF			8.0	
Bandwidth	-5V	MHz		100		

Application Note

The slope (minimum average of 0.45 dB/nm) of the rejection curve in the 1480 nm - 1525 nm wavelength range found in Figure 1, exhibits the effectiveness of the filter. The attenuation of 20 dB in the 980 nm and 1480 nm pump wavelength range ensures the isolation between the C band and the noise generated from the pump signal and ASE.

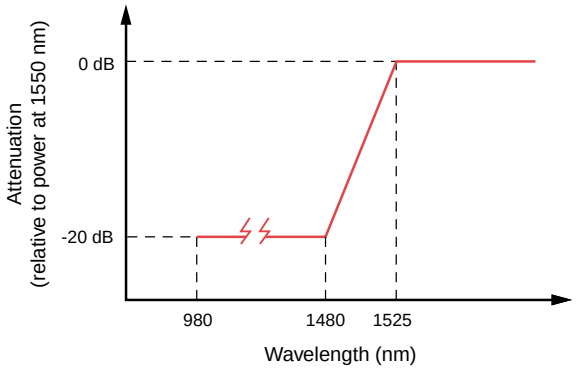
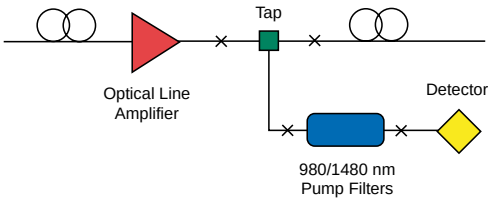


Figure 1. A schematic of the rejection curve exhibiting the filter performance.

Figure 2 illustrates that the integrated filter and monitor product requires only three splices for installation compared to four splices in the discrete assembly. Testing needs only to be performed on the single WSP 823 unit, while in the case of the discrete assembly, both the pump filter and detector need to be tested. The WSP 823 is a hermetically-sealed coax module. The reduced form factor of an integrated filter photodiode provides valuable space savings on the board.

Discrete Monitor and Filter Design



Waveselect™ Integrated Monitor and Filter Design

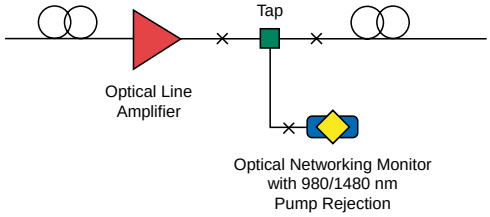


Figure 2. Comparison of integrated product to discrete design.

Responsivity ripple and Polarization Dependent Loss contribute to the error budget in an amplifier. The error budget is a combination of the specified losses of the individual components. By integrating individual components into a module, in this case the filter and photodiode, the error associated with the integrated WSP 823 module is less than that of the sum of the errors associated with the individual filter and individual photodiode. This is illustrated in Figure 3.

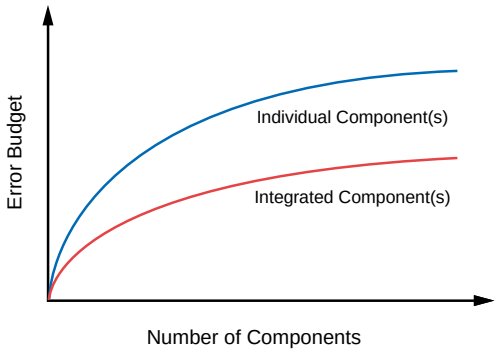


Figure 3. A schematic of the relation between the total system error budget and number of components.

Amplifier gain performance can be calibrated in situ by using a specific wavelength at a predefined power level. The low PDL and responsivity ripple specification of Waveselect™ 823 enhances the accuracy of this in situ calibration.

Maximum Ratings

Parameter	Min	Typ	Max	Units
[A]Forward Current, I_F			10	mA
[B]Reverse Current, I_R			10	mA
Input Optical Power, P_{in}			3	dBm
Reverse Voltage, V_b			20	V
Power Dissipation, P_D			100	mW
Operating Temperature, T_O	-10		75	℃
Storage Temperature, T_S	-40		85	℃
Relative Humidity			85	%

A. Under forward bias, current at which device may be damaged.
B. Under reverse bias, current at which device may be damaged.

Ordering Information

Product Model	Fiber Description
WSP 823 T MMM	Optical Networking Monitor w/ 980/1480 nm Pump Rejection
WSP 823 T MMM-250	250 µm buffer without connector
WSP 823 T MMM-900	900 µm buffer without connector

Note: All of the above can also be ordered with a Dual Mount Bracket by adding the DMB suffix to the base product number as shown below. For example:

WSP 823 T MMM-xxx DMB xxx µm buffer with Dual Mount Bracket

Figure 1

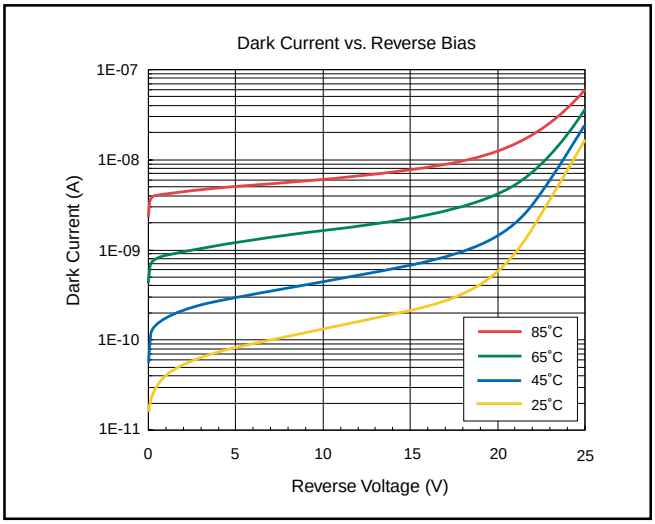


Figure 2

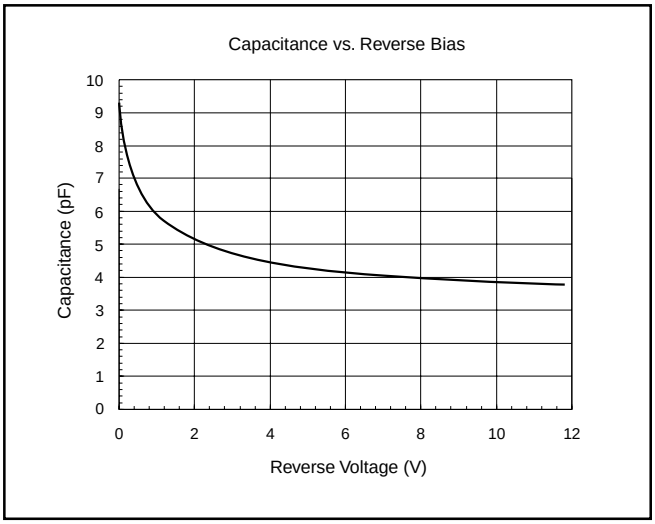


Figure 3

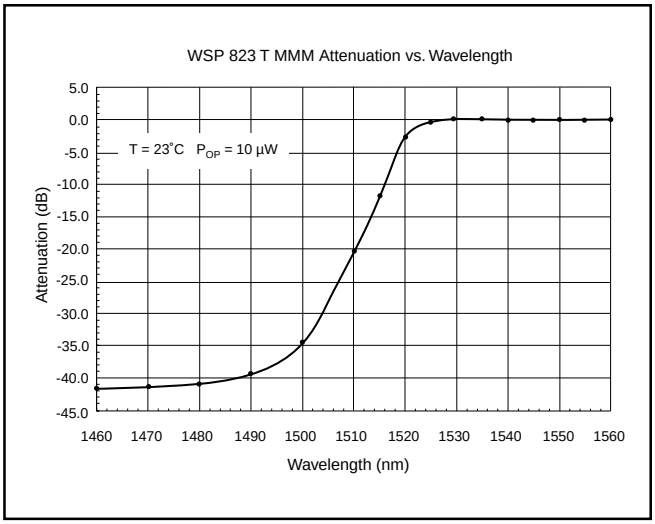


Figure 4

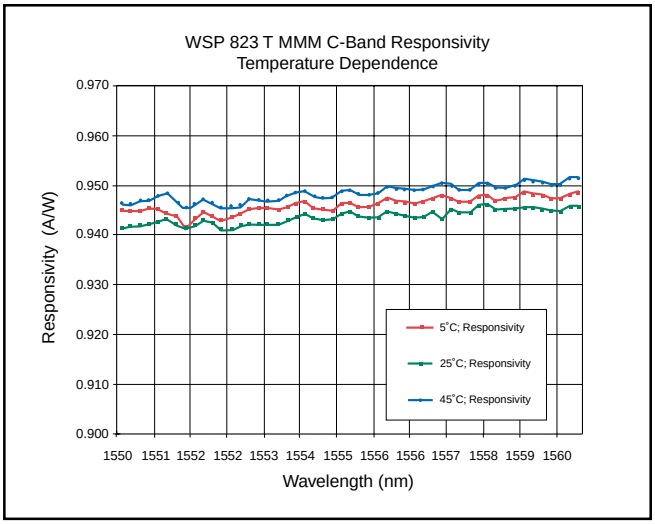


Figure 5

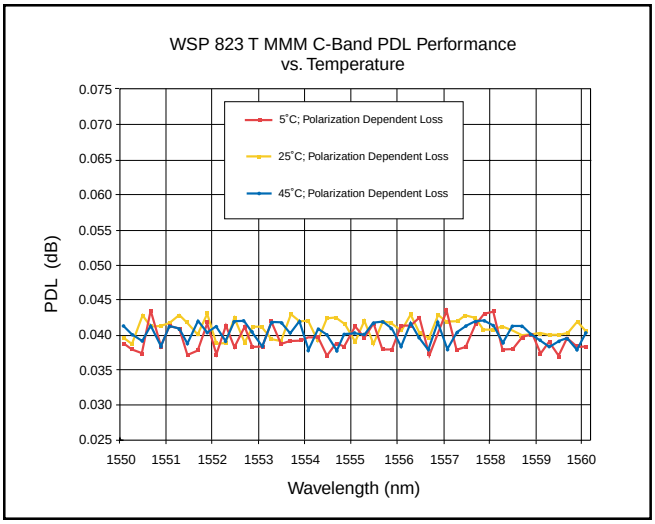
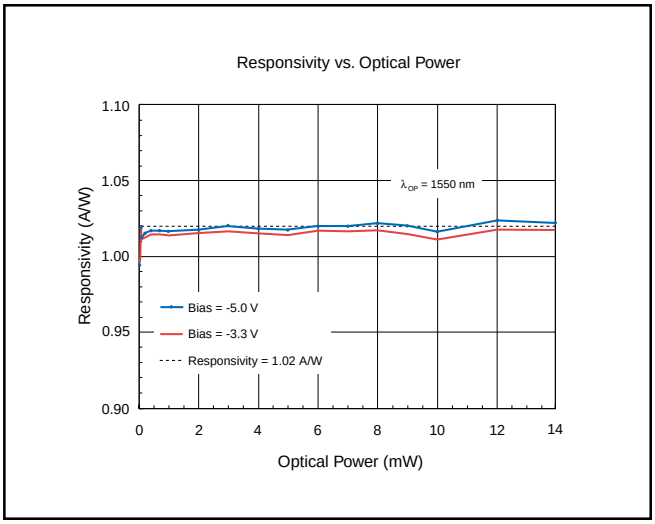
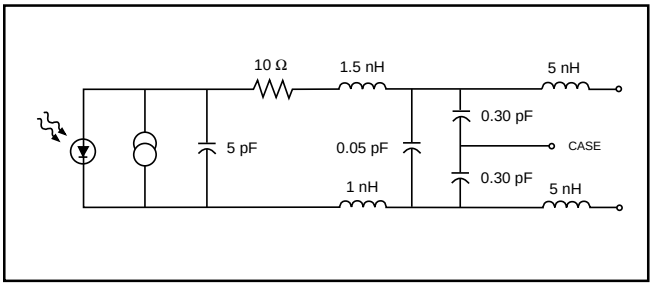


Figure 6



WSP 823 Equivalent Circuit



Precautions for Use

ESD protection is imperative. Use of grounding straps, anti-static mats, and other standard ESD protective equipment is required when handling or testing an InGaAs PIN or any other junction photodiode.

The flexible 250 µm fiber coating can be mechanically stripped and provides protection for the optical fiber under normal handling characteristics.

Soldering temperature of the leads should not exceed 260 °C for more than 10 seconds.

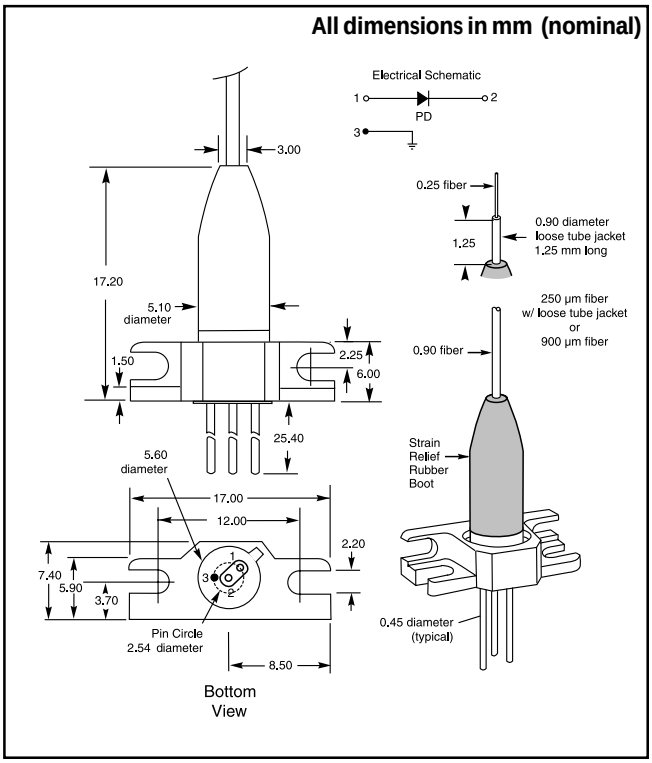
Fiber pigtails should be handled with less than 10N pull and with a bending radius greater than 1".

Quality Vision

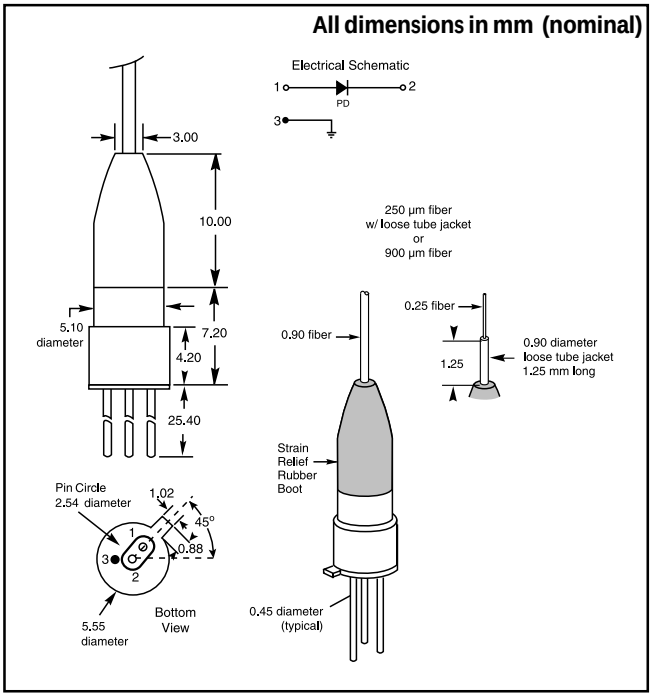
We have a leadership position in the optoelectronic industry with a vision for excellence in quality. The company is committed to providing customers with the highest levels of quality and reliability in design and manufacturing. The top priorities remain continuous process improvement and total customer satisfaction. We obtained ISO 9001 certification in 1996. In addition, the company maintains a strict quality control program to ensure that all products meet or surpass customer requirements.

Mechanical Dimensions

WSP 823 T MMM with Dual Mount Bracket



WSP 823 T MMM without Bracket



JDS Uniphase

JDS Uniphase Corporation
EPITAXX Division
7 Graphics Drive
West Trenton, NJ 08628

Tel 609 538-1800
Fax 609 538-1684
epitaxx@us.jdsuniphase.com
www.jdsuniphase.com

Preliminary 10/16/00 Printed in USA