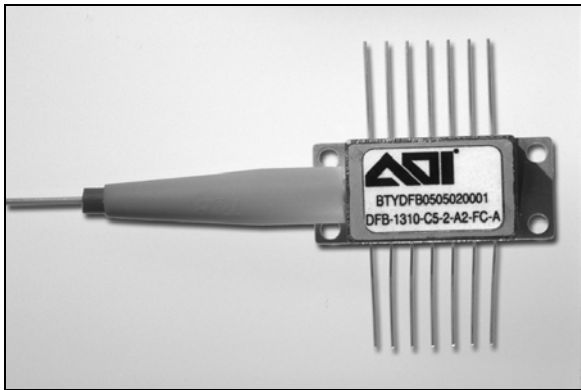


## DFB-1310-BF-18-A-xx Laser Module



### Description

The DFB-1310-BF-18-A-xx DFB laser modules are designed for forward- and return- path CATV applications. The modules are designed to incorporate high output power while maintaining high linearity. The devices feature standard pin assignments (compatible with OC-48).

The modules are excellent sources for use in CATV systems incorporating both PAL-D, with 60 channel loading, and NTSC, with up to 78 channels. The combination of high performance and very reasonable price make these modules the most cost-effective CATV transmitter solutions in the industry.

### Features

- ❑ Standard OC-48 pin compatibility
- ❑ Negative bias
- ❑ Optimized for PAL-D and NTSC channel counts
- ❑ Output power to 18 mW
- ❑ Meets GR 468 reliability specifications

### Applications

- ❑ CATV forward and return path
- ❑ 1310-nm broadcast and point-to-point applications

## DFB-1310-BF-18-A-xx Laser Module

### Absolute Maximum Ratings

Exceeding the conditions specified below may result in permanent damage to the laser module. In normal operation, refer to the operating conditions in Table 1, below. Exceeding the conditions in Table 1, but below the absolute maximum ratings may result in unacceptable performance in some applications. Exposure to conditions above the absolute maximum ratings may negatively impact the reliability of the devices.

Parameter	Symbol	Condition	Min	Max	Unit
Operating Case Temperature	T <sub>c</sub>	I=I <sub>op</sub>	-20	65	°C
Storage Temperature	T <sub>stg</sub>	--	-40	80	°C
Laser Forward Current	--	--	--	120	mA
Laser Reverse Bias	V <sub>r</sub>	--	--	2	V
Photodiode Reverse Bias	V <sub>rpd</sub>	--	--	10	V
TEC Current	I <sub>tec</sub>	-20 °C < T <sub>c</sub> < +65 °C, T <sub>op</sub> =25 °C I <sub>f</sub> =100 mA		1.5	A

### Electrical/Optical Characteristics

**Table 1. Electrical and Optical Characteristics**

Parameters are over operating temperature range unless otherwise noted.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Center Wavelength	$\lambda_c$	P <sub>o</sub> =18.0 mW, CW	1290	1310	1330	nm
Spectral Width (-20 dB)	$\Delta\lambda$	P <sub>o</sub> =18.0 mW	--	0.1	1.0	nm
Optical Output Power	P <sub>o</sub>	CW, T <sub>L</sub> =25 °C	17.5	18.0	--	mW
Optical Isolation	I <sub>s</sub>	T=25 °C	30	--	--	dB
Side-mode Suppression Ratio	SMSR	P <sub>o</sub> =18.0 mW	30	--	--	dB
Threshold Current	I <sub>th</sub>	T <sub>L</sub> =25 °C	--	12	18	mA
Operating Current	I <sub>op</sub>	P <sub>o</sub> =18.0 mW	--	82	98	mA
Forward Voltage	V <sub>F</sub>	P <sub>o</sub> =18.0 mW	--	1.2	1.7	V
Monitor Current	I <sub>mon</sub>	V <sub>R</sub> =5 V	100	--	1000	μA
Monitor Dark Current	I <sub>D</sub>	V <sub>R</sub> =5 V	10	--	200	nA
Operating Case Temperature	T		-20	--	65	°C
Tracking Error	$\gamma$	I <sub>mon</sub> =const, $\gamma=10 \log (P_i/2.0)$ [dB]	-0.5	--	0.5	dB
Thermistor Resistance	R <sub>t</sub>	T=25 °C	9.5	--	10.5	KΩ
Thermistor B Constant	B	T=25 °C	--	3900	--	K
TEC Current	I <sub>C</sub>	$\Delta T=40^\circ\text{C}$	--	--	1.0	A
TEC Voltage	V <sub>C</sub>	$\Delta T=40^\circ\text{C}$	--	--	2.0	V

## DFB-1310-BF-18-A-xx Laser Module

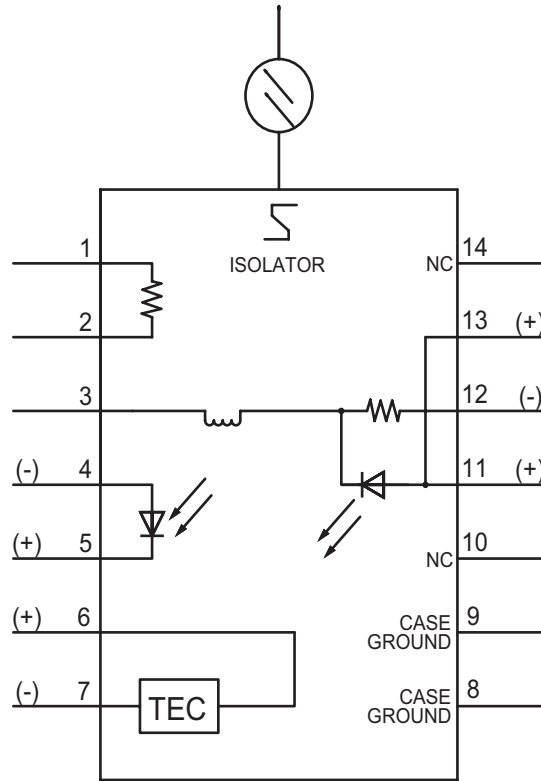
**Table 2. RF Characteristics (PAL-D 60)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Frequency Range	F	--	45	--	860	MHz
Frequency Response	$ S_{21} $	I=82 mA 45 MHz-860 MHz T=25 °C	--	$\pm 0.5$	--	dB
Carrier to Noise Ratio	CNR	Note 1	50	52	--	dB
Composite Second Order	CSO	Note 1	--	60	--	dBc
Composite Triple Beat	CTB	Note 1	--	65	--	dBc
Relative Intensity Noise	RIN	CW, $P_o=18.0$ mW, $f=45$ MHz to 860 MHz, Optical reflection=-40 dB	--	-155	--	dB/Hz

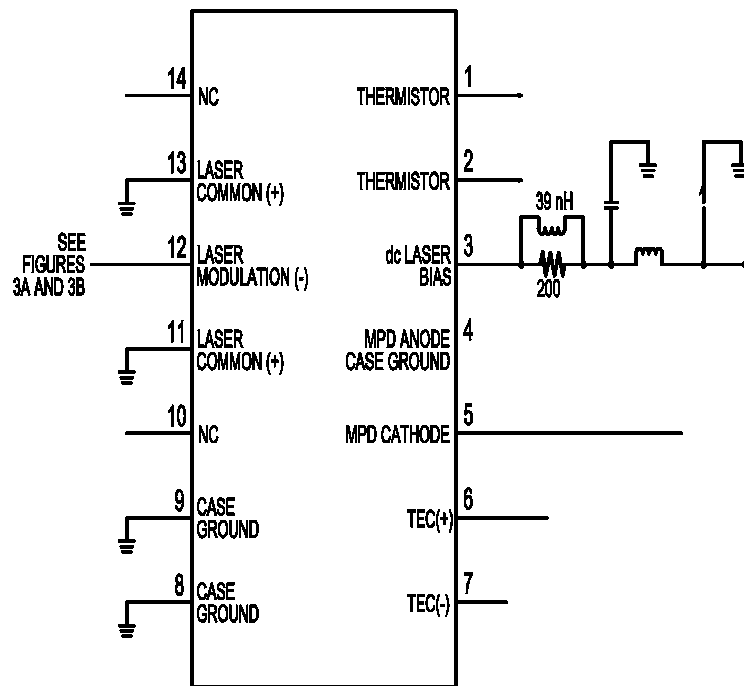
Note 1: Test condition:  $P_o=18$  mW, OMI 3.2%, 60 unmodulated carriers (45 to 550 MHz), Link loss=11 dB, optical reflection=-40 dB.

**DFB-1310-BF-18-A-xx Laser Module**

**ELECTRICAL SCHEMATICS**



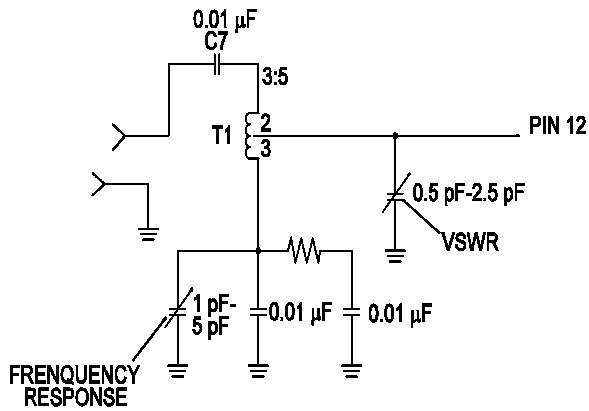
**Figure 1. Laser Schematic**



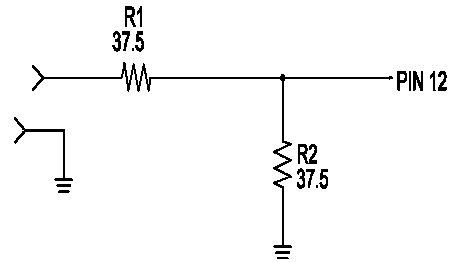
**Figure 2. Circuit Diagram**

**DFB-1310-BF-18-A-xx Laser Module**

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**Figure 3A. Impedance-Matched Configuration**

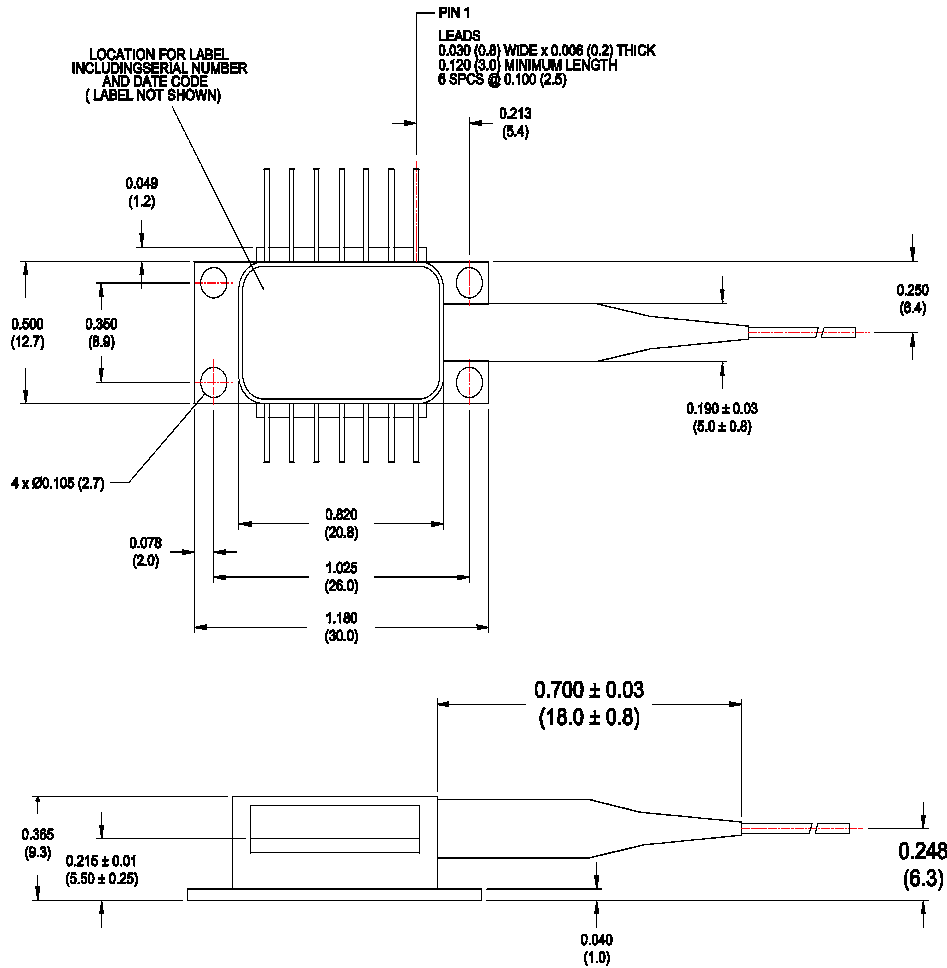


**Figure 3B. Resistive-Matched Configuration**

## DFB-1310-BF-18-A-xx Laser Module

### Outline Diagram

Dimensions are in inches (millimeters)



### Pin Information

Pin No.	DESCRIPTION
1	THERMISTOR
2	THERMISTOR
3	dc LASER BIAS (-)
4	MPD ANODE, CASE GROUND (-)
5	MPD CATHODE (+)
6	THERMOELECTRIC COOLER (+)
7	THERMOELECTRIC COOLER (-)
8	CASE GROUND
9	CASE GROUND
10	NC
11	LASER COMMON (+)
12	LASER MODULATION (-)
13	LASER COMMON (+)
14	NC

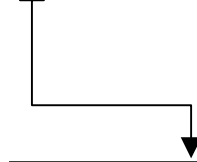


## DFB-1310-BF-18-A-xx Laser Module

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### CONNECTOR OPTIONS:

DFB-1310-BF-18-A-xx

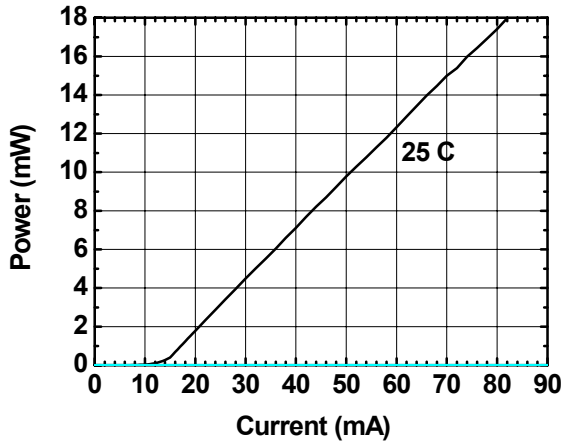


SC=SC/PC  
FC=FC/PC  
SA=SC/APC  
FA=FC/APC  
NC=No Connector

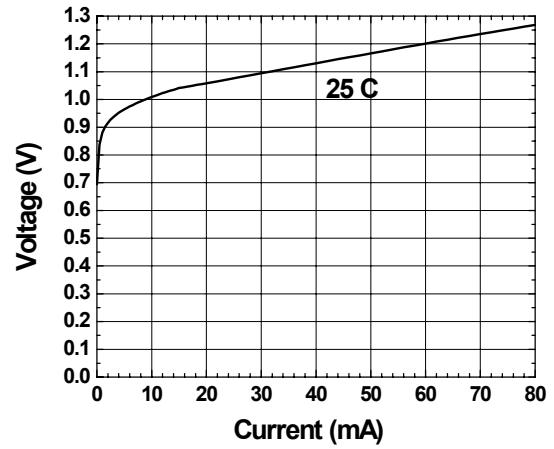
**DFB-1310-BF-18-A-xx Laser Module**

**TYPICAL LASER PERFORMANCE DATA**

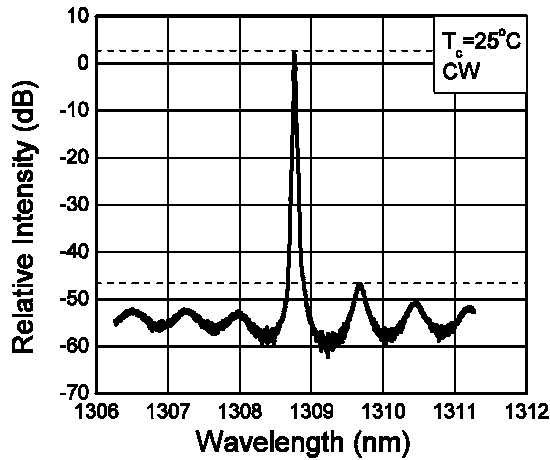
Output Power vs. Current



Forward Voltage vs. Current



Output Spectrum





## DFB-1310-BF-18-A-xx Laser Module

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### Safety Information

All versions of this laser are Class 3R laser products per IEC\* 60825-1:2001. Users should observe safety precautions such as those recommended by ANSI\*\* Z136.1-2000, ANSI Z36.2-1997 and IEC 60825-1:2001.

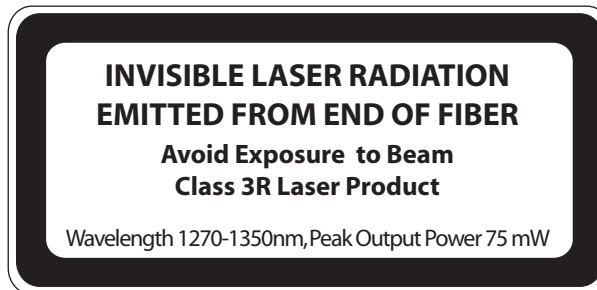
This product does not conform to 21 CFR 1040.10 and 1040.11. Consequently, this laser module is only intended for use as a component by manufacturers of electronic products and equipment.

Wavelength = 1.3  $\mu\text{m}$   
Maximum Power = 100 mW  
Single-mode fiber pigtail  
Fiber Numerical Aperture = 0.14

Labeling is not affixed to the laser module due to size constraints; 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.**



classified in accordance with IEC 60825-1:2001-08

\*IEC is a registered trademark of the International Electrotechnical Commission

\*\*ANSI is a registered trademark of the American National Standards Institute