



# Analogue Lasers & Detectors

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## 1310nm FP Lasers, 1GHz, Coax Package

FP-1310-C5-0.5-A-xx-A-x-x  
FP-1310-C5-1.8-A-xx-A-x-x

- **Advanced Multiple Quantum Well (MQW) FP Laser Design**
- **Low Distortion**
  - IMD2 typ. -45 dBc
  - IMD3 typ. -45 dBc
- **Cost-effective Uncooled Laser Technology**
- **5.6-mm TO-style package with SMF pigtail**

### Applications

- CATV
- Analog transmission

These Multi-Quantum Well (MQW) Fabry-Perot lasers have been designed specifically for analogue applications, especially CATV.

The devices feature high output power, wide operating temperature range, and low distortion characteristics.

Their uncooled, hermetically sealed, coaxial fibre-pigtailed packages are a cost-effective means of providing a highly linear light source for short-reach and intermediate-reach analog transmission applications.

### Ordering Information

FP-1310-C5-0.5-A-xx-A-x-x  
FP-1310-C5-1.8-A-xx-A-x-x

Connector	Pin Assignment	Isolator
SC=SC/PC	A= Pin Type A	I=Single-stage Isolator
FC=FC/PC	C= Pin Type C	N=Not Isolated
SA=SC/APC		
FA=FC/APC		
NC=No Connector		

### 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  $\mu$ m  
Maximum Power = 75mW  
Singlemode Fibre Pigtail  
Fibre 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.

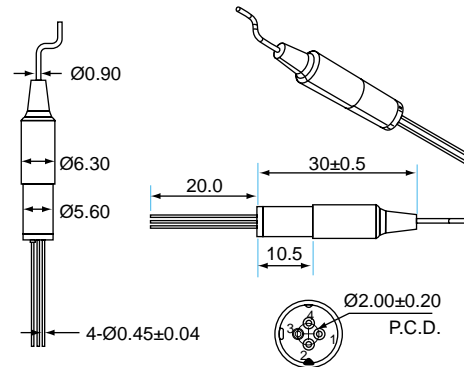
This product is not shipped with a power supply.

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

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

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

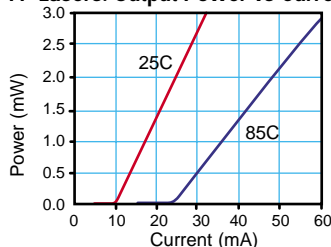
### Dimensions (in mm)



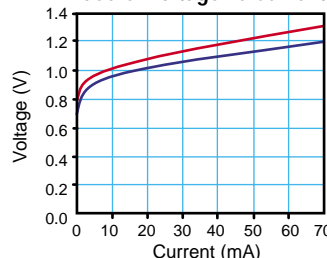
### Pin Assignment

	Type A	Type C
1.	PD Cathode	PD Anode
2.	PD Anode	LD Anode, PD Cathode
3.	LD Anode, GRD	GRD
4.	LD cathode	LD cathode

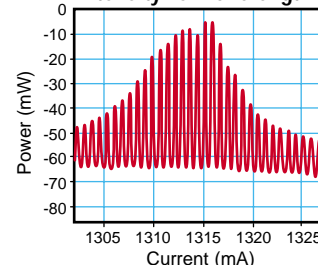
FP Lasers: Output Power vs Current



FP Lasers: Voltage vs Current



Intensity vs Wavelength



### 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
Operating Case Temperature	$T_c$	I=I <sub>op</sub>	-20	85
Storage Temperature	T <sub>stg</sub>	-	-40	100
Laser Forward Current	-	-	-	120
Laser Reverse Bias	V <sub>r</sub>	-	-	2
Photodiode Reverse Bias	V <sub>rpd</sub>	-	-	10

### RF Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max
Relaxation Oscillation Frequency	f <sub>r</sub>	P <sub>o</sub> = 0.5mW	-	4.5	-
Modulation Bandwidth	BW	-3dB, P <sub>o</sub> = 0.5mW	1.0	-	-
Intermodulation Distortion 2	IMD2	T = 25°C, P <sub>o</sub> = 0.5mW, OMI = 0.1, Two-tone test, 13MHz and 19MHz, 7dB plus connector loss	-	-45	-
Intermodulation Distortion 3	IMD3	T = 25°C, P <sub>o</sub> = 0.5mW, OMI = 0.1, Two-tone test, 13MHz and 19MHz, 7dB plus connector loss, all peaks from 5MHz to 300MHz meet this level	-	-45	-
RF Bandpass Flatness	BF	Peak to valley, 5MHz to 300MHz	-	-	1.0

### Electrical/Optical Characteristics

Parameter	Symbol	FP-1310-C5-0.5-A-xx-A-x-x				FP-1310-C5-1.8-A-xx-A-x-x			
		Min	Typ	Max	Test Conditions	Min	Typ	Max	Test Conditions
Operating Temperature	$T$	-20	-	85		-20	-	85	
Optical Output Power	P <sub>o</sub>	0.5	-	-	CW	1.8	2.0	-	CW
Threshold Current	I <sub>th</sub>	-	10	14	T = 25°C	-	10	14	T = 25°C
Operating Current	I <sub>op</sub>	-	25	35	T = 85°C	-	25	35	T = 85°C
		-	20	27	CW, P <sub>o</sub> =0.5mW, T=25°C	-	25	35	CW, P <sub>o</sub> =1.8mW, T=25°C
Forward Voltage	V <sub>F</sub>	-	1.1	1.6	P <sub>o</sub> =0.5 mW	-	1.1	1.6	P <sub>o</sub> =1.8 mW
		-	1.1	1.6	CW, P <sub>o</sub> =0.5 mW, CW	1275	1310	1345	P <sub>o</sub> =1.8 mW, CW
Center Wavelength	$\lambda$	1275	1310	1345	P <sub>o</sub> =0.5 mW, CW	1275	1310	1345	P <sub>o</sub> =1.8 mW, CW
RMS Spectral Width	$\Delta\lambda$	-	1.6	2.5	P <sub>o</sub> =0.5 mW	-	1.6	2.5	P <sub>o</sub> =1.8 mW
Wavelength temperature coefficient	$\Delta\lambda / \Delta T$	-	0.45	0.5		-	0.45	0.5	
Monitor Current	I <sub>mon</sub>	75	-	400	V <sub>R</sub> =5 V	75	-	400	V <sub>R</sub> =5 V
Monitor Dark Current	I <sub>d</sub>	-	-	200	V <sub>R</sub> =5 V	-	-	200	V <sub>R</sub> =5 V
Tracking Error	$\gamma$	-1	-	1	I <sub>mon</sub> =const, $\gamma$ =10 log (P <sub>i</sub> /0.5) [dB]	-1	-	1	I <sub>mon</sub> =const, $\gamma$ =10 log (P <sub>i</sub> /1.8) [dB]
Optical Isolation*	ISO	30	35	-	30	35	-	-	-

Parameters are over operating temperature range unless otherwise noted. \* Optical Isolation is only applicable to devices that include the optical isolator option.



## 1310nm DFB Lasers, 2.2GHz, Coax Package

DFB-1310-C5-2-A4-xx-x-x

- **Advanced Multiple Quantum Well (MQW) Distributed Feedback (DFB) Laser Design**
- **Low Distortion**
  - IMD2 typ. -40 dBc
  - IMD3 typ. -58 dBc
- **RIN < -145 dB/Hz**
- **Cost-effective Uncooled Laser Technology**
- **SMSR typ. 40 dB**
- **5.6-mm TO-style package with SMF pigtail**

### Applications

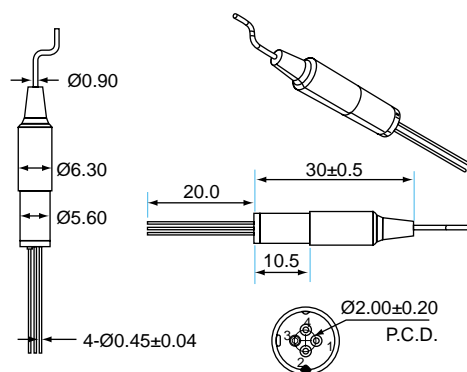
- **Wireless (W-CDMA, GSM, PCS) fiber-optic repeaters**
- **Analog transmission**

The DFB-1310-C5-2-A4-xx-x-x series of Multi-Quantum Well (MQW) Distributed Feedback (DFB) lasers have been designed specifically for analog applications, especially wireless repeater applications.

The devices feature high output power, wide operating temperature range, low distortion characteristics, low RIN noise, and high side mode suppression.

Their uncooled, hermetically sealed, coaxial fiber-pigtailed packages are a cost-effective means of providing a highly linear light source for intermediate-reach and long-reach analog transmission applications.

Dimensions (in mm)



### Pin Assignment

	Type A	Type C
1.	PD Cathode	PD Anode
2.	PD Anode	LD Anode, PD Cathode
3.	LD Anode, GRD	GRD
4.	LD cathode	LD cathode

### Safety Information

All versions of this laser are Class 3B 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  $\mu$ m  
 Maximum Power = 75mW  
 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.**

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



### Ordering Information

DFB-1310-C5-2-A4-xx-x-x

Connector	Temperature	Pin Assignment
SC=SC/PC	A=-20°C to 85°C	A= Pin Type A
FC=FC/PC	B=-20°C to 75°	C= Pin Type C
SA=SC/APC		
FA=FC/APC		
NC=No Connector		

### Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Max
Operating Case Temperature	°C	Tc	I=Iop	85
Storage Temperature	°C	Tstg	-	100
Laser Forward Current	mA	If	-	120
Laser Reverse Bias	V	Vr	-	2
Photodiode Reverse Bias	V	Vrpd	-	10

### Electrical and Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions	
Operating Temperature	°C	T	-20	85*		
Optical Output Power	mW	P <sub>o</sub>	2.0	-	CW	
Threshold Current	mA	I <sub>th</sub>	-	12	T=25 °C	
			-	35	T=85 °C	
Operating Current	mA	I <sub>op</sub>	-	60	T=85 °C	
Forward Voltage	V	V <sub>F</sub>	-	1.1	P <sub>o</sub> =2.0 mW	
Center Wavelength	nm	$\lambda_c$	1290	1310	P <sub>o</sub> =2.0 mW, CW	
Spectral Width (-20 dB)	nm	$\Delta\lambda$	-	0.1	P <sub>o</sub> =2.0 mW	
Wavelength temperature coefficient	nm/°C	$\Delta\lambda/\Delta T$	-	0.09	-	
Side-mode Suppression Ratio	dB	SMSR	30	40	P <sub>o</sub> =2.0 mW	
Monitor Current	$\mu$ A/mW	I <sub>mon</sub>	25	-	V <sub>rpd</sub> =5 V	
Monitor Dark Current	nA	I <sub>D</sub>	-	-	200	V <sub>rpd</sub> =5 V
Tracking Error	dB	$\gamma$	-1	-	1	I <sub>mon</sub> =const, $\gamma=10 \log(P_o/2.0)$ [dB]
Optical Isolation	dB	ISO	30	-	-	

Parameters are at 25 °C unless otherwise noted.

\* See Ordering Options for operating temperature ranges available.

### RF Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions	
Relative Intensity Noise	dB/Hz	RIN	-	-	-145	CW, P <sub>o</sub> =2.0 mW, f=80 MHz to 2200 MHz
Second-Order Intermodulation	dBc	IMD2	-	-	-40	T=25 °C, P <sub>o</sub> =2.0 mW, OMI=0.2, Two-tone test, 936 MHz and 958 MHz
Third-Order Intermodulation	dBc	IMD3	-	-	-58	T=25 °C, P <sub>o</sub> =2.0 mW, OMI=0.2, Two-tone test, 936 MHz and 958 MHz, and also 1800 MHz and 1801 MHz
RF Bandpass Flatness	dB	BF	-	-	4.0	Peak to valley, 5 MHz to 300 MHz



## 1310nm DFB Lasers, 550MHz, Coax Package

DFB-1310-C5-4-A3-xx-x-x

- **Advanced Multiple Quantum Well (MQW) Distributed Feedback (DFB) Laser Design**
- **Low Distortion**
  - CSO -53 dBc
  - CTB -62 dBc
- **RIN < -145 dB/Hz**
- **Cost-effective Uncooled Laser Technology**
- **SMSR typ. 40 dB**
- **5.6-mm TO-style package with SMF pigtail**

### Applications

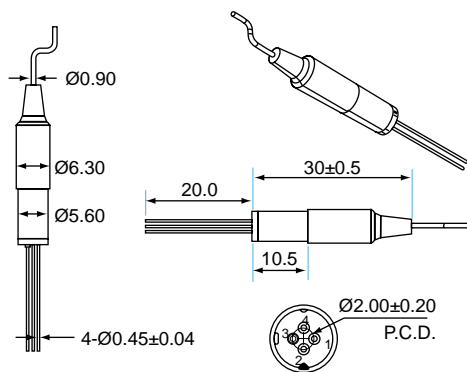
- **CATV Forward-path**
- **Analog transmission**

The DFB-1310-C5-4-A3-xx-x-x series of Multi-Quantum Well (MQW) Distributed Feedback (DFB) lasers have been designed specifically analog applications, especially CATV forward-path.

The devices feature high output power, wide operating temperature range, low distortion characteristics, low RIN noise, and high side mode suppression.

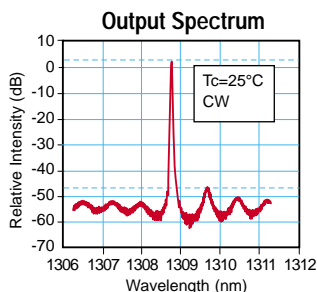
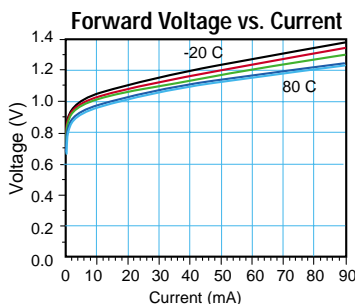
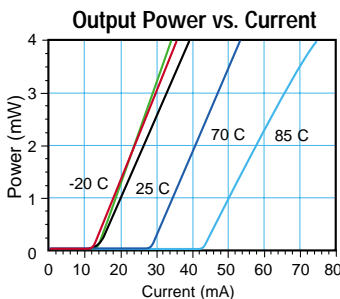
Their uncooled, hermetically sealed, coaxial fibre-pigtailed packages are a cost-effective means of providing a highly linear light source for intermediate-reach and long-reach analog transmission applications.

Dimensions (in mm)



### Pin Assignment

	Type A	Type C
1.	PD Cathode	PD Anode
2.	PD Anode	LD Anode, PD Cathode
3.	LD Anode, GRD	GRD
4.	LD cathode	LD cathode



### Safety Information

All versions of this laser are Class 3B 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 µm  
Maximum Power = 75mW  
Single-mode fibre pigtail  
Fibre 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.

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### Ordering Information

**DFB-1310-C5-4-A3-xx-x-x**

Connector	Temperature	Pin Assignment
SC=SC/PC	A=-20°C to 85°C	A= Pin Type A
FC=FC/PC	B=-20°C to 75°	C= Pin Type C
SA=SC/APC		
FA=FC/APC		
NC=No Connector		

### Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Max
Operating Case Temperature	°C	Tc	I=Iop	-20 85
Storage Temperature	°C	Tstg	-	-40 100
Laser Forward Current	mA	If	-	120
Laser Reverse Bias	V	Vr	-	2
Photodiode Reverse Bias	V	Vrpd	-	10

### Electrical and Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions
Operating Temperature	°C	T	-20*	85*	
Optical Output Power	mW	P <sub>o</sub>	4.0	-	CW
Threshold Current	mA	I <sub>th</sub>	-	12 18	T=25 °C
Operating Current	mA	I <sub>op</sub>	-	35 50	T=85 °C
Forward Voltage	V	V <sub>F</sub>	-	70 100	T=85 °C
Center Wavelength	nm	λ <sub>c</sub>	-	1.1 1.6	P <sub>o</sub> =4.0 mW
Spectral Width (-20 dB)	nm	Δλ	-	1280 1310 1340	P <sub>o</sub> =4.0 mW, CW
Wavelength temperature coefficient	nm/°C	Δλ/ΔT	-	0.1 1.0	P <sub>o</sub> =4.0 mW
Side-mode Suppression Ratio	dB	SMSR	-	30 40	P <sub>o</sub> =4.0 mW
Monitor Current	µA/mW	I <sub>mon</sub>	75	-	400 V <sub>R</sub> =5 V
Monitor Dark Current	nA	I <sub>D</sub>	-	200	V <sub>R</sub> =5 V
Tracking Error	dB	γ	-1	-	1 200 I <sub>mon</sub> =const, γ=10 log (P <sub>γ</sub> /4.0) [dB]
Optical Isolation	dB	ISO	30	35	-

Parameters are at 25 °C unless otherwise noted.

\* See Ordering Options for operating temperature ranges available.

### RF Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions
Relative Intensity Noise	dB/Hz	RIN	-	-	-145 CW, P <sub>o</sub> =4.0 mW, f=50 MHz to 550 MHz
Relaxation Oscillation Frequency	GHz	f <sub>R</sub>	-	4.5	P <sub>o</sub> =4.0mW
Modulation Bandwidth	GHz	BW	1.0	-	-3dB, P <sub>o</sub> =4.0mW
Composite Second-Order	dBc	IMD2	-	-	-53 Note 1
Composite Triple Beat	dBc	CTB	-	-	-62 Note 1
Carrier-to-Noise ratio	dB	CNR	50	-	Note 1
RF Bandpass Flatness	dB	BF	-	-	1.0 Peak to valley, 50 MHz to 550 MHz

Note 1: Test condition: P<sub>o</sub>=4mW, OMI 3.2%, 77 unmodulated carriers (50 to 550 MHz), Received Power=-4dBm.



## 1550nm DFB Lasers, 1GHz, Coax Package

DFB-1550-C5-2-A2-xx-x-x

- **Advanced Multiple Quantum Well (MQW) Distributed Feedback (DFB) Laser Design**
- **Low Distortion**  
- IMD3 typ. -60 dBc
- **RIN < -145 dB/Hz**
- **Cost-effective Uncooled Laser Technology**
- **SMSR typ. 40 dB**
- **5.6-mm TO-style package with SMF pigtail**

### Applications

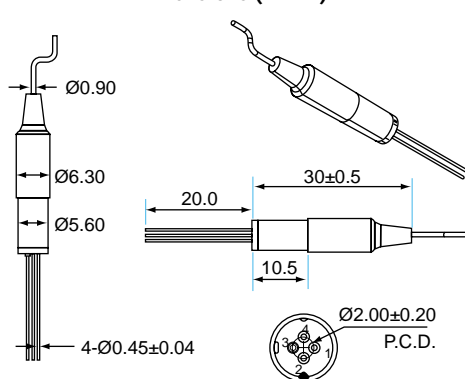
- **Wireless (CDMA) fibre-optic repeaters**
- **Analog transmission**

The DFB-1550-C5-2-A2-xx-x-x series of Multi-Quantum Well (MQW) Distributed Feedback (DFB) lasers have been designed specifically for analog applications, especially wireless repeater applications.

The devices feature high output power, wide operating temperature range, low distortion characteristics, low RIN noise, and high side mode suppression.

Their uncooled, hermetically sealed, coaxial fibre-pigtailed packages are a cost-effective means of providing a highly linear light source for intermediate-reach and long-reach analog transmission applications.

Dimensions (in mm)



### Pin Assignment

Type A	Type C
1. PD Cathode	PD Anode
2. PD Anode	LD Anode, PD Cathode
3. LD Anode, GRD	GRD
4. LD cathode	LD cathode

### Safety Information

All versions of this laser are Class 3B 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 = 1.55  $\mu$ m  
 Maximum Power = 75mW  
 Single-mode fibre pigtail  
 Fibre 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.

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### Ordering Information

DFB-1550-C5-2-A2-xx-x-x

Connector	Temperature	Pin Assignment
SC=SC/PC	A=-20°C to 85°C	A= Pin Type A
FC=FC/PC	B=-20°C to 75°	C= Pin Type C
SA=SC/APC		
FA=FC/APC		
NC=No Connector		

### Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Max
Operating Case Temperature	°C	Tc	I=Iop	-20 85
Storage Temperature	°C	Tstg	-	-40 100
Laser Forward Current	mA	If	-	120
Laser Reverse Bias	V	Vr	-	2
Photodiode Reverse Bias	V	Vrpd	-	10

### Electrical and Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions
Operating Temperature	°C	T	-20	-	85*
Optical Output Power	mW	Po	2.0	-	CW
Threshold Current	mA	Ith	-	14	20 T=25 °C
				40	55 T=85 °C
Operating Current	mA	Iop	-	60	80 T=85 °C
Forward Voltage	V	Vf	-	1.1	1.6 Po=2.0 mW
Center Wavelength	nm	$\lambda_c$	1530	1550	1570 Po=2.0 mW, CW
Spectral Width (-20 dB)	nm	$\Delta\lambda$	-	0.1	1.0 Po=2.0 mW
Wavelength temperature coefficient	nm/°C	$\Delta\lambda/\Delta T$	-	0.11	-
Side-mode Suppression Ratio	dB	SMSR	30	40	- Po=2.0 mW
Monitor Current	$\mu$ A/mW	I <sub>mon</sub>	25	-	375 V <sub>rpd</sub> =5 V
Monitor Dark Current	nA	I <sub>D</sub>	-	-	200 V <sub>rpd</sub> =5 V
Tracking Error	dB	$\gamma$	-1	-	1 I <sub>mon</sub> =const, $\gamma$ =10 log (Po/2.0) [dB]
Optical Isolation	dB	ISO	30	-	-

Parameters are at 25 °C unless otherwise noted.  
 \* See Ordering Options for operating temperature ranges available.

### RF Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions
Relative Intensity Noise	dB/Hz	RIN	-	-	-145 CW, Po=2.0 mW, f=300 MHz to 1000 MHz
Third-Order Intermodulation	dBc	IMD3	-	-	-60 T=25 °C, Po=2.0 mW, OMI=0.2, Two-tone test, 936 MHz and 958 MHz
RF Bandpass Flatness	dB	BF	-	-	1.0 Peak to valley, 50 MHz to 1000 MHz



## 1550nm DFB Lasers, 2.2GHz, Coax Package

DFB-1550-C5-2-A4-xx-x-x

- **Advanced Multiple Quantum Well (MQW) Distributed Feedback (DFB) Laser Design**
- **Low Distortion**
  - IMD2 typ. -40 dBc
  - IMD3 typ. -58 dBc
- **RIN < -145 dB/Hz**
- **Cost-effective Uncooled Laser Technology**
- **SMSR typ. 40 dB**
- **5.6-mm TO-style package with SMF pigtail**

### Applications

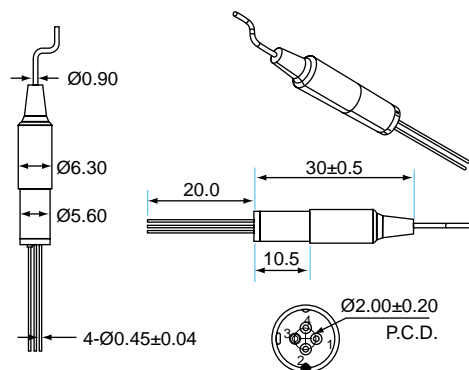
- **Wireless (W-CDMA, GSM, PCS) fibre-optic repeaters**
- **Analog transmission**

The DFB-1550-C5-2-A4-xx-x-x series of Multi-Quantum Well (MQW) Distributed Feedback (DFB) lasers have been designed specifically for analog applications, especially wireless repeater applications.

The devices feature high output power, wide operating temperature range, low distortion characteristics, low RIN noise, and high side mode suppression.

Their uncooled, hermetically sealed, coaxial fibre-pigtailed packages are a cost-effective means of providing a highly linear light source for intermediate-reach and long-reach analog transmission applications.

Dimensions (in mm)



### Pin Assignment

	Type A	Type C
1.	PD Cathode	PD Anode
2.	PD Anode	LD Anode, PD Cathode
3.	LD Anode, GRD	GRD
4.	LD cathode	LD cathode

### Safety Information

All versions of this laser are Class 3B 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 = 1.55  $\mu$ m  
 Maximum Power = 75mW  
 Single-mode fibre pigtail  
 Fibre 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.**

\* IEC is a registered trademark of the International Electrotechnical Commission.  
 \*\* ANSI is a registered trademark of the American National Standards Institute.



### Ordering Information

DFB-1550-C5-2-A4-xx-x-x

Connector	Temperature	Pin Assignment
SC=SC/PC	A=-20°C to 85°C	A= Pin Type A
FC=FC/PC	B=-20°C to 75°	C= Pin Type C
SA=SC/APC		
FA=FC/APC		
NC=No Connector		

### Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Max
Operating Case Temperature	°C	Tc	I=Iop	85
Storage Temperature	°C	Tstg	-	100
Laser Forward Current	mA	If	-	120
Laser Reverse Bias	V	Vr	-	2
Photodiode Reverse Bias	V	Vrpd	-	10

### Electrical and Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions
Operating Temperature	°C	T	-20	-	85*
Optical Output Power	mW	P <sub>o</sub>	2.0	-	CW
Threshold Current	mA	I <sub>th</sub>	-	14	20 T=25 °C
				40	55 T=85 °C
Operating Current	mA	I <sub>op</sub>	-	60	80 T=85 °C
Forward Voltage	V	V <sub>F</sub>	-	1.1	1.6 P <sub>o</sub> =2.0 mW
Center Wavelength	nm	$\lambda_c$	1530	1550	1570 P <sub>o</sub> =2.0 mW, CW
Spectral Width (-20 dB)	nm	$\Delta\lambda$	-	0.1	1.0 P <sub>o</sub> =2.0 mW
Wavelength temperature coefficient	nm/°C	$\Delta\lambda/\Delta T$	-	0.11	-
Side-mode Suppression Ratio	dB	SMSR	30	40	- P <sub>o</sub> =2.0 mW
Monitor Current	$\mu$ A/mW	I <sub>mon</sub>	25	-	375 V <sub>rpd</sub> =5 V
Monitor Dark Current	nA	I <sub>D</sub>	-	-	200 V <sub>rpd</sub> =5 V
Tracking Error	dB	$\gamma$	-1	-	1 I <sub>mon</sub> =const, $\gamma=10$ log (P <sub>o</sub> /2.0) [dB]
Optical Isolation	dB	ISO	30	-	-

Parameters are at 25 °C unless otherwise noted.

\* See Ordering Options for operating temperature ranges available.

### RF Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions
Relative Intensity Noise	dB/Hz	RIN	-	-	-145 CW, P <sub>o</sub> =2.0 mW, f=80 MHz to 2200 MHz
Second-Order Intermodulation	dBc	IMD2	-	-	-40 T=25 °C, P <sub>o</sub> =2.0 mW, OMI=0.2, Two-tone test, 936 MHz and 958 MHz
Third-Order Intermodulation	dBc	IMD3	-	-	-58 T=25 °C, P <sub>o</sub> =2.0 mW, OMI=0.2, Two-tone test, 936 MHz and 958 MHz, and also 1800 MHz and 1801 MHz
RF Bandpass Flatness	dB	BF	-	-	4.0 Peak to valley, 5 MHz to 300 MHz



## 15XXnm DFB Lasers, 2.2GHz, BFY Package

### DFB-1xxx-BF-xx-A2-xx

- Standard OC-48 pin compatibility
- Negative bias
- Optimized for WCDMA
- Output power up to 13 mW
- Meets GR 468 reliability specifications

#### Applications

- Wideband Wireless Repeaters
- High frequency analog transmission

The DFB-1xxx-BF-xx-A2-xx DFB laser modules are designed for high-frequency analog 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 wideband wireless systems with frequencies up to 2.2 GHz.

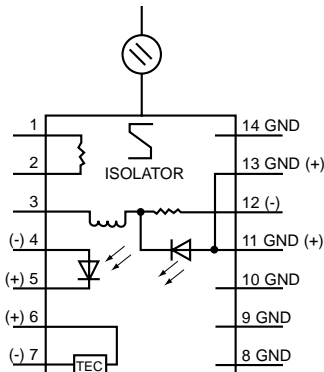


Figure 1: Laser Schematic

#### Ordering Information

### DFB-1XXX-BF-xx-A2-xx

Wavelength	Rated Output Power P <sub>r</sub>	Connector
470 = 1470nm	08 = 8mW	SA = SC/APC
490 = 1490nm	10 = 10mW	FA = FC/APC
510 = 1510nm	13 = 13mW	NC = No Connector
530 = 1530nm		
550 = 1550nm		
570 = 1570nm		
590 = 1590nm		
610 = 1610nm		

#### Safety Information

All versions of this laser are Class 3B 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.

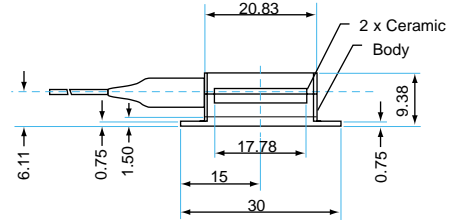
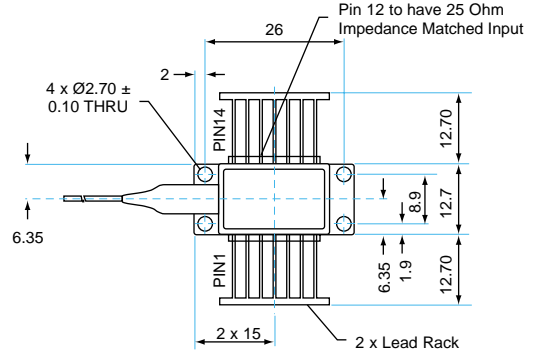
Wavelength = 1.5 μm  
 Maximum Power = 100 mW  
 Single-mode fibre pigtail  
 Fibre Numerical Aperture = 0.14

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.**

\*IEC is a registered trademark of the International Electrotechnical Commission  
 \*\*ANSI is a registered trademark of the American National Standards Institute



Dimensions in mm

#### Pin Information

Pin No.	Description	Pin No.	Description
1	Thermistor	9	Case Ground
2	Thermistor	10	Case Ground
3	Dc Laser Bias (-)	11	Laser Common (+)
4	MPD Anode Case Ground (-)		Case Ground
5	MPD Cathode (+)	12	Laser Modulation (-)
6	Thermoelectric Cooler (+)	13	Laser Common (+)
7	Thermoelectric Cooler (-)		Case Ground
8	Case Ground	14	Case Ground

#### Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Max
Operating Case Temperature	°C	T <sub>c</sub>	-20	65
Storage Temperature	°C	T <sub>stg</sub>	-40	85
Laser Forward Current	mA	I <sub>f</sub>	-	150
Laser Reverse Bias	V	V <sub>r</sub>	-	2
Photodiode Reverse Bias	V	V <sub>rpd</sub>	-	10
TEC Current	A	I <sub>tec</sub>	-20 °C < T <sub>c</sub> < +65 °C, Top=25 °C I <sub>f</sub> =150 mA	1.6

#### Electrical and Optical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	
Centre Wavelength	nm	λ <sub>c</sub>	I <sub>r</sub> = I <sub>op</sub> , CW	1460	-	1620
Optical Output Power*	mW	P <sub>o</sub>	CW, T <sub>L</sub> =25 °C	8	-	13
Optical Isolation	dB	I <sub>s</sub>	T=25 °C	30	-	-
Side-mode Suppression Ratio	dB	SMSR	I <sub>r</sub> = I <sub>op</sub>	30	-	-
Threshold Current	mA	I <sub>th</sub>	T <sub>L</sub> =25 °C	-	14	20
Operating Current	mA	I <sub>op</sub>	P <sub>o</sub> = P <sub>r</sub>	-	90	120
Forward Voltage	V	V <sub>F</sub>	I <sub>r</sub> = I <sub>op</sub>	-	1.2	1.9
Monitor Current	μA/mW	I <sub>mon</sub>	V <sub>rpd</sub> =5V	10	-	150
Monitor Dark Current	nA	I <sub>D</sub>	V <sub>rpd</sub> =5V	-	-	200
Operating Case Temperature	°C	T		-40	-	85
Tracking Error	dB	γ	I <sub>mon</sub> =const, γ=10 log (P <sub>o</sub> /P <sub>r</sub> ) [dB]	-1	-	1
Thermistor Resistance	K	R <sub>t</sub>	T=25 °C	9.5	-	10.5
Thermistor B Constant	K	B	T=25 °C	-	3900	-
TEC Current	A	I <sub>c</sub>	ΔT=40 °C	-	-	1.5
TEC Voltage	V	V <sub>C</sub>	ΔT=40 °C	-	-	1.6

Parameters are over operating temperature range unless otherwise noted. \*See Ordering Options for operating powers available.

#### RF Characteristics (NTSC 77)

Parameter	Symbol	Test Conditions	Min	Typ	Max
Frequency Range	MHz	F	-	0.3	2200
Frequency Response	dB	S <sub>21</sub>	I <sub>r</sub> =I <sub>op</sub>	-	±2
			0.3 to 2200MHz		
			T=25 °C		
Relative Intensity Noise	dB/Hz	RIN	CW, I <sub>r</sub> = I <sub>op</sub> , f=0.3MHz to 2200MHz, Optical reflection=-40dB	-	-150
Third-Order Intermodulation Distortion	dBc	IMD3	Two-tones 936MHz, 958MHz, OMI=0.2, I <sub>r</sub> =I <sub>op</sub>	-	-60



## 1310nm DFB Lasers, 1GHz, Coax Package

DFB-1310-C5-2-A2-xx-x-x

- **Advanced Multiple Quantum Well (MQW) Distributed Feedback (DFB) Laser Design**
- **Low Distortion**
  - IMD2 max -50 dBc
  - IMD3 max -55 dBc
- **RIN < -145 dB/Hz**
- **Cost-effective Uncooled Laser Technology**
- **SMSR typ. 40 dB**
- **5.6-mm TO-style package with SMF pigtail**

### Applications

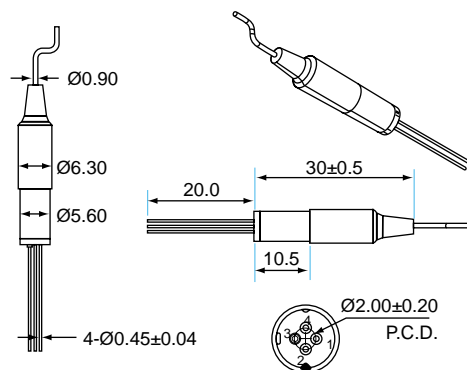
- **Wireless (CDMA, GSM, PCS) fiber-optic repeaters**
- **Analog transmission**

The DFB-1310-C5-2-A2-xx-x-x series of Multi-Quantum Well (MQW) Distributed Feedback (DFB) lasers have been designed specifically analog applications, especially wireless repeater applications.

The devices feature high output power, wide operating temperature range, low distortion characteristics, low RIN noise, and high side mode suppression.

Their uncooled, hermetically sealed, coaxial fiber-pigtailed packages are a cost-effective means of providing a highly linear light source for intermediate- reach and long-reach analog transmission applications.

### Dimensions (in mm)



### Pin Assignment

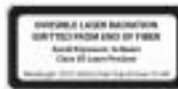
Type A	Type C
1. PD Cathode	PD Anode
2. PD Anode	LD Anode, PD Cathode
3. LD Anode, GRD	GRD
4. LD cathode	LD cathode

### Safety Information

All versions of this laser are Class 3B 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  $\mu$ m  
Maximum Power = 75mW  
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.**

\* IEC is a registered trademark of the International Electrotechnical Commission.  
\*\* ANSI is a registered trademark of the American National Standards Institute.

### Ordering Information

**DFB-1310-C5-2-A2-xx-x-x**

Connector	Temperature	Pin Assignment
SC=SC/PC	A=-20°C to 85°C	A= Pin Type A
FC=FC/PC	B=-20°C to 75°	C= Pin Type C
SA=SC/APC		
FA=FC/APC		
NC=No Connector		

### Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Max
Operating Case Temperature	°C	T <sub>c</sub>	I=I <sub>op</sub>	-20 85
Storage Temperature	°C	T <sub>stg</sub>	-	-40 100
Laser Forward Current	mA	I <sub>f</sub>	-	120
Laser Reverse Bias	V	V <sub>r</sub>	-	2
Photodiode Reverse Bias	V	V <sub>rpd</sub>	-	10

### Electrical and Optical Characteristics

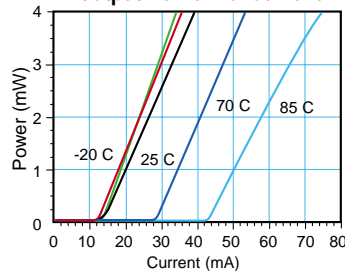
Parameter	Symbol	Min	Typ	Max	Test Conditions
Operating Temperature	°C	T	-20	85*	
Optical Output Power	mW	P <sub>o</sub>	2.0	2.5	CW
Threshold Current	mA	I <sub>th</sub>	-	12	T=25 °C
			-	35	T=85 °C
Operating Current	mA	I <sub>op</sub>	-	60	T=85 °C
Forward Voltage	V	V <sub>f</sub>	-	1.1	P <sub>o</sub> =2.0 mW
Center Wavelength	nm	$\lambda_c$	1280	1310	P <sub>o</sub> =2.0 mW, CW
Spectral Width (-20 dB)	nm	$\Delta\lambda$	-	0.1	P <sub>o</sub> =2.0 mW
Wavelength temperature coefficient	nm/°C	$\Delta\lambda/\Delta T$	-	0.09	
Side-mode Suppression Ratio	dB	SMSR	30	40	P <sub>o</sub> =2.0 mW
Monitor Current	$\mu$ A/mW	I <sub>mon</sub>	75	-	V <sub>R</sub> =5 V
Monitor Dark Current	nA	I <sub>D</sub>	-	-	V <sub>R</sub> =5 V
Tracking Error	dB	$\gamma$	-1	-	I <sub>mon</sub> =const, $\gamma$ =10 log (P <sub>f</sub> /2.0) [dB]
Optical Isolation	dB	ISO	30	35	-

Parameters are at 25 °C unless otherwise noted. \* See Ordering Options for operating temperature ranges available.

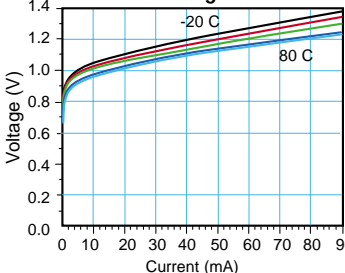
### RF Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions
Relative Intensity Noise	dB/Hz	RIN	-	-145	CW, P <sub>o</sub> =2.0 mW, f=300 MHz to 1000 MHz
Relaxation Oscillation Frequency	GHz	f <sub>r</sub>	4.5	-	P <sub>o</sub> =2.0mW
Modulation Bandwidth	GHz	BW	2.5	-	-3dB, P <sub>o</sub> =2mW
Second-Order Intermodulation	dBc	IMD2	-	-50	T=25 °C, P <sub>o</sub> =2 mW, OMI=0.1, Two-tone test, 13 MHz and 19 MHz, 7dB plus connector loss
Third-Order Intermodulation	dBc	IMD3	-	-55	T=25 °C, P <sub>o</sub> =2.0 mW, OMI=0.1, Two-tone test, 13 MHz and 19 MHz, 7dB plus connector loss, all peaks from 5MHz to 50MHz meet this level
Carrier-to-Noise ratio	dB	CNR	50	-	T=25 °C, P <sub>o</sub> =2.0 mW, OMI=0.1, ref. To one-tone: 5 MHz to 50 MHz, 7dB plus connector loss
RF Bandpass Flatness	dB	BF	-	1.0	Peak to valley, 5 MHz to 10000 MHz

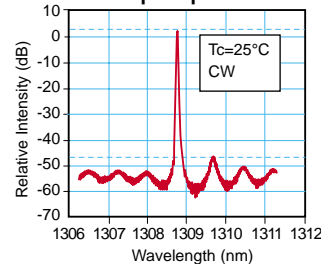
### Output Power vs. Current



### Forward Voltage vs. Current



### Output Spectrum





## 1310nm DFB Lasers, 300MHz, Coax Package

DFB-1310-C5-2-A-xx-x-x  
DFB-1310-C5-3-A-xx-x-x  
DFB-1310-C5-4-A-xx-x-x

- **Advanced Multiple Quantum Well (MQW) Distributed Feedback (DFB) Laser Design**
- **Low Distortion**
  - IMD2 max -50 dBc
  - IMD3 max -55 dBc
- **RIN < -145 dB/Hz**
- **Cost-effective Uncooled Laser Technology**
- **SMSR typ. 40 dB**
- **5.6-mm TO-style package with SMF pigtail**

### Applications

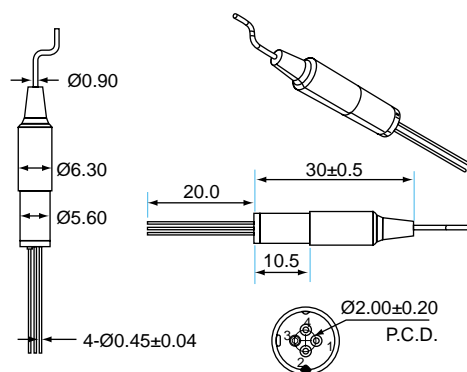
- **CATV Return-path**
- **Analog transmission**

These Multi-Quantum Well (MQW) Distributed Feedback (DFB) lasers have been designed specifically analog applications, especially CATV return-path.

The devices feature high output power, wide operating temperature range, low distortion characteristics, low RIN noise, and high side mode suppression.

Their uncooled, hermetically sealed, coaxial fibre pigtailed packages are a cost-effective means of providing a highly linear light source for intermediate-reach and long-reach analog transmission applications.

### Dimensions (in mm)



### Pin Assignment

Type A	Type C
1. PD Cathode	PD Anode
2. PD Anode	LD Anode, PD Cathode
3. LD Anode, GRD	GRD
4. LD cathode	LD cathode

### Safety Information

All versions of this laser are Class 3B 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  $\mu$ m  
Maximum Power = 75mW  
Single-mode fibre pigtail  
Fibre 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.**

\* IEC is a registered trademark of the International Electrotechnical Commission.  
\*\* ANSI is a registered trademark of the American National Standards Institute.

### Ordering Information

DFB-1310-C5-2-A-xx-x-x  
DFB-1310-C5-3-A-xx-x-x  
DFB-1310-C5-4-A-xx-x-x

Connector	Temperature	Pin Assignment
SC=SC/PC	A=-20°C to 85°C	A= Pin Type A
FC=FC/PC	B=-20°C to 75°	C= Pin Type C
SA=SC/APC		
FA=FC/APC		
NC=No Connector		

### Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Max
Operating Case Temperature	°C	T <sub>c</sub>	I=I <sub>op</sub>	-20 85
Storage Temperature	°C	T <sub>stg</sub>	-	-40 100
Laser Forward Current	mA	I <sub>f</sub>	-	120
Laser Reverse Bias	V	V <sub>r</sub>	-	2
Photodiode Reverse Bias	V	V <sub>rpd</sub>	-	10

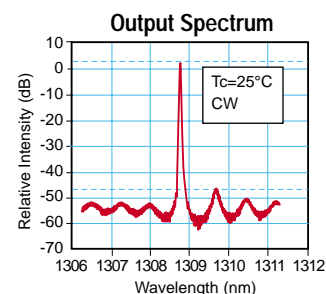
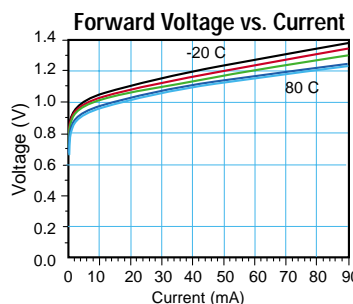
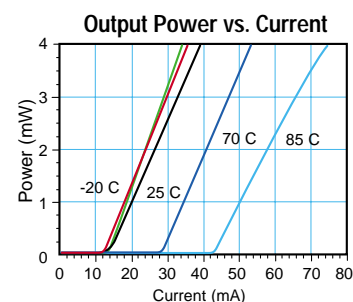
### Electrical and Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions
Operating Temperature	°C	T	-20	-	85*
Optical Output Power	mW	P <sub>o</sub>	2.0	2.2	- CW
Threshold Current	mA	I <sub>th</sub>	-	12	18
			-	35	50
			-	60	80
Operating Current	mA	I <sub>op</sub>	-	60	80
Forward Voltage	V	V <sub>F</sub>	-	1.1	1.6
Center Wavelength	nm	$\lambda_c$	1280	1310	1340
Spectral Width (-20 dB)	nm	$\Delta\lambda$	-	0.1	1.0
Wavelength temperature coefficient	nm/°C	$\Delta\lambda/\Delta T$	-	0.09	-
Side-mode Suppression Ratio	dB	SMSR	30	40	-
Monitor Current	$\mu$ A/mW	I <sub>mon</sub>	75	-	400
Monitor Dark Current	nA	I <sub>D</sub>	-	-	200
Tracking Error	dB	$\gamma$	-1	-	1
					I <sub>mon</sub> =const, $\gamma$ =10 log (P <sub>f</sub> /P <sub>min</sub> ) [dB]
Optical Isolation	dB	ISO	30	35	-

Parameters are at 25 °C unless otherwise noted. \* See Ordering Options for operating temperature ranges available.

### RF Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions
Relative Intensity Noise	dB/Hz	RIN	-	-	-145
					CW, P <sub>o</sub> =P <sub>min</sub> , f=5 MHz to 300 MHz
Relaxation Oscillation Frequency	GHz	f <sub>R</sub>	-	4.5	-
Modulation Bandwidth	GHz	BW	1.0	-	-
Second-Order Intermodulation	dBc	IMD2	-	-	-50
					T=25 °C, P <sub>o</sub> =P <sub>min</sub> , OMI=0.1, Two-tone test, 13 MHz and 19 MHz, 7dB plus connector loss
Third-Order Intermodulation	dBc	IMD3	-	-	-55
					T=25 °C, P <sub>o</sub> =P <sub>min</sub> , OMI=0.1, Two-tone test, 13 MHz and 19 MHz, 7dB plus connector loss, all peaks from 5MHz to 50MHz meet this level
Carrier-to-Noise ratio	dB	CNR	50	-	-
					T=25 °C, P <sub>o</sub> =P <sub>min</sub> , OMI=0.1, ref. To one-tone: 5 MHz to 50 MHz, 7dB plus connector loss
RF Bandpass Flatness	dB	BF	-	-	1.0
					Peak to valley, 5 MHz to 300 MHz





# 1310nm DFB Lasers, 860MHz, BFY Package

DFB-1310-BF-xx-Ax-xx

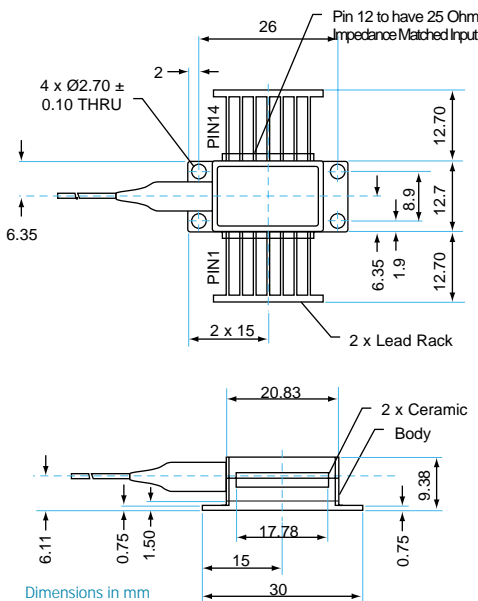
- Standard OC-48 pin compatibility
- Negative bias
- Optimized for PAL-D and NTSC channel counts
- Output power up to 31mW
- Meets GR 468 reliability specifications

### Applications

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

The DFB-1310-BF-xx-Ax-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.



### Pin Information

Pin No.	Description	Pin No.	Description
1	Thermistor	8	Case Ground
2	Thermistor	9	Case Ground
3	Dc Laser Bias (-)	10	NC
4	MPD Anode Case Ground (-)	11	Laser Common (+)
5	MPD Cathode (+)	12	Laser Modulation (-)
6	Thermoelectric Cooler (+)	13	Laser Common (+)
7	Thermoelectric Cooler (-)	14	NC

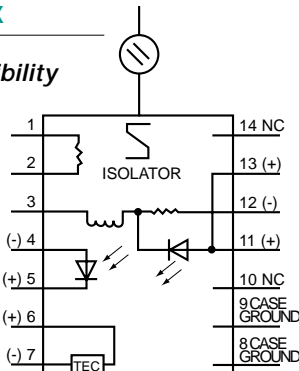


Figure 1: Laser Schematic

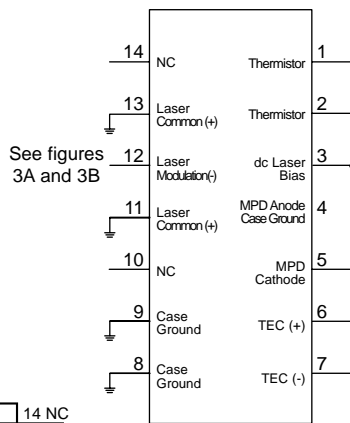


Figure 2: Circuit Diagram

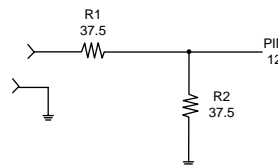


Figure 3B: Resistive-Matched Configuration

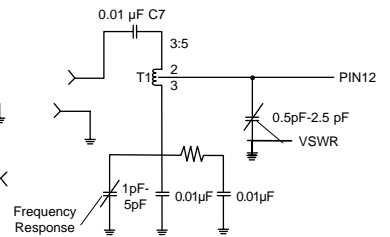


Figure 3A: Impedance-Matched Configuration

### Safety Information

All versions of this laser are Class 3B 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 = 1.5 µm  
Maximum Power = 100 mW  
Single-mode fibre pigtail  
Fibre 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.**

\*IEC is a registered trademark of the International Electrotechnical Commission  
\*\*ANSI is a registered trademark of the American National Standards Institute

### Ordering Information

#### DFB-1310-BF-xx-Ax-xx

Rated Output Power P <sub>o</sub>	Modulation	Connector
04 = 4mW	3 = Distortion Range 3	SC = SC/PC
06 = 6mW	4 = Distortion Range 4	FC = FC/PC
08 = 8mW	5 = Distortion Range 5	SA = SC/APC
10 = 10mW	6 = Distortion Range 6	FA = FC/APC
13 = 13mW		NC = No Connector
16 = 16mW		
19 = 19mW		
22 = 22mW		
25 = 25mW		
28 = 28mW		
31 = 31mW		

### Absolute Maximum Ratings

Parameter	Symbol	Conditions	Min	Max	
Operating Case Temperature	°C	T <sub>c</sub>	-20	65	
Storage Temperature	°C	T <sub>stg</sub>	-40	85	
Laser Forward Current	mA	I <sub>f</sub>	-	120	
Laser Reverse Bias	V	V <sub>r</sub>	-	2	
Photodiode Reverse Bias	V	V <sub>rpd</sub>	-	10	
TEC Current	A	I <sub>tec</sub>	-20°C < T <sub>c</sub> < +65°C, Top=25 °C I <sub>f</sub> =100 mA	-	1.5

### Electrical and Optical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max
Center Wavelength	nm	λ <sub>c</sub>	1290	1310	1330
Spectral Width (-20dB)	nm	Δλ	-	0.1	1.0
Optical Output Power*	mW	P <sub>o</sub>	4	-	31
Optical Isolation	dB	I <sub>s</sub>	30	-	-
Side-mode Suppression Ratio	dB	SMSR	30	-	-
Threshold Current	mA	I <sub>th</sub>	-	12	18
Operating Current	mA	I <sub>op</sub>	-	-	120
Forward Voltage	V	V <sub>F</sub>	-	1.2	1.7
Monitor Current	µA/mW	I <sub>mon</sub>	10	-	150
Monitor Dark Current	nA	I <sub>D</sub>	-	-	200
Operating Case Temperature	°C	T	-20	-	65
Tracking Error	dB	γ	-0.5	-	0.5
Thermistor Resistance	K	R <sub>t</sub>	9.5	-	10.5
Thermistor B Constant	K	B	-	3900	-
TEC Current	A	I <sub>c</sub>	-	-	1.0
TEC Voltage	V	V <sub>c</sub>	-	-	2.0

Parameters are over operating temperature range unless otherwise noted. \*See Ordering Options for operating powers available.

### RF Characteristics (NTSC 77)

Parameter	Symbol	Test Conditions	Min	Typ	Max
Frequency Range	MHz	F	45	-	860
Frequency Response	dB	S <sub>21</sub>	-	± 0.5	-
Relative Intensity Noise	dB/Hz	RIN	-	-155	-150

### Distortion

Parameter	Symbol	Test Conditions	Min	Typ	Max
<b>DFB-1310-BF-xx-A3-xx</b>					
Carrier to Noise Ratio	dB	CNR	53	-	-
Composite Second Order	dBc	CSO	-	-	-63
Composite Triple Beat	dBc	CTB	-	-	-70
<b>DFB-1310-BF-xx-A4-xx</b>					
Carrier to Noise Ratio	dB	CNR	53	-	-
Composite Second Order	dBc	CSO	-	-	-60
Composite Triple Beat	dBc	CTB	-	-	-67
<b>DFB-1310-BF-xx-A5-xx</b>					
Carrier to Noise Ratio	dB	CNR	51	-	-
Composite Second Order	dBc	CSO	-	-	-60
Composite Triple Beat	dBc	CTB	-	-	-65
<b>DFB-1310-BF-xx-A6-xx</b>					
Carrier to Noise Ratio	dB	CNR	53	-	-
Composite Second Order	dBc	CSO	-	-	-56
Composite Triple Beat	dBc	CTB	-	-	-58

Note 1: Test condition: P<sub>r</sub>= P<sub>i</sub>, OMI 3.2%, 77 unmodulated carriers (50 to 550 MHz), Received Power=-4 dBm.



## 1550nm DFB Lasers, 300MHz, Coax Package

DFB-1550-C5-2-A-xx-x-x

- **Advanced Multiple Quantum Well (MQW) Distributed Feedback (DFB) Laser Design**
- **Low Distortion**
  - IMD2 max -50 dBc
  - IMD3 max -55 dBc
- **RIN < -140 dB/Hz**
- **Cost-effective Uncooled Laser Technology**
- **SMSR typ. 40 dB**
- **5.6-mm TO-style package with SMF pigtail**

### Applications

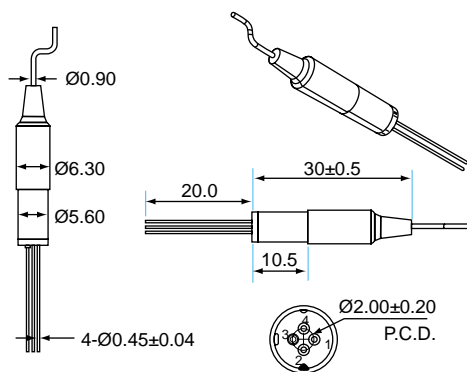
- **CATV Return-path**
- **Analog transmission**

The DFB-1550-C5-2-A-xx-x-x series of Multi-Quantum Well (MQW) Distributed Feedback (DFB) lasers have been designed specifically for analog applications, especially CATV return-path.

The devices feature high output power, wide operating temperature range, low distortion characteristics, low RIN noise, and high side mode suppression.

Their uncooled, hermetically sealed, coaxial fibre pigtailed packages are a cost-effective means of providing a highly linear light source for intermediate-reach and long-reach analog transmission applications.

### Dimensions (in mm)



### Pin Assignment

	Type A	Type C
1.	PD Cathode	PD Anode
2.	PD Anode	LD Anode, PD Cathode
3.	LD Anode, GRD	GRD
4.	LD cathode	LD cathode

### Safety Information

All versions of this laser are Class 3B 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 = 1.5  $\mu$ m  
 Maximum Power = 75mW  
 Single-mode fibre pigtail  
 Fibre 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.**

\* IEC is a registered trademark of the International Electrotechnical Commission.  
 \*\* ANSI is a registered trademark of the American National Standards Institute.

### Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Max
Operating Case Temperature	$^{\circ}$ C	Tc	I=Iop	-20 85
Storage Temperature	$^{\circ}$ C	Tstg	-	-40 100
Laser Forward Current	mA	If	-	150
Laser Reverse Bias	V	Vr	-	2
Photodiode Reverse Bias	V	Vrpd	-	10

### Electrical and Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions	
Operating Temperature	$^{\circ}$ C	T	-20	-	85*	
Optical Output Power	mW	Po	2.0	-	CW	
Threshold Current	mA	Ith	-	14	T=25 $^{\circ}$ C	
			-	40	T=85 $^{\circ}$ C	
Operating Current	mA	Iop	-	60	T=85 $^{\circ}$ C	
Forward Voltage	V	Vf	-	1.1	1.6	Po=2.0 mW
Center Wavelength	nm	$\lambda$ c	1530	1550	1570	Po=2.0 mW, CW
Spectral Width (-20 dB)	nm	$\Delta\lambda$	-	0.1	1.0	Po=2.0 mW
Wavelength temperature coefficient	nm/ $^{\circ}$ C	$\Delta\lambda/\Delta T$	-	0.11	-	
Side-mode Suppression Ratio	dB	SMSR	30	40	-	Po=2.0 mW
Monitor Current	$\mu$ A/mW	I <sub>mon</sub>	25	-	375	V <sub>rpd</sub> =5 V
Monitor Dark Current	nA	ID	-	-	200	V <sub>rpd</sub> =5 V
Tracking Error	dB	$\gamma$	-1	-	1	I <sub>mon</sub> =const, $\gamma$ =10 log (Po/2.0) [dB]
Optical Isolation	dB	ISO	30	-	-	

Parameters are at 25  $^{\circ}$ C unless otherwise noted.

\* See Ordering Options for operating temperature ranges available.

### RF Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions	
Relative Intensity Noise	dB/Hz	RIN	-	-	-140	CW, Po=2.0 mW, f=5 MHz to 300 MHz
Second-Order Intermodulation	dBc	IMD2	-	-	-50	T=25 $^{\circ}$ C, Po=2.0 mW, OMI=0.1, Two-tone test, 13 MHz and 19 MHz, Receiver power: -4 dBm
Third-Order Intermodulation	dBc	IMD3	-	-	-55	T=25 $^{\circ}$ C, Po=2.0 mW, OMI=0.1, Two-tone test, 13 MHz and 19 MHz, Receiver power: -4 dBm
Carrier-to-Noise ratio	dB	CNR	50	-	-	T=25 $^{\circ}$ C, Po=2.0 mW, OMI=0.1, ref. To one-tone: 5 MHz to 50 MHz, Receiver power: -4 dBm
RF Bandpass Flatness	dB	BF	-	-	1.0	Peak to valley, 5 MHz to 300 MHz



### Ordering Information

DFB-1550-C5-2-A-xx-x-x

Connector	Temperature	Pin Assignment
SC=SC/PC	A=-20 $^{\circ}$ C to 85 $^{\circ}$ C	A= Pin Type A
FC=FC/PC	B=-20 $^{\circ}$ C to 75 $^{\circ}$	C= Pin Type C
SA=SC/APC		
FA=FC/APC		
NC=No Connector		



## 1550nm DFB Lasers, 3GHz, Coax Package

DFB-1550-C5-2-A-xx-A-x

- **Advanced Multiple Quantum Well (MQW) Distributed Feedback (DFB) Laser Design**
- **Low Distortion**
  - IMD2 -50 dBc
  - IMD3 -55 dBc
- **RIN < -135 dB/Hz**
- **Cost-effective Uncooled Laser Technology**
- **SMSR typ. 40 dB**
- **5.6-mm TO-style package, with SMF fibre pigtail**

### Applications

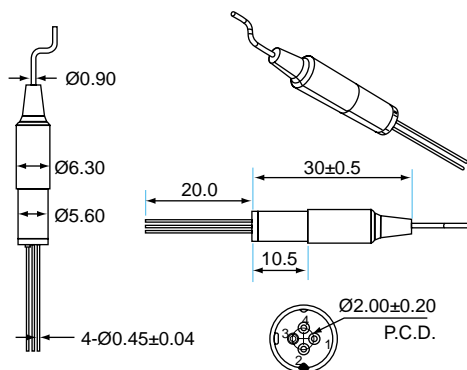
- **CATV Return-path**
- **Analog transmission**

The DFB-1550-C5-2-A-xx-x series of Multi-Quantum Well (MQW) Distributed Feedback (DFB) lasers have been designed specifically analog applications, especially CATV return-path.

The devices feature high output power, wide operating temperature range, low distortion characteristics, low RIN noise, and high side mode suppression.

Their uncooled, hermetically sealed, coaxial fibre-pigtailed packages are a cost-effective means of providing a highly linear light source for intermediate-reach and long-reach analog transmission applications.

Dimensions (in mm)



### Pin Assignment

	Type A	Type C
1.	PD Cathode	PD Anode
2.	PD Anode	LD Anode, PD Cathode
3.	LD Anode, GRD	GRD
4.	LD cathode	LD cathode

### Safety Information

All versions of this laser are Class 3B 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 = 1.5  $\mu$ m  
 Maximum Power = 75mW  
 Single-mode fibre pigtail  
 Fibre 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.**

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

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



### Ordering Information

DFB-1310-C5-2-A-xx-A-x

Connector	Pin Assignment
SC=SC/PC	A= Pin Type A
FC=FC/PC	C= Pin Type C
SA=SC/APC	
FA=FC/APC	
NC=No Connector	

### Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Max
Operating Case Temperature	$^{\circ}$ C	Tc	-20	70
Storage Temperature	$^{\circ}$ C	Tstg	-40	100
Laser Forward Current	mA	If	-	150
Laser Reverse Bias	V	Vr	-	2
Photodiode Reverse Bias	V	Vrpd	-	10

### Electrical and Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions
Operating Temperature	$^{\circ}$ C	T	-20	-	70
Optical Output Power	mW	P <sub>o</sub>	2.0	-	CW
Threshold Current	mA	I <sub>th</sub>	-	17	25
			-	40	55
			-	85	110
Operating Current	mA	I <sub>op</sub>	-	85	110
Forward Voltage	V	V <sub>F</sub>	-	1.1	1.6
Center Wavelength	nm	$\lambda_c$	1530	1550	1570
Spectral Width (-20 dB)	nm	$\Delta\lambda$	-	0.1	1.0
Wavelength temperature coefficient	nm/ $^{\circ}$ C	$\Delta\lambda/\Delta T$	-	0.11	-
Side-mode Suppression Ratio	dB	SMSR	30	40	-
Monitor Current	$\mu$ A/mW	I <sub>mon</sub>	75	-	400
Monitor Dark Current	nA	I <sub>D</sub>	-	-	200
Tracking Error	dB	$\gamma$	-1	-	1
					I <sub>mon</sub> =const, $\gamma$ =10 log (Po/2.0) [dB]
Optical Isolation	dB	ISO	30	35	-

### RF Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions
Relative Intensity Noise	dB/Hz	RIN	-	-	-135
					CW, P <sub>o</sub> =2.0 mW, f=5 MHz to 300 MHz
Modulation Bandwidth	GHz	BW	3	-	-3dB, P <sub>o</sub> =2mW
Second-Order Intermodulation	dBc	IMD2	-	-	-50
					T=25 $^{\circ}$ C, P <sub>o</sub> =2 mW, OMI=0.1, Two-tone test, 13 MHz and 19 MHz, 7dB plus connector loss
Third-Order Intermodulation	dBc	IMD3	-	-	-55
					T=25 $^{\circ}$ C, P <sub>o</sub> =2.0 mW, OMI=0.1, Two-tone test, 13 MHz and 19 MHz, 7dB plus connector loss, all peaks from 5MHz to 50MHz meet this level
Carrier-to-Noise ratio	dB	CNR	50	-	-
					T=25 $^{\circ}$ C, P <sub>o</sub> =2.0 mW, OMI=0.1, ref. To one-tone: 5 MHz to 50 MHz, 7dB plus connector loss
RF Bandpass Flatness	dB	BF	-	-	1.0
					Peak to valley, 5 MHz to 300 MHz



## 1550nm DFB Lasers, 860MHz, BFY Package

DFB-1550-BF-xx-A3-xx

- Standard OC-48 pin compatibility
- Negative bias
- Optimized for PAL-D and NTSC channel counts
- Output power up to 10 mW
- Meets GR 468 reliability specifications

### Applications

- CATV forward-path
- 1550-nm broadcast and point-to-point applications

The DFB-1550-BF-xx-A3-xx DFB laser modules are designed for forward-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 77 channels. The combination of high performance and very reasonable price make these modules the most cost-effective CATV transmitter solutions in the industry.

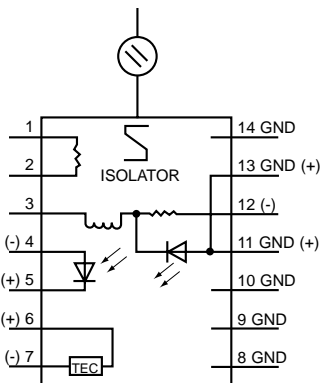


Figure 1: Laser Schematic

### Ordering Information

DFB-1550-BF-xx-A3-xx

Rated Output Power P <sub>r</sub>	Connector
06 = 6mW	SC = SC/PC
08 = 8mW	FC = FC/PC
10 = 10mW	SA = SC/APC
	FA = FC/APC
	NC = No Connector

### Safety Information

All versions of this laser are Class 3B 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.

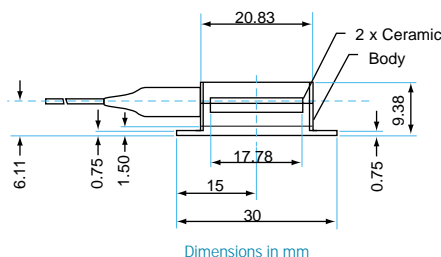
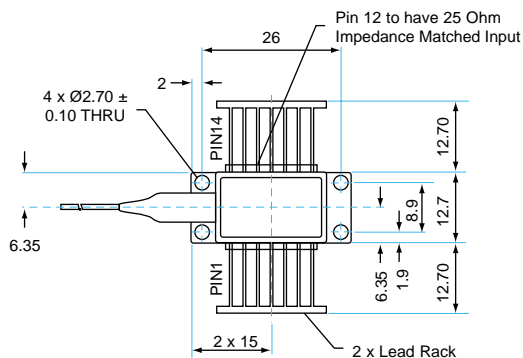
Wavelength = 1.5 μm  
Maximum Power = 100 mW  
Single-mode fibre pigtail  
Fibre Numerical Aperture = 0.14

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.**

\*IEC is a registered trademark of the International Electrotechnical Commission  
\*\*ANSI is a registered trademark of the American National Standards Institute



### Pin Information

Pin No.	Description	Pin No.	Description
1	Thermistor	9	Case Ground
2	Thermistor	10	Case Ground
3	Dc Laser Bias (-)	11	Laser Common (+)
4	MPD Anode Case Ground (-)		Case Ground
5	MPD Cathode (+)	12	Laser Modulation (-)
6	Thermoelectric Cooler (+)	13	Laser Common (+)
7	Thermoelectric Cooler (-)		Case Ground
8	Case Ground	14	Case Ground

### Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Max
Operating Case Temperature	T <sub>c</sub>	I=I <sub>op</sub>	-20	65
Storage Temperature	T <sub>stg</sub>	-	-40	85
Laser Forward Current	I <sub>f</sub>	-	-	120
Laser Reverse Bias	V <sub>r</sub>	-	-	2
Photodiode Reverse Bias	V <sub>rpd</sub>	-	-	10
TEC Current	I <sub>tec</sub>	-20 °C < T <sub>c</sub> < +65 °C, Top=25 °C If=100 mA	-	1.5

### Electrical and Optical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max
Center Wavelength	λ <sub>c</sub>	P <sub>o</sub> = P <sub>r</sub> , CW	1530	1545	1560
Optical Output Power*	P <sub>o</sub>	CW, T <sub>L</sub> =25 °C	6.0	-	10.0
Optical Isolation	I <sub>s</sub>	T=25 °C	30	-	-
Side-mode Suppression Ratio	SMSR	P <sub>o</sub> = P <sub>r</sub>	30	-	-
Threshold Current	I <sub>th</sub>	T <sub>L</sub> =25 °C	-	14	20
Operating Current	I <sub>op</sub>	P <sub>o</sub> = P <sub>r</sub>	-	80	120
Forward Voltage	V <sub>F</sub>	P <sub>o</sub> = P <sub>r</sub>	-	1.2	1.9
Monitor Current	I <sub>mon</sub>	V <sub>rpd</sub> =5V	15	-	150
Monitor Dark Current	I <sub>D</sub>	V <sub>rpd</sub> =5V	-	-	200
Operating Case Temperature	T	-	-20	-	65
Tracking Error	γ	I <sub>mon</sub> =const, γ=10 log (P <sub>o</sub> /P <sub>r</sub> ) [dB]	-0.5	-	0.5
Thermistor Resistance	R <sub>t</sub>	T=25 °C	9.5	-	10.5
Thermistor B Constant	B	T=25 °C	-	3900	-
TEC Current	I <sub>c</sub>	ΔT=40 °C	-	-	1.5
TEC Voltage	V <sub>c</sub>	ΔT=40 °C	-	-	2.0

Parameters are over operating temperature range unless otherwise noted. \*See Ordering Options for operating powers available.

### RF Characteristics (NTSC 77)

Parameter	Symbol	Test Conditions	Min	Typ	Max
Frequency Range	F	-	45	-	860
Frequency Response	S <sub>21</sub>	I <sub>f</sub> =I <sub>op</sub> 45MHz - 860MHz T=25 °C	-	± 0.5	-
Relative Intensity Noise	RIN	CW, P <sub>o</sub> = P <sub>r</sub> , f=45 MHz to 860MHz, Optical reflection=-40dB	-	-155	-
Composite Second Order Distortion	CSO	Note 1	-	-	-51
Composite Triple Beat	CTB	Note 1	-	-	-63
Carrier to Noise Ratio	CNR	Note 1	51	-	-

Note 1: Test condition: P<sub>o</sub>= P<sub>r</sub>, OMI=3.2%/ch., 77 unmodulated carriers (50 to 550 MHz), received power= 0 dBm.



# 1550nm DFB Lasers, 860MHz, BFY Package

## DFB-1550-BF-10-Ax-xx

The DFB-1550-BF-10-Ax-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.

- Standard OC-48 pin compatibility
- Negative bias
- Optimized for PAL-D and NTSC channel counts
- Output power to 10 mW
- Meets GR 468 reliability specifications

### Applications

- CATV forward and return path
- 1550-nm broadcast and point-to-point applications

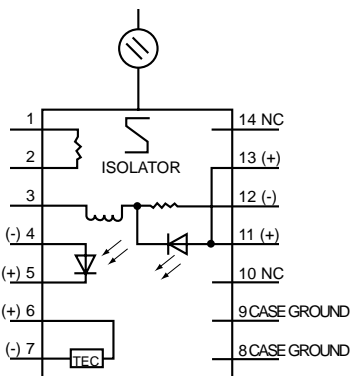


Figure 1: Laser Schematic

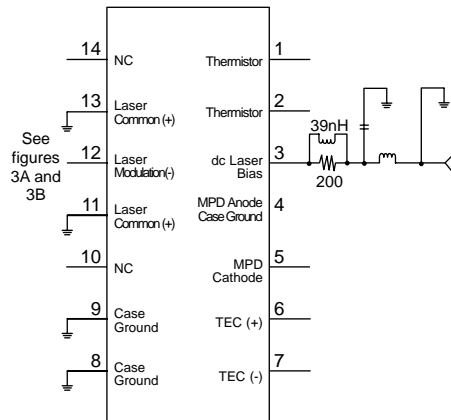


Figure 2: Circuit Diagram

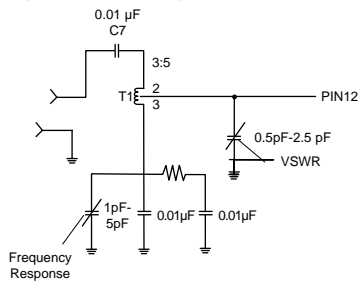


Figure 3A: Impedance-Matched Configuration

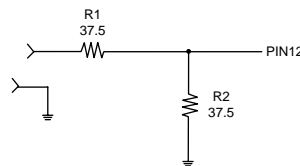


Figure 3B: Resistive-Matched Configuration

### Safety Information

All versions of this laser are Class 3B 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 = 1.5 μm  
Maximum Power = 100 mW  
Single-mode fibre pigtail  
Fibre 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.**

\*IEC is a registered trademark of the International Electrotechnical Commission  
\*\*ANSI is a registered trademark of the American National Standards Institute



### Ordering Information

#### DFB-1550-BF-10-Ax-xx

Modulation	Connector
3 = Distortion Range 3	SC = SC/PC
4 = Distortion Range 4	FC = FC/PC
5 = Distortion Range 5	SA = SC/APC
6 = Distortion Range 6	FA = FC/APC
	NC = No Connector

### Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Max
Operating Case Temperature	°C	T <sub>c</sub>	-20	65
Storage Temperature	°C	T <sub>stg</sub>	-40	85
Laser Forward Current	mA	I <sub>f</sub>	-	120
Laser Reverse Bias	V	V <sub>r</sub>	-	2
Photodiode Reverse Bias	V	V <sub>rpd</sub>	-	10
TEC Current	A	I <sub>tec</sub>	-20 °C < T <sub>c</sub> < +65 °C, Top=25 °C I <sub>f</sub> =100 mA	1.5

### Electrical and Optical Characteristics

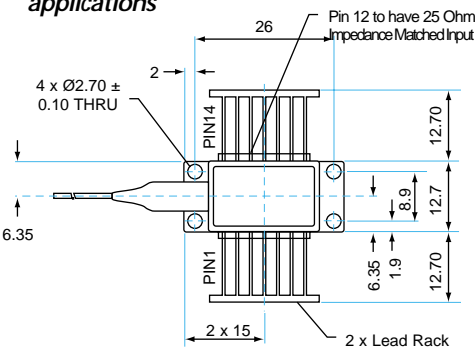
Parameter	Symbol	Test Conditions	Min	Typ	Max
Center Wavelength	nm	λ <sub>c</sub>	1530	1545	1560
Optical Output Power*	mW	P <sub>o</sub>	10.0	-	-
Optical Isolation	dB	I <sub>s</sub>	30	-	-
Side-mode Suppression Ratio	dB	SMSR	30	-	-
Threshold Current	mA	I <sub>th</sub>	-	20	35
Operating Current	mA	I <sub>op</sub>	-	120	150
Forward Voltage	V	V <sub>F</sub>	-	1.2	1.9
Monitor Current	μA/mW	I <sub>mon</sub>	15	-	150
Monitor Dark Current	nA	I <sub>D</sub>	-	-	200
Operating Case Temperature	°C	T	-20	-	65
Tracking Error	dB	γ	-0.5	-	0.5
Thermistor Resistance	K	R <sub>t</sub>	9.5	-	10.5
Thermistor B Constant	K	B	-	3900	-
TEC Current	A	I <sub>c</sub>	-	-	1.0
TEC Voltage	V	V <sub>C</sub>	-	-	2.0

Parameters are over operating temperature range unless otherwise noted. \*See Ordering Options for operating powers available.

### RF Characteristics (NTSC 77)

Parameter	Symbol	Test Conditions	Min	Typ	Max
Frequency Range	MHz	F	45	-	860
Frequency Response	dB	S <sub>21</sub>	-	± 0.5	-
Relative Intensity Noise	dB/Hz	RIN	-	-155	-
Composite Second Order Distortion	dBc	CSO	-	-	-50
Composite Triple Beat	dBc	CTB	-	-	-60
Carrier to Noise Ratio	dB	CNR	-	53	-

Note 1: Test condition: P<sub>o</sub> = 10mW, OMI 10%, eight channels, Received Power = -4dBm. Note 2: Measured at 42MHz  
Note 3: Measured at 553.25MHz, 577.25MHz, and 595.25MHz



Dimensions in mm

### Pin Information

Pin No.	Description	Pin No.	Description
1	Thermistor	8	Case Ground
2	Thermistor	9	Case Ground
3	Dc Laser Bias (-)	10	NC
4	MPD Anode Case Ground (-)	11	Laser Common (+)
5	MPD Cathode (+)	12	Laser Modulation (-)
6	Thermoelectric Cooler (+)	13	Laser Common (+)
7	Thermoelectric Cooler (-)	14	NC



## 15XXnm DFB Lasers, 300MHz, Coax Package

DFB-1xxx-C5-2-A-xx-x-x

- **Advanced Multiple Quantum Well (MQW) Distributed Feedback (DFB) Laser Design**
- **Low Distortion**
  - IMD2 -50 dBc
  - IMD3 -55 dBc
- **RIN < -145 dB/Hz**
- **Cost-effective Uncooled Laser Technology**
- **SMSR typ. 40 dB**
- **5.6-mm TO-style package with SMF pigtail**

### Applications

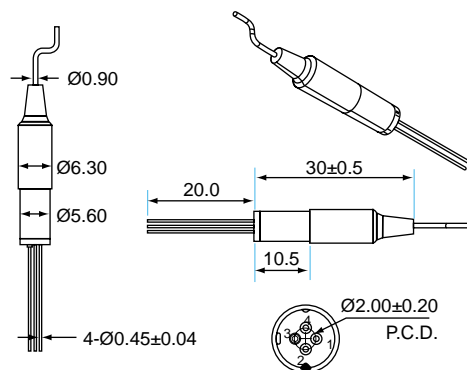
- **CATV Return-path**
- **Analog transmission**

The DFB-1xxx-C5-2-A-xx-x-x series of Multi-Quantum Well (MQW) Distributed Feedback (DFB) lasers have been designed specifically analog applications, especially CATV return-path.

The devices feature multiple available wavelengths on the ITU CWDM grid, low distortion characteristics, low RIN noise, and high side mode suppression.

Their uncooled, hermetically sealed, coaxial fibre-pig-tailed packages are a cost-effective means of providing a highly linear light source for intermediate- reach and long-reach analog transmission applications.

### Dimensions (in mm)



### Pin Assignment

	Type A	Type C
1.	PD Cathode	PD Anode
2.	PD Anode	LD Anode, PD Cathode
3.	LD Anode, GRD	GRD
4.	LD cathode	LD cathode

### Safety Information

All versions of this laser are Class 3B 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 = 1.5  $\mu$ m  
 Maximum Power = 75mW  
 Single-mode fibre pigtail  
 Fibre 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.**

\* IEC is a registered trademark of the International Electrotechnical Commission.  
 \*\* ANSI is a registered trademark of the American National Standards Institute.



### Ordering Information

DFB-1xxx-C5-2-A-xx-x-x

Wavelength	Connector	Temperature	Pin Assignment
510=1510nm	SC=SC/PC	A=-20°C to 85°C	A= Pin Type A
530=1530nm	FC=FC/PC	B=-20°C to 75°	C= Pin Type C
550=1550nm	SA=SC/APC		
570=1570nm	FA=FC/APC		
	NC=No Connector		

### Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Max
Operating Case Temperature	$^{\circ}$ C	Tc	-20	75
Storage Temperature	$^{\circ}$ C	Tstg	-40	100
Laser Forward Current	mA	If	-	120
Laser Reverse Bias	V	Vr	-	2
Photodiode Reverse Bias	V	Vrpd	-	10

### Electrical and Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions
Operating Temperature	$^{\circ}$ C	T	-20	75*	
Optical Output Power	mW	P <sub>o</sub>	2.0	-	CW
Threshold Current	mA	I <sub>th</sub>	-	14	T=25 $^{\circ}$ C
			-	35	T=75 $^{\circ}$ C
Operating Current	mA	I <sub>op</sub>	-	70	T=75 $^{\circ}$ C
Forward Voltage	V	V <sub>F</sub>	-	1.1	P <sub>o</sub> =2.0 mW
Center Wavelength	nm	$\lambda_c$	1510	-	P <sub>o</sub> =2.0 mW, CW
Center Wavelength Accuracy	nm	$\Delta\lambda_{acc}$	-3	-	P <sub>o</sub> =2.0mW, CW, T=25 $^{\circ}$ C
Spectral Width (-20 dB)	nm	$\Delta\lambda$	-	0.1	P <sub>o</sub> =2.0 mW
Wavelength temperature coefficient	nm/ $^{\circ}$ C	$\Delta\lambda/\Delta T$	-	0.11	
Side-mode Suppression Ratio	dB	SMSR	30	40	P <sub>o</sub> =2 mW
Monitor Current	$\mu$ A/mW	I <sub>mon</sub>	75	-	V <sub>rpd</sub> =5 V
Monitor Dark Current	nA	I <sub>d</sub>	-	200	V <sub>rpd</sub> =5 V
Tracking Error	dB	$\gamma$	-1	-	I <sub>mon</sub> =const, $\gamma$ =10 log (Po/2.0) [dB]
Optical Isolation	dB	ISO	30	35	-

Parameters are at 25  $^{\circ}$ C unless otherwise noted.

\* See Ordering Options for operating temperature ranges available.

### RF Characteristics

Parameter	Symbol	Min	Typ	Max	Test Conditions
Relative Intensity Noise	dB/Hz	RIN	-	-145	CW, P <sub>o</sub> =2.0 mW, f=5 MHz to 300 MHz
Relaxation Oscillation Frequency	GHz	f <sub>R</sub>	-	4.5	P <sub>o</sub> =2.0mW
Modulation Bandwidth	GHz	BW	1.0	-	-3dB, P <sub>o</sub> =2.0mW
Second-Order Intermodulation	dBc	IMD2	-	-50	T=25 $^{\circ}$ C, P <sub>o</sub> =2 mW, OMI=0.1, Two-tone test, 13 MHz and 19 MHz, 7dB plus connector loss
Third-Order Intermodulation	dBc	IMD3	-	-55	T=25 $^{\circ}$ C, P <sub>o</sub> =2.0 mW, OMI=0.1, Two-tone test, 13 MHz and 19 MHz, 7dB plus connector loss, all peaks from 5MHz to 50MHz meet this level
Carrier-to-Noise ratio	dB	CNR	50	-	T=25 $^{\circ}$ C, P <sub>o</sub> =2.0 mW, OMI=0.1, ref. To one- tone: 5 MHz to 50 MHz, 7dB plus connector loss
RF Bandpass Flatness	dB	BF	-	1.0	Peak to valley, 5 MHz to 300 MHz



## Analogue Device

### PD TO

Part Number	Active Diameter ( $\mu\text{m}$ )	Linearity IMD2	Application
R-11-040A-G-B-C	40	-70 dBc	Forward path Analog CATV Optical Receivers
R-11-075A-G-B-C	75	-70 dBc	Forward path Analog CATV Optical Receivers

### LD Module

Part Number	Wavelength (nm)	Laser	CSO	Package Feature	Application
C-13-001A-P-SXXXI/APC	1310	FP	-50 dBc	Pigtail	For Analog Fiber-optics application
C-13-DFBA-P-SXXXI/APC	1310	DFB	-50 dBc	Pigtail	For Analog Fiber-optics application

*\*XXX: For specifying connector type and power range.*

### PD Module

Part Number	Active Diameter ( $\mu\text{m}$ )	Package	Application
R-11-040A-P-SXX	40	Pigtail	Forward path Analog CATV Optical Receivers
R-11-075A-P-SXX	75	Pigtail	Forward path Analog CATV Optical Receivers

*\*XX: For specifying connector type.*