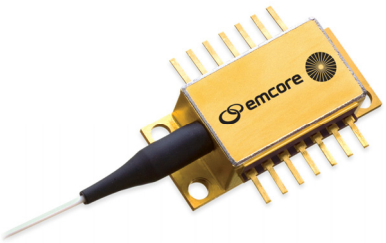
# 1612A/B 1310 nm DFB Laser Module

DATASHEET | FEBRUARY 2016 CATV




## Applications

- 1310 nm Forward Path/Return Path
- Broadcast and Narrowcast Networks
- Long Distances
- High Optical Splits

## Features

- OC-48 Pinout Compatible
- Telcordia® Technologies 468 Compliant
- 79 Channel Count
- Up to 31 mW
- Wide Temperature Range – Stable even in Harsh Environments

The 1612A/B 1310 nm forward path DFB laser modules are designed for both broadcast and narrowcast analog applications. The highly linear OC-48 pinout compatible devices feature options up to 31mW of minimum optical output power with superior distortion performance over an enhanced temperature range of 40°C to +85°C.

## Performance Highlights

| Parameter | Min | Typical | Max | Units |
|---|---|---|---|---|
| Wavelength | 1300 | - | 1320 | nm |
| Optical Output Power (multiple versions) | 4-31 | - | - | mW |
| Temperature Range | -40 | - | +85 | °C |
| Frequency Range | 5 | - | 1002 | MHz |
| Carrier to Noise Ratio | 51 | - | - | dB |
| Composite Second Order (multiple versions) | 55-60 | - | - | dB |
| Composite Triple Beat | 65 | - | - | dB |

GENUINE ORTEL TECHNOLOGY

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## Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

| Parameter | Symbol | Condition | Min | Max | Unit |
|---|---|---|---|---|---|
| Operating Temperature Range | $T_C$ | Continuous | -40 | +85 | °C |
| Storage Temperature Range | $T_{STG}$ | - | -40 | +85 | °C |
| Laser Forward dc Current | - | - | - | 150 | mA |
| Photodiode Reverse Voltage | $V_{RPD}$ | - | - | 10 | V |
| Laser Reverse Voltage, dc | - | - | - | 1 | V |
| ESD | - | HBM: R = 1500 Ohm, C = 100pF | -500 | 500 | V |
| TEC Current | $I_{TEC}$ | Continuous | -1.9 | 1.9 | A |

## Electrical/Optical Characteristics

Laser Temperature (TL) = 25°C, $I_F$=$I_{OP}$, Beginning of Life (BOL)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Wavelength | - | - | 1300 | - | 1320 | nm |
| Optical Output Power | - | 1612-xxxx-04 version<br>See ordering page for options<br>1612-xxxx-31 version | 4<br>.<br>31 | -<br><br>- | -<br><br>- | mW<br><br>mW |
| Optical Isolation | ISO | - | 30 | - | - | dB |
| Optical Return Loss | ORL | Tc | 40 | - | - | dB |
| Sidemode Suppression Ratio | SMSR | - | 35 | - | - | dB |
| Threshold Current | $I_{TH}$ | - | - | - | 20 | mA |
| Operating Current | $I_{OP}$ | varies with power option | - | - | 120 | mA |
| Monitor PD Responsivity | $r_{PD}$ | $V_{RM}$=5V | 10 | - | 200 | µA/mW |
| Thermistor Resistance | $R_{TH}$ | $T_{OP}$=25 °C | 9.5 | 10 | 10.5 | KOhm |
| Thermistor Temp. Coefficient | $TC_{TH}$ | $T_{OP}$=25 °C | - | -4.4 | - | %/°C |
| TEC Current | $I_{TEC}$ | -40<$T_C$<+85°C, $I_F$ = 100 mA | -1.5 | - | 1.6 | A |
| Fiber Length | - | May include splice | 1.0 | 1.5 | - | m |
| Fiber Buffer | - | - | - | 900 | - | µm |
| Fiber Core / Cladding | - | - | - | 9/125 | - | µm |



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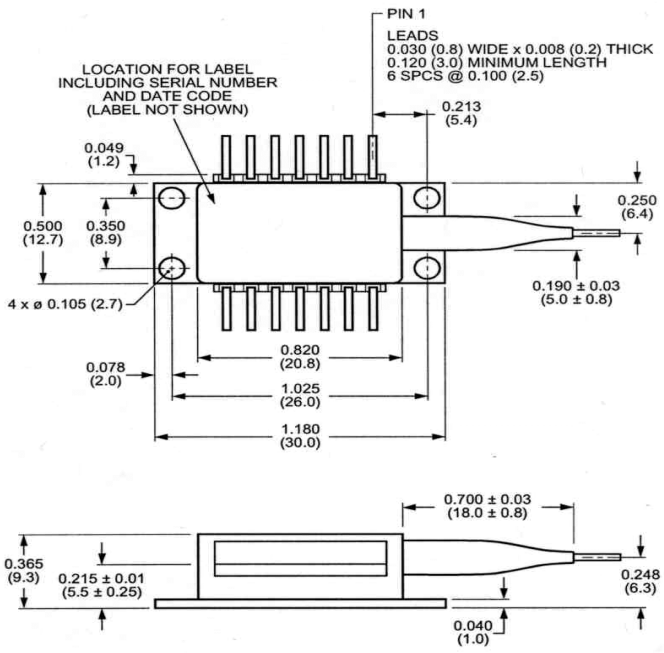
## RF Characteristic

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Frequency Range | F | - | 5 | - | 1002 | MHz |
| Frequency Response | S21 | $I_F$ = 60 mA, 5 MHz-1002 MHz | - | - | ±0.75 | dB |
| Carrier-to-Noise Ratio | CNR | - | 51 | - | - | dB |
| Comp. Second Order, 1612A | CSO | 4, 6, 8 mW options<br>≥ 10 mW options | 55<br>57 | -<br>- | -<br>- | dB<br>dB |
| Comp. Second Order, 1612B | CSO | - | 60 | - | - | dB |
| Composite Triple Beat, 1612A/B | CTB | - | 65 | - | - | dB |
| Relative Intensity Noise | RIN | - | - | <-155 | - | dB/Hz |

OMI = 3.7% for 79ch NTSC
In order to prevent reflection-induced distortion, the laser must be connected to an optical cable having a return loss of at least 55 dB for discrete reflections and 30 dB for distributed reflections.

## Outline Drawing (dimensions are in inches & mm)







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## Electrical Schematics

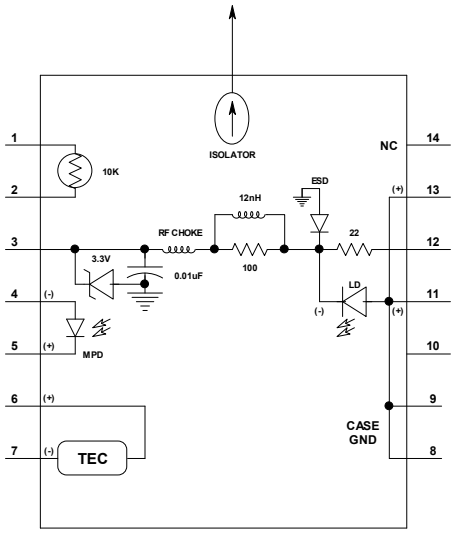


Figure 1. 1612A/B Laser Schematic

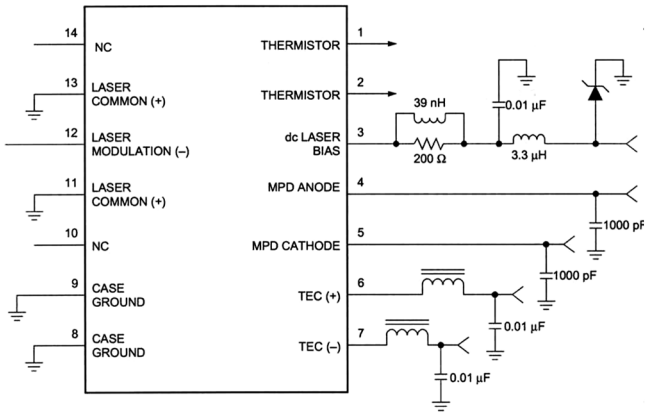


Figure 2. 1612A/B Circuit Schematic

## Pin Definitions

| Pin | Description |
|---|---|
| 1 | Thermistor |
| 2 | Thermistor |
| 3 | Dc Laser Bias (-) |
| 4 | MPD Anode (-) |
| 5 | MPD Cathode (+) |
| 6 | Thermal Electric Cooler (+) |
| 7 | Thermal Electric Cooler (-) |
| 8 | Case Ground |
| 9 | Case Ground |
| 10 | NC |
| 11 | Laser Common (+) |
| 12 | Laser Modulation (-) |
| 13 | Laser Common (+) |



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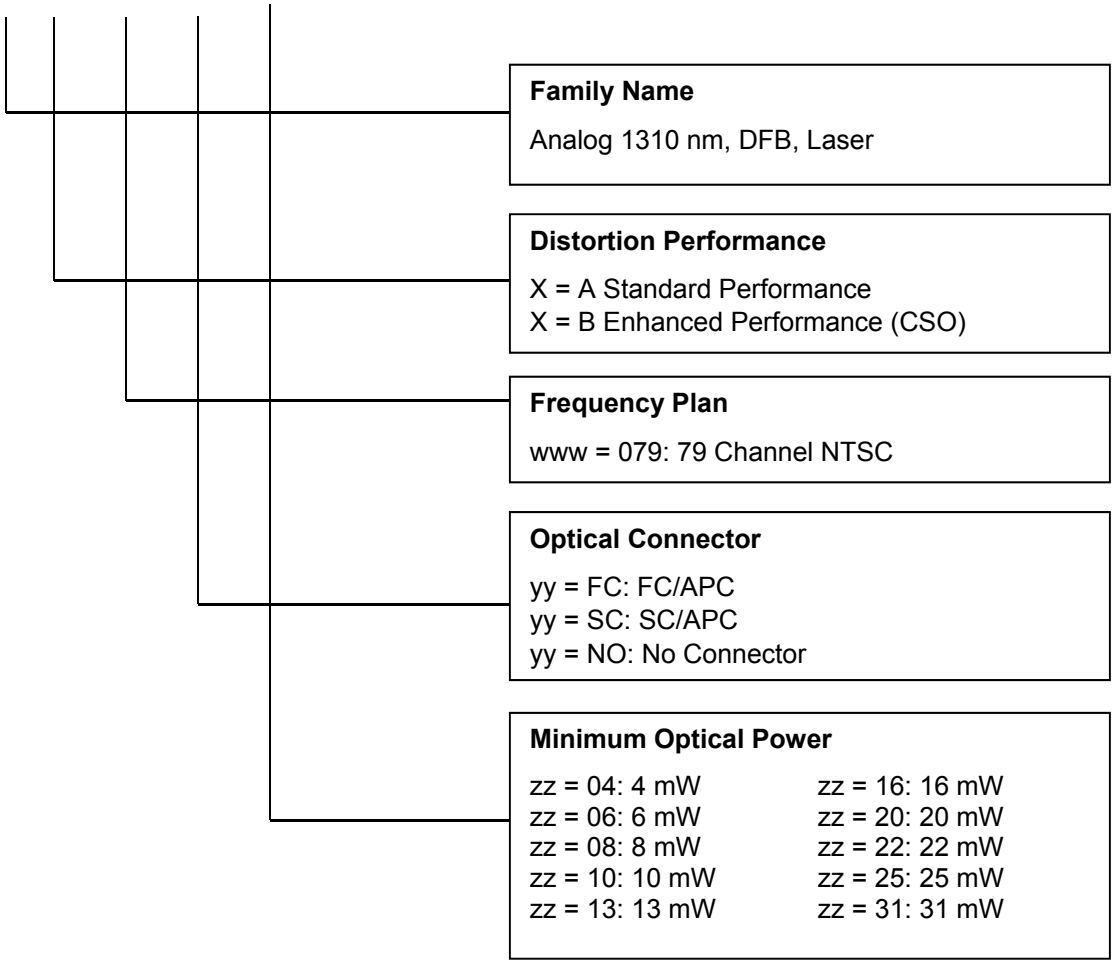
## Ordering Code Definitions

**1612x – www – yy – zz**



**Family Name**

Analog 1310 nm, DFB, Laser

**Distortion Performance**

X = A Standard Performance
X = B Enhanced Performance (CSO)

**Frequency Plan**

www = 079: 79 Channel NTSC

**Optical Connector**

yy = FC: FC/APC
yy = SC: SC/APC
yy = NO: No Connector

**Minimum Optical Power**

| | |
|---|---|
| zz = 04: 4 mW | zz = 16: 16 mW |
| zz = 06: 6 mW | zz = 20: 20 mW |
| zz = 08: 8 mW | zz = 22: 22 mW |
| zz = 10: 10 mW | zz = 25: 25 mW |
| zz = 13: 13 mW | zz = 31: 31 mW |

## Example

**1612A-079-SC-10:** DFB 1310 nm, Standard Performance, 79 Channel NTSC, SC/APC Connector, 10mW



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## Laser Safety

This product meets the appropriate standard in Title 21 of the Code of Federal Regulations (CFR). FDA/CDRH Class 1 laser product. This device has been classified with the FDA/CDRH under accession number 0220191.

All Versions of this laser are Class 1 laser product, tested according to IEC 60825-1:2014/EN 60825-1:2014

Single-mode fiber pigtail with SC/APC connectors (standard).

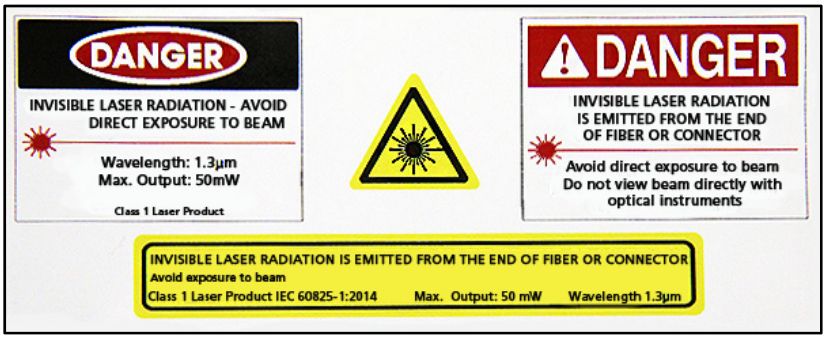
Wavelength = 1.3 μm.

Maximum power = 50 mW.

Because of size constraints, laser safety labeling (including an FDA class 1 label) is not affixed to the module, but attached to the outside of the shipping carton.

Product is not shipped with power supply.

**Caution: Use of controls, adjustments and procedures other than those specified herein may result in hazardous laser radiation exposure.**



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