

## A1112 High-Power 1550 nm DFB Source Lasers

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### Description

The A1112 1550 nm DFB laser modules are high-power devices in a 14-pin butterfly package with a thermoelectric cooler and monitor photodiode. The lasers are designed to be used in conjunction with commercially available external modulators for high-performance analog and digital applications. Agere Systems Inc. offers modules with 30 mW or 40 mW output power coupled into polarization-preserving fiber. The A1112 operates with positive or negative bias.

### Features

- High fiber-coupled power, 30 mW and 40 mW
- Narrow linewidth, <3 MHz
- Low relative intensity noise, < -162 dB/Hz
- Coupled to polarization-preserving (PANDA-type fiber)

### Applications

- Externally modulated CATV transmitters
- Externally modulated analog and digital communication links

## 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           | Min | Max | Unit |
|----------------------------------|------------------|-----|-----|------|
| Operating Case Temperature Range | T <sub>C</sub>   | -20 | 65  | °C   |
| Storage Temperature Range        | T <sub>stg</sub> | -40 | 70  | °C   |
| Forward Current (Laser)          | I <sub>F</sub>   | —   | 275 | mA   |
| A1112PB, A1112NB                 |                  | —   | 400 | mA   |
| A1112PC, A1112NC                 |                  |     |     |      |
| Reverse Voltage (Laser)          | V <sub>R</sub>   | —   | 2.0 | V    |
| Photodiode Reverse Voltage       | V <sub>RPD</sub> | —   | 10  | V    |
| TEC Voltage                      | V <sub>TEC</sub> | —   | 2.0 | V    |
| TEC Current                      | I <sub>TEC</sub> | —   | 1.8 | A    |
| Cooling                          |                  | —   | 1.5 | A    |
| Heating                          |                  |     |     |      |

## Electrical/Optical Characteristics

Table 1. Optical Characteristics (25 °C Case Temperature)

| Parameter                     | Symbol                         | Conditions                             | Min  | Max     | Unit   |
|-------------------------------|--------------------------------|--|------|---------|--------|
| Optical Output Power          | P <sub>O</sub>                 | —                                      | 30   | —       | mW     |
| A1112PB, A1112NB              |                                | —                                      | 40   | —       | mW     |
| A1112PC, A1112NC              |                                |  |      |         |        |
| Center Wavelength             | $\lambda_C$                    | I <sub>OP</sub>                        | 1540 | 1560    | nm     |
| Linewidth (FWHM)              | $\Delta\nu$                    | I <sub>OP</sub>                        | —    | 3       | MHz    |
| Side Mode Suppression Ratio   | SMSR                           | I <sub>OP</sub>                        | 30   | —       | dB     |
| Relative Intensity Noise      | RIN                            | I <sub>OP</sub> ,<br>40 MHz to 860 MHz | —    | -162    | dBc/Hz |
| Operating Current             | I <sub>OP</sub>                | —                                      | —    | 250/350 | mA     |
| Threshold Current             | I <sub>TH</sub>                | —                                      | —    | 35/40   | mA     |
| Forward Voltage               | V <sub>F</sub>                 | —                                      | —    | 2.5/3.0 | V      |
| Optical Isolation             | —                              | -20 °C to +65 °C                       | 30   | —       | dB     |
| Polarization Extinction Ratio | T <sub>E</sub> /T <sub>M</sub> | From fiber end, I <sub>OP</sub>        | 20   | —       | dB     |
| Reverse Voltage               | V <sub>R</sub>                 | —                                      | —    | 2.0     | V      |

Table 2. Electrical Characteristics

| Parameter                          | Symbol            | Condition                 | Min | Max  | Unit |
|------------------------------------|-------------------|---------------------------|-----|------|------|
| Monitor Photodiode Reverse Voltage | V <sub>RMPD</sub> | I <sub>OP</sub>           | —   | 10   | V    |
| Monitor Photodiode Current         | I <sub>MPD</sub>  | —                         | 40  | 2000 | μA   |
| TEC Current                        | I <sub>TEC</sub>  | $\Delta T = 40\text{ °C}$ | —   | 1.8  | A    |
| TEC Voltage                        | V <sub>TEC</sub>  | $\Delta T = 40\text{ °C}$ | —   | 2.2  | V    |
| Thermistor Resistance              | R <sub>TH</sub>   | 25 °C                     | 9.0 | 11.0 | kΩ   |

Electrical/Optical Characteristics (continued)

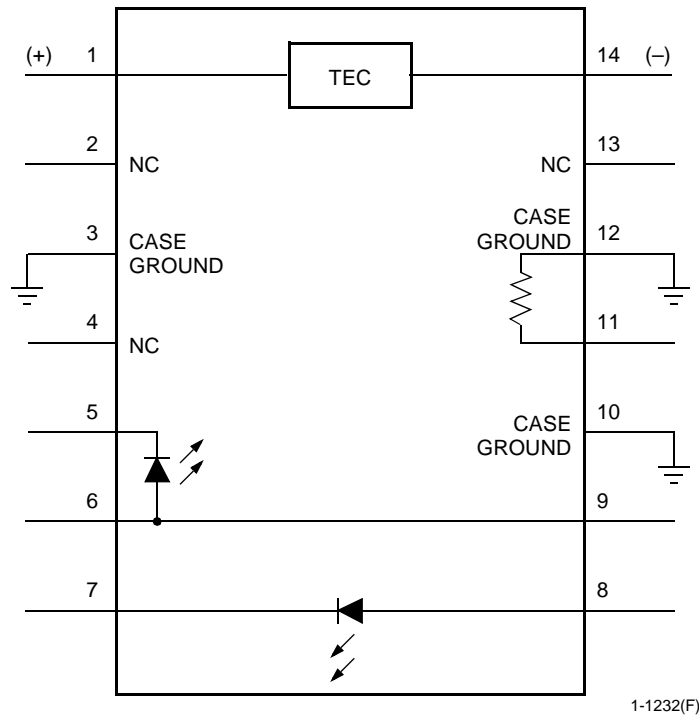


Figure 1. A1112 Laser Positive Bias Ciicuit Schematic

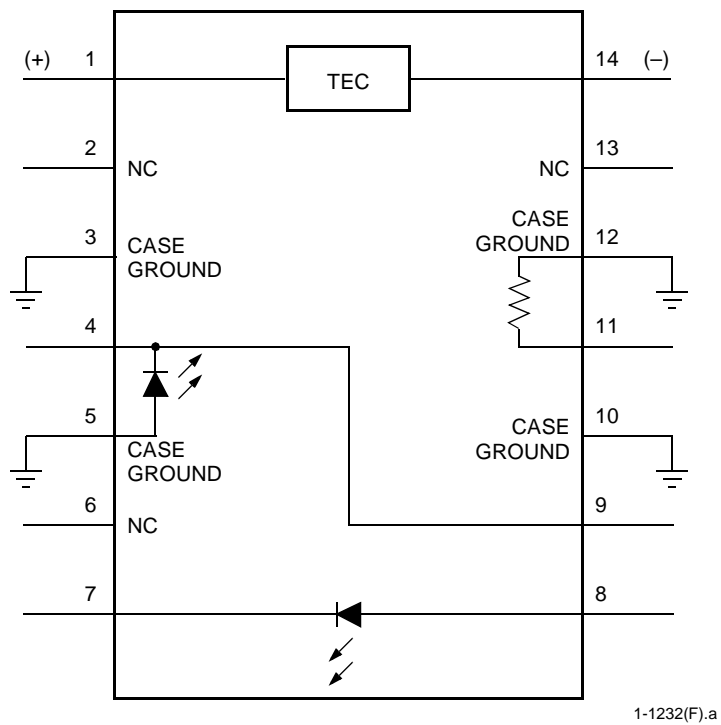
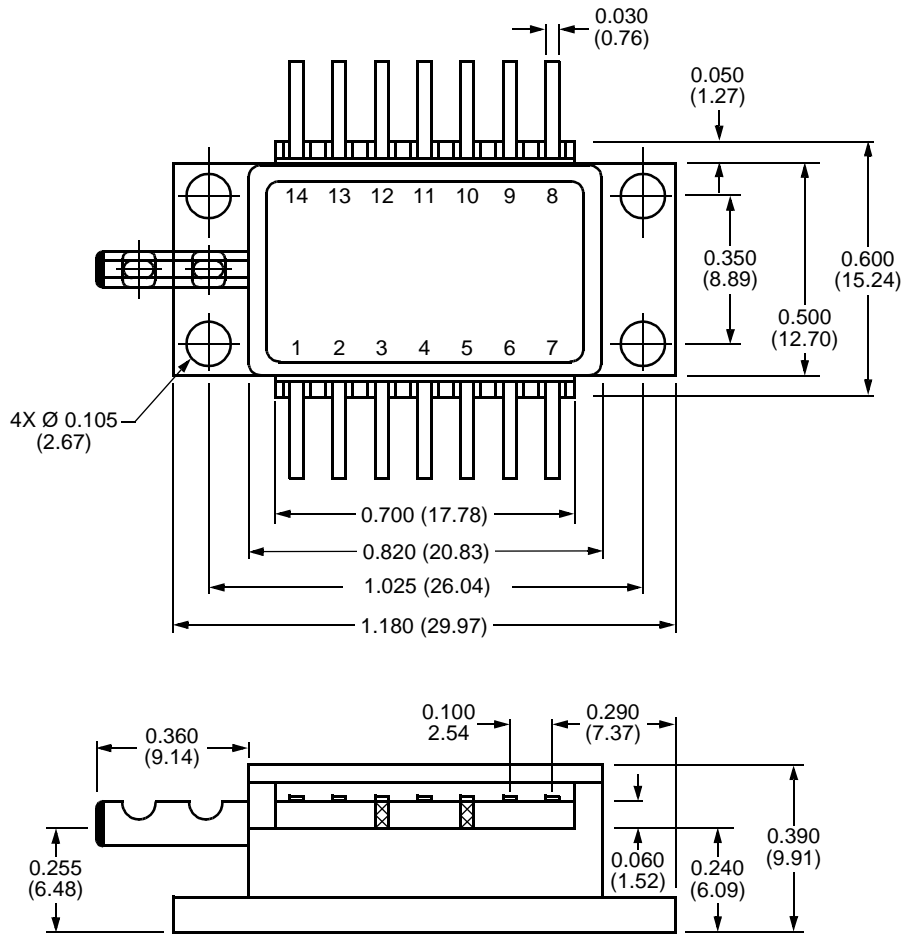


Figure 2. A1112 Laser Negative Bias Ciicuit Schematic

### Outline Diagram

Dimensions are in inches and (millimeters).



1-1177(F)

### Pin Information

Table 3. Pin Descriptions

| Pin No. | A1112 (Positive Bias)      | A1112 (Negative Bias)    | Pin No. | A1112 (Positive Bias) | A1112 (Negative Bias) |
|---------|----------------------------|--------------------------|---------|-----------------------|-----------------------|
| 1       | TE Cooler (+)              | TE Cooler (+)            | 8       | Photodiode Anode      | Photodiode Anode      |
| 2       | NC                         | NC                       | 9       | Laser Anode           | Laser Cathode         |
| 3       | Case Ground                | Case Ground              | 10      | Case Ground           | Case Ground           |
| 4       | NC                         | Laser Cathode            | 11      | Thermistor            | Thermistor            |
| 5       | Laser Cathode, Case Ground | Laser Anode, Case Ground | 12      | Case Ground           | Case Ground           |
| 6       | Laser Anode                | NC                       | 13      | NC                    | NC                    |
| 7       | Photodiode Cathode         | Photodiode Cathode       | 14      | TE Cooler (-)         | TE Cooler (-)         |

## Laser Safety Information

### Class IIIb Laser Product

FDA/CDRH Class IIIb laser product. All versions are Class IIIb laser products per CDRH, 21 CFR 1040 Laser Safety requirements. All versions are Class 3B laser products per *IEC*<sup>1</sup> 60825-1:1993. The device has been classified with the FDA under an accession number to be determined.

This product complies with 21 CFR 1040.10 and 1040.11.

*Fujikura*<sup>2</sup> PANDA single-mode fiber pigtail, 1 m—2 m; FC/APC connector, nonaligned

Wavelength = 1.5  $\mu\text{m}$

Maximum power = 60 mW

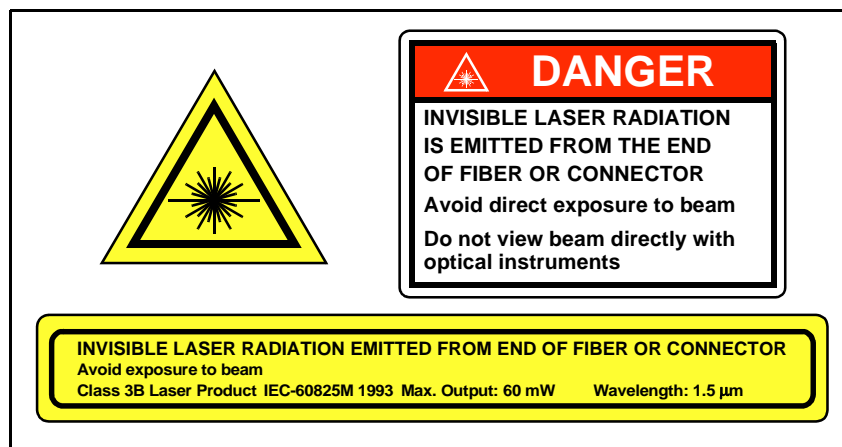
Because of size constraints, laser safety labeling (including an FDA Class IIIb label) is not affixed to the module but attached to the outside of the shipping carton.

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.**

1. *IEC* is a registered trademark of The International Electrotechnical Commission.

2. *Fujikura* is a registered trademark of Fujikura LTD.



## Ordering Information

Table 4. Ordering Information<sup>1</sup>

| Device Code | Output Power/Laser Bias    | Fiber/Connector                             | Comcode   |
|-------------|----------------------------|---|-----------|
| A1112PB     | 30 mW/ Positive Laser Bias | <i>Fujikura</i> PANDA/<br>FC/APC nonaligned | 108846536 |
| A1112PC     | 40 mW/ Positive Laser Bias |   | 108846544 |
| A1112NB     | 30 mW/ Negative Laser Bias |   | 108846510 |
| A1112NC     | 40 mW/ Negative Laser Bias |   | 108846528 |

1. For additional ordering information, please contact an account manager at Opto West, Agere Systems, 1-800-362-3891 (for sales staff, please press option 2).

For additional information, contact your Agere Systems Account Manager or the following:

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