

# **SPECIFICATIONS**

## **Low DOP ASE Broadband Source**

### **DL-ASE-CW-CSS145A**

## A. PRODUCT DESCRIPTION

The DenseLight DL-ASE-CW-CSS145A is a series Low DOP ASE broadband source for fiber optic gyroscope, fiber optic sensor, optical test instrument and optical coherence tomography. This DL-ASE-CW-CSS145A consists of a DenseLight standard ASE broadband source, a temperature controller and a built-in current driver capable for CW driving, which can be customized with various options to meet your specific needs.

## B. FEATURES

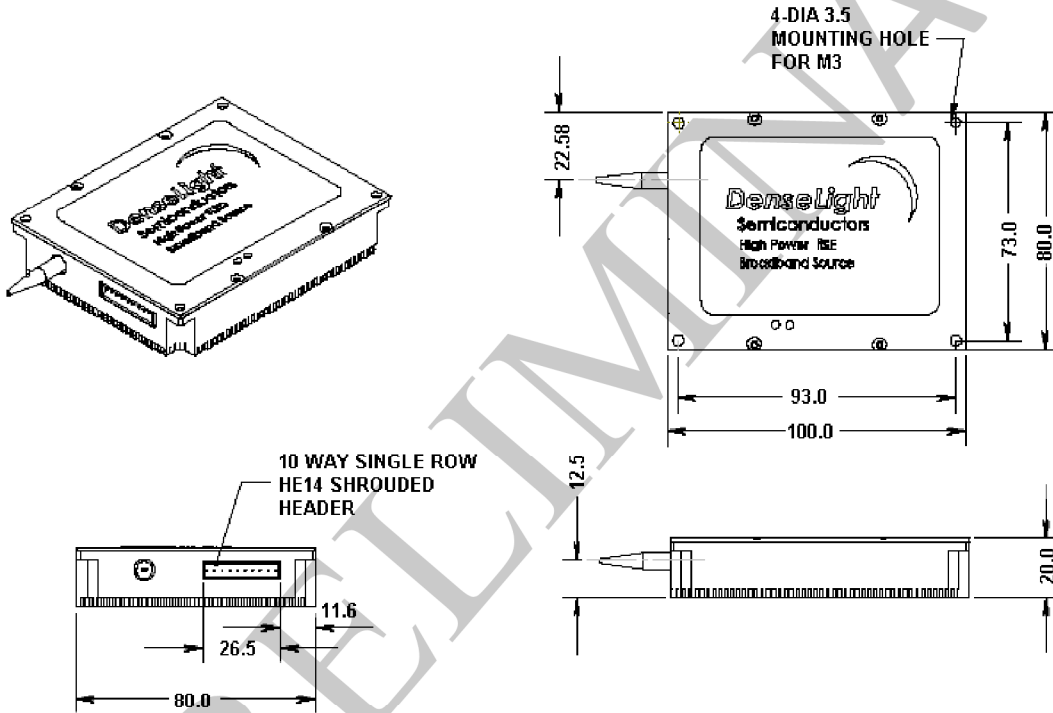
- Ex-fiber output power of  $>13.5\text{dBm}$
- Spectral power density  $>-7\text{dBm/nm}$  over 1470-1506nm
- Low Degree of Polarization
- Single mode fiber output
- Integrated optical isolator
- Highly stable power output with active power control
- Built-in current driver and temperature controller
- Over temperature protection and internal PCB temperature monitor
- Single +5V power supply (optional power adapter)
- High wall-plug efficiency
- Compact size
- RoHS Compliance
- Telcordia Qualified broadband source (GR-468-CORE)

## C. APPLICATIONS

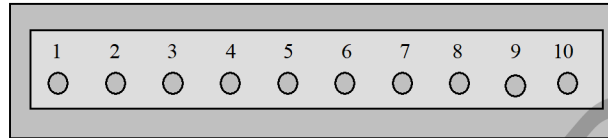
- Optical Test Instrument
- Fiber Optic Sensors
- Fiber Optic Communications
- Optical Coherence Tomography
- Biomedical Imaging Device
- Clinical Healing Equipment

## D. PHYSICAL DIMENSIONS AND MECHANICAL SPECIFICATION

|                       |   |
|-----------------------|---|
| Dimension:            | L100 x W80 x H20 mm   |
| Enclosure:            | Metal Case  |
| Optical output:       | 1m SMF-28 fiber, 900um loose tube with FC/APC                   |
| Cooling:              | Air-cooled or fan cooled. (Mounting holes for fan are provided) |
| Electronic interface: | 10-way single row HE14 shrouded header                          |



## E. PIN ASSIGNMENT AND FUNCTION



**HE14 Shrouded Header Pin Layout (Pin 1 near to SMF output)**

### Pin Assignment

| Pin No. | Symbol            | Power/Control /Monitor | Analog /Digital | Input /Output | Description   |
|---------|-------------------|------------------------|-----------------|---------------|---|
| 1       | P <sub>GND</sub>  | P                      | -               | -             | Power Supply Ground   |
| 2       | P <sub>GND</sub>  | P                      | -               | -             | Power Supply Ground   |
| 3       | V <sub>S</sub>    | P                      | -               | -             | +5V d.c.  |
| 4       | V <sub>S</sub>    | P                      | -               | -             | +5V d.c.  |
| 5       | OVRT              | M                      | D               | O             | To report PCB over temperature and internal self-protection shutdown in operation (Active high) |
| 6       | T <sub>MON</sub>  | M                      | A               | O             | To monitor the temperature of PCB   |
| 7       | P <sub>MON1</sub> | M                      | A               | O             | To monitor the PD current in ASE1   |
| 8       | P <sub>MON2</sub> | M                      | A               | O             | To monitor the PD current in ASE2   |
| 9       | LO_EN             | C                      | D               | I             | To enable Light output (active low or no connection to enable light driver)                     |
| 10      | A <sub>GND</sub>  | -                      | -               | -             | Signal ground for control and monitor signals   |

## F. ABSOLUTE MAXIMUM RATINGS

| Parameters                               | Symbol           | Condition       | Min | Max | Unit |
|--|------------------|-----------------|-----|-----|------|
| Operating temperature (chassis)          | T <sub>op</sub>  | I <sub>op</sub> | 0   | 50  | °C   |
| Operating Relative Humidity <sup>1</sup> | RH               | I <sub>op</sub> | -   | 85  | %    |
| Storage temperature                      | T <sub>stg</sub> | Unbiased        | -40 | 85  | °C   |
| Input current                            | I <sub>s</sub>   | -               | -   | 6   | A    |

<sup>1</sup>) Non condensing

## G. ELECTRICAL SPECIFICATIONS <sup>2</sup>

| Parameter                        | Symbol            | Condition   | Min  | Typ | Max  | Unit |
|----------------------------------|-------------------|---|------|-----|------|------|
| Input Power Supply               | V <sub>s</sub>    | -   | 4.75 | 5   | 5.5  | V    |
| Input Current                    | I <sub>s</sub>    | -   | -    | -   | 3.0  | A    |
| Total Power Consumption          | P <sub>s</sub>    | -   | -    | -   | 15.0 | W    |
| Over Temperature                 | OVRT              | Open-drain digital output with internal 1K pull-up to 3V for V <sub>H</sub> and 8mA current sink for V <sub>L</sub> |      |     |      |      |
|                                  | V <sub>OL</sub>   | Normal  | 0    | -   | 0.45 | V    |
|                                  | V <sub>OII</sub>  | Over-temp   | 2.0  | -   | 3.0  | V    |
| Internal PCB Temperature Monitor | T <sub>MON</sub>  | Analog voltage: T <sub>MON</sub> = 395mV + (6.2mV/°C x T),<br>T = PCB temperature in °C                             |      |     |      | mV   |
| Voltage                          | V <sub>OUT</sub>  | R <sub>X</sub> = infinite   | 0    | -   | 2.5  | V    |
| Output Impedance                 | R <sub>OUT</sub>  | -   | -    | 150 | -    | Ω    |
| Source Current                   | I <sub>OUT</sub>  | V <sub>OUT</sub> = 2.5V   | -    | -   | 4    | mA   |
| Power Output Monitor             | P <sub>MON1</sub> | Analog output: P <sub>MONx</sub> ~ 1.5V x (P <sub>o</sub> / P <sub>rated</sub> ),                                   |      |     |      | V    |
|                                  | P <sub>MON2</sub> | P <sub>o</sub> and P <sub>rated</sub> in mW   |      |     |      |      |
| Voltage                          | V <sub>OUT</sub>  | R <sub>X</sub> = infinite   | 0    | -   | 3.0  | V    |
| Output Impedance                 | R <sub>OUT</sub>  | -   | -    | 150 | -    | Ω    |
| Source Current                   | I <sub>OUT</sub>  | V <sub>OUT</sub> = 3.0V   | -    | -   | 4    | mA   |
| Light Output Enable              | LO-EN             | Digital input with internal 10K pull-down for light output enable at logic low or no connection                     |      |     |      |      |
|                                  | V <sub>IL</sub>   | Normal  | 0    | -   | 1    | V    |
|                                  | V <sub>IH</sub>   | Disable light output  | 1.7  | -   | 3.3  | V    |

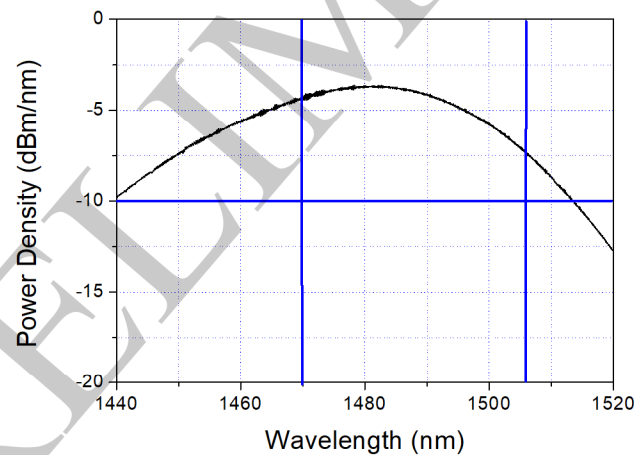
<sup>2</sup>) Unless otherwise specified, tests are performed at T<sub>op</sub> = 25°C.

## H. OPTICAL SPECIFICATIONS

| Parameter                              | Symbol        | Min  | Typ | Max        | Unit   |
|--|---------------|------|-----|------------|--------|
| Power output                           | $P_o$         | 13.5 | -   | -          | dBm    |
| Power density @ 1470 to 1506nm         | $P_{density}$ | -7   | -   | -          | dBm/nm |
| Degree of polarization                 | DOP           | -    | -   | 5          | %      |
| Output stability <sup>(3)</sup> 1 hour | Stb           | -    | -   | $\pm 0.05$ | dB     |
| 8 hour                                 |               |      |     | $\pm 0.1$  | dB     |

<sup>3)</sup> After 1 hour warm-up

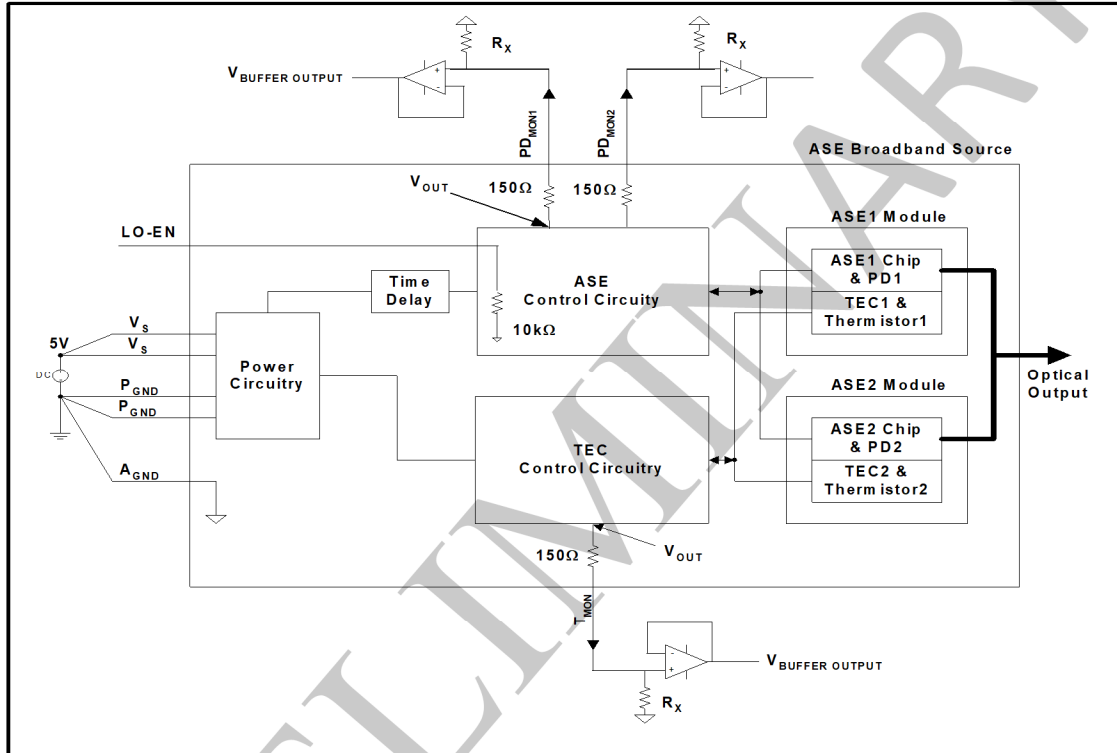
## I. TYPICAL OPTICAL PERFORMANCE



**Spontaneous Emission Spectrum**

## J. APPLICATION INFORMATION

### J.1 Typical Application Circuit



### J.2 Power Supply Requirement and Connections

The power supply must be capable of supplying the maximum input current ( $I_s$ ) as given in the electrical specification table at all times during operation. This is because during transients (eg. switching on the light source or with a sudden change in operating ambient temperature), the ASE broadband Source will require a momentary higher current from the power supply compared to its steady-state operation.

The two cables to the two  $V_s$  pins (Pin 3 and Pin 4) should be shorted at the positive terminal of the power supply as shown in the Typical Application Circuit. This is to divide the total current load to the broadband source between the two cables. Similarly, the two cables to the  $P_{GND}$  pins (Pin 1 and Pin 2), as well as the cable to the  $A_{GND}$  pin (Pin 10) should be shorted at the ground of the power supply terminal.

### J.3 Selection of Resistance $R_X$ for Analog Monitor Signals

In the Typical Application Circuit given, the function of  $R_X$  is to increase the current in the signal cables so as to reduce the effect of environmental noise on the analog monitor signals. In a noisy environment, the value of  $R_X$  is recommended to be  $1k\Omega$ . By choosing  $R_X$  to be  $1k\Omega$ , the actual voltage measured at the buffer output will be reduced due to loading effect, as compared to when  $R_X$  is infinite.

$$V_{\text{BUFFER OUTPUT}} = \frac{R_X}{R_X + 150} \times V_{\text{OUT}}$$

where  $R_X$  is resistance in  $\Omega$

In a non-noisy environment, the value of  $R_X$  can be increased to reduce loading effect. It is not recommended to choose  $R_X$  less than  $1k\Omega$ .

**For further technical information, please refer to DenseLight Semiconductor Low DOP ASE Broadband Source User Operation Manual.**



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## **K. DISCLAIMER FOR CUSTOMER SPECIFIC APPLICATIONS**

Denselight product is not intended for use other than stated on the application note or as defined in the product specification. The performance of the product should always be tested in the actual application conditions. As our products are used in conditions beyond our control, we cannot assume any liability for damage caused through their use. Users of DenseLight products are solely responsible to thoroughly test and qualify their system and / or application for their intended application and have determined such at their sole discretion. DenseLight cannot assume any liability for the use of our products in conjunctions with other. Customer assumes the sole risk and liability of the product performance other than specified by the product specific data sheet or application notes without DenseLight's specific written consent.

## **L. SAFETY INFORMATION**

The DL-ASE-CW-CSS145A is classified as Class 3R products per IEC 60825-1 laser safety requirements.