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## **SPECIFICATIONS**

### **1310 nm High Power Superluminescent LED**

#### **DL-CS3404A**

DenseLight Semiconductors reserves the right to make product design or specifications changes without notice.

## A. PRODUCT DESCRIPTION

The DenseLight DL-CS3404A series is a broadband SLED that operates in a true inherent superluminescent mode. This superluminescent property generates broader band at higher drive currents in contrast to other conventional SLEDs which are ASE-based, where high drive tends to give narrower band. Its low coherence reduces Rayleigh backscattering noise. Coupled with high power and large spectral width, it offsets photoreceiver noise and improves spatial resolution (in OCT) and measurand sensitivity (in sensors). The SLED is available in 14-pin BTF package. It is compliance with the requirements of Bellcore Document GR-468-CORE.

Enabled by DensePIC™ spread spectra bandgap engineering technology, future generations of DenseLight SLEDs promise higher chip powers (up to 50mW possible), and broader spectral bands (beyond 120nm). Higher levels of integration may feature integrated SLEDs with phase modulators, optical couplers and photodetectors into a complete optical sensor chipset.

For responsive prototyping enquiries please email: [info@denselight.com](mailto:info@denselight.com)

## B. FEATURES

- Ex-fiber output power > 40mW
- 3dB bandwidth of >40nm
- Spectral modulation of <0.5dB
- 14-pin BTF package
- SM fiber

## C. APPLICATIONS

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

## D. ABSOLUTE MAXIMUM RATINGS

| Parameter                      | Symbol     | Condition        | Min | Max  | Unit |
|--------------------------------|------------|------------------|-----|------|------|
| Reverse voltage                | $V_R$      |                  |     | 2    | V    |
| Forward current                | $I_F$      |                  |     | 750  | mA   |
| Forward voltage                | $V_F$      | $I_{op}$         |     | 3    | V    |
| Case temperature               | $T_C$      | $I_{op}$         | -20 | 55   | °C   |
| SLED temperature <sup>1</sup>  | $T_{SLED}$ | $I_{op}$         | 0   | 70   | °C   |
| Thermoelectric cooler voltage  | $V_{TEC}$  |                  |     | 3.56 | V    |
| Thermoelectric cooler current  | $I_{TEC}$  |                  |     | 2.6  | A    |
| Storage temperature            | $T_{stg}$  | Unbiased         | -40 | 85   | °C   |
| Storage humidity               |            |                  | 5   | 85   | %RH  |
| Electro static discharge (ESD) | $V_{ESD}$  | Human body model |     | 500  | V    |
| Lead soldering temperature     | $S_{temp}$ |                  |     | 260  | °C   |
| Lead soldering time            | $S_{time}$ |                  |     | 10   | sec  |

## E. SPECIFICATIONS ( $T_{SLED} = 25\text{ °C}$ )

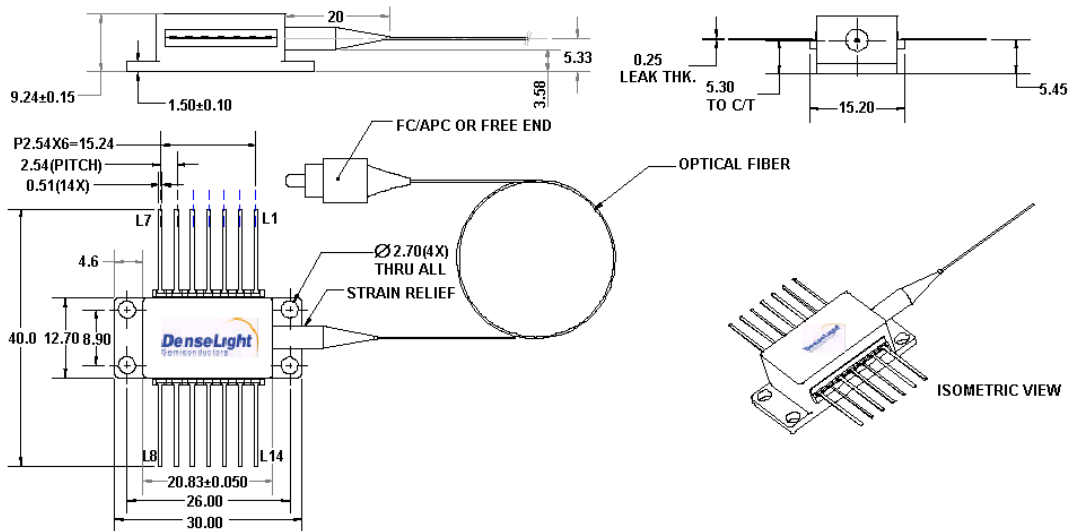
| Parameter                        | Symbol      | Condition          | Min  | Typ  | Max  | Unit       |
|----------------------------------|-------------|--------------------|------|------|------|------------|
| Operating current                | $I_{op}$    |                    |      |      | 700  | mA         |
| Forward voltage                  | $V_F$       | $I_{op}$           |      |      | 2.4  | V          |
| Power in SMF                     | $P_o$       | $I_{op}$           | 40   |      |      | mW         |
| Central wavelength               | $\lambda$   | $I_{op}$           | 1290 | 1310 | 1330 | nm         |
| Bandwidth                        | $B_{FWHM}$  | $I_{op}$           | 40   |      |      | nm         |
| Spectrum modulation <sup>2</sup> | R           | $I_{op}$           |      |      | 0.5  | dB         |
| Thermistor resistance            | $R_{therm}$ | $T = 25\text{ °C}$ | 9.5  | 10   | 10.5 | k $\Omega$ |
| Thermoelectric cooler voltage    | $V_{TEC}$   | $I_{op}$           |      |      | 3.0  | V          |
| Thermoelectric cooler current    | $I_{TEC}$   | $I_{op}$           |      |      | 1.8  | A          |

1.  $T_{SLED}$  is monitored by internal thermistor with external pin out.
2. Peak-to-peak modulation shall be measured at the range of +/- 2.5nm of peak wavelength. Spectrum modulation will be measured at resolution of 0.1nm.

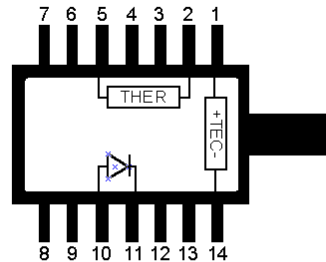
## F. PACKAGE

### BTF package

| Part                 | Description            |
|----------------------|------------------------|
| Package type         | BTF                    |
| Fiber:               | SMF-28                 |
| MFD                  | 9 $\mu$ m              |
| Cladding diameter    | 125 $\mu$ m            |
| Coating diameter     | 245 $\mu$ m            |
| Jacket               | 900 $\mu$ m loose tube |
| Fiber pigtail length | 1 m                    |
| Fiber bending radius | >40mm                  |
| Connector            | FC/APC                 |
| Dimensions           | See figure             |

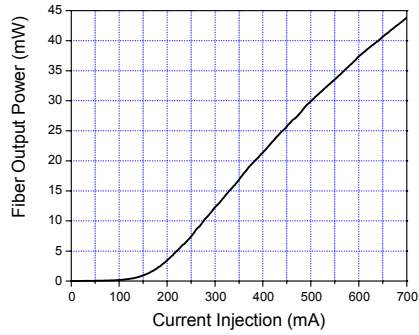


| Pin Assignment |                |
|----------------|----------------|
| 1              | TEC+           |
| 2              | THERMISTOR     |
| 3              | -              |
| 4              | -              |
| 5              | THERMISTOR     |
| 6              | -              |
| 7              | -              |
| 8              | -              |
| 9              | -              |
| 10             | SLED ANODE +   |
| 11             | SLED CATHODE - |
| 12             | -              |
| 13             | CASE           |
| 14             | TEC -          |

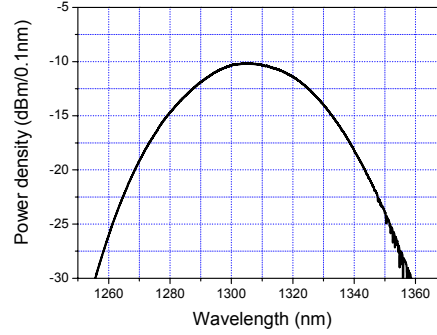


## G. TYPICAL PERFORMANCE CHARACTERISTICS

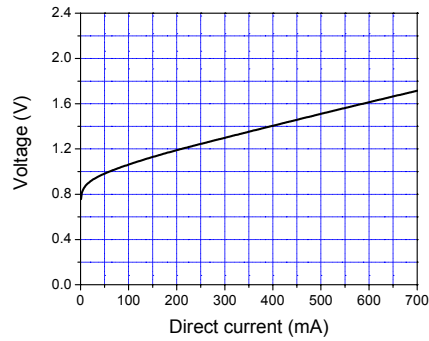
Operating condition:  $T_{SLED} = 25\text{ }^{\circ}\text{C}$



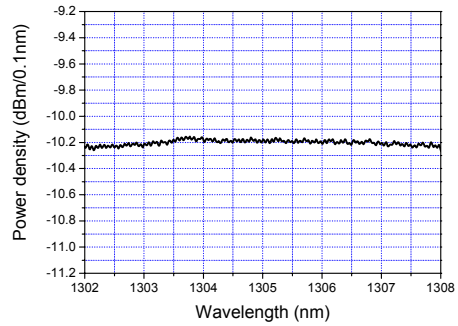
**P-I Curve**



**Spontaneous Emission Spectrum**



**I-V Curve**



**Spectrum Modulation**