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## **SPECIFICATIONS**

### **Superluminescent LED Box**

#### **DL-BX9-CSxxxxA**

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

## **A. PRODUCT DESCRIPTION**

The DenseLight DL-BX9-CSxxxxA is a series superluminescent light emitting diode (SLED) broadband source for fiber optic gyroscope, fiber optic sensor, optical test instrument and optical coherence tomography. It provides a stable light source over a wide wavelength range include O, E, S, C and L bands. It incorporates a high precision controller for high output level and stability of the superluminescent diodes output. This DL-BX9-CSxxxxA consists of a built-in CW current driver, a temperature controller and a DenseLight standard 14-pin butterfly package CSxxxxA.

## **B. FEATURES**

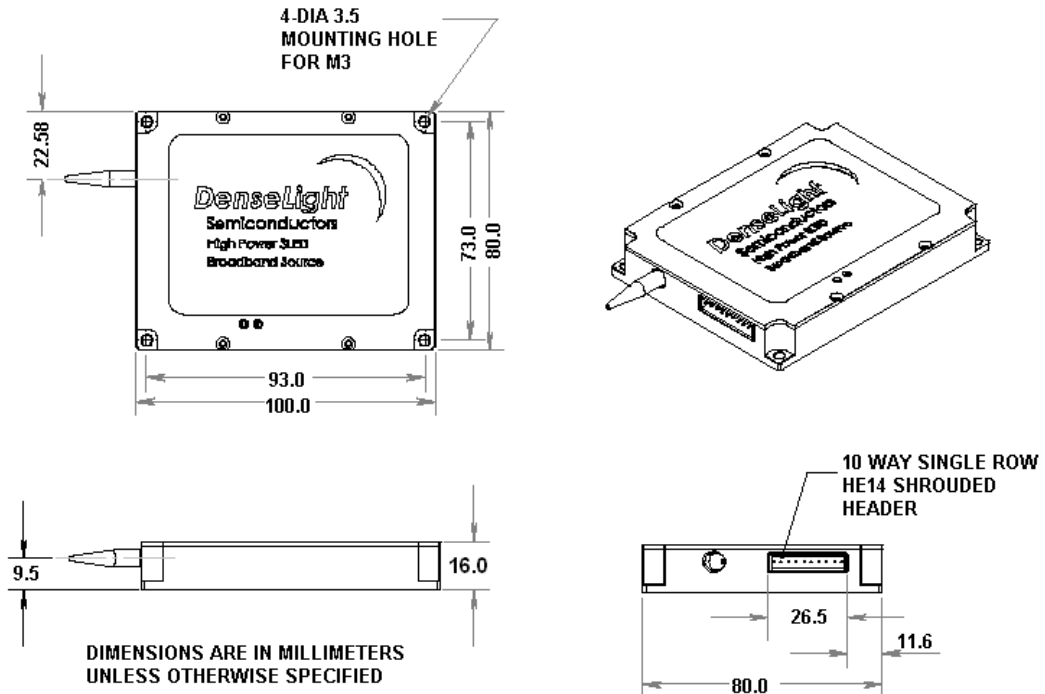
- Optical power of 3 to 50mW
- 3dB spectral width of 20 to 85nm
- Wavelength availability 1260 to 1670nm
- Tunable optical power
- Fiber pigtail output with FC/APC connector
- Integrated optical isolator (optional)
- Single +5V power supply (optional power adapter)
- Built-in current driver and temperature controller
- Highly stable power output and active power control
- High wall-plug efficiency
- Compact size
- Telcordia qualified SLED (GR-468-CORE)

## **C. APPLICATIONS**

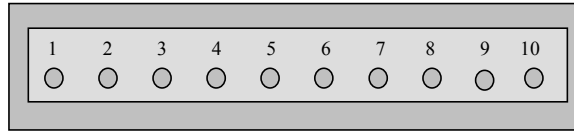
- Fiber Optic Gyroscope
- Optical Test Instrument
- Fiber Optic Sensors
- Fiber Optic Communications
- Optical Coherence Tomography
- Biomedical Imaging Device
- Clinical Healing Equipment

## D. PHYSICAL DIMENSIONS AND MECHANICAL SPECIFICATION

Dimension:	L100 x W80 x H16 mm
Enclosure:	Metal Case
Optical output:	1 m SMF-28 fiber, 900um loose tube with FC/APC
Cooling:	Air-cooled.
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 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 DC
4	V <sub>S</sub>	P			+5V DC
5	NC				
6	T <sub>MON</sub>	M	A	O	To monitor the thermistor temperature in SLED
7	NC				
8	P <sub>REF</sub>				For internal reference power check <sup>1</sup>
9	P <sub>SET</sub>	C	A	I	To set SLED optical output power
10	A <sub>GND</sub>				Signal ground for control and monitor signals

<sup>1</sup>) Connect Pin 8 (P<sub>REF</sub>) to Pin 9 (P<sub>SET</sub>) to check internal factory optical power setting. Leave Pin 8 (V<sub>REF</sub>) unconnected for external power control through Pin 9 (P<sub>SET</sub>).

## F. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Condition	Min	Max	Unit
Operating temperature (case)	$T_{op}$	$I_{op}$	0	65	°C
Operating Relative Humidity	RH	$I_{op}$		85	%
Storage temperature	$T_{stg}$	Unbiased	-40	85	°C
Input current	$I_s$			6	A

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Input Power Supply	$V_s$		4.75	5	5.5	V
Input Current <sup>3</sup>	$I_s$				2	A
Total Power consumption <sup>3</sup>	$P_s$				10	W
<b>Analog Output Monitor</b>						
<b>Pin 6</b>						
Voltage	$V_{OUT}$	$R_x = \text{infinite}$	0		2.5	V
Output Impedance	$R_{OUT}$			150		$\Omega$
Source Current	$ I_{OUT} $	$V_{OUT} = 2.5V$			4	mA
<b>Analog Input Control</b>						
<b>Pin 9</b>						
Voltage	$P_{SET}$		0.3		2.5	V
Input Impedance	$R_{IN}$			1000		$\Omega$
Sink Current	$ I_{IN} $	$V_{IN} = 2.5V$		2.5		mA

<sup>2</sup>) Unless otherwise specified. Tests are performed at  $T_{op} = 25^\circ\text{C}$

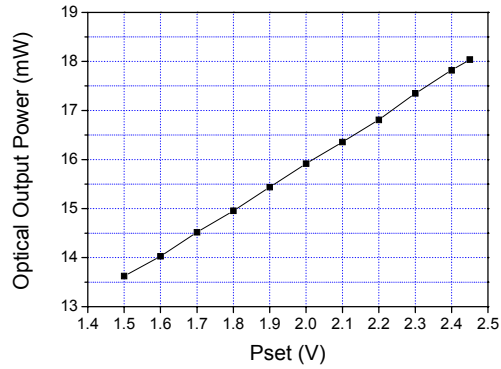
<sup>3</sup>) Depending on product selection

## H. OPTICAL SPECIFICATIONS

14-Pin Butterfly package CSxxxxA	Min Power (mW)	Central wavelength (nm)	Typ. Bandwidth (nm)	Typ. spectrum modulation (dB)
CS2079A	7	1260-1290	75	0.2
CS2184A	18	1270-1290	40	0.15
CS3055A	5	1290-1330	50	0.15
CS3089A	8	1290-1330	70	0.2
CS3102A	10	1290-1330	30	0.15
CS3152A	15	1290-1330	30	0.15
CS3184A	18	1290-1330	42	0.15
CS3159A	15	1290-1330	83	0.2
CS3202A	20	1290-1330	30	0.2
CS3307A	30	1290-1330	58	0.25
CS3404A	40	1290-1330	43	0.25
CS3452A	40	1290-1330	32	0.35
CS3504A	50	1290-1330	38	0.3
CS35H5A	13	1330-1370	48	0.2
CS40H2A	15	1380-1420	35	0.2
CS43H4A	15	1415-1445	45	0.2
CS44H4A	15	1430-1470	45	0.2
CS48H5A	15	1460-1550	50	0.2
CS5037A	3	1530-1570	60	0.15
CS5077A	5	1530-1570	60	0.2
CS5107A	8	1530-1570	60	0.2
CS5103A	10	1530-1570	40	0.15
CS5153A	15	1530-1570	40	0.2
CS5169A	16	1530-1570	80	0.25
CS5203A	20	1530-1570	40	0.25
CS5254A	25	1530-1570	40	0.25
CS5403A	35	1530-1570	40	0.35
CS58M7A	5	1560-1600	58	0.15
CS6107A	8	1580-1620	60	0.15
CS62M7A	8	1600-1630	65	0.15
CS65M5A	10	1635-1665	50	0.2

Parameter	Symbol	Min	Typ	Max	Unit
Output stability <sup>(4)</sup> 1 hour	Stb			± 0.03	dB
8 hour				± 0.1	dB

<sup>4)</sup> After one hour of warm-up

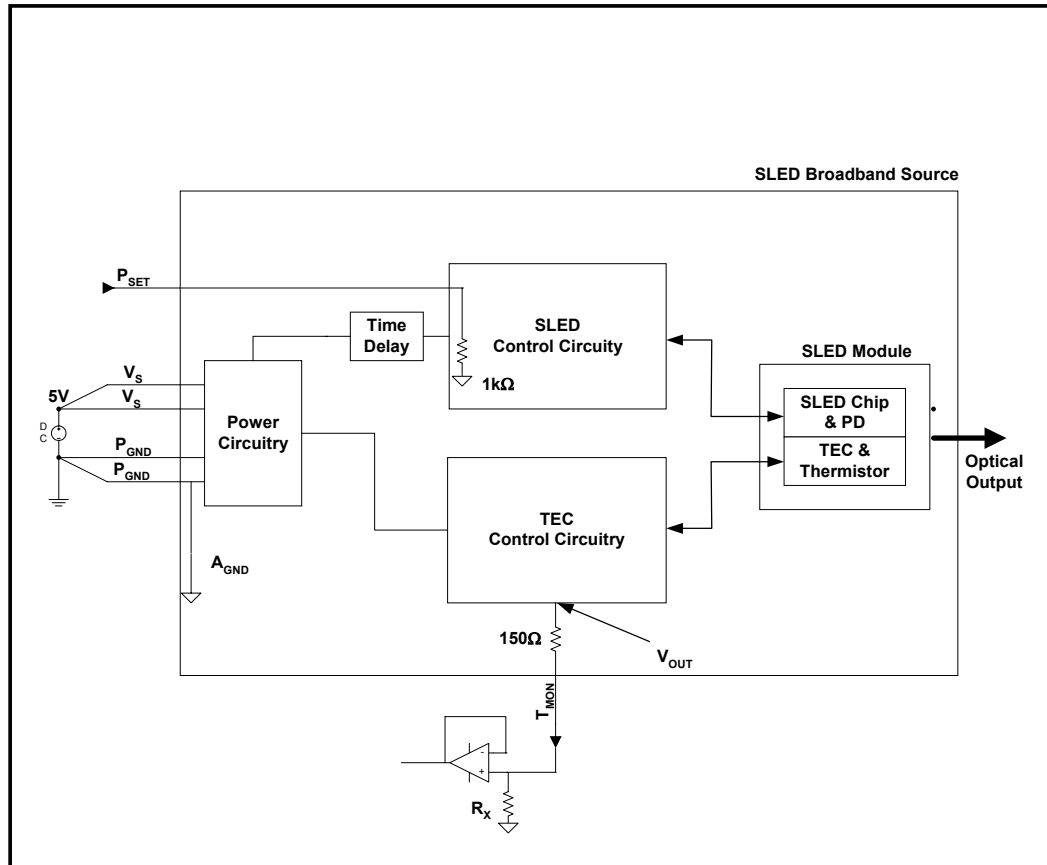


Typical Output power versus P<sub>SET</sub> curve

The full optical performance of the DL-BX9-CSxxxxA can be found in DenseLight standard 14-pin Butterfly package CSxxxxA series individual specification. Please contact DenseLight Semiconductor Pte Ltd for further information.

## I. APPLICATION INFORMATION

### A. Typical Application Circuit



### B. 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 SLED or with a sudden change in operating ambient temperature), the SLED 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 SLED Broadband source between the two cables. Similarly, the two cables to the two  $P_{GND}$  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.



### C. 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  $1k\Omega$ .

### D. Operation in Noisy Environment

In a noisy environment, it is recommended to twist the cables to  $P_{\text{SET}}$  and  $A_{\text{GND}}$  pins together to form a twisted pair. Shielding of these two cables, together with other cables to control or monitor pins will greatly reduce the effect of noise.

**For further technical information, please refer to DenseLight Semiconductor BX9 SLED Broadband Source User Operation Manual.**

## J. REVISION CONTROL

Authorized Personnel	Rev	Description of Change	Date
OTK	A	Initial: Production Release	28 July 2006
OTK	B	1) Updated Section B (pg 2) 2) Updated optical specification (pg 6)	23 March 2007
OTK	C	1) Added $P_{\text{SET}}$ and $P_{\text{REF}}$ pin (pg 4) 2) Added output power versus $P_{\text{SET}}$ curve (pg 7) 3) Added Section I. Application Information (pg 9)	18 May 2007