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## **SPECIFICATIONS**

### **Direct Modulation Superluminescent LED Box**

#### **DL-BZ1-CsxxxxA-yy**

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

## A. PRODUCT DESCRIPTION

The DenseLight DL-BZ1-CsxxxxA-yy is a series superluminescent light emitting diode (SLED) broadband source for fiber optic gyroscope, fiber optic sensor, optical test instrument and optical coherence tomography. This DL-BZ1-CsxxxxA-yy consists of a DenseLight standard 14-pin butterfly package CsxxxxA, a temperature controller and a built-in current driver capable for CW driving, digital or analog modulation input, which can be customized with various options to meet your specific needs. The SLED light source covers over a wide wavelength range include O, E, S, C and L bands.

## B. FEATURES

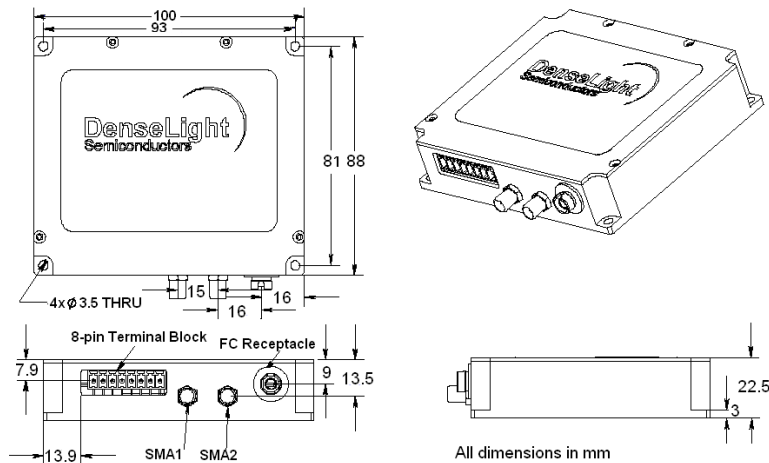
- Optical power of 3 to 45mW
- 3dB spectral width of 20 to 85nm
- Wavelength availability 1260 to 1670nm
- Fiber pigtail output or FC receptacle
- Integrated optical isolator
- Single +5V power supply (optional power adapter)
- Built-in current driver and temperature controller
- Operating temperature 0 to 65 °C (<0°C or >65°C extended range available)
- Over temperature protection and internal PCB temperature monitor
- Analog intensity modulation upto 20MHz (transconductance amplifier performance)
- Pulse or digital modulation upto 200MHz
- High wall-plug efficiency
- Compact size
- Telcordia Qualified SLED (GR-468-CORE)

## C. APPLICATIONS

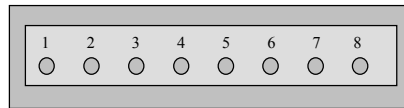
- Fiber Optic Gyroscope
- Optical Test Instrument
- Fiber Optic Sensors
- Fiber Optic Communications
- Optical Coherence Tomography
- Biomedical Imaging Device
- Clinical Healing Equipment

## D. PHYSICAL DIMENSIONS AND MECHANICAL SPECIFICATION

Dimension: L100 x W88 x H22.5 mm  
 Enclosure: Metal Case  
 Optical output: FC receptacle  
 Cooling: Air-cooled.  
 Electronic interface: 8-pin terminal block



## E. PIN ASSIGNMENT AND FUNCTION



8-pin terminal block (Pin 8 near to SMA1)

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

## F. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Condition	Min	Max	Unit
Operating temperature (chassis)	T <sub>op</sub>	I <sub>op</sub>	0	65	°C
Operating Relative Humidity	RH	I <sub>op</sub>		85	%
Storage temperature	T <sub>stg</sub>	Unbiased	-40	85	°C
Input current	I <sub>s</sub>			6	A
Input Power Supply	V <sub>s</sub>			6	V

## G. ELECTRICAL SPECIFICATIONS <sup>1</sup>

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Input Power Supply	V <sub>s</sub>		4.75	5	5.5	V
Input Current <sup>2</sup>	I <sub>s</sub>				1.5	A
Total Power consumption <sup>2</sup>	P <sub>s</sub>				7.5	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>OH</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), 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
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	Normal
	V <sub>IH</sub>	Disable light output	2.5		3.3	Disable light output

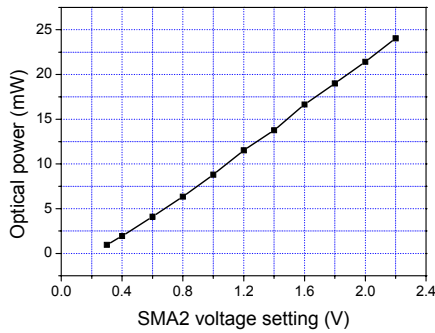
<sup>1)</sup> Unless otherwise specified. Tests are performed at T<sub>op</sub> = 25°C

<sup>2)</sup> Depending on product selection

Operating mode <sup>3</sup>	Operation Setting	
	SMA1 connector (50Ω)	SMA2 connector (50Ω)
CW	Logic High, $2V \leq V_{IH} \leq 5V$	DC Voltage (User to set optical peak power through DC voltage to SMA2)
Digital modulation <sup>4</sup>	External Trigger Input (CMOS/TTL compatible), $0 \leq V_{IL} \leq 0.8V$ and $2V \leq V_{IH} \leq 5V$	DC Voltage (User to set optical peak power through DC voltage to SMA2)
Analog modulation <sup>4</sup>	Logic High, $2V \leq V_{IH} \leq 5V$	Transconductance amplifier operating on positive polarity analog input signal

<sup>3</sup>) There will be no optical output power if SMA1 or SMA2 is left unconnected

<sup>4</sup>) Pre-bias setting on SLED can be factory preset. Please specify the amount of pre-set bias (in terms of X% of optical power). Note: Factory default setting is zero.



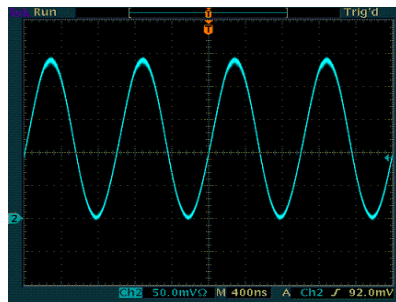
Optical power vs SMA2 voltage setting

**Digital modulation:**



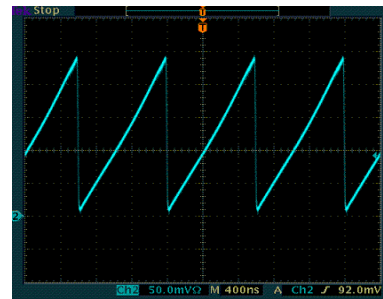
SMA1: Pulse waveform  
Frequency= 100kHz  
Amplitude= 2V  
SMA2: DC voltage 2V

**Analog modulation**



SMA1: Logic high ( $V_{IH} = 2V$ )  
SMA2: Sine wave  
Frequency: 1MHz  
Amplitude= 0.3 to 2.3V

**Analog modulation**



SMA1: Logic high ( $V_{IH} = 2V$ )  
SMA2: Ramp wave  
Frequency: 1MHz  
Amplitude= 0.3 to 2.3V

## H. OPTICAL SPECIFICATIONS

Parameter	Symbol	Min	Typ	Max	Unit
Output stability <sup>(6)</sup> 1 hour	Stb			± 0.03	dB
8 hour				± 0.1	dB

<sup>6)</sup> After one hour of warm-up for CW operation

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
CS3452A	45	1290-1330	32	0.35
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

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

## I. ORDERING INFORMATION

Please use the following part code system to order products.

### **DL-BZ1-CSxxxxA-yy**

Part code:

1) CsxxxxA refers to DenseLight standard 14-pin Butterfly package. Refer to the summary in section H for the code number.

2) yy denotes the factory SLED optical power pre-bias setting:

00= Zero bias (factory default)

yy= Pre-bias 01 to yy% (eg. 05 denotes 5% optical power pre-bias)

## J. REVISION CONTROL

Authorized Personnel	Rev	Description of Change	Date
OTK	A	Initial: Prelim Production Release	18 June 2006

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### Manufacturer Information:

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