Datasheet 850nm 3Gbps VCSEL

DESCRIPTION

The 850nm VCSEL was designed for wide temperature operating environments from -55°C to +85°C to meet the needs of mission-critical industrial, medical, and automotive applications, including TOF proximity sensing, IR illumination, long-distance data communication, and power over fiber. The device allows for top p-contact and bottom n-contact assemblies to support a variety of packaging options. The Inneos 850nm 3Gbps VCSEL maintains superior performance over wide-temperature operating environments.

FEATURES

- Wide operating temperature from -55°C to +85°
- Top-emitting
- Single emitter

ORDERING INFORMATION

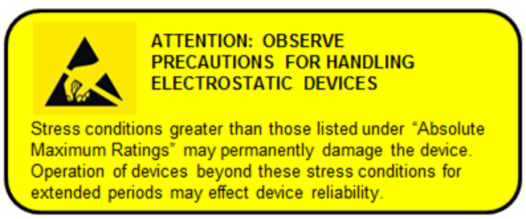
PART NUMBER	DESCRIPTION
V850-3GWB-1BHA	850nm 3Gbps VCSEL, Bare Die, Top-Bottom Contact, -55°C to 85°C

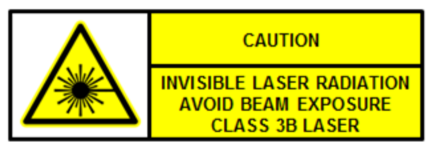
APPLICATIONS

- TOF proximity sensing
- IR illumination
- Communication links
- Sensor systems

COMPLIANCE

- RoHS3





ABSOLUTE MAXIMUM RATINGS

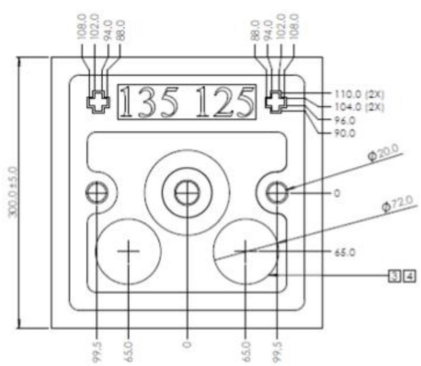
PARAMETER	SYMBOL	MIN	MAX	UNITS
Storage Temperature Range	T_S	-55	125	°C
Operating Temperature Range	T_o	-55	85	°C
Reverse Voltage	V_R		8	V
Continuous Forward Current	I_F		50	mA
ESD Protection (HBM)			100	V

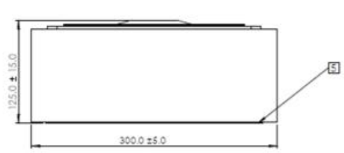
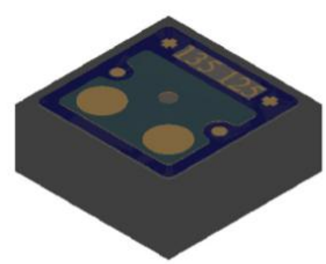
OPTICAL/ELECTRICAL SPECIFICATIONS

PARAMETER	CONDITIONS	SYMBOL	UNITS	MIN	TYPICAL	MAX
Emission Wavelength	T_o=30°C @ 35mA	λ_c	nm	840	850	860
Variation of Wavelength with Temperature	-	$\frac{\Delta\lambda}{\Delta T}$	$nm/{}^\circ C$	-	0.07	-
Spectral Width [a]	T_o=-55°C @ 35mA	σ_λ	nm	-	-	1.00
	T_o=85°C @ 35mA					
Threshold Current [b]	T_o=-55°C, 85°C	I_{th}	mA	-	-	14
	T_o=30°C			-	6.6	-
Average Operating Current		I_{avg}	mA	-	-	45
Operating Voltage	T_o=-55°C @ 35mA	V_o	V	-	-	3.0
	T_o=85°C @ 35mA			-	2.30	-
Optical Output Power	T_o=-55°C, 85°C @ 35mA	P_o	mW	12	-	-
	T_o=30°C @ 35mA			-	20	-
Small Signal Bandwidth [c]	T_o=85°C @ 35mA	f_{3dB}	GHz	-	3	-
Beam Divergence Half Angle ($1/e^2$) [d]	T_o =30°C @ 35mA	$\theta_{1/2}$	deg	-	16	-
Slope Efficiency [e]	T_o =-55°C	SE	mW/mA	-	0.9	-
	T_o =85°C			-	0.6	-
Differential Resistance [f]	T_o =-55°C @ 35mA	R_{diff}	Ω	-	75	-
	T_o =85°C @ 35mA			-	60	-

MECHANICAL OUTLINE

Dimensions are in microns.



PARAMETER CALCULATION METHODS USED

a. Spectral width is calculated based on FOTP-127 where the spectral level of the measured spectra below 20dB from maximum value are made zero and RMS spectral width is calculated based on formula

$$\Delta\lambda_{RMS} = \sqrt{\frac{\sum_{i=1}^{N} P_i \lambda_i^2}{\sum_{i=1}^{N} P_i} - \left(\frac{\sum_{i=1}^{N} P_i \lambda_i}{\sum_{i=1}^{N} P_i}\right)^2}$$

where ‘λ_i’ is the wavelength and ‘P_i’ is the optical power level of the i_{th} point in the spectra.

b. The threshold current is derived by a linear fit method using 10% and 20% of peak optical power points. Threshold current is the point at which the optical power is zero using the linear fit.

c. The small signal bandwidth is obtained from optical response measurements at set current and reading the cut off frequency at which the power level is 3dB down from the power level at DC.

d. Beam divergence half-angle is derived from measurement of optical power in far-field at various angles. The half-angle is the angular deviation from center where the power reduces by ‘1/e’.

e. The slope efficiency is derived by linear fit method using 10% and 20% of peak optical power points. Slope efficiency is the slope of the lineal fit of optical power and drive current.

f. Differential resistance at point *‘i’* of the measured LIV is calculated based on formula,

$$R_{diff} = \frac{V_i - V_{i-1}}{I_i - I_{i-1}}$$

where ‘V_i’, ‘V_{i-1}’ are the measured voltages at set currents ‘I_i’ and ‘I_{i-1}’ respectively.

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