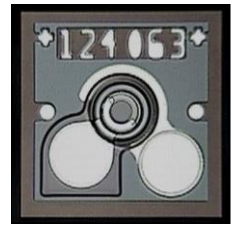
Datasheet 10 Gbps 980nm VCSEL

DESCRIPTION

Inneos' 980nm 10 Gbps VCSEL was designed for extended temperature operating environments from -40°C to +125°C to meet the needs of automotive and industrial applications, where low operating currents and extended lifetimes are critical parameters. The device allows for wirebond assemblies to support a variety of packaging options. The Inneos 980nm VCSEL maintains superior performance in wide range of operating environments.



FEATURES

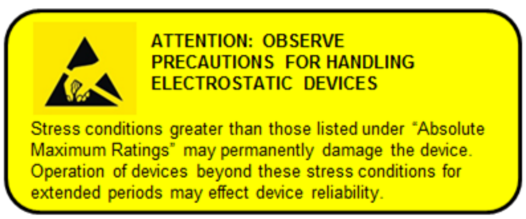
- Operating temperature from -40°C to +125°C
- Top-emitting
- Single channel

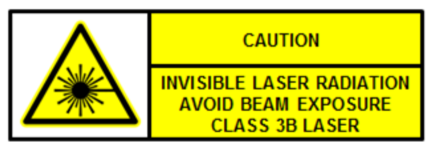
ORDERING INFORMATION

PART NUMBER	DESCRIPTION
V980-10GXA-1TGA	10 Gbps 980nm VCSEL, Bare Die, -40°C to 125°C, Gel-Pak

APPLICATIONS

- Wide-Temperature Transceivers
- Transmitter Optical Sub-Assemblies





ABSOLUTE MAXIMUM RATINGS

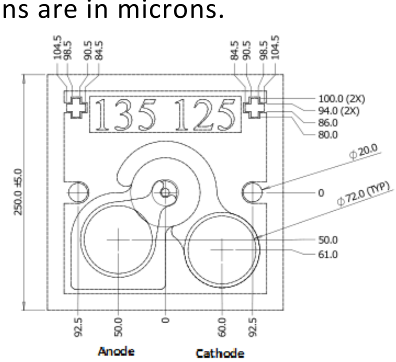
PARAMETER	SYMBOL	MIN	MAX	UNITS
Storage Temperature Range	T_S	-65	135	°C
Operating Temperature Range	T_O	-40	125	°C
Reverse Voltage	V_R		8	V
Continuous Forward Current	I_F		10	mA
ESD Protection (HBM)			200	V

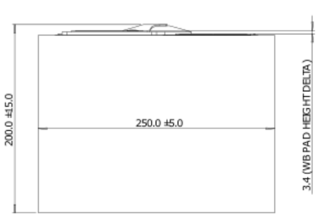
OPTICAL/ELECTRICAL SPECIFICATIONS

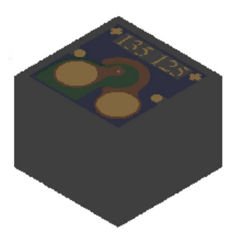
PARAMETER	CONDITIONS	SYMBOL	UNITS	MIN	TYPICAL	MAX
Emission Wavelength	T_o=30°C @ 3mA	λ_c	nm	965	-	990
Variation of Wavelength with Temperature	-	$\frac{\Delta\lambda}{\Delta T}$	$nm/°C$	-	0.06	0.07
Spectral Width [a]	T_o=30°C @ 3mA	σ_λ	nm	-	0.4	-
Threshold Current [b]	T_o=-40°C	I_{th}	mA	-	0.5	0.7
	T_o=30°C			-	0.7	-
	T_o=125°C			-	1.6	2.0
Average Operating Current	T_o=30°C	I_{avg}	mA	-	3	-
Operating Voltage	T_o=-40°C @ P_o=1mW	V_o	V	-	-	3.15
	T_o=125°C @ P_o=1mW			-	-	2.0
Optical Output Power	T_o=-40°C @ 2.2mA, 125°C @ 4.3mA	P_o	mW	1.0	-	-
	T_o=30°C, @ 3mA			-	1.6	-
Small Signal Bandwidth [c]	T_o=30°C @ 3mA	f_{3dB}	GHz	7.75	-	-
Beam Divergence Half Angle ($1/e^2$) [d]	T_o =30°C @ 3mA	$\theta_{1/2}$	deg	-	16	-
Slope Efficiency [e]	T_o =-40°C	SE	mW/mA	-	0.75	-
	T_o =125°C			-	0.5	-
Differential Resistance [f]	T_o =125°C @ 6mA	R_{diff}	Ω	-	89	-

MECHANICAL OUTLINE

Dimensions are in microns.







NOTES UNLESS OTHERWISE SPECIFIED:
1. INTERPRET DRAWING IN ACCORDANCE WITH ASME Y14.5-2009.
2. SUBSTRATE MATERIAL: GaAs.
3. WIREBOND PAD MATERIAL: 1 mm GOLD.
4. WIREBOND SHALL BE FULLY CONTAINED WITHIN BOND PAD OPENINGS.

ELECTROSTATIC-DISCHARGE SENSITIVE DEVICE:
FOLLOW ESD PROTECTIVE HANDLING PROCEDURES
IN ACCORDANCE WITH ANSI/ESD S20.20-2014.

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.