connector OPTICS

DATASHEET

25 Gbit/s VCSEL and VCSEL array chips (850 nm)

Product code:

CO-V850-25-1	1x1 chip
CO-V850-25-4	1x4 array
CO-V850-25-12	1x12 array

Product Description

These compact and very high modulation rate top-emitting GaAs-based vertical cavity surface emitting laser (VCSEL) chips and 1xN (N=1, 2, 4, 12, etc.) arrays are available as engineering samples for use in the development and evaluation of optical interconnects, optical backplanes and integrated waveguides, and next-generation optical data communications systems. The VCSELs are contacted on the top-surface individually using ground-source (GS) microprobes, wire bonds, or flip-chip bonds.

Features

- Up to 12 parallel channels
- More than 25 Gbit/s per channel
- High temperature stability
- A device-to-device pitch of 250 µm
- Suitable for wire or flip-chip bonding

Applications

- Active optical cables (AOCs), TOSA
- High-speed optical interconnects and links
- Infiniband EDR (eight data rate), Radio-over-Fiber, Fibre Channel and short-reach 40/100 Gbit/s Ethernet
- Chip-to-chip interconnects

Optical and Electrical Characteristics

T_O = 25 °C unless otherwise stated

Parameter	Symbol	Unit	Value	Notes
Data bit rate	G	Gbit/s	>25	
Operating wavelength	λ_{op}	nm	850±15	I_F =8mA
Threshold current	I_{th}	mA	<1	
Slope efficiency	η	W/A	>0.5	
Operating voltage	V_{op}	V	2.5	I_F =8mA
Optical output power	P	mW	>3.5	I_F =8mA
Differential resistance	R_s	Ω	<100	I_F =8mA
-3dB modulation bandwidth	f_{3dB}	GHz	>15	T_O =20 - 85 °C
Rise / Fall time	t_R	ps	<20	20% - 80%
Modulation current efficiency factor	MCEF	GHz/mA $^{1/2}$	>7	T_O =20 - 85 °C
Wavelength temperature coefficient	dλ/dT	nm/°C	0.06	T_O=20 - 85 °C
Thermal resistance	R_{th}	°C/mW	<3.5	
RMS spectral width	Δλ	nm	<0.7	I_F =8mA

T_O - operating temperature; I_F - operating current

Absolute maximum ratings

Parameter	Symbol	Unit	Value
Forward current	I_{max}	mA	15
Reverse voltage	V_{rv}	V	5
Optical output power	P_{opt_max}	mW	7
Electrical dissipation power	P_{dis_max}	mW	35
Storage temperature	T_{st}	°C	-40 - 100

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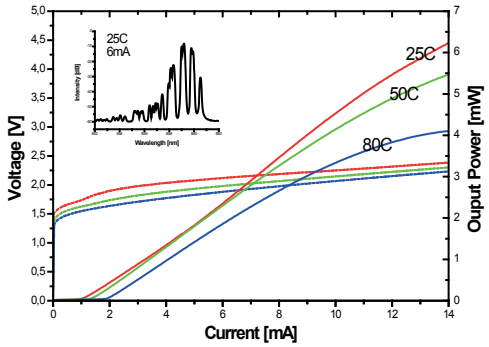
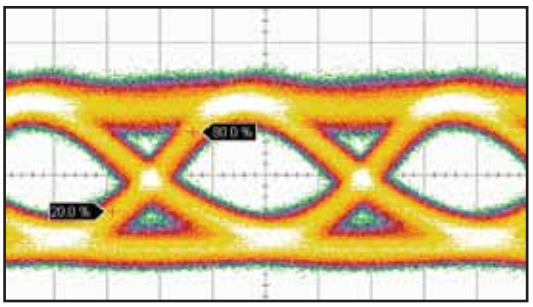
Mechanical dimensions

Parameter	Unit	Value
Length (single VCSEL), L	µm	250
Length (1x4 VCSEL array), L	µm	1000
Length (1x12 VCSEL array), L	µm	3000
Width, W	µm	250
VCSEL pitch	µm	250
Thickness, H	µm	150
Au-bond pads	µm	80x80

Typical light power-current-voltage characteristics

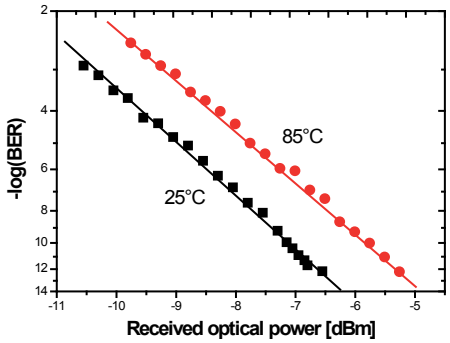


Typical optical eye diagram at data bit rate 25 Gbit/s



25 °C 35 mV/div, 10 ps/div

Typical bit error ratio (BER) test data at 25 Gbit/s



Possible design of 1x4 VCSEL array: