

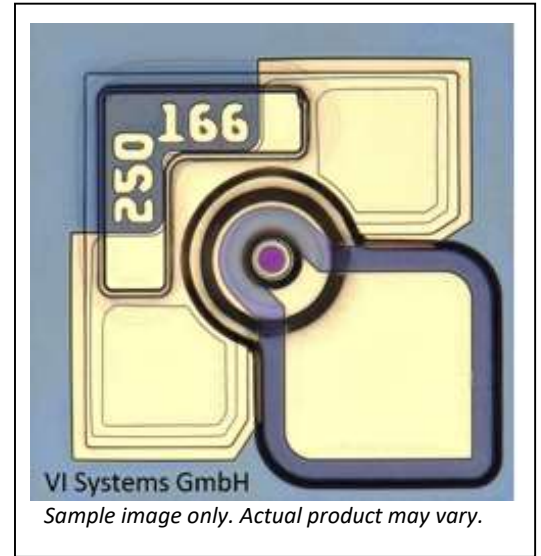
100 Gbit/s VCSEL (850 nm) Chip version: quasi single mode Contact type: GS/SG

Product Code:

VM100-850-SG-qSM-C1 1x1

VM100-850-SG-qSM-C4 4x1

Engineering Samples



Product Description

These compact and very high modulation rate top-emitting GaAs-based vertical cavity surface emitting laser (VCSEL) chips and 1xN (N=4,12) arrays are available as engineering samples for use in the development and evaluation of optical interconnections, 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.

Optical aperture: ~3µm

Features

- Single chips and 4-ch arrays
- Up to 112 Gbit/s per channel
- Device-to-device pitch of 250 µm
- Suitable for wire or flip-chip bonding

Applications

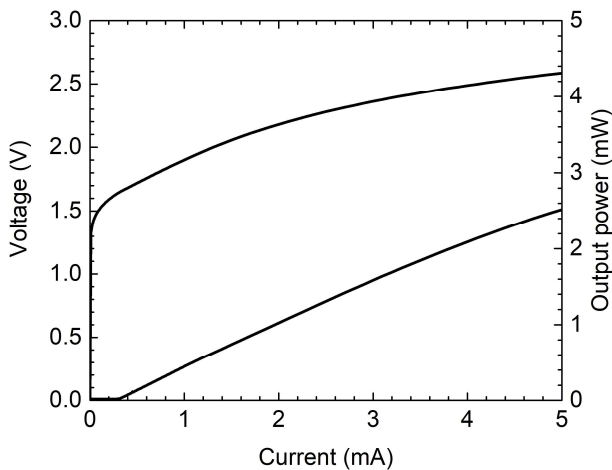
- Ethernet
- Proprietary optical interconnects
- Active Optical Cables (AOC)
- 25G and 100G Ethernet

| Parameter | Typical | Notes |
|---------------------|-------------|-------|
| Emission wavelength | 850 nm | |
| Data rate | ~112 Gbit/s | PAM-4 |
| Threshold current | ~ 0.5 mA | |
| Peak output power | ~3 mW @85°C | |

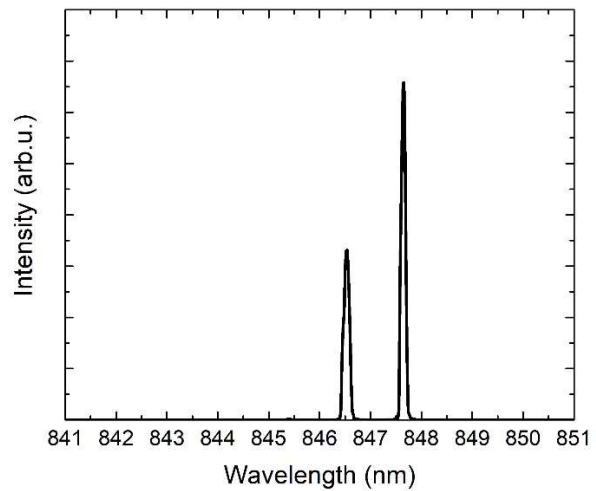
Electro-Optical Specifications (T = 0 to 85°C)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|--------------------------|-------------------------|-----------|-----|-----|-----|----------|
| Emission wavelength | λ | | 840 | | 860 | nm |
| Maximum data rate | BR | | | 50 | 56 | GBaud/s |
| Optical bandwidth | BW (f3dB _o) | | | 25 | 33 | GHz |
| Slope efficiency | η | 3 mA | 0.3 | | 0.5 | W/A |
| Threshold current | I _{th} | 25-85°C | | | 0.5 | mA |
| Differential resistance | R _d | 5 mA | | 80 | 100 | Ω |
| Beam divergence | Θ | FWHM | | 10 | | ° |
| Peak output power | P _{max} | | | 3 | 5 | mW |
| Spectral bandwidth (RMS) | $\Delta\lambda_{RMS}$ | 5 mA | | | 0.5 | nm |

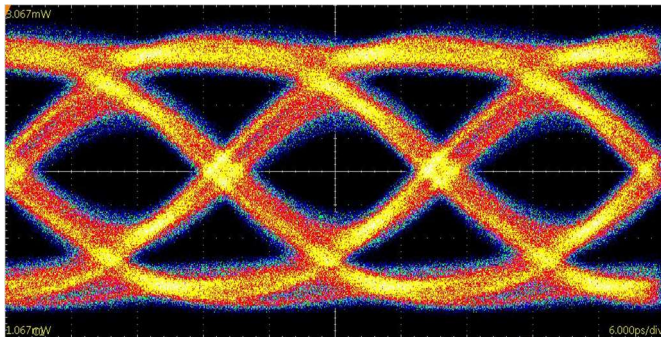
LIV Characteristics



Optical Spectrum

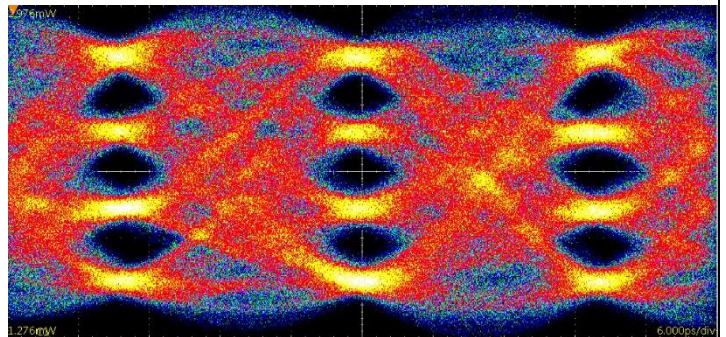


50 Gbit/s NRZ 25°C



Without pre-emphasis or equalization

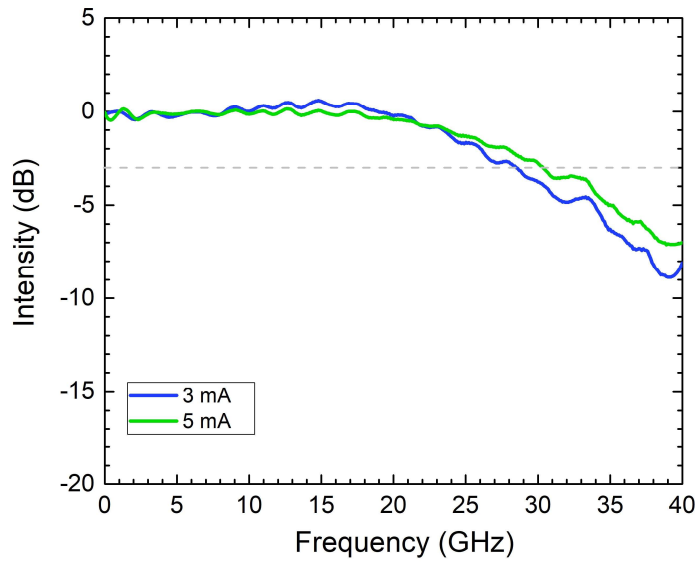
100 Gbit/s PAM4 25°C



With 6-tap FFE pre-emphasis

Transmitter: SHF BPG 12104A. Receiver: Tektronix DSA8300 w. 80C15 Optical Sampling Module.

Frequency response (optical)



Test Equipment: Keysight VNA

Absolute Maximum Ratings

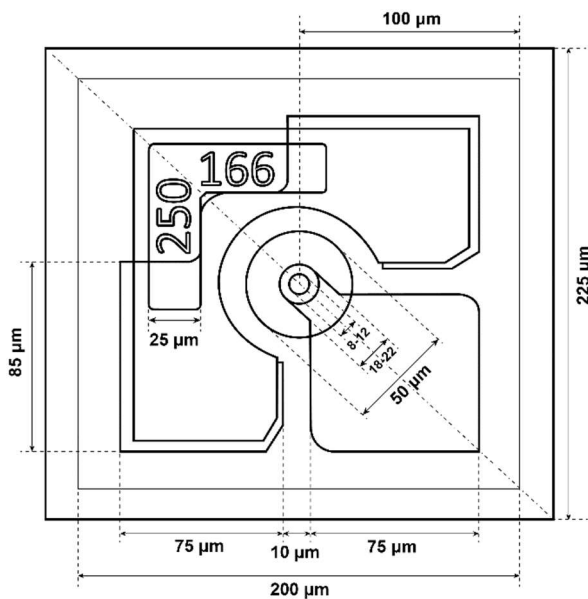
| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|-------------------------|----------|-------------|-----|-----|-----|------|
| Peak forward current | I_f | | | | 9 | mA |
| Maximum reverse voltage | V_{rv} | | | | 5 | V |
| Operating temperature | T_{op} | | | | 85 | °C |
| Storage temperature | T_{st} | | -40 | | 100 | °C |
| Soldering temperature | T_{sl} | max 260 sec | | | 150 | °C |

Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate irreversible damage to the component even if all other parameters are within the electro-optical specifications. Exposure to any of the Absolute Maximum Ratings for extended periods can adversely affect the reliability of these chips.

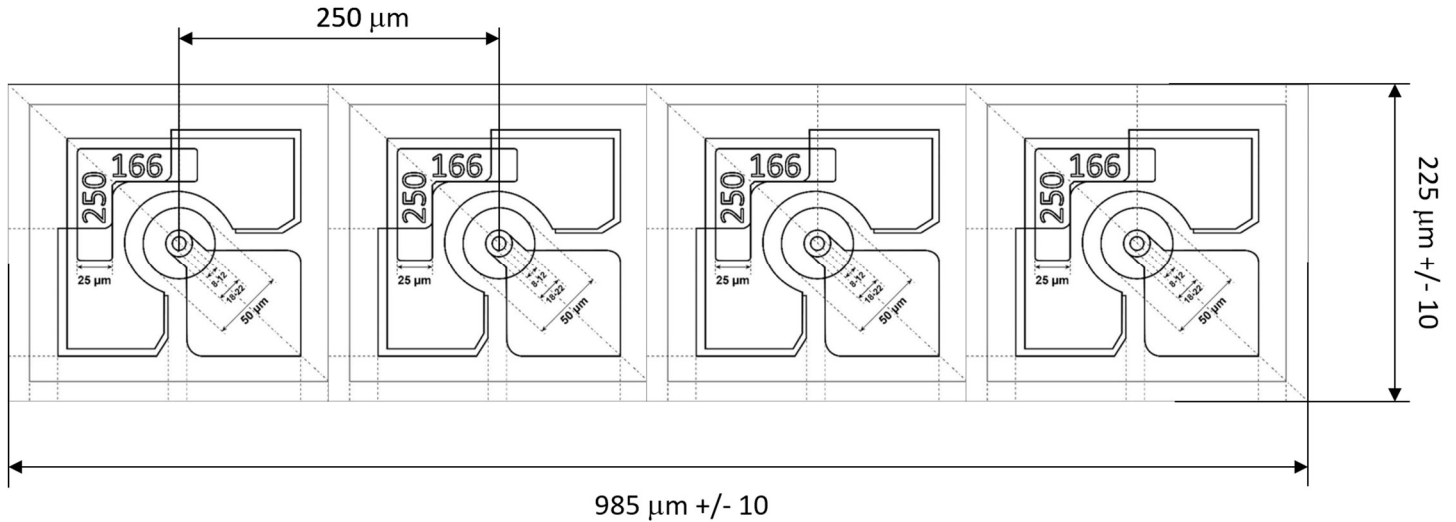
Mechanical Dimensions

| Parameter | Type | Min | Typ | Max | Unit |
|------------------------|--------|-----|-----|------|---------------|
| VCSEL pitch | All | | 250 | | μm |
| Length 1x1 VCSEL chip | 850-C1 | | 210 | 250 | μm |
| Length 1x4 VCSEL array | 850-C4 | | 960 | 1000 | μm |
| Height | All | 140 | 150 | 160 | μm |
| Width | All | | 210 | 250 | μm |

Dimensions



VM100-850-SG-qSM-C4 Array dimensions



Qualification Notification

The VM100-850Cx-qSM has been tested to meet specifications outlined in this data sheet at room temperature. However, it has not undergone full qualification testing or characterization and therefore may not meet the performance specifications over all extremes.



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