# TMC-5F40

## High speed VCSEL TO-46 metal can

### FEATURES:

- Industry standard TO-46 package with flat glass.
- Optimized for fiber optical communication.
- Low temperature dependence of electrical and optical characteristic.
- Symmetrical beam.
- High coupling efficiency for multi-mode fibers.
- Bandwidth > 2 GHz.

### ELECTRO-OPTICAL CHARACTERISTICS:

| PARAMETERS | SYMBOL | MIN | TYP | MAX | UNIT | TEST CONDITIONS[1] |
|---|---|---|---|---|---|---|
| Threshold Current | $I_{th}$ | | 3 | 6 | mA | |
| Output Power | $P_o$ | 1 | 2 | 3 | mW | $I_F$=12 mA[2] |
| Operating Current | $I_{OP}$ | | 12 | | mA | Adjustable to achieve proper output power |
| Slope Efficiency | $\eta$ | | 0.25 | | mW/mA | $I_F$=12 mA |
| Wavelength | $\lambda_P$ | 830 | 850 | 860 | nm | $I_F$=12 mA |
| Forward Voltage | $V_F$ | 1.7 | 1.9 | 2.2 | V | $I_F$=12 mA |
| Breakdown voltage | $V_{BD}$ | 10 | 15 | | V | $I_R$=10 μA |
| Series Resistance | $R_S$ | | 30 | | Ω | $I_F$=12 mA |
| Spectral width (RMS) | $\Delta\lambda$ | | | 0.85 | nm | $I_F$=12 mA |
| Relative Intensity Noise | RIN | | -120 | | dB/Hz | $I_F$=12 mA ,f=1 GHz |
| Beam Divergence | $\theta$ | | 8 | | degree | $I_F$=12 mA[3] |

Notes:

1. All parameters except mentioned are measured at $I_F$=12 mA, 25°C, CW.
2. Higher power can be provided under request.
3. Beam divergence is defined as the angle of light intensity at Full Width at Half Maximum (FWHM).

### THERMAL CHARACTERISTICS:

| PARAMETERS | SYMBOL | MIN | TYP | MAX | UNIT | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| Thermal Resistance | $R_{th}$ | | 900 | | °C /W | $T_A$=25°C |
| $I_{th}$ Temperature Variation | $\Delta I_{th}$ | -1 | | 1 | mA | $T_A$=0~70°C |
| $V_F$ Temperature Coefficient | $\Delta V_F/\Delta T$ | -3.5 | -2.5 | -2.0 | mV/°C | $T_A$=0~70°C, $I_F$=12mA |
| $\eta$ Temperature Coefficient | $\Delta\eta/\Delta T$ | | -0.15 | | %/°C | $T_A$=0~70°C, $I_F$=12mA |
| $\lambda_P$ Temperature Coefficient | $\Delta\lambda_P/\Delta T$ | | 0.06 | | nm/°C | $T_A$=0~70°C, $I_F$=12mA |

### ABSOLUTE MAXIMUM RATINGS:

| PARAMETERS | MIN | MAX | UNIT | CONDITIONS |
|---|---|---|---|---|
| Storage Temperature | -40 | 125 | °C | |
| Operating Temperature | -40 | 85 | °C | |
| Lead Solder Temperature | | 260 | °C | 10 seconds |
| Continuous Forward Current | | 40 | mA | |
| Continuous Reverse Voltage | | 10 | V | |

Fig. 1 Typical Optical Characteristics

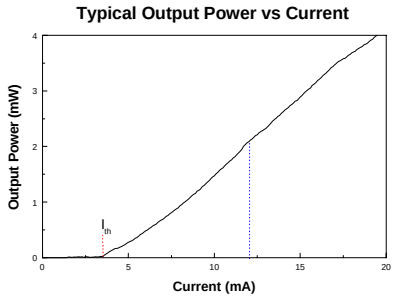



Fig. 2 Typical Electrical Characteristics

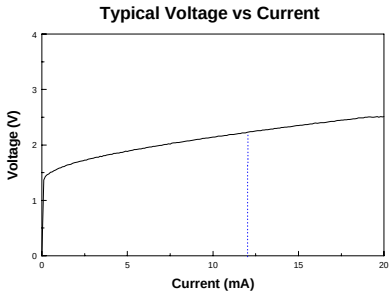
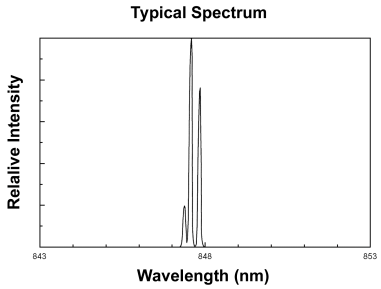
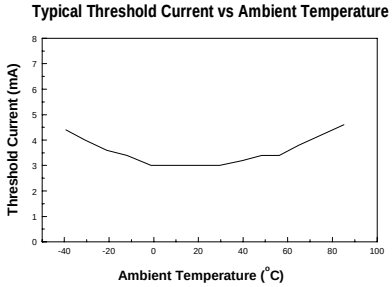



Fig. 3 Spectrum When Driving Current 12 mA



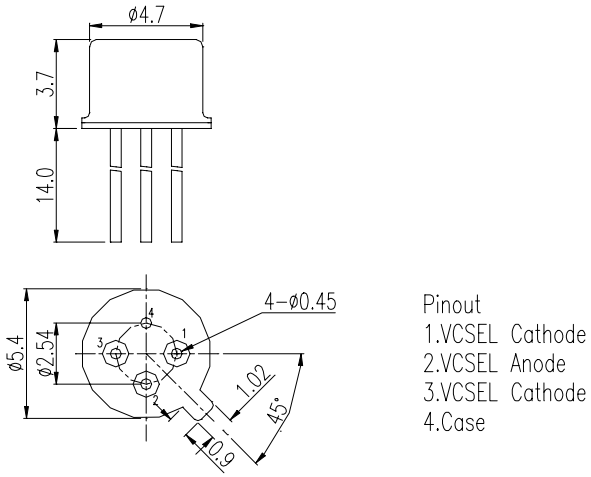

3 transverse modes typically.

Fig. 4 Temperature Dependence of Threshold Current




## OUTLINE DIMENSIONS:

UNIT:mm




Pinout
1.VCSEL Cathode
2.VCSEL Anode
3.VCSEL Cathode
4.Case

## WARNING:

The VCSEL is a class IIIb laser in the safety standard ANSI Z136.1 and should be treated as a potential eye hazard.