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v 1.1 1.07.2014

VC670M-TO46FW

- Red VCSEL
- 670 nm, 1 mW
- Multi Mode
- TO-46 Can
- Flat Window



Description

VC670M-TO46FW is a multi mode red VCSEL emitting at typically 670 nm with rated output power of 1.0 mW cw, mounted into a standard TO-46 package and sealed with a flat window cap. The VCSEL works under low forward current and voltage.

Maximum Ratings

Parameter	Symbol	Values Min.	Values Max.	Unit
Forward Current	I_F		7	mA
Reverse Voltage (@ 10µA)	V_F		5	V
Operating Temperature	T_{CASE}	- 20	+ 50	°C
Storage Temperature	T_{STG}	- 40	+ 85	°C
Lead Solder Temperature *	T_{SLD}		+ 260	°C

** must be completed within 10 seconds*

Laser Characteristics (T_{CASE}=25°C)

Parameter	Symbol	Min.	Values Typ.	Max.	Unit
Emission Wavelength	λ_{Peak}	660	670	690	nm
Spectral Width	$\Delta\lambda$			0.85	nm
Optical Output Power	P_O		1.0		mW
Threshold Current	I_{TH}		2.0	3.5	mA
Operating Current	I_F		4		mA
Operating Voltage	V_F		2.1	2.5	V
Beam Divergence (Full Width)	Θ	14		30	deg
Slope Efficiency	η	0.2	0.4		mW/mA
Dynamic Resistance	R_D		60	90	Ω

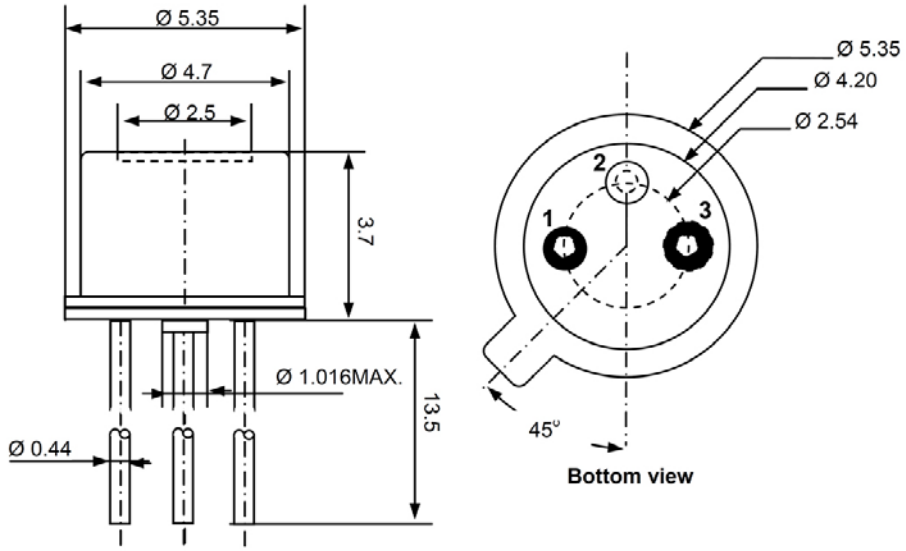
Thermal Characteristics

Parameter	Symbol	Min.	Values Typ.	Max.	Test Conditions	Unit
Max. Operating Temperature Optical Output Power	$P_{T=50°C}$		0.7		T_C=50°C, 4mA	mW
I_{TH} Temperature Variation	ΔI_{TH}		1		T_C=-20 to 50°C	mA
η Temperature Variation	$\Delta\eta / \Delta T$		-0.8		T_C=-20 to 50°C,4mA	%/°C
λ Temperature Variation	$\Delta\lambda / \Delta T$		0.05		T_C=-20 to 50°C,4mA	nm/°C

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Outline Dimensions

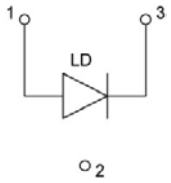
TO46FW	TO-46 with flat window



All Dimensions in mm

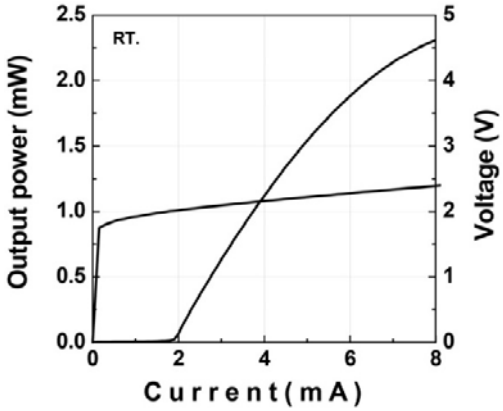
Electrical Connection

Lead	Description
Pin 1	LD Anode
Pin 2	n.c.
Pin 3	LD Cathode

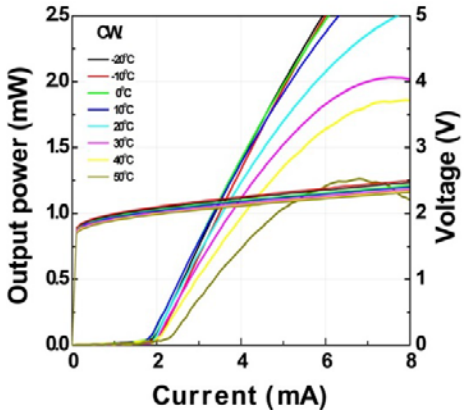


Performance Characteristics

LIV Curve

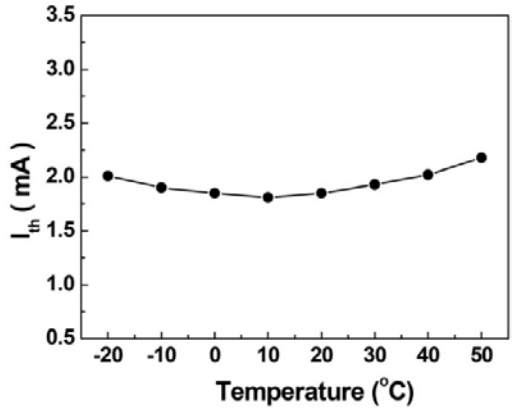


LIV vs. Operating Temperature

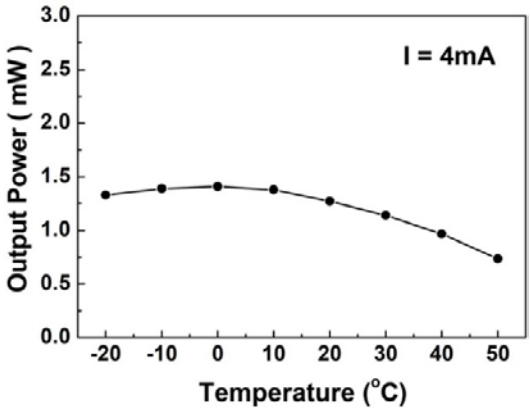


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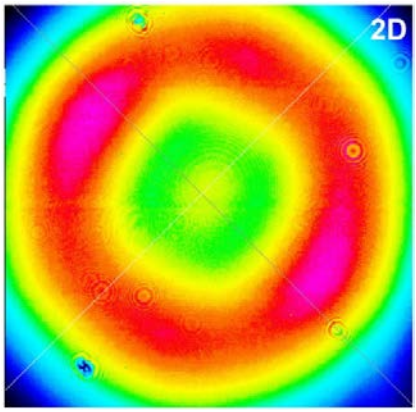
Forward Current vs. Operating Temperature

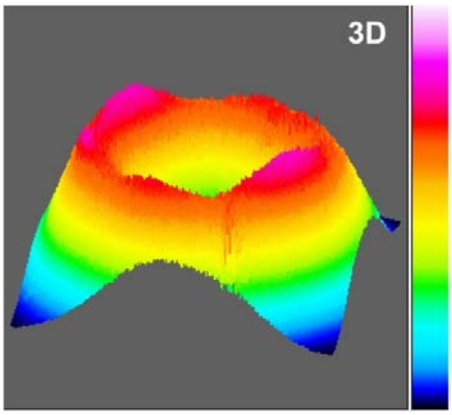


Output Power vs. Operating Temperature



Far Field Pattern





Precautions

Static Electricity:

VCSELs are **sensitive to electrostatic discharge (ESD)**. Precautions against ESD must be taken when handling or operating these VCSELs. Surge voltage or electrostatic discharge can result in complete failure of the device.



Safety Advice:

This VCSEL emits concentrated red light which can be **hazardous to the human eye and skin**. This diode is classified as CLASS 2 laser product according to **IEC 60825-1** and **21 CFR Part 1040.10** Safety Standards.

Operation:

Do *only* operate VCSELs with a current source.
Running these LEDs from a voltage source will result in complete failure of the device.
Current of a LED is an exponential function of the voltage across it. Usage of current regulated drive circuits is mandatory.

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