



## VC670S-TO46FW

- Red VCSEL
- 670 nm, 0.5 mW
- Single Mode
- TO-46 Can
- Flat window cap



### Description

**VC670S-TO46FW** is a single mode red VCSEL emitting at typically 670 nm with rated output power of 0.5 mW cw, mounted into a standard TO-46 package and sealed with a flat window cap. The VCSEL provides a Gaussian beam shape under low forward current and voltage.

### Maximum Ratings

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

\* must be completed within 10 seconds

### Laser Characteristics ( $T_{CASE}=25^{\circ}$ C)

Parameter	Symbol	Min.	Values		Unit
			Typ.	Max.	
Emission Wavelength	$\lambda_{Peak}$	660	670	690	nm
Optical Output Power	$P_O$	0.2	0.5		mW
Threshold Current	$I_{TH}$		2.5	4	mA
Operating Current	$I_F$		4		mA
Operating Voltage	$V_F$		2.3	2.7	V
Beam Divergence (Full Width)	$\Theta$	10	12	30	deg
Slope Efficiency	$\eta$	0.1	0.2		mW/mA
Dynamic Resistance	$R_D$		120	180	$\Omega$

### Thermal Characteristics

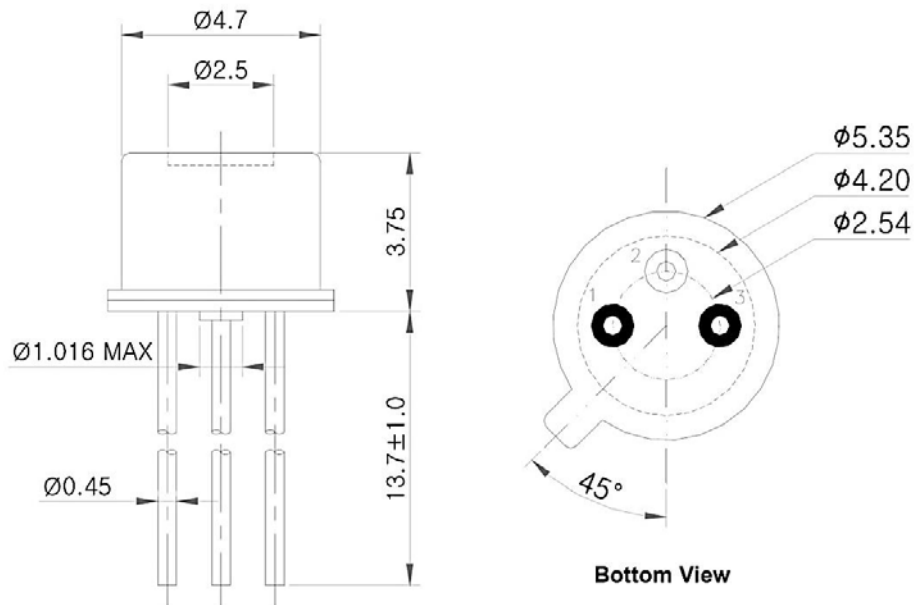
Parameter	Symbol	Min.	Values		Test Conditions	Unit
			Typ.	Max.		
Max. Operating Temperature Optical Output Power	$P_{T=50^{\circ}C}$		0.1		$T_C=50^{\circ}$ C, 4mA	mW
$I_{TH}$ Temperature Variation	$\Delta I_{TH}$		1.5		$T_C=-20$ to $50^{\circ}$ C	mA
$\eta$ Temperature Variation	$\Delta \eta / \Delta T$		-0.8		$T_C=-20$ to $50^{\circ}$ C, 4mA	%/ $^{\circ}$ C
$\lambda$ Temperature Variation	$\Delta \lambda / \Delta T$		0.06		$T_C=-20$ to $50^{\circ}$ C, 4mA	nm/ $^{\circ}$ C



## Outline Dimensions

TO46FW

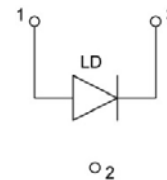
TO-46 with flat window



All Dimensions in mm

## Electrical Connection

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





## Precautions

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### 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.