

# TMC-5B21

## High speed VCSEL TO-46 metal can

### FEATURES:

- Industry standard TO-46 package with dome lens.
- Low beam divergence without extra optics.
- Low dependence of electrical and optical characteristic over temperature.
- Symmetrical beam.
- High coupling efficiency to multi-mode fibers.
- Speed > 1 GHz.



### ELECTRO-OPTICAL CHARACTERISTICS:

PARAMETERS	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITIONS <sup>(1)</sup>
Threshold Current	$I_{th}$		3	6	mA	
Output Power	$P_o$	1	2	3	mW	$I_F=12\text{ mA}$ <sup>(2)</sup>
Operating Current	$I_{OP}$		12		mA	Adjustable to establish 1.5 mW output power
Slope Efficiency	$\eta$		0.25		mW/mA	$I_F=12\text{ mA}$ <sup>(3)</sup>
Wavelength	$\lambda_p$	830	850	860	nm	$I_F=12\text{ mA}$
Forward Voltage	$V_F$	1.7	1.9	2.3	V	$I_F=12\text{ mA}$
Breakdown voltage	$V_{BD}$	10	15		V	$I_R=10\text{ }\mu\text{A}$
Series Resistance	$R_S$		40		$\Omega$	$I_F=12\text{ mA}$
Beam Divergence	$\theta$		2		degree	$I_F=12\text{ mA}$ <sup>(4)</sup>

Notes:

1. All parameters except mentioned are measured at  $I_F=12\text{ mA}$ ,  $25^\circ\text{C}$ , CW.
2. Higher power can be provided under request.
3. Slope efficiency is defined as  $\Delta P/(12-I_{th})$  at  $25^\circ\text{C}$ .
4. 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		$^\circ\text{C}/\text{W}$	$T_A=25^\circ\text{C}$
$I_{th}$ Temperature Variation	$\Delta I_{th}$	-1		1	mA	$T_A=0\sim 70^\circ\text{C}$
$V_F$ Temperature Coefficient	$\Delta V_F/\Delta T$		-2.5	-3.5	mV/ $^\circ\text{C}$	$T_A=0\sim 70^\circ\text{C}$ , $I_F=12\text{ mA}$
Temperature Coefficient	$\Delta\eta/\Delta T$		-0.15		%/ $^\circ\text{C}$	$T_A=0\sim 70^\circ\text{C}$ , $I_F=12\text{ mA}$
$\lambda_p$ Temperature Coefficient	$\Delta\lambda_p/\Delta T$		0.06		nm/ $^\circ\text{C}$	$T_A=0\sim 70^\circ\text{C}$ , $I_F=12\text{ mA}$

### ABSOLUTE MAXIMUM RATINGS:

PARAMETERS	MIN	MAX	UNIT	CONDITIONS
Storage Temperature	-40	125	$^\circ\text{C}$	
Operating Temperature	-20	85	$^\circ\text{C}$	
Lead Solder Temperature		260	$^\circ\text{C}$	5 seconds
Continuous Forward Current		40	mA	
Continuous Reverse Voltage		10	V	

Fig. 1 Typical Optical Characteristics

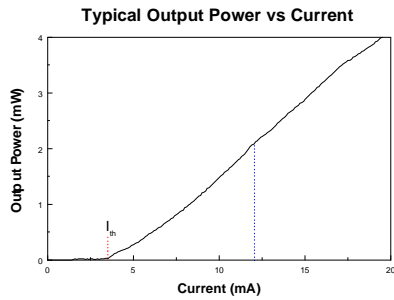


Fig. 2 Typical Electrical Characteristics

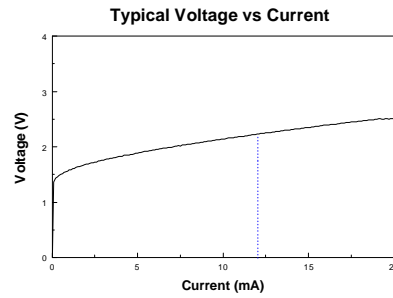
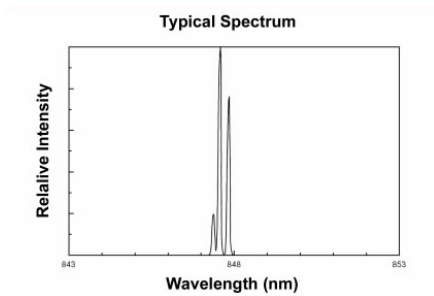
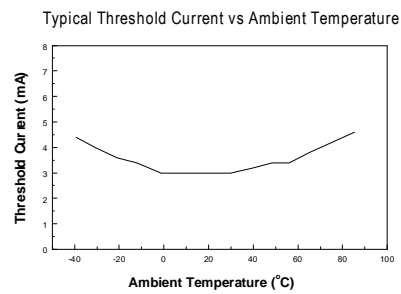


Fig. 3 Spectrum When Driving Current 15 mA



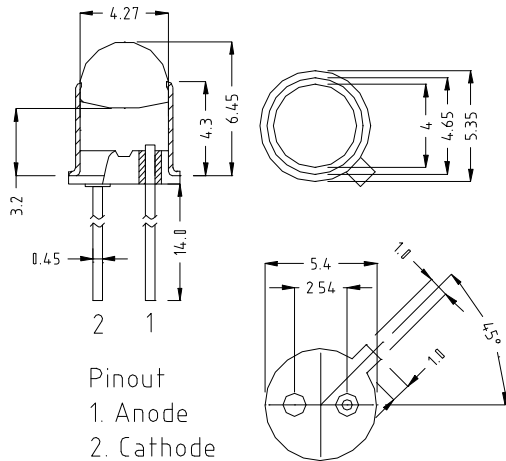
3 transverse modes typically.

Fig. 4 Temperature Dependence of Threshold Current



**OUTLINE DIMENSIONS:**

• Unit: mm



**WARNING:**

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

