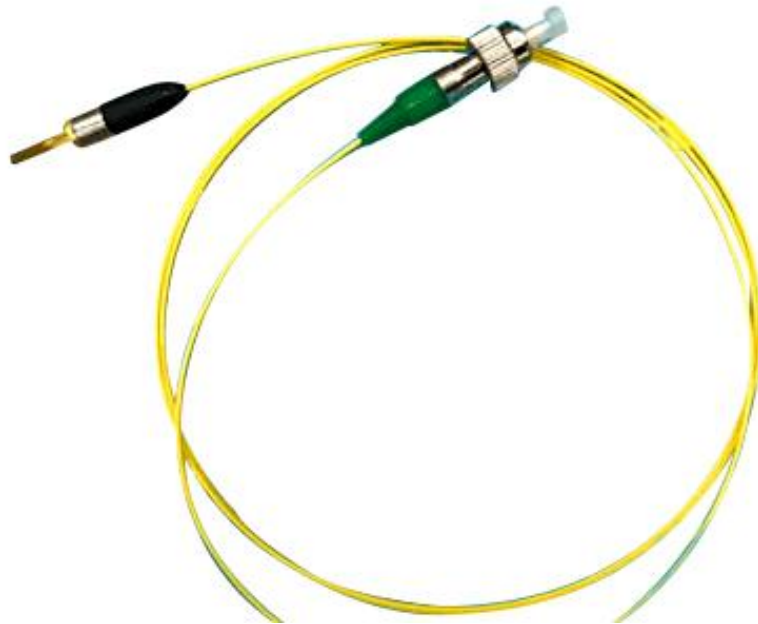


## 850nm single mode fiber-coupled VCSEL laser diode (without TEC)



### ● Product Description

850nm VCSEL is a vertical emitting MOVPE grown GaAsP/AlGaAs single mode diode laser. Wavelength tuning can be achieved by laser current and temperature tuning. Built-in TEC and thermistor. Our 850 nm single mode VCSEL is designed for high speed, high performance communication applications.



- **Product features**

Low temperature dependence of electrical and optical properties、 Vertical cavity surface emitting laser、 Internal TEC and thermistor, ESD protection、 Narrow line width、 2nm tunable

- **Part Number**

MP-VCS-FC-850-1-SA

- **Application area**

Long distance telephone access network、 Local area network、 Ethernet

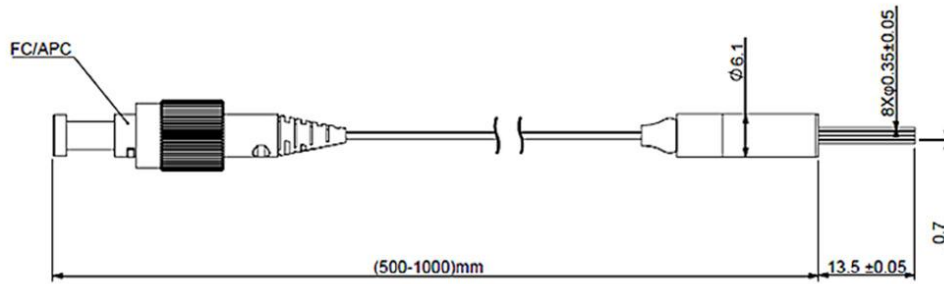
- **Core parameters**

Wavelength	Output Power	Spectral Width
850nm	1mW	100MHz



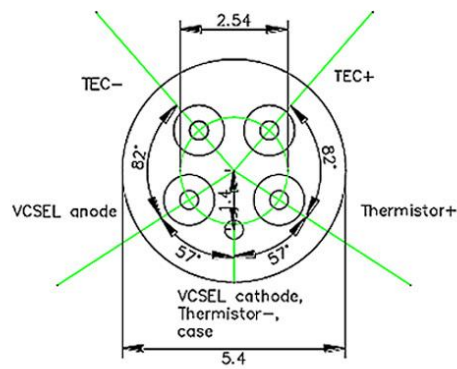
## ● Dimension Drawing

Packing size:



### Pin definition

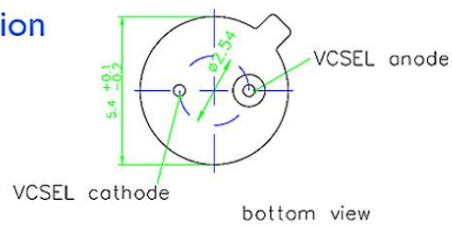
With TEC pin assignment



bottom view

Without TEC pin assignment

### Pin configuration



bottom view



## ● General Parameters

### Parameters

Conditions:  $T_{OP} = 20^{\circ}\text{C}$ ,  $I_{OP} = 10.0 \text{ mA}$  unless otherwise stated ( $T_{OP} = \text{chip}$

backside temperature, controlled by TEC)

Parameter	symbols	Min.	Typical	Max.	Unit	Remarks
Operating wavelength	$\lambda_R$	850nm				
Threshold current	$I_{TH}$		1		mA	
Output power	$P_{opt}$	0.5	1		mW	
Threshold voltage	$U_{TH}$		1.8		V	
Operating current	$I_{OP}$		3		mA	$P_{opt} = 0.5\text{mW}$
Operating voltage	$U_{OP}$		3		V	$P_{opt} = 0.5 \text{ mW}$
Photoelectric conversion rate	$\eta_{WP}$		12		%	$P_{opt} = 0.5 \text{ mW}$
Slope efficiency	$\eta_s$		0.3		W/A	
Rise and fall time	$T_r/T_f$		90/120		Psec	
Differential series resistance	$R_s$		100	200	$\Omega$	$P_{opt} = 0.5 \text{ mW}$
3dB modulation bandwidth	v3dB	0.10	2.5		GHz	$P_{opt} = 0.5 \text{ mW}$
						Due to ESD protection diode
Relative noise intensity	RIN		-130	-120	dB/Hz	$P_{opt} = 0.3 \text{ mW @ 1 GHz}$
Wavelength current tuning coefficient			0.6		nm/mA	
Wavelength temperature tuning coefficient			0.06		nm/K	
Thermistor (VCSEL chip)	$R_{thermal}$	3		5	K/mW	
Side mode suppression ratio(SMSR)		35			dB	$I = 2 \text{ mA}$

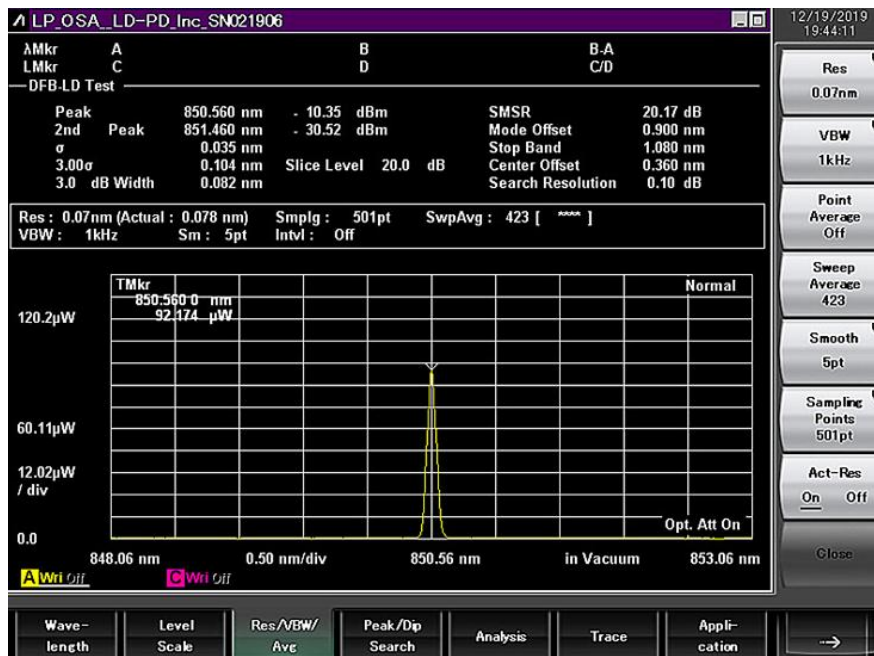


Parameter	symbols	Min.	Typical	Max.	Unit	Remarks
Beam divergence angle	$\theta$	10		25	°	$P_{opt} = 0.5mW$ , full width $1/e^2$
Spectral width			100		MHz	$P_{opt} = 0.5 mW$

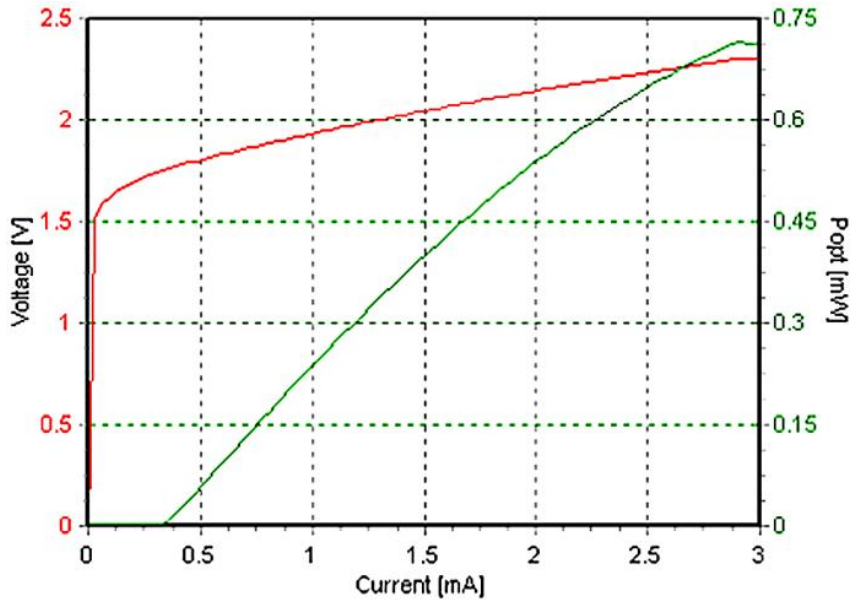
\*Above specifications are for device without connectors.

Tec Characteristics	Unit	Min.	Typical value	Max.	Remarks
Tec current	mA	-150(Heating)		+300(Cooling)	Proper Heat Sink Required
NTC Thermistor	K $\Omega$	9.5	10.0	10.5	T=25°C@10 K $\Omega$
NTC Thermistor	K $\Omega$	$10/\exp\{3892-(1/289K-I/TOP)\}$			

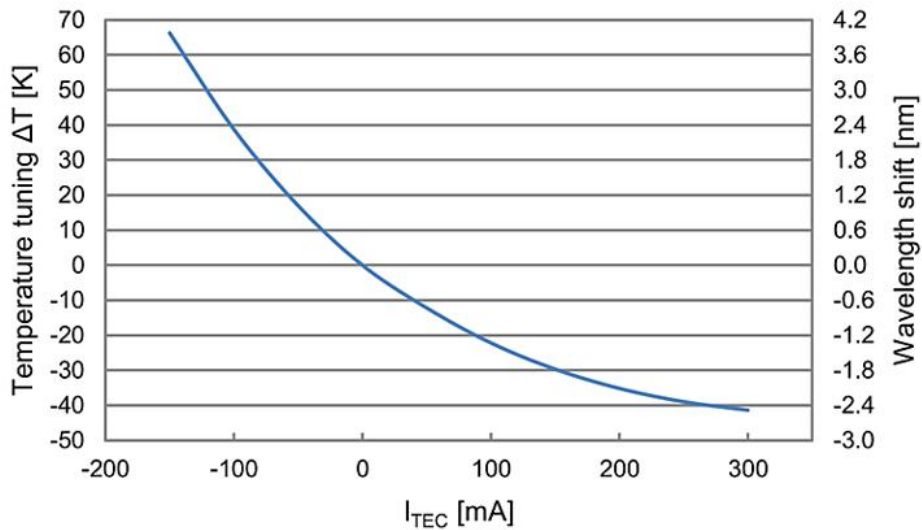
## Spectrum



## L-I Curve (T@25°C)

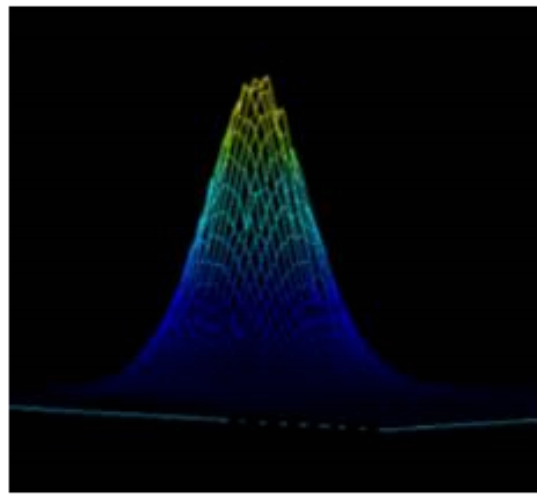
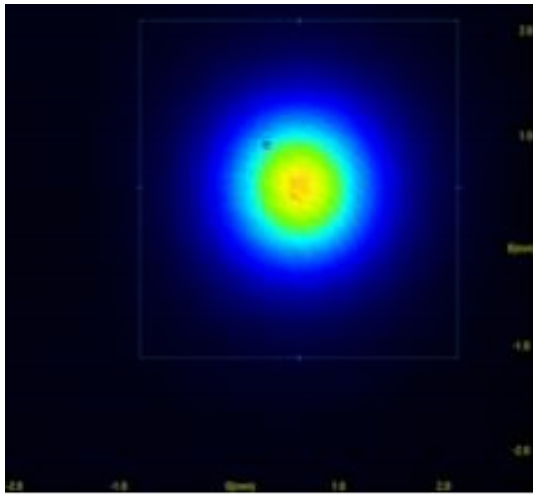


## Temperature/wavelength tuning curve @TEC current:



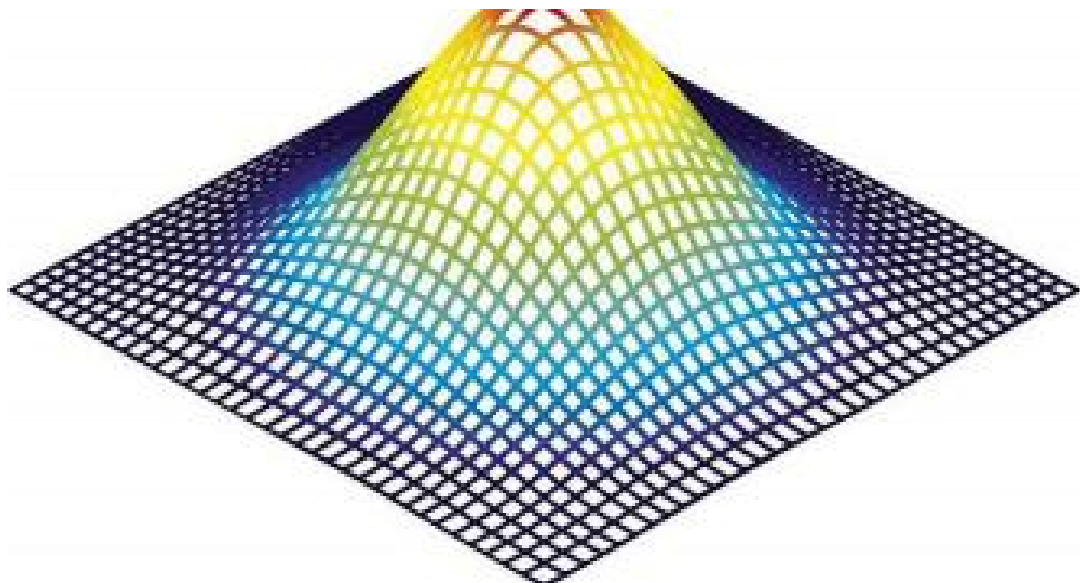
\* TEC performance is dependent on heat load, ambient temperature and heatsink properties

## Laser spot image (2D/3D):



## Beam Profile

In the far field, the intensity distribution of a single-mode VCSEL is a perfect Gaussian shape.





## Absolute Maximum Parameters

Parameter	Unit	Min.	Typical value	Max.
Storage temperature	°C	-40	25	125
Chip temperature	°C	+10	25	40
Operating current	mA	0	3.0	5.0
Forward voltage	V	0.8	3.0	4.8
TEC current	mA	-150	-	+300
Soldering temperature*	°C	100	130	260
Power consumption	mw	-	-	5

(\*TEC temperature must be below 150°C)

## Ordering information

MP-VCS-□□□□-☆-A8▽-XX

□□□□: Wavelength

0760: 760nm

0850: 850nm

\*\*\*\*\*

1550: 1550nm

☆ : TEC

0: Without TEC



**1: With TEC**

**▽: Wavelength Tolerance**

**1:  $\pm 0.5\text{nm}$**

**2:  $\pm 1.5\text{nm}$**

**XX: Fiber and Connector Type**

**FS=Free Space**

**BFSA=Butterfly Package with HI780+ FC/APC**

**CPSA=Coaxial Package with HI780+ FC/APC**

**BFSP=Butterfly Package with HI780+ FC/PC**

**CPSP=Coaxial Package with HI780+ FC/PC**

**BFPP=PM Fiber+ FC/PC PA=PM Fiber+ FC/APC**