



ATC - SEMICONDUCTOR DEVICES

1 W CW Laser Diode Model ATC-C1000-3800



Key features

- 1 W CW output power
- 380 μm emitting aperture
- High efficiency MOCVD InAlGaAs quantum well design
- High reliability
- C-mount, ATC and TO-3 packages

Applications

- Medical, ophthalmic and dental application
- Beacons and illumination
- Testing and measuring applications

Description

Innovative post-growth technology enables to develop a highly efficient technological cycle for the laser diode manufacturing. Laser diodes are soldered on to the heat sink with the epitaxial layers down, which ensures efficient heat removal and provides high optical output power. ATC-SD carries out testing of each device (up to 500 hours of operation in CW mode) and one-off certification after the test. This procedure ensures the selection of highly reliable samples.

Lasers of the following configurations are manufactured: c-mount, ATC package and TO-3 package. Open heat sink and c-mount types are preferable if the user carries out different manipulations with the laser crystal. In this case user should provide an additional radiator and encapsulates the entire unit by himself. The ATC package is a hermetically sealed case with a flat output window. This unit allows operation without a complementary heat sink in a pulsed mode. The small heat resistance of the ATC package provides a low temperature difference between external package surface and laser diode. The TO-3 package includes a Peltier thermocooler and thermistor, which allows to maintain constant operation temperature. Being adjusted and completely compatible to the worldwide standards, our version of TO-3 package has a detachable mounting ring. This gives a higher variety of possible applications and allows to achieve a higher density of the device design in the user's applications.

The ATC and TO-3 packages may contain a monitor photodiode as an option, which ensures stabilization of the radiation power. Photodiode characteristics are linear with a wide power range. The photodiode operates without opposite bias and the response time is about 50 ns. The photodiode current is a relative value which may be used as a feedback for control and adjustment of the emitted optical power. The maximum photodiode current is 10 mA.

All packages may contain a cylindrical microlens as an option, which reduces the radiation divergence in 20 times (in off-axis plane). With this option customer can work without additional optical systems or can use an inexpensive long focus lens.



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Safety

The laser light emitted from the laser diode may be harmful to the human eye. When in use, safety precautions should be taken, to avoid possibility of eye damage. These laser diodes are classified as **Class IV lasers**. It means that user should not exposure of the eye or skin to direct or scattered radiation. If viewing is required, the beam should be observed by reflection from matte surface utilizing an image converter or suitable fluorescent screen. Refer to operations manual for additional precautions and procedures.

Caution: the use of optical instruments with this product will increase eye hazard.

ESD: Laser diodes are very sensitive to the electrostatic discharge. Caution should be taken when using these devices.

Specification

Parameter ($T_{OP}=20^{\circ}C$)	Symbol	Values			Unit
		Min.	Typ.	Max	
Output power (continuous wave) ¹⁾	P_{CW}	---	1.0	---	W
Emission wavelength ²⁾	λ	662	668	672	nm
Spectral width (FWHM) ²⁾	$\Delta\lambda$	---	3	---	nm
Differential quantum efficiency	η_D	0.8	1.0	1.2	W/A
Emitting dimensions	W x H	---	380x1.0	---	μm
Threshold current	I_{TH}	1.6	1.8	2.0	A
Operating current ¹⁾²⁾	I_{OP}	2.7	3.0	3.8	A
Operating voltage ¹⁾²⁾	U_{OP}	---	2.0	2.2	V
Differential series resistance	R_S	---	0.08	0.15	Ω
Beam divergence (FWHM)	$\Theta_{ } \times \Theta_{\perp}$	---	10x40	12x45	Deg.
Temp. coefficient of threshold current ³⁾	T_0	---	150	---	K
Temp. coefficient of operating current	$I_{OP2}/I_{OP1}T$	---	0.7	---	%/K
Temp. coefficient of wavelength	$\Delta\lambda/\Delta T$	---	0.27	0.3	nm/K
Thermal resistance	R_T	---	6	---	K/W

Maximum ratings

Output power (continuous wave) ¹⁾	P_{CW}	---	---	1.3	W
Reverse voltage	U_R	---	---	2	V
Operating temperature (for sealed case)	T_{OP}	- 10	---	+ 50	K
Storage temperature (for sealed case)	T_{ST}	- 40	---	+ 60	K
Lead soldering temperature (for 5 sec)	T_S	---	---	250	K

¹⁾ Optical power is measured by coupling with 0.75 NA collection optics

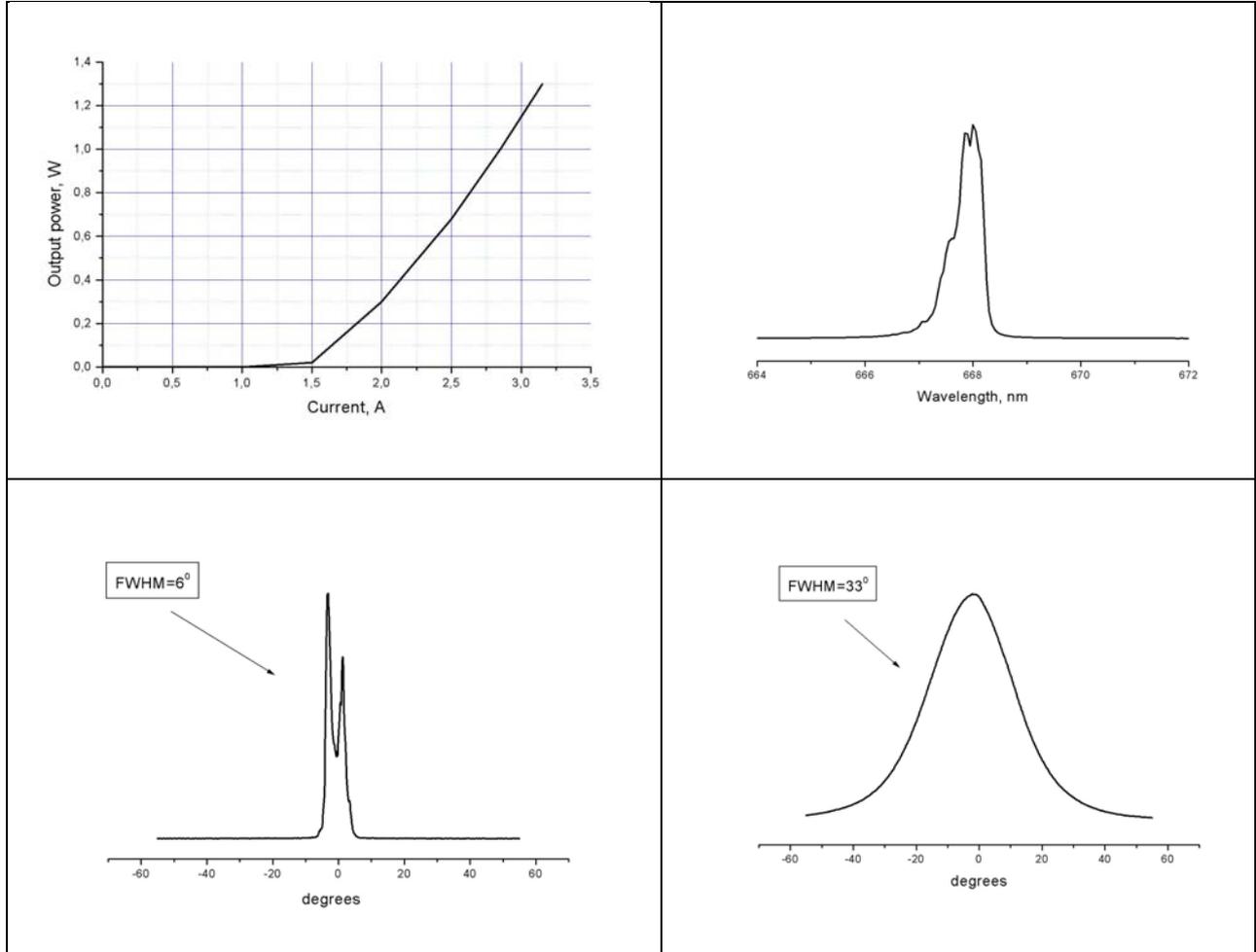
²⁾ The value corresponds to 1.0 W CW optical output power

³⁾ Temp. coefficient of threshold current can be modeled as: $I_{TH2}=I_{TH1}\exp[(T_2-T_1)/T_0]$



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Optical characteristics

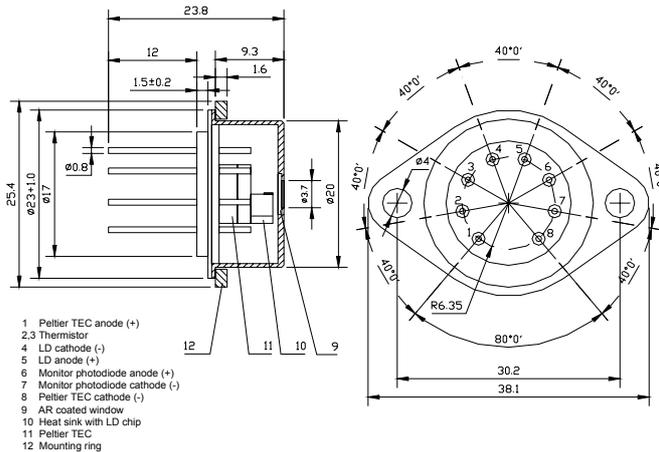




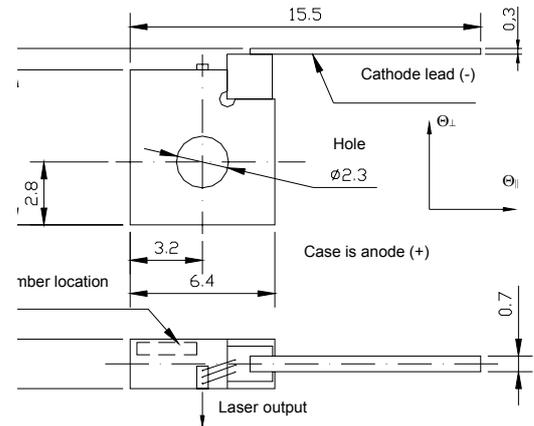
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Package specifications. All dimensions are specified in mm. Tolerances ± 0.25

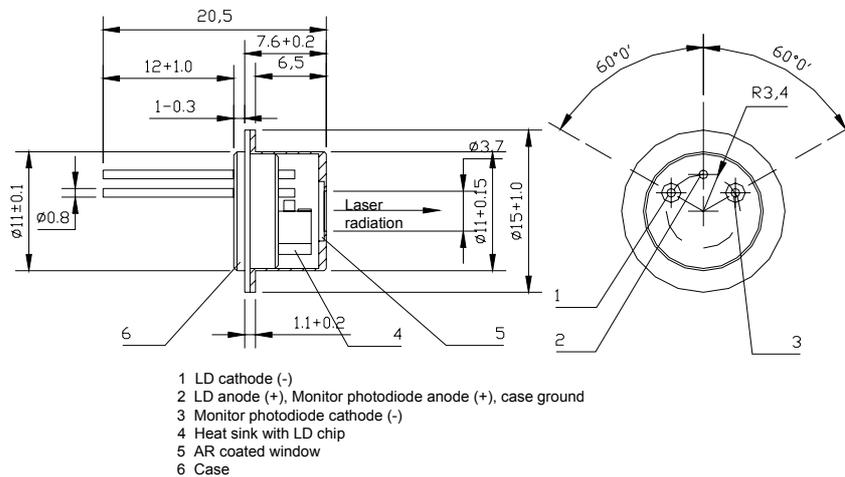
TO-3 PACKAGE



C-MOUNT



ATC-PACKAGE



All devices are pretested and will be delivered with the certificate including measured laser characteristics. For safety, unpacking, handling, mounting, operating and warranty issues, please read attentively our **“Operating manual”**.

Warning: ATC-SD reserves the right to change the design and specification of any product at any time without notice.

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