Laser Diode in TO-220 Package with FC-Connector 1.5 W cw
Version 1.1

SPL 2F94-2S

Features:

- Efficient radiation source for cw and pulsed operation
- Reliable InGa(Al)As strained quantum-well structure
- New optimized single quantum-well structure
- Improved reliability, low treshold current, higher efficiency
- Small TO-220 package with efficient thermal coupling
- Included thermistor allows wavelength control by temperature
- FC-type connector for efficient fiber coupling into a 200 µm / 0.22 NA fiber

Applications

- Pumping of fiber lasers and amplifiers (Er,Yb)
- Pumping of solid state lasers (Nd: YAG, Yb: YAG)
- Medical applications
- Soldering, heating, illumination
- Energy transmission
- Testing and measuring applications

Notes

Depending on the mode of operation, these devices emit highly concentrated non visible infrared light which can be hazardous to the human eye. Products which incorporate these devices have to follow the safety precautions given in IEC 60825-1 "Safety of laser products".

Ordering Information

Type:	Peak wavelength [1) page 7] λ_{peak} [nm]	Ordering Code
SPL 2F94-2S	940	Q65110A1828

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Maximum Ratings (T_A = 25 °C)

Parameter	Symbol	Values	Unit
Output power (continuous wave) 2) *page 7* , 3) *page 7*	P_{cw}	2	W
Output power (quasi-continuous wave) 2) *page 7* , 3) *page 7* (t_p ≤ 150 µs, duty cycle ≤ 30 %)	P_{qcw}	3	W
Reverse voltage	V_R	3	V
Operating temperature 4) *page 7*	T_{op}	-10 ... 60	°C
Storage temperature range 4) *page 7*	T_{stg}	-40 ... 85	°C
Soldering temperature at the pins, max. 10 s	T_{s1}	260	°C

Characteristics (T_A = 25 °C)

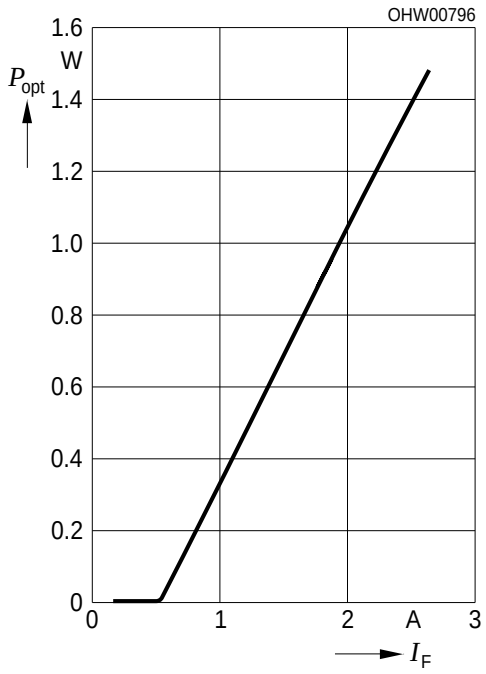
Parameter	Symbol	Values			Unit
		min	typ	max	
Emission wavelength 5) *page 7*	λ_{peak}	930	940	950	nm
Spectral width (FWHM) 5) *page 7*	$\Delta\lambda$		3		nm
Peak output power 6) *page 7* , 7) *page 7*	P_{opt}		1.5		W
Differential efficiency 6) *page 7* , 7) *page 7*	η	0.6	0.75		W / A
Threshold current	I_{th}	0.35	0.45	0.6	A
Operating current 5) *page 7* , 6) *page 7* , 7) *page 7*	I_{op}		2.5	3	A
Operating voltage 5) *page 7*	V_{op}		1.9	2.1	V
Differential series resistance	R_s		0.15	0.25	Ω
Fiber diameter	D	50	200		µm
Numerical aperture	NA		0.22		
Temperature coefficient of operating current	$\partial I_{op} / I_{op} \partial T$		0.5		% / K
Temperature coefficient of wavelength	$\Delta\lambda / \Delta T$		0.3		nm / K
Thermal resistance (junction → heat sink)	R_{th}		5		K / W

Typical Coupling Efficiency by Using Other Fiber Types
(Standard fiber: core Ø 200 µm, 0.22 NA, η_c = 1)

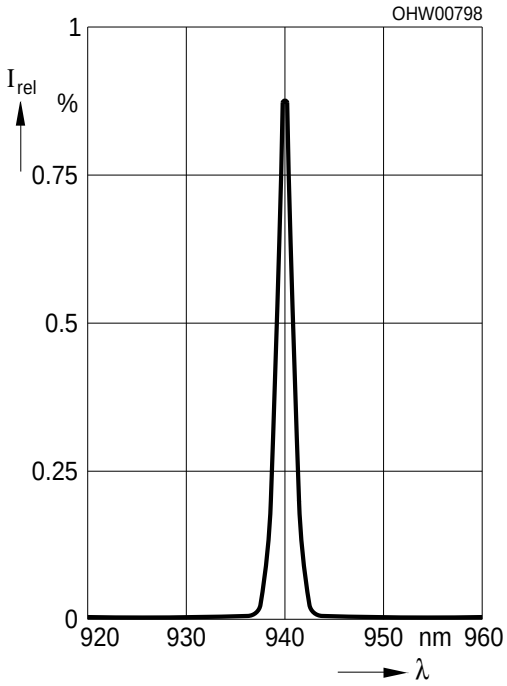
Core Diameter Ø (µm)	Numerical Aperture NA	Coupling Efficiency η_c(W/A)
125	0.35	0.9
100	0.22	0.75
50	0.22	0.25

Optical power from the fiber output with the coupling efficiency η_c
$P_{opt} = \eta \times \eta_c \times (I - I_{th})$

Opt. Output Power vs. Forward Current
T_A = 25 °C



Relative Spectral Emission
T_A = 25 °C, P_{opt} = 1.5 W



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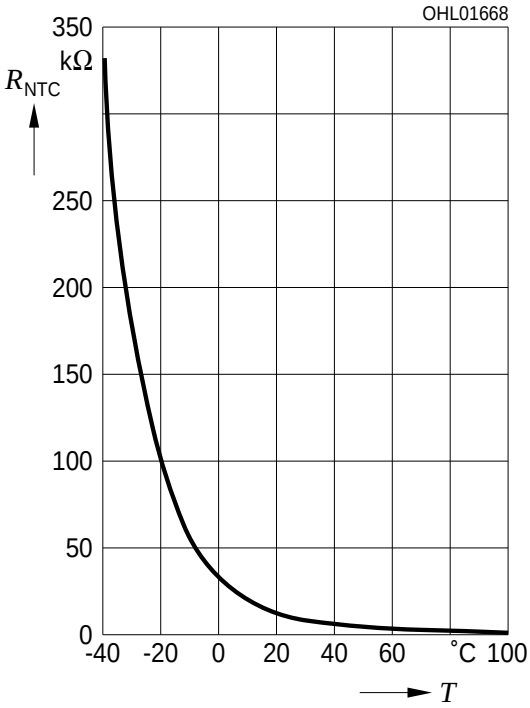
NTC Thermistor

$R_T = R_0 \times \exp(B \times (1/T - 1/T_0))$
R_0 = 10 kΩ ± 3%, T_0 = 25 °C = 298 K, B = 3730 K



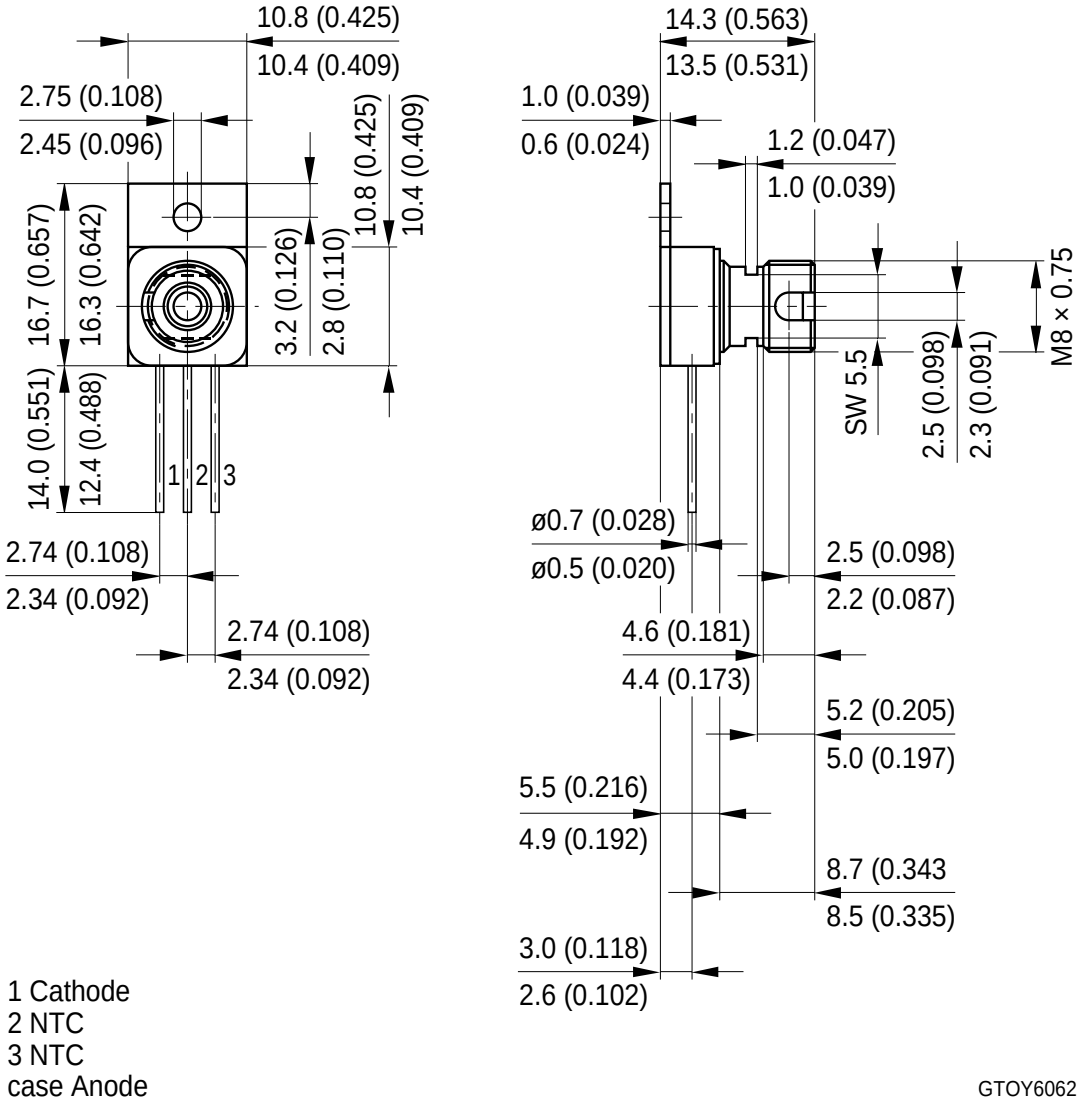
Notes for Operation I

All devices are pre-tested and will be delivered including measured laser characteristics. For safety, unpacking, handling, mounting, and operating issues, please read carefully our **"Notes for Operation I"**.

Mechanical Attachment

Mounting hole (suitable for M 2.5).
Because of the good thermal conductivity of the TO 220 base plate (copper) the heat loss is properly dissipated even if the component is attached on one side only.
For exact positioning of the TO component and other parts, e. g. lenses, the TO 220 package can be attached with appropriate clampig devices or screws (max. M 2.5).

Package Outline



1 Cathode
2 NTC
3 NTC
case Anode

GTOY6062

Dimensions in mm (inch).

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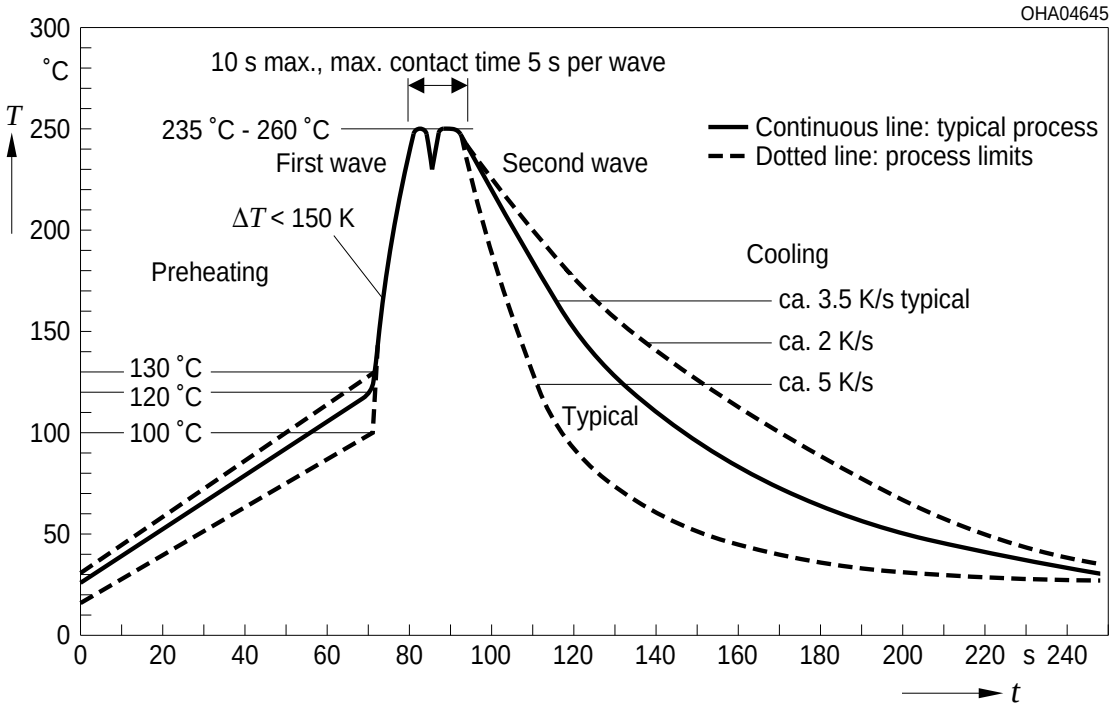
TTW Soldering

IEC-61760-1 TTW



Disclaimer

Language english will prevail in case of any discrepancies or deviations between the two language wordings.

Attention please!

The information describes the type of component and shall not be considered as assured characteristics.
Terms of delivery and rights to change design reserved. Due to technical requirements components may contain dangerous substances.
For information on the types in question please contact our Sales Organization.
If printed or downloaded, please find the latest version in the Internet.

Packing

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

Components used in life-support devices or systems must be expressly authorized for such purpose!

Critical components* may only be used in life-support devices** or systems with the express written approval of OSRAM OS.

*) A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or the effectiveness of that device or system.

**) Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health and the life of the user may be endangered.

Glossary

[1] **Wavelength:** Other wavelengths in the range of 780 nm ... 980 nm are available on request.

[2] **Output power:** The operation at the maximum ratings influences the life time.

[3] **Output power:** Optical data refer to the output from a fiber stub (core Ø 200 µm, 0.22 NA).

[4] **Operating and storage temperature:** Bedewing has to be excluded.

[5] **Standard operating conditions:** Standard operating conditions refer to 1.5 W cw optical output power.

[6] **Standard operating conditions:** Standard operating conditions refer to the usage of a multimode fiber (core Ø 200 µm, 0.22 NA)

[7] **Output power:** Optical power is measured by coupling into an integrating sphere.

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