

OSRAM SPL LL90_3

Datasheet

Discontinued

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Radial Smart Laser

SPL LL90_3

Hybrid Pulsed Laser Diode with Integrated Driver Stage
905 nm, 70 W Peak Power



Applications

- Robotics

Features

- Qualifications: The product qualification test plan is based on the guidelines of AEC-Q101-REV-C, Stress Test Qualification for Automotive Grade Discrete Semiconductors.
- Laser wavelength 905 nm
- Low cost, small size plastic package
- Integrated FET and capacitors for pulse control
- Strained InAlGaAs/GaAs QW-structures
- High power large-optical-cavity laser structure
- Nanostack laser technology including multiple epitaxially stacked emitters
- High-speed operation (< 30 ns pulse width)
- Low supply voltage (< 20 V)

Ordering Information

Type	Peak output power typ. $t_p \geq 50 \text{ ns}; f = 1 \text{ kHz}; V_C = 18.5 \text{ V}; V_G = 15 \text{ V}$ P_{opt}	Ordering Code
SPL LL90_3	70 W	Q65110A1009

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Maximum Ratings

short time operation, $T_A = 25^\circ\text{C}$

Parameter	Symbol	Values	
Operating temperature	T_{op}	min. max.	-40 °C 100 °C
Storage temperature	T_{stg}	min. max.	-40 °C 100 °C
Junction temperature ¹⁾	T_j	max.	105 °C
Peak output power ²⁾	P_{opt}	max.	80 W
Duty cycle	D	max.	0.1 %
Gate voltage	V_G	min. max.	-20 V 20 V
Charge voltage $V_G = 15\text{ V}$	V_C	max.	20 V
Soldering temperature $t_{max} = 10\text{ }\mu\text{s}$	T_s	max.	260 °C

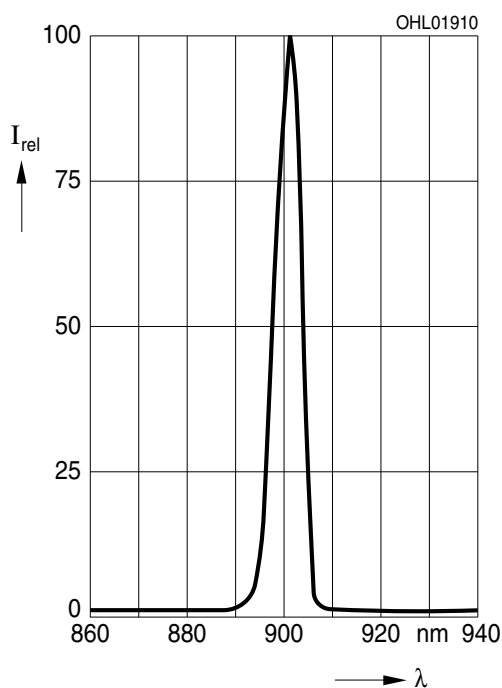
Characteristics

$t_p \geq 50 \text{ ns}$; $f = 1 \text{ kHz}$; $V_C = 18.5 \text{ V}$; $V_G = 15 \text{ V}$

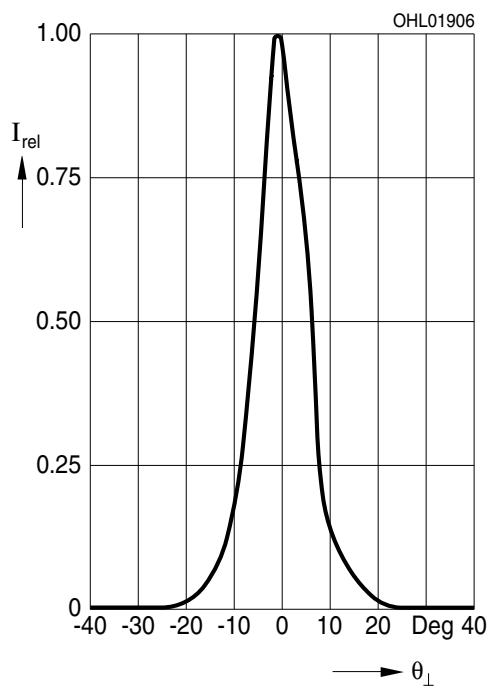
Parameter	Symbol		Values
Number of emitters	n		3
Peak wavelength ³⁾	λ_{peak}	min. typ. max.	895 nm 905 nm 915 nm
Spectral bandwidth (FWHM) ³⁾	$\Delta\lambda$	typ.	7 nm
Peak output power ³⁾	P_{opt}	min. typ. max.	60 W 70 W 80 W
Beam divergence (FWHM) parallel to pn-junction ³⁾	Θ_{\parallel}	min. typ. max.	12 ° 15 ° 18 °
Beam divergence (FWHM) perpendicular to pn-junction ³⁾	Θ_{\perp}	min. typ. max.	27 ° 30 ° 33 °
Pulse width (FWHM) ³⁾⁴⁾	t_p	min. typ. max.	37 ns 40 ns 43 ns
Charge voltage at laser threshold	$U_{C, \text{th}}$	min. typ. max.	4 V 4.5 V 5 V
Switch on gate voltage	$V_{G \text{ on}}$	typ.	5 V
Rise time ³⁾⁴⁾	t_r	min. typ. max.	7 ns 10 ns 13 ns
Fall time ³⁾⁴⁾	t_f	min. typ. max.	40 ns 45 ns 50 ns
Jitter (regarding trigger signal and optical pulse)	t_j	typ. max.	170 ps 500 ps
Aperture size	w x h	typ.	200 X 10 μm^2
Temperature coefficient of wavelength	TC_{λ}	typ. max.	0.30 nm / K 0.33 nm / K
Thermal resistance junction ambient real	R_{thJA}	typ.	200 K / W

Relative Spectral Emission 5), 6)

$$I_{e,rel} = f(\lambda); P_{opt} = 70 \text{ W}; t_p = 30 \text{ ns}$$

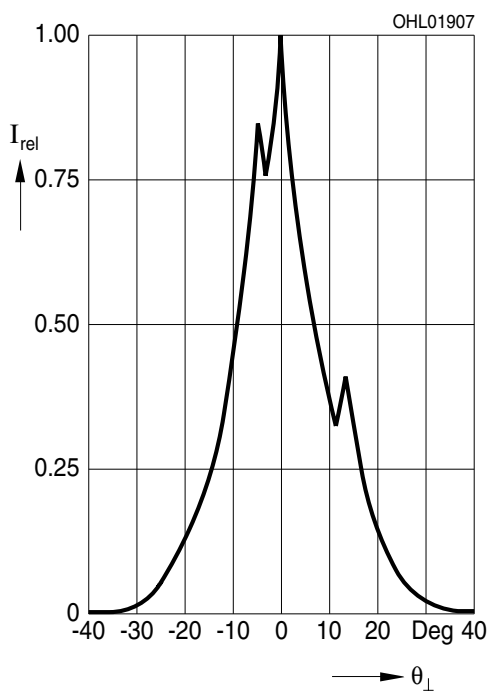
**Far-Field Distribution Parallel to pn-Junction** 5), 6)

$$I_{e,rel} = f(\Theta_{||}); P_{opt} = 70 \text{ W}; t_p = 30 \text{ ns}$$

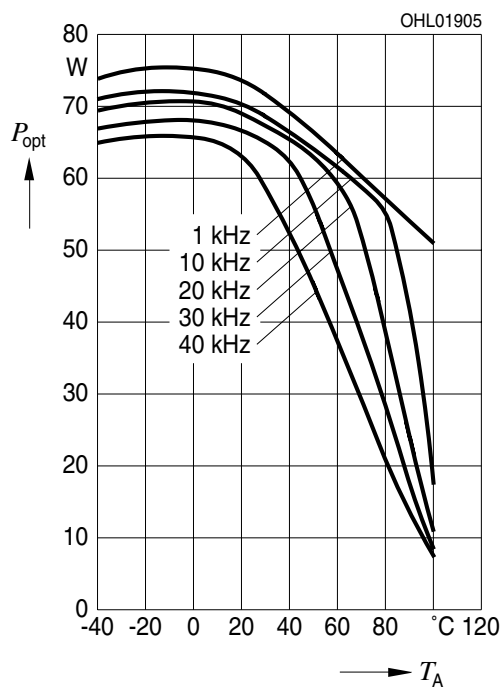


Far-Field Distribution Perpendicular to pn-Junction 5), 6)

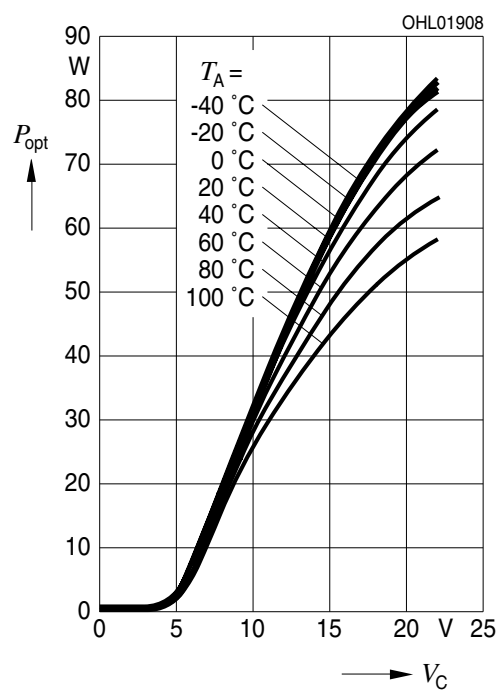
$$I_{e,rel} = f(\Theta_{\perp}); P_{opt} = 70 \text{ W}; t_p = 30 \text{ ns}$$

**Peak Output Power** 5)

$$P_{opt} = f(T_A); t_p = 30 \text{ ns}$$

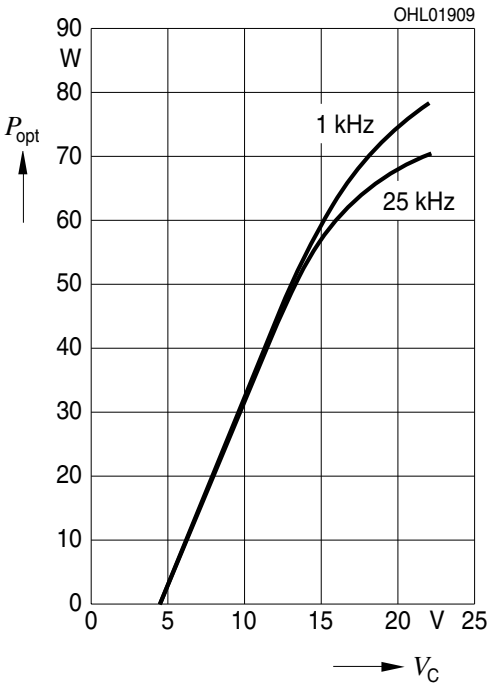
**Optical Output Power** 5), 6)

$$P_{opt} = f(V_C); t_p = 30 \text{ ns}; \text{PRF} = 1 \text{ kHz}$$



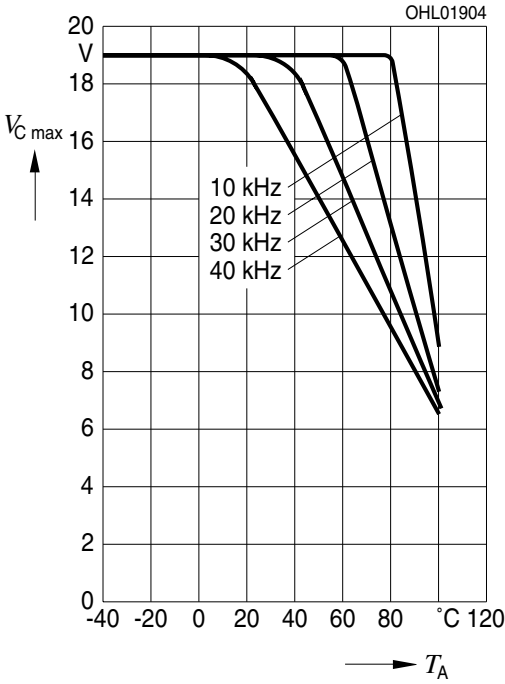
Optical Output Power 5), 6)

$P_{\text{opt}} = f(V_C); t_p = 30 \text{ ns}; \text{PRF} = 1 \text{ kHz}$

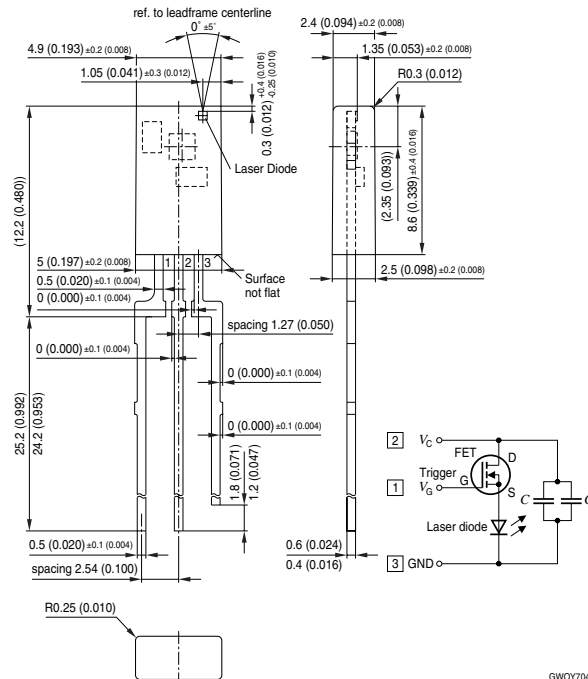


Max. Charge Voltage 5)

$V_{C,\text{max}} = f(T_A); t_p = 30 \text{ ns}; V_C \leq 19 \text{ V}; T_{\text{chip}} \leq 105 \text{ }^\circ\text{C}$



Dimensional Drawing ⁷⁾



Further Information:

Approximate Weight: 430.0 mg

Notes

Depending on the mode of operation, these devices emit highly concentrated visible and non visible 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.

Subcomponents of this device contain, in addition to other substances, metal filled materials including silver. Metal filled materials can be affected by environments that contain traces of aggressive substances. Therefore, we recommend that customers minimize device exposure to aggressive substances during storage, production, and use. Devices that showed visible discoloration when tested using the described tests above did show no performance deviations within failure limits during the stated test duration. Respective failure limits are described in the IEC60810.

For further application related information please visit www.osram-os.com/appnotes

Disclaimer

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 on our website.

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.

Product and functional safety devices/applications or medical devices/applications

Our components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.

Our products are not qualified at module and system level for such application.

In case buyer – or customer supplied by buyer – considers using our components in product safety devices/ applications or medical devices/applications, buyer and/or customer has to inform our local sales partner immediately and we and buyer and /or customer will analyze and coordinate the customer-specific request between us and buyer and/or customer.

Glossary

- 1) **Junction temperature:** Limited due to plastic package, not due to laser chip.
- 2) **Brightness:** The brightness values are measured with a tolerance of $\pm 11\%$.
- 3) **Driver information:** The laser is driven by the MOSFET driver Elantec EL7104C.
- 4) **Switching speed:** Switching speed at gate depends on current and speed, charging the gate capacitance (typ. 300 pF) of the internal transistor. Reduced pulse widths, rise and fall times occur at trigger pulse widths < 50 ns. This also reduces the optical peak power.
- 5) **Typical Values:** Due to the special conditions of the manufacturing processes of semiconductor devices, the typical data or calculated correlations of technical parameters can only reflect statistical figures. These do not necessarily correspond to the actual parameters of each single product, which could differ from the typical data and calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.
- 6) **Testing temperature:** $T_A = 25^\circ\text{C}$ (unless otherwise specified)
- 7) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ± 0.1 and dimensions are specified in mm.

Revision History

Version	Date	Change
1.2	2018-12-13	Additional Information
1.3	2023-02-07	Discontinued New Layout Applications

Discontinued

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EU RoHS and China RoHS compliant product

此产品符合欧盟 RoHS 指令的要求；
按照中国的相关法规和标准，
不含有毒有害物质或元素。

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