Hybrid Pulsed Laser Diode with Integrated Driver Stage 70 W Peak Power
Version 1.2

SPL LL90_3

Features:

- 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
- The product qualification test plan is based on the guidelines of AEC-Q101-REV-C, Stress Test Qualification for Automotive Grade Discrete Semiconductors.
- High-speed operation (< 30 ns pulse width)
- Low supply voltage (< 20 V)

Applications

- Range finding
- Security, surveillance
- Illumination, ignition
- Testing and measurement

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:	Number of emitters	Peak wavelength λ_{peak}	Peak output power P_{opt}	Ordering Code
SPL LL90_3	3	905	70	Q65110A1009

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Maximum Ratings (short time operation / kurzzeitiger Betrieb, T_A = 25 °C)

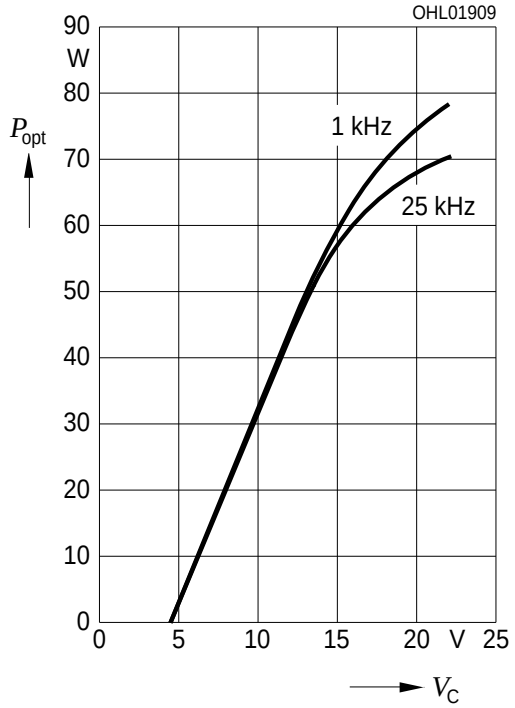
Parameter	Symbol	Values	Unit
Peak output power	P_{peak}	80	W
Charge voltage (V_G = 15 V)	V_C	20	V
Gate voltage	V_G	-20 ... 20	V
Duty cycle	dc	0.1	%
Operating temperature	T_{op}	-40 ... 100	°C
Junction temperature [1) page 7]	T_j	105	°C
Storage temperature range	T_{stg}	-40 ... 100	°C
Soldering temperature (t_{max} = 10 s)	T_s	260	°C

Characteristics (T_A = 25 °C)

Parameter	Symbol	Values			Unit
		min	typ	max	
Emission wavelength [2) page 7]	λ_{peak}	895	905	915	nm
Spectral width (FWHM) [2) page 7]	$\Delta\lambda$		7		nm
Peak output power [2) page 7]	P_{opt}	60	70	80	W
Charge voltage at laser threshold	$U_{C, th}$	4	4.5	5	V
Pulse width (FWHM) [2) page 7, 3) page 7]	t_P	37	40	43	ns
Rise time [2) page 7, 3) page 7]	t_r	7	10	13	ns
Fall Time [2) page 7, 3) page 7]	t_f	40	45	50	ns
Jitter (regarding trigger signal and optical pulse)	t_j		170	500	ps
Aperture size	w x h		200 x 10		µm x µm
Beam divergence (FWHM) parallel to pn-junction [2) page 7]	$\Theta_{\|\|}$	12	15	18	°
Beam divergence (FWHM) perpendicular to pn-junction [2) page 7]	$\Theta_{\perp}$	27	30	33	°
Temperature coefficient of wavelength	$\Delta\lambda / \Delta T$		0.3	0.33	nm / K
Thermal resistance	R_{th}		200		K / W
Switch on gate voltage	$V_{G\,on}$		5		V

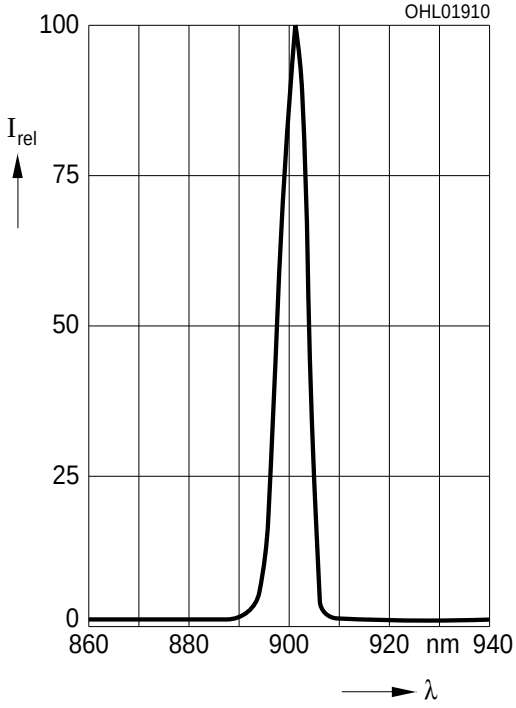
Optical Output Power vs. Charge Voltage

$P_{opt} = f(V_C)$, t_p = 30 ns



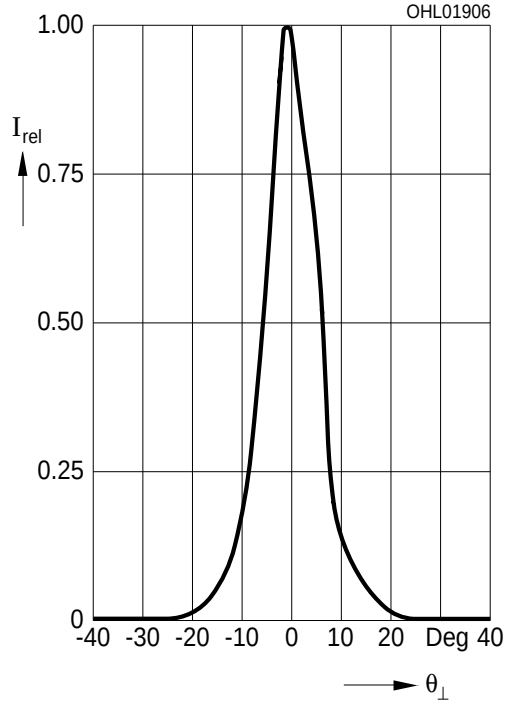
Relative Spectral Emission

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



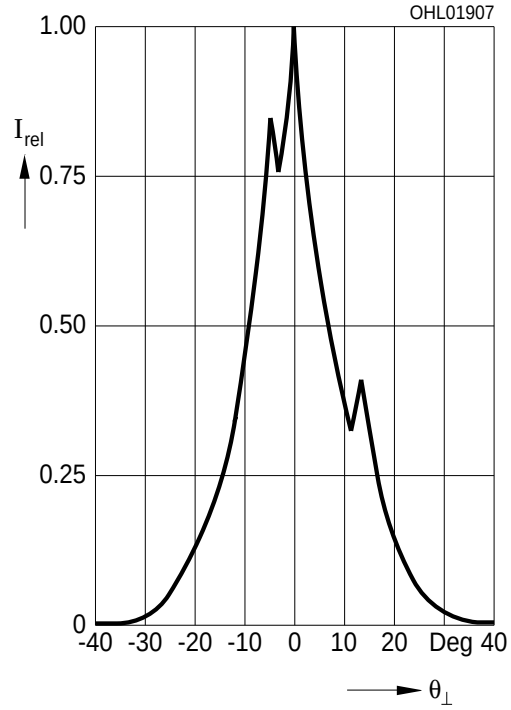
Far-Field Distribution Parallel to pn-Junction

$I_{rel} = f(\Theta_{II})$, P_{opt} = 70 W, t_p = 30 ns



Far-Field Distribution Perpendicular to pn-Junction

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



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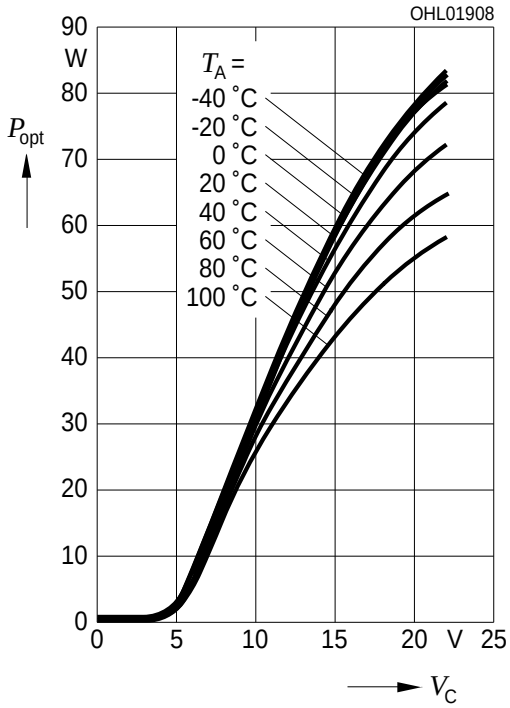
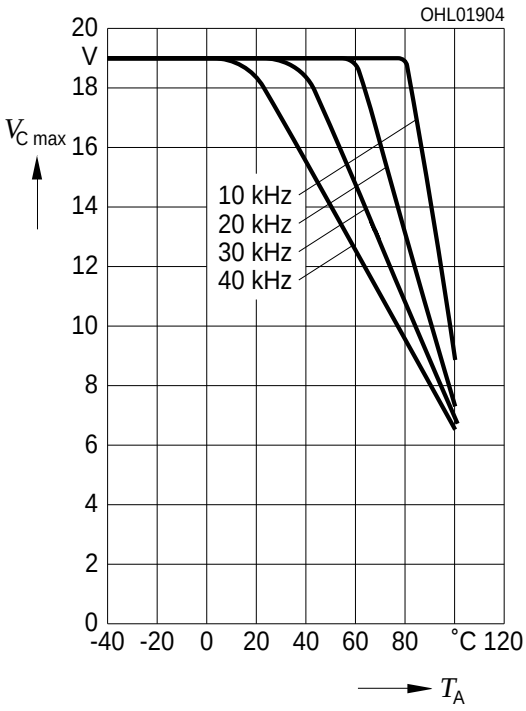
Optical Output Power vs. Charge Voltage

$P_{opt} = f(V_C)$, tp = 30 ns, PRF = 1 kHz



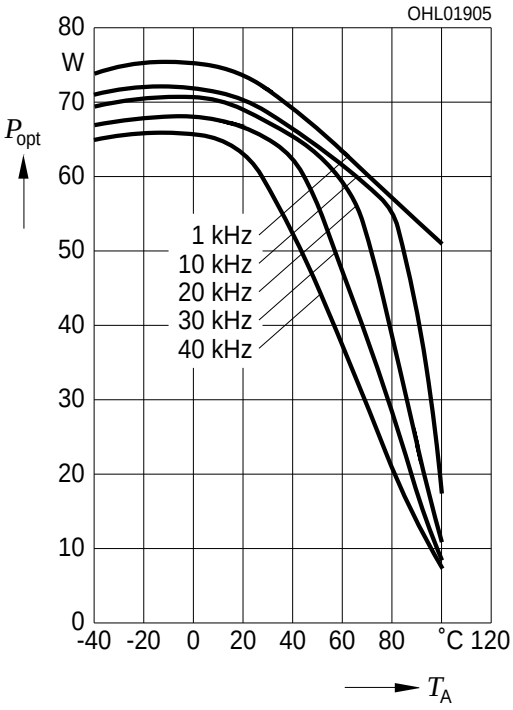
Max. Charge Voltage vs. Ambient Temperature

$V_{Cmax} = f(T_A)$, t_p = 30 ns, $V_C \leq$ 19 V, chip temp. ≤ 105 °C

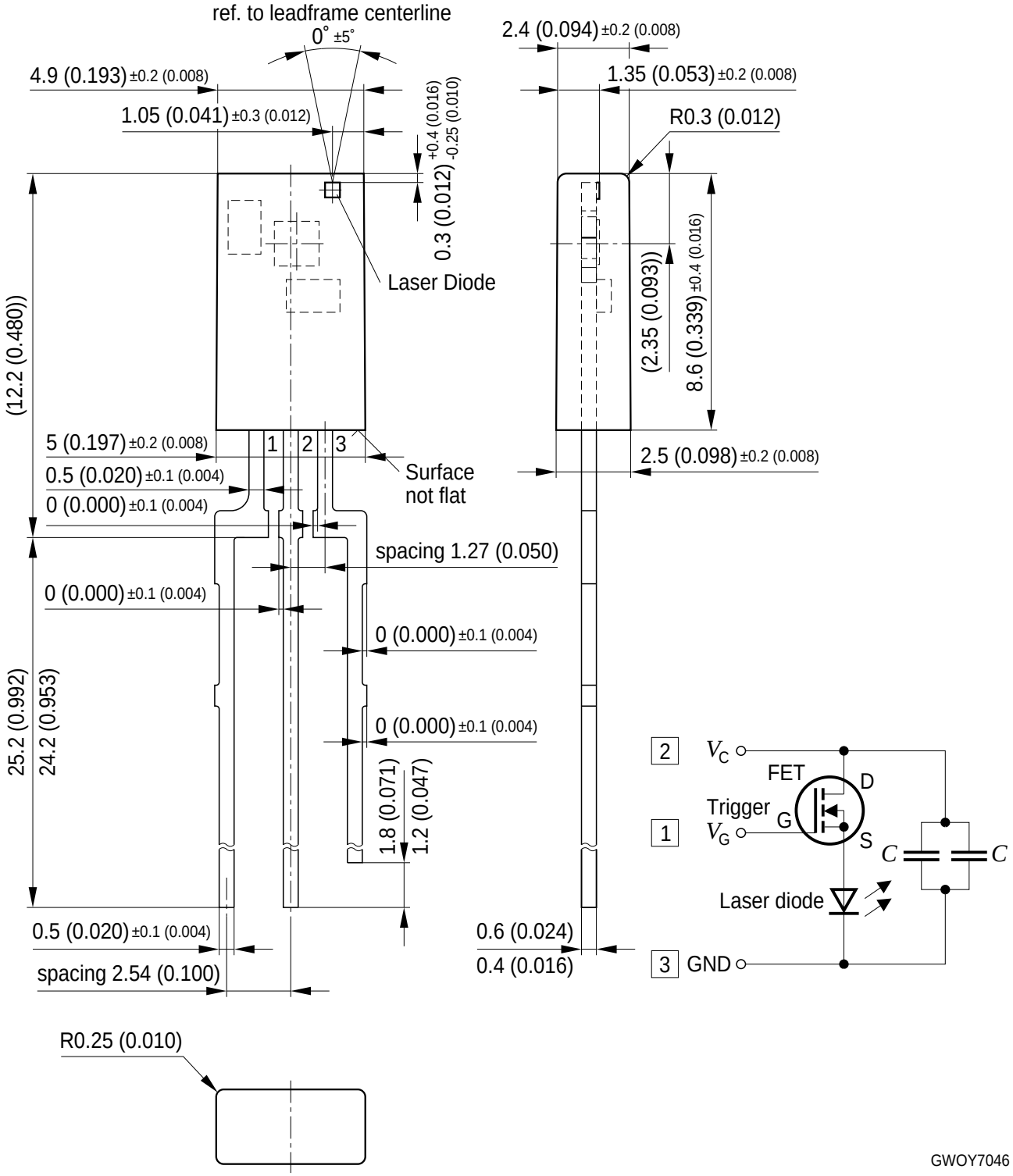


Peak Output Power at Max. Charge Voltage vs. Ambient Temperature

$P_{opt} = f(T_A)$, t_p = 30 ns



Package Outline



Dimensions in mm (inch).

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Disclaimer

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

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Glossary

[1] **Junction temperature:** Limited due to plastic package, not due to laser chip.

[2] **Standard operating conditions:** > 50 ns pulse width, 1 kHz pulse repetition rate, 18.5 V charge voltage, 15 V gate voltage and 25 °C ambient temperature. The laser is driven by the MOSFET driver Elantec EL7104C.

[3] **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.

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