

# Hybride Impuls-Laserdiode mit integrierter Treiberstufe 70 W Spitzenleistung Hybrid Pulsed Laser Diode with Integrated Driver Stage 70 W Peak Power

**Lead (Pb) Free Product - RoHS Compliant**

**SPL LL90\_3**



## Besondere Merkmale

- Kleines kostengünstiges Plastik-Gehäuse
- Integriert sind ein FET und Kondensatoren zur Impulsansteuerung
- InAlGaAs/GaAs kompressiv verspannte Quantenfilmstruktur
- Hochleistungslaser mit „Large-Optical-Cavity“ (LOC) Struktur
- Nanostack Lasertechnologie beinhaltet mehrere epitaktisch integrierte Emitter
- Laserapertur 200 µm x 10 µm
- Schneller Betrieb (< 30 ns Impulsbreite)
- Niedrige Versorgungsspannung (< 20 V)

## Anwendungen

- Entfernungsmessung
- Sicherheit, Überwachung
- Beleuchtung, Zündung
- Test- und Messsysteme

## Sicherheitshinweise

Je nach Betriebsart emittieren diese Bauteile hochkonzentrierte, nicht sichtbare Infrarot-Strahlung, die gefährlich für das menschliche Auge sein kann. Produkte, die diese Bauteile enthalten, müssen gemäß den Sicherheitsrichtlinien der IEC-Norm 60825-1 behandelt werden.

## 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
- Laser aperture 200 µm x 10 µm
- High-speed operation (< 30 ns pulse width)
- Low supply voltage (< 20 V)

## Applications

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

## Safety advices

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".

Typ	Emitteranzahl	Opt. Spitzenausgangleistung	Wellenlänge	Bestellnummer
Type	Number of Emitters	Opt. Peak Power	Wavelength	Ordering Code
SPL LL90_3	3	70 W	905 nm	Q65110A1009

2009-03-04

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**Opto Semiconductors**

**OSRAM**

**Grenzwerte (kurzzeitiger Betrieb) ( $T_A = 25\text{ °C}$ )**  
**Maximum Ratings (short time operation)**

Parameter Parameter	Symbol Symbol	Werte Values		Einheit Unit
		min.	max.	
Spitzenausgangsleistung Peak output power	$P_{\text{opt}}$	–	80	W
Ladespannung ( $V_G = 15\text{ V}$ ) Charge voltage ( $V_G = 15\text{ V}$ )	$V_C$		20	V
Gate-Spannung Gate voltage	$V_G$	– 20	+ 20	V
Tastverhältnis Duty cycle	<i>d.c.</i>	–	0.1	%
Betriebstemperatur Operating temperature	$T_{\text{op}}$	- 40	+ 85	°C
Temperatur des pn-Übergangs <sup>1)</sup> Junction temperature <sup>1)</sup>	$T_j$	–	+ 105	°C
Lagertemperatur Storage temperature	$T_{\text{stg}}$	- 40	+ 100	°C
Löttemperatur ( $t_{\text{max}} = 10\text{ s}$ ) Soldering temperature ( $t_{\text{max}} = 10\text{ s}$ )	$T_s$	–	+ 260	°C

<sup>1)</sup> limited due to plastic package, not due to laser chip

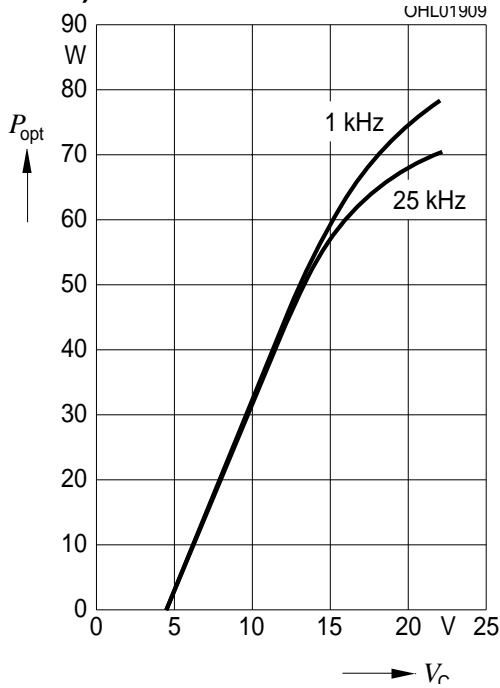
**Optische Kennwerte ( $T_A = 25\text{ °C}$ )**  
**Optical Characteristics**

Parameter Parameter	Symbol Symbol	Werte Values			Einheit Unit
		min.	typ.	max.	
Zentrale Emissionswellenlänge <sup>1)</sup> Emission wavelength <sup>1)</sup>	$\lambda$	895	905	915	nm
Spektralbreite (Halbwertsbreite) <sup>1)</sup> Spectral width (FWHM) <sup>1)</sup>	$\Delta\lambda$	–	7	–	nm
Spitzenausgangsleistung <sup>1)</sup> Peak output power <sup>1)</sup>	$P_{\text{opt}}$	60	70	80	W
Ladespannung an der Laserschwelle Charge Voltage at laser threshold	$U_{\text{C, th}}$	4.0	4.5	5.0	V
Pulsbreite (Halbwertsbreite) <sup>1), 2)</sup> Pulse width (FWHM) <sup>1), 2)</sup>	$t_p$	37	40	43	ns
Anstiegs- und Abfallzeit (10% ... 90%) <sup>1), 2)</sup> Rise and fall time (10% ... 90%) <sup>1), 2)</sup>	$t_r$ , $t_f$	7 40	10 45	13 50	ns ns
Jitter (bzgl. Triggersignal und optischem Puls) Jitter (regarding trigger signal and optical pulse)	$t_j$		170	500	ps
Austrittsöffnung Aperture size	$w \times h$	–	200 × 10	–	$\mu\text{m}^2$
Strahldivergenz (Halbwertsbreite) parallel zum pn-Übergang <sup>1)</sup> Beam divergence (FWHM) parallel to pn junction <sup>1)</sup>	$\theta_{\parallel}$	12	15	18	Grad deg.
Strahldivergenz (Halbwertsbreite) senkrecht zum pn-Übergang <sup>1)</sup> Beam divergence (FWHM) perpendicular to pn-junction <sup>1)</sup>	$\theta_{\perp}$	27	30	33	Grad deg.
Temperaturkoeffizient der Wellenlänge Temperature coefficient of wavelength	$\partial\lambda / \partial T$	–	0.30	0.33	nm/K
Thermischer Widerstand Thermal resistance	$R_{\text{th}}$	–	200	–	K/W
Einschaltzeitpunkt der Gate-Spannung Switch on gate voltage	$V_{\text{G on}}$	–	5.0	–	V

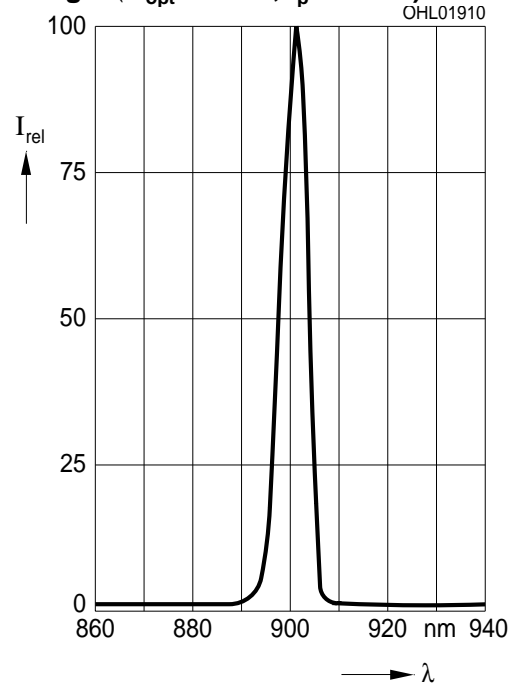
<sup>1)</sup> Werte beziehen sich auf folgende Standardbetriebsbedingung: >50 ns Pulsbreite, 1 kHz Pulsfrequenz, 18.5 V Ladespannung, 15 V Gate-Spannung und 25°C Umgebungstemperatur. Der Laser wird angesteuert mit dem MOSFET-Treiber Elantec EL7104C. Values refer to the following standard operating conditions: >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.

<sup>2)</sup> Die Schaltgeschwindigkeit ist abhängig von Strom und Geschwindigkeit, mit der die Gate-Kapazität (typ. 300 pF) des internen Transistors geladen wird. Kürzere Pulsbreiten, Anstiegs- und Abfallzeiten erhält man bei Trigger-Pulsbreiten <50 ns. Dies bewirkt jedoch auch eine reduzierte optische Spitzenleistung. 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.

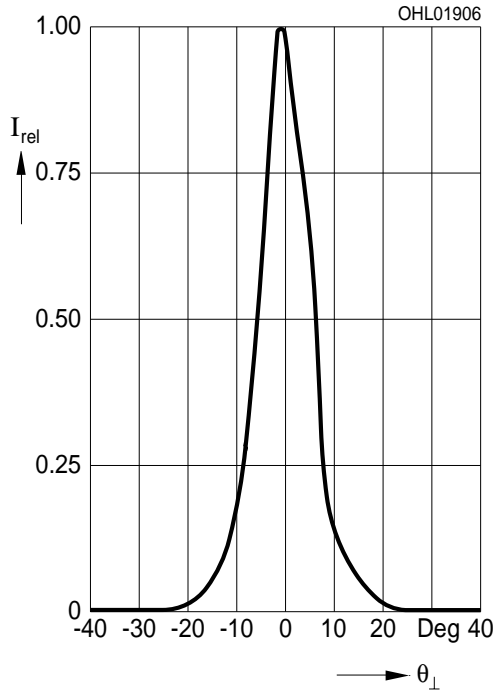
Optical output power  $P_{opt}$  vs charge voltage  $V_c$  ( $t_p = 30$  ns)



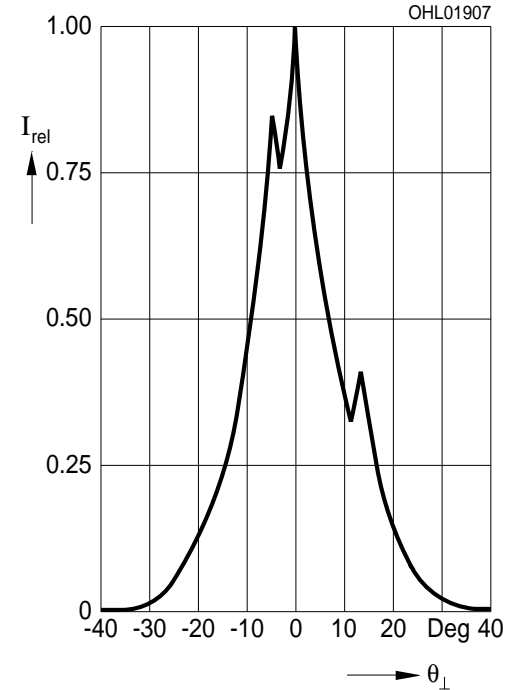
Optical spectrum, relative intensity  $I_{rel}$  vs. wavelength ( $P_{opt} = 70$  W,  $t_p = 30$  ns)  $\lambda$



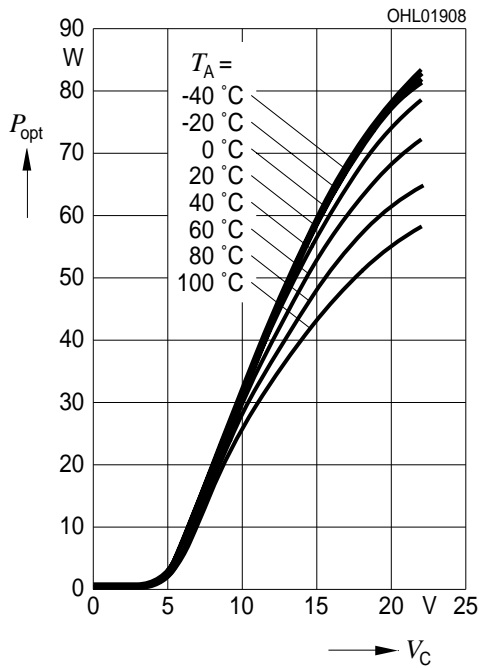
Far-field distribution parallel to junction  $I_{rel}$  vs. angle  $\theta_{||}$  ( $P_{opt} = 70$  W,  $t_p = 30$  ns)



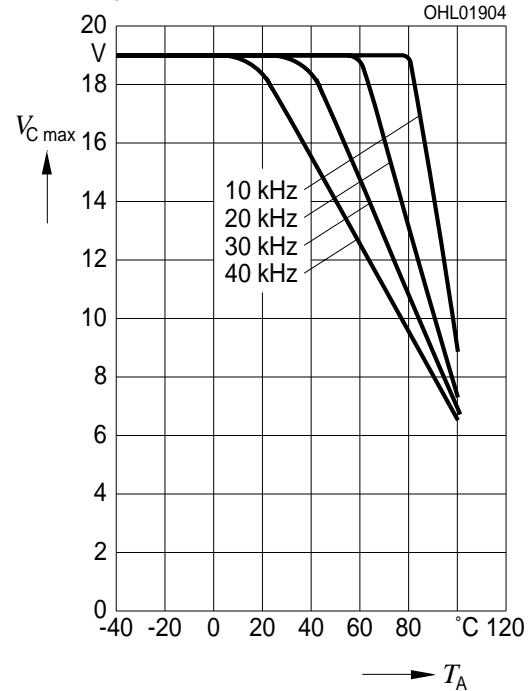
Far-field distribution perpendicular to junction  $I_{rel}$  vs. angle  $\theta_{\perp}$  ( $P_{opt} = 70$  W,  $t_p = 30$  ns)



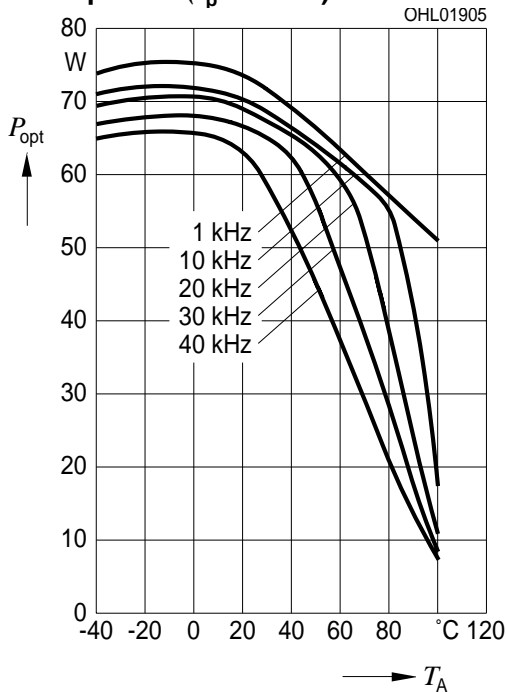
Optical output power  $P_{opt}$  vs charge voltage  $V_c$  ( $t_p = 30$  ns, PRF = 1 kHz) at different ambient temperature  $T_{amb}$



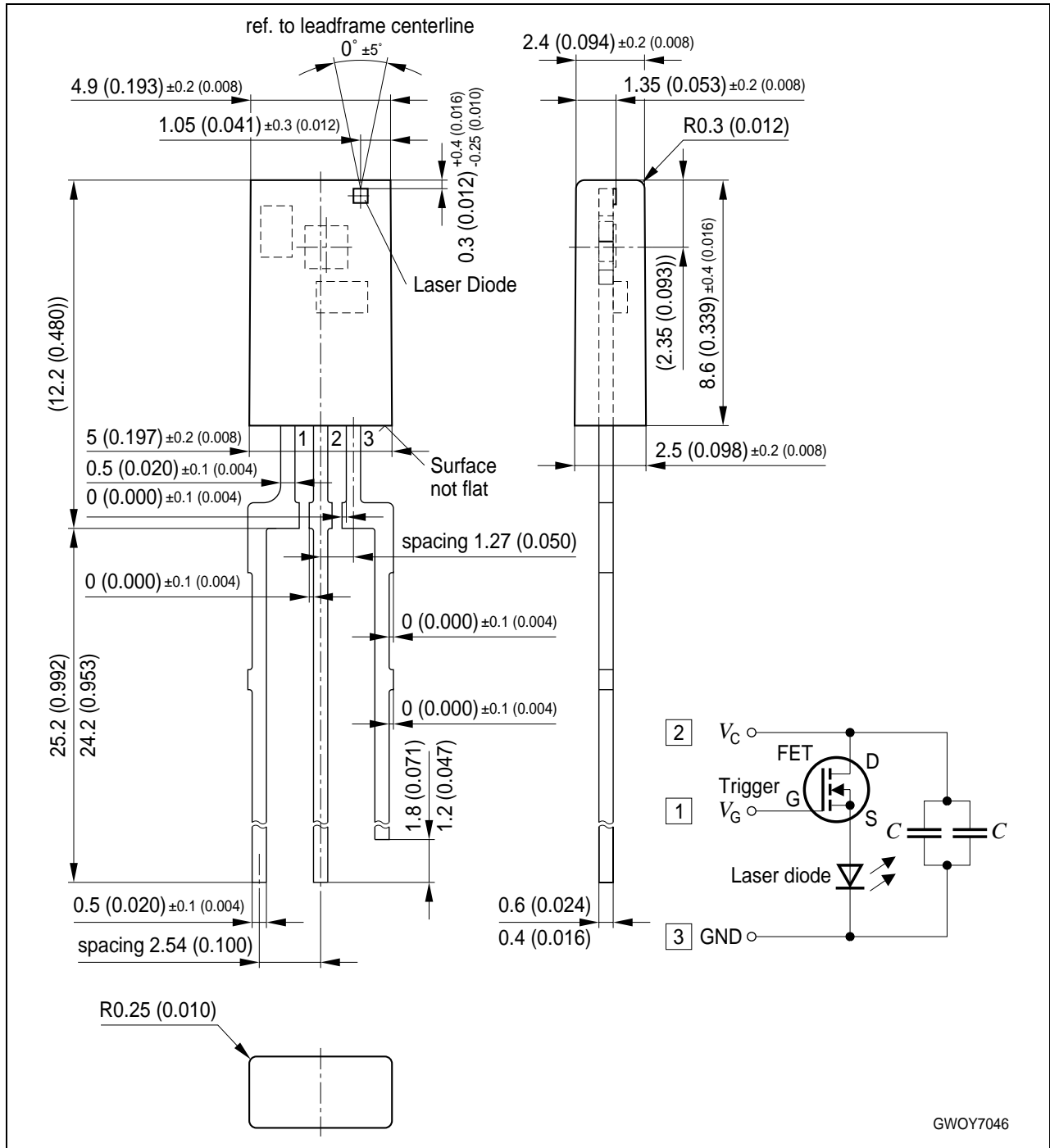
Maximum allowed charge voltage  $V_{c,max}$  vs. ambient temperature  $T_{amb}$  at various rep rates ( $t_p=30$  ns,  $V_c \leq 19$  V, chip temperature  $\leq 105$  °C)



Peak output power at maximum charge voltage  $V_{c,max}$  vs. ambient temperature  $T_{amb}$  at various rep rates ( $t_p = 30$  ns)



Maßzeichnung  
Package Outlines



Maße in mm (inch) / Dimensions in mm (inch).

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