

# Hybride Impuls-Laserdiode mit integrierter Treiberstufe 25 W Spitzenleistung Hybrid Pulsed Laser Diode with Integrated Driver Stage 25 W Peak Power

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

**SPL LL90**



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## 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
- Laserapertur  $200\text{ }\mu\text{m} \times 2\text{ }\mu\text{m}$
- Schneller Betrieb ( $< 30\text{ ns}$  Impulsbreite)
- Niedrige Versorgungsspannung ( $< 20\text{ V}$ )

## 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
- Laser aperture  $200\text{ }\mu\text{m} \times 2\text{ }\mu\text{m}$
- High-speed operation ( $< 30\text{ ns}$  pulse width)
- Low supply voltage ( $< 20\text{ V}$ )

## 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<br>Type | Opt. Spitzenausgangsleistung<br>Opt. Peak Power | Wellenlänge<br>Wavelength | Bestellnummer<br>Ordering Code |
|-------------|-------------------------------------------------|---------------------------|--------------------------------|
| SPL LL90    | 25 W                                            | 905 nm                    | Q62702P5367                    |

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

| Parameter<br>Parameter                                                                                       | Symbol<br>Symbol | Werte<br>Values |       | Einheit<br>Unit |
|--------------------------------------------------------------------------------------------------------------|------------------|-----------------|-------|-----------------|
|                                                                                                              |                  | min.            | max.  |                 |
| Spitzenausgangsleistung<br>Peak output power                                                                 | $P_{\text{opt}}$ | –               | 30    | W               |
| Ladespannung ( $V_G = 15\text{ V}$ )<br>Charge voltage ( $V_G = 15\text{ V}$ )                               | $V_C$            |                 | 20    | V               |
| Gate-Spannung<br>Gate voltage                                                                                | $V_G$            | – 20            | + 20  | V               |
| Tastverhältnis<br>Duty cycle                                                                                 | $d.c.$           | –               | 0.1   | %               |
| Betriebstemperatur<br>Operating temperature                                                                  | $T_{\text{op}}$  | - 40            | + 85  | °C              |
| Lagertemperatur<br>Storage temperature                                                                       | $T_{\text{stg}}$ | - 40            | + 100 | °C              |
| Löttemperatur ( $t_{\text{max}} = 10\text{ s}$ )<br>Soldering temperature ( $t_{\text{max}} = 10\text{ s}$ ) | $T_s$            | –               | + 260 | °C              |

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

## Optical Characteristics

| Parameter<br>Parameter                                                                                                                               | Symbol<br>Symbol               | Werte<br>Values |                |        | Einheit<br>Unit |
|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------|----------------|--------|-----------------|
|                                                                                                                                                      |                                | min.            | typ.           | max.   |                 |
| Zentrale Emissionswellenlänge <sup>1)</sup><br>Emission wavelength <sup>1)</sup>                                                                     | $\lambda$                      | 895             | 905            | 915    | nm              |
| Spektralbreite (Halbwertsbreite) <sup>1)</sup><br>Spectral width (FWHM) <sup>1)</sup>                                                                | $\Delta\lambda$                | –               | 7              | 9      | nm              |
| Spitzenausgangsleistung <sup>1)</sup><br>Peak output power <sup>1)</sup>                                                                             | $P_{\text{opt}}$               | 22              | 25             | 28     | W               |
| Ladespannung an der Laserschwelle<br>Charge Voltage at laser threshold                                                                               | $U_{\text{C, th}}$             | 1.2             | 1.5            | 2.0    | V               |
| Anstiegs- und Abfallzeit (10% ... 90%) <sup>1), 2)</sup><br>Rise and fall time (10% ... 90%) <sup>1), 2)</sup>                                       | $t_r$ ,<br>$t_f$               | 11<br>14        | -<br>-         | –<br>– | ns<br>ns        |
| Austrittsöffnung<br>Aperture size                                                                                                                    | $w \times h$                   | –               | $200 \times 2$ | –      | $\mu\text{m}^2$ |
| Strahldivergenz (Halbwertsbreite) parallel zum<br>pn-Übergang <sup>1)</sup><br>Beam divergence (FWHM) parallel to pn junction <sup>1)</sup>          | $\theta_{\parallel}$           | 12              | 15             | 18     | Grad<br>deg.    |
| Strahldivergenz (Halbwertsbreite) senkrecht zum<br>pn-Übergang <sup>1)</sup><br>Beam divergence (FWHM) perpendicular to<br>pn-junction <sup>1)</sup> | $\theta_{\perp}$               | 27              | 30             | 33     | Grad<br>deg.    |
| Temperaturkoeffizient der Wellenlänge<br>Temperature coefficient of wavelength                                                                       | $\partial\lambda / \partial T$ | –               | 0.30           | 0.32   | nm/K            |
| Thermischer Widerstand<br>Thermal resistance                                                                                                         | $R_{\text{th}}$                | –               | 200            | –      | K/W             |
| Einschaltzeitpunkt der Gate-Spannung<br>Switch on gate voltage                                                                                       | $V_{\text{G on}}$              | –               | 4.0            | –      | V               |

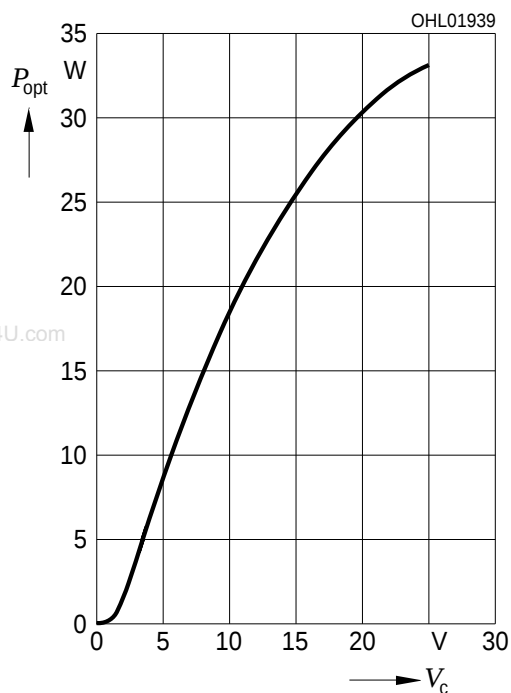
<sup>1)</sup> Werte beziehen sich auf folgende Standardbetriebsbedingung: 30 ns Pulsbreite, 1 kHz Pulswiederholrate, 16 V Ladespannung, 15 V Gate-Spannung und 25°C Umgebungstemperatur. Der Laser wird angesteuert mit dem MOSFET-Treiber Elantec EL7104C.

Values refer to the following standard operating conditions: 30 ns pulse width, 1 kHz pulse repetition rate, 16 V charge voltage, 15 V gate voltage and 25 °C ambient temperature. The laser is driven by the MOSFET driver Elantec EL7104C.

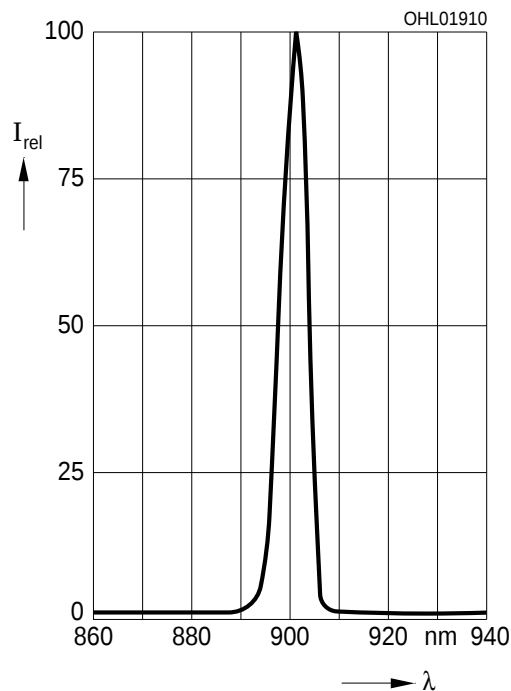
<sup>2)</sup> Die Schaltgeschwindigkeit ist abhängig von Strom und Geschwindigkeit, mit der die Gate-Kapazität (typ. 300 pF) des internen Transistors geladen wird. Geringere Anstiegs- und Abfallzeiten erhält man bei reduzierter optischer Spitzenleistung (siehe Diagramme auf Seite 5)

Switching speed at gate depends on current and speed, charging the gate capacitance (typ. 300 pF) of the internal transistor. Reduced rise and fall times occur at reduced optical peak power (see diagrams on page 5)

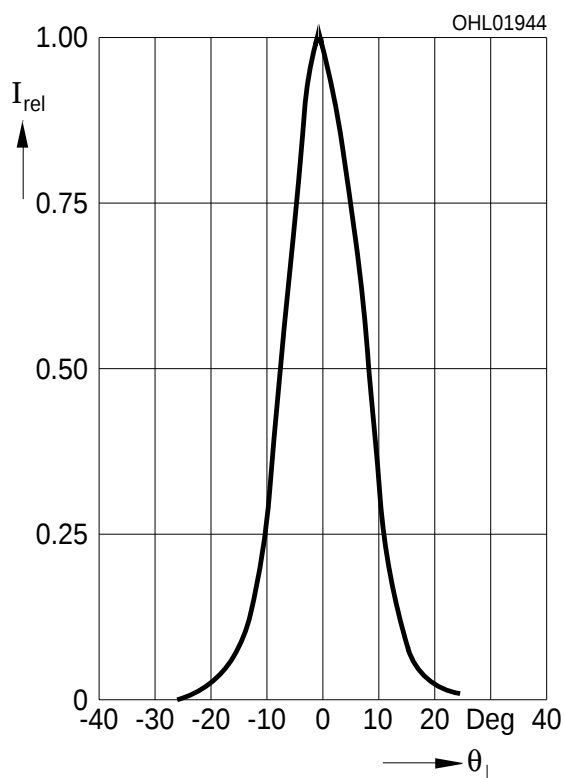
Optical output power  $P_{\text{opt}}$  vs charge voltage  $V_c$   
( $t_p = 30$  ns)



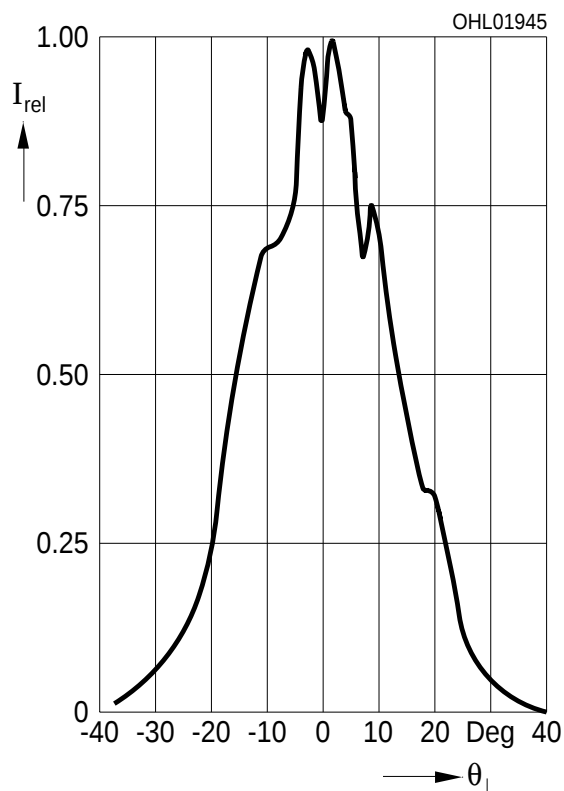
Optical spectrum, relative intensity  $I_{\text{rel}}$  vs. wavelength  $\lambda$  ( $P_{\text{opt}} = 25$  W,  $t_p = 30$  ns)



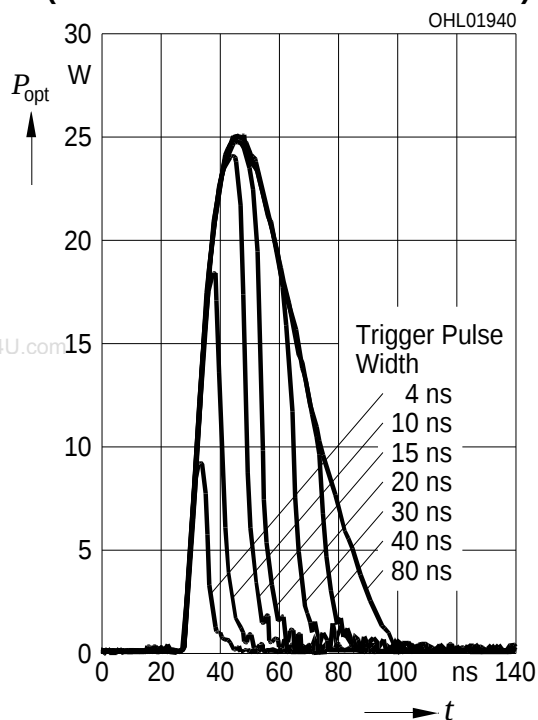
Far-field distribution parallel to junction  
 $I_{\text{rel}}$  vs. angle  $\theta_{\parallel}$



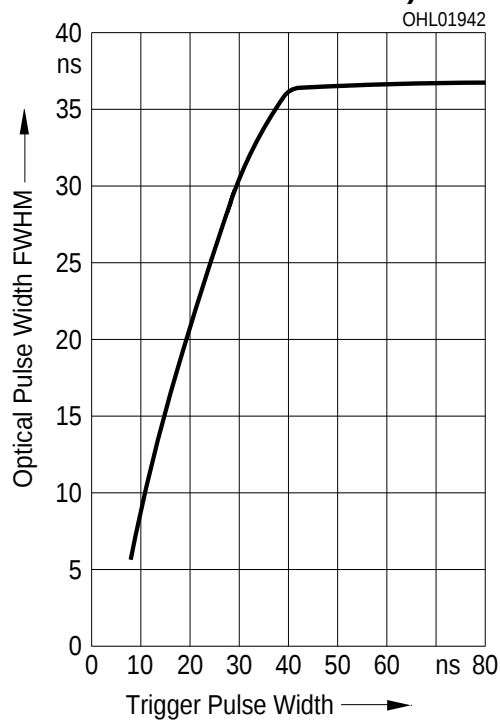
Far-field distribution perpendicular to junction  
 $I_{\text{rel}}$  vs. angle  $\theta_{\perp}$



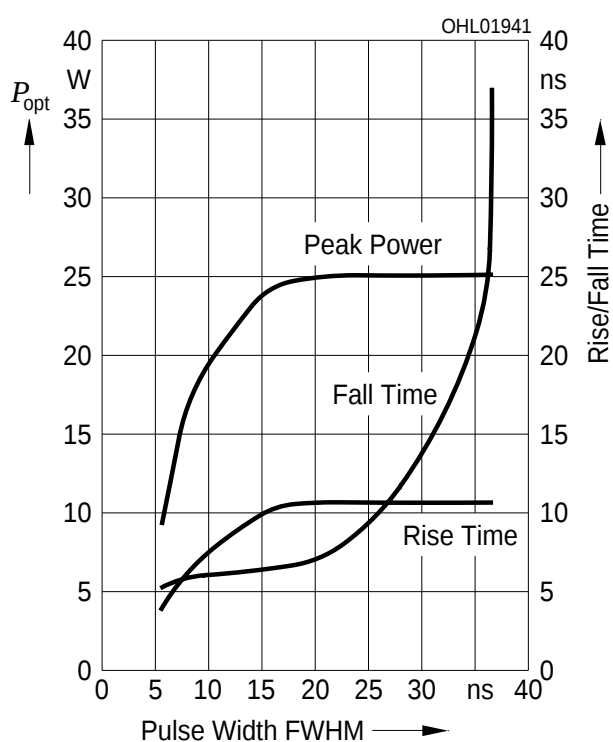
Optical pulse form for varying trigger pulse widths (MOSFET driver Elantec EL7104C)



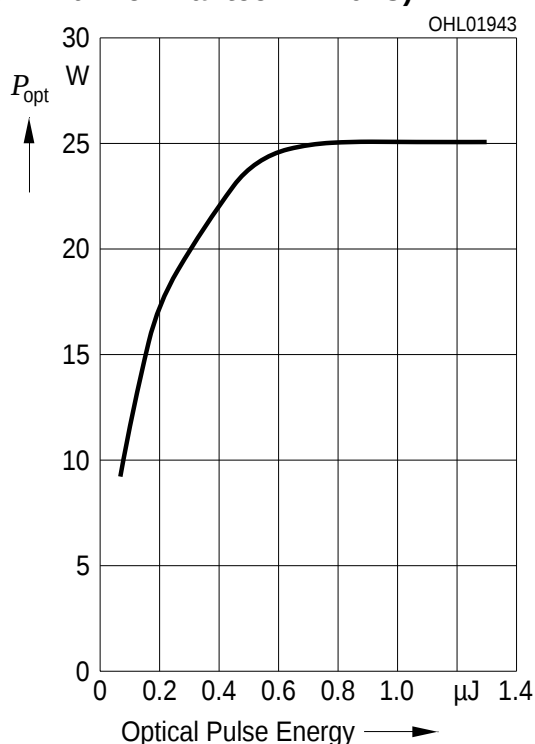
Optical pulse width vs. trigger pulse width (MOSFET driver Elantec EL7104C)



Optical peak power, fall and rise time vs. pulse width (MOSFET driver Elantec EL7104C)



Optical peak power vs. optical pulse energy (MOSFET driver Elantec EL7104C)





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