

QuickSwitch® Pulsed Laser Diode QS-905 Series

Description

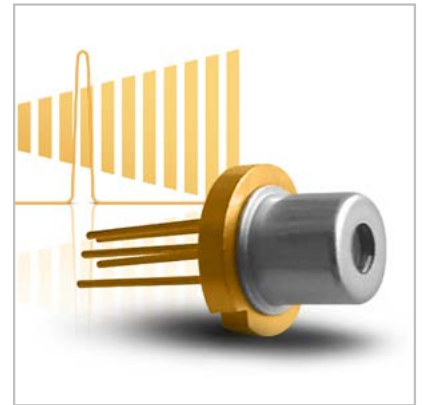
Ultra-compact module containing a high current switch, charge storage capacitor and pulsed laser diode inside a small hermetic package. The high current loop is all internal to the package which provides EMI shielding when the switch is active. The package has an independent ground pin.

Features

- Hermetic TO-56 package (5 pins)
- 905 nm triple junction laser diode for optical output power to 90 W
- Typical pulse width of 2.5 ns
- Low voltage charge storage: 20 V to 80 V DC
- Pulse frequency to 200 KHz
- Evaluation board available

Applications

- High resolution Range Finding for consumers
- Laser scanning / LIDAR
- Drones
- Automotive
- Robotics
- Military
- Industrial



Typical Product Characteristics:

Conditions are $T_{\text{case}} = 21\text{ °C}$, Trig = 40 ns, Rep. Rate = 10 kHz, $R_{\text{HV}} = 400\ \Omega$

Parameter	QS905D1S3JT03U	QS905D1S3JT06U	QS905D1S3JT09U	Units
HV with R_{HV}	80	80	80	V
I_{HV} - at 10 kHz, 65 V - at 100 kHz, 65 V	1 10	1 10	1 10	mA mA
P_{O} - at 65 V - at 80 V	67 76	72 88	81 93	W W
Pulse Width (FWHM)	2.5			ns
Rise Time	1.4			ns
Power Dissipation Factor ⁽¹⁾ (PDF)	0.66 E-9	0.83 E-9	0.99 E-9	W/Hz/V ²
Thermal Resistance ⁽²⁾ (R_{Th})	32.5	32.5	32.5	°C/W

⁽¹⁾ The power dissipation is calculated as follows.

$P_{\text{diss}} = \text{PDF} \times f \times (\text{HV} - 4.5)^2$, where f is the repetition rate.

$T_{\text{junction}} = T_{\text{case}} + P_{\text{diss}} \times R_{\text{Th}}$, where T_{junction} is the junction temperature of the laser and T_{case} is the case temperature.

⁽²⁾ The thermal resistance is measured on a heat sink and $T_{\text{case}} = 21\text{ °C}$.

Optical Characteristics at $T_{\text{case}} = 21\text{ °C}$

Parameter	Min	Typ	Max	Units
λ of peak radiant intensity	895	905	915	nm
Spectral FWHM		8		nm
Wavelength temperature coefficient @20 V HV and 10 kHz		0.29		nm/°C
Divergence FWHM Parallel to junction plane Perpendicular to junction plane		12 20		Degrees
Emitting Area QS905D1S3JT03U QS905D1S3JT06U QS905D1S3JT09U		85 x 10 160 x 10 235 x 10		μm

Absolute Maximum Ratings

Maximum Ratings Parameter	QS-905 Series	Units
HV	80	V
Minimum HV Series resistance R_{HV}	100	Ω
V_{Trig} Max	6	V
Case temperature		$^{\circ}\text{C}$
- Storage	- 55 to 100	
- Operating	- 40 to 85	

Recommended Operating Conditions

Parameter	QS-905 Series	Units
HV with 1 k Ω series resistor	20 – 80	V
V_{Trig}	5	V

Figure 1: Peak Power vs HV, $T_{case} = 21^{\circ}\text{C}$,
 $f = 10\text{ kHz}$

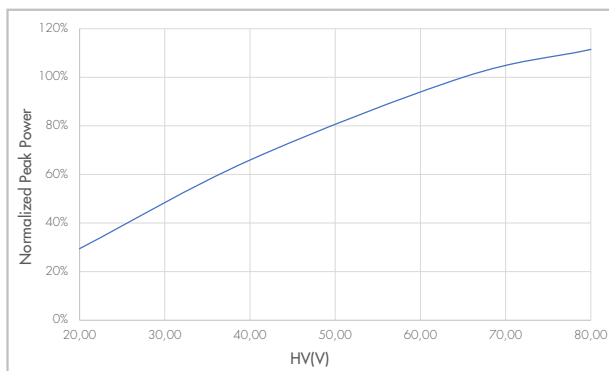


Figure 2: Peak Power vs T_{case} , HV = 65 V,
 $f = 10\text{ kHz}$

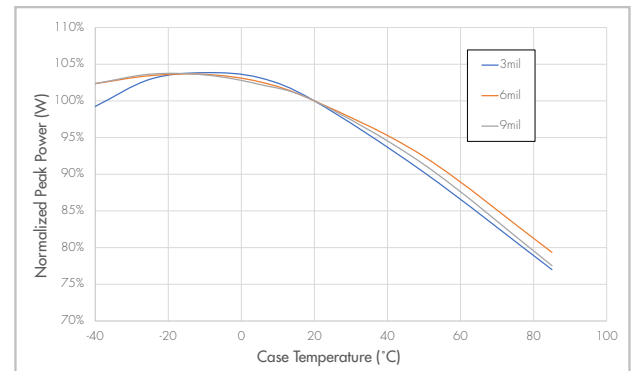


Figure 3: Peak Power vs Junction Temperature, HV = 80 V, f = 200 kHz

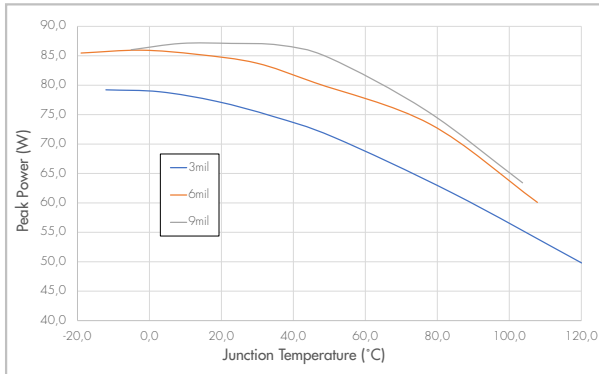


Figure 4: Peak Power vs Frequency, T_{case} = 21 °C, HV = 65 V

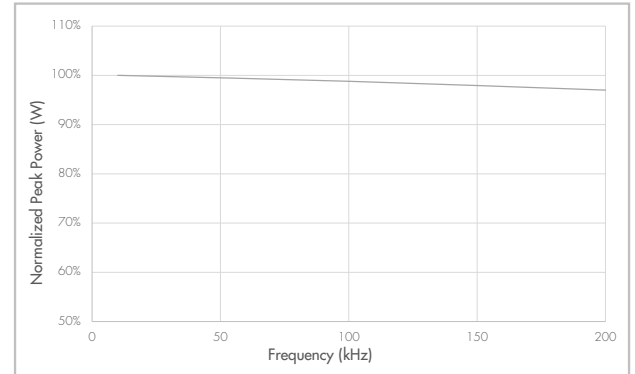


Figure 5: Δ Wavelength vs HV, T_{case} = 21 °C

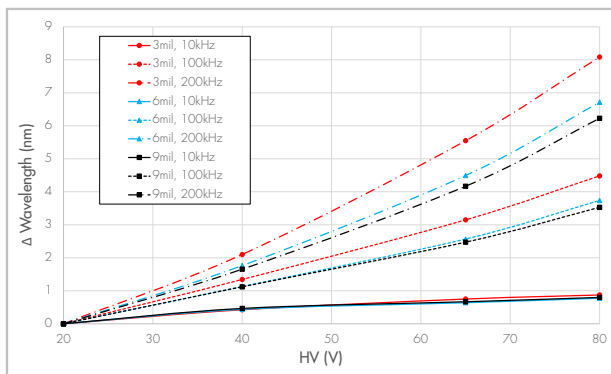


Figure 6: Δ Pulse Width vs HV, T_{case} = 21 °C

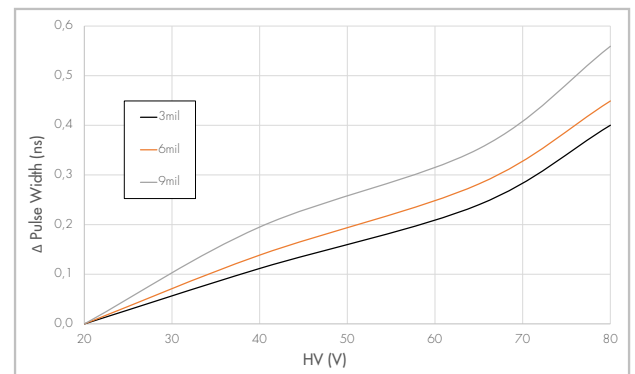


Figure 7: Δ Rise Time vs HV, T_{case} = 21 °C

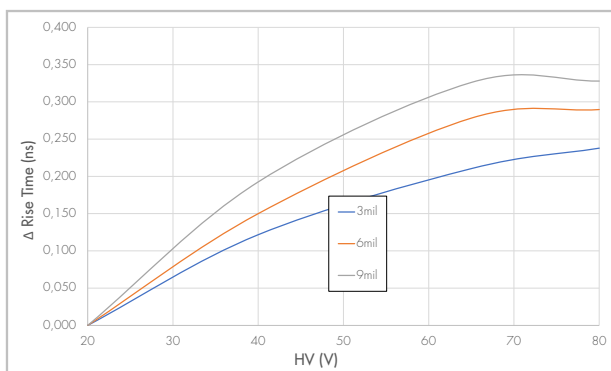


Figure 8: Relative Spectral Emission

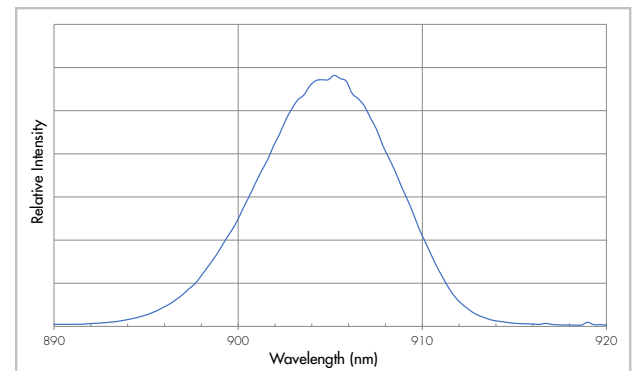


Figure 9: Relative Divergence Fast Axis

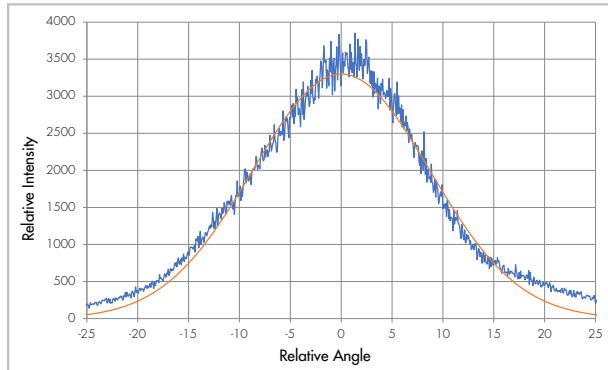


Figure 10: Relative Divergence Slow Axis

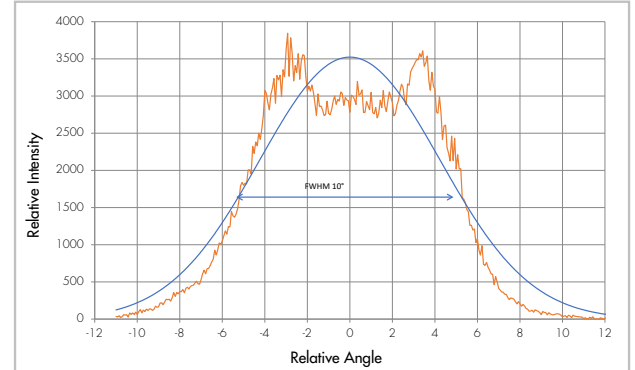
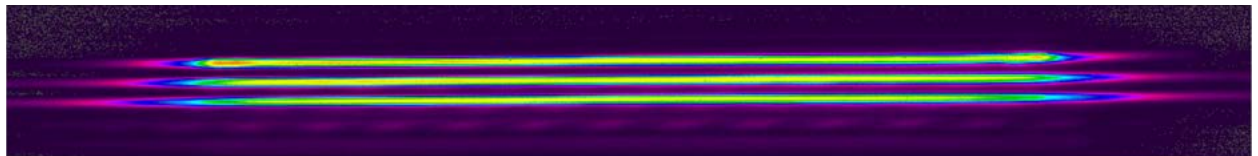
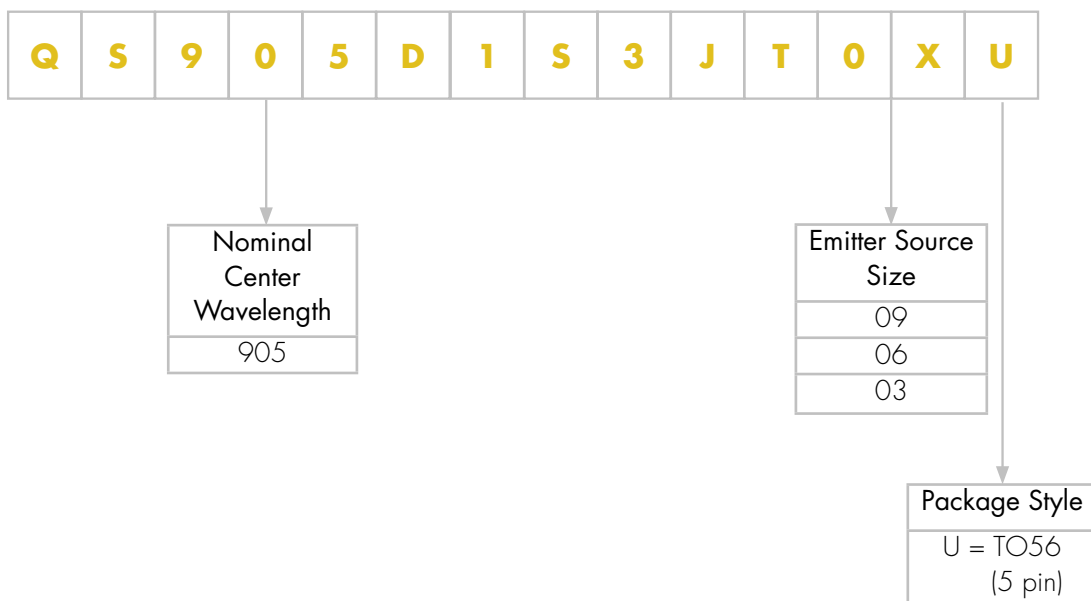


Figure 11: Near Field



Product Number Designation

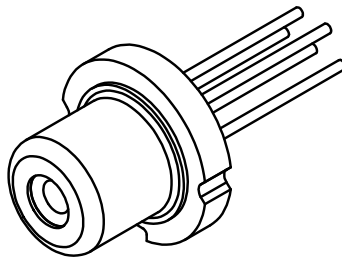
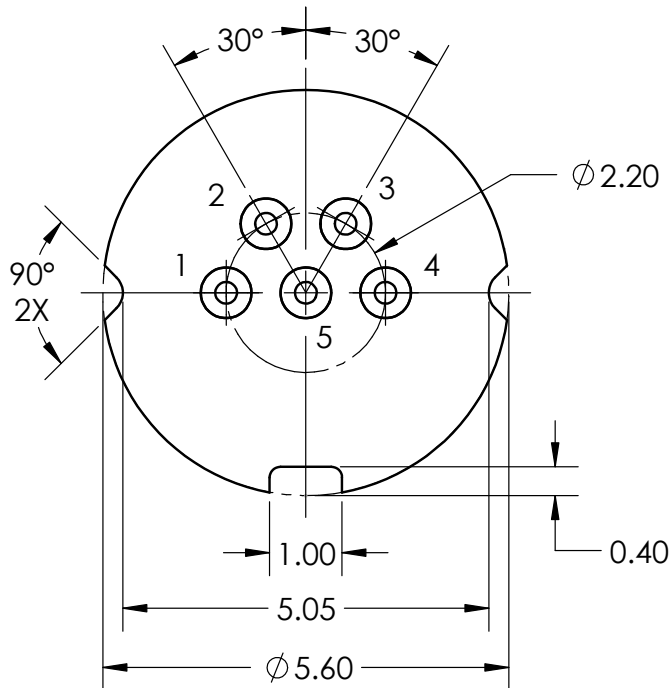


Package Drawing

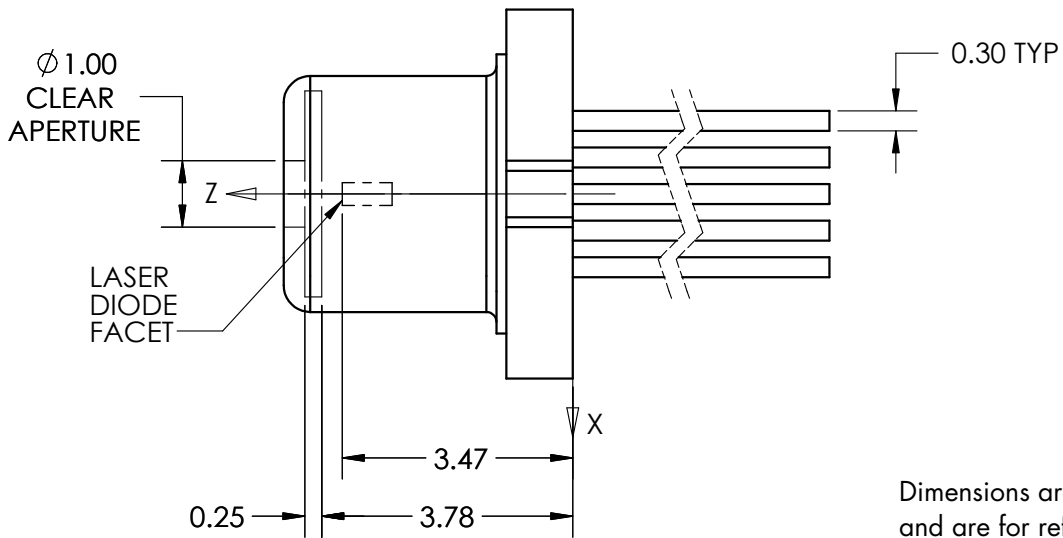
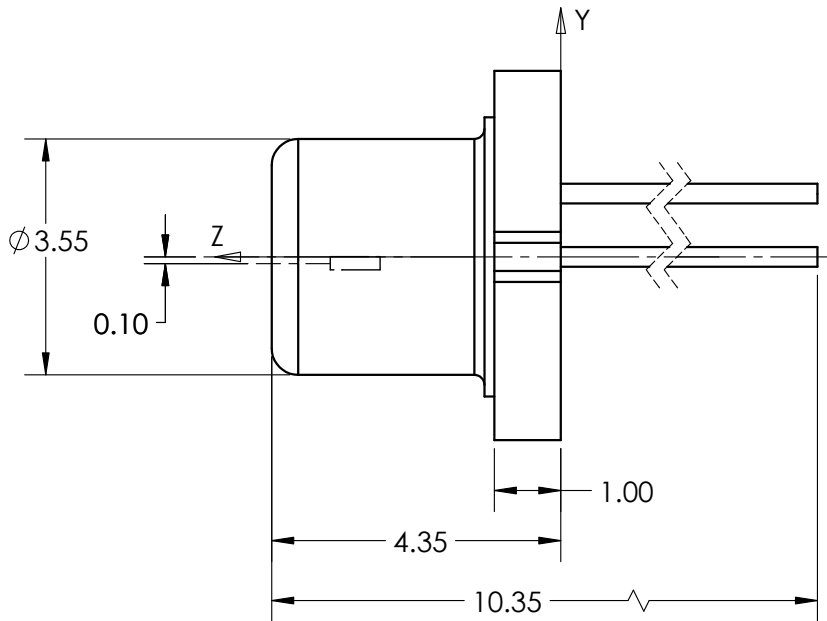
Package QS

Pin Out

- 1: TRIGGER
- 2: NC
- 3: HV
- 4: GND
- 5: CASE



Dimensions are in millimeters and are for reference only.

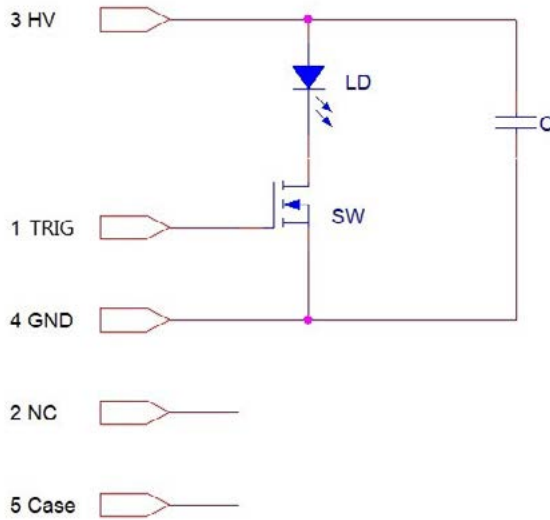


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Tolerance of Laser Position

Direction	Tolerance	Units
X (Parallel to laser junction)	0 ± 0.1	mm
Y (Perpendicular to laser junction)	0.1 ± 0.05	mm
Z (From laser facet to window)	0.31 ± 0.15	mm

Electrical Schematic



ESD

Devices are sensitive to electro-static discharge. Employ ESD preventative precautions when handling.

Evaluation Board & Driver: QS-EVAL DRIVER 2

25 mm x 51 mm evaluation board and QuickSwitch® driver is available upon request.

Product Changes

LASER COMPONENTS reserves the right to make change to the product information contained herein without notice. No liability is assumed as a result of their use or application.

Ordering Information

Products can be ordered directly from LASER COMPONENTS or its representatives.
For a complete listing of representatives, visit our website at www.lasercomponents.com