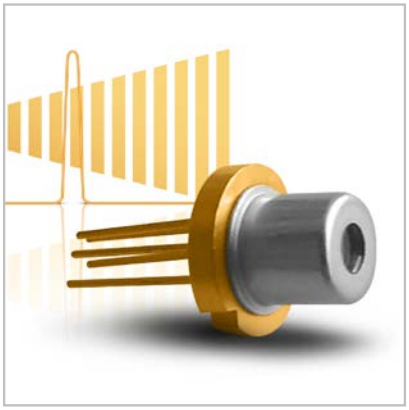
PRELIMINARY

# 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 from the signal and supply returns.

## Features

- Hermetic TO-56 package (5 pins)
- 905 nm triple junction laser diode, 3 mil & 9 mil stripe
- Pulse width of 2.5 ns typical, enables high resolution ranging applications
- Low voltage charge storage: 15 V to 80 V DC
- Pulse frequency: up to 200 KHz
- Evaluation board available
- Available for mass production

## Applications

- High resolution range finding for consumers
- Laser scanning / LIDAR
- Drones
- Optical trigger
- Automotive
- Robotics
- Military
- Industrial



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## Optical Characteristics at tRT= 21°C

| | Min | Typ | Max | Units |
|---|---|---|---|---|
| λ of peak radiant intensity | 895 | 905 | 915 | nm |
| Spectral FWHM | | 8 | | nm |
| $\delta\lambda/\delta t°$ | | 0.27 | | nm/°C |
| Divergence FWHM<br>∥ Parallel to junction plane<br>⊥ Perpendicular to junction plane | | <br>12<br>20 | | <br>Degrees<br>Degrees |
| Emitting Area<br>1S3J09<br>1S3J03 | | <br>10 x 225<br>10 x 75 | | <br>µm |

## Typical Product Characteristics

Conditions are tRT =21 °C, Pw (trig) = 40 ns, Rep. Rate =10 KHz;

| | QS905D1S3J09U | | QS905D1S3J03U | | |
|---|---|---|---|---|---|
| Parameter | Min | Max | Min | Max | Units |
| HV for Po | 15 | 80 | 15 | 80 | V |
| $P_O$ at HV (Typ.) | 15 | 89 | 12 | 71 | W |
| Pulse energy (Typ.) | 30 | 220 | 26 | 185 | nJ |
| Pulse width (Typ.) | 2.0 | 2.5 | 2.2 | 2.6 | ns |

## Absolute Maximum Ratings

| Maximum Ratings Parameter | QS905D1S3J09U/03U | Units |
|---|---|---|
| HV | 80 | V |
| $P_O$ at HV Max | 89 / 71 | W |
| V trig Max | 6 | V |
| Temperature<br>- Storage<br>- Operating | <br>- 55 to 100<br>- 45 to 60 | <br>°C<br>°C |



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Figure 1: Performance Plot

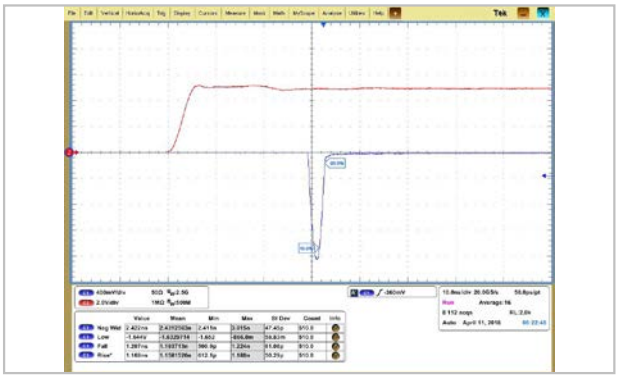


Figure 2: Instantaneous Peak Power vs Pulse Frequency

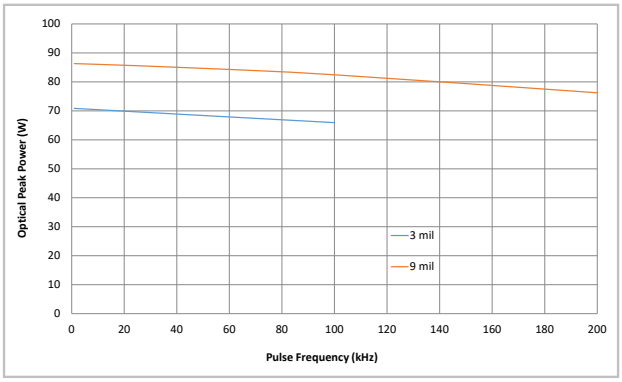



Figure 3: Pulse width, FWHM (ns) vs HV ( High Voltage )

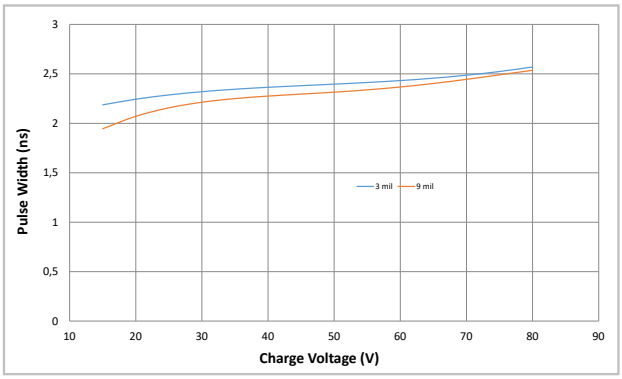



Figure 4: Optical Peak Power vs Charging Voltage (HV)

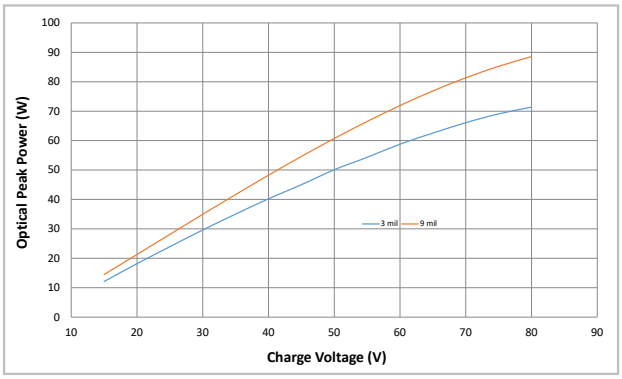
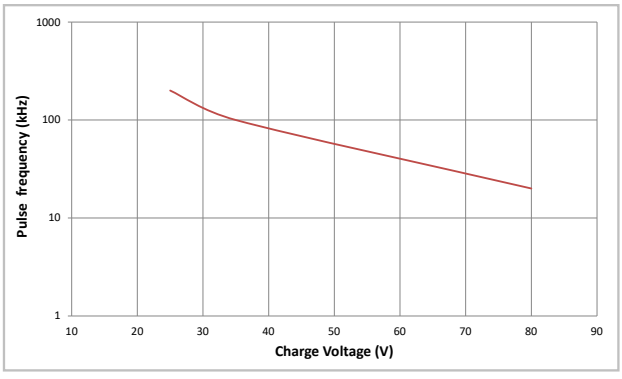



Figure 5: Pulse frequency vs HV ( High Voltage ) for devices without Heat Sink



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## Product Number Designations

| Q | S | 9 | 0 | 5 | D | 1 | S | 3 | J | 0 | 9 | U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

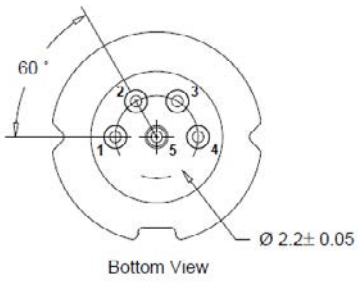
| QS Type |
|---|
| QS905D1S3J09U |
| QS905D1S3J03U |

| Emitter Type |
|---|
| 1S3J09 ( triple junction 9 mil ) |
| 1S3J03 ( triple junction 3 mil ) |

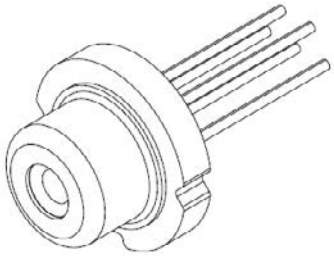
| Package Style |
|---|
| U = TO56 (5 pin) |

## Package Drawing

### Package QS



Bottom View



### Pin Out

1: Gate
2: N.C. (GND)
3: HV (High Voltage)
4: GND (Ground)
5: Case



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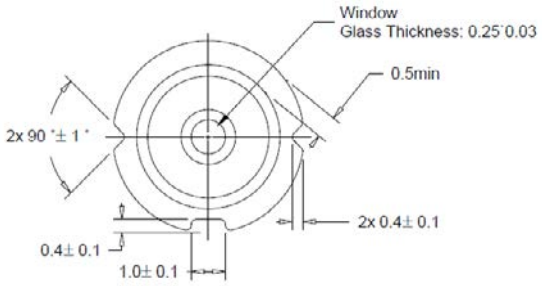
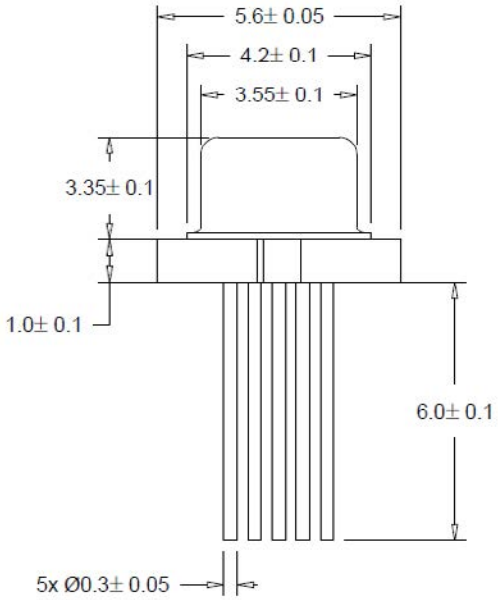
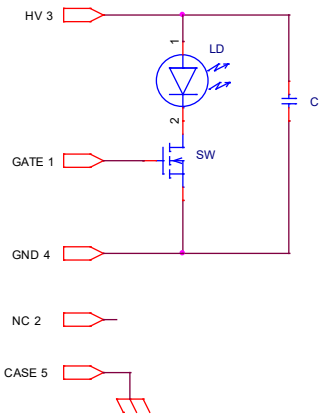



## PIN Configuration (NEW PINOUT)

| Pin | Function | Comment |
|---|---|---|
| 1 | GATE | 0V OFF, ON 5V min/5.4 V Nominal<br>Tr to be < 2 ns to meet FWHM |
| 2 | N.C. | Unused, GND recommended. |
| 3 | HV | 15 V / 80 DC |
| 4 | GND | GND (HV and GATE return) |
| 5 | CASE | Connect to GND for case to acts as a shield. |

## Electrical Schematic



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## 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



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