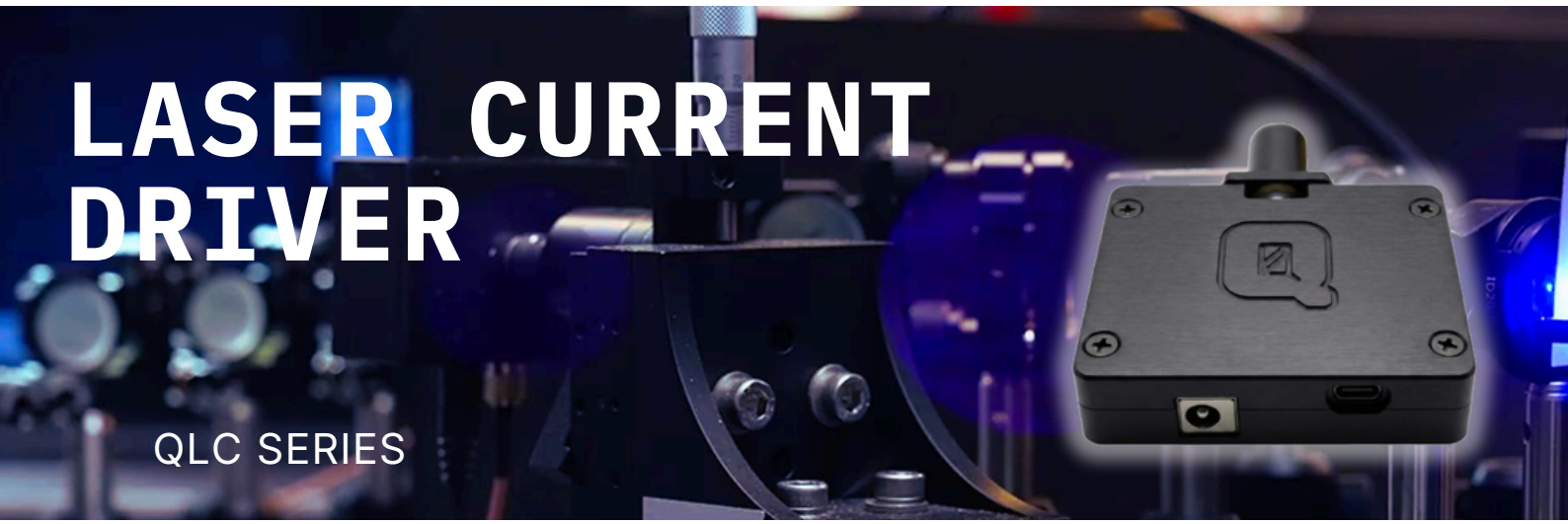
QUBITRIUM



LASER CURRENT DRIVER

QLC SERIES

The QLC Series, is a high-precision laser current driver designed to provide stable and adjustable output for laser diodes used in demanding quantum systems.

FEATURES

- High Resolution
- Integrated Laser Header
- Versatile Current Output
- Multiple Interface Support
- Compact Form Factor
- Turn-key Integration

APPLICATIONS

- Quantum Light Sources
- Entangled Photon Sources
- Optical Transmitters
- Quantum Sensing & Metrology
- Quantum Optics Experiments
- Space-Based Payloads

The QLC Series, is a high-precision laser current driver designed to provide stable and adjustable output for laser diodes used in demanding quantum systems. The series offers a versatile output range from 0 to 300 mA with an ultra-fine 100 µA (0.1 mA) step resolution, ensuring optimal driving conditions for various optical requirements. Available in both a Commercial (C-Grades) version for laboratory use and a CubeSat (S-Grades) version for space missions, the driver supports USB and SPI interfaces respectively. The unit is engineered with an integrated Laser Diode Header, allowing for the factory integration of specific laser diodes based on customer needs.

KEY ADVANTAGES

- **High Stability:** Ensures constant current levels, which are critical for maintaining the frequency stability of quantum light sources
- **Precision Control:** Offers a fine step resolution of 0.1 mA (100 µA), allowing for exact tuning of the laser diode's output power.
- **Plug-and-Play Experience:** Includes dedicated GUI software for straightforward current setting and real-time monitoring on Windows systems
- **Versatile Integration:** Features an integrated Laser Diode Header enabling the factory-installed integration of a wide range of laser diodes based on customer requirements.
- **Space & Laboratory Ready:** Provides optimized architectures for both terrestrial research (C-Grades) and space-qualified CubeSat missions (S-Grades).
- **Customizable Architecture:** Supports tailored current output ranges and interface options (USB or SPI) to match specific optical and electrical payload requirements

QLC SERIES (LASER CURRENT DRIVER) TECHNICAL SPECIFICATIONS			
Description	**Condition**	**Min**	**Typical**
Laser Diode	Desired laser diode can be integrated		
Interface	Customizable		USB/SPI
Step Size	Customizable		0.1 mA
Current Output Range			0.1 ~ 300 mA
Supply Current	It may vary according to the desired current output	10 mA	350 mA
Supply Voltage		6 V	

- The driver is designed to accommodate a wide range of laser diodes; upon request, the desired laser diode can be integrated and factory-installed into the module to provide a ready-to-use solution.
- The system offers a 0.1 mA customizable step size, allowing for extremely fine adjustments within a broad output range of 0.1 to 300 mA.
- To ensure compatibility across different platforms, the control interface is customizable, supporting both USB and SPI protocols.
- Operating on a stable 6 V supply voltage, the module manages a supply current that typically reaches 350 mA, varying based on the specific requirements of the integrated laser output.

OPERATING STRUCTURE

- Connect a stable 6 V DC power source to the dedicated Power Jack.
- Laser Connection: Ensure the laser diode is securely seated in the Laser Diode Header before applying power.
- Use the USB mini-B port to connect the driver to a Windows-based PC for digital control.
- Utilize the provided GUI software to set the output current within the 0.1 to 300 mA range with 100 µA precision.
- Real-time monitoring of the supply current (up to 350 mA) can be performed through the software interface to ensure stable operation.
- This module contains highly sensitive electronics; handle only at an ESD-safe workstation to prevent electrostatic damage.

OPERATING CONDITIONS				
Description	**Condition**	**Min**	**Typical**	**Max**
Operating Temperature			20±5 °C	
Storage Temperature		10°C		40°C
Storage Humidity	Non-condensing	5%		95%
Operating Humidity	Non-condensing	15%		85%

CAUTION: Any attempt to open the sealed enclosure or modify the internal optical and electronic circuitry will void the manufacturer's warranty.

CAUTION: Do not connect or disconnect the laser diode while the driver is powered on to avoid damaging the diode with transient currents.
Do not look directly into the laser beam once the diode is integrated and powered; always follow standard laser safety protocols.

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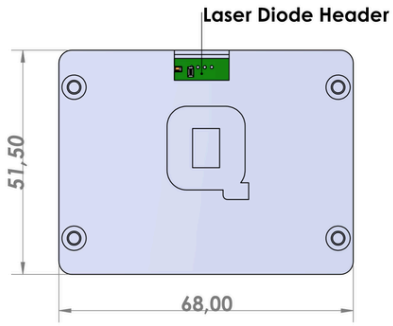
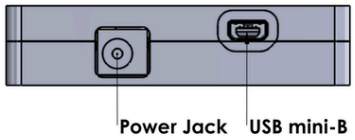
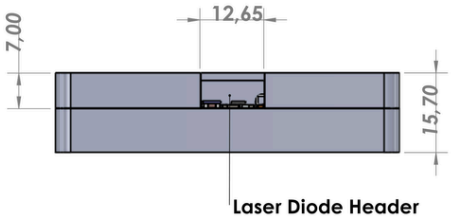
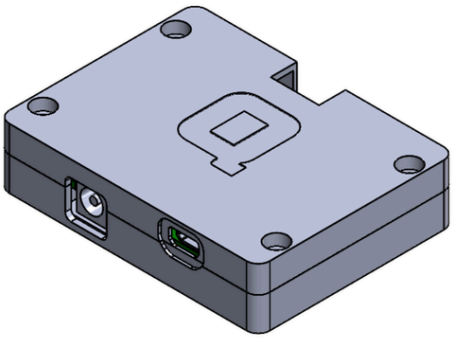
MECHANICAL DRAWINGS









The QLC Series is housed in a precision-engineered, compact aluminum enclosure designed for high durability and optimal thermal stability. The module has external dimensions of 68x51.50x15.70 mm, making it suitable for space-constrained laboratory and satellite environments. A key feature of the design is the integrated Laser Diode Header (12.65x7 mm), which provides a dedicated interface for the user's specific laser requirements. To ensure maximum flexibility, the unit can be supplied with an open header area for customers to integrate their own laser diodes, or it can be shipped as a turn-key solution with a pre-installed, factory-calibrated laser diode based on user request. The enclosure also features a standard Power Jack and a USB mini-B port for secure connectivity and control

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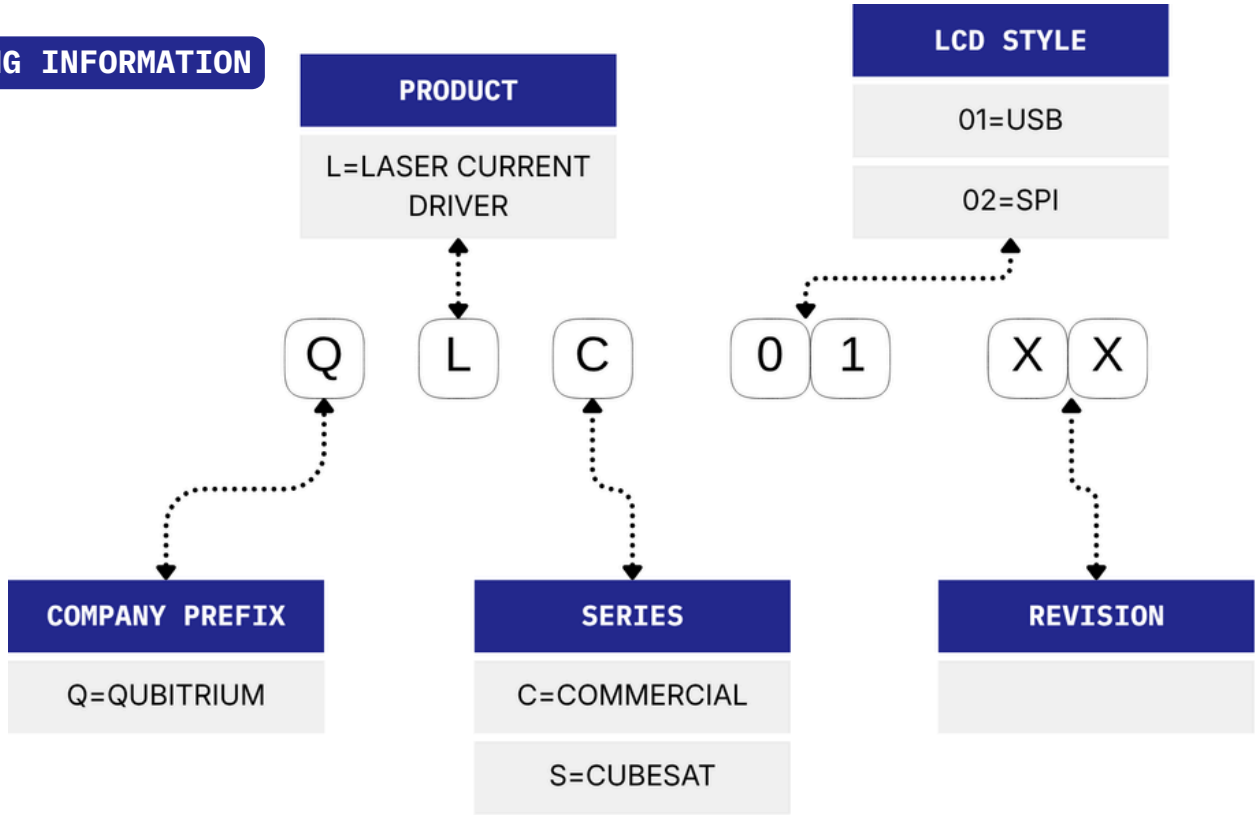
ORDERING INFORMATION



The QLC Series utilizes a modular nomenclature system that allows users to configure the laser current driver according to their specific mission and interface requirements. Customers can select between the Commercial (C) series for high-precision laboratory environments or the CubeSat (S) series, which is specifically optimized for space-qualified payloads. The communication style can be further customized by choosing between USB (01) for standard terrestrial connectivity or SPI (02) for integrated embedded systems. Every module is categorized under the QUBITRIUM (Q) prefix and the Laser Current Driver (L) product line, with unique revision codes to ensure full traceability and hardware version control.

RELATED PRODUCTS

To complete your quantum optics or timing measurement setup, the following Qubitrium products are fully compatible with the QLC Series:

QEC Series Entangled Photon Sources: High-rate photon pair sources that serve as the primary signal input for entanglement distribution and Bell-state analysis.

Qubitrium QDC-V series Single Photon Detectors: High-precision, compact detection modules optimized for visible and telecommunications wavelength ranges

Qubitrium QubitCore Integrated QKD Systems: Comprehensive Quantum Key Distribution solutions for secure communication research and network integration.

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