

Datasheet: Qubit-in-a-box 0 (QiB0)

v 1.0, 4 march 2024



Overview:

These devices featured qubits coupled to resonators come bonded and packaged with easy to connect SMA connectors - perfect for benchmarking and calibration. The standard setup includes 4 fixed frequency transmon single qubits (3-5 GHz) and 2 hanging resonators (6-7 GHz). The qubits have a lifetime, T1, up to 80 us and the quality factor of the resonator is approximately 1M.

Product features:

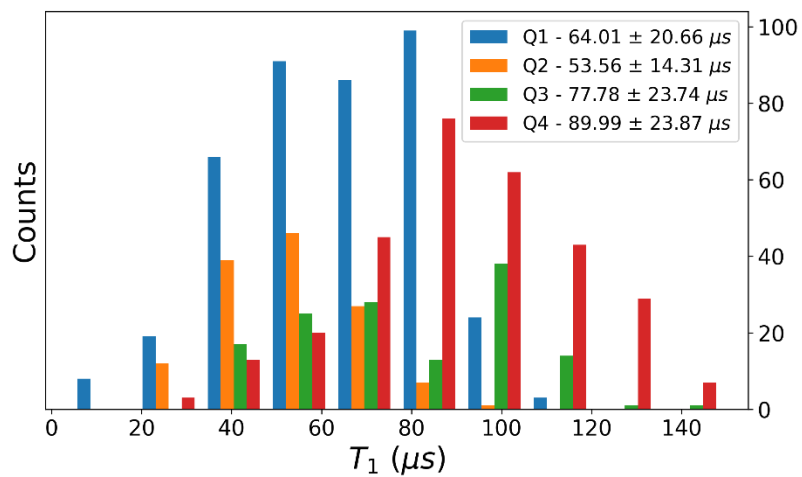
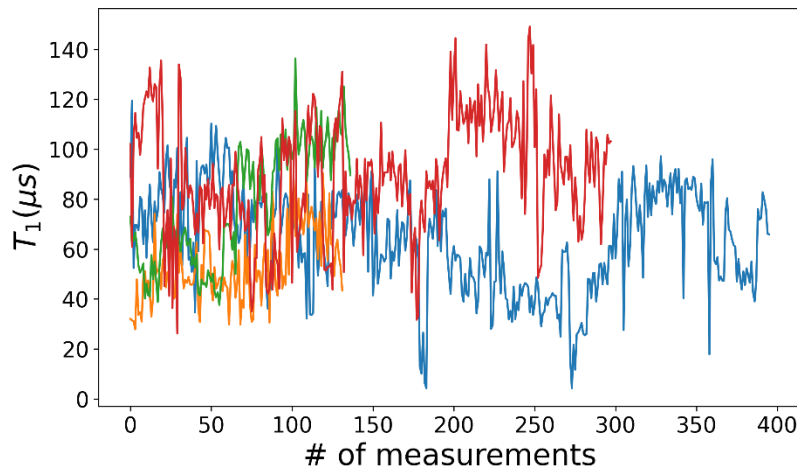
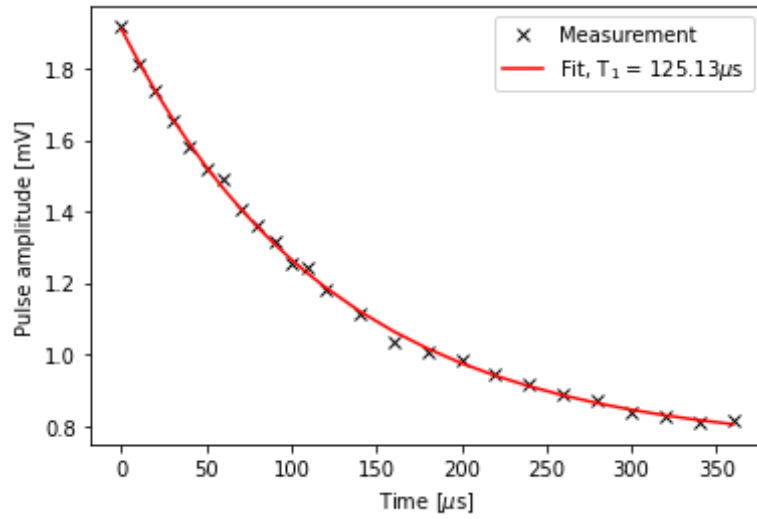
- 4 isolated qubits with T1 = 50 – 90 μ s on average and up to > 100 μ s *
- 4 readout resonators, coupled separately to each qubit
- 2 hanging resonators with Qi > 0.5 \times 10⁶ *
- Oxygen-free copper case
- Female SMA for RF connectors

| Operating range | | |
|-----------------|---------|-------|
| Parameter | Min | Max |
| RF input power | | 0 dBm |
| Temperature | < 10 mK | 60 mK |

| Typical characteristics * | | |
|---------------------------|------------------|------------------|
| | ω_q (GHz) | ω_r (GHz) |
| Qubit 1 | 4.60 | 6.45 |
| Qubit 2 | 4.40 | 6.30 |
| Qubit 3 | 4.16 | 6.15 |
| Qubit 4 | 3.68 | 6.00 |
| Resonator 1 | - | 6.65 |
| Resonator 2 | - | 6.90 |

* Specific parameters for each unit are only available for characterized products

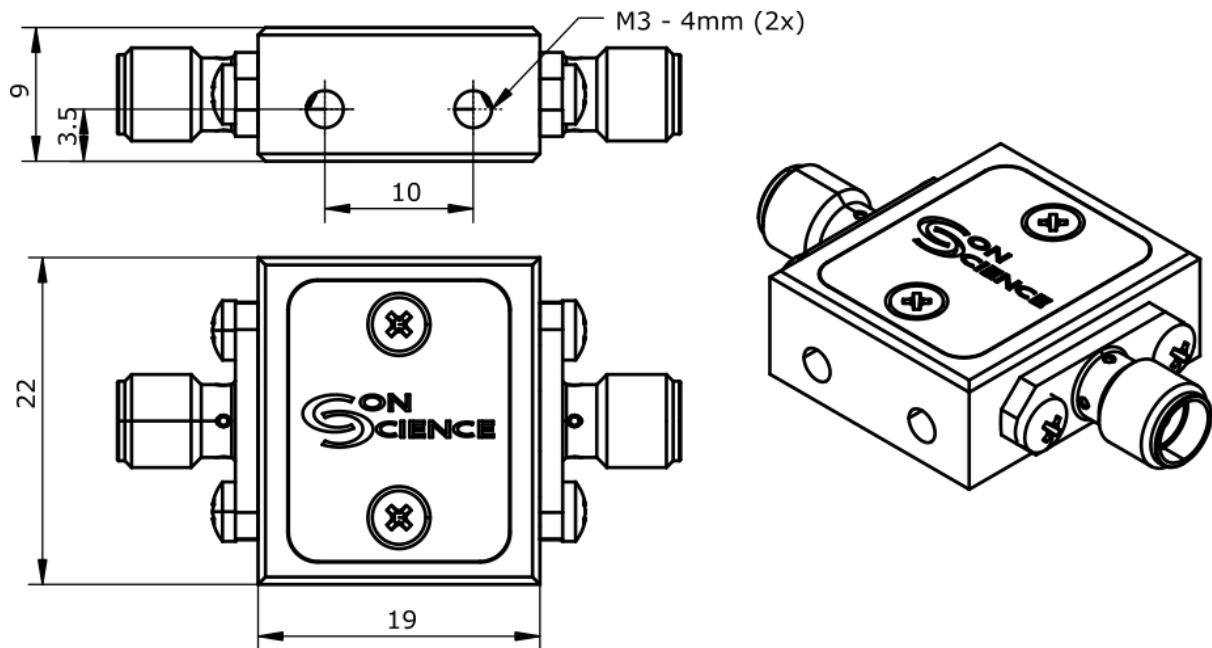
Qubit Characteristics – measured at $T \sim 10$ mK *



* Specific parameters for each unit are only available for characterized products

Dimensions

Units: mm



Installation

1. Mount the QiB0 with 2 M3-4mm screws to a mixing chamber plate of a dilution refrigerator. The optimal operating temperature is below 50 mK.
2. Connect one end of the SMA connectors to the signal input line and another end to the readout line.

Dual-use (can be used for both civilian and military application)

Annex 1, Category 3: Electronics, 3A001 **:

Electronic devices and circuits containing components, manufactured from "superconductive" materials, specially designed for operation at temperatures below the "critical temperature" of at least one of the "superconductive" constituents and having any of the following:

1. Current switching for digital circuits using "superconductive" gates with a product of delay time per gate (in seconds) and power dissipation per gate (in watts) of less than 10-14 J; or
2. Frequency selection at all frequencies using resonant circuits with Q-values exceeding 10 000;

** Specific export regulations may apply depending on destination country.