Test&Measurement

YOKOGAWA

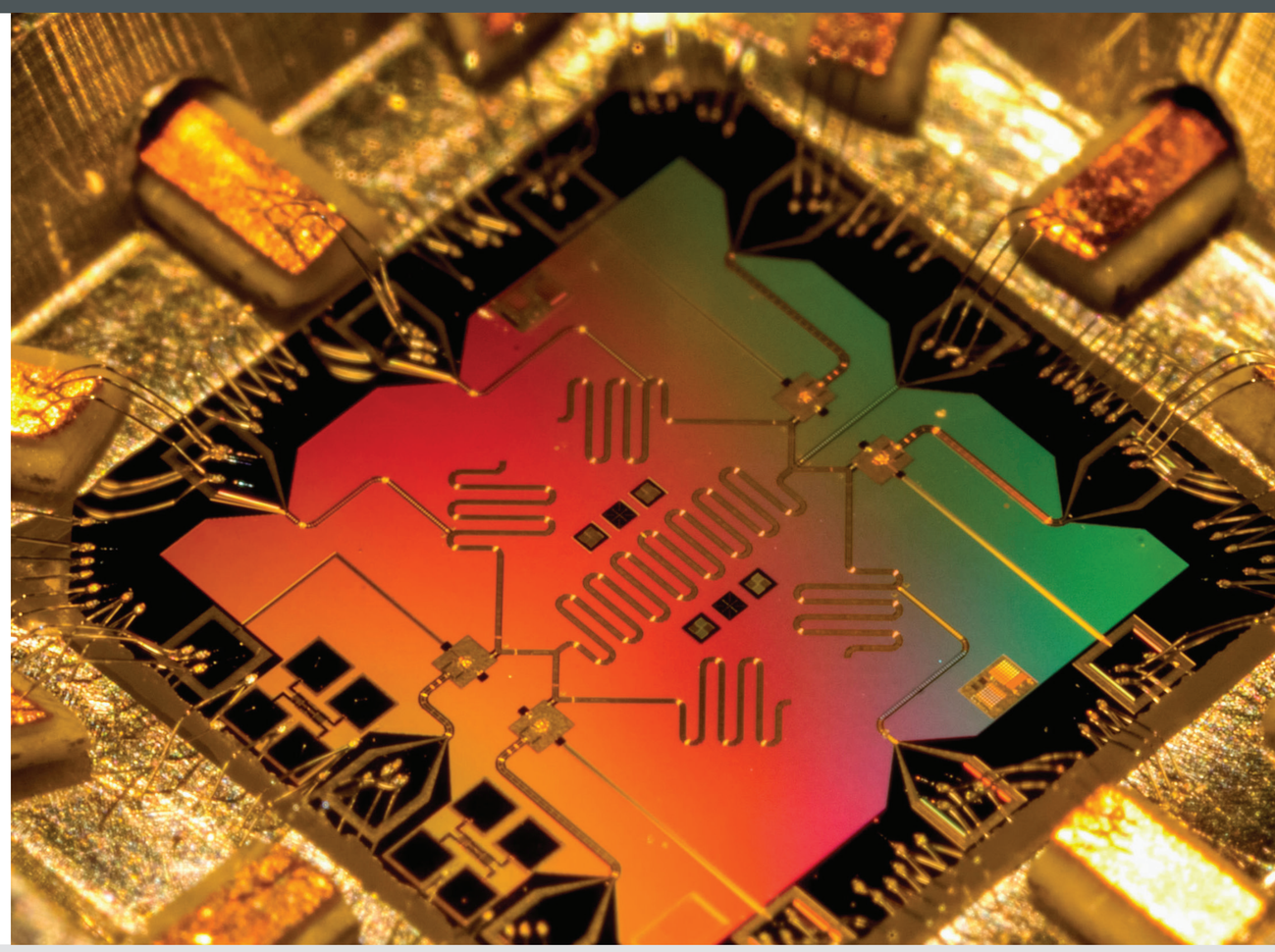
Give your qubits a quiet, stable home with the Yokogawa GS200

Application

Quantum qubits are built up from Josephson junctions which, when integrated in a closed loop, are highly sensitive to small changes in the external magnetic field passing through the loop. The magnetic field needs to be finely tuned so the quantized energy levels can be smoothly transformed. This is crucial for initializing a quantum computer.

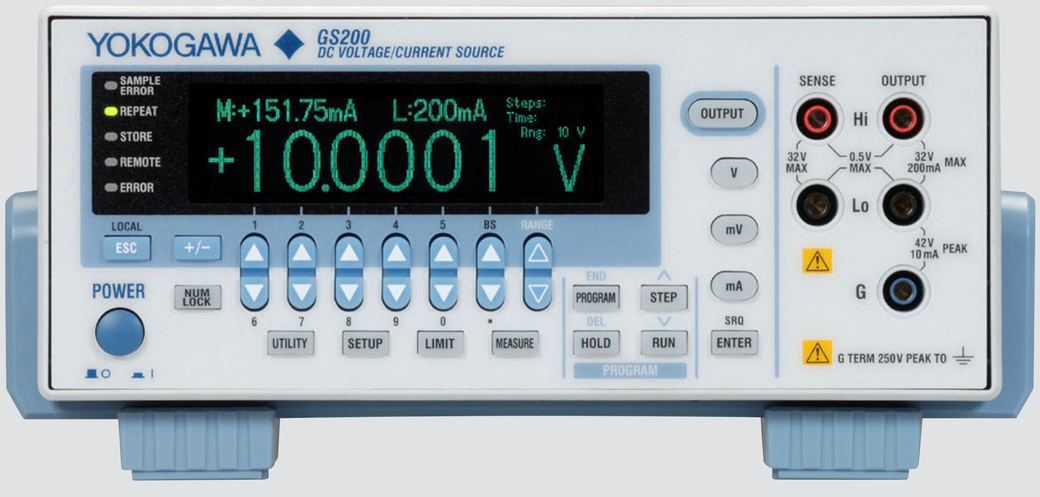
The Problem

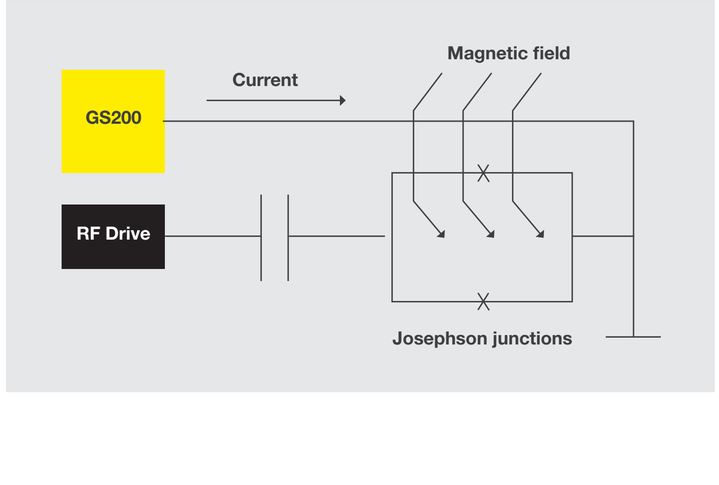
Noise or drift in the DC source used to generate and tune the magnetic field for qubit biasing and computer initialization.



Why Use the GS200

The GS200 is a low voltage/current DC source with high accuracy, high stability, and high resolution. With its excellent traceability, stability, and 5 1/2-digit resolution, the GS200 generates extremely low-noise DC voltage and current signals that are required to produce a stable, finely tuned magnetic field and initialize the qubits.

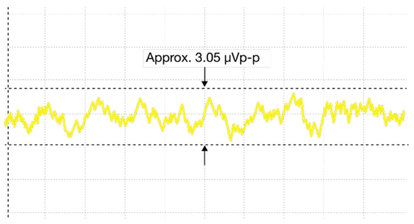




Low Noise

One of the key features of the GS200 for quantum applications is the extremely low noise it offers.

- 100 uVp-p
- 3 uAp-p

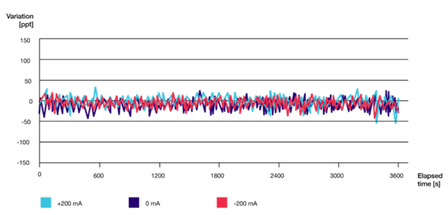


Noise waveform example at 0V output in 10 V output range (observed using a 1000 times amplifier with a 10 kHz band-limiting filter)

High Stability

The other key feature of the GS200 for quantum applications is its high stability.

- +/- 0.001% of setting + 20 uV
- +/- 0.004% of setting + 3 uA
- The stability is specified out to 90 days



Example of 1 hour stability in output mA (As reference data)

Precision Making

www.tmi.yokogawa.com