

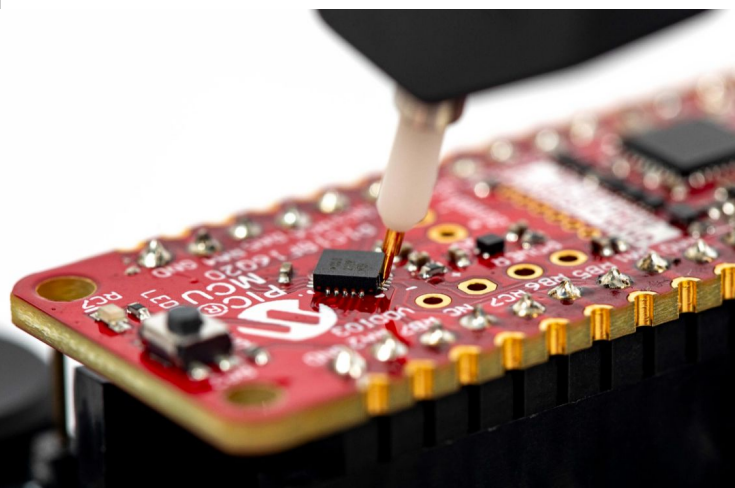
# PCBite SQB1

I3C handsfree probes



# I3C Low-Capacitance Probe for Precision Debugging

## Meet the SQB1 probes



### Overview of I3C Probing Challenges

The I3C (Improved Inter-Integrated Circuit) bus, designed to optimize communication between embedded systems, offers advanced features like higher data rates and power efficiency compared to traditional I2C. However, instrumenting an I3C bus for debugging can be challenging due to the need for precise signal integrity and minimal capacitive loading. The I3C interface supports peak speeds with a maximum capacitance load of 50pF, significantly lower than legacy I2C, enabling higher capacitance buses only at reduced speeds and limited features.

This handsfree probe solution addresses these challenges with the world's first low-capacitance bidirectional probes tailored for I3C applications. These passive 1:1 probes ensure accurate signal measurements with minimal disruption, enabling efficient debugging and development.

This probe pack is an ideal tool for engineers working on I3C systems, offering precision, reliability, and ease of use in a compact and efficient design.

### Low-Capacitive Probes for I3C Signals:

- Bidirectional probes for SCL & SDA signals.
- Total capacitive load < 41 pF @ 12.5 MHz.
- Passive 1:1 ratio ensures no signal amplification or alteration.
- Coaxial design for high signal integrity, the ground and signal has equal length.

### Optimized for High-Frequency I3C Communication, with Push-Pull Frequencies:

- Up to 12.5 MHz for 2.5–3.3V.
- Up to 10 MHz for 1.8V.
- Supports up to 3.12 MHz Open Drain.

### Spring-Loaded Test Needles for Fine-Pitch Measurements:

- Ensures stable and precise contact on small components or PCB traces.

### Flexible Grounding Options:

- Includes detachable cables, alligator clips, and custom ground springs for handheld or handsfree use.

### Dual-Use Design:

- Can be used handheld with an insulated grip or handsfree with the included probe holder.

### Durable and Protected Components:

- Color-coded cable holders.
- Protective probe tip covers included.



The SQB1 significantly reduced PCB loading with spring-loaded signal and ground connections applying only 60–100g of force, compared to the 400g–1kg exerted by rigid probes. The design also provides tactile feedback, ensuring reliable contact with the target being measured.



# SPECIFICATION – PROBE MODEL OVERVIEW

| Model                                       | SQB1                                                                                                                                                     |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Coupling                                    | DC                                                                                                                                                       |
| Nominal division ratio                      | 1:1                                                                                                                                                      |
| Bandwidth, unidirectional                   | 100 MHz                                                                                                                                                  |
| Bandwidth, bidirectional I3C                | 13 MHz                                                                                                                                                   |
| Output Connector                            | MMCX                                                                                                                                                     |
| Transition time (note 1)                    | < 10 ns                                                                                                                                                  |
| Probe tip impedance, nominal                | 100 Ω                                                                                                                                                    |
| Probe tip capacitance, maximum (note 2)     | 41 pF                                                                                                                                                    |
| Peak voltage (note 3)                       | ±60 V DC, 30 V AC RMS, ± 42.4 V pk max.                                                                                                                  |
| Nominal probe tip pitch                     | 0 - 10 mm                                                                                                                                                |
| Environment                                 |                                                                                                                                                          |
| Operating temperature range                 | 0 - 50 °C                                                                                                                                                |
| Storage temperature range                   | -20 to 70 °C                                                                                                                                             |
| Temperature range for stated specifications | 15 - 30 °C                                                                                                                                               |
| Max. humidity, operating (non-condensing)   | 80 % to +30 °C, decreasing linearly to 40 % at +50 °C                                                                                                    |
| Max. humidity, storage (non-condensing)     | 80 %                                                                                                                                                     |
| Max. altitude Operating                     | 2 km                                                                                                                                                     |
| Pollution degree                            | 2 (As defined in IEC 61010-031. Only non-conductive pollution. Occasionally, however, a temporary conductivity caused by condensation must be accepted.) |
| Safety                                      | CAT 0, IEC 61010-031:2022                                                                                                                                |
| EMC approvals                               | Not applicable                                                                                                                                           |
| Environmental approvals                     | WEEE, RoHS                                                                                                                                               |



# SPECIFICATION – PROBE MODEL OVERVIEW

## General

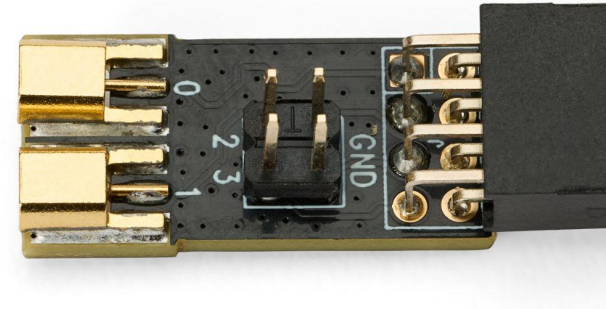
|                                       |                                                                                                     |
|---------------------------------------|-----------------------------------------------------------------------------------------------------|
| Supplied accessories                  | Probe holder for handsfree measurement, cable holders, replacement tip needle, spring loaded ground |
| Cable length with probe and connector | 800 mm (approximately 31 in)                                                                        |
| Dimensions (probe head)               | Length 90 mm, Ø 8.9mm                                                                               |
| Weight with probe and cable           | 34 g                                                                                                |

All specifications are subject to change without notice.

note 1, Calculated 10% - 90%, I3C Push-Pull Parameters use 30% - 70%

note 2, Measured

note 3, WARNING Signals exceeding the voltage limits in the table below are defined as "hazardous live" by EN 61010.



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