

GPM40-U USB CW Power Sensor

50 MHz to 40 GHz

At a Glance

The GPM40-U measures continuous wave signal power from 50 MHz to 40 GHz across a measurement range of -70 dBm to +20 dBm. Its USB 2.0 interface supports power measurement in field testing, production line testing and system integration.



Measurement Highlights

- **50 MHz to 40 GHz**

Continuous wave power measurement from -70 dBm to +20 dBm; low-power measurements require the preparation described below.

- **USB 2.0 Control**

A USB 2.0 control interface compatible with USB-TMC supports field testing, production line testing and system integration.

- **±0.25 dB Accuracy**

Applies from -40 dBm to +20 dBm with DUT SWR below 1.20 and the sensor average count set to 128.

- **50,000 Readings/s**

Maximum measurement speed. The reading rate is governed by aperture time and is distinct from the ADC sampling rate.

Power Measurement

Specification	Value
Frequency range	50 MHz to 40 GHz
Measurement power range	-70 dBm to +20 dBm
Amplitude measurement accuracy	±0.25 dB; -40 dBm to +20 dBm, DUT SWR <1.20, average count 128
Maximum input power, average	+23 dBm
Maximum input power, peak	+26 dBm, duration <10 µs
Zero setting	±70 pW
Measurement noise	±80 pW
Maximum ADC sampling rate	1 MSamples/s
Maximum measurement speed	50,000 readings/s

The maximum input powers are damage limits, not the measurement range. Exceeding either limit may damage or burn out the sensor.

Maximum Input VSWR

Specification	Value
50 MHz ≤ f ≤ 2 GHz	1.15
2 GHz < f ≤ 12.4 GHz	1.20
12.4 GHz < f ≤ 18 GHz	1.26
18 GHz < f ≤ 26.5 GHz	1.35
26.5 GHz < f ≤ 40 GHz	1.50

Calibration Uncertainty

Specification	Value
50 MHz ≤ f ≤ 18 GHz	0.19 dB
18 GHz < f ≤ 26.5 GHz	0.21 dB
26.5 GHz < f ≤ 40 GHz	0.23 dB

Measurement uncertainty also includes sensor-to-DUT mismatch, zero-setting uncertainty and measurement noise.

Interface and General Specifications

Specification	Value
RF connector	2.4 mm male
Control interface	USB 2.0 interface, compatible with USB-TMC
Dimensions (W × H × D)	51.5 × 33.5 × 124.5 mm
Weight	<0.4 kg
Operating temperature	-10°C to 50°C
Storage temperature	-40°C to 70°C
Recommended calibration cycle	12 months
Power requirement	+5 V, 500 mA
Display	Host computer display
User interface language	Chinese / English

Measurement Conditions and Definitions

Low-power measurement

Below -40 dBm, connect the sensor to the DUT and preheat for one hour in a temperature-controlled environment. Set Step Detection to Off, configure an appropriate number of averages and perform External Zero Calibration. Then enable the DUT signal output, wait one minute and observe the results. The results include zero-setting and measurement-noise errors.

Maximum input power

Maximum input power is the highest power the sensor can handle. Exceeding the stated limit may damage or burn out the sensor.

Accuracy conditions

The ± 0.25 dB accuracy applies from -40 dBm to +20 dBm with DUT SWR < 1.20 and an average count of 128. Below -40 dBm, zero-setting and measurement-noise effects on measurement accuracy increase as the measured power decreases.

Calibration and measurement uncertainty

Calibration uncertainty includes inherent linear deviation, temperature effects and expanded uncertainty arising from sensor calibration. User measurement uncertainty includes this calibration uncertainty plus sensor-to-DUT port mismatch, zero-setting uncertainty and measurement noise.

Zero setting

Zero setting is the sensor's fixed output deviation when no signal is applied. Non-ideal internal circuits, including amplifier offset and thermoelectric potential, or external interference cause this deviation, which significantly affects low-power measurements. Preheat for one hour in a temperature-controlled environment and perform external zero calibration before testing.

Measurement noise

Measurement noise is the effect of internal circuit noise on the measurement and is more pronounced for small signals. Measurement-noise testing requires one hour of preheating in a temperature-controlled environment followed by external zero calibration.

ADC sampling rate

Maximum sampling rate is the highest conversion rate of the ADC and is a design specification of the sensor.

Measurement reading rate

Maximum measurement rate is the maximum amount of sensor data that can be read per second. It is correlated with aperture time: measurement rate equals $1/\text{aperture time}$.

PC Software Requirements

Specification	Value
Operating system	Windows 11 (64-bit); Windows 10 and Windows 7 (32-bit and 64-bit)
Processor	1 GHz or higher; recommended 2 GHz or higher
Memory	2 GB or higher; recommended 4 GB or higher
Disk space	1.0 GB or higher
Display resolution	1280 × 1024 or higher

Configuration and Supplied Accessories

Specification	Value
USB cable	2.0 m, quantity 1
Software and documentation CD	Manuals and power measurement display software, quantity 1
Certificate of conformity	Quantity 1

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