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## Key PowerSensor+™ Specifications

10 MHz to 26.5 GHz

-55 dBm to +20 dBm

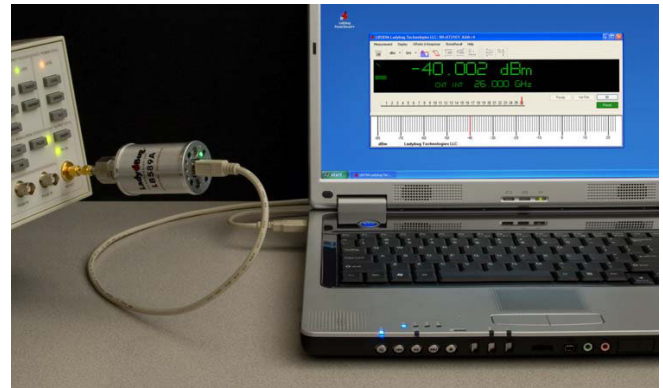
1.95% Total Error\*

1.20:1 VSWR

\* Measuring a well matched DUT (-20 dBm @1 GHz)

## Key PowerSensor+™ Capability

General purpose power and scalar measurements



Test Setup for One Sensor Measurements

## General Description

The LB589A is an easy to use high performance general purpose power meter and power sensor in one. It features high speed measurements and temperature compensated accuracy with superior in-class performance. The standard product can measure signals below -55 dBm.

Get up and running quickly with the supplied power meter panels. Use the supplied drivers and programming examples for ATE applications. Easily integrate the power sensors into Lab View, C, VB and other programming environments.

Integration and usability are further simplified because calibration and zeroing are not required before use and, you have the choice of selecting a male or female SMA input connector.

Order option 003 for triggering on the RF input level and general TTL triggering. Order option 001 recorder out when a slow moving (<3 Hz) analog output is required.

## Features

- Best in-class price
- Superior in-class performance
- Compact - 1/10 the volume of competitive sensors
- Ruggedized USB connector - does not fatigue or break like competitive sensors
- Trigger on the RF input level
- Fully calibrated over temperature
- Unlimited signal bandwidth measurements
- Offered with 30 day return policy



Power Meter Panel

## Applications

- General purpose scalar measurements
- General average RF and microwave power measurements requiring leading edge accuracy:
  - CW & pulsed signals
  - Narrow and wide band signals: CDMA, W-CDMA, QAM, OFDM, GSM, TDMA, QPSK, FSK, AM, FM, etc.
  - Recorders, power monitoring, and ALC loops
- Research and development and manufacturing
- Maintenance, repair, installation and service
- Communications
- Radar, wireless, satellite, radio links, etc.

**LB589A PowerSensor+™ Specifications**

| Parameter                            | LB589A  |
|--------------------------------------|---|
| <b>Frequency Range</b>               | 10 MHz to 26.5 GHz  |
| <b>Dynamic Range</b>                 |   |
| Standard                             | -55 dBm to +20 dBm  |
| <b>Accuracy</b>                      | Total Error (RSS) = $\sqrt{(Mm^2 + CF^2 + L^2 + N^2 + T^2 + Z^2)}$ <i>Note 1</i>  |
| <b>Calibration Factor (SMA)</b>      | NIST traceable  |
| 10 MHz to 1 GHz                      | 2.5%  |
| 1 GHz to 10 GHz                      | 2.4%  |
| 10 GHz to 18 GHz                     | 2.7%  |
| 18 GHz to 26.5 GHz                   | 3.7%  |
| <b>Linearity</b> <i>Note 3</i>       |   |
| +15 to +20 dBm                       | 3.0%  |
| -15 to +15 dBm                       | 2.5%  |
| -55 to -15 dBm                       | 2.0%  |
| <b>Noise</b>                         | 5 second integration  |
| -30 to +20 dBm                       | 0.10%   |
| -40 to -30 dBm                       | 0.25%   |
| -50 to -40 dBm                       | 0.50%   |
| -55 to -50 dBm                       | 1.00%   |
| <b>Zero Offset</b> <i>Note 3</i>     | $\{[(1.0 \text{ nW @ } 25^\circ\text{C}) +  \Delta T  \times (0.075 \text{ nW / } ^\circ\text{C})] \pm 0.01 \text{ nW / month}\}$ <i>Note 2</i> |
| <b>Match (SMA)</b>                   |   |
| 10 MHz to 1 GHz                      | 1.20:1 VSWR (21 dB Return Loss)   |
| 1 GHz to 10 GHz                      | 1.20:1 VSWR (21 dB Return Loss)   |
| 10 GHz to 18 GHz                     | 1.29:1 VSWR (18 dB Return Loss)   |
| 18 GHz to 26.5 GHz                   | 1.29:1 VSWR (18 dB Return Loss)   |
| <b>Temperature (°C)</b>              |   |
| 40 - 50                              | 2.00%   |
| 30 - 40                              | 0.75%   |
| 20 - 30                              | 0.00%   |
| 10 - 20                              | 0.75%   |
| 0 - 10                               | 2.00%   |
| <b>Maximum Average Power</b>         | +20 dBm (100 mW)  |
| Damage Level                         | +23 dBm (200 mW)  |
| <b>Maximum Pulse Power</b>           | +20 dBm (100 mW)  |
| Damage Level                         | +23 dBm (200 mW)  |
| <b>Video Bandwidth</b>               |   |
| Standard                             | 100 Hz  |
| <b>Time Base</b>                     | ±50 ppm   |
| <b>Measurements</b>                  | 2000/second (100 settled measurements per second typical)   |
| <b>Recommended Calibration Cycle</b> | 1 year  |

**LB589A PowerSensor+™ Specifications (continued)**

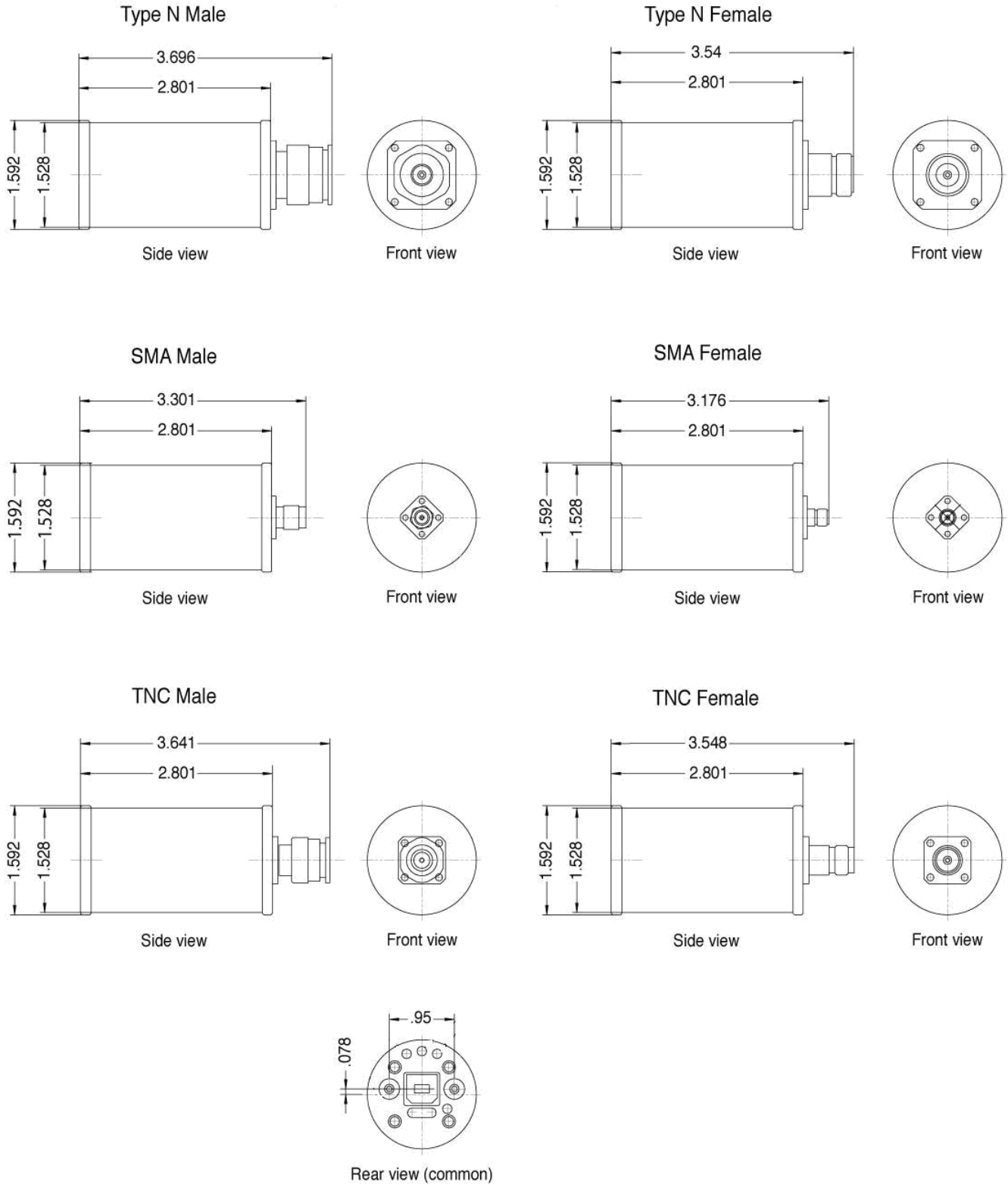
| Parameter                                       | LB589A  |
|---|---|
| <b>Average Power Measurements</b>               | Average Power, Duty Cycle-Computed Pulse Power, Data Logging      |
| <b>Display &amp; Data Processing Capability</b> | Multiple sensors, displays, and traces                            |
| Scaling   | Linear, dB  |
| Memory  | Unlimited   |
| <b>Trigger</b>                                  | Option 003  |
| Resolution                                      | 2 us  |
| Modes (GUI)                                     | Single, Continuous  |
| Source  | External  |
| Input   | TTL compatible, rising or falling edge                            |
| V <sub>IH</sub> , minimum high-level input      | 2.0 V at +/- 10 uA  |
| V <sub>IL</sub> , maximum low-level input       | 0.8 V at +/- 10 uA  |
| Connector type                                  | SMB male (shared with recorder output)                            |
| Absolute maximum levels                         | 5.5 V maximum, -0.5 V minimum                                     |
| Output  | TTL compatible, rising or falling edge                            |
| V <sub>OH</sub> , minimum high-level output     | 4.6 V at 1 mA   |
| V <sub>OL</sub> , maximum low-level output      | 0.8 V at -1 mA  |
| Connector type                                  | SMB male  |
| Absolute maximum levels                         | 5.5 V maximum, -0.5 V minimum                                     |
| <b>Recorder Out</b>                             | Option 001  |
| Range   |   |
| Operating                                       | 0 to 1 V typical  |
| Maximum output                                  | 5 V, if in trigger mode (option 003)                              |
| Output impedance                                | 1 K ohm typical   |
| Sensitivity                                     |   |
| Scale   | Linear or dB, factory default to Linear                           |
| Full Scale Value                                | User settable, factory default to Linear                          |
| Connector                                       | SMB male (shared with trigger input)                              |
| <b>Environment, operating</b>                   |   |
| Temperature                                     | 0 °C to 55 °C   |
| Humidity  | 15% - 95% non-condensing  |
| Altitude  | 10,000 feet (3,000 meters)  |
| <b>Environment, storage</b>                     |   |
| Temperature                                     | -25 °C to 85 °C   |
| Humidity  | 15% to 95% non-condensing   |
| Altitude  | 50,000 feet (15,000 meters)                                       |
| <b>Physical</b>                                 |   |
| Weight  | 2.75 oz (78 g), plus connector weight                             |
| Size  | 1.6" (40 mm) diameter by 2.25" (57 mm) long plus connector length |

<sup>1</sup> Error term definitions: Mm (Mismatch); CF (Cal Factor); N (Noise); L (Linearity); T (Temperature); Z (Zero Offset). All error terms are converted to percentages for RSS calculation.

<sup>2</sup> Use the following formula to determine Zero Offset error (%):  $Z = (\text{Zero Offset Power} / \text{Measured Power})100$ .

<sup>3</sup> Linearity and Zero Offset are measured as a combined specification as LadyBug sensors require no meter zeroing or reference calibration before use.

**LB5XXA PowerSensor+ Outline Drawings**  
(dimensions are inches +/- 0.01)



**LB589A USB PowerSensor+™**  
Data Sheet



Revisions to data sheet by date:

03/19/09:

1. Accuracy updates: linearity, noise; add zero offset.
2. Delete effective sample rate.
3. Add revision page.
4. Add mechanical outline drawings.

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