LB679A CW and Pulse (Modulation) USB PowerSensor+™

Data Sheet

Key PowerSensor+™ Specifications

50 MHz to 20 GHz

- 40 dBm to +20 dBm

2.8% Total Error*

1.20:1 VSWR (-21 dB Return Loss)

* Measuring a well matched DUT (-20 dBm @ 2 GHz)

Key PowerSensor+™ Capability

Pulse (Modulation) Power Measurements: *Duty Cycle, Measured Pulse Power, Peak Power, Crest Factor*

CW and Average Measurements: *Average Power, Duty Cycle-Corrected Pulse Power, Data Logging*

Description

The PowerSensor+™ is an easy to use high performance, general purpose and pulse (modulation) power meter and sensor in one. High speed measurements and temperature compensated accuracy provide superior in-class performance. These instruments are suitable for making real time scalar analyzer measurements with 2000 readings per second.

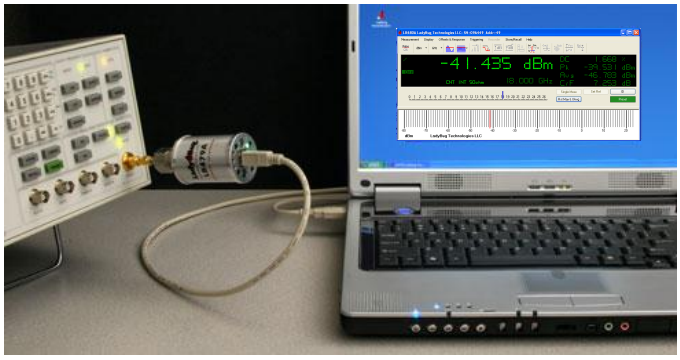
Get up and running quickly with the CW/Avg and Pulse power meter panels. Easily Integrate the power sensors into Lab View, C, VB and other programming environments using the supplied drivers and programming examples.

Integration and usability are further simplified because calibration and zeroing are not required before use and, you have the flexibility of selecting from a variety of connector types including SMA, and N. Contact LadyBug Technologies for 3.5 mm.

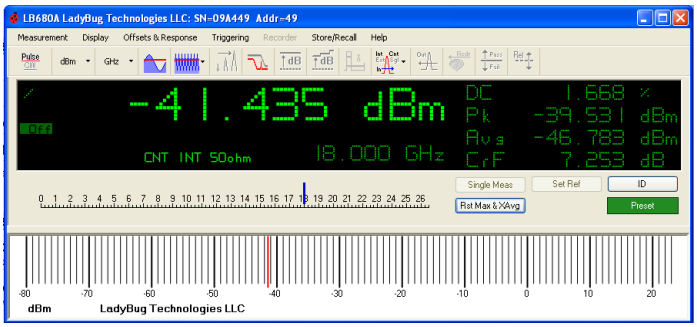
Unlike other CW sensors, the LB679A can make a variety of Peak and Pulse Power measurements often found in power measurement solutions costing well over $10,000.

Features

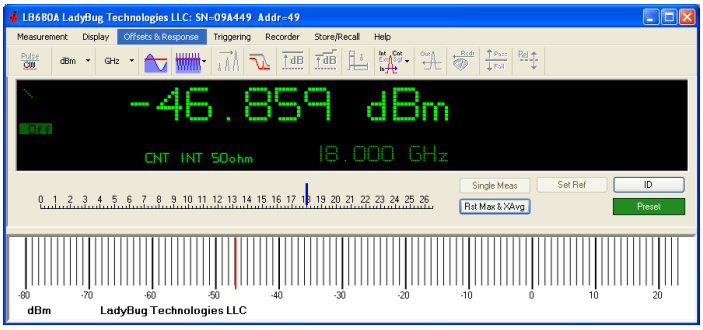
- Superior in-class price
- Superior in-class performance
- Fast - 10 to 100 times faster than competitive sensors
- Compact - 1/10 the volume of competitive sensors
- Ruggedized USB connector - does not fatigue or break like competitive sensors
- Trigger on RF input levels
- Fully calibrated over temperature



Test Setup for One Sensor Measurements



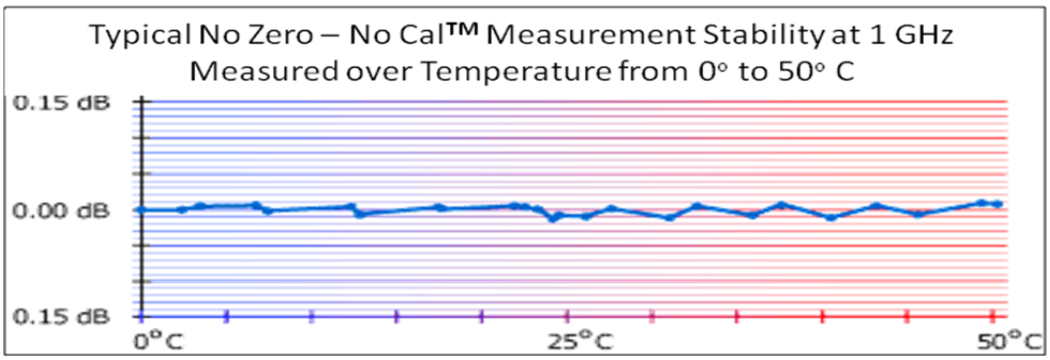
Pulse Power Panel



CW/Avg Power Panel

Applications

- General purpose scalar measurements
- General average and pulse 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 & development, and manufacturing
- Maintenance, repair, installation, and service
- Radar, wireless, satellite, radio links, etc.



LB679A PowerSensor+™ Specifications

Parameter	LB679A
Frequency Range	Type N: 50 MHz to 18.6 GHz (Useable to 20 GHz) SMA & 3.5 mm: 50 MHz to 20 GHz
Dynamic Range	
50 MHz to 20 GHz	-40 dBm to +20 dBm
Accuracy	Total Error (RSS) = $\sqrt{(Mm^2 + CF^2 + L^2 + N^2 + T^2 + Z^2)}$ *Note 1*
Calibration Factor	NIST traceable
(Type N)	
50 MHz to 500 MHz	4.0%
500 MHz to 10 GHz	1.7%
10 GHz to 18.6 GHz	1.9%
(SMA & 3.5 mm)	
50 MHz to 500 MHz	4.0%
500 MHz to 12.5 GHz	2.6%
12.5 GHz to 18 GHz	3.2%
18 GHz to 20 GHz	3.5%
Linearity *Note 3*	
(50 MHz to 100 MHz)	
+15 to +20 dBm	7.0%
+5 to +15 dBm	5.0%
-20 to +5 dBm	5.0%
-30 to -20 dBm	5.0%
-40 to 30 dBm	5.0%
(100 MHz to 2 GHz)	
+15 to +20 dBm	7.0%
+5 to +15 dBm	5.0%
-20 to +5 dBm	3.0%
-30 to -20 dBm	3.0%
-40 to 30 dBm	3.0%
(2 GHz to 20 GHz)	
+15 to +20 dBm	6.0%
+5 to +15 dBm	4.0%
-20 to +5 dBm	2.0%
-30 to -20 dBm	2.0%
-40 to -30 dBm	2.0%
Noise	5 second integration
(-30 to +20 dBm)	
50 MHz – 20 GHz	0.25%
(-40 to -30 dBm)	
50 MHz – 18.6 GHz	0.50%
Zero Offset *Note 3*	
50 MHz – 500 MHz	{[(200 nW @ 25ºC) + |ΔT| x (10 nW / ºC)] ± 10 nW / month} *Note 2*
500 MHz – 20 GHz	{[(100 nW @ 25ºC) + |ΔT| x (5 nW / ºC)] ± 5 nW / month} *Note 2*

LB679A PowerSensor+™ Specifications (continued)

Parameter	LB679A
Accuracy (continued)	
Match	
(Type N)	
50 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 18.6 GHz	1.29:1 VSWR (18 dB Return Loss)
(SMA & 3.5 mm)	
50 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 20 GHz	1.29:1 VSWR (18 dB Return Loss)
Temperature (ºC)	
40 - 50	2.50%
30 - 40	1.25%
20 - 30	0.00%
10 - 20	1.25%
0 - 10	2.50%
Maximum Average Power	+20 dBm (100 mW)
Damage Level	+23 dBm (200 mW)
Maximum Pulse Power	+20 dBm (100 mW)
Damage Level	+23 dBm (200 mW)
Maximum Peak-to-Average Ratio	
50 MHz to 20 GHz	55 dB
Internal Video Bandwidth	10 MHz
Time Base	+/- 50 ppm
Effective Sample Rate	48 MS/second
Measurements	2000/second
Pulse (Modulation) Power Measurements	Duty Cycle, Measured Pulse Power, Peak Power, Crest Factor (Peak-to-Average Ratio)
Average Power Measurements	Average Power, Duty Cycle-Corrected Pulse Power, Data Logging

LB679A PowerSensor+™ Specifications (continued)

Parameter	LB679A
Trigger	Option 003
Resolution	2 us
Modes (GUI)	Single, Continuous
Source	External
Input	TTL compatible, rising or falling edge
V_{IH}, minimum high-level input	2.0 V at +/- 10 uA
V_{IL}, 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_{OH}, minimum high-level output	4.6 V at 1 mA
V_{OL}, 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
Recorder Out	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
Bandwidth	3 Hz typical
Connector type	SMB male (shared with trigger input)
Recommended Calibration Cycle	1 year
Environment, operating	
Temperature	0 ºC to 55 ºC
Humidity	15% - 95% non-condensing
Altitude	10,000 feet (3,000 meters)
Environment, storage	
Temperature	-25 ºC to 85 ºC
Humidity	15% to 95% non-condensing
Altitude	50,000 feet (15,000 meters)
Physical	
Weight	3.3 oz (94 g), plus connector weight
Size	1.6” (40 mm) diameter by 2.8” (72 mm) long plus connector length

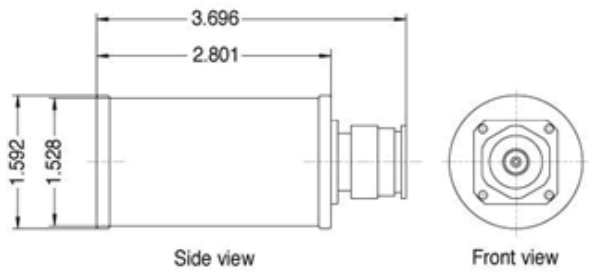
[1] Error term definitions: Mm (Mismatch); CF (Cal Factor); N (Noise); L (Linearity); T (Temperature); Z (Zero Offset). All error terms are converted to percentages for RSS calculation.

[2] Use the following formula to determine Zero Offset error (%): Z = (Zero Offset Power / Measured Power)100.

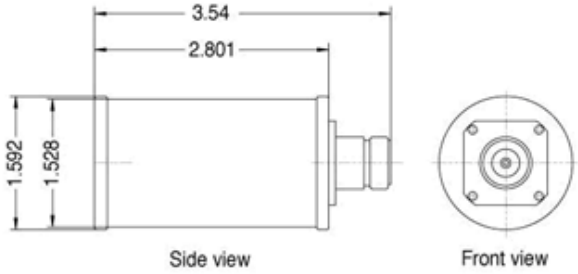
[3] Linearity and Zero Offset are measured as a combined specification as LadyBug sensors require no meter zeroing or reference calibration before use.

LB6xxA PowerSensor+ Outline Drawings
(dimensions are inches +/- 0.01

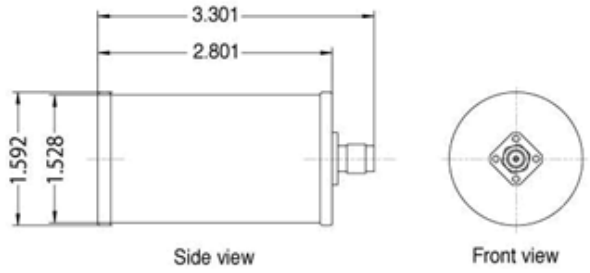
Type N Male



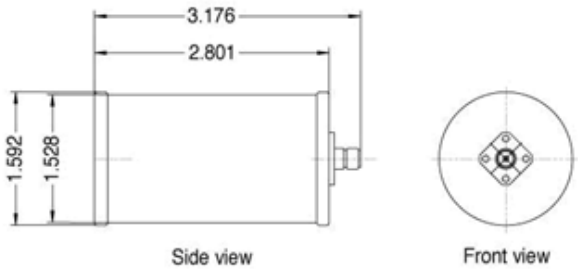
Type N Female



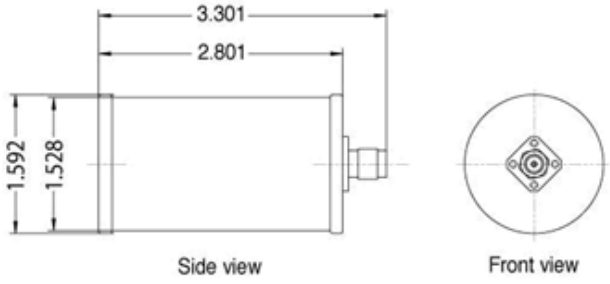
SMA Male



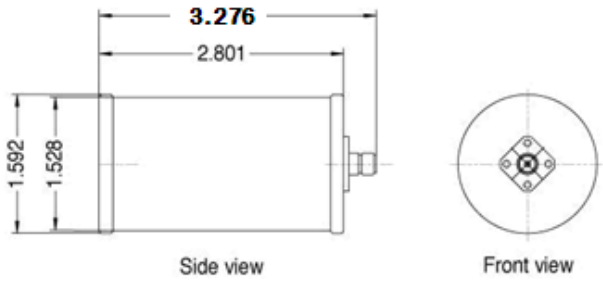
SMA Female

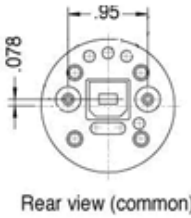


3.5 mm Male



3.5 mm Female





Revisions to data sheet by date:

06/25/10:
1. Final Specifications

06/01/12
1. Add 3.5 mm connector
2. Add temperature sensitivity graph
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