

4027A

PRECISION POWER SENSORS FOR PRECISION PROCESS APPLICATIONS

- Achieves tighter, more consistent RF power measurements for improved yield.
- $\pm 1\%$ accuracy at specified calibration frequencies and power levels.
- Direct, plug-in operation with the industry standard Bird Model 4421 RF Power Meter.
- Multiple sensors provide for measurement of 0.3W to 10kW over a 250kHz to 60MHz frequency range.

Let Bird® Be an Extension of Your RF Design Team!

The Bird® Engineering Design Team provides **over 250** years of collective RF Engineering experience.

Our R & D / Design Engineers focus on **leading edge** technology, product **integrity** and **quality** control.

We have the **expertise** to provide a **standard** or **custom** product to suit an environment or a specific design application.

Bird® Electronic Corporation **designs** and **manufactures** a diverse range of products, from RF power meters and antenna analyzers to high power RF load resistors. This broad product offering requires an equally diverse design skills base.



Bird's new **4027A Series Power Sensors** represent a family of sensors for use in semiconductor processing and other precision process applications. Intended for use with the industry standard Bird Precision Laboratory Power Meter Model 4421, these products provide a threefold improvement in long-term unit-to-unit accuracy.

Application:

Periodically, power delivery systems used in semiconductor wafer processing must be calibrated against an accurate RF power standard, incorporating a highly repeatable laboratory standard power meter. This calibration is used to correct for drift in the system power sensor. Typically, these calibration standard power meters are accurate to within $\pm 3\%$ of reading, with measurement-to-measurement repeatability on the order of $\pm 1\%$. Although these parameters are quite good, the semiconductor industry is requiring better performance from calibration systems, particularly in the area of long-term unit-to-unit uniformity and measurement repeatability. These more stringent system calibrations result in the best possible fab yields.

Improvements in calibration system accuracy and long-term repeatability have a direct effect on process yields. The effects of RF calibration setpoint accuracy on process yields is related to the consistency with which the same amount of RF energy is applied to an etch process over many cycles. Generally, there is not a great deal of drift in the calibration sensor setpoint over time, but it is easy to see how the RF power delivery to the etch chamber could be affected if two different calibration sensors, differing by as much as 6% were used to calibrate the RF generator.

This new family of power sensors allows for the tightening of the RF power calibration window from 6% to 2%. At the same time, these new techniques greatly reduce the possibility of time-related setpoint drift problems.

Ordering Information:

Order these new power sensors according to the frequency range and operating power level of your fabrication system. See the specification table for frequency ranges and power levels.



SPECIFICATIONS

4027A

Power Measurement:

Accuracy:	±1% of reading at calibration frequencies and power levels; ±2 % over entire frequency and power range.
Calibration Power Level:	1000W units: 700 watts. 10kW units: 1700 watts.
Uniformity:	2 % maximum unit to unit, at calibration frequency and power levels.
Speed:	2 readings per second.
Maximum Power:	10 kW units - 12 kW max 1 kW units - 1.2 kW max

Connectors: *Customer Specified

Power Requirements:

External DC: 12 Vdc, supplied from Multifunction Power Meter.

Physical Specifications:

Dimensions: 5-7/32" L x 2-1/2" W x 3-1/4" H.
Weight: 1 lbs. 11 oz. (0.76 kg).

Environmental Specifications:

Operating Temperature: 15° to 35°C (59° to 95°F).
Storage Temperature: -40° to 80°C (-40° to 176°F).
Humidity: 95% ± 5% maximum (non-condensing).
Altitude: Up to 10,000 feet (3,048 m).
General EMC: Designed to carry CE mark (with immunity exception noted below).
Emissions: EN-55011, 1991, Class B.
Immunity: EN-50082-1, 1995.
Safety: EN-61010, 1993 in accordance with Council Directives 73/23/EEC and 93/68/EEC.
Calibration Cycle: 1 year. Performance before and performance after data to be supplied for units.

Model	Power Range	Frequency	VSWR Range	Directivity	Insertion Loss
4027A12M	300 mW to 1 kW	10-15 MHz	1.0 to 2.0	28 dB	<0.05 dB
4027A250K	3 W to 10 kW	250-400 kHz	1.0 to 2.0	28 dB	<0.05 dB
4027A400K	3 W to 10 kW	400-550 kHz	1.0 to 2.0	28 dB	<0.05 dB
4027A800K	3 W to 10 kW	800-950 kHz	1.0 to 2.0	28 dB	<0.05 dB
4027A2M	3 W to 10 kW	1.5-2.5 MHz	1.0 to 2.0	28 dB	<0.05 dB
4027A4M	3 W to 10 kW	3-5 MHz	1.0 to 2.0	28 dB	<0.05 dB
4027A10M	3 W to 10 kW	10-15 MHz	1.0 to 2.0	28 dB	<0.05 dB
4027A25M	3 W to 10 kW	25-30 MHz	1.0 to 2.0	28 dB	<0.05 dB
4027A35M	3W to 10 kW	35-45 MHz	1.0 to 2.0	28 dB	<0.05 dB
4027A60M	3W to 6kW	45-65 MHz	1.0 to 2.0	28 dB	<0.05 dB

Also available - Standard 4020 series 4021 (300mW-1kW, 1.8-32 MHz), 4022 (300mW-1kW, 25-1000 MHz), 4024 (3W-10kW, 1.5-32 MHz), and 4025 (3W-10kW, 100-2500 MHz). ±3% of reading accuracy and 28 dB minimum directivity.

If you need assistance in selecting products from our standard 4020-series sensor line, please contact a sales engineer at Bird Electronic Corporation.

*For connector options, please refer to our catalog or contact sales at 866.695.4569 / sales@bird-electronic.com



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