

Overview

This compact module is excellent for converting AC power to a measurable and stable DC voltage with an output voltage that can be higher than 70V and an output current up to 10mA depending upon the load and input drive level. Operating over an extremely wide range of frequencies, it can convert AC signals from 1Hz-450MHz to a DC voltage and is ideal for converting piezo-electric signals to a DC voltage. When connected to an antenna or coupler, the module can extract power from AC sources such as switching power supplies, 50-60Hz power lines, low-band mobile phone signals and many other electromagnetic sources. The optimal frequency range for this module is 50Hz...450MHz. At frequencies above and below this range the response rolls off but still provides a useable voltage up to 1GHz but with reduced efficiency.

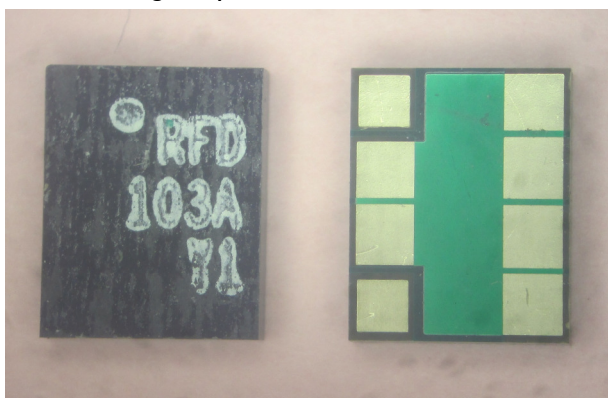
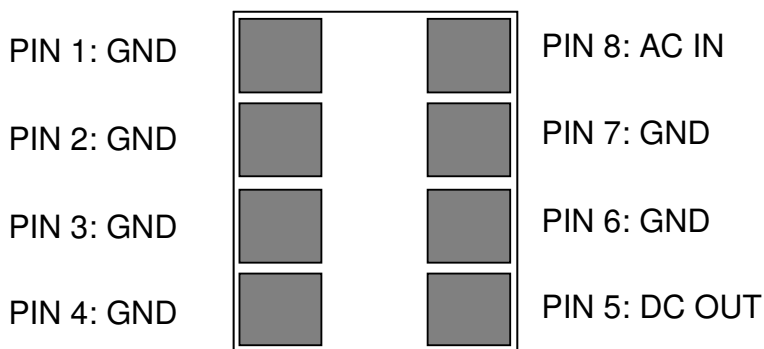
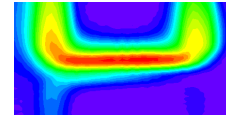


Figure 1. RFD103A module photo. Pin pitch is 2.5mm along the Y-direction making it easy to test with one 0.1" pitch 4-pin DC header.



Top View

Figure 2. RFD103A 8.0mm x 10.0mm AC energy harvesting module.



Electrical Properties

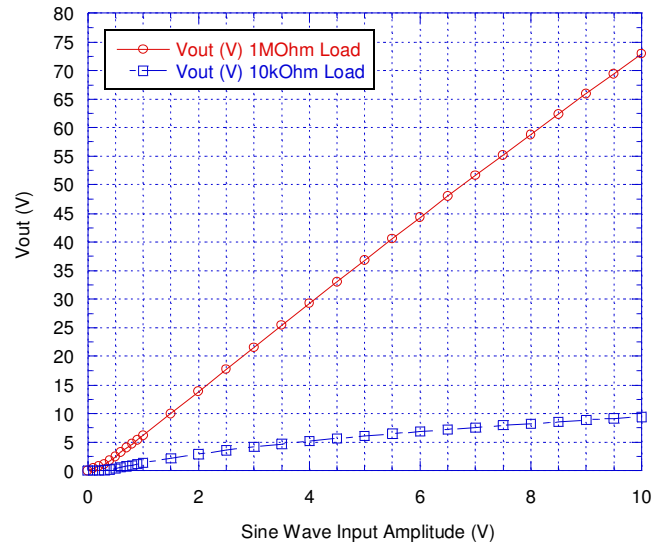


Figure 3a. Output voltage vs. input voltage amplitude with a 50Hz sine wave into a 1MOhm and a 10kOhm load.

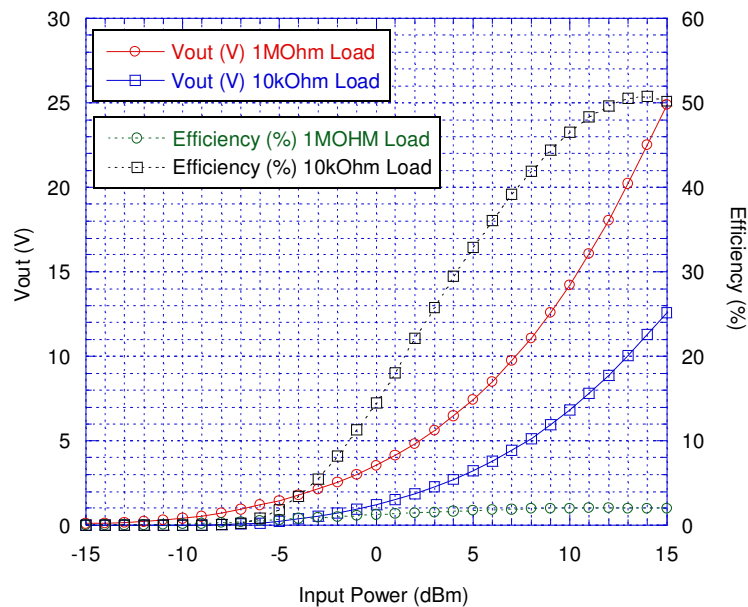


Figure 3b. 10MHz output voltage and efficiency with a 1MOhm and 10kOhm load versus input power (dBm).

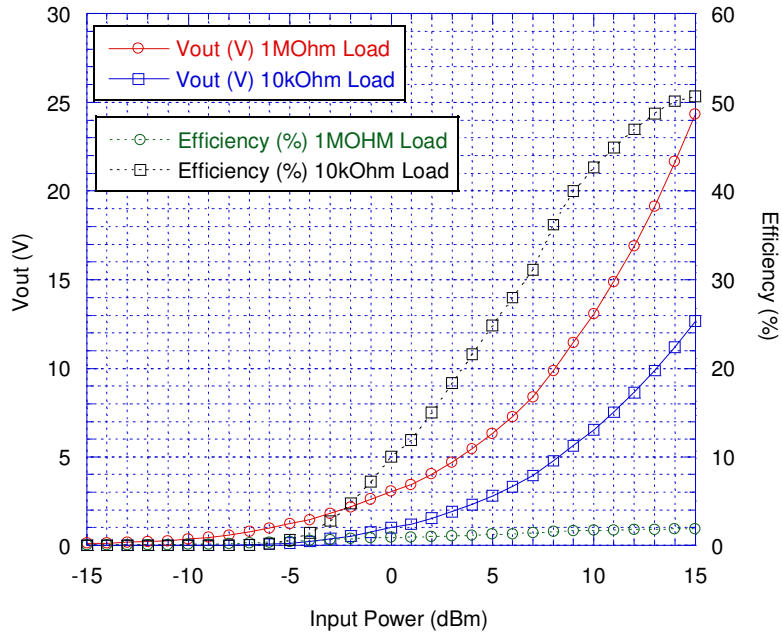
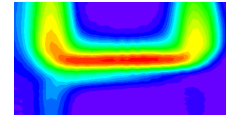


Figure 3c. 100MHz output voltage and efficiency with a 1MOhm and 10kOhm load versus input power (dBm).

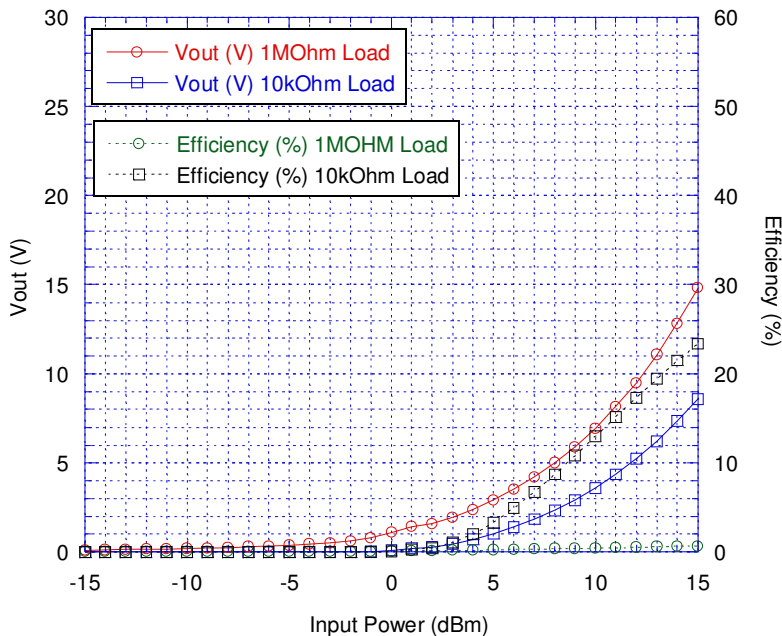
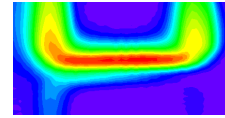


Figure 3d. 450MHz output voltage and efficiency with a 1MOhm and 10kOhm load versus input power (dBm).



PCB Footprint

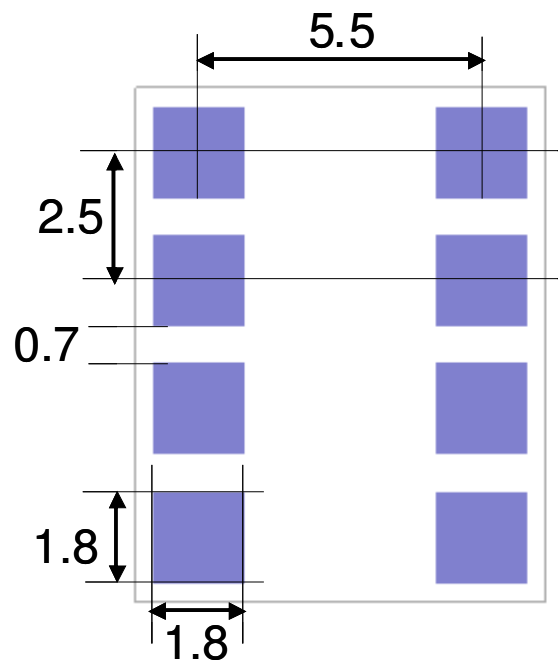


Figure 4. Recommended PCB footprint. Package size is 8mm x 10mm. Dimensions are in millimeters.

Pin 5	Pin 8	Pins 1, 2, 3, 4, 6, 7
DC Output	AC Input	Ground

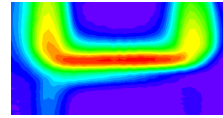
Evaluation

The RFD103A can be evaluated using soldered wire connections to the module or by using a 4-Pin 0.1" pitch DC header soldered to the bottom of the module.

RFD103A

1Hz to 450MHz AC to DC Converter

8.0 x 10.0mm AC to DC converter



RF Diagnostics, LLC

Additional Technical Information

Maximum Ratings and Output Voltage Protection

The RFD103A includes the following features:

- +/-10V maximum on the AC input line.
- An external Zener diode is recommended for use with the RFD103A to protect the application circuit.
- -0.5V/+75V maximum on the DC output pin.
- Maximum output current is 10 mA.
- Exceeding the above limits can cause partial or permanent module damage.

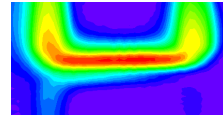
Other Comments

The recommended load on the DC output is 10-20 kOhm for maximally efficient power transfer.

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1Hz to 450MHz AC to DC Converter

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Disclaimer

This module is guaranteed to be defect free upon shipment. However the module is not intended for use in critical applications such as medical devices, automotive safety, or anywhere else where poor performance can result in injury, loss of life or property. The user agrees to assume all risks arising from use of the module and releases RF Diagnostics from all liability for its malfunction or misuse.

Specifications listed on datasheets are subject to change without notice.

Datasheet Revision: 3-10-2016