



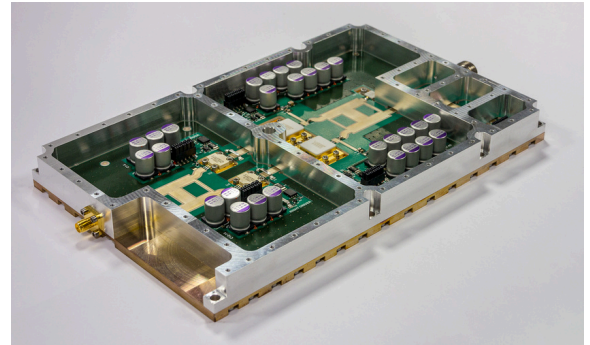
RF Module Design Services

MMIC, RFIC and microwave/mmWave module design specialists

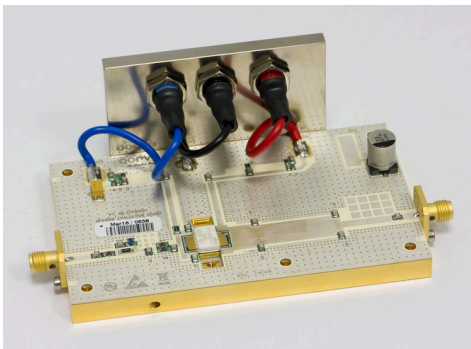
PRFI Ltd. is a UK-based design house specialising in the design and development of RFICs and MMICs, and microwave/mmWave modules. Projects range from feasibility studies to the design and development of microwave ICs, components and sub-systems. Our offices and labs are located near Cambridge, in the UK.

Design Experience

PRFI has a dedicated design team with extensive knowledge in developing RF modules and PCBs, ranging from connectorized evaluation boards based on single unmatched GaN transistors to high gain multi-stage PA modules using multiple devices combined in parallel to increase RF output power. We have designed all aspects of RF modules including RF PCBs, mechanical housings, and control boards. We design our modules for high RF performance, long-term reliability and low SWaP-C (size, weight, power and cost). Biasing circuitry is included for bias sequencing and generation of negative voltages for depletion mode devices where necessary.



1kW pulsed RF PA module for S-band



L-band 125W GaN-on-SiC Power Amplifier with PAE of up to 70%

Module Test & Measurement

PRFI can test prototype RF modules and PCBs up to 50GHz in its in-house lab. This includes high power testing up to 1kW pulsed, measurement versus temperature, and linearity measurements.

PCB Fabrication & Assembly

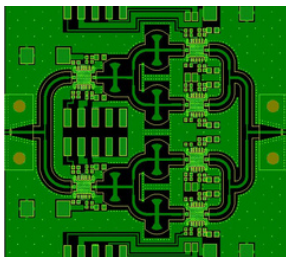
PRFI works closely with selected PCB manufacturers and assembly houses to develop prototype modules which can be taken forward to volume production.

Publications

A selection of PRFI's free-to-download technical papers on RF module design include:

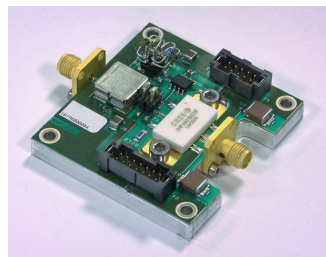
- [The Design of an L-band 125W GaN PA](#)
- [High Power GaN SSPA Module Development](#)
- [5W X-Band GaN Power Amplifier Using a Commercially Available Discrete Plastic Packaged SMT Transistor](#)
- [Broadband L-band 160W GaN PA SMT Packaged Transistor \(QPD1013\)](#)

Design Examples



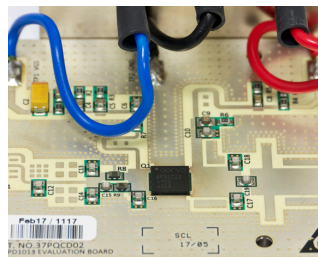
Ka-band 20W Module

4-off GaN-on-SiC MMIC power amplifiers (also designed by PRFI) were incorporated on a PCB to produce a total output power of 20W. A two-stage design produced 25dB gain in a compact form factor.



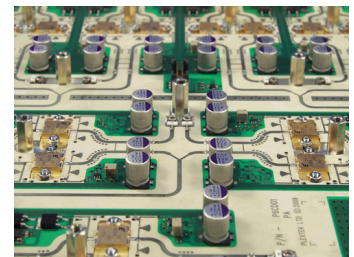
CubeSat Propulsion

A two-stage RF module optimised for compactness and reliability was deployed in the client's CubeSat application. Commercial GaAs and GaN devices were cascaded to provide a high power, high gain solution.



Discrete GaN PAs

PRFI designed a range of discrete GaN transistor-based PCBs for Qorvo using both copper coin and solid copper via technology at L-, S-, and X-band. Power levels were up to 160W with efficiencies of 70% PAE.



200W X-band Radar PA

PRFI was commissioned to replace a magnetron-based PA with a solid-state PA. This involved undertaking parts of the radar system design as well as the complete development of a 200W solid state PA.

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