

Spatium® SSPAs and Applications

Introduction

This document provides a list of frequently asked questions (FAQ) about our patented Spatium solid-state power amplifier (SSPA) product line. This FAQ is to assist potential users in understanding SSPA technology, input and output requirements and a high-level functional description. If this FAQ does not answer your questions, or you have application/platform specific questions, please contact your local FAE or Qorvo® sales office. These professionals will arrange to have your questions answered via email or via a customer specific teleconference with the Spatium SSPA engineering team.

Question/Answer

1. **What is a Spatium SSPA?**

Spatium is the Qorvo brand name for our family of SSPAs that use highly efficient spatial combining. Frequency bands of operation include 2-18 GHz, 8-11 GHz, 18-40 GHz, 32-38 GHz and others. Output power levels can be as high as 750W CW.

2. **Can Spatium SSPAs replace traveling-wave tubes (TWT)?**

Yes. In most cases, the Spatium SSPA products are a preferred alternative to using legacy TWT products, specifically in terms of reliability and maintainability.

3. **Are Spatium SSPAs more expensive than TWTs?**

Qorvo believes that the overall SSPA system total cost of ownership (TCO) is far more cost-effective with greater reliability, mean time between failure (MTBF), lower power supply costs and ease of repair and maintenance.

4. **What kind of applications are best suited for Spatium SSPAs?**

Spatium SSPAs are high-performance products designed to operate in most conditions and are capable of withstanding harsh environments (temperature, shock, vibration, acceleration) typically seen in defense and aerospace application conditions. Commercial and military applications include, but are not limited to radar, electronic warfare (EW), communications, instrumentation and satellite up/down links.

5. **Have Spatium SSPAs been designed into and used successfully in real-world defense applications?**

Yes. Spatium SSPA products have been deployed on front line applications, flown missions and performed to design specifications in very harsh environments.

6. **Are Spatium SSPAs commercial off the shelf (COTS)?**

Yes. Qorvo offers many standard Spatium SSPAs, used in both commercial and military applications, that are available from our standard product inventory. We also offer customer-specific services for those customers requiring specific needs.

7. **Can Spatium SSPAs be purchased through a distributor?**

Yes. Qorvo works with several global distributors who are authorized to stock and ship these commercially available standard products to customers within their regions.

8. **Do Spatium SSPAs require specialized training to operate or maintain?**

No. The operation and maintenance of Spatium products require minimal training and are supported via Qorvo applications engineering.

9. Are Spatium SSPAs space qualified?

Qorvo has not yet attempted to space qualify the Spatium technology.

10. Are sample/demo units available for Spatium SSPAs?

Yes. For qualified customers, a sample/demo unit will be made available for customers' demonstration and/or evaluation purposes. Contact your local Qorvo sales office to inquire about these units.

11. What happens if a MMIC used on the Spatium SSPA blade fails or is degraded?

When a MMIC fails within a Spatium SSPA, the combined output power is reduced proportionally. Hence the graceful degradation feature allows the equipment to stay operational as opposed to abruptly failing during a mission.

12. What connectors can be applied to the Spatium SSPA?

The input connector is generally coaxial (SMA, TNC, etc.), and the output connector is coaxial or waveguide, depending on the product or part number. Check the standard product data sheet for exact connector usage.

13. Do Spatium SSPAs operate in both CW and pulsed conditions?

Yes. They are designed to incorporate MMIC HPAs that operate under a full range of duty cycles. CW and/or pulsed operation are product dependent.

14. What is the "fast pulse" feature and how does it work?

The fast pulse feature is a means for designers to design their system in which the RF source remains "on" while drain pulsing the Spatium SSPA as opposed to pulsing the RF source without gating the drain.

15. Under what environmental conditions can Spatium SSPAs operate?

The Spatium platform is designed to operate between -40°C and +71°C clamp temperature (note: temperature range is dependent on thermal environmental/dissipation conditions). Spatium SSPAs are ruggedized for challenging shock/acceleration/vibration D&A applications (MIL-STD-810).

The microwave platform's Spatium SSPAs (up to 20 GHz) can be made capable of operating in salt-fog conditions due to packaging and coating features and have been externally tested in operation up to 50K ft altitude.

16. What are the voltages at which Spatium SSPAs are biased?

Today's Spatium SSPAs typically operate in the 18V to 28V DC bias range. Check the standard product data sheet for voltage and power requirements.

17. How is the Spatium SSPA thermally managed?

The standard Spatium platform is provided with thermal clamps for conduction cooling. The thermal clamps require customer provided cooling via air or liquid plates to maintain a maximum surface temperature on the clamp. Please check the standard product data sheet for additional details.

18. Is there AGC or temperature compensation in the Spatium SSPA?

No. The standard Spatium platform does not provide temperature compensation or AGC. A temperature output can be provided for external monitoring.

19. Is the Spatium SSPA reconfigurable or customizable?

Off the shelf standard products are not reconfigurable or customizable. Qorvo offers customer specific services for those customers requiring very specific needs to meet very specific requirements. Contact your local sales office for terms/conditions/NRE if reconfiguration is a requirement.

20. Are Spatium SSPAs capable of being maintained by customers in the field?

No. The Spatium SSPA repair requires specialized factory equipment and techniques. Therefore, if a failure were to happen, the Spatium SSPA must be returned to Qorvo for evaluation, testing and repair. Please contact the sales manager or inside sales representative for appropriate RMA number and repair quotation prior to the shipment of a defective unit.

21. What is the warranty?

The Spatium SSPA product warranty is 1 year from date of shipment on new standard products and 90 days on repaired products.

22. Can Spatium SSPAs be exported to other countries?

Spatium SSPAs are export controlled: an export license is required before shipping to non-US destinations.

23. What frequency bands are supported by the Spatium product line?

Today, the Spatium product line supports 3 platforms: microwave (2-18 GHz), millimeter wave (18-40 GHz) and high-power microwave (X-band, Ku-band). Please visit the Qorvo website for information on each of the standard products that support these bands.

24. What is the production lead time for Spatium SSPAs?

The typical lead time is 10-18 weeks if materials are in stock, and 27-30 weeks if materials are out of stock, after receipt of order (ARO), and all terms and conditions have been agreed upon by all parties.

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

Web: www.qorvo.com

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