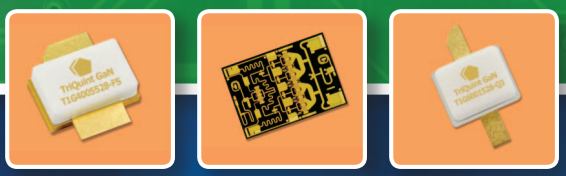
2011

Market-Tested GaN Innovation from TriQuint

Images Courtesy of Jamie Hunter / Aviacom

TriQuint Semiconductor is proud of its heritage and ongoing product innovations supporting the RF / microwave / millimeter wave needs of worldwide defense and aerospace contractors. Our success is based on trust, value, unrivaled support, and an in-depth understanding of high-power, high-frequency active devices using Gallium Nitride (GaN) and Gallium Arsenide (GaAs) technology. Our leadership continues to break new ground and establish performance benchmarks. TriQuint offers complete solutions from our standard product portfolio and a renowned, world-class GaN / GaAs Foundry.



Connecting the Digital World to the Global Network®

TriQuint SEMICONDUCTOR

Gallium Nitride Innovation

The GaN Advantage

Power densities made possible with Gallium Nitride technology range between two- and four-times that of Gallium Arsenide-based RF amplifiers. GaN technology's proven abilities to handle high current and high voltage make it an ideal choice for defense and aerospace systems including radar, communications and electronic warfare applications such as counter-IED (C-IED).

Key GaN capabilities:

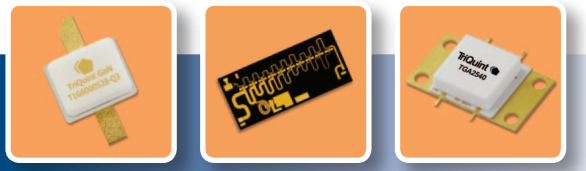
- Very high thermal conductivity
- High power density and ESD resistance
- Reliability at high junction temperatures
- Applications from UHF to W-band to THz
- Excellent noise figure – comparable to pHEMT, but at higher voltage
- Higher input serviceability

GaN Foundry & Support

As a DoD accredited 'Trusted Foundry', TriQuint offers a variety of GaN custom ASIC solutions. Our foundry services complement TriQuint's high-frequency standard product portfolio. TriQuint foundry services are centered on satisfying custom requirements with security levels up to classified. Our award-winning, highly-experienced foundry teams guide customers through each development phase, supported by the latest industry-leading design kits and modeling from ADS, AWR and DRC. For more information about GaN and GaAs foundry services, please visit us on the web at: www.triquint.com/foundry.

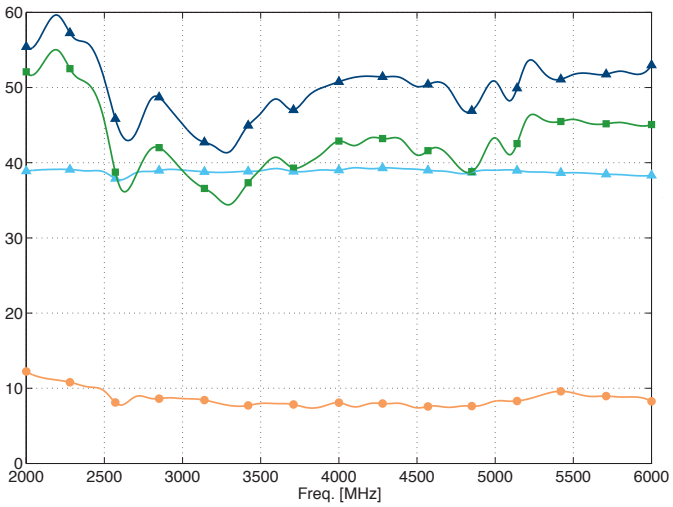
Process specifications:

- Technology: 0.25µm GaN on SiC
- Power handling: Vd up to 40V
- Operating frequencies: DC to 18 GHz
- PAE: >60% at 10 GHz
- Power density: >5.5W/mm at 10 GHz
- Reliability: 1M hours at 200C (3-temp DC MTTF w/ failure defined as 10% degradation in Idmax)



T1G6000528-Q3 2500-6000 MHz
Evaluation Fixture RF Results (3dB Compression)

Bias Condition: Vds = 28V, Idq = 50 mA



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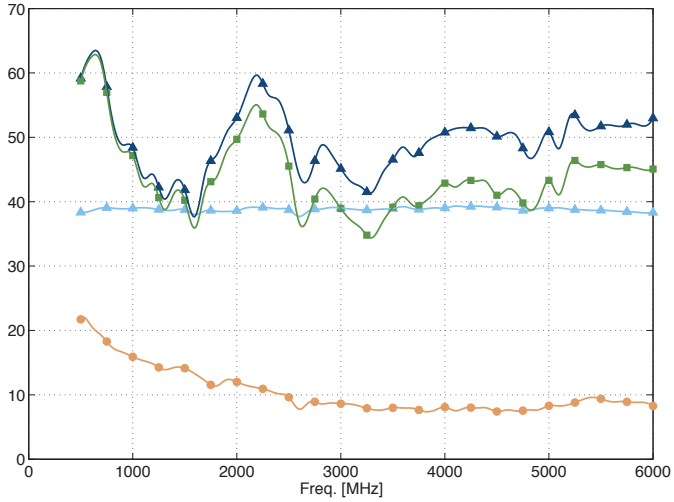


GaN Standard Product Portfolio

TriQuint's unique experience with GaN technology and long-established expertise with both GaN and GaAs power solutions enable us to offer many product options beginning with world-class / high-performance 'off-the-shelf' devices. Products include a variety of form factors and circuit types including die-level FETs, MMICs, packaged transistors and multi-chip modules.

GaN Transistors

Description	Frequency (GHz)	Psat (dBm)	LS Gain (dB)	PAE (%)	Bias (V / mA)	Package	ECCN	Part Number
1.25mm HEMT	DC - 18	37.4	10.4	52	28 / 125	Die	EAR99	TGF2023-01
2.5mm HEMT	DC - 18	40.2	9.9	50	28 / 250	Die	EAR99	TGF2023-02
5.0mm HEMT	DC - 18	43	9.4	49	28 / 500	Die	3A001b.3b	TGF2023-05
10mm HEMT	DC - 18	45.8	8.9	47	28 / 1000	Die	3A001b.3b	TGF2023-10
20mm HEMT	DC - 18	48.6	8.4	46	28 / 2000	Die	3A001b.3b	TGF2023-20
9W HEMT	DC - 6	39.5	12.5	50	28 / 50	Ceramic Flat Lead	EAR99	T1G6000528-Q3
18W HEMT	DC - 6	42.5	12	50	28 / 50	Ceramic Flat Lead	EAR99	T1G6001528-Q3
55W HEMT	DC - 3.5	47.2	12	50	28 / 200	Ceramic Flat Lead	EAR99	T1G4005528-FS

Samples / evaluation fixtures are available; call for details.

GaN Amplifiers

Description	Frequency (GHz)	Psat (dBm)	LS Gain (dB)	PAE %)	Bias (V / mA)	Package	ECCN	Part Number
10W HPA	0.03 - 3	39.5	19.5	40	30 / 360	Flange	ITAR	TGA2540-FL
20W HPA	14 - 16	43	23	>30	30 / 2000	Die	ITAR	TGA2572
20W HPA	14 - 16	43	23	>30	30 / 2000	Die on Tab	ITAR	TGA2572-TS
20W HPA	14 - 16	43	23	>30	30 / 2000	Flange	ITAR	TGA2572-FL
10W HPA	2 - 18	40	9	25	30 / 500	Die	ITAR	TGA2573
10W HPA	2 - 18	40	9	25	30 / 500	Die on Tab	ITAR	TGA2573-TS
30W HPA	2.5 - 6	45	25	>30	30 / 1400	Die	TBD	TGA2576
30W HPA	2.5 - 6	45	25	>30	30 / 1400	Flange	TBD	TGA2576-FL

Samples / evaluation fixtures are available; call for details.

GaN Switches

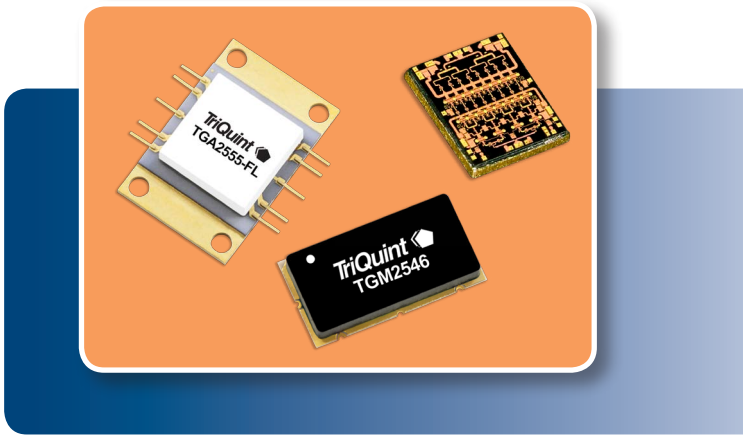
Description	Frequency (GHz)	IL (dB)	ISO (dB)	P1dB (dBm)	Voltage (V)	Package	ECCN	Part Number
High Power SPDT Switch	DC - 6	0.8	-40	>45	0 / -40	Die	EAR99	TGS2351
High Power SPDT Switch	DC - 6	0.8	-40	>45	0 / -40	5x5 QFN	EAR99	TGS2351-SM
High Power SPDT Switch	DC - 12	<1	-35	>43	0 / -40	Die	EAR99	TGS2352
High Power SPDT Switch	DC - 18	1.5	-25	>40	0 / -40	Die	EAR99	TGS2353

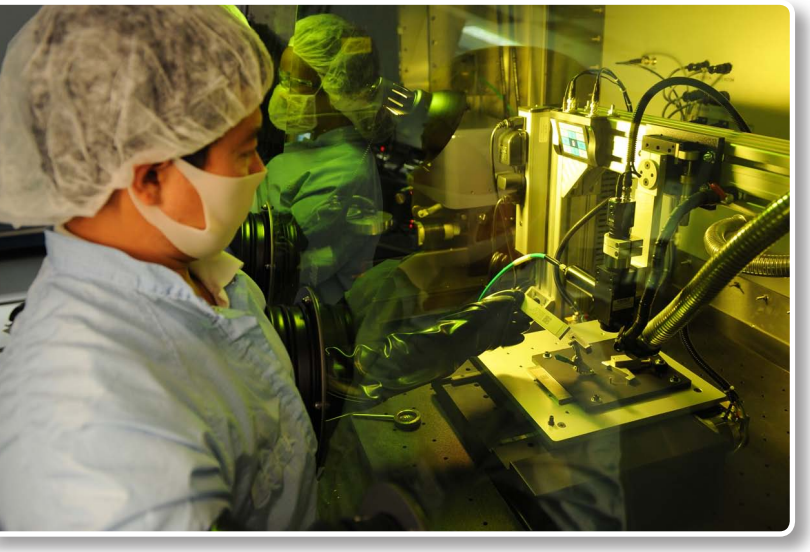
Samples / evaluation fixtures are available; call for details.

Gallium Nitride Innovation

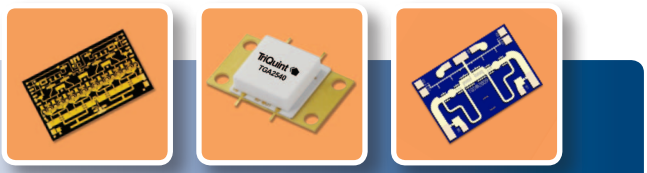
Expert Module & Packaging Services

TriQuint offers many packaging, module and die-level services that make final assembly easier and more efficient. The Advanced Microwave Module Assembly (AMMA) facility expands TriQuint's range of integrated solutions. TriQuint packaged products benefit from the same innovative and dependable manufacturing process controls that ensure reliability and functionality for our MMIC solutions. Integration – either through on-chip designs or multi-chip modules – offers greater BOM economy, overall cost savings, PCB area reduction and greater performance / efficiency.





- **One-stop convenience:** fabricate circuits, package die and test components in one secure location for shorter lead times, greater savings
- **Single- and multi-chip assembly:** integrate single or multiple die using industry-standard or custom packages
- **Experience and innovation:** ensure your program success through TriQuint's expert teams and state-of-the-art facilities
- **Die on Tab (DoT):** simplify assembly, increase yields and mitigate thermal considerations
  - Virtually void-free vacuum reflow die attach
  - 100% in-factory x-ray inspected
  - In-house RF test services



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