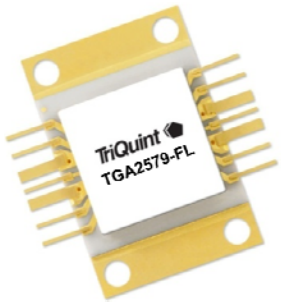
TGA2579-FL

25 Watt Ku-Band GaN Power Amplifier

Applications

- Ku-band communications



Product Features

- Frequency Range: 13.75 - 15.35 GHz
- Saturated Output Power: 44 dBm
- Power-added Efficiency: 30%
- Small Signal Gain: 32 dB
- Bias: Vd = 25 V, Idq = 1A, Vg = -3.4V typical

General Description

The TriQuint TGA2579-FL is a packaged Ku-band power amplifier fabricated on TriQuint's production-released, 0.25um GaN on SiC process. Operating from 13.75 to 15.35 GHz, the TGA2579-FL typically provides 44 dBm of saturated output power, 30% power-added efficiency and 32dB of small signal gain.

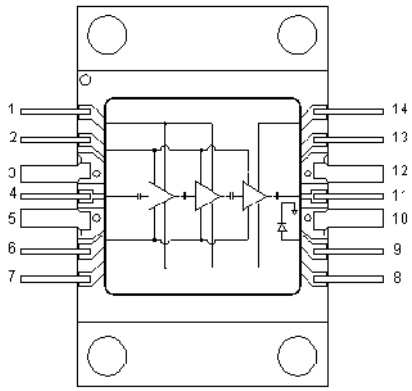
The TGA2579-FL features low loss ground-signal-ground (GSG) RF transitions designed to interface with a coplanar waveguide multilayer board.

Ideally suited for Ku-band communications, the TGA2579-FL supports key commercial and defense-related frequency bands.

TriQuint's 0.25um GaN on SiC process offers superior electrical performance through Ku-band while maintaining high reliability. In addition, the use of SiC substrates provides optimum thermal performance necessary for high power operation.

Lead-free and RoHS compliant.

Functional Block Diagram



Pin Configuration

Pin #	Symbol
1	Vd
2,6	Vg
3,5,10,12	Gnd
4	RF In
7	Vd
8	Vd
9	Vdet
11	RF Out
13	N/C
14	Vd

Ordering Information

Part No.	ECCN	Description
TGA2579-FL	3A001.b.2.b	Ku-band Power Amplifier

Specifications

Absolute Maximum Ratings

Parameter	Rating
Drain to Gate Voltage, Vd - Vg	80 V
Drain Voltage,Vd	40 V
Gate Voltage,Vg	-10 to 0 V
Drain Current, Id	4.5 A
Gate Current, Ig	-18 to 18 mA
RF Input Power, CW, 50Ω,T = 25ºC	27 dBm
Channel Temperature, Tch	275 °C
Mounting Temperature (30 Seconds)	260 °C
Storage Temperature	-40 to 150 °C

Operation of this device outside the parameter ranges given above may cause permanent damage. These are stress ratings only, and functional operation of the device at these conditions is not implied.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
Vd		25		V
Idq (no RF drive)		1.0		A
Id_drive (under RF drive)		3.5		A
Vg		-3.4		V

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions

Electrical Specifications

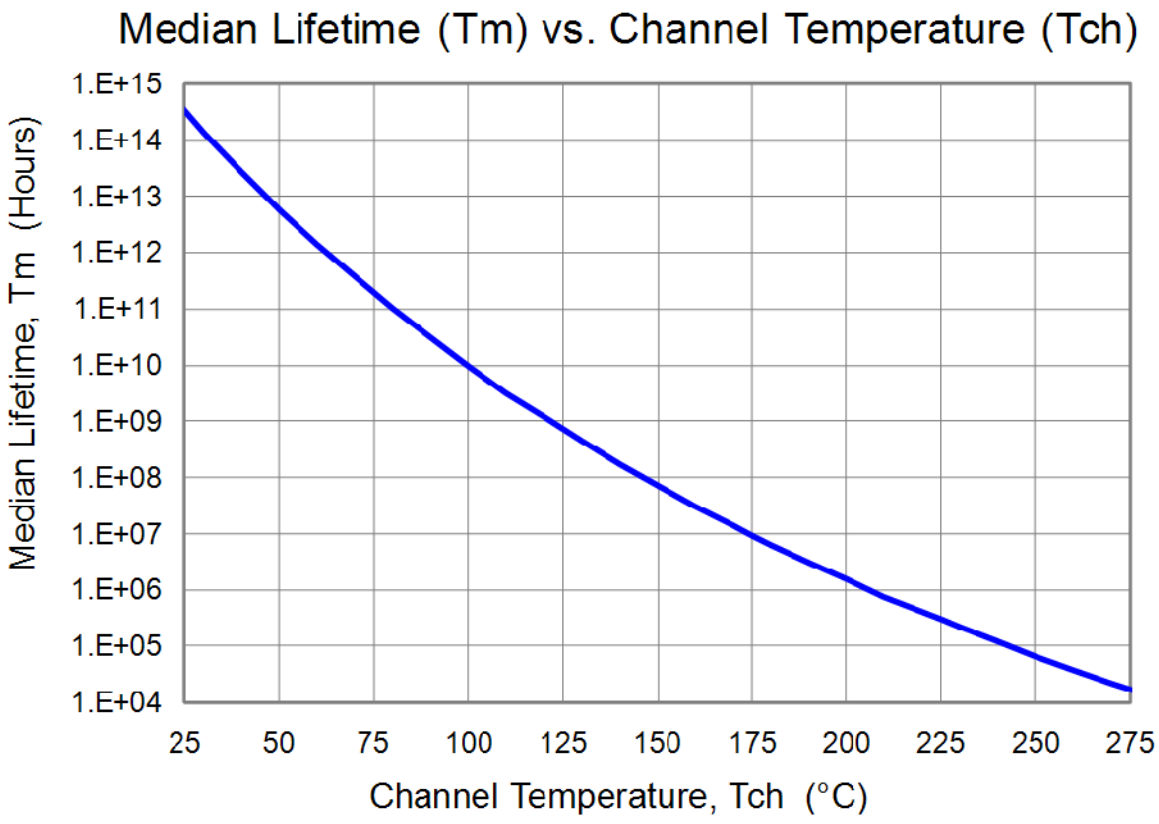
Test conditions unless otherwise noted: 25ºC, Vd = 25 V, CW, Idq = 1A, Vg = -3.4 V typical.

Parameter	Min	Typ	Max	Units
Operational Frequency Range	13.75		15.35	GHz
Small Signal Gain		32		dB
Output Power @ Saturation		44		dBm
Power-added Efficiency @ Saturation		30		%
Output TOI		48		dBm
Gain Temperature Coefficient		-0.07		dB/°C
Power Temperature Coefficient		-0.007		dB/°C

Specifications (cont'd)

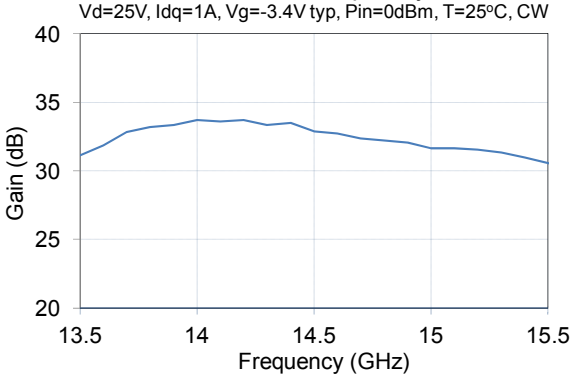
Thermal and Reliability Information

Parameter	Condition	Rating
Channel Temperature (Tch), Median Lifetime (Tm), Thermal Resistance*, no RF Drive	Tbase = 85 °C, Vd = 25 V, Idq = 1A, Pdiss = 25 W, CW	Tch = 117 °C Tm = 1.6E+9 Hours θJC = 1.3 °C/W
Channel Temperature (Tch), Median Lifetime (Tm), Thermal Resistance*, under RF Drive	Tbase = 85 °C, Vd = 25 V, Id = 3.1A, Pout = 44 dBm, Pdiss = 49W, CW	Tch = 142 °C Tm = 1.4E+8 Hours θJC = 1.2 °C/W

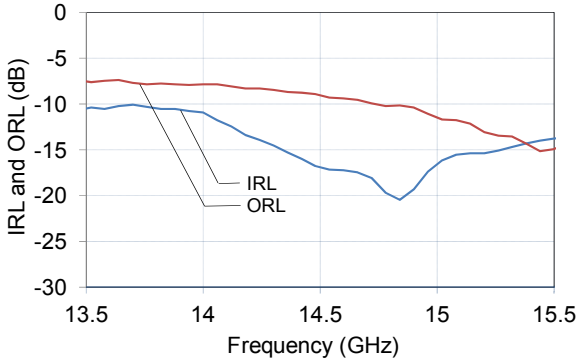


Typical Performance

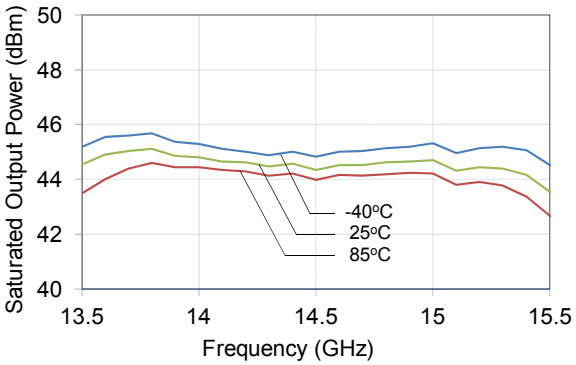
Gain vs. Frequency
Vd=25V, Idq=1A, Vg=-3.4V typ, Pin=0dBm, T=25°C, CW



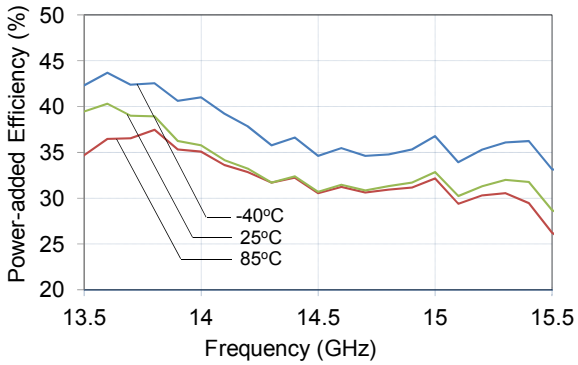
Return Loss vs. Frequency
Vd=25V, Idq=1A, Vg=-3.4V typ, T=25°C, CW



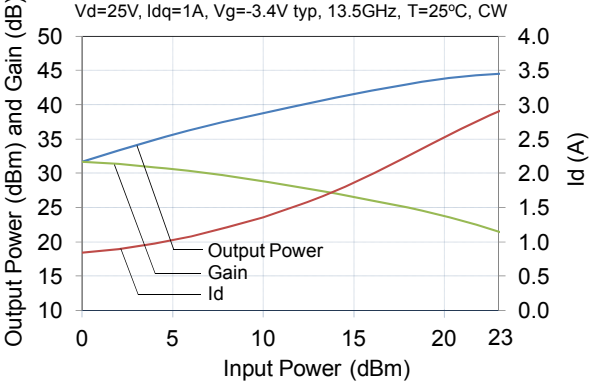
Saturated Output Power vs. Frequency
Vd=25V, Idq=1A, Vg=-3.4 typ, CW, Pin=24dBm



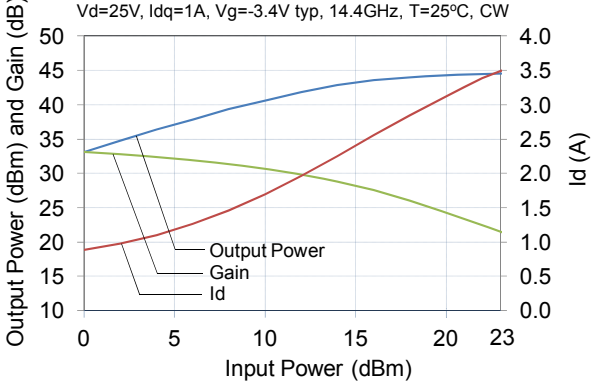
Power-added efficiency vs. Frequency
Vd=25V, Idq=1A, Vg=-3.4V typ, CW, Pin=24dBm



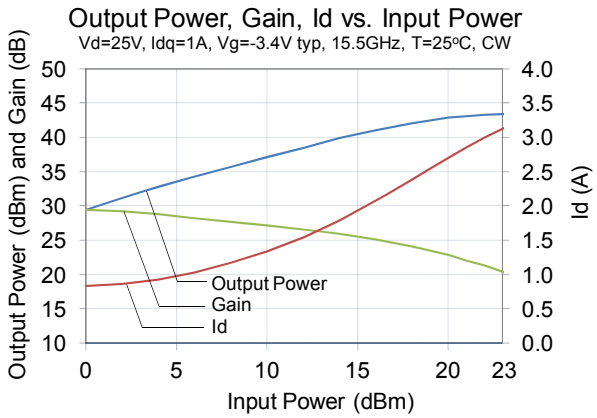
Output Power, Gain, Id vs. Input Power
Vd=25V, Idq=1A, Vg=-3.4V typ, 13.5GHz, T=25°C, CW

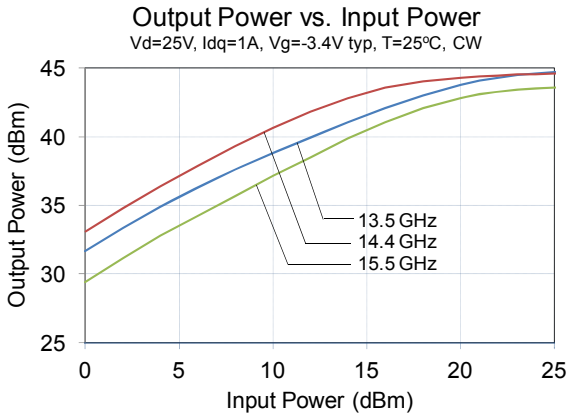


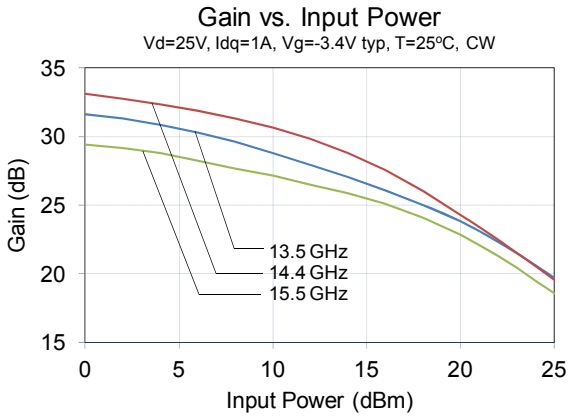
Output Power, Gain, Id vs. Input Power
Vd=25V, Idq=1A, Vg=-3.4V typ, 14.4GHz, T=25°C, CW

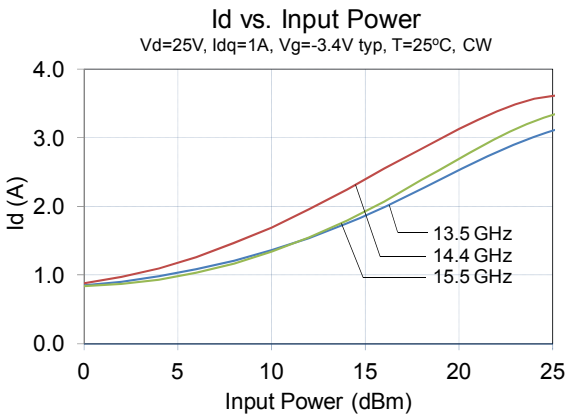


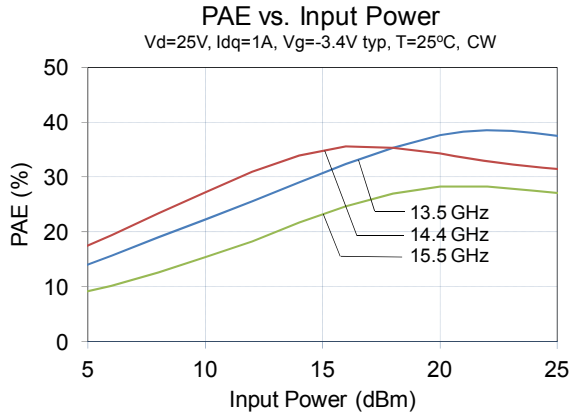
Typical Performance





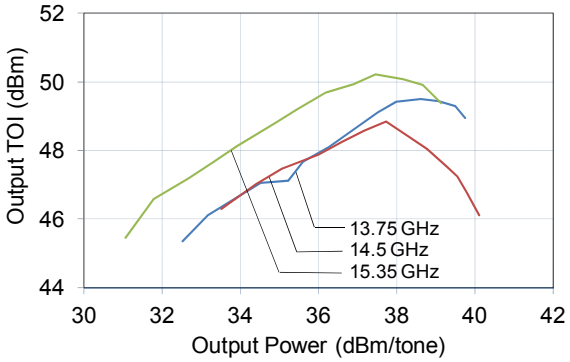




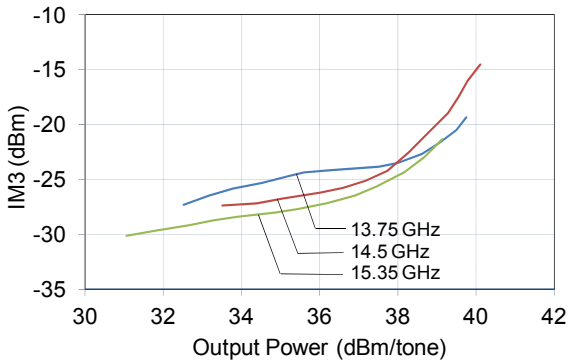


Typical Performance

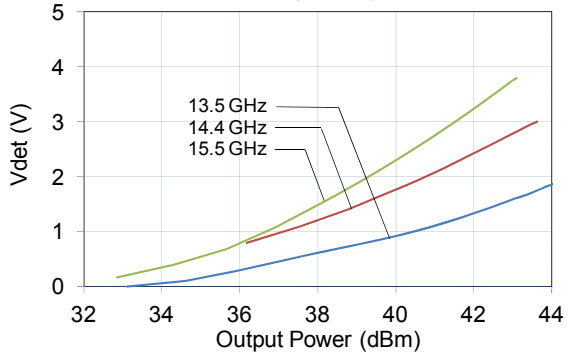
Output TOI vs. Output Power/Tone
Vd=25V, Idq=1A, Vg=-3.4V typ, T=25°C, CW



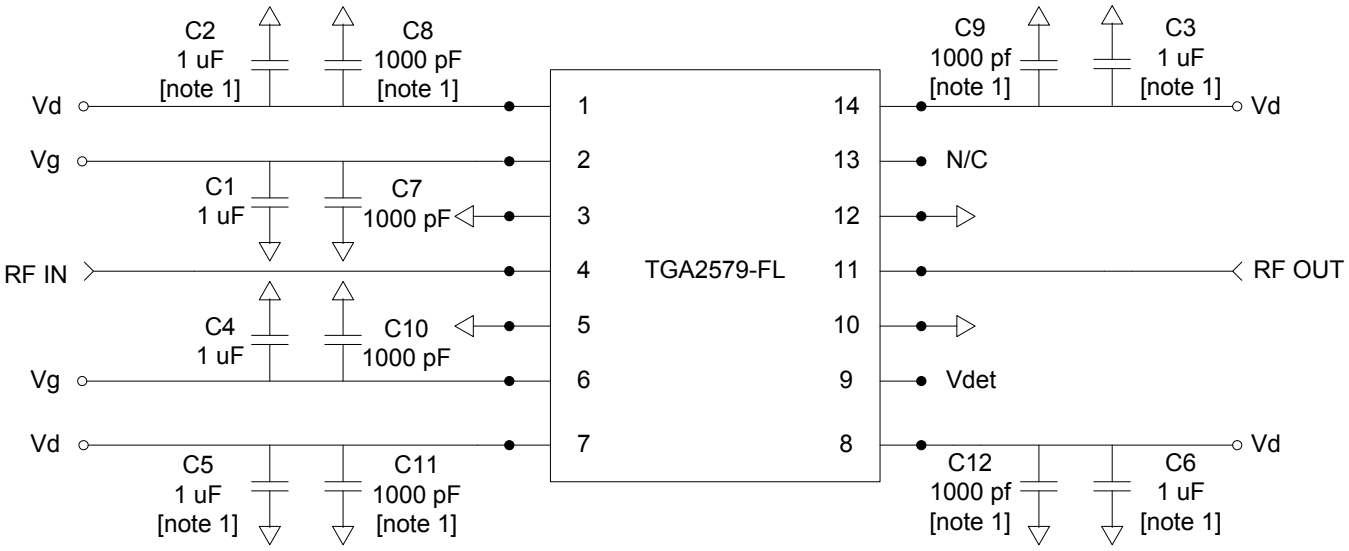
IM3 vs. Output Power/Tone
Vd=25V, Idq=1A, Vg=-3.4V typ, T=25°C, CW



Vdet vs. Output Power
Vd=25V, Idq=1A, Vg=-3.4V typ, T=25°C, CW



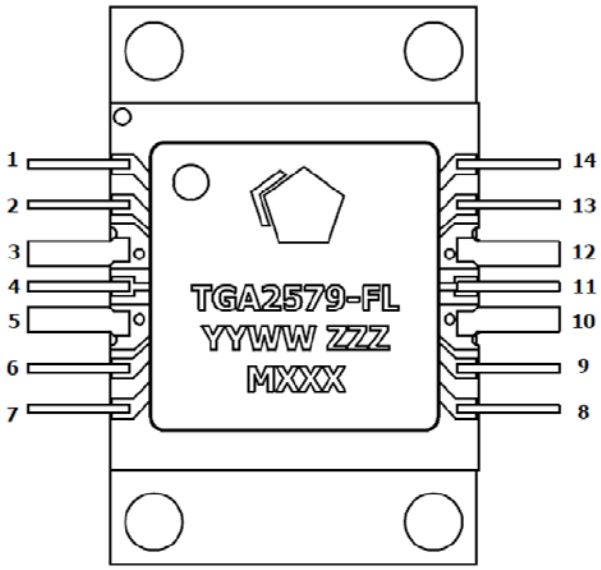
Application Circuit



Note 1: Remove cap for pulsed drain operation

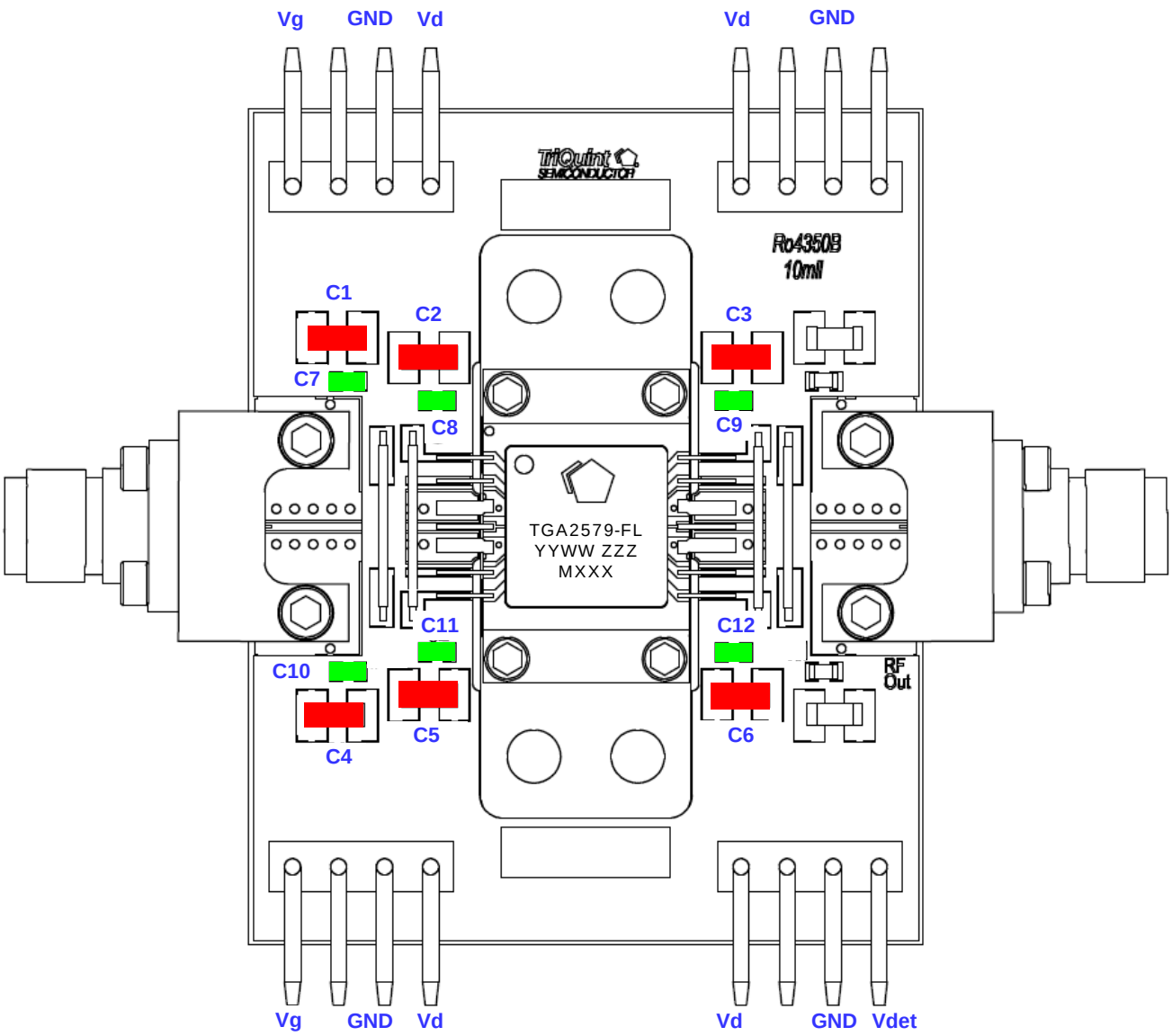
Bias-up Procedure	Bias-down Procedure
Turn Vg to –5 V	Turn off RF signal
Turn Vd (all pins) to 25 V	Reduce Vg to –5 V. Ensure Id ~ 0 mA
Adjust Vg more positive until quiescent Id is 1.0 A. This will be Vg ~ -3.4 V typical	Turn Vd (all pins) to 0 V
Apply RF signal	Turn Vg to 0 V

Pin Description



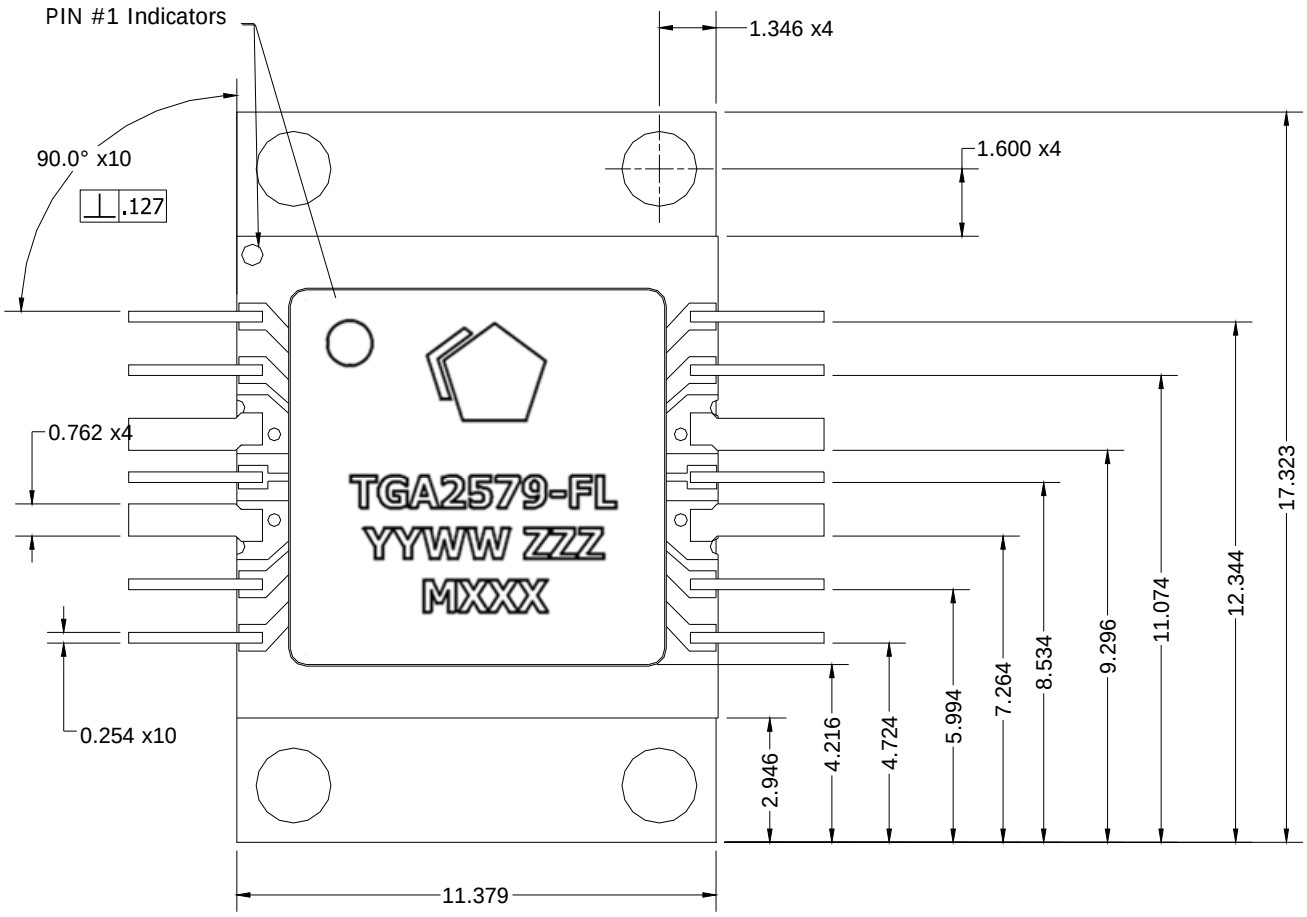
Pin #	Symbol	Description
1	Vd	Top side 1st and 2nd stage Drain voltage. Bias network is required; all Drain voltage pins must be connected and biased; see Application Circuit on page 7 as an example.
2,6	Vg	Gate voltage. Bias network is required; both top and bottom sides must be connected and biased; see Application Circuit on page 7 as an example.
3,5,10,12	Gnd	Connect to Ground; see Application Circuit on page 7 as an example
4	RF In	Input, matched to 50 ohms
7	Vd	Bottom side 1st and 2nd stage Drain voltage. Bias network is required; all Drain voltage pins must be connected and biased; see Application Circuit on page 7 as an example.
8	Vd	Bottom side 3rd stage Drain voltage. Bias network is required; all Drain voltage pins must be connected and biased; see Application Circuit on page 7 as an example.
9	Vdet	Vdetect; see Application Circuit on page 7 as an example.
11	RF Out	Output, matched to 50 ohms
13	N/C	No internal connection, may be left open.
14	Vd	Top side 3rd stage Drain voltage. Bias network is required; all Drain voltage pins must be connected and biased; see Application Circuit on page 7 as an example.

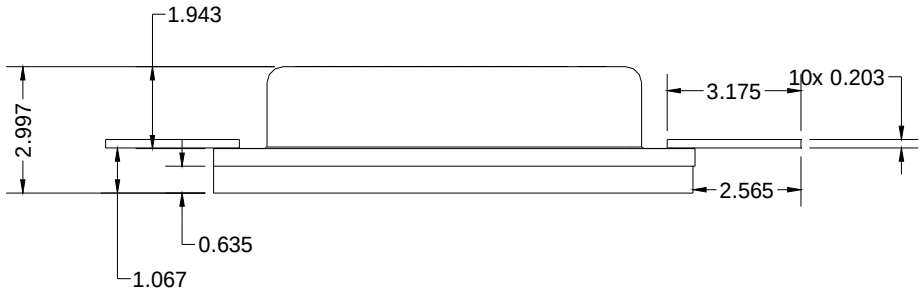
Evaluation Board Layout



Bill of Material

Ref Des	Value	Description	Manufacturer	Part Number
C1-6	1 uF	Cap, 1206, 50V, 10%, XR7	Kemet	C1206C105K5RACTU
C7-12	0.1 uF	Cap, 0603, 50V, 10%, XR7	Kemet	C0603C104K5RACTU





Unit: millimeters
Part marking:

YY	assembly lot start year
WW	assembly lot start week
ZZZ	part serial number
MXXX	batch ID

Product Compliance Information

ESD Information

Caution! ESD-Sensitive Device

ESD rating:	TBD
Value:	Passes ≥ TBD V min.
Test:	Human Body Model (HBM)
Standard:	JEDEC Standard JESD22-A114

Solderability

This part is compliant with EU 2002/95/EC RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A ($C_{15}H_{12}Br_4O_2$) Free
- PFOS Free

ECCN

US Department of State: 3A001.b.2.b

Assembly Notes

1. Clean the board or module with alcohol. Allow it to fully dry
2. Nylock screws are recommended for mounting the TGA2579-FL to the board
3. To improve the thermal and RF performance, we recommend a heat sink attached to the bottom of the board and/or apply thermal compound to the bottom of the TGA2579-FL
4. Apply solder to each pin of the TGA2579-FL.
5. Clean the assembly with alcohol.

Contact Information

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

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Email: info-products@tqs.com **Fax:** +1.972.994.8504

For technical questions and application information:

Important Notice

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