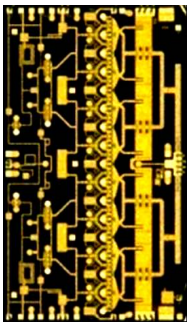
TGA2572

20 Watt Ku-Band GaN Power Amplifier

Applications

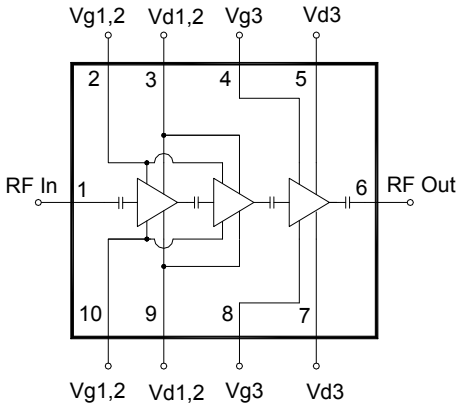
- Ku-band Communications



Product Features

- Frequency Range: 14 – 16 GHz
- Power: 43 dBm Psat
- Small Signal Gain: 23 dB
- Bias: Vd = 35 V, Id = 2.0 A, Vg = -3.2 V Typical
- Dimensions: 3.5 x 5.9 x 0.1 mm

Functional Block Diagram



General Description

The TriQuint TGA2572 is a Ku-band power amplifier fabricated on TriQuint's production-released, 0.25um GaN on SiC process. Operating from 14 to 16 GHz, the TGA2572 typically provides 43dBm of saturated output power, 30% power-added efficiency and 24dB of small signal gain.

Ideally suited for Ku-band communications, the TGA2572 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

Bond Pad Configuration

Bond Pad #	Symbol
1	RF In
2, 10	Vg1, 2
3, 9	Vd1, 2
4, 8	Vg3
5, 7	Vd3
6	RF Out

Ordering Information

Part No.	ECCN	Description
TGA2572	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	3000 mA
Gate Current, Ig	-10 to 20 mA
Power Dissipation, Pdiss	84 W
RF Input Power, CW, 50Ω,T = 25ºC	27 dBm
Channel Temperature, Tch	275 °C
Mounting Temperature (30 Seconds)	320 °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	Typical	Max	Units
Vd		35		V
Id		2000		mA
Id_drive (Under RF Drive)		2750		mA
Vg		-3.2		V

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

Electrical Specifications

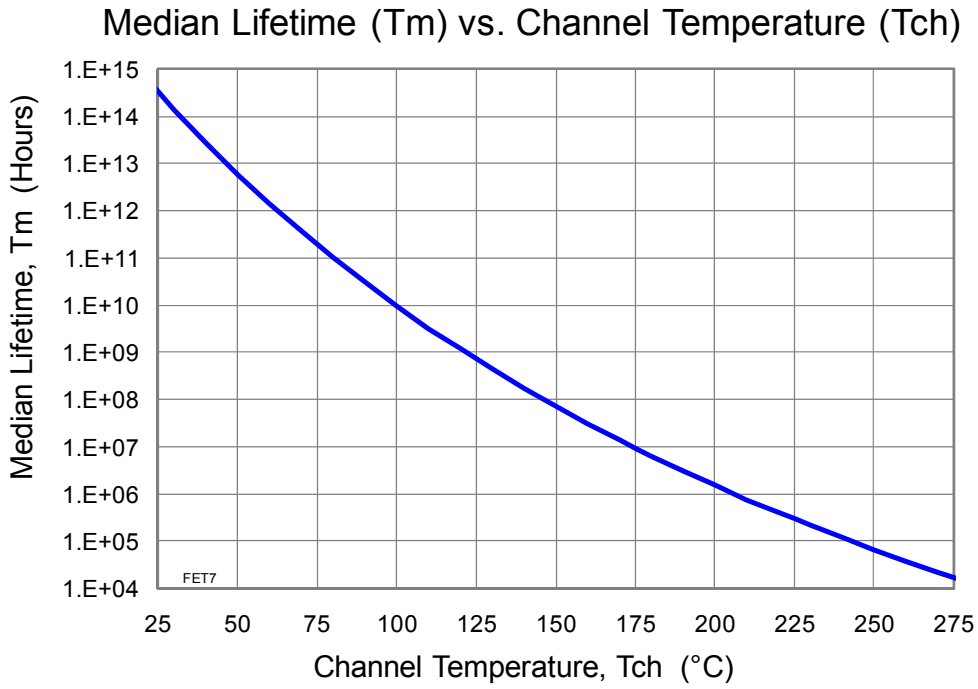
Test conditions unless otherwise noted: 30ºC, Vd = 35 V, Idq = 2000 mA, Vg = -3.2 V Typical.

Parameter	Min	Typical	Max	Units
Operational Frequency Range	14		16	GHz
Small Signal Gain		23		dB
Output Power @ Saturation		43		dBm
Output TOI @ 22 dBm SCL		TBD		dBm
Noise Figure		TBD		dB
Gain Temperature Coefficient		0.03		dB/°C
Power Temperature Coefficient		0.03		dBm/°C

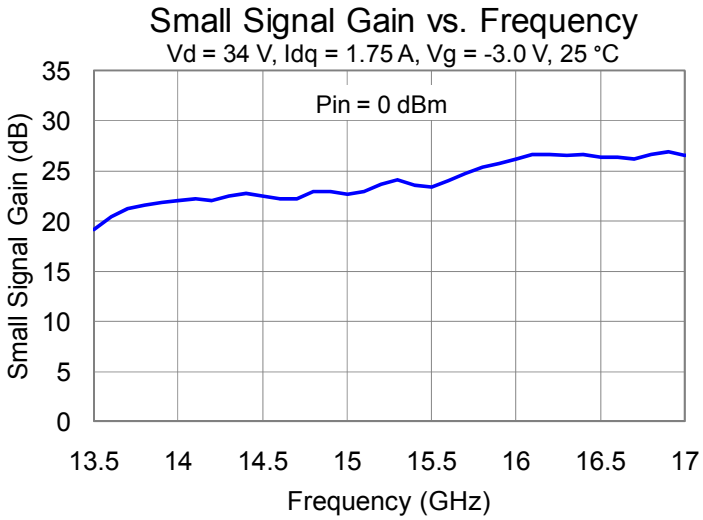
Specifications (cont.)

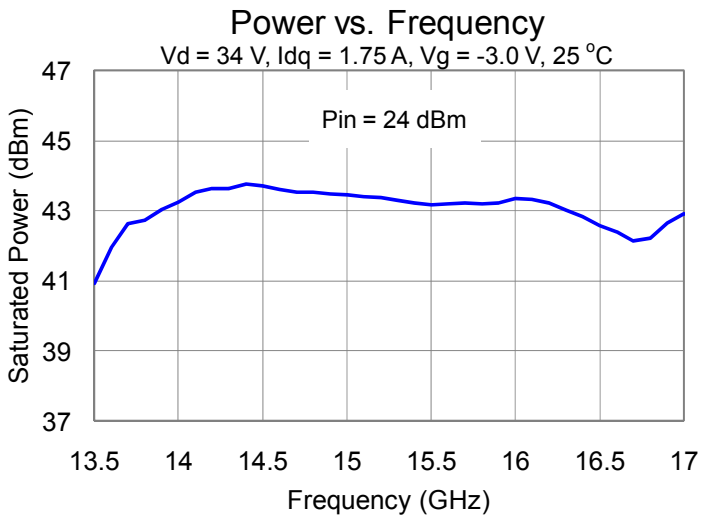
Thermal and Reliability Information

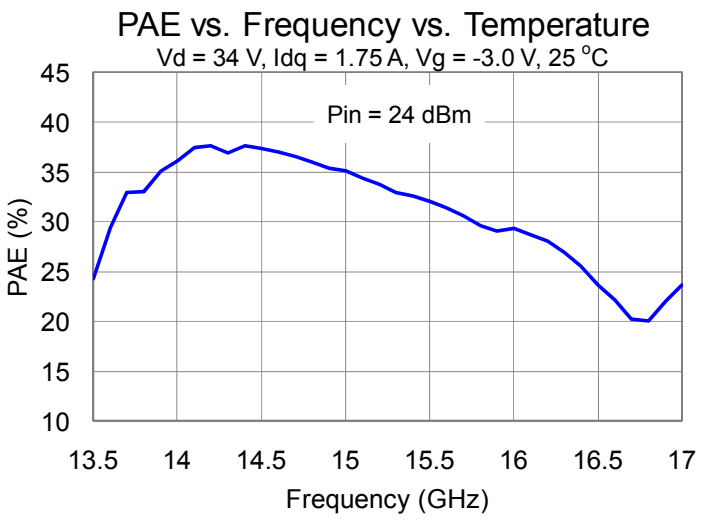
Parameter	Condition	Rating
Thermal Resistance, θ_{JC}, measured to back of MMIC	Tbase = 85 °C	θ_{JC} = 1.38 °C/W
Channel Temperature (Tch), and Median Lifetime (Tm)	Tbase = 85 °C, Vd = 34 V, Id = 1750 mA, Pdiss = 59.5 W	Tch = 167 °C Tm = 2.3 E+7 Hours
Channel Temperature (Tch), and Median Lifetime (Tm) Under RF Drive	Tbase = 85 °C, Vd = 34V, Id = 2450 mA, Pout = 43 dBm, Pdiss = 63.3 W	Tch = 172 °C Tm = 9.6 E+6 Hours

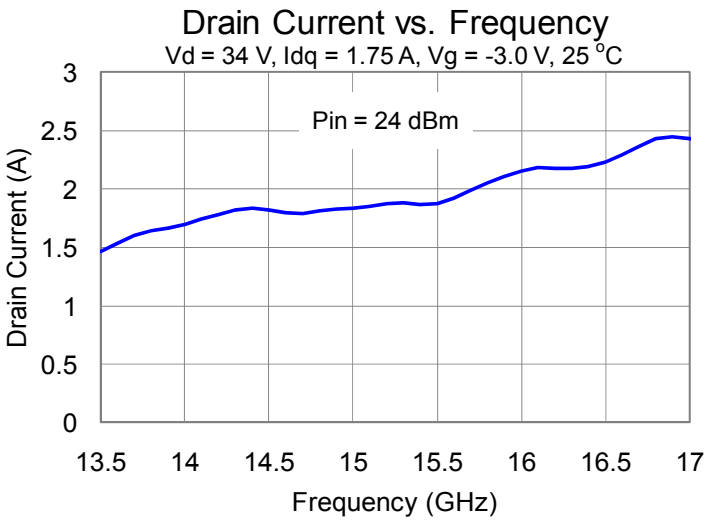


Typical Performance

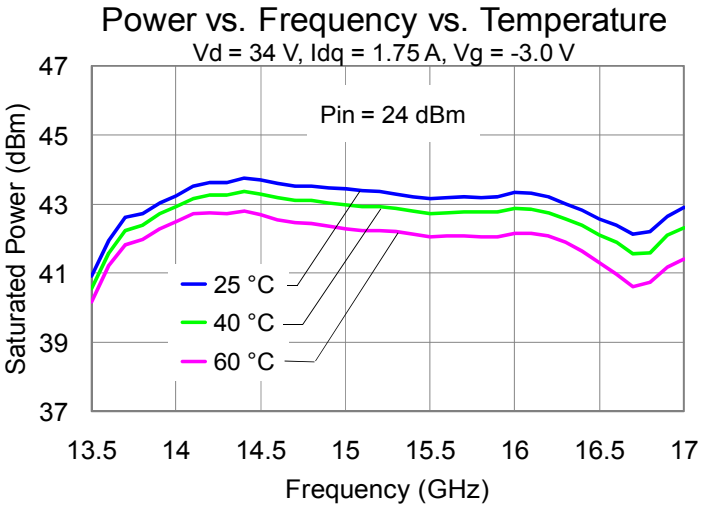


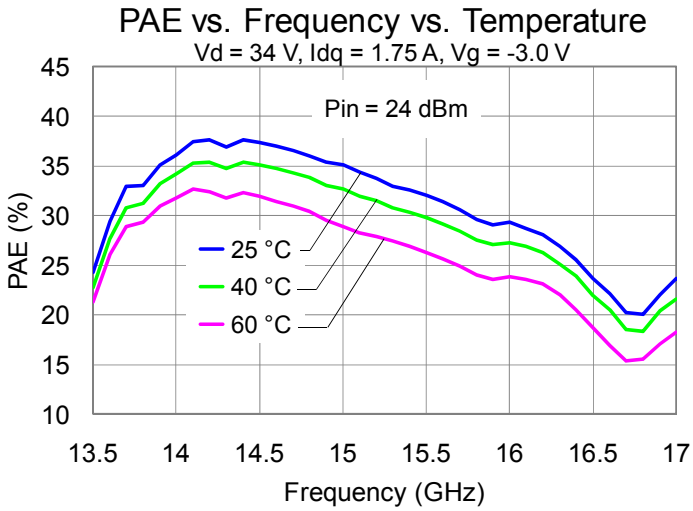


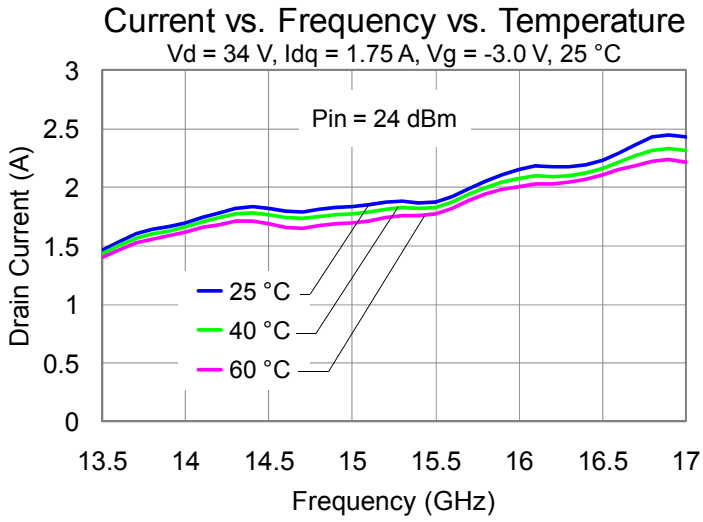




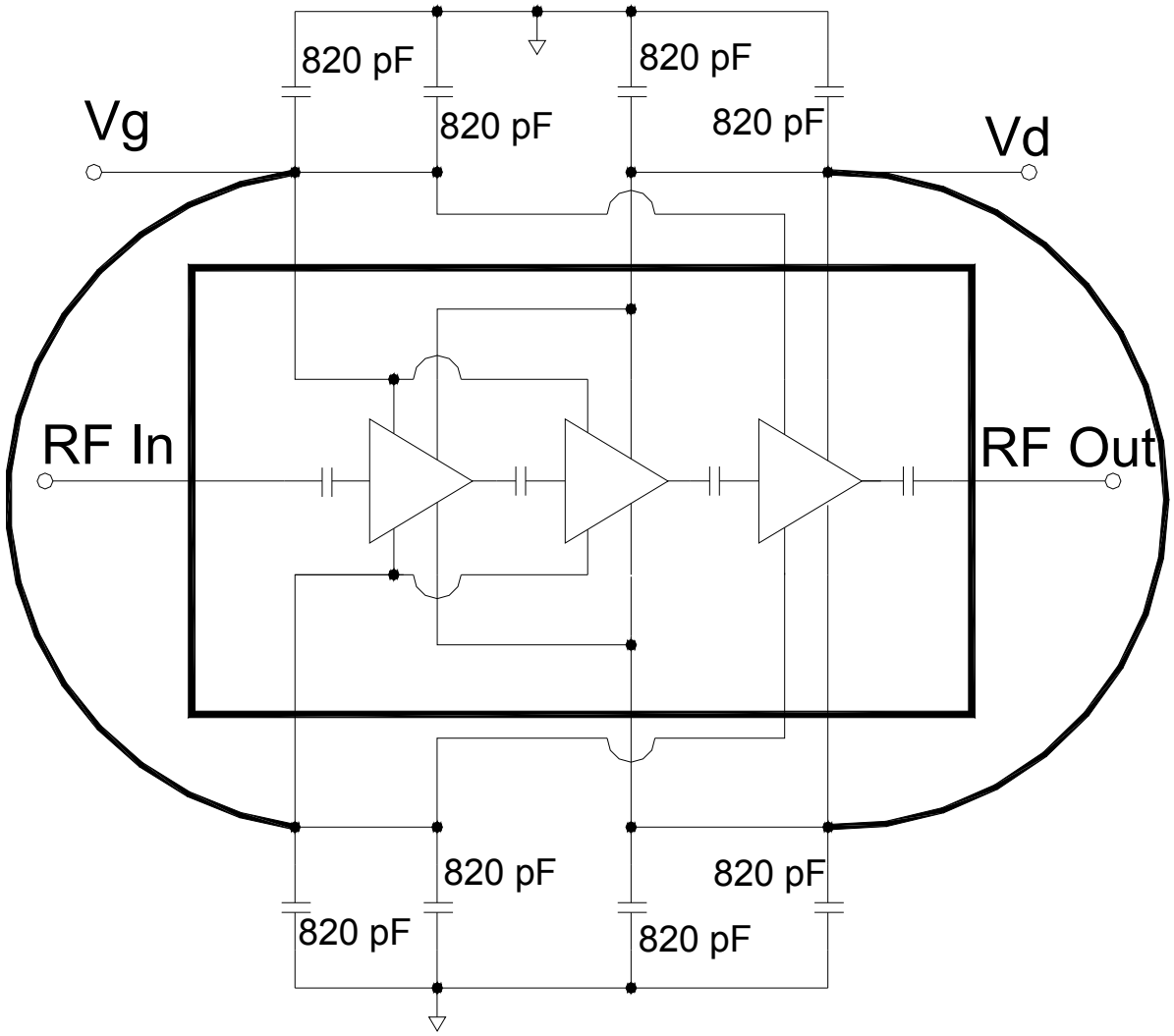
Typical Performance (cont.)





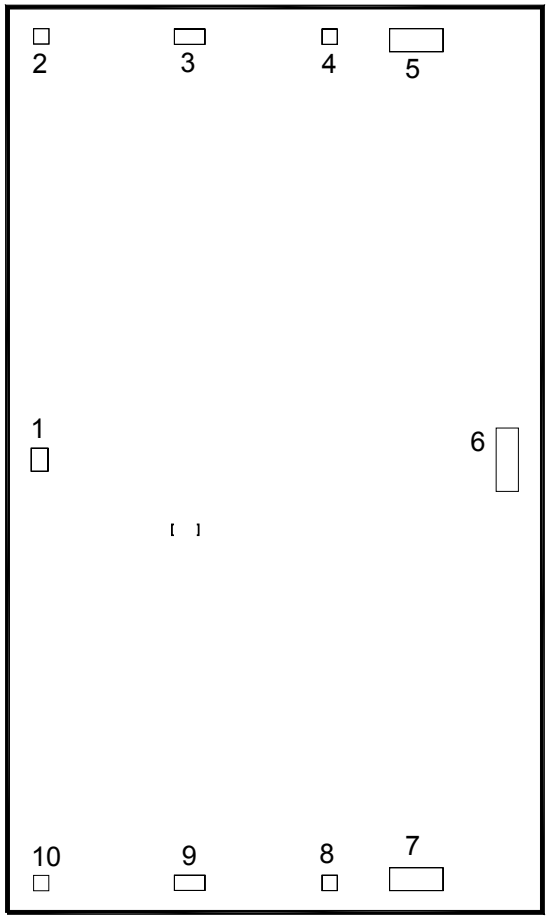


Application Circuit



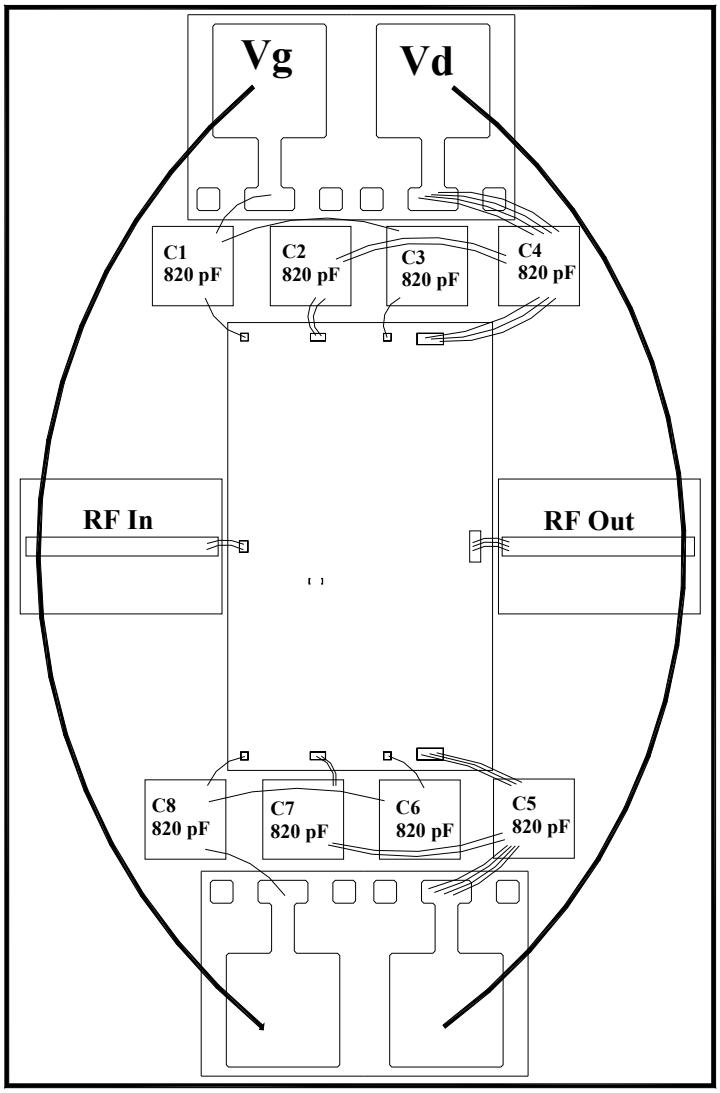
Bias-up Procedure	Bias-down Procedure
Vg set to -5.0 V	Turn off RF signal
Vd set to +35 V	Reduce Vg to -5.0 V. Ensure Id ~ 0 mA
Adjust Vg more positive until quiescent Id is 2000 mA. This will be ~ Vg = -3.2 V	Turn Vd to 0 V
Apply RF signal	Turn Vg to 0 V

Bond Pad Description



Bond Pad	Symbol	Description
1	RF In	Input, matched to 50 ohms
2, 4	Vg1, 3	Top side Gate voltage. Bias network is required; both top and bottom sides must be connected and biased; see Application Circuit on page 8 as an example.
3, 5	Vd1, 3	Top side Drain voltage. Bias network is required; both top and bottom sides must be connected and biased; see Application Circuit on page 8 as an example.
7, 9	Vd1, 3	Bottom side Drain voltage. Bias network is required; both top and bottom sides must be connected and biased; see Application Circuit on page 8 as an example.
8, 10	Vg1, 3	Bottom side Gate voltage. Bias network is required; both top and bottom sides must be connected and biased; see Application Circuit on page 8 as an example.
6	RF Out	Output, matched to 50 ohms

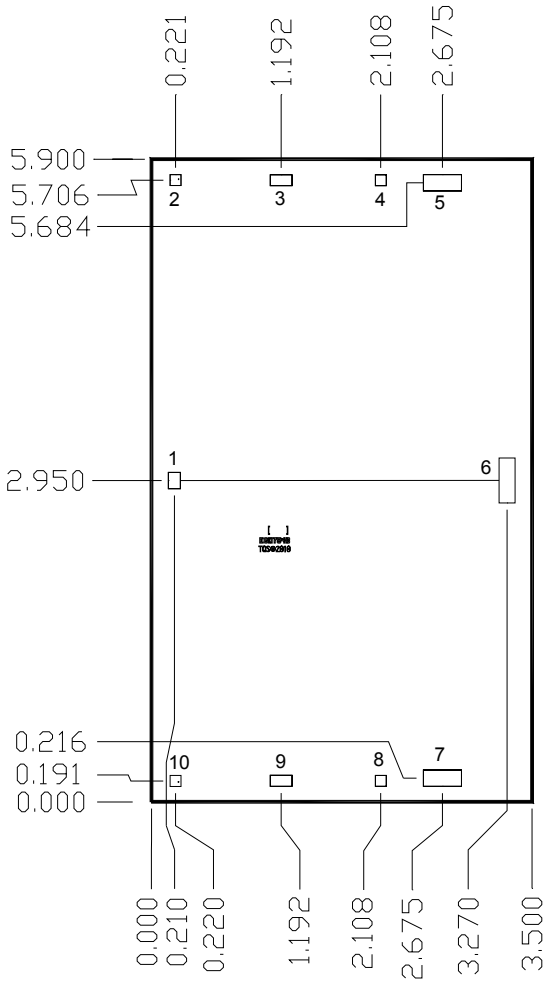
Assembly Drawing



Bill of Material

Ref Des	Value	Description	Manufacturer	Part Number
C1- C8	820 pF	Cap, 50V, 25%, Single Layer Cap	various	

Mechanical Information



Unit: millimeters
Thickness: 0.10
Die x, y size tolerance: +/- 0.050
Chip edge to bond pad dimensions are shown to center of pad
Ground is backside of die

Bond Pad	Symbol	Pad Size
1	RF In	0.110 x 0.150
2, 10	Vg1, 2	0.100 x 0.100
3, 9	Vd1,2	0.200 x 0.100
4, 8	Vg3	0.100 x 0.100
5, 7	Vd3	0.350 x 0.150
6	RF Out	0.145 x 0.412

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

ECCN

US Department of Commerce 3A001b.2.b

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 ($C_{15}H_{12}Br_40_2$) Free
- PFOS Free
- SVHC Free

Assembly Notes

Component placement and adhesive attachment assembly notes:

- Vacuum pencils and/or vacuum collets are the preferred method of pick up.
- Air bridges must be avoided during placement.
- The force impact is critical during auto placement.
- Organic attachment (i.e. epoxy) can be used in low-power applications.
- Curing should be done in a convection oven; proper exhaust is a safety concern.

Reflow process assembly notes:

- Use AuSn (80/20) solder and limit exposure to temperatures above 300°C to 3-4 minutes, maximum.
- Do not use any kind of flux.
- Coefficient of thermal expansion matching is critical for long-term reliability.
- In order to achieve the advertised performance and to maintain reliability of the product, it is necessary for the solder attach to cover >90% for each of the active areas. An active area is defined as a single unit cell. This is critical given the high power dissipation associated with GaN power amplifiers. Total die area should not exceed 10% voiding.
- Devices must be stored in a dry nitrogen atmosphere.

Interconnect process assembly notes:

- Thermosonic ball bonding is the preferred interconnect technique.
- Force, time, and ultrasonics are critical parameters.
- Aluminum wire should not be used.
- Devices with small pad sizes should be bonded with 0.0007-inch wire.

Contact Information

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

Web: www.triquint.com **Tel:** +1.972.994.8465
Email: info-sales@tqs.com **Fax:** +1.972.994.8504

For technical questions and application information:

Email: info-defense@tqs.com

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