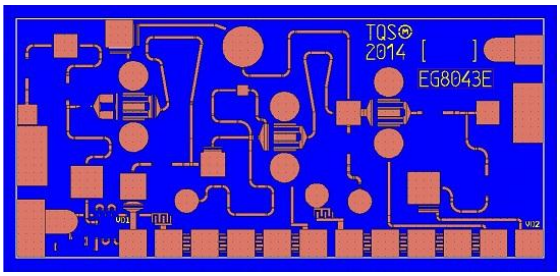
TGA2243

12 – 16.5 GHz 3-Stage Driver Amplifier

Applications

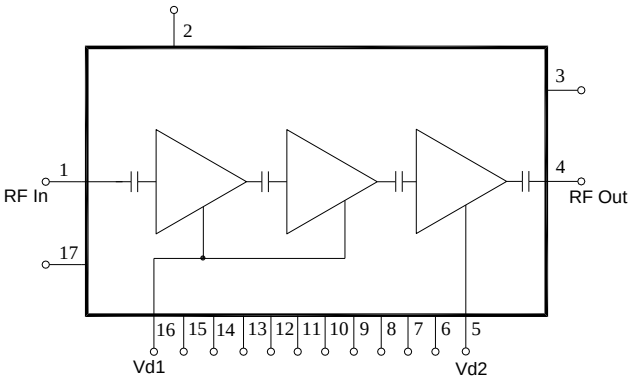
- Point-to-Point Radio
- Military Ku-Band
- Ku-Band Space
- VSAT



Product Features

- 12 to 16.5 GHz Bandwidth
- 28 dB Nominal Gain
- 20 dBm Nominal P1dB
- Bias: 6 to 9 V, 85 mA Self-Bias
- pHEMT Technology
  Chip Dimensions: 1.84 x 0.88 x 0.1 mm

Functional Block Diagram



General Description

The TriQuint TGA2243 is a Ku-Band driver amplifier. The TGA2243 operates over a bandwidth of 12 to 16.5 GHz and is designed using TriQuint's pHEMT production process.

The TGA2243 typically provides 28 dB of gain, and a 1dB gain compression point of 20 dBm output power.

Lead-free and RoHS compliant.

Pin Configuration

Pin No.	Label
1	RF IN
2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17	NC
4	RF OUT
5	Vd2
16	Vd1

Ordering Information

Part No.	ECCN	Description
TGA2243	EAR99	Ku-Band Driver Amplifier

Standard T/R size = 500 pieces on a 7" reel

Absolute Maximum Ratings

Parameter	Rating
Drain Voltage,Vd	9 V
Drain Current, Id	114 mA
Power Dissipation, Pdiss	1.03 W
RF Input Power, CW, 50Ω, T = 25ºC	20 dBm
Channel Temperature, Tch	200 °C
Mounting Temperature (30 Seconds)	260 ºC
Storage Temperature	-40 to 150 ºC

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
Operating Temp. Range	-40	+25	+85	°C
Vd	6	7		V
Id		85		mA
Id drive (Under RF Drive)		85		mA

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

Electrical Specifications

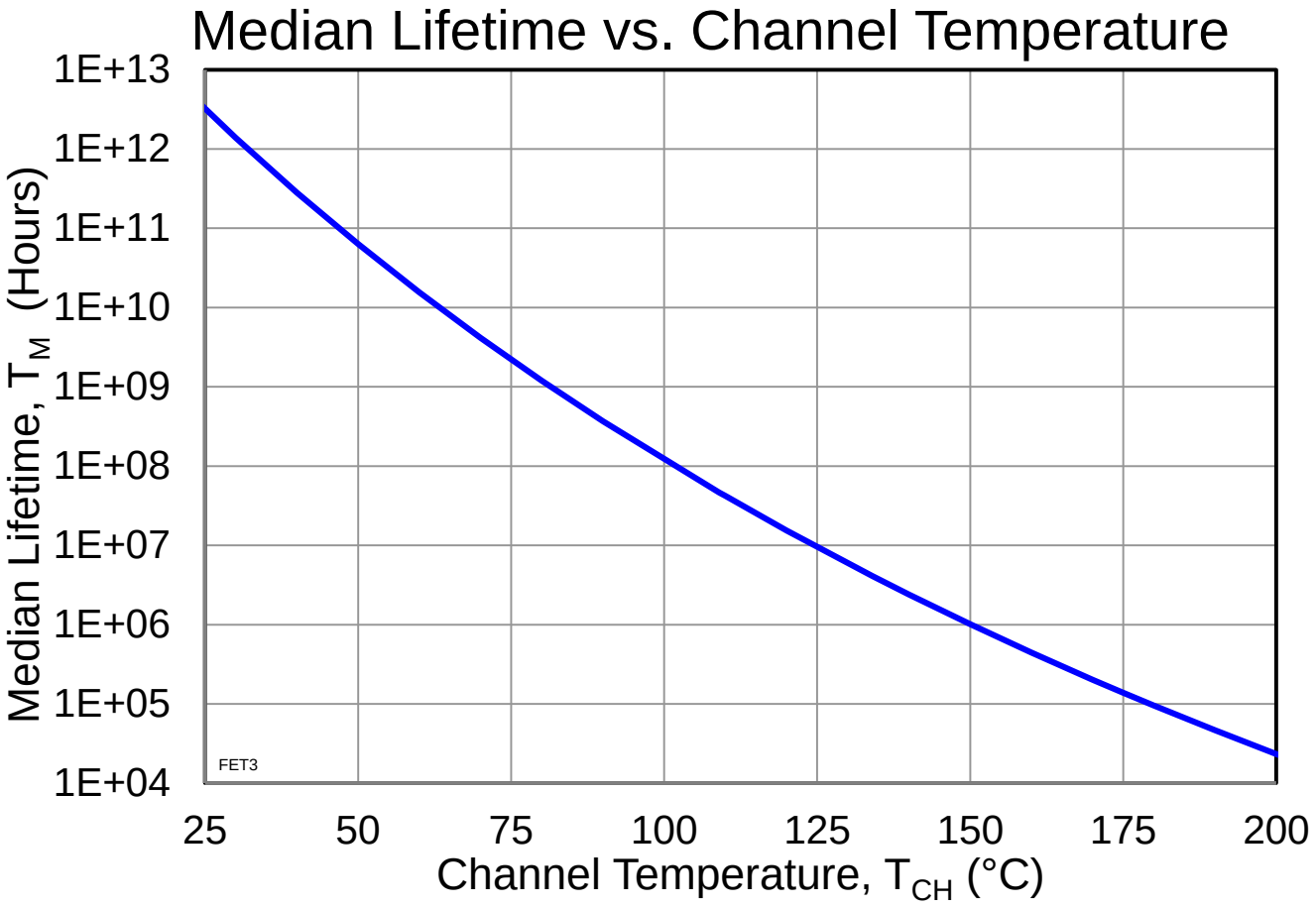
Conditions for specifications below unless otherwise noted: Vd = 7 V, Id = 85 mA self-bias. Temperature = +25°C

Parameter	Min	Typ	Max	Units
RF Frequency Range	12		16.5	GHz
Small Signal Gain		28		dB
Input Return Loss, IRL		15		dB
Output Return Loss, ORL		20		dB
Output Power at Saturation, Psat		21		dBm
Output Power at 1dB Gain Compression, P1dB		20		dBm
Gain Temperature Coefficient		-0.07		dB/°C
Power Temperature Coefficient		-0.003		dBm/°C

Specifications

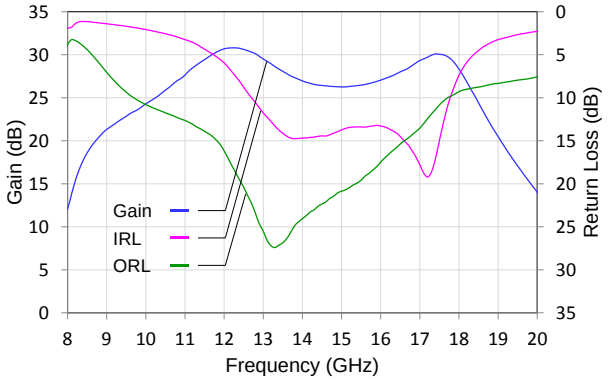
Thermal and Reliability Information

Parameter	Conditions	Rating
Thermal Resistance, θ_{JC}, measured to back of package	Tbase = 70 °C	θ_{JC} = 80 °C/W
Channel Temperature (Tch), and Median Lifetime (Tm)	Tbase = 70 °C Vd = 7 V, Id = 85 mA Pdiss = 0.6 W	Tch = 118 °C Tm = 1.9E+7 Hours
Channel Temperature (Tch), and Median Lifetime (Tm) at 15 dBm Pout	Tbase = 70 °C Vd = 7 V, Id = 85 mA Pdiss = 0.6 W	Tch = 118 °C Tm = 1.9E+7 Hours

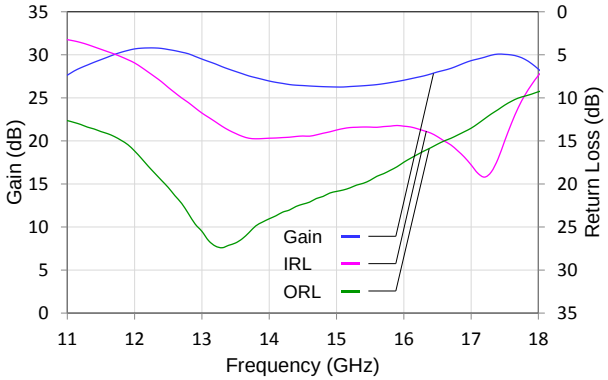


Typical Performance

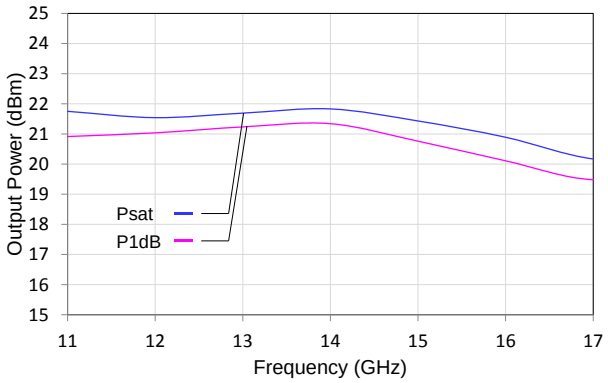
S-Parameters vs. Frequency
Vd = 7 V, Id = 85 mA Self-Bias, +25°C



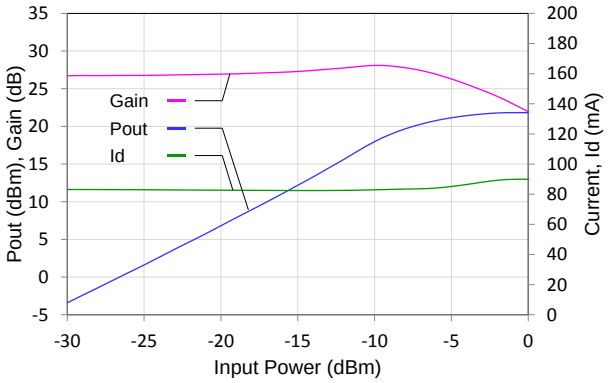
S-Parameters vs. Frequency
Vd = 7 V, Id = 85 mA Self-Bias, +25°C



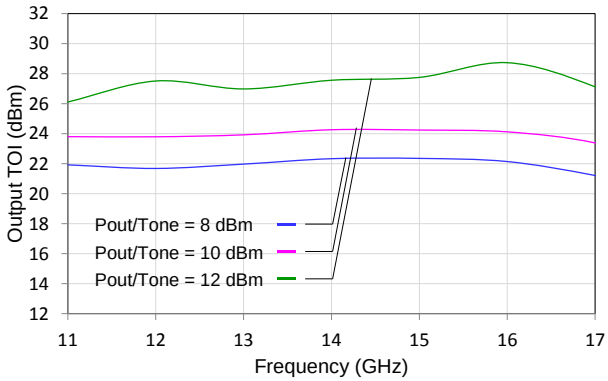
Output Power vs. Frequency
Vd = 7 V, Id = 85 mA Self-Bias, +25°C



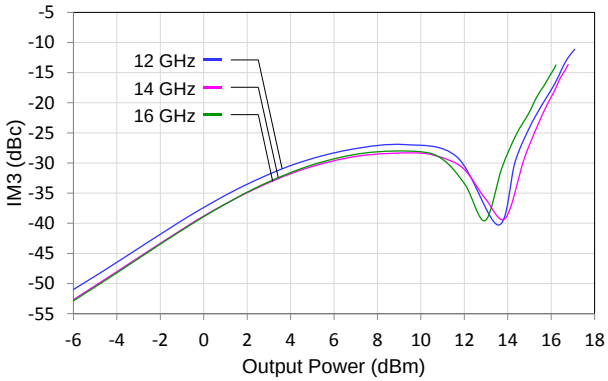
Pout, Gain, Id vs. Pin @ 14 GHz
Vd = 7 V, Id = 85 mA Self-Bias, +25°C



TOI vs. Frequency vs. Pout/Tone
Vd = 7 V, Id = 85 mA Self-Bias, +25°C

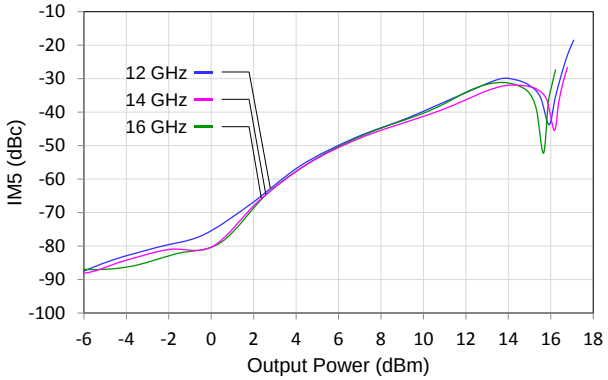


IM3 vs. Pout/Tone vs. Frequency
Vd = 7 V, Id = 85 mA Self-Bias, +25°C

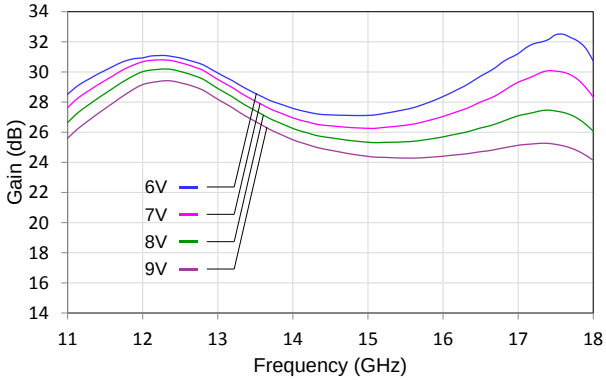


Typical Performance

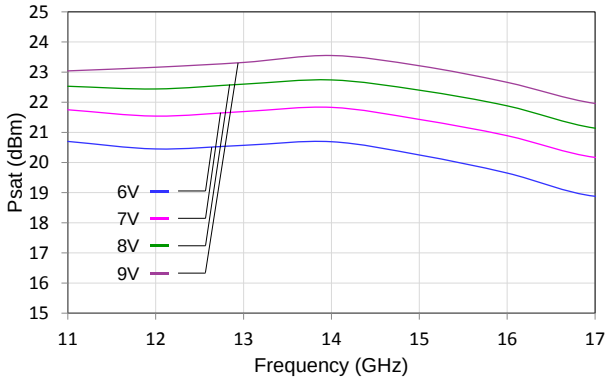
IM5 vs. Pout/Tone vs. Frequency
Vd = 7 V, Id = 85 mA Self-Bias, +25°C



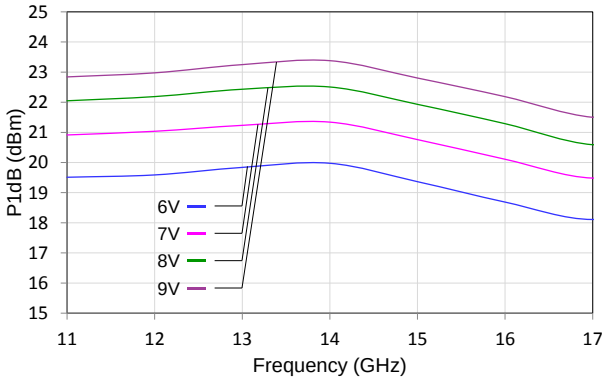
Gain vs. Frequency vs. Vd
Vd = 6 - 9 V, Id = 85 mA Self-Bias, +25°C



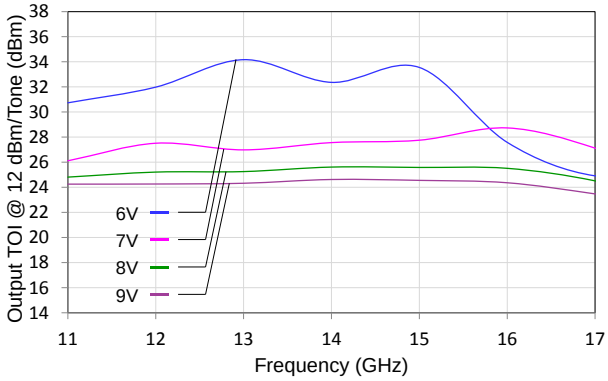
Psat vs. Frequency vs. Vd
Vd = 6 - 9 V, Id = 85 mA Self-Bias, +25°C



P1dB vs. Frequency vs. Vd
Vd = 6 - 9 V, Id = 85 mA Self-Bias, +25°C

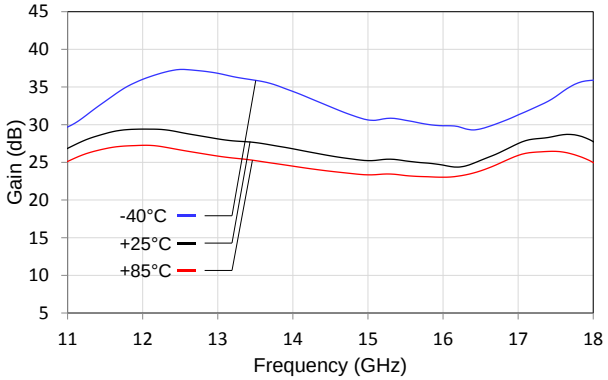


TOI vs. Frequency vs. Vd
Vd = 6 - 9 V, Id = 85 mA Self-Bias, +25°C

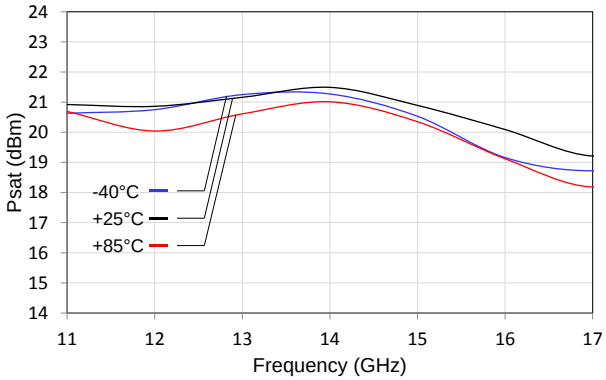


Typical Performance

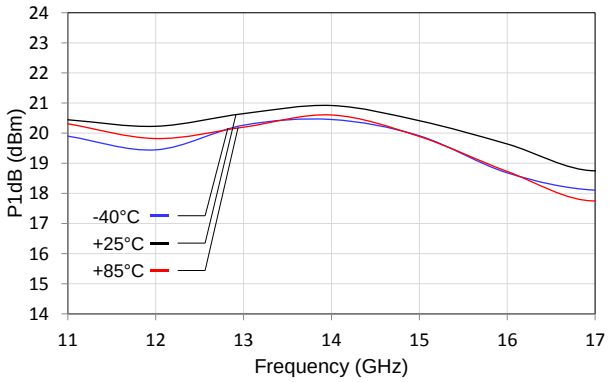
Gain vs. Frequency vs. Temperature
Vd = 7 V, Id = 85 mA Self-Bias



Psat vs. Frequency vs. Temperature
Vd = 7 V, Id = 85 mA Self-Bias

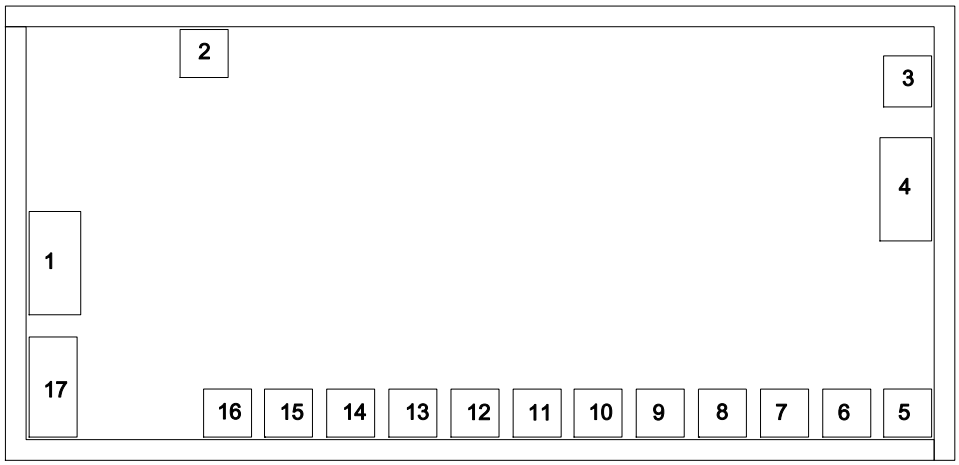


P1dB vs. Frequency vs. Temperature
Vd = 7 V, Id = 85 mA Self-Bias



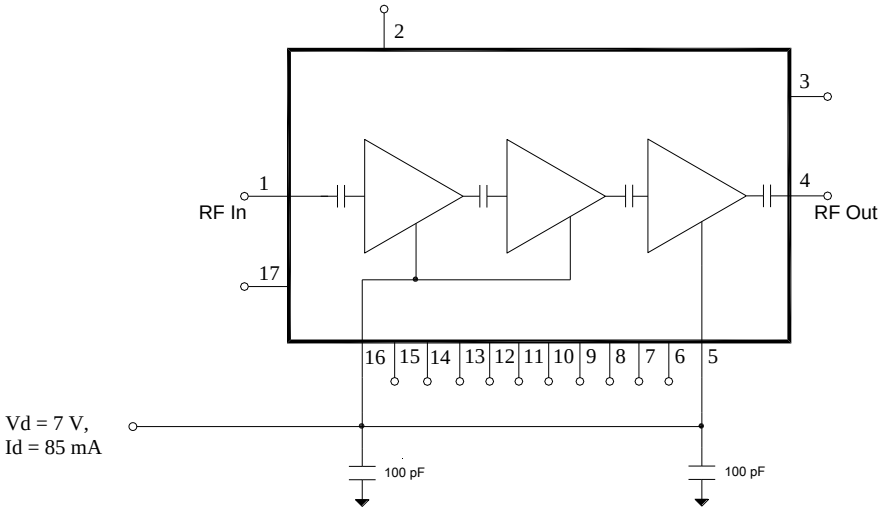
Bond Pad Description

Top View



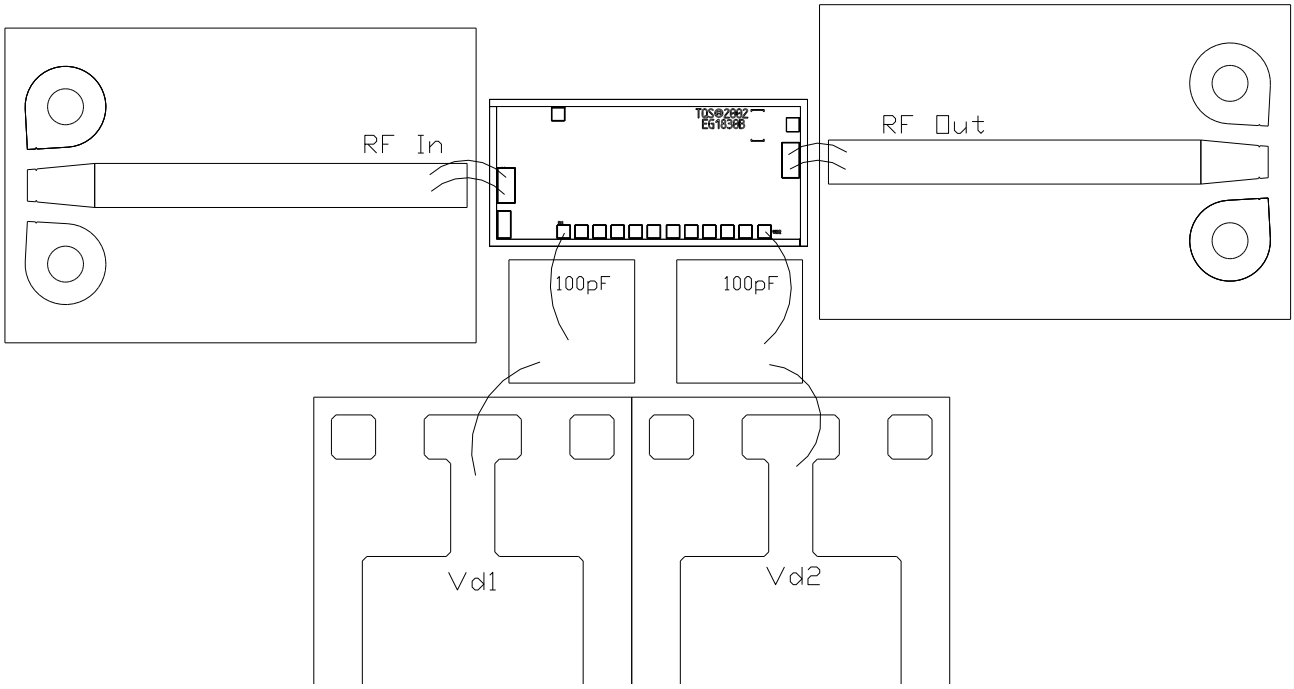
Pin No.	Label	Description
1	RF IN	RF Input, matched to 50 ohms, AC Coupled.
4	RF OUT	RF Output, matched to 50 ohms, AC Coupled.
2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17	NC	No connection
5	Vd2	Drain voltage. Bias network is required; see Application Circuit on page 9 as an example.
16	Vd1	Drain voltage. Bias network is required; see Application Circuit on page 9 as an example.

Application Circuit



Bias-up Procedure	Bias-down Procedure
Vd set to +7 V	Turn off RF signal
Id is nominally 85 mA, self-biased	Turn Vd to 0 V
Apply RF signal	

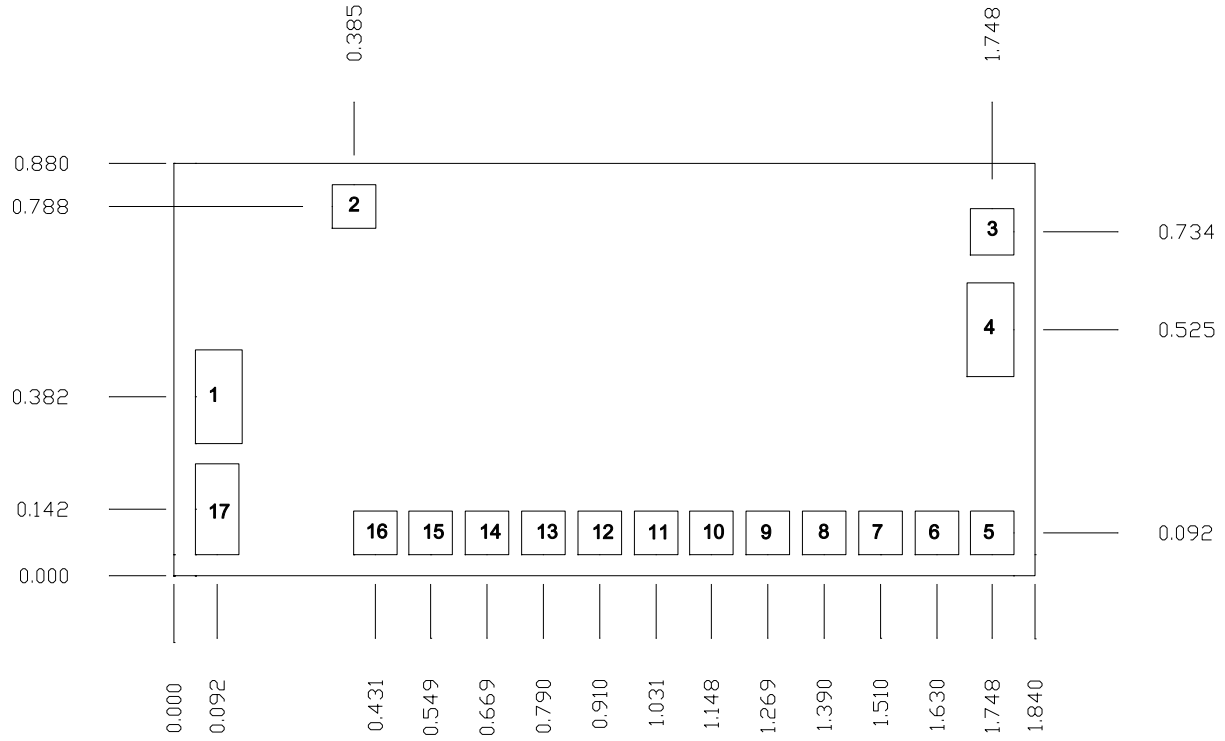
Application Circuit



Mechanical Information

Package Marking and Dimensions

All dimensions are in millimeters.



Unit: millimeters
Thickness: 0.100
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	0.200 x 0.100
2	NC	0.093 x 0.093
3	NC	0.099 x 0.093
4	RF Out	0.200 x 0.100
5	Vd2	0.093 x 0.093
6 thru 15	NC	0.093 x 0.093
16	Vd1	0.093 x 0.093
17	NC	0.193 x 0.093

Product Compliance Information

ESD Sensitivity Ratings

Caution! ESD-Sensitive Device

ESD Rating: TBD
Value: TBD
Test: Human Body Model (HBM)
Charge Device Model (CDM)
Standard: JEDEC Standard JESD22-A114

Solderability

Compatible with AuSn solder (320 C max) process. Time at peak temperature should be less than 30 seconds.

RoHs Compliance

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
- 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.
- An alloy station or conveyor furnace with reducing atmosphere should be used.
- Do not use any kind of flux.
- Coefficient of thermal expansion matching is critical for long-term reliability.
- 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-networks@tqs.com

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