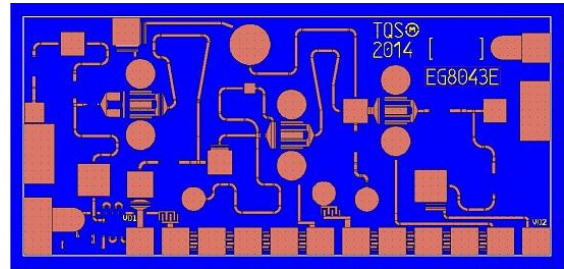


### Applications

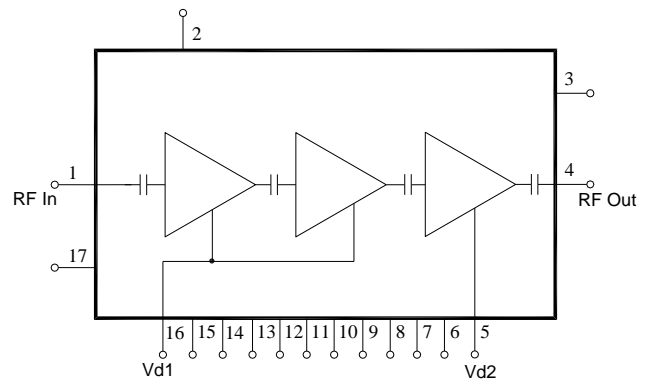
- Point-to-Point Radio
- Military Ku-Band
- Ku-Band Space
- VSAT



### 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 = 25°C	20 dBm
Channel Temperature, Tch	200 °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
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:  $V_d = 7\text{ V}$ ,  $I_d = 85\text{ mA}$  self-bias. Temperature =  $+25^\circ\text{C}$

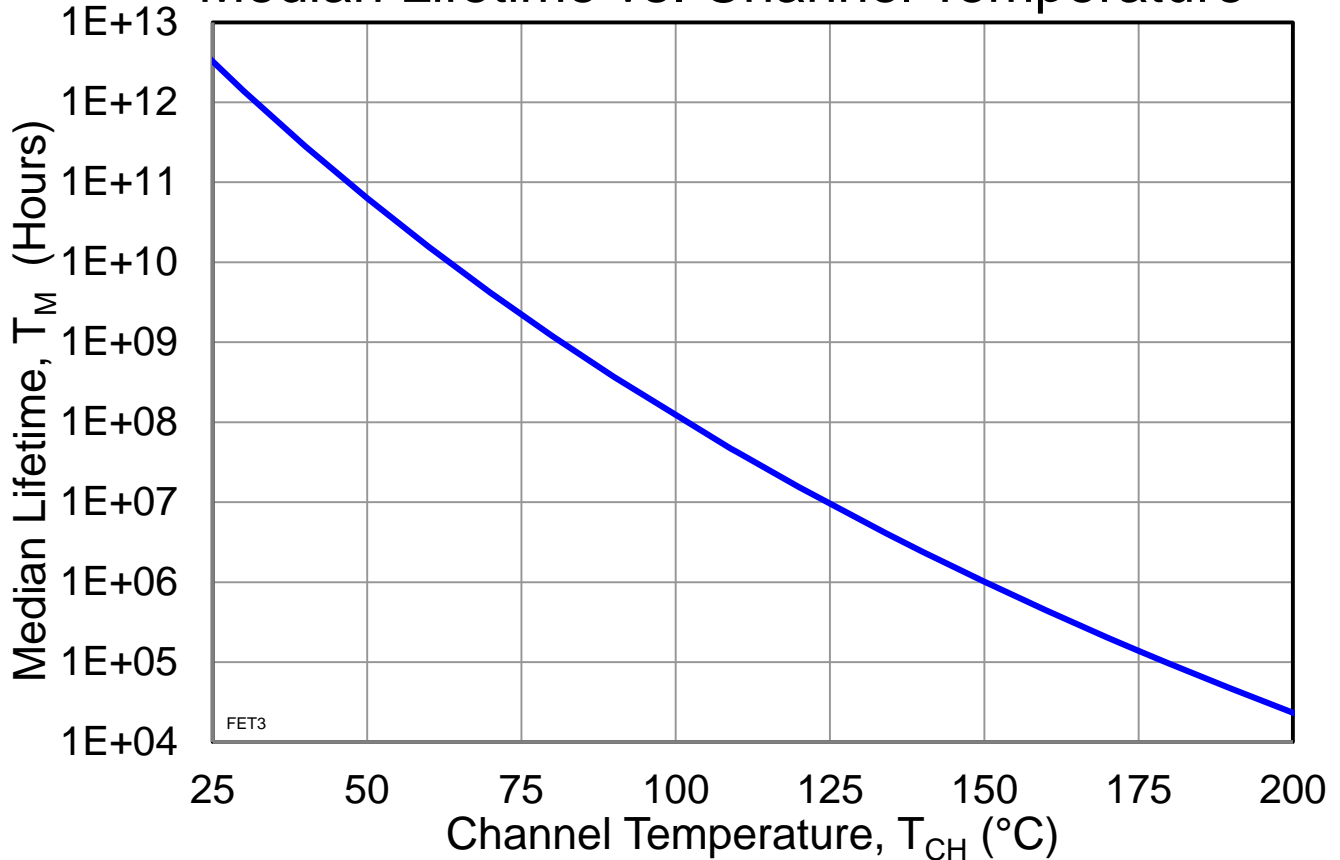
Parameter	Min	Typ	Max	Units
RF Frequency Range	12		16.5	GHz
Small Signal Gain		28		dB
Input Return Loss, IRL		15		dB
Output Return Loss, ORL		20		dB
Output Power at Saturation, Psat		21		dBm
Output Power at 1dB Gain Compression, P1dB		20		dBm
Gain Temperature Coefficient		-0.07		dB/ $^\circ\text{C}$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

**Specifications**

**Thermal and Reliability Information**

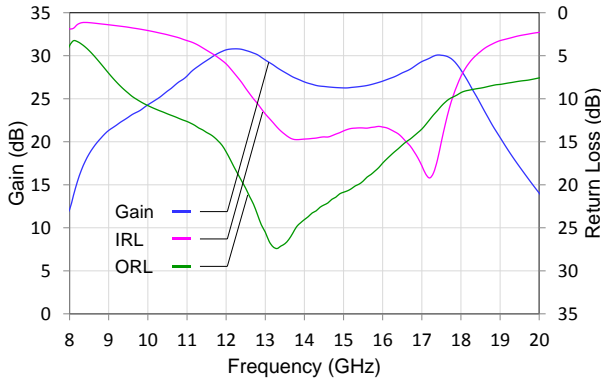
Parameter	Conditions	Rating
Thermal Resistance, $\theta_{JC}$ , measured to back of package	Tbase = 70 °C	$\theta_{JC} = 80$ °C/W
Channel Temperature (Tch), and Median Lifetime (Tm)	Tbase = 70 °C Vd = 7 V, Id = 85 mA Pdiss = 0.6 W	Tch = 118 °C Tm = 1.9E+7 Hours
Channel Temperature (Tch), and Median Lifetime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

**Median Lifetime vs. Channel Temperature**

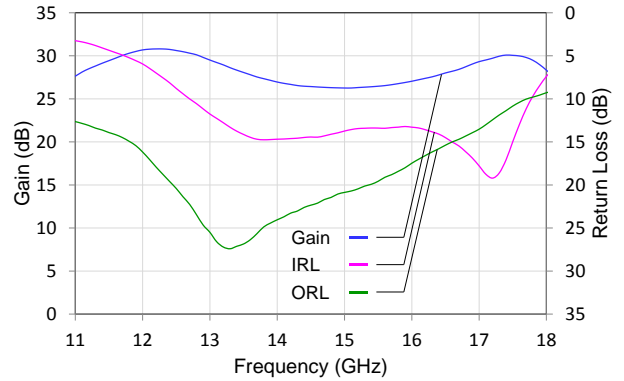


### Typical Performance

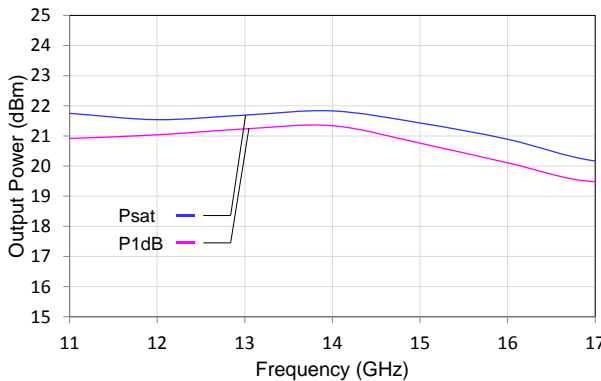
S-Parameters vs. Frequency  
Vd = 7 V, Id = 85 mA Self-Bias, +25°C



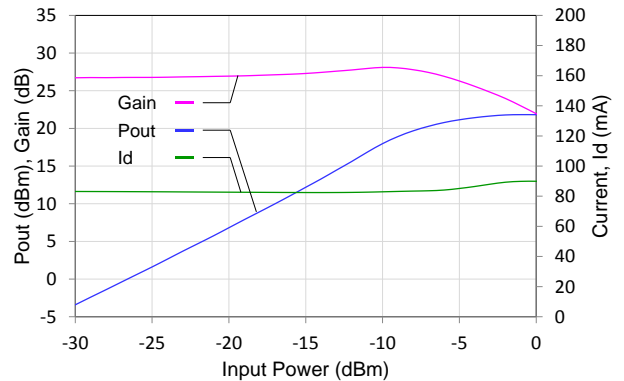
S-Parameters vs. Frequency  
Vd = 7 V, Id = 85 mA Self-Bias, +25°C



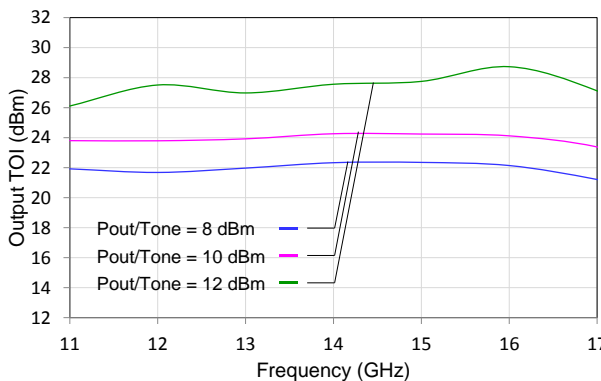
Output Power vs. Frequency  
Vd = 7 V, Id = 85 mA Self-Bias, +25°C



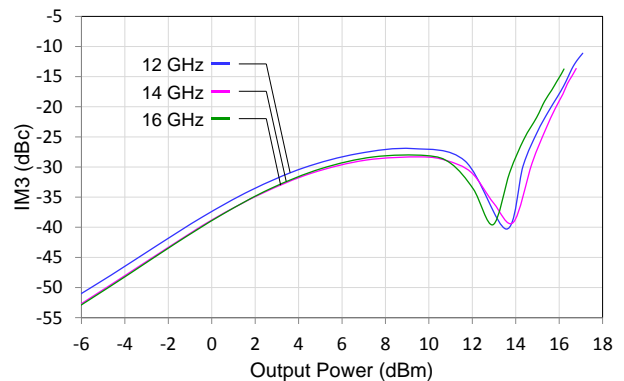
Pout, Gain, Id vs. Pin @ 14 GHz  
Vd = 7 V, Id = 85 mA Self-Bias, +25°C



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

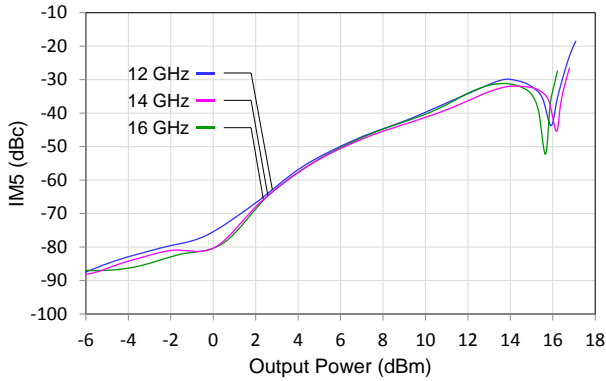


IM3 vs. Pout/Tone vs. Frequency  
Vd = 7 V, Id = 85 mA Self-Bias, +25°C

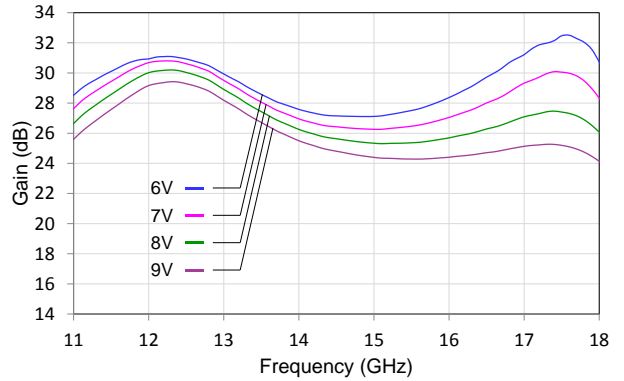


**Typical Performance**

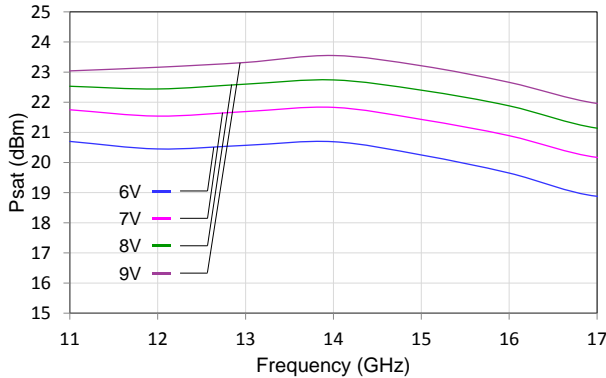
**IM5 vs. Pout/Tone vs. Frequency**  
 Vd = 7 V, Id = 85 mA Self-Bias, +25°C



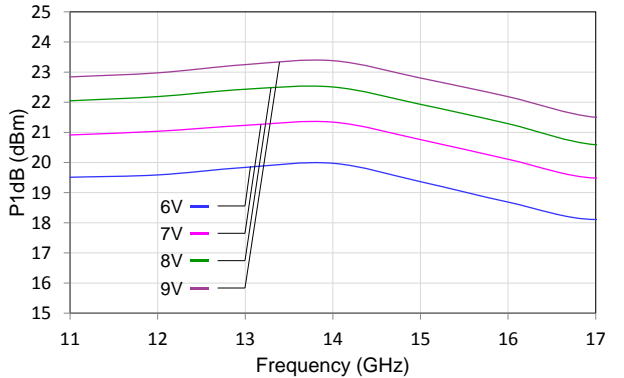
**Gain vs. Frequency vs. Vd**  
 Vd = 6 - 9 V, Id = 85 mA Self-Bias, +25°C



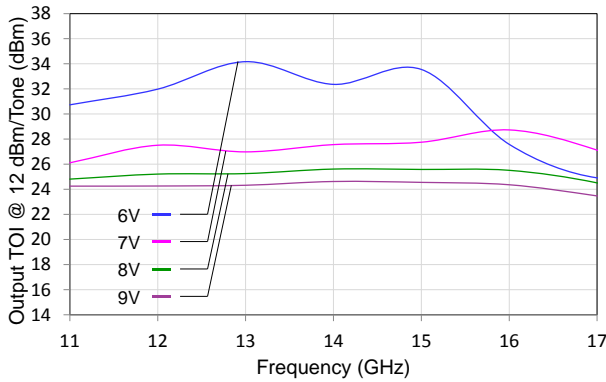
**Psat vs. Frequency vs. Vd**  
 Vd = 6 - 9 V, Id = 85 mA Self-Bias, +25°C



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

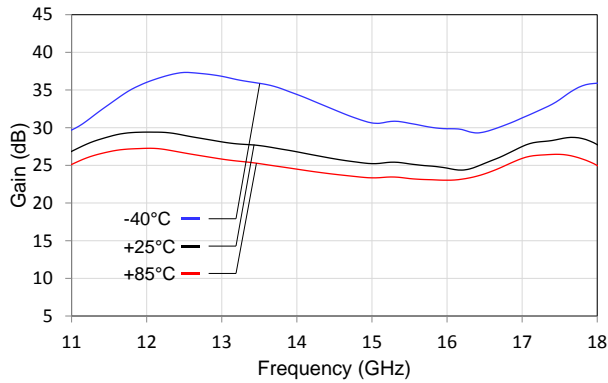


**TOI vs. Frequency vs. Vd**  
 Vd = 6 - 9 V, Id = 85 mA Self-Bias, +25°C

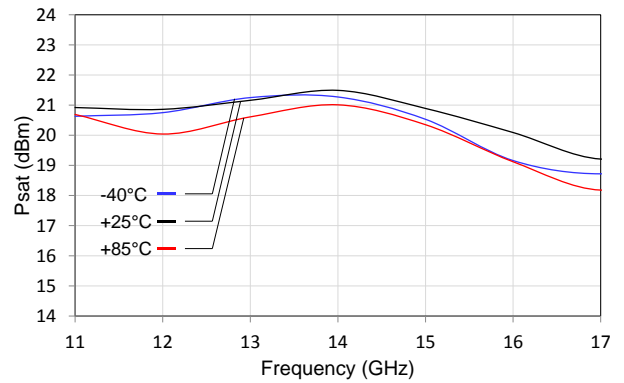


**Typical Performance**

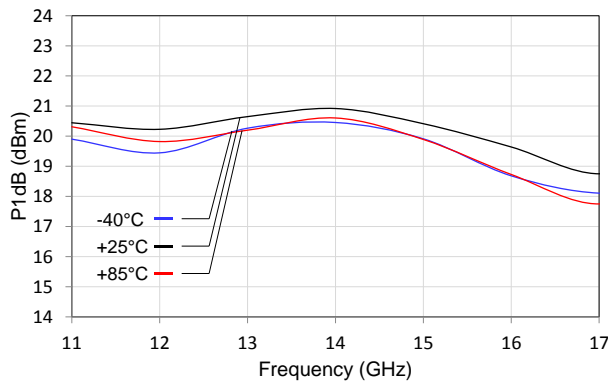
**Gain vs. Frequency vs. Temperature**  
 Vd = 7 V, Id = 85 mA Self-Bias



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

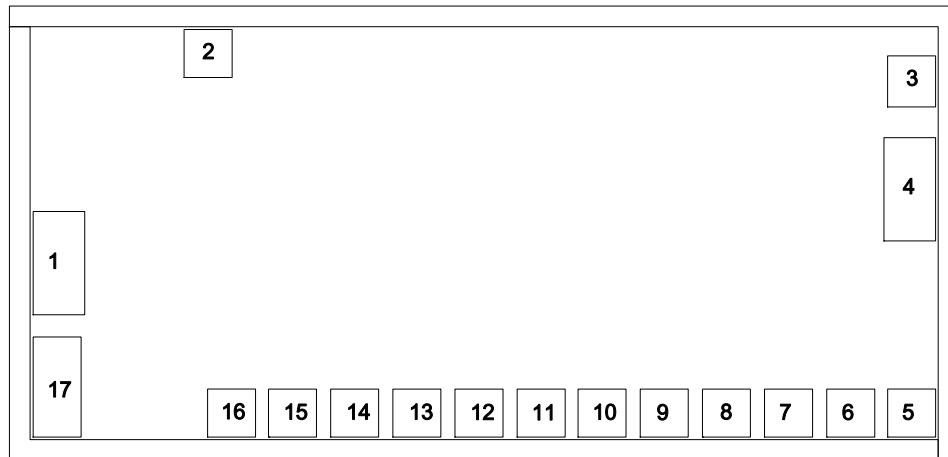


**P1dB vs. Frequency vs. Temperature**  
 Vd = 7 V, Id = 85 mA Self-Bias



**Bond Pad Description**

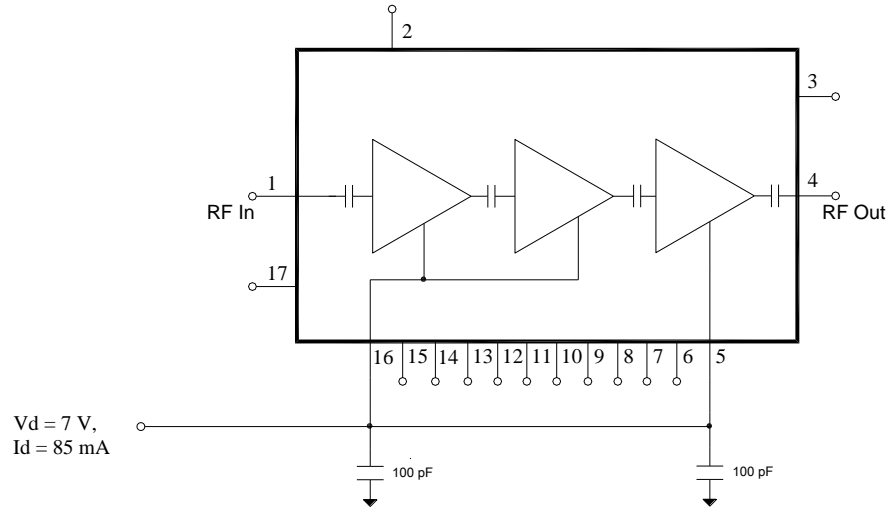
Top View



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.

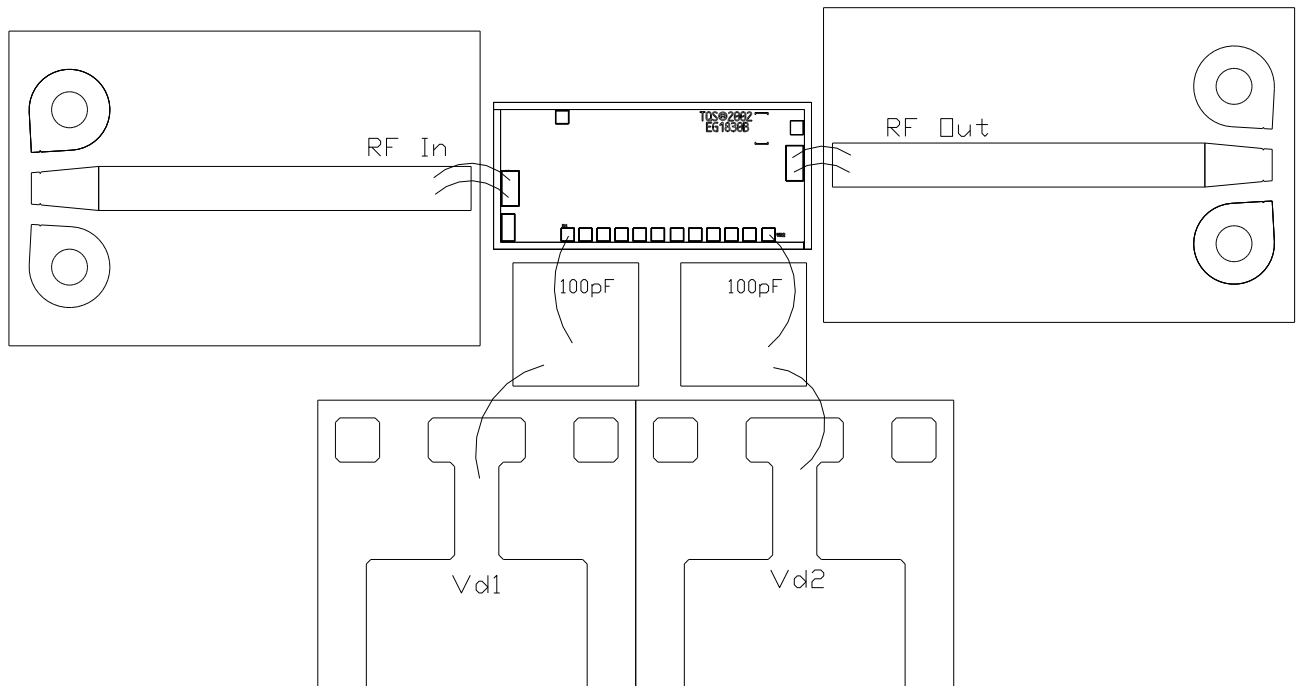


**Application Circuit**



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	

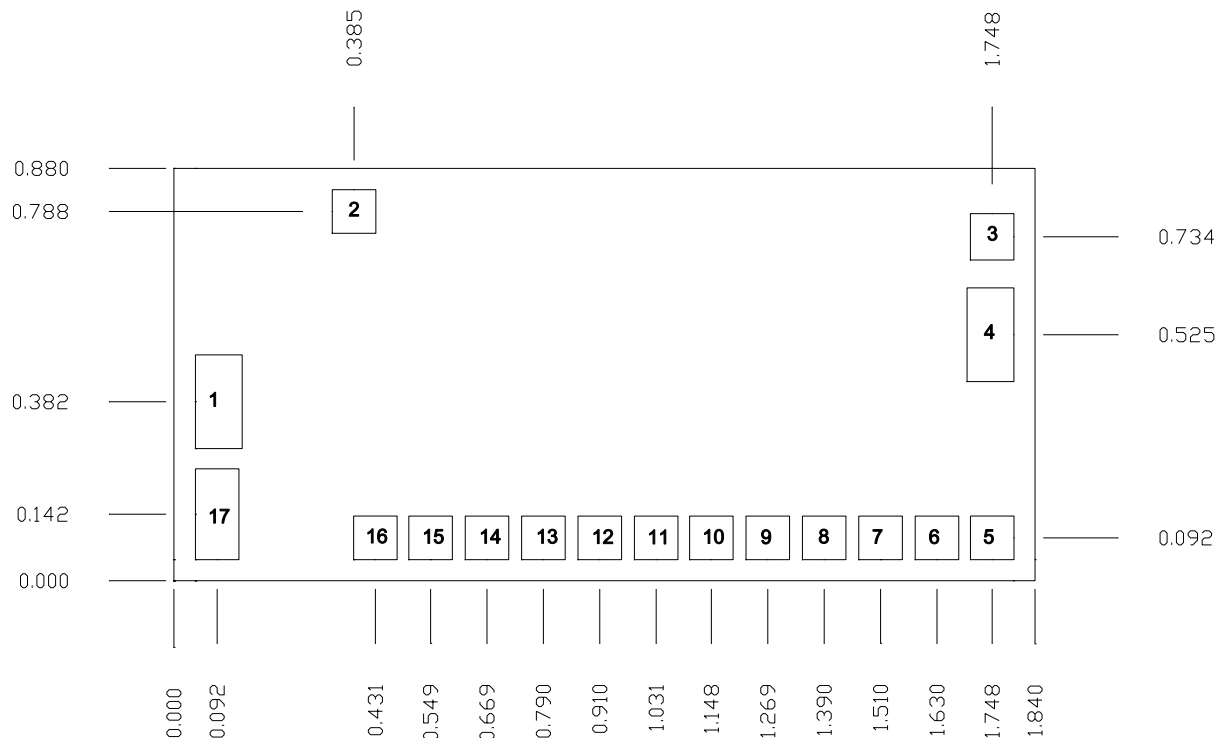
**Application Circuit**



### 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<sub>15</sub>H<sub>12</sub>Br<sub>4</sub>O<sub>2</sub>) 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](http://www.triquint.com)  
**Email:** [info-sales@tqs.com](mailto:info-sales@tqs.com)

**Tel:** +1.972.994.8465  
**Fax:** +1.972.994.8504

For technical questions and application information: **Email:** [info-networks@tqs.com](mailto:info-networks@tqs.com)

## Important Notice

The information contained herein is believed to be reliable. TriQuint makes no warranties regarding the information contained herein. TriQuint assumes no responsibility or liability whatsoever for any of the information contained herein. TriQuint assumes no responsibility or liability whatsoever for the use of the information contained herein. The information contained herein is provided "AS IS, WHERE IS" and with all faults, and the entire risk associated with such information is entirely with the user. All information contained herein is subject to change without notice. Customers should obtain and verify the latest relevant information before placing orders for TriQuint products. The information contained herein or any use of such information does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights, whether with regard to such information itself or anything described by such information.

TriQuint products are not warranted or authorized for use as critical components in medical, life-saving, or life-sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.