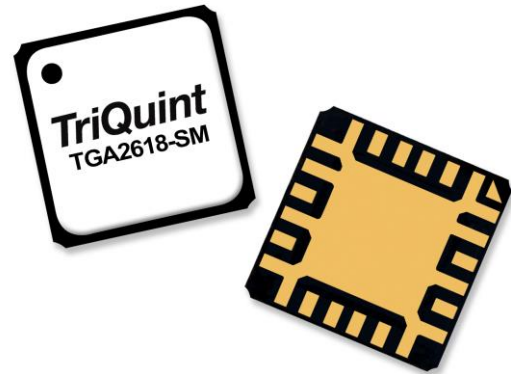


## Applications

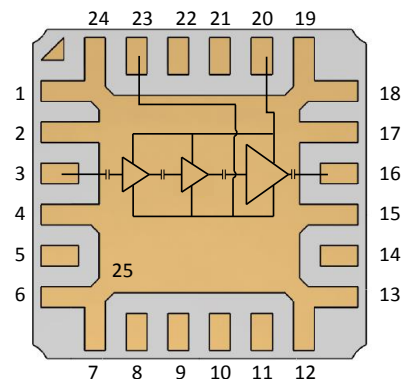
- Commercial and Military Radar
- Satellite Communications



## Product Features

- Frequency Range: 16 - 18 GHz
- NF: 2.3 dB
- Small Signal Gain: 28 dB
- Return Loss: >10 dB
- Output P1dB: 6 dBm
- $P_{SAT} = 10$  dBm at  $P_{IN} = -13$  dBm
- OTOI: 12 dBm ( $P_{OUT} = -2.5$  dBm)
- Bias:  $V_D = 3$  V,  $I_{DQ} = 30$  mA,  $V_G = -0.6$  V
- Package Dimensions: 4.0 x 4.0 x 1.5 mm

## Functional Block Diagram



## General Description

TriQuint's TGA2618-SM is a packaged Ku-band Low Noise Amplifier fabricated on TriQuint's TQPHT15 0.15  $\mu$ m GaAs pHEMT process. The TGA2618-SM operates from 16 to 18 GHz and typically provides 28 dB of small signal gain with 2.3 dB of noise figure.

The TGA2618-SM is available in a low cost, 4x4 mm air-cavity ceramic QFN. It is ideally suited to support both radar and satellite communications as either an LNA or a general purpose gain block.

Both RF ports have intergraded DC blocking caps and are fully matched to 50 ohms allowing for simple system integration.

Lead-free and RoHS compliant

Evaluation Boards are available upon request.

## Pad Configuration

Pad No.	Symbol
1, 2, 4, 6,7,12,13,15,17-19,24,25	Gnd
3	RF <sub>IN</sub>
5,8-11,14,21,22	N/C
16	RF <sub>OUT</sub>
20	V <sub>D</sub>
23	V <sub>G</sub>

## Ordering Information

Part	ECCN	Description
TGA2618-SM	EAR99	16 - 18 GHz GaAs LNA

## Absolute Maximum Ratings

Parameter	Value
Drain Voltage ( $V_D$ )	6 V
Gate Voltage Range ( $V_G$ )	-2 to 0 V
Drain Current ( $I_D$ )	70 mA
Gate Current ( $I_G$ )	-0.5 to 6 mA
Power Dissipation, 85 °C ( $P_{DISS}$ )	0.3 W
Input Power, CW, 50 $\Omega$ , ( $P_{IN}$ )	-4 dBm
Channel temperature ( $T_{CH}$ )	200 °C
Mounting Temperature (30 Seconds)	260 °C
Storage Temperature	-55 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	Value
Drain Voltage ( $V_D$ )	3 V
Drain Current ( $I_{DQ}$ )	30 mA
Gate Voltage ( $V_G$ )	-0.6 V Typical
Temperature ( $T_{BASE}$ )	-40 to 85 °C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed overall operating conditions.

## Electrical Specifications

Test conditions unless otherwise noted: 25 °C,  $V_D = 3V$ ,  $I_{DQ} = 30mA$ ,  $V_G = -0.6V$ , CW

Parameter	Min	Typical	Max	Units
Operational Frequency Range	16		18	GHz
Small Signal Gain		28		dB
Noise Figure		2.3		dB
Input Return Loss		>13		dB
Output Return Loss		>10		dB
Output Power at 1 dB Gain Compression		6		dBm
Output TOI ( $P_{OUT} = -2.5$ dBm, 10 MHz spacing)		12		dBm
Gain Temperature Coefficient		-0.02		dB/°C
Noise Figure Temperature Coefficient		0.008		dB/°C

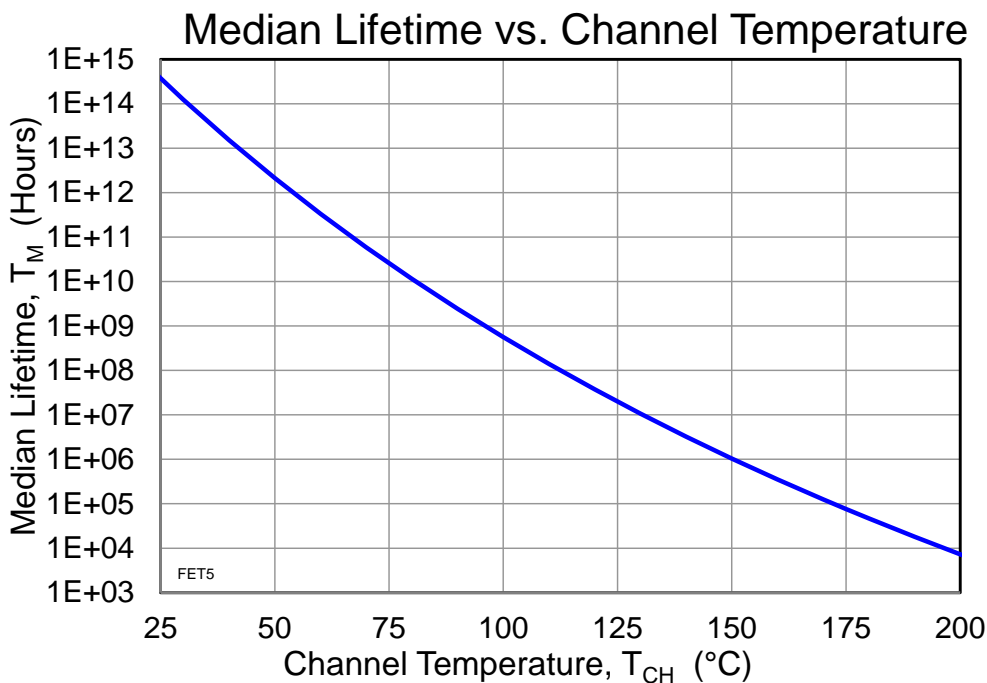
## Thermal and Reliability Information

Parameter	Test Conditions	Value	Units
Thermal Resistance ( $\theta_{JC}$ ) <sup>(1)</sup>	$T_{base} = 85\text{ }^{\circ}\text{C}$ , $V_D = 3\text{ V (CW)}$ $I_{DQ} = 30\text{ mA}$ , $P_{DISS} = 0.09\text{ W}$	200	$^{\circ}\text{C/W}$
Channel Temperature ( $T_{CH}$ ) (Without RF)		103	$^{\circ}\text{C}$
Median Lifetime ( $T_M$ )		$3.7 \times 10^8$	Hrs
Thermal Resistance ( $\theta_{JC}$ ) <sup>(1)</sup>	$T_{base} = 85\text{ }^{\circ}\text{C}$ , $V_D = 3\text{ V (CW)}$ $I_{DQ} = 30\text{ mA}$ , $I_{D\_Drive} = 52\text{ mA}$ $P_{IN} = -10\text{ dBm}$ , $P_{OUT} = 11\text{ dBm}$ , $\text{Freq} = 17\text{ GHz}$ , $P_{DISS} = 0.15\text{ W}$	200	$^{\circ}\text{C/W}$
Channel Temperature ( $T_{CH}$ ) (Under RF drive)		115	$^{\circ}\text{C}$
Median Lifetime ( $T_M$ )		$7.2 \times 10^7$	Hrs

Notes:

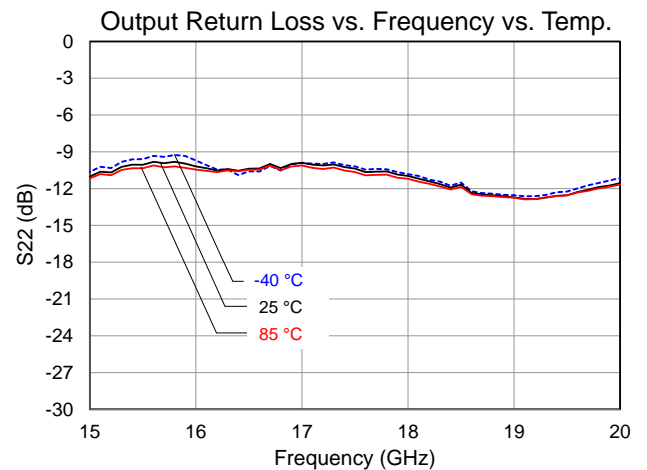
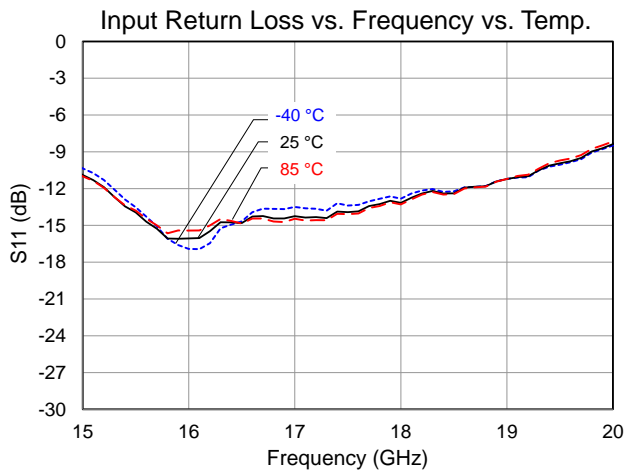
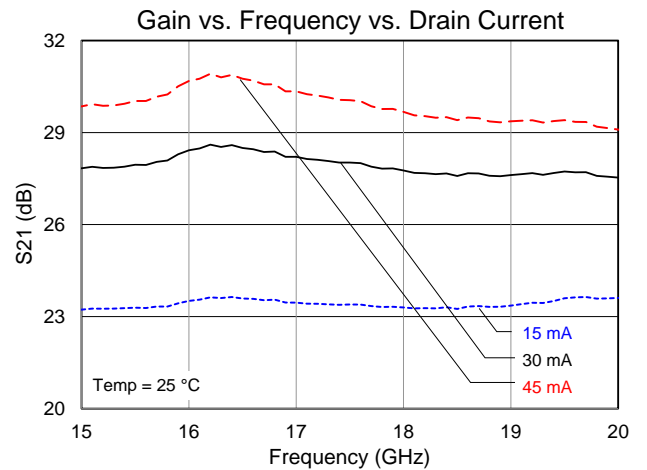
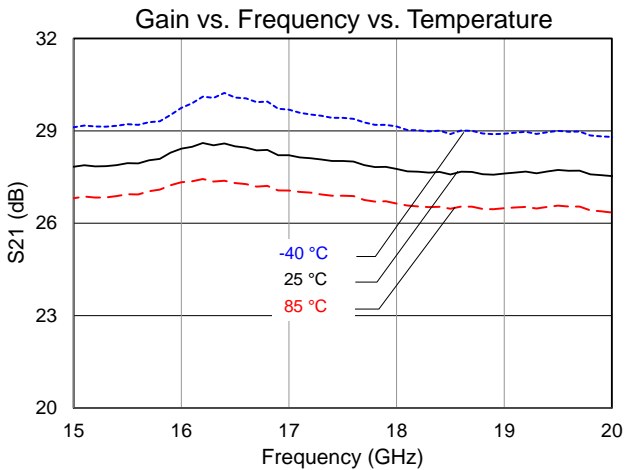
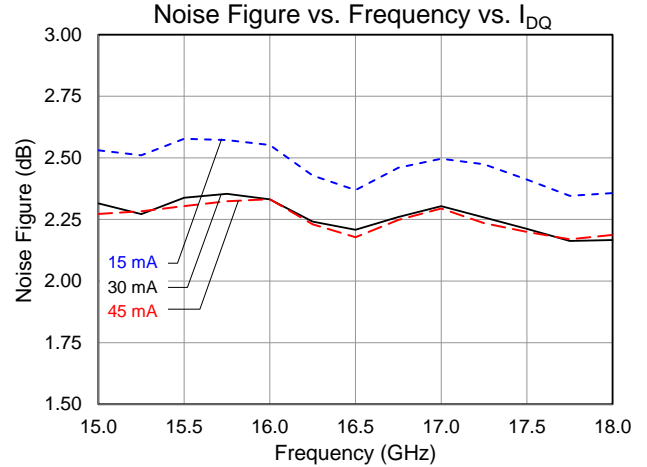
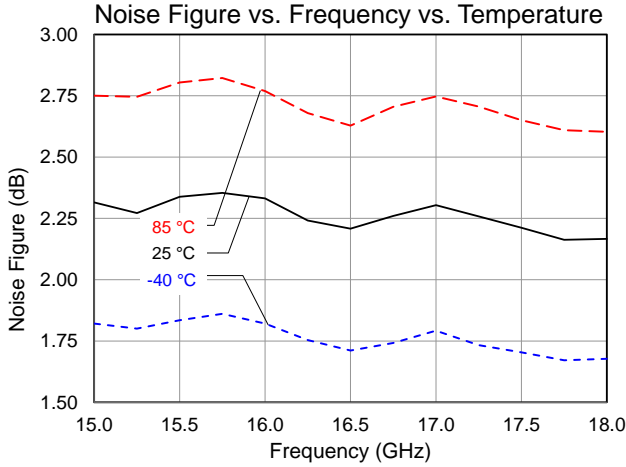
1. Thermal resistance measured at back of the package.

Test Conditions:  $V_D = 6\text{ V}$ ; Failure Criteria is 10% reduction in  $I_{D\_MAX}$



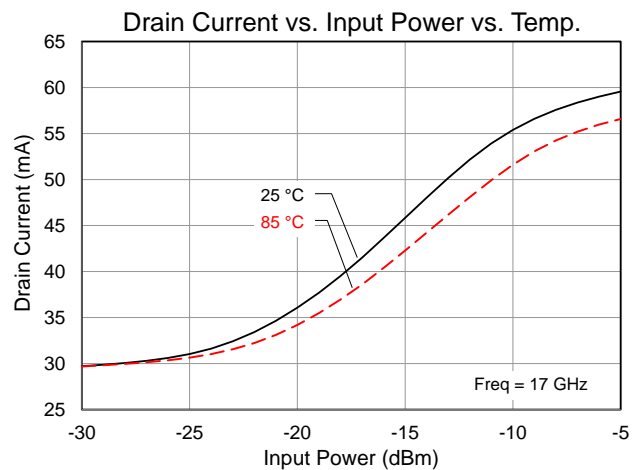
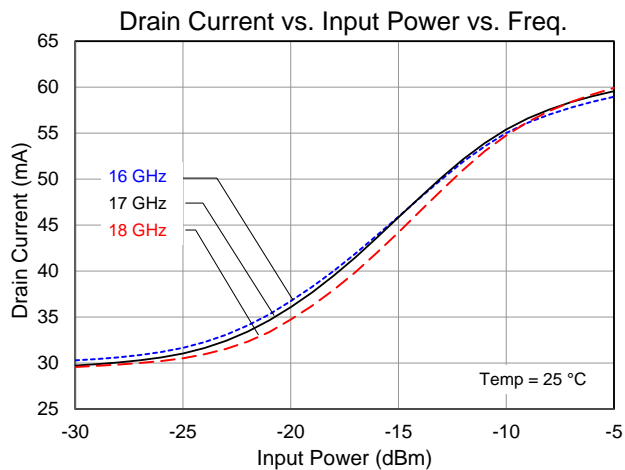
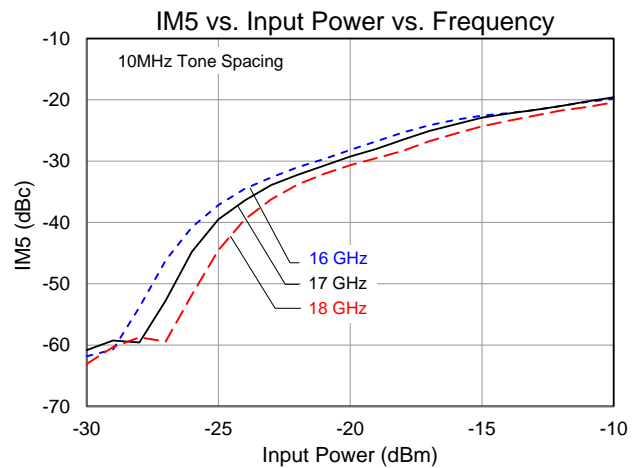
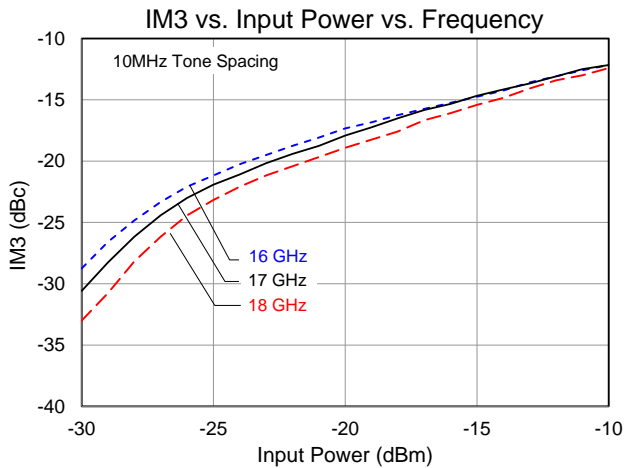
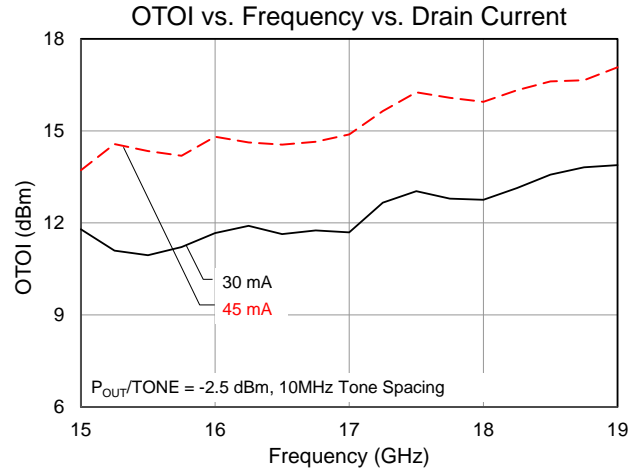
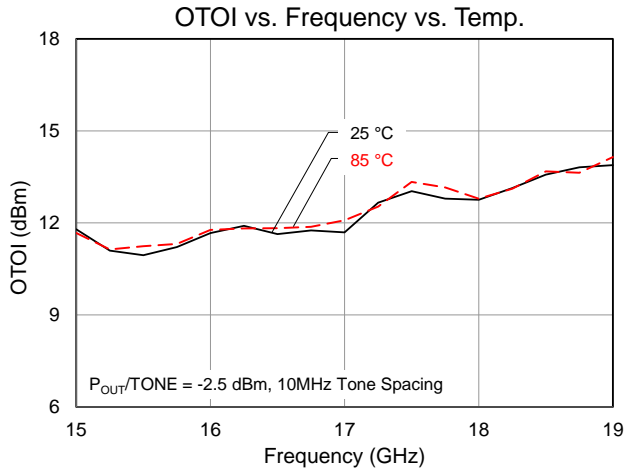
### Typical Performance: Small Signal

Conditions unless otherwise specified:  $V_D = 3\text{ V}$ ,  $I_{DQ} = 30\text{ mA}$ ,  $V_G = -0.6\text{ V}$ , CW



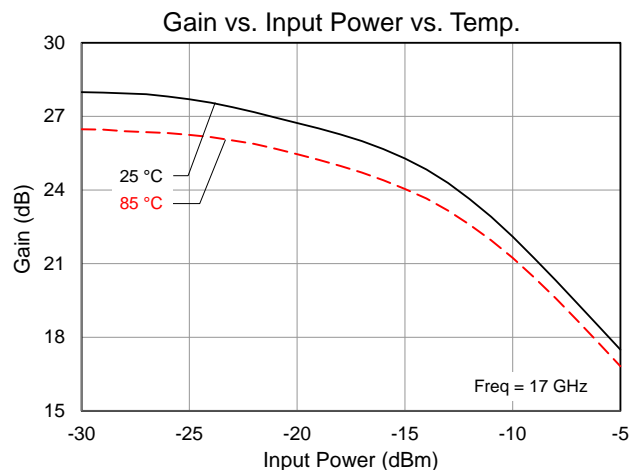
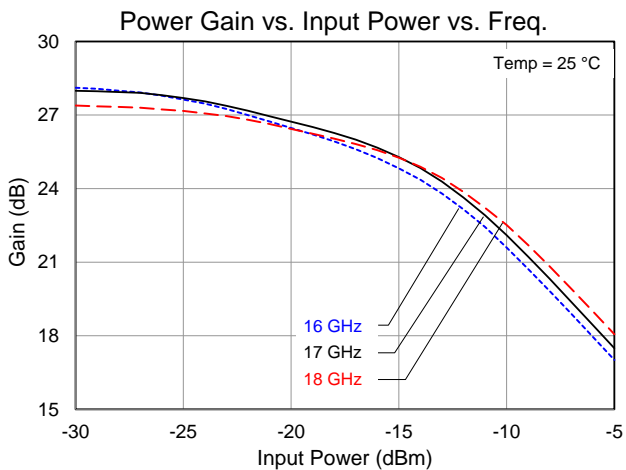
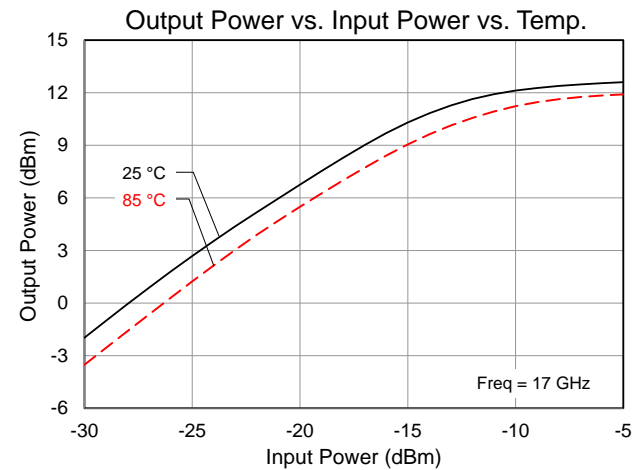
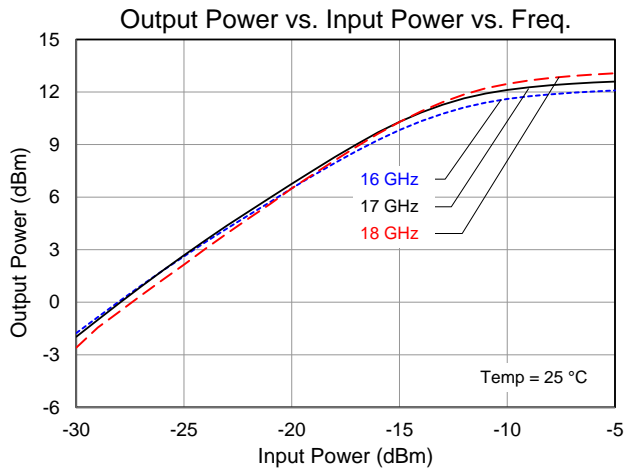
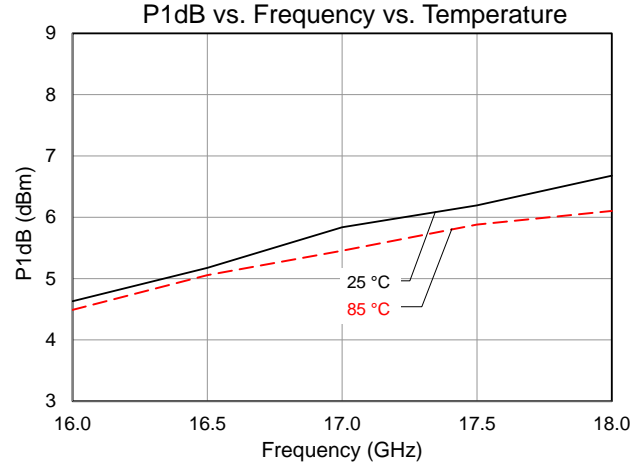
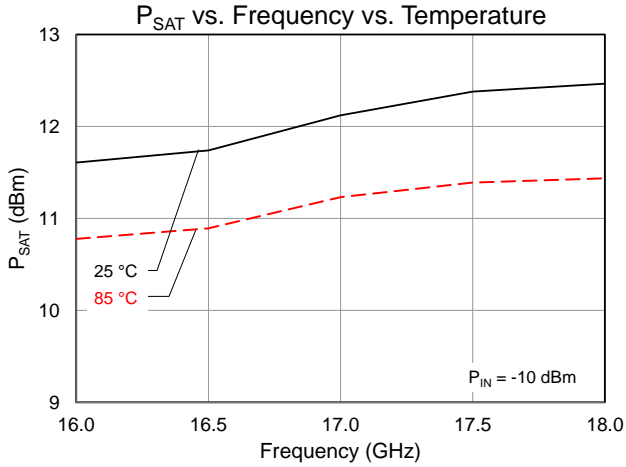
### Typical Performance: Linearity

Conditions unless otherwise specified:  $V_D = 3\text{ V}$ ,  $I_{DQ} = 30\text{ mA}$ ,  $V_G = -0.6\text{ V}$ , CW

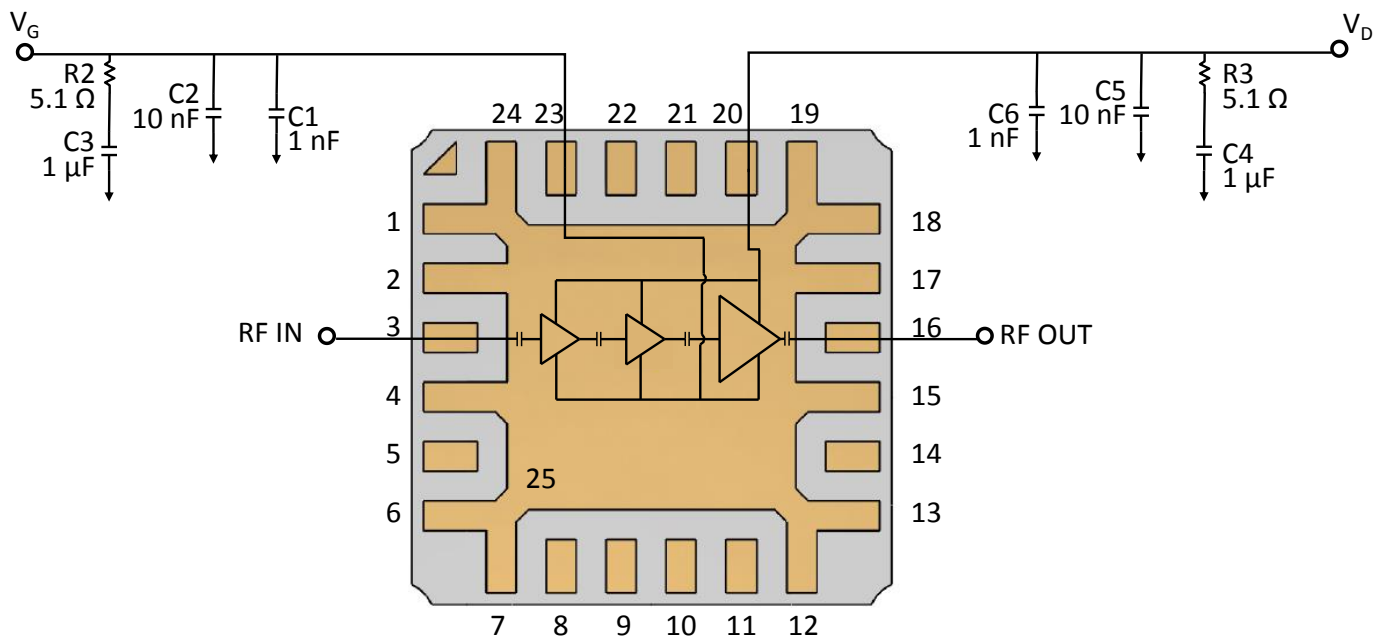


### Typical Performance: Large Signal

Conditions unless otherwise specified:  $V_D = 3\text{ V}$ ,  $I_{DQ} = 30\text{ mA}$ ,  $V_G = -0.6\text{ V}$ , CW



## Application Information



### Bias-up Procedure

1. Set  $I_D$  limit to 70 mA,  $I_G$  limit to 6 mA
2. Apply -2 V to  $V_G$  for pinch off
3. Apply +3 V to  $V_D$
4. Adjust  $V_G$  more positive until  $I_{DQ} = 30$  mA ( $V_G \sim -0.6$  V Typical)
5. Apply RF signal

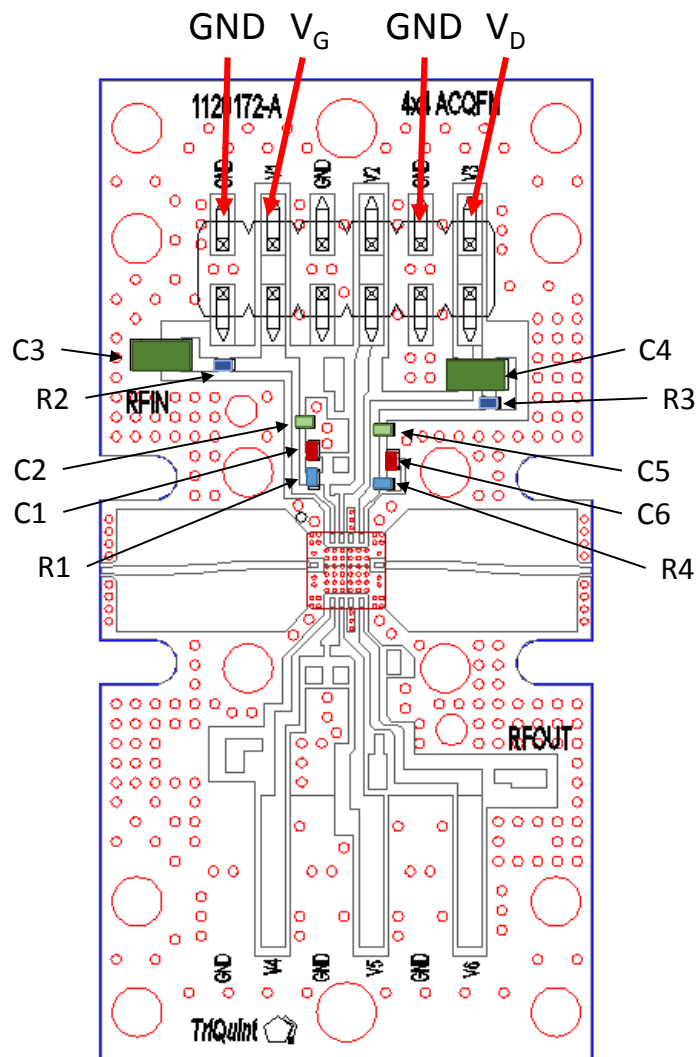
### Bias-down Procedure

1. Turn off RF signal
2. Reduce  $V_G$  to -2 V. Ensure  $I_{DQ} \sim 0$  mA
3. Set  $V_D$  to 0 V
4. Turn off  $V_D$  supply
5. Turn off  $V_G$  supply

### Pin Description

Pin No.	Symbol	Description
1, 2, 4, 6, 7, 12, 13, 15, 17-19, 24	Gnd	Recommend grounding on PCB
3	RF <sub>IN</sub>	Input; matched to 50 Ω; DC blocked
5, 8-11, 14, 21, 22	N/C	No Internal Connection
16	RF <sub>OUT</sub>	Output; matched to 50 Ω; DC blocked
20	$V_D$	Drain voltage; bias network is required; see recommended Application Information above.
23	$V_G$	Gate voltage; bias network is required; see recommended Application Information above.
25	Gnd	Ground Paddle. Multiple vias should be employed to minimize inductance and thermal resistance.

## Evaluation Board

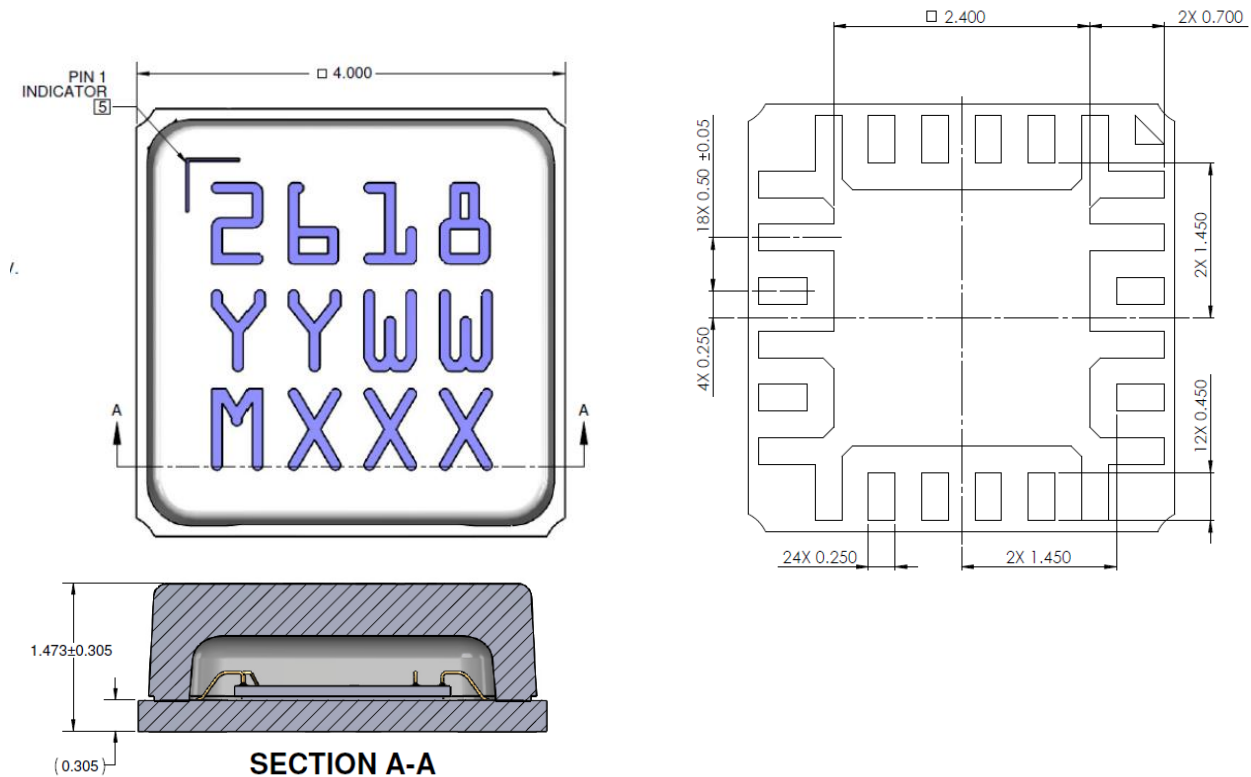


## Bill of Material

Reference Des.	Value	Description	Manuf.	Part Number
C1, C6	1 nF	Cap, 0402, X7R	Various	
C2, C5	10 nF	Cap, 0402, X7R	Various	
C3, C4	1 $\mu$ F	Cap, 1206, X5R	Various	
R1, R4	0 Ohms	Res, 0402 (Jumper required for above EVB design)	Various	
R2, R3	5.1 Ohms	Res, 0402	Various	



**Mechanical Information**



Units: millimeters

Tolerances: unless specified

x.xx = ± 0.01

x.xxx = ± 0.005

Materials:

Base: Ceramic

Lid: Plastic

All metalized features are Au plated

Part is epoxy sealed

Marking:

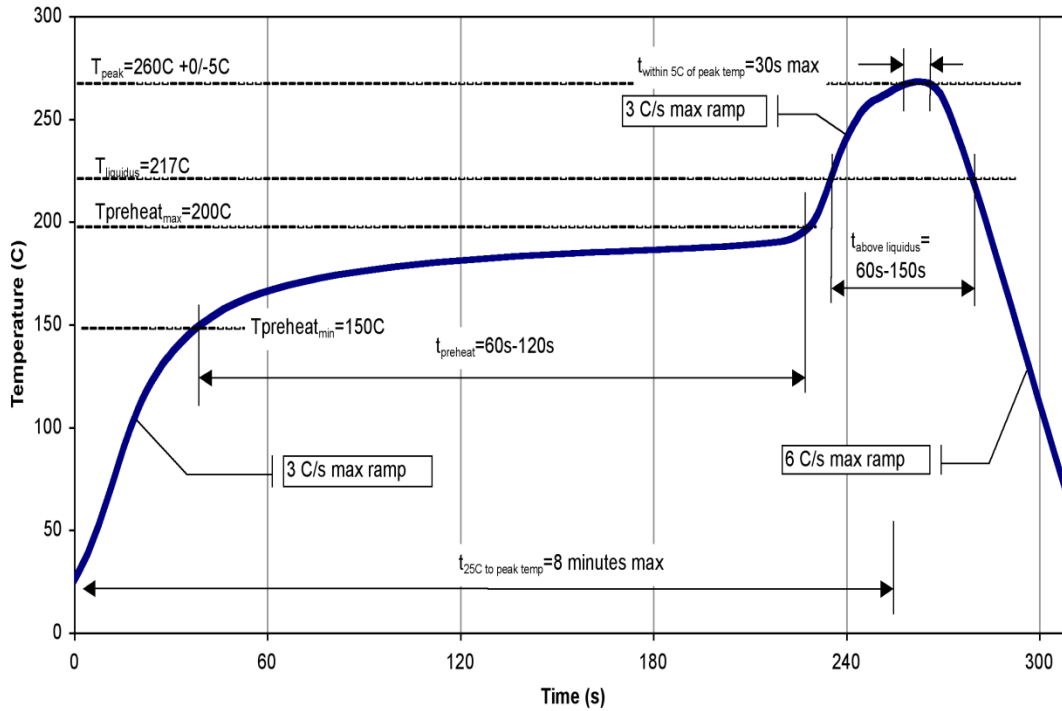
2618: Part number

YY: Part Assembly year

WW: Part Assembly week

MXXX: Lot ID

**Recommended Soldering Temperature Profile**



## Product Compliance Information

### ESD Sensitivity Ratings



Caution! ESD-Sensitive Device

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

### MSL Rating

Level TBD at TBD°C convection reflow  
The part is rated Moisture Sensitivity Level TBD at TBD°C  
per JEDEC standard IPC/JEDEC J-STD-020.

### ECCN

US Department of Commerce: EAR99

### Solderability

Compatible with the latest version of J-STD-020, Lead-free solder, 260 °C.

### 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

## Contact Information

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

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Fax: +1.972.994.8504

For technical questions and application information: Email: [info-products@triquint.com](mailto:info-products@triquint.com)

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