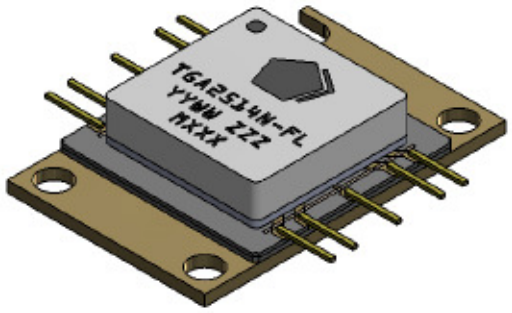
TGA2514N-FL

13 – 16 GHz Power Amplifier

Applications

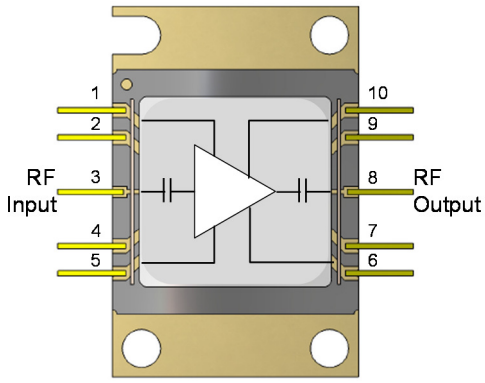
- Ku Band VSAT Transmitter
- Point to Point Radio



Product Features

- Frequency Range: 13 – 16 GHz
- Saturated Output Power: 38 dBm
- Small Signal Gain: 24 dB
- Input and Output Return Loss: 14 dB
- Bias Condition (V_D/I_{DQ}): 8.0V/2.6 A
- Package Size: 0.448 x 0.682 x 0.120 inches (11.379 x 17.323 x 3.048 mm)

Functional Block Diagram



General Description

Qorvo's TGA2514N-FL is a packaged Ku-band power amplifier operating from 13 – 16 GHz. Fabricated on Qorvo's production 0.25um GaAs pHEMT process (QPHT25), the TGA2514N–FL delivers 6.5 W of saturated output power with 24 dB of small signal gain. Performance is ideal for VSAT transmitters, data links and point to point radios.

To support easy system integration, the TGA2514N–FL is offered in a 10-pin flange–mounted package, offering robust handling and good thermal management. In addition, both RF ports have integrated DC blocking capacitors and are fully matched to 50 ohms.

Lead free and RoHS compliant.

Evaluation boards are available upon request.

Pad Configuration

Pad Number	Symbol
1, 5	V_G
2, 4, 7, 9	GND
3	RF Input
6, 10	V_D
8	RF Output

Ordering Information

Part	ECCN	Description
TGA2514N-FL	3A001.b.2.b	13 – 16 GHz Power Amplifier
TGA2514N-FL_EVB	EAR99	13 – 16 GHz Power Amplifier Evaluation Board

Absolute Maximum Ratings

Parameter	Value
Drain Voltage (V_D)	9.0 V
Drain Current (I_D)	3.8 A
Gate Voltage Range (V_G)	-5 to 0 V
Gate Current (I_G)	-18 to +18 mA
Input Power, CW (P_{IN})	21 dBm
Power Dissipation (P_{DISS})	33.3 W
Operating Channel Temperature	200 °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_G)	8.0 V
Gate Voltage (V_S)	-0.65 V
Drain Current (I_{DQ})	2.6 A

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

Electrical Specifications

Test conditions, unless otherwise noted: Temp = 25 °C, V_D = 8.0 V, I_{DQ} = 2.6 A

Parameter	Min	Typical	Max	Units
Frequency Range	13		16	GHz
Small Signal Gain		24		dB
Saturated Output Power		38		dBm
Input Return Loss		14		dB
Output Return Loss		14		dB

Specifications

Thermal and Reliability Information

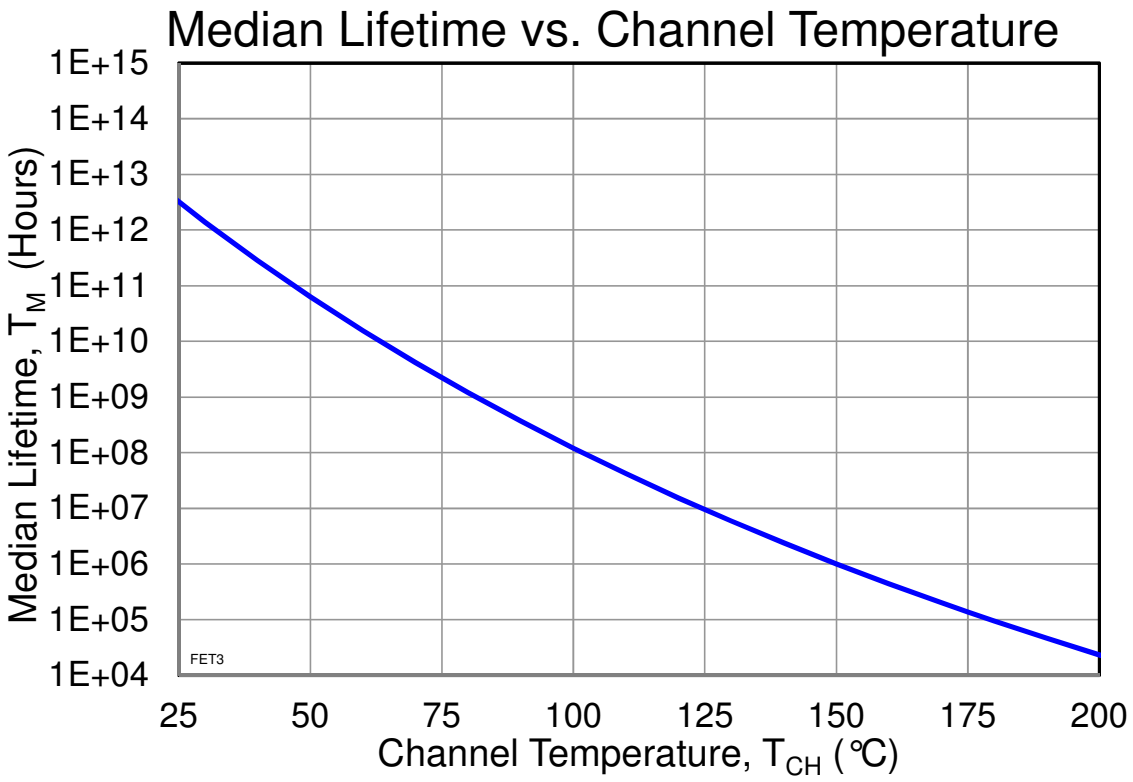
Parameter	Conditions	Value	Units
Thermal Resistance (θ_{JC}) (1)	T_{BASE} = 70 °C, V_D = 8 V I_{DQ} = 2.6 A, P_{DISS} = 20.8 W	3.9	ºC/W
Channel Temperature (T_{CH}) (1)		151	°C
Median Lifetime (T_M)		9.3E5	Hrs
Thermal Resistance (θ_{JC}) (1)	T_{BASE} = 70 °C, V_D = 8 V I_{DQ} = 2.6 A, P_{DISS} = 22.5 W (Under RF Drive)	3.9	ºC/W
Channel Temperature (T_{CH}) (1)		158	°C
Median Lifetime (T_M)		5.2E5	Hrs

Note:

1. Package backside temperature fixed at 70 °C.

Median Lifetime

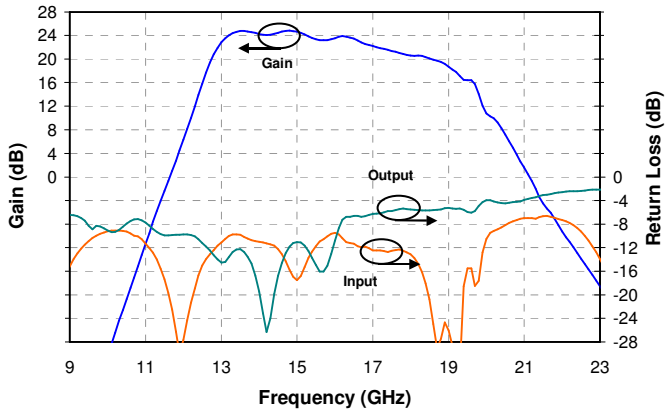
Failure Criterion = 10% reduction in $I_{D\ MAX}$



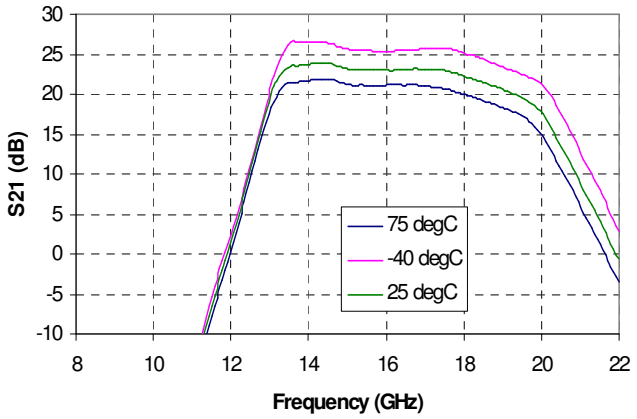
Typical Performance – Small Signal and Power

Test conditions, unless otherwise noted: Temp = 25 °C, V_D = 8.0 V, I_{DQ} = 2.6 A

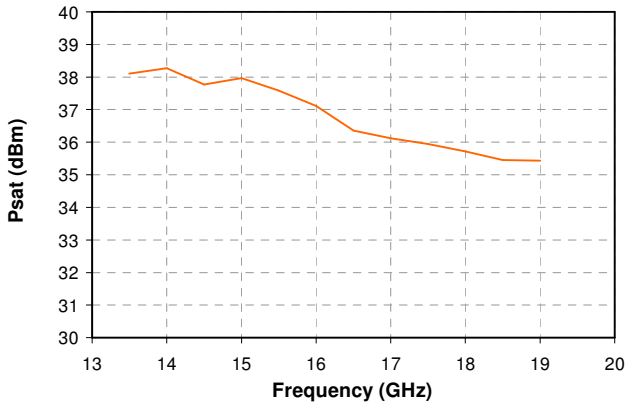
Gain and Return Loss vs. Frequency



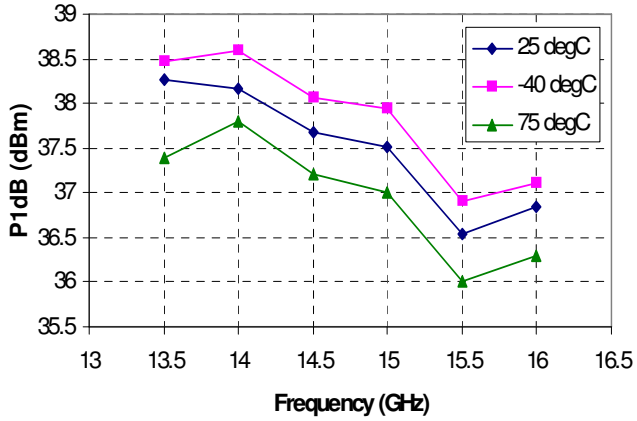
Gain vs. Frequency vs. Temperature



Saturated Output Power vs. Frequency



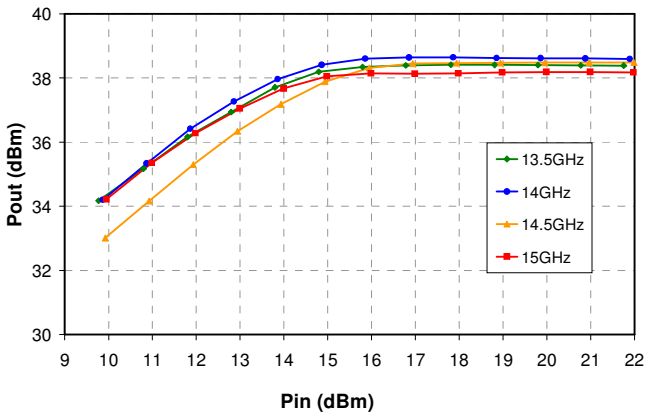
P1dB vs. Frequency vs. Temperature



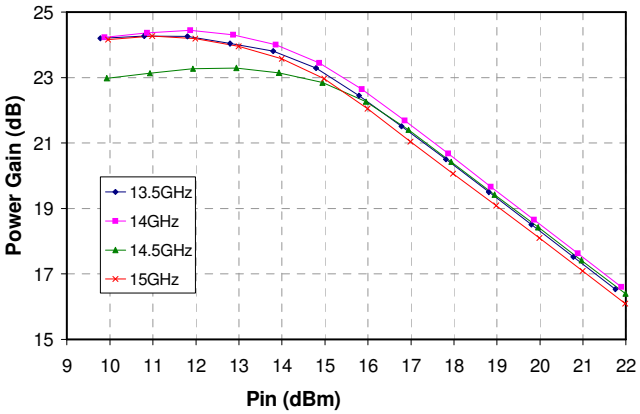
Typical Performance – Power

Test conditions, unless otherwise noted: Temp = 25 °C, V_D = 8.0 V, I_{DQ} = 2.6 A

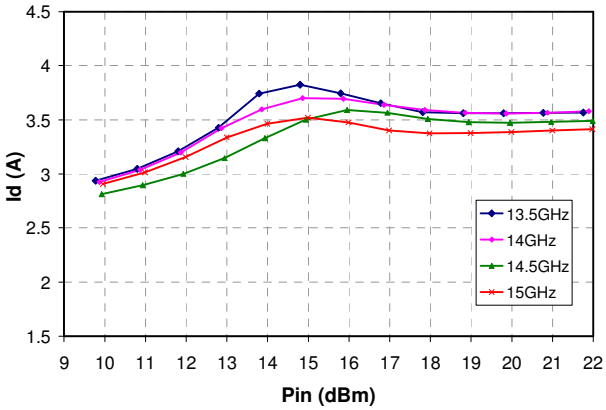
Output Power vs. Input Power vs. Frequency



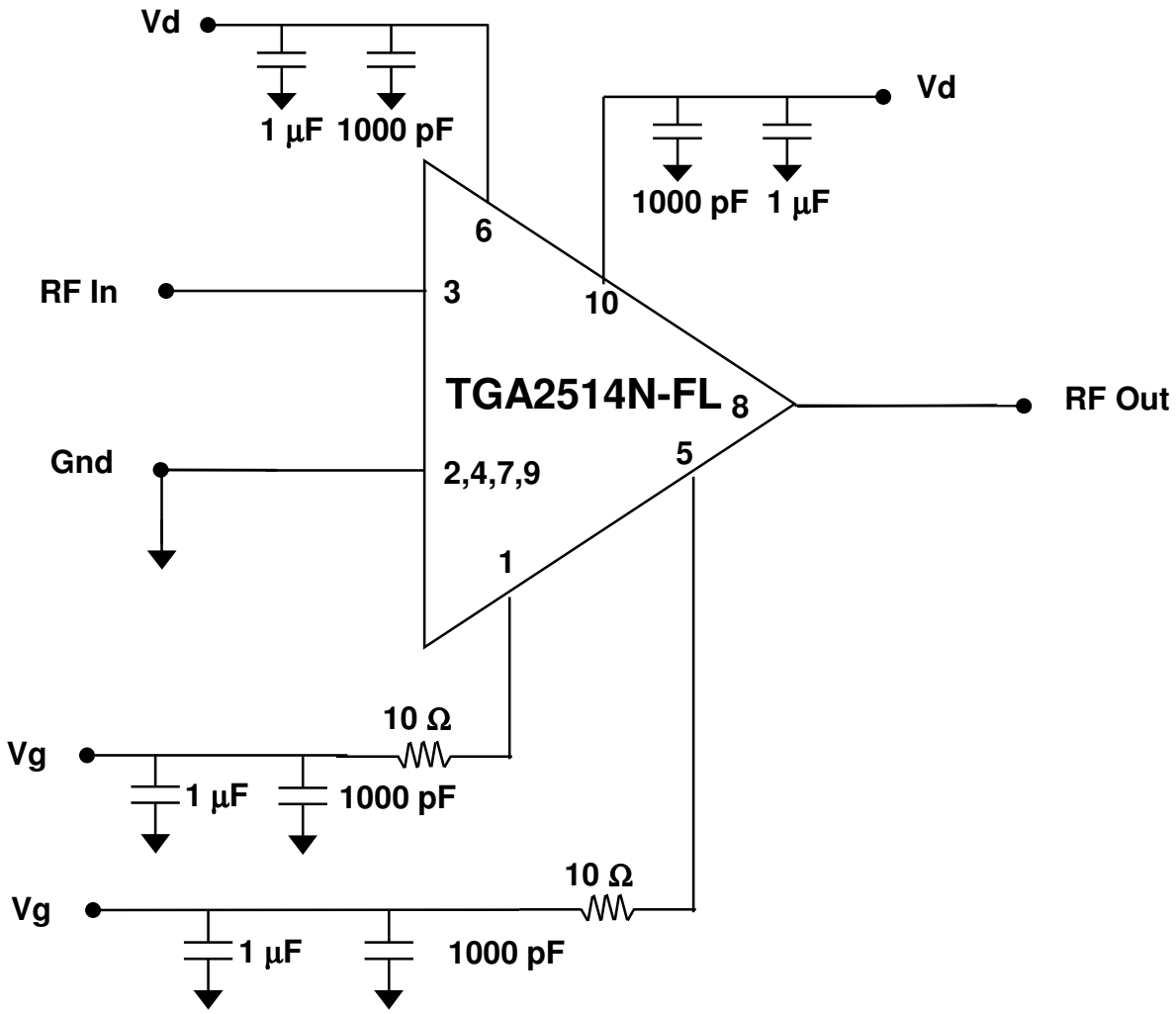
Gain vs. Input Power vs. Frequency



Drain Current vs. Input Power vs. Frequency



Application Circuit



Note: Vg can be biased from either Pin 1 or Pin 5

Bias-up Procedure
1. Set I_D limit to 3300 mA, I_G limit to 18 mA
2. Set V_G to –1.5 V
3. Set V_D +8 V
4. Adjust V_G more positive until I_{DQ} = 2600 mA (V_G ~ –0.65 V Typical)
5. Apply RF signal

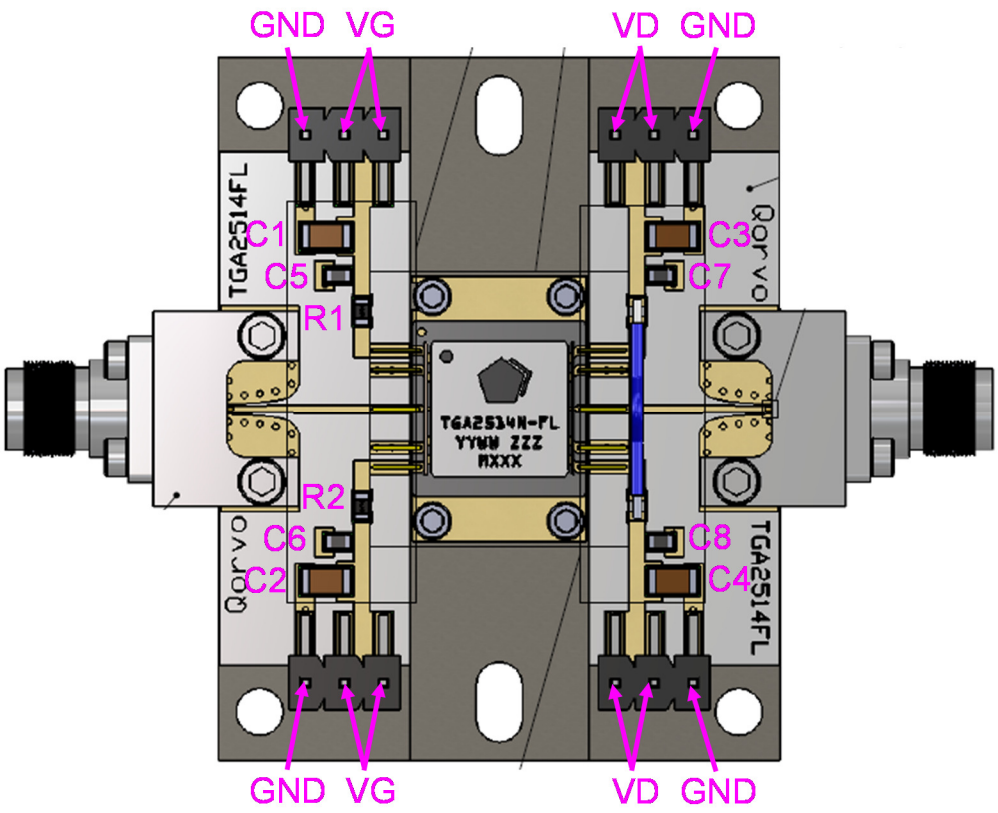
Bias-down Procedure
1. Turn off RF signal
2. Reduce V_G to –1.5V. Ensure I_{DQ} ~ 0mA
3. Set V_D to 0V
4. Turn off V_D supply
5. Turn off V_G supply

Applications Information

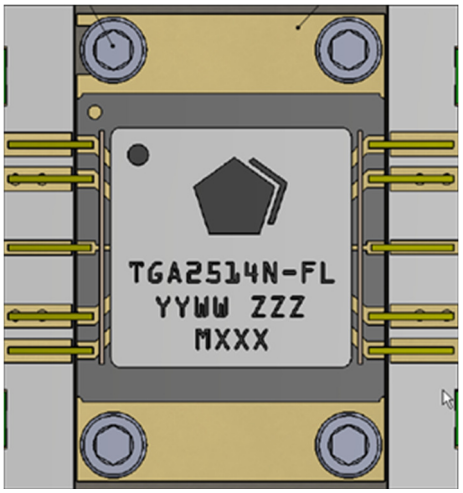
Evaluation Board Layout

RF Layer is 0.010" thick Rogers Corp. RO4350, εr = 3.38. Metal layers are 0.5 oz. copper. The microstrip line at the connector interface is optimized for the Southwest Microwave end launch connector 1092-01A-5.

The pad pattern shown has been developed and tested for optimized assembly at TriQuint Semiconductor. The PCB land pattern has been developed to accommodate lead and package tolerances. Since surface mount processes vary from company to company, careful process development is recommended.

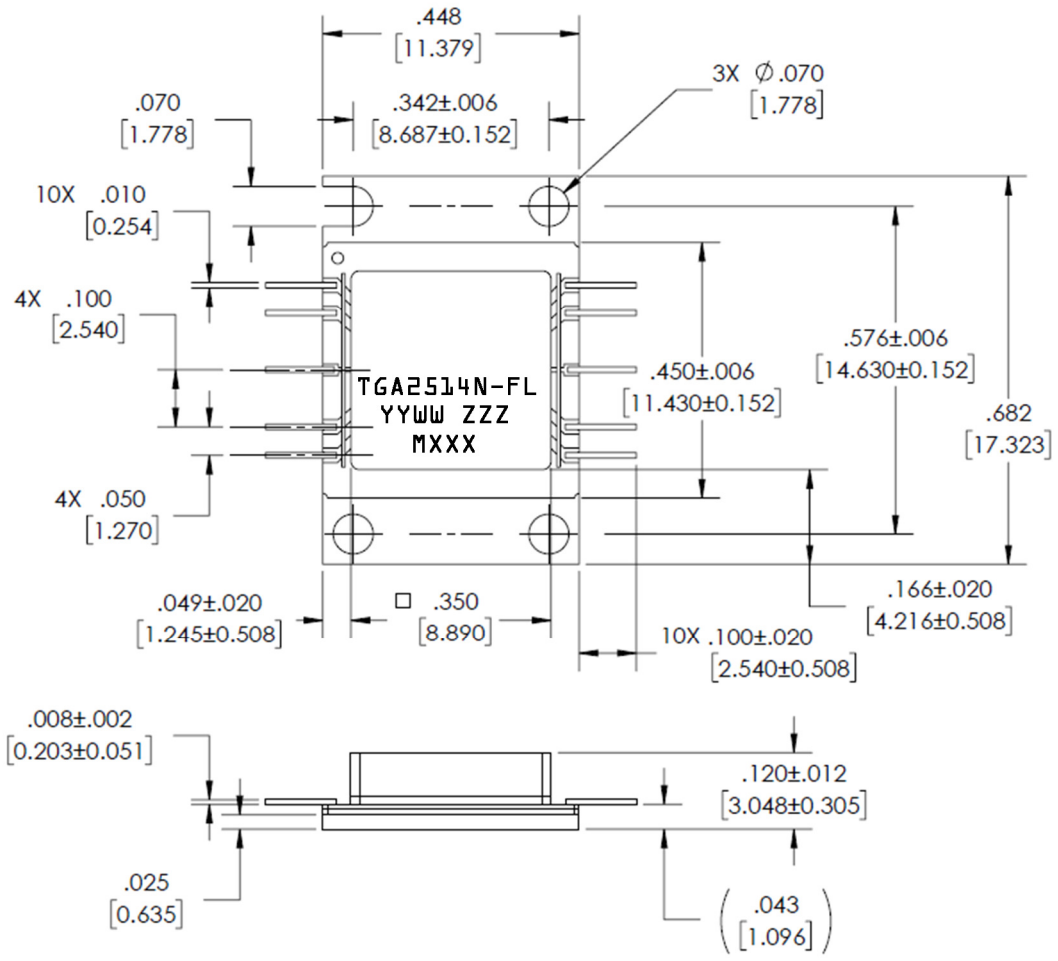


Package Mounting Detail



Ref. Designation.	Value	Description	Manufacturer
C1 – C4	1 uF, 50V, 5%	CAP CER X7R 1206	Various
C5 – C8	1000 pF, 50V, 5%	CAP CER NP0 0603	Various
R1 – R2	10 OHM, 1/10W	RES 0603, SMD	Various

Mechanical Drawing



(1) Units: inches [mm]
(2) Exposed metallization is Ni/Au plated
(3) Parts are non-hermetic
(4) Unless noted, tolerance is ±.005
(5) Drawing subject to change without notice

Marking:
TGA2514N-FL: Part number
YY: Part Assembly year
WW: Part Assembly week
ZZZ: Serial Number
MXXX: Batch ID

Pin No.	Label	Description
1, 5	V_G	Gate Voltage; bias network is required, part can be biased from either pin
2, 4, 7, 9	GND	Ground
3	RF Input	RF Input; 50 Ω, AC coupled
6, 10	V_D	Drain Voltage; bias network is required, part must be biased from both pins
8	RF Output	RF Output; 50 Ω, AC coupled

Assembly Notes

1. Clean the board or module with alcohol. Allow it to dry fully.
2. Nylock screws are recommended for mounting the TGA2514N-FL to the neat sink carrier.
3. To improve the thermal and RF performance, we recommend applying thermal compound or a 4 mil thick indium shim between the package and the heat sink
4. Apply solder to each pin of the TGA2514N-FL.
5. Clean the assembly with alcohol.

Product Compliance Information

ESD Sensitivity Ratings

Caution! ESD-Sensitive Device

ESD Rating: 0B
Value: ≤ 250 V
Test: Human Body Model (HBM)
Standard: JEDEC Standard JESD22-A114

MSL Rating

Level 3 at +260 °C convection reflow.
The part is rated Moisture Sensitivity Level 3 at 260°C per JEDEC standard IPC/JEDEC J-STD-020.

ECCN

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

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 (C15H12Br402) Free
- PFOS Free
- SVHC Free

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: customer.support@qorvo.com

For information about the merger of RFMD and TriQuint as Qorvo:

Web: www.qorvo.com

For technical questions and application information: **Email:** info-products@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.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Qorvo:
TGA2514N-FL