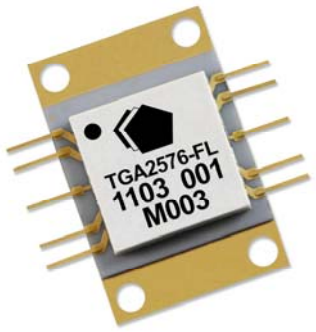
TGA2576-FL

2.5 to 6 GHz GaN HEMT Power Amplifier

Applications

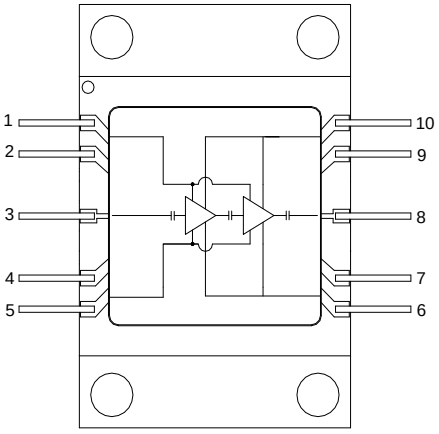
- Communications
- Electronic Warfare
- Test Instrumentation
- EMC Amplifier



Product Features

- Frequency Range: 2.5 – 6 GHz
- Psat: 45.5 dBm @ Pin = 26 dBm
- PAE: 35 %
- Small Signal Gain: 26 dB
- Bias: Vd = 30 V, Idq = 1.55 A, Vg = -3.3 V Typical
- Dimensions: 11.4 x 17.3 x 3.0 mm

Functional Block Diagram



General Description

TriQuint's TGA2576-FL is a packaged wideband power amplifier fabricated on TriQuint's production-released 0.25um GaN on SiC process. Operating from 2.5 GHz to 6 GHz, it achieves 45.5 dBm saturated output power, 35% PAE and 26 dB small signal gain.

Fully matched to 50 ohms and with integrated DC blocking caps on both I/O ports, the TGA2576-FL is ideally suited to support both commercial and defense related opportunities.

Pin out Configuration

Pin #	Symbol
1,5	Vg
2,4,7,9	NC
3	RF In
6	Vd Bot
8	RF Out
10	Vd Top

Ordering Information

Part No.	ECCN	Description
TGA2576-FL	3A001.b.2.a	2.5-6 GHz 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	4500 mA
Gate Current, Ig	-18 to 50 mA
Power Dissipation, Pdiss	84 W
RF Input Power, CW, 50Ω,T = 25ºC	28 dBm
Channel Temperature, Tch	275 °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	Typical	Max	Units
Vd		30		V
Idq		1550		mA
Id_drive (Under RF Drive)		2500 - 3500	4000	mA
Vg		-3.3		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: 25 ºC, Vd = 30 V, Idq = 1550 mA, Vg = -3.3 V Typical.

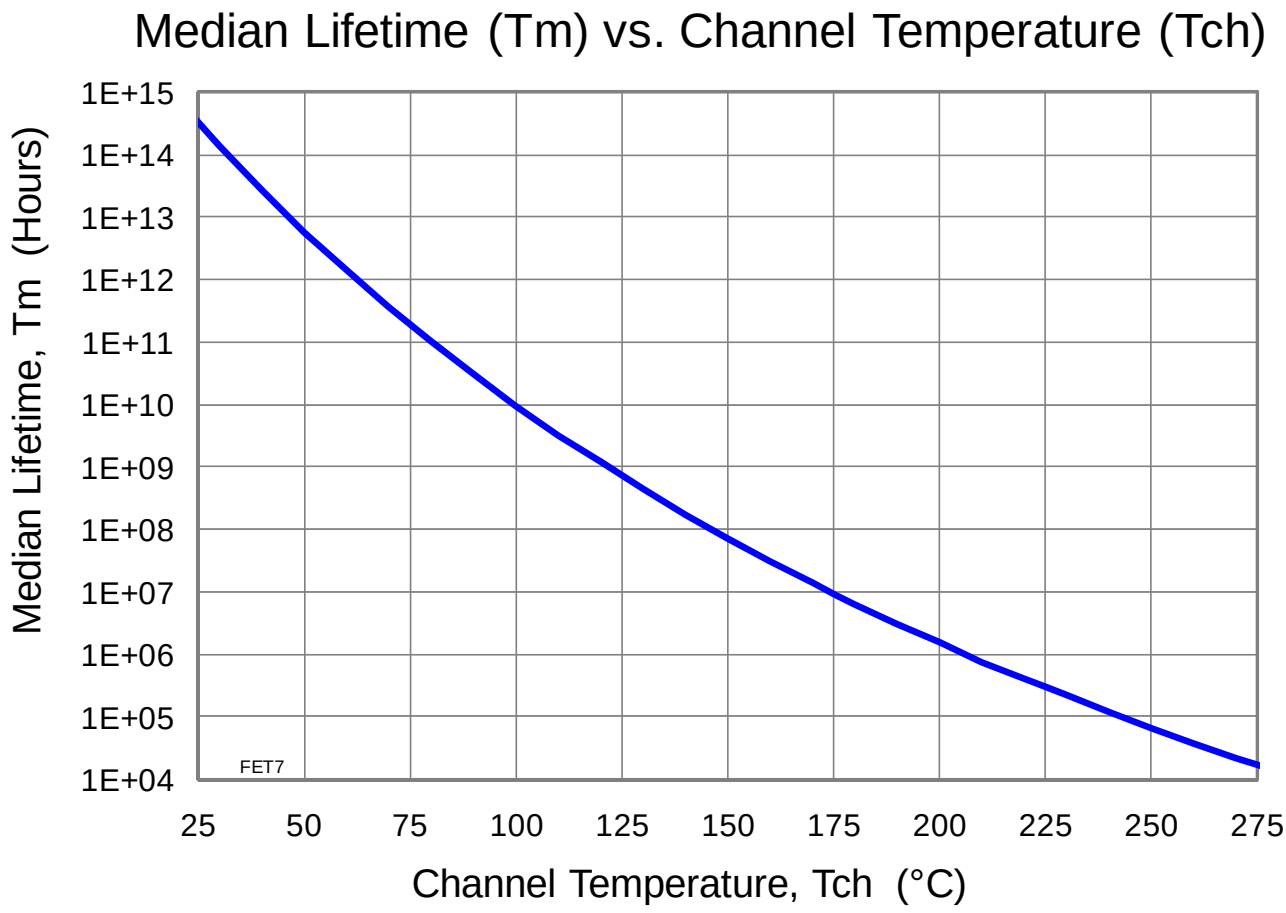
Parameter	Min	Typical	Max	Units
Operational Frequency Range	2.5		6	GHz
Small Signal Gain		26		dB
Output Power @ Saturation		45.5		dBm
Power-added efficiency		35		%
Gain Temperature Coefficient		- 0.04		dB/°C
Power Temperature Coefficient		- 0.02		dBm/°C

Specifications (cont.)

Thermal and Reliability Information

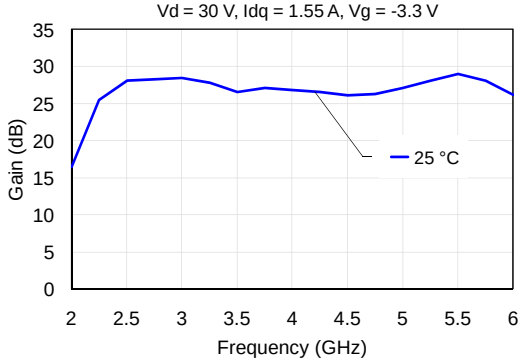
Parameter	Condition	Rating
Thermal Resistance, θ_{JC}, measured to back of package	Tbase = 85 °C	θ_{JC} = 1.47 °C/W
Channel Temperature (Tch), and Median Lifetime (Tm)	Tbase = 85 °C, Vd = 30 V, Idq = 1550 mA, Pdiss = 46.5 W	Tch = 153 °C Tm = 5.5 E+7 Hours
Channel Temperature (Tch), and Median Lifetime (Tm) Under RF Drive	Tbase = 85 °C, Vd = 30 V, Id = 3000 mA, Pout = 44 dBm, Pdiss = 64.9 W	Tch = 180 °C Tm = 6.3 E+6 Hours

Note: Thermal model to backside of package

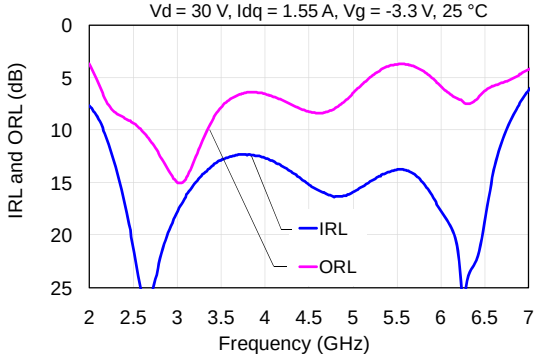


Typical Performance

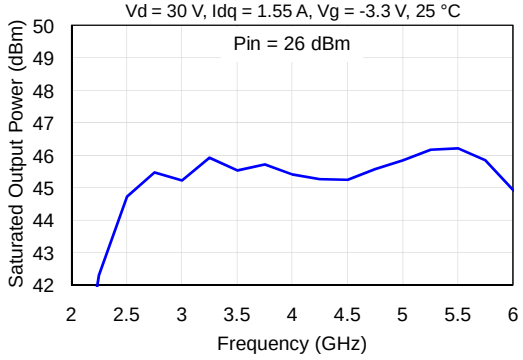
Gain vs. Frequency
Vd = 30 V, Idq = 1.55 A, Vg = -3.3 V



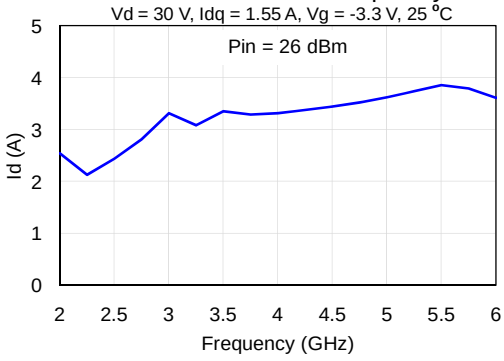
Return Loss vs. Frequency
Vd = 30 V, Idq = 1.55 A, Vg = -3.3 V, 25 °C



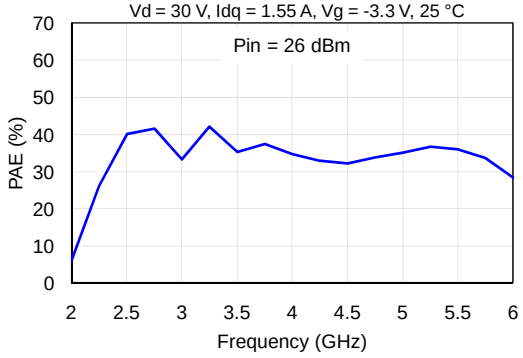
Saturated Output Power vs. Frequency
Vd = 30 V, Idq = 1.55 A, Vg = -3.3 V, 25 °C



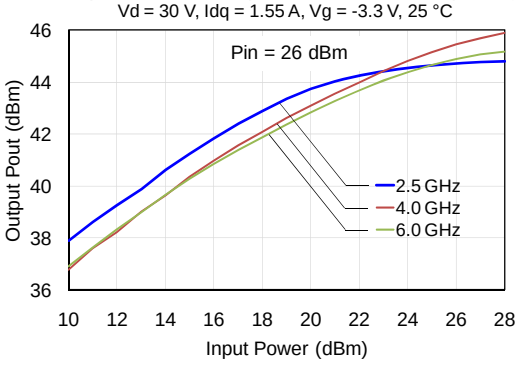
Drain Current vs. Frequency
Vd = 30 V, Idq = 1.55 A, Vg = -3.3 V, 25 °C



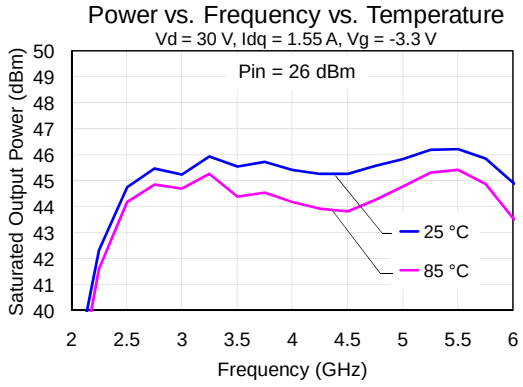
PAE vs. Frequency
Vd = 30 V, Idq = 1.55 A, Vg = -3.3 V, 25 °C

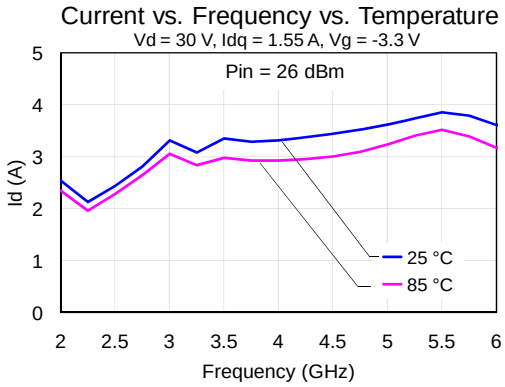


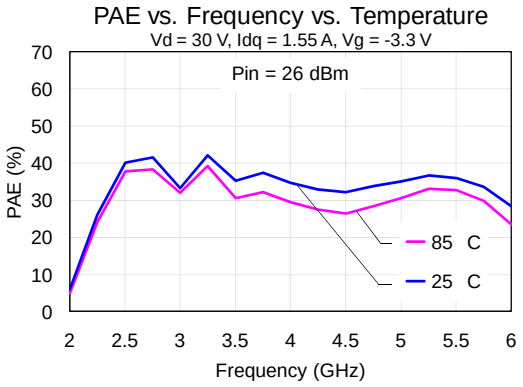
Output Pout vs. Input Power vs. Frequency
Vd = 30 V, Idq = 1.55 A, Vg = -3.3 V, 25 °C

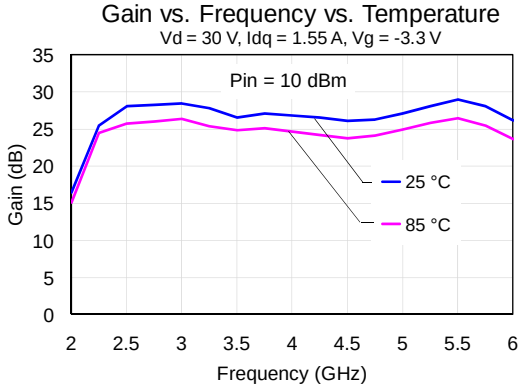


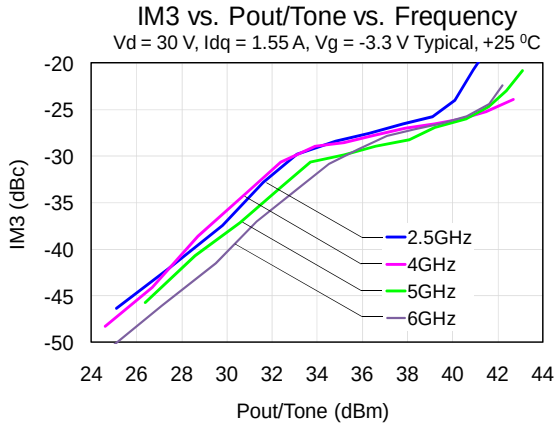
Typical Performance (cont.)

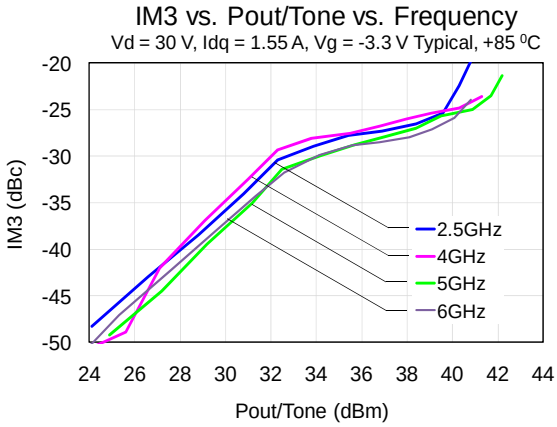




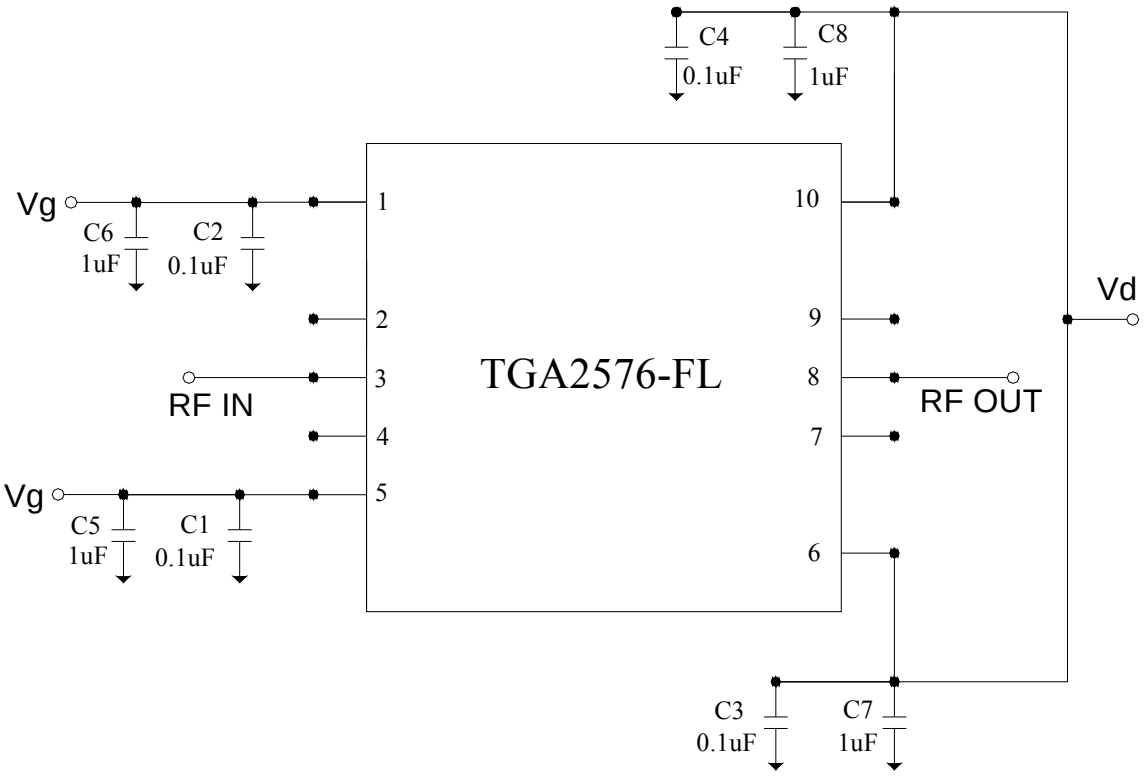








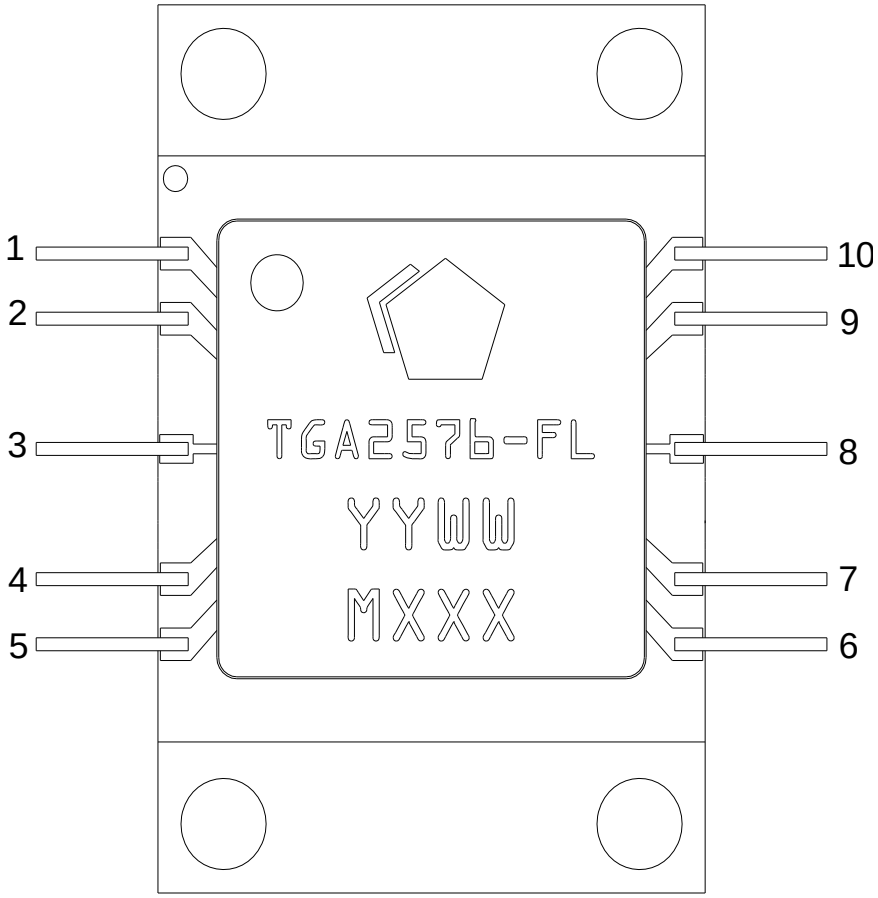
Application Circuit



Vg can be biased from either side (pins 1 or 5).
Vd must be biased from both sides (pins 6 and 10).

Bias-up Procedure	Bias-down Procedure
Vg set to -5.0 V	Turn off RF signal
Vd set to +30 V	Reduce Vg to -5.0 V. Ensure Id ~ 0 mA
Adjust Vg more positive until quiescent Id is 1400 mA. This will be ~ Vg = -3.3 V typical	Set Vd to 0 V
Apply RF signal	Set Vg to 0 V

Pin Description

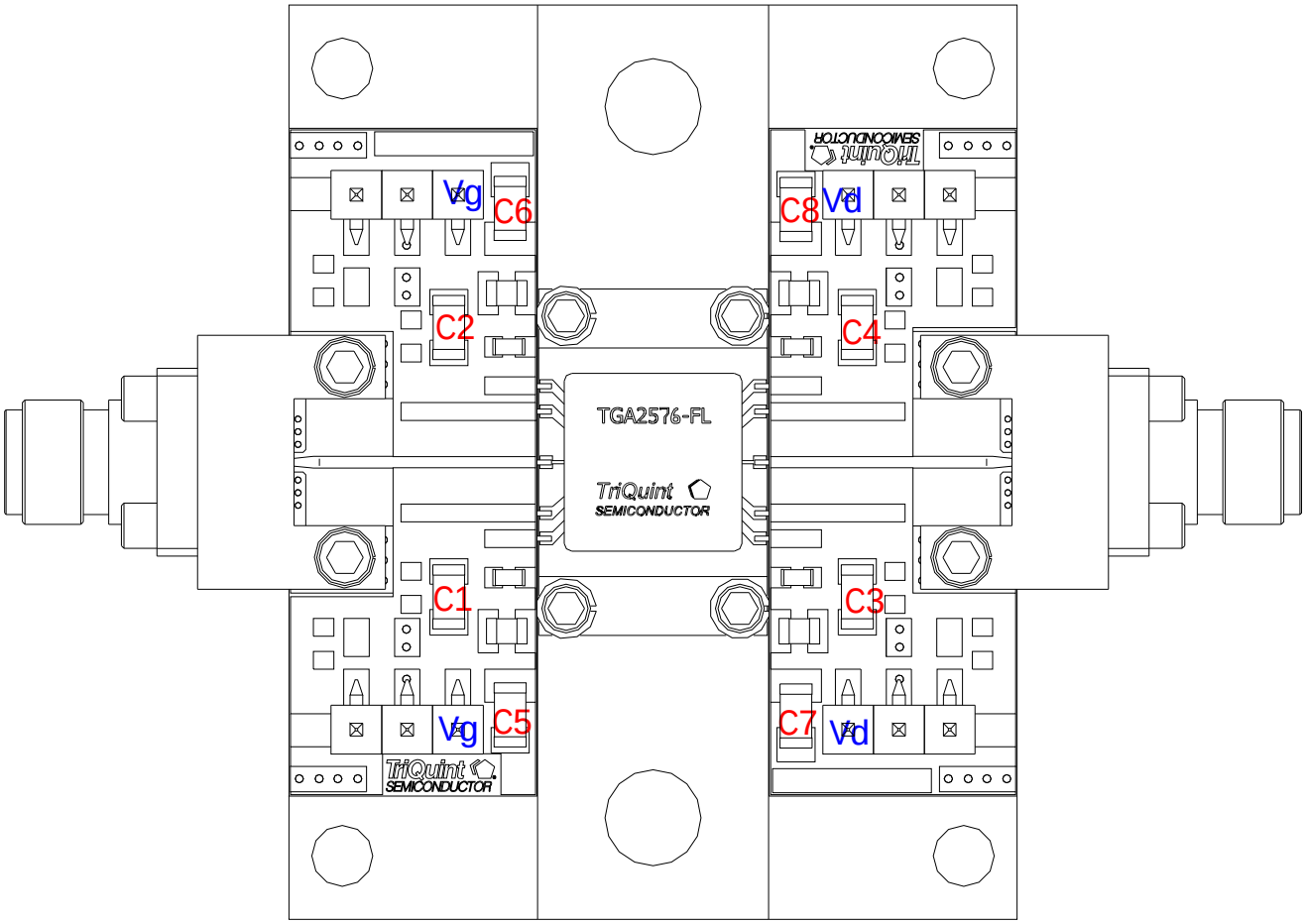


Pin	Symbol	Description
3	RF In	Input, matched to 50 ohms.
1	Vg	Gate voltage. See Note 1.
10	Vd Top	Top Drain voltage. See Note 2.
8	RF Out	Output, matched to 50 ohms.
6	Vd Bot	Bottom Drain voltage. See Note 2.
5	Vg	Gate voltage. See Note 1.
2,4,7,9	N/C	No internal connection; may be grounded or left open on PCB
	(Package Base)	RF and DC ground

Notes:

1. Bias network is required; can be biased from either side (pin 1 or pin 5); see Application Circuit on page 6 as an example.
2. Bias network is required; must be biased from both sides (pins 6 and 10); see Application Circuit on page 6 as an example.

Evaluation Board Layout



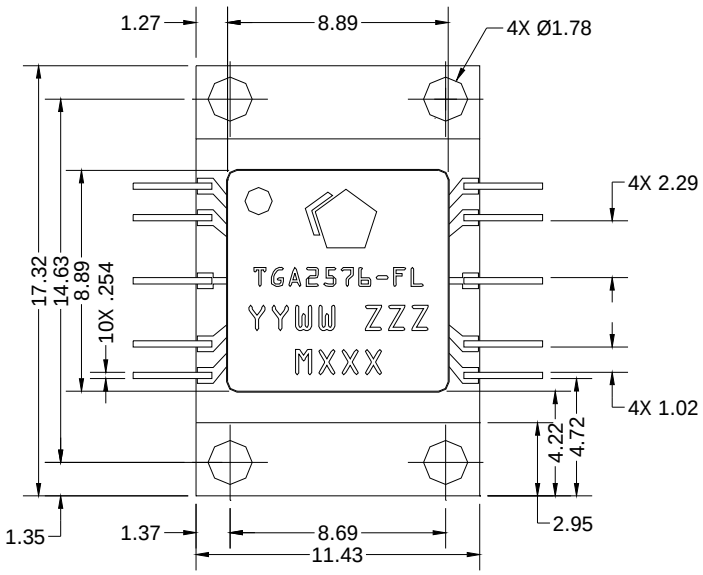
Bill of Material

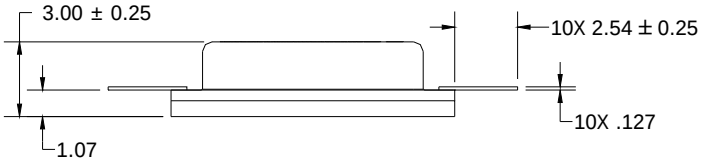
Ref Des	Value	Description	Manufacturer	Part Number
C1- C4	0.1 uF	Cap, 0603, 50V, 10%, X7R	various	
C5-C8	1 uF	Cap, 1206, 50V, 10%, X7R	various	

Mechanical Information

Package Information and Dimensions

All dimensions are in millimeters.





Notes:

1. Unless specified otherwise, dimensions are in millimeters
2. Unless specified otherwise, tolerance are +/- 0.127
3. Materials:

Package base:	Copper Tungsten (CuW) composite
Package lid:	LCP (liquid crystal polymer)
Package leads:	Kovar, MIL I 23011C Class 1
Plating Finish:	Gold (Au) 1.27um minimum over Nickel (Ni) 2.54-8.89um

4, Part Marking:

YY	Part Assembly Year
WW	Part Assembly Week
MXXX	Batch ID

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

MSL Rating

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

ECCN

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

Solderability

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

1. 0-80 screws are recommended for mounting the TGA2576-FL.
2. We recommend attaching a heat sink to the base of the TGA2576-FL. Use a thermal compound or 4 mils Indium shim between the heat sink and the TGA2576-FL base.
3. Apply solder to each pin of the TGA2576-FL.

Contact Information

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