



GRF0150

GaN HEMT

150 Watt P3dB

DC to 3.2 GHz

FEATURES

- Operating Frequency Range: DC to 3.2 GHz
- Operating Drain Voltage: 28 V & 50 V
- Maximum Output Power: 150 Watt (P_{SAT})
- Suitable for CW, Pulsed, & Linear Applications
- 100% DC & RF Production Tested
- Air Cavity Ceramic Package (ACC)

APPLICATIONS

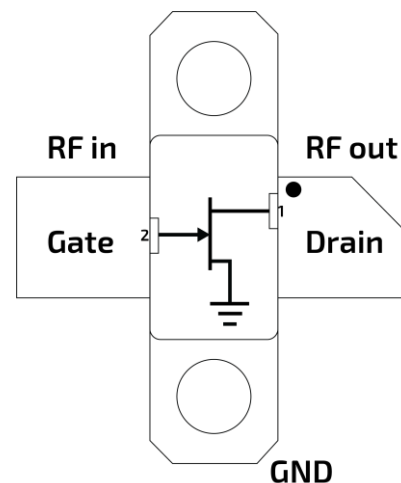
- Cellular Infrastructure
- Radar
- Communications
- Test Instrumentation

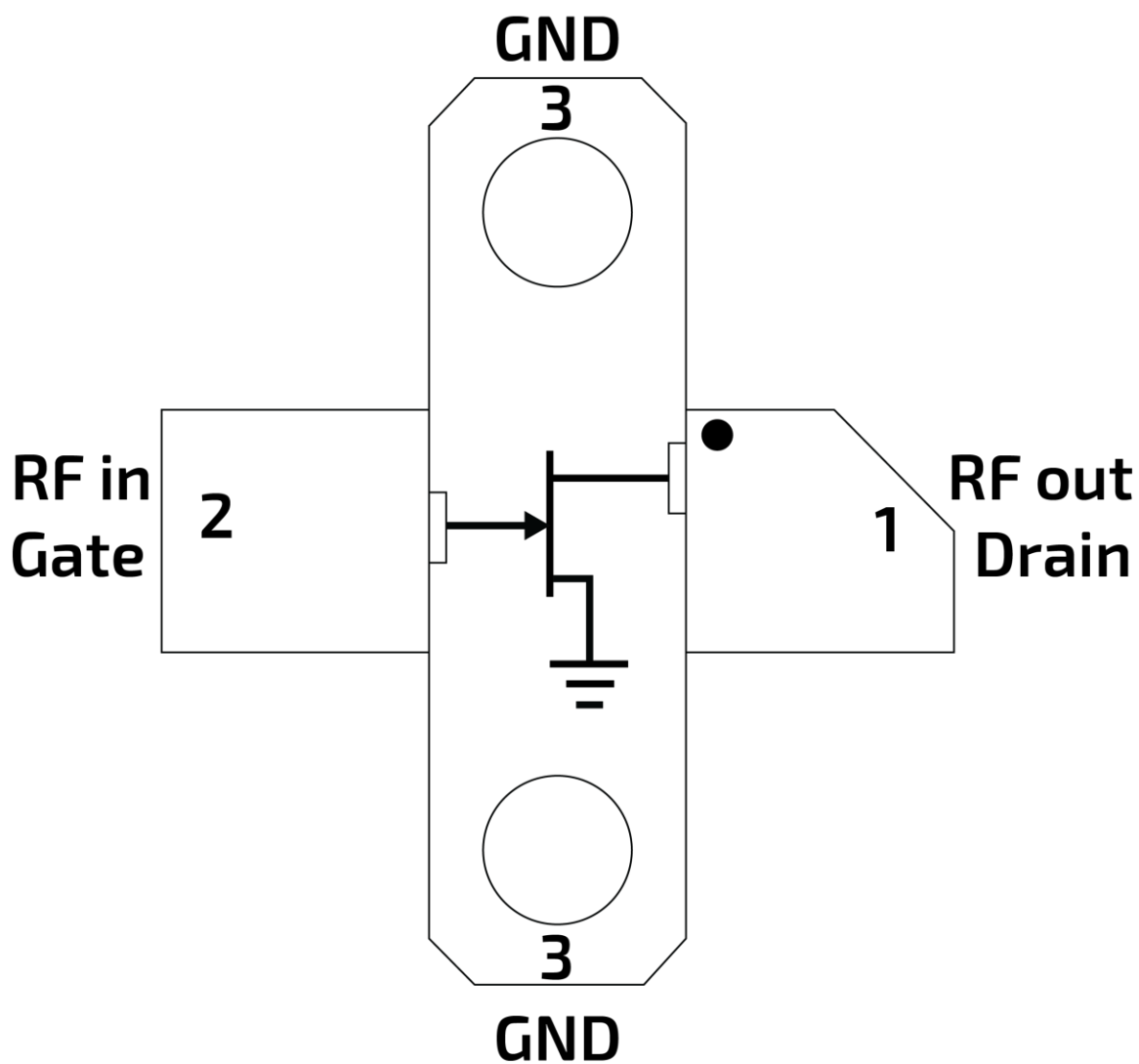
DESCRIPTION

The GRF0150 is a 150 watt (P3dB) unmatched discrete GaN-on-SiC HEMT device which operates from DC to 3.2 GHz on a 50 volt supply rail. The device is housed in an industry-standard Air Cavity Ceramic Package (ACC). Applications include cellular infrastructure, radar, communications, test instrumentation, and can support CW, linear and pulse operations. Lead free and RoHS compliant

Please consult with the GRF applications engineering team for custom tuning/evaluation board data.

BLOCK DIAGRAM





NI-360 Air Cavity Ceramic Pin Out (Top View)

Pin Assignments

Pin	Name	Description	Note
1	RF Output	Drain Voltage	Connected to GATE terminal of GaN transistor.
2	RF Input	Gate Voltage	Connected to DRAIN terminal of GaN transistor.
3	Flange	Ground	Connected to the SOURCE terminals of the GaN transistor. Provides DC and RF ground as well as thermal heat sink.

GaN HEMT Power-up / Power-down Procedure:

To turn the transistor ON:

1. Set V_{GS} to -5 V.
2. Turn on V_{DS} to normal operation voltage (50 V).
3. Slowly increase V_{GS} to set I_{DQ} current to 150 mA.
4. Apply RF power.

To turn the transistor OFF:

1. Turn the RF power off.
2. Decrease V_{GS} to -5 V.
3. Turn off V_{DS} . Wait a few seconds for Drain capacitor to discharge.
4. Turn off V_{GS} .

Absolute Ratings

Parameter	Symbol	Min.	Max.	Unit
Drain to Source Voltage	V_{DS}		150	V
Gate to Source Voltage	V_{GS}	-8	2	V
Operating Voltage	V_{DSQ}		55	V
Junction Temperature	T_{JUNC}		225	°C
Case Temperature	T_{CASE}	-40	105	°C

Electrostatic Discharge

Human Body Model	HBM	TBD		V
Charged Device Model	CDM	TBD		V

Storage

Storage Temperature	$T_{STORAGE}$	-65	150	°C
Moisture Sensitivity Level	MSL		TBD	--

Note 1: Exceeding any of these limits may cause permanent damage to the device or reduce the lifetime (MTTF).

Note 2: Guerrilla-RF does not recommend sustained operation above the maximum operating conditions.



Caution! ESD Sensitive Device.

Exceeding Absolute Maximum Rating conditions may cause permanent damage.

Note: For additional information, please refer to [Manufacturing Note MN-001 — Package and Manufacturing Information](#).



All Guerrilla RF products are provided in RoHS compliant lead (Pb)-free packaging requiring no exemptions. Additional information for this topic can be found at this link - [Environmental and Restricted Substance Statement Library](#)

Recommended Operating Conditions

Parameter	Symbol	Specification			Unit	Condition
		Min.	Typ.	Max.		
RF Frequency Range	F_{TEST}	DC		3200	MHz	
Drain to Source Voltage	V_{DS}	28	28	50	V	
Drain Current (Quiescent)	I_{DQ}		150		mA	
Gate Voltage	V_{GS}		-2.5		V	

Note 3: Operation outside of this range is possible, but with degraded performance of some parameters.

Note 4: Contact the Guerrilla RF applications team for guidance on optimizing the tuning of the device for alternative bands.

Nominal Operating Parameters – General

The following conditions apply unless noted otherwise: $V_{DS} = 50\text{ V}$, $I_{DQ} = 150\text{ mA}$, $F_{TEST} = 3200\text{ MHz}$, $T_A = 25\text{ }^{\circ}\text{C}$, $50\text{ }\Omega$ system impedance. Performance measured in the GalliumSemi production test fixture.

Parameter	Symbol	Specification			Unit	Condition
		Min.	Typ.	Max.		
Drain Source Breakdown Voltage	B_{VDS}	150			V	
Drain Source Leakage Current	I_{DLK}		9		mA	$V_{GS} = -8\text{ V}$, $V_{DS} = 50\text{ V}$
Drain Current: Quiescent	I_{DQ}		150		mA	
Gate Threshold Voltage	V_{GS}	-3.4		-1.5	V	$V_{DS} = 50\text{ V}$
Gate Bias Voltage	V_{GS}		-2.5		V	
Drain Voltage	V_{DS}		50		V	

Thermal And Reliability Information: CW

Thermal Resistance (Infrared Scan)	θ_{JC}		TBD		$^{\circ}\text{C} / \text{W}$	
Channel Temperature	$T_{CHANNEL}$		TBD		$^{\circ}\text{C}$	

Note 5: MIN/MAX limits defined using modelled estimates that account for part-to-part variations and expected process spreads. As additional production lots are fabricated, accumulated test data will be used to refine the MIN/MAX limits.

Nominal Operating Parameters – RF: DC to 3.2 GHz

The following conditions apply unless noted otherwise: $V_{DS} = 50\text{ V}$, $I_{DQ} = 150\text{ mA}$, $F_{TEST} = 3200\text{ MHz}$, $T_A = 25\text{ }^{\circ}\text{C}$, $50\text{ }\Omega$ system impedance. Performance measured in the GalliumSemi production test fixture.

Parameter	Symbol	Specification			Unit	Condition
		Min.	Typ.	Max.		
Small Signal Gain	G_{SS}		13.1		dB	
Saturated Gain	G_{SAT}		10.7		dB	
Saturated Drain Efficiency	$DEff_{SAT}$		53		%	
Saturated Output Power	P_{SAT}		51.8		dBm	
Ruggedness	Ψ	TBD				No damage or shift in performance

Note 6: MIN/MAX limits defined using *modelled estimates* that account for part-to-part variations and expected process spreads. As additional production lots are fabricated, accumulated test data will be used to refine the MIN/MAX limits.

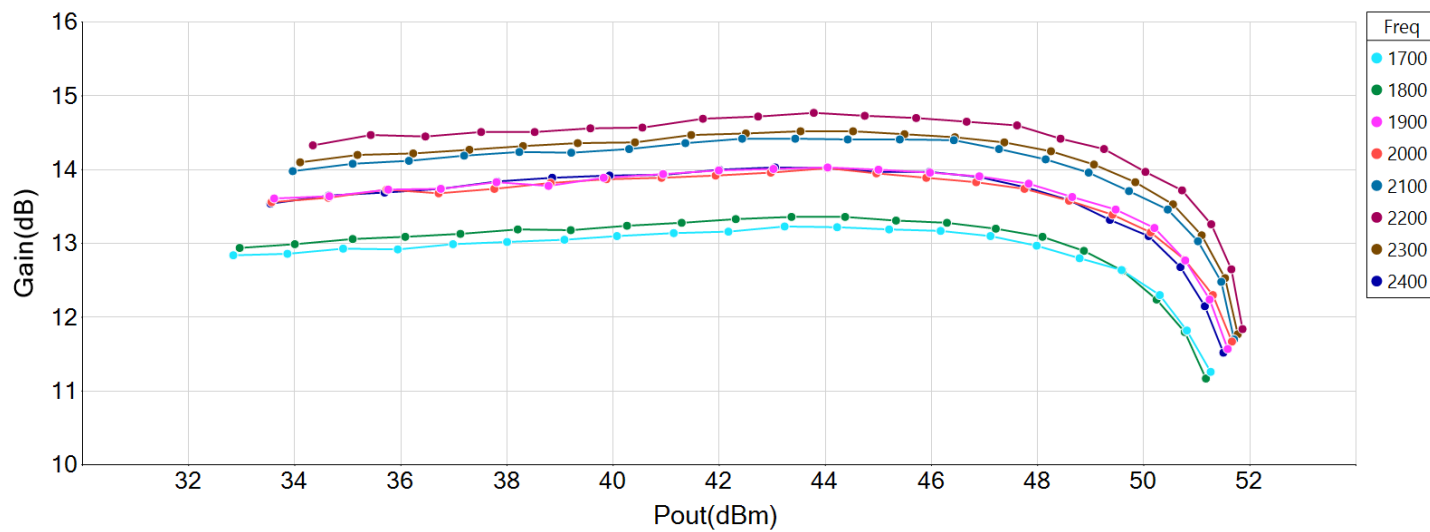
Note 7: 1 Tone Pulse CW, pulse width 100 μs , duty cycle 10%.

Note 8: The device supports CW operation, provided the junction temperature remains below the maximum specified.

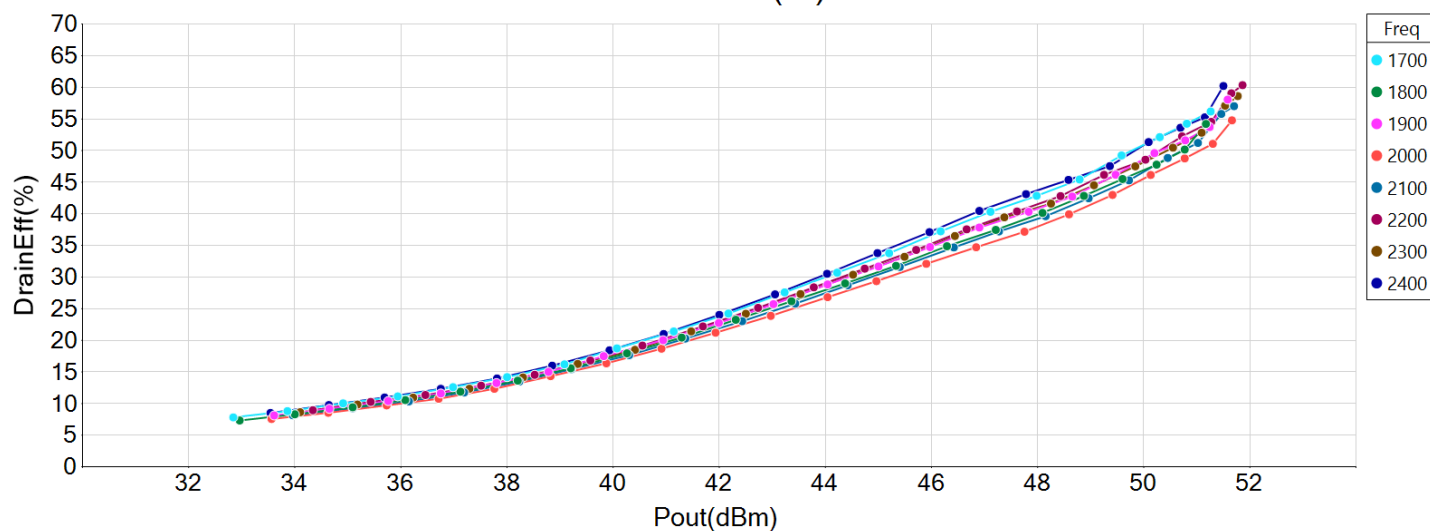
Typical Performance Curves: Measured in the 2.8 - 3.2 GHz Evaluation Test Fixture

1 Tone Pulsed CW, 10% Duty Cycle, 100 μ s Width), $V_{DS} = 50$ V, $I_{DQ} = 150$ mA, TC = 25 $^{\circ}$ C (unless otherwise noted).

GRF0150 Gain vs Pout



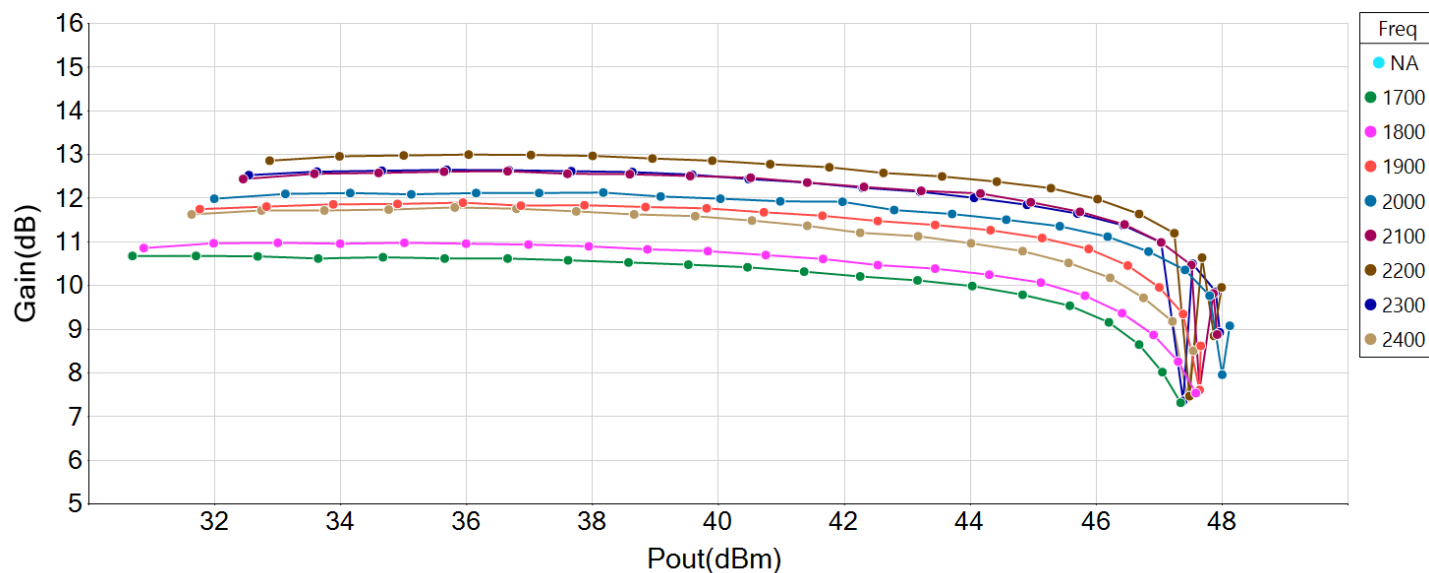
GRF0150 DrainEff(%) vs Pout



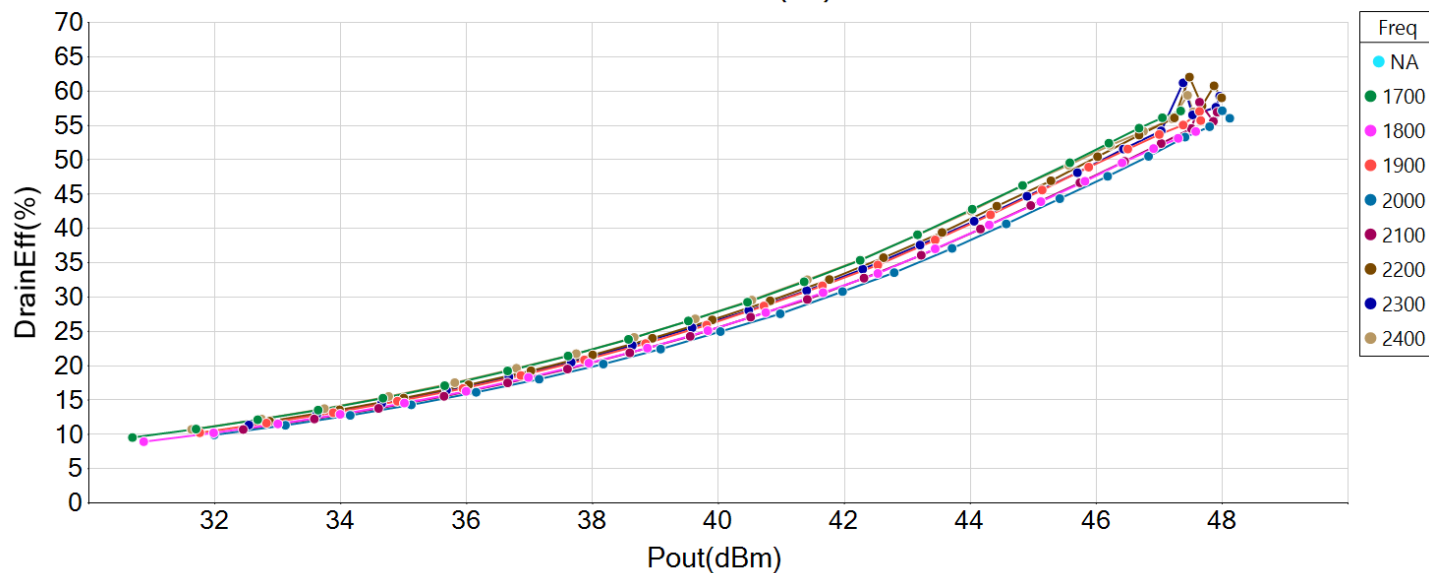
Typical Performance Curves: Measured in the 2.8 - 3.2 GHz Evaluation Test Fixture

1 Tone CW, $V_{DS} = 28$ V, $I_{DQ} = 150$ mA, $T_C = 25$ °C (unless otherwise noted).

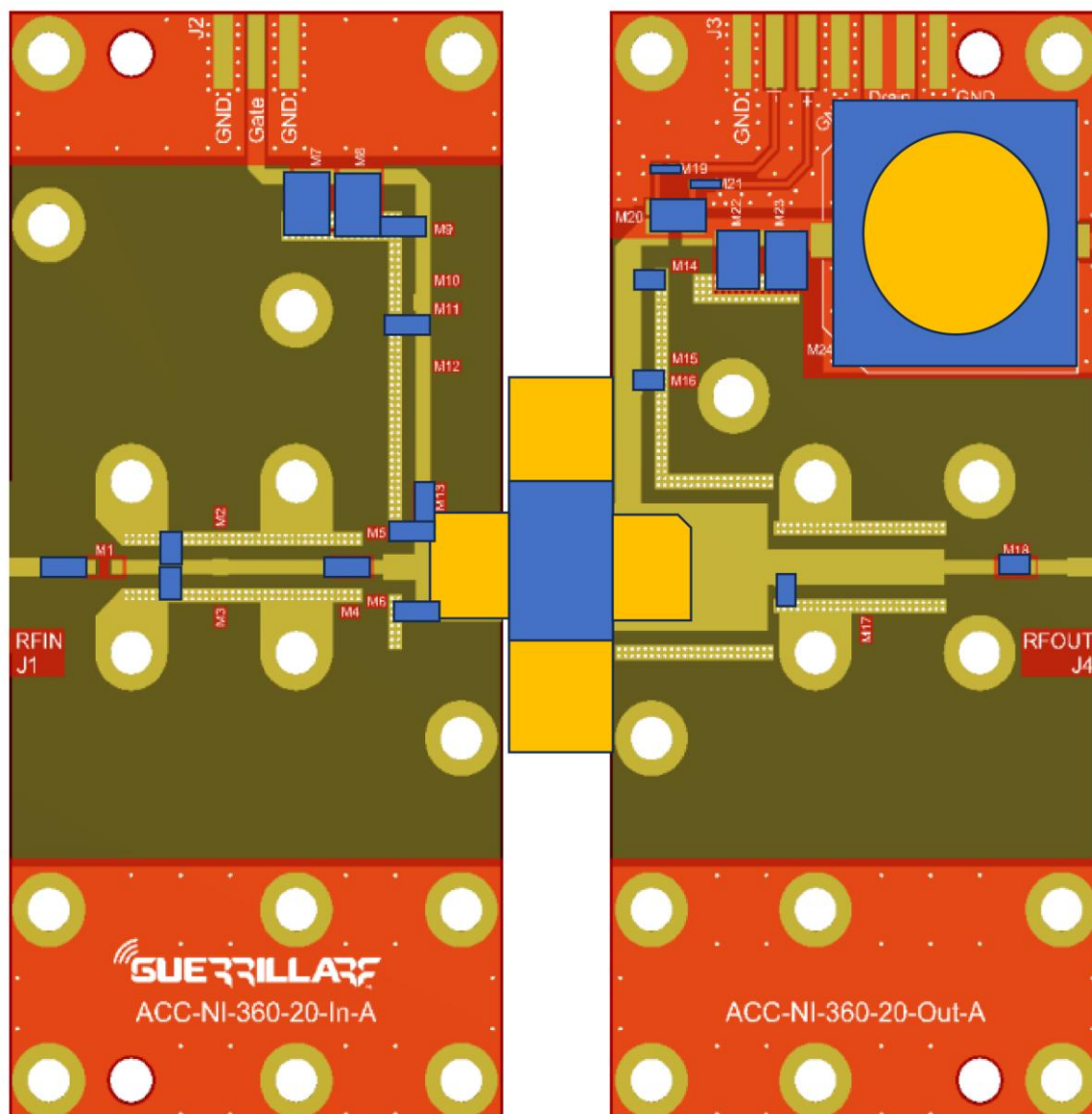
GRF0150 Gain vs Pout



GRF0150 DrainEff(%) vs Pout

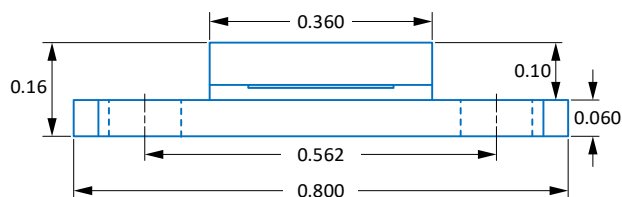


GRF0150 Evaluation Board Assembly Diagram

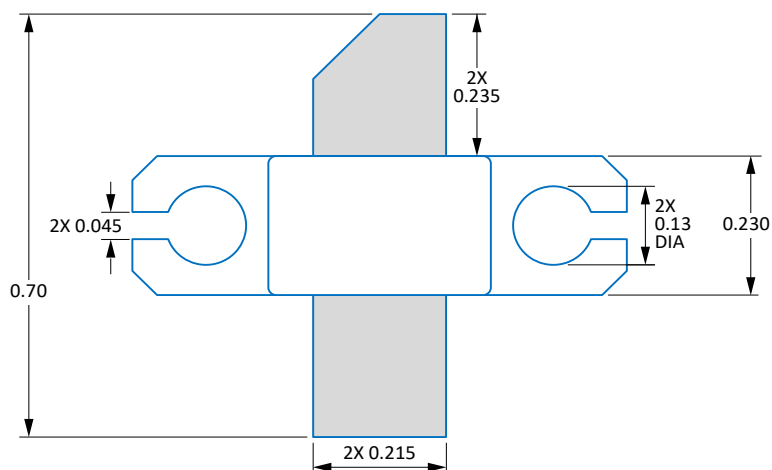


GRF0150 Evaluation Board Assembly Diagram Reference: 2.8 - 3.2 GHz

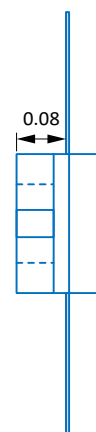
Component	Type	Manufacturer	Family	Value	Package Size	Substitution
ACC-NI-360-20-In (Input Board)						
M4, M11	Capacitor	Johansen		6.8 pF	0805	no
M5, M6	Capacitor	Murata		1.3 pF	0603	no
M7, M8	Capacitor	Murata	GRM32	10 μ F	1210	ok
M9	Capacitor	Murata	GRM21	10 nF	0805	ok
M1	Resistor	Various	1%	2 Ω	0805	ok
M2, M3	Resistor	Various	5%	1 K Ω	0805	ok
M13	Resistor	Various	1%	5.1 Ω	0805	ok
J1	SMA Connector	Various				ok
J2	DC Connector	Various				ok
ACC-NI-360-20-Out (Output Board)						
M14	Capacitor	Murata	GRM21	10 nF	0805	ok
M16, M18	Capacitor	Johansen		6.8 pF	0805	no
M17	Capacitor	Johansen		0.6 pF	0805	no
M22, M23	Capacitor	Murata	GRM32	10 μ F	1210	ok
M24	Capacitor	Various	100 V	220 μ F		ok
M19, M21	Resistor	Various	5%	1 K Ω	0603	ok
M20	Resistor	Ohmite	1%	10 m Ω	1206	ok
J4	SMA Connector	Various				ok
J3	DC Connector	Various				ok



FRONT VIEW



TOP VIEW



SIDE VIEW

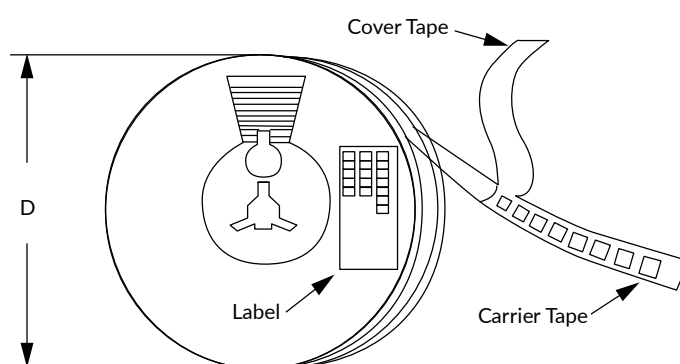
NI-360 Air Cavity Ceramic Package Dimensions and Suggested PCB Footprint (Top View)

Tape and Reel Information

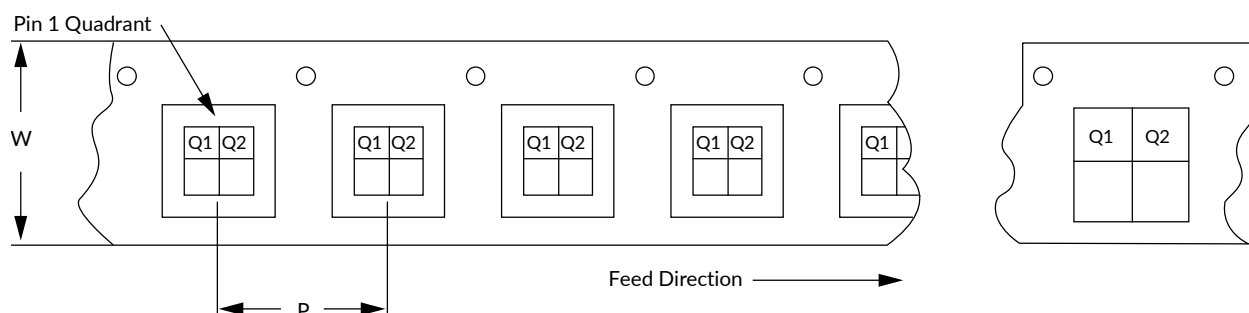
Guerrilla RF's tape and reel specification complies with Electronic Industries Alliance (EIA) standards for "Embossed Carrier Tape of Surface Mount Components for Automatic Handling" (reference EIA-481). See the following page for the Tape and Reel Specification and Device Package Information table, which includes units per reel.

Devices are loaded with pins down into the carrier pocket with protective cover tape and reeled onto a plastic reel. Each reel is packaged in a cardboard box. There are product labels on the reel, the protective ESD bag and the outside surface of the box.

For the Tape and Reel Reference Table, please refer to: <https://www.guerrilla-rf.com/prodFiles/Manufacturing/MN001.pdf>



Tape and Reel Packaging with Reel Diameter Noted (D)



Carrier Tape Width (W), Pitch (P), Feed Direction and Pin 1 Quadrant Information



Revision History

Revision Date	Description of Change
March 5, 2026	Advance Data Sheet
July 20, 2026	Preliminary Data Sheet - Added EVB diagram and BOM, Typ Op plots, and general formatting / layout standardization



Data Sheet Classifications

Data Sheet Status	Notes
Advance	S-Parameter and NF data based on EM simulations for the fully packaged device using foundry-supplied transistor S-Parameters. Linearity estimates based on device size, bias condition and experience with related devices.
Preliminary	All data based on limited evaluation board measurements taken within the Guerrilla RF Applications Lab. All parametric values are subject to change pending the collection of additional data.
Release Ø	All data based on measurements taken with <i>production-released</i> material. TYP values are based on a combination of ATE and bench-level measurements, with MIN/MAX limits defined using <i>modelled estimates</i> that account for part-to-part variations and expected process spreads. Although unlikely, future refinements to the TYP/MIN/MAX values may be in order as multiple lots are processed through the factory.
Release A-Z	All data based on measurements taken with production-released material <i>derived from multiple lots which have been fabricated over an extended period of time</i> . MIN/MAX limits may be refined over previous releases as more statistically significant data is collected to account for process spreads.

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