AR262021

ART450FE 108-420 MHz

AMPLEON

V1.0 — 30 April 2026

Application Report

Document information

Info	Content
Status	General Publication
Author(s)	Bob Bartola
Abstract	Measurement results of ART450FE LDMOS device in demo # AR262021 tested over 108-420 MHz CW and pulsed at 48V

1 Revision History

Table 1. Report revisions

Revision No.	Date	Description	Author
1.0	20260430	Initial document	Bob Bartola

2 Contents

Table of Contents

V1.0 — 30 April 2026 Application Report 1
1 Revision History 2
2 Contents 2
3 List of Figures 3
4 List of Tables 3
5 General Description 3
6 Biasing 4
6.1 Bias Details 4
7 Test Bench Set Up 4
9 Performance Details 6
9.1 Small Signal Results 6
9.2 Pulsed Large Signal Test Results 7
9.3 CW Large Signal Test Results 10
10 Hardware 11
10.1 AR262021 DC and RF Connections 11
10.2 Board Photographs 12
10.3 PCB layout 13
10.4 Bill of materials 14
10.5 PCB materials 15
10.6 Device markings 15
11 Legal Information 16
11.1 Contact information 16

3 List of Figures

Figure 1. Small Signal Test Results Vds=48V Idq=500mA. Total. Pin=+13dBm. 6
Figure 2. Gain vs. Pload (dBm.) Vds=48V Idq=500mA. PW=100uS. DF=10% 7
Figure 3. Efficiency vs. Pload (dBm.) Vds=48V Idq=500mA. PW=100uS. DF=10%..... 7
Figure 4. Efficiency vs. Pload (WATTS) Vds=48V Idq=500mA. PW=100uS. DF=10% 8
Figure 5. Gain at +48.6dBm. Pload vs. Frequency Vds=48V Idq=500mA. PW=100uS. DF=10%..... 8
Figure 6. Gain and Efficiency at +53dBm. Pload vs. Frequency Vds=48V Idq=500mA. PW=100uS. DF=10% 9
Figure 7. Pload (dBm.) P-1, P-2, and P-3dB Pload and Eff. vs. Frequency Vds=48V Idq=500mA. PW=100uS. DF=10% 9
Figure 8. CW Gain vs. Pload (dBm.) Vds=48V Idq=500mA. PW=100uS. DF=10% 10
Figure 9. CW Efficiency vs. Pload (dBm.) Vds=48V Idq=500mA. 10
Figure 10. CW Efficiency vs. Pload (WATTS) Vds=48V Idq=500mA. 11
Figure 11. CW Gain at +48.6dBm. Pload vs. Frequency Vds=48V Idq=500mA. 11
Figure 12. CW Gain and Efficiency at +53dBm. Pload vs. Frequency Vds=48V Idq=500mA..... 12
Figure 13. CW Pload (dBm.) P-1, P-2, and P-3dB Pload and Eff. vs. Frequency Vds=48V Idq=500mA. 12
Figure 14. AR262021 DC and RF Connections..... 11
Figure 15. PCB Layout..... 13

4 List of Tables

Table 1. Report revisions..... 2
Table 2. RF Pulsed Performance Vdd=48V, Idq=500mA. PW=100uS. DF=10%..... 5
Table 3. RF CW Performance Vdd=48V, Idq=500mA..... 5
Table 4. BOM 14
Table 5. Board Specifications 15
Table 6. Device Specifications 15

5 General Description

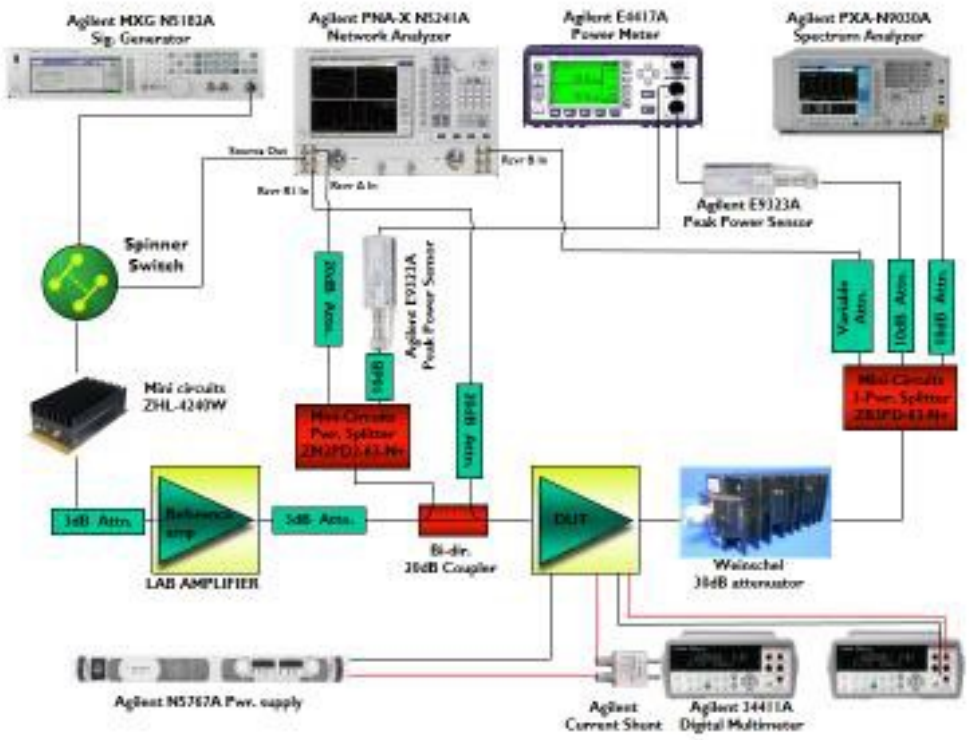
This report presents the measurement results of the Class AB Demo board AR262021. The device used is an ART450FE LDMOS device.

6 Biasing

6.1 Bias Details

For Vdd =48Vds adjust Vgs~2.30 V for Idq =500mA total.

7 Test Bench Set Up



8 Summary

This demo AR262021 demonstrates the performance of the ART450FE LDMOS device in a broadband 108-420 MHz class AB biased under CW and pulsed conditions of a PW=100iS and a DF of 10%.

Table 2. RF Pulsed Performance Vdd=48V, Idq=500mA. PW=100uS. DF=10%

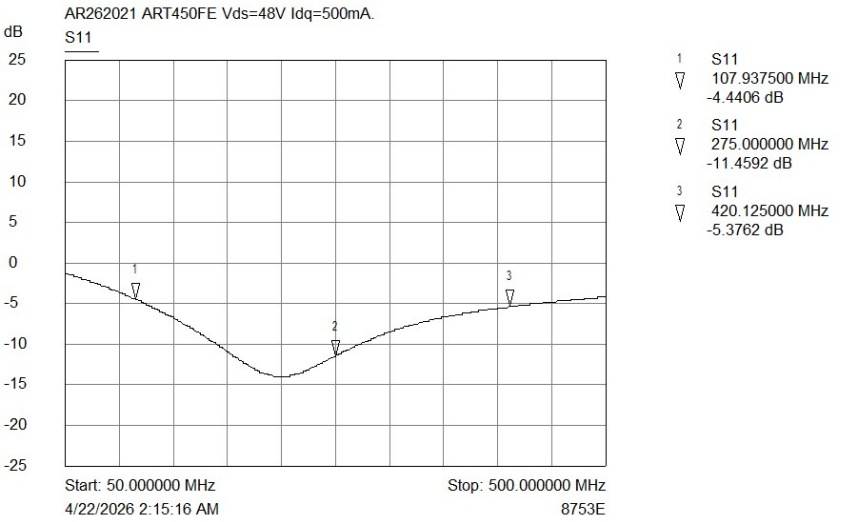
Symbol	Parameter	Frequency (low)	Frequency (Mid)	Frequency (Hi)	Unit
Freq.	Range	108	275	420	MHz.
P-1dB	Power output	53.4	55.33	54.71	dBm.
P-3dB	Power output	55.17	56.12	55.36	dBm.
Eff. @ P-1dB	Eff.	46.75	53.33	64.66	%
Eff. @ P-3dB	Eff.	57.29	56.25	65.12	%
Eff. @ +53dBm.	Eff.	42.98	42.84	54.08	%
Gain @ +48.6dBm. Pload	Gain	20.23	20.86	19.6	dB.
Gain @ P-1dB.	Gain	19.355	20.44	19.2	dB.
RTN-L	Input Return Loss	4.44	11.46	5.38	dB.
SS. Gain	Small Signal Gain	15.05	16.39	16.98	dB.

Table 3. RF CW Performance Vdd=48V, Idq=500mA.

Symbol	Parameter	Frequency (low)	Frequency (Mid)	Frequency (Hi)	Unit
Freq.	Range	108	275	420	MHz.
P-1dB	Power output	52.76	54.12	54.23	dBm.
P-3dB	Power output	54.35	54.88	54.87	dBm.
Eff. @ P-1dB	Eff.	45	48.55	59.1	%
Eff. @ P-3dB	Eff.	53	51	60.6	%
Eff. @ +53dBm.	Eff.	46.13	43.66	53.17	%
Gain @ +48.6dBm. Pload	Gain	20.16	20.53	19.39	dB.
Gain @ P-1dB.	Gain	19.18	19.6	18.7	dB.

9 Performance Details

9.1 Small Signal Results



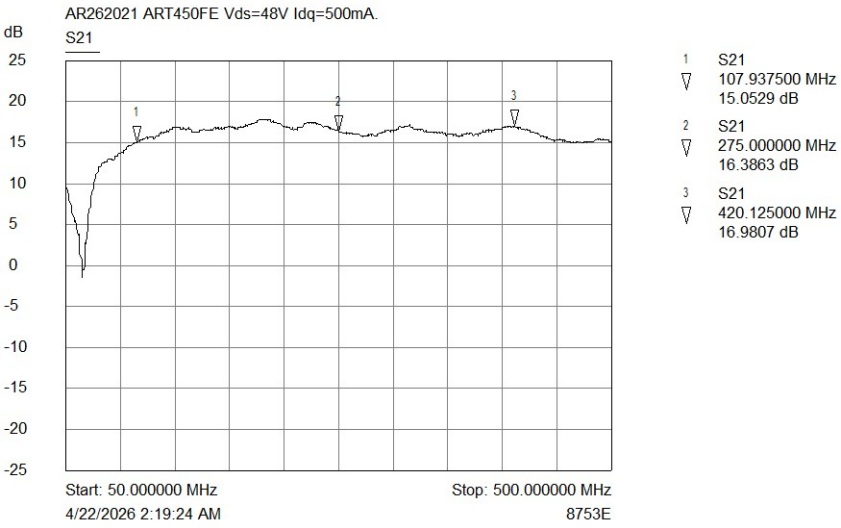


Figure 1. Small Signal Test Results Vds=48V Idq=500mA. Total. Pin=+13dBm.

9.2 Pulsed Large Signal Test Results

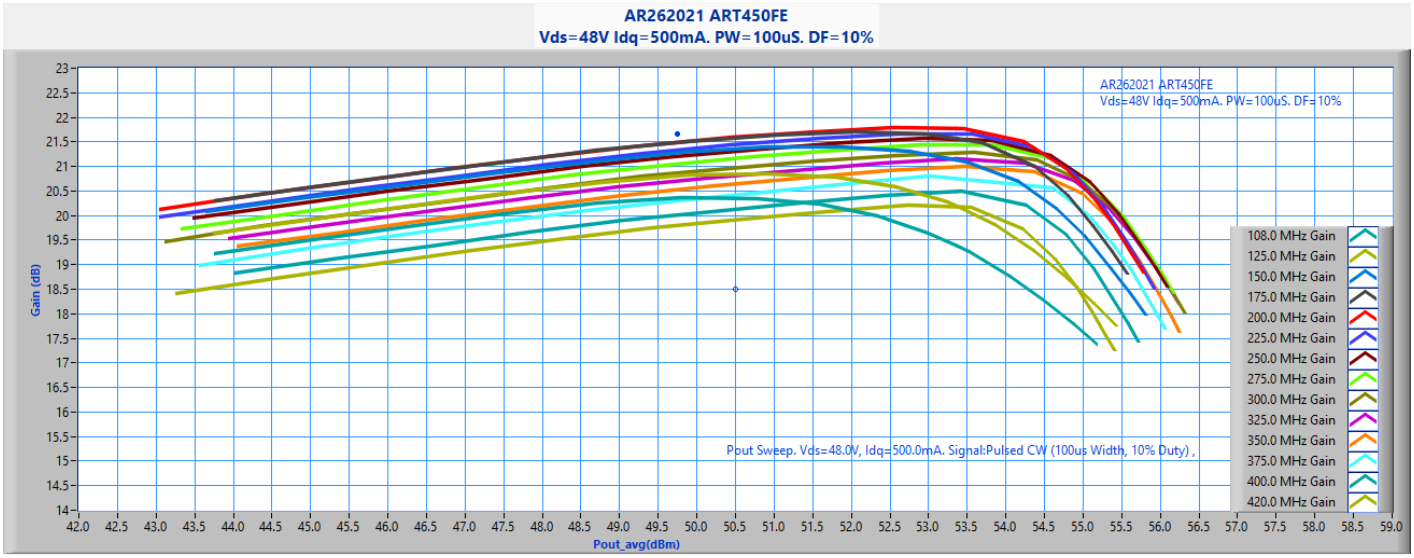


Figure 2. Gain vs. Pload (dBm.) Vds=48V Idq=500mA. PW=100uS. DF=10%

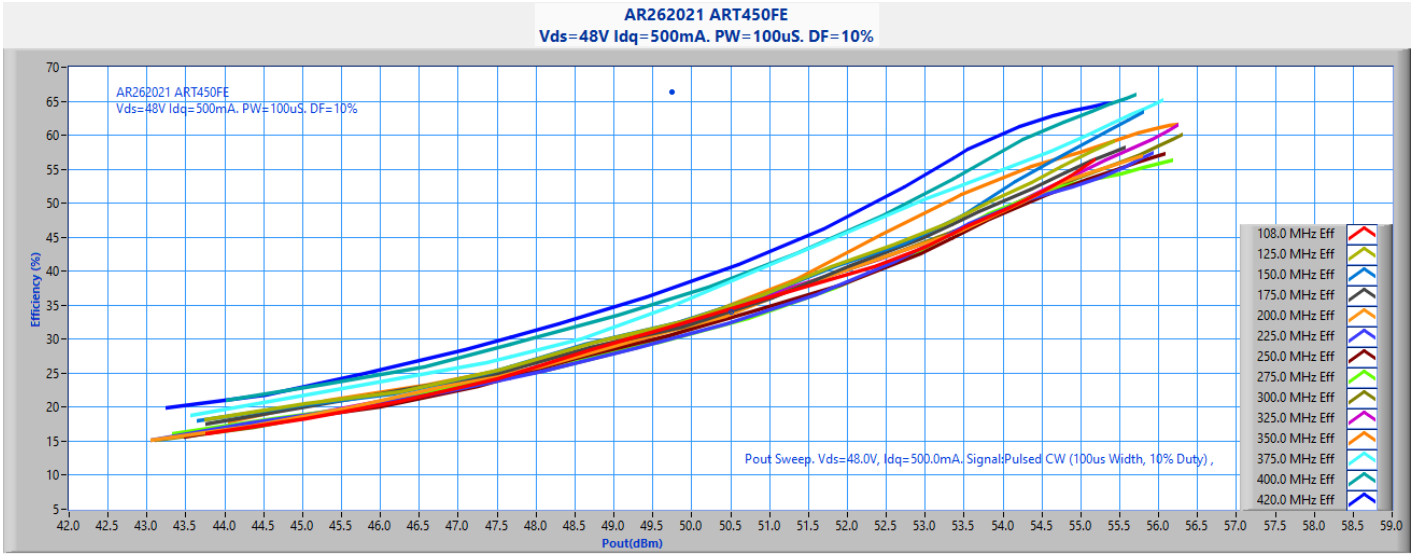


Figure 3. Efficiency vs. Pload (dBm.) Vds=48V Idq=500mA. PW=100uS. DF=10%

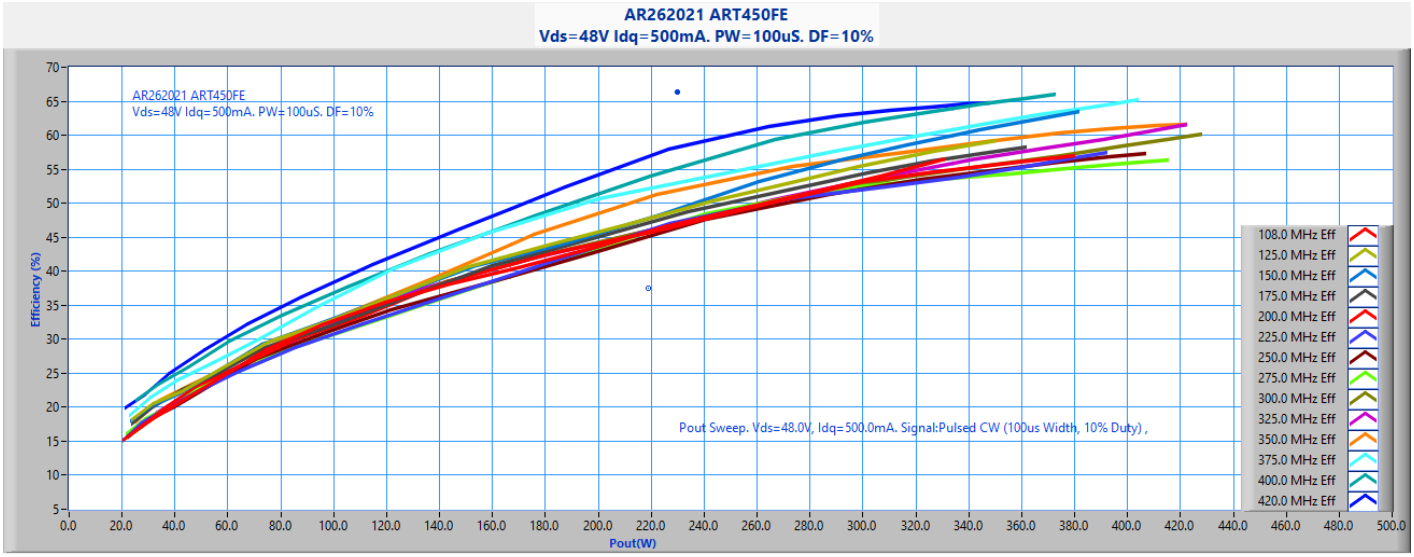


Figure 4. Efficiency vs. Pload (WATTS) Vds=48V Idq=500mA. PW=100uS. DF=10%

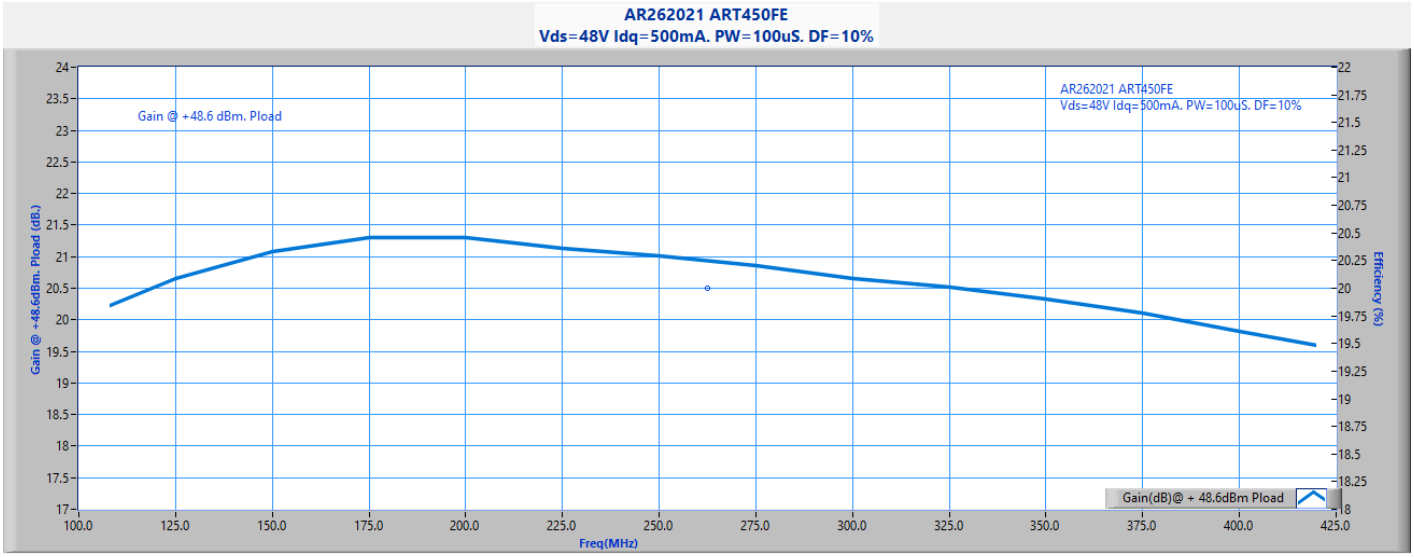


Figure 5. Gain at +48.6dBm. Pload vs. Frequency Vds=48V Idq=500mA. PW=100uS. DF=10%

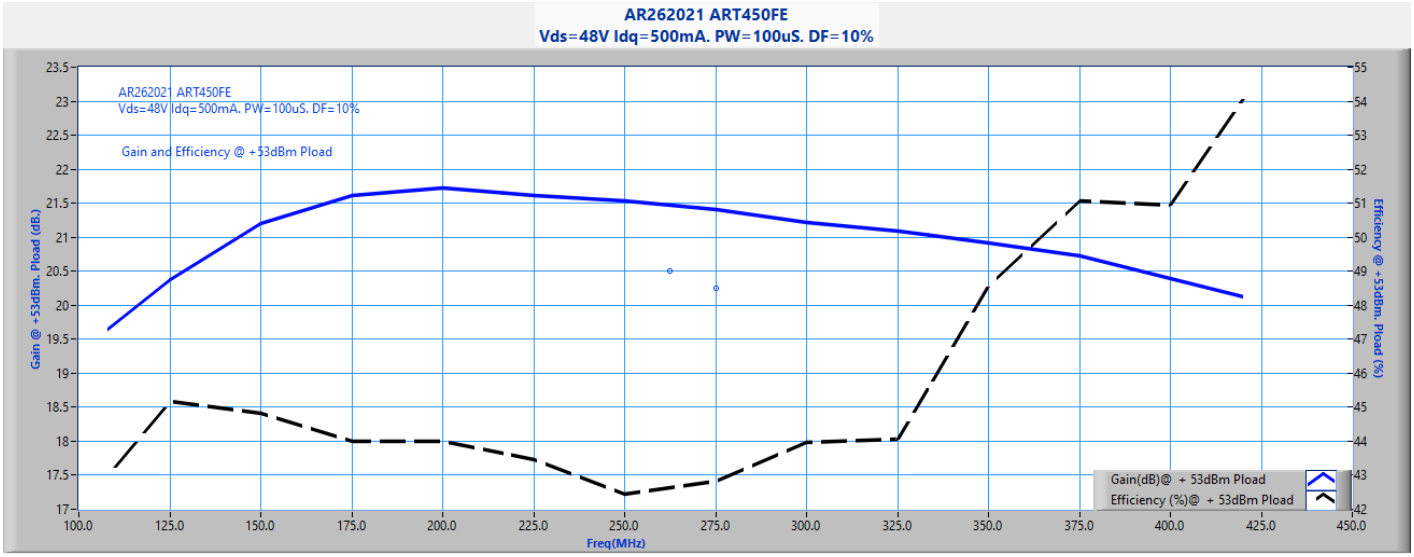


Figure 6. Gain and Efficiency at +53dBm. Pload vs. Frequency Vds=48V Idq=500mA. PW=100uS. DF=10%

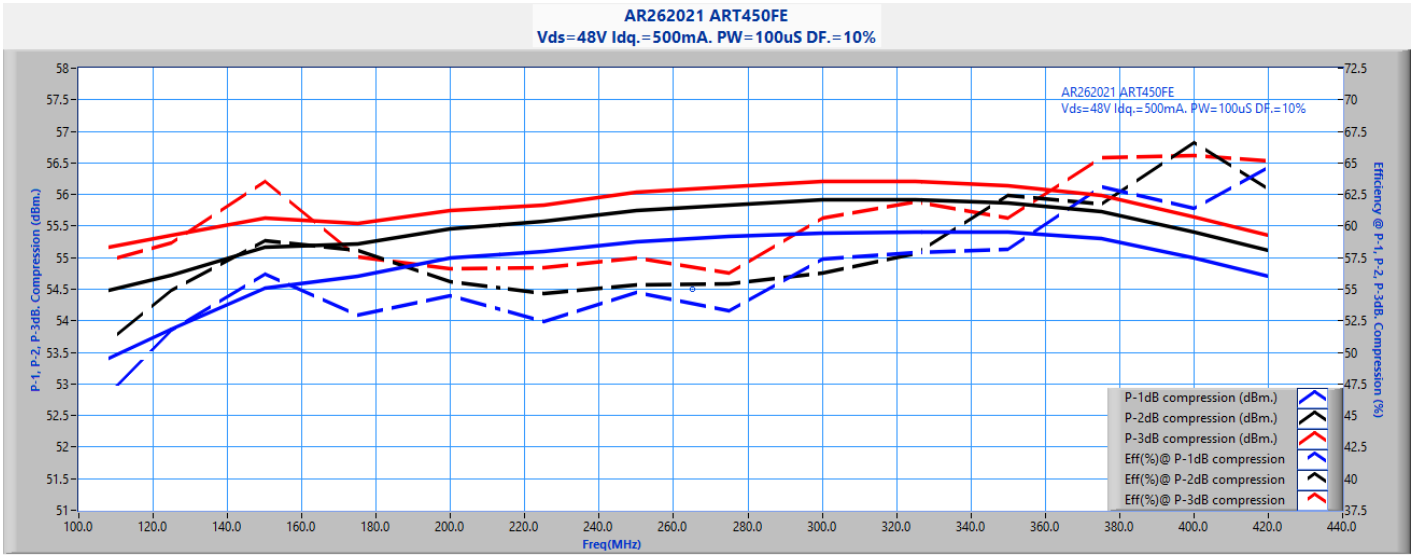


Figure 7. Pload (dBm.) P-1, P-2, and P-3dB Pload and Eff. vs. Frequency Vds=48V Idq=500mA. PW=100uS. DF=10%

9.3 CW Large Signal Test Results

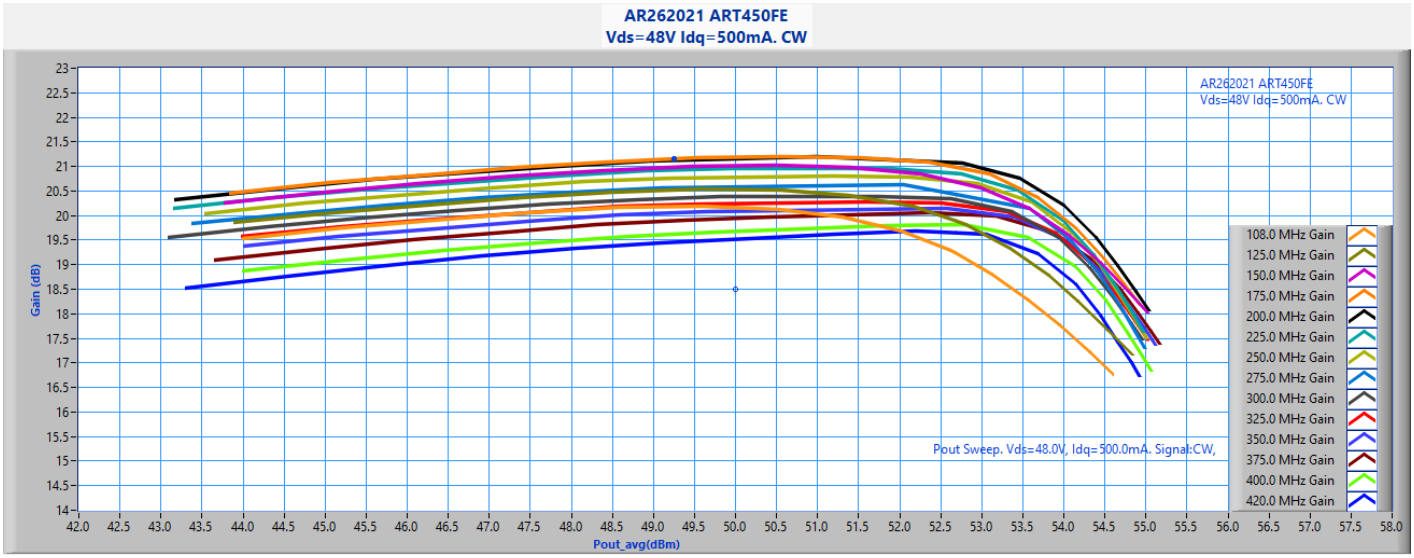


Figure 8. CW Gain vs. Pload (dBm.) Vds=48V Idq=500mA. PW=100uS. DF=10%

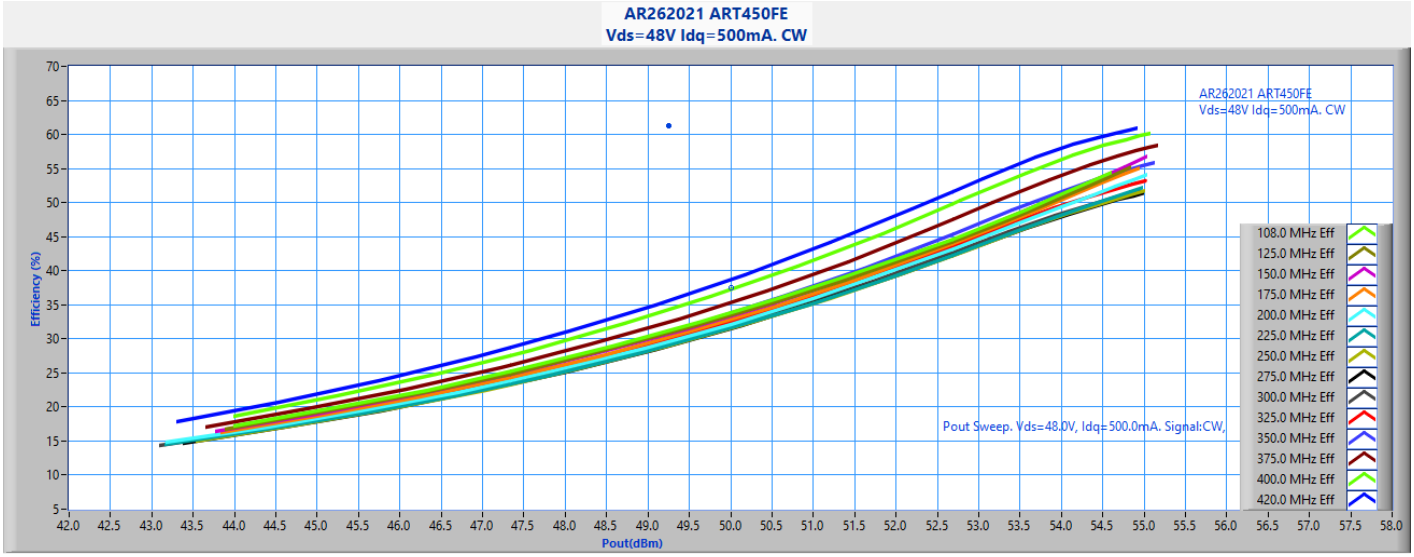


Figure 9. CW Efficiency vs. Pload (dBm.) Vds=48V Idq=500mA.

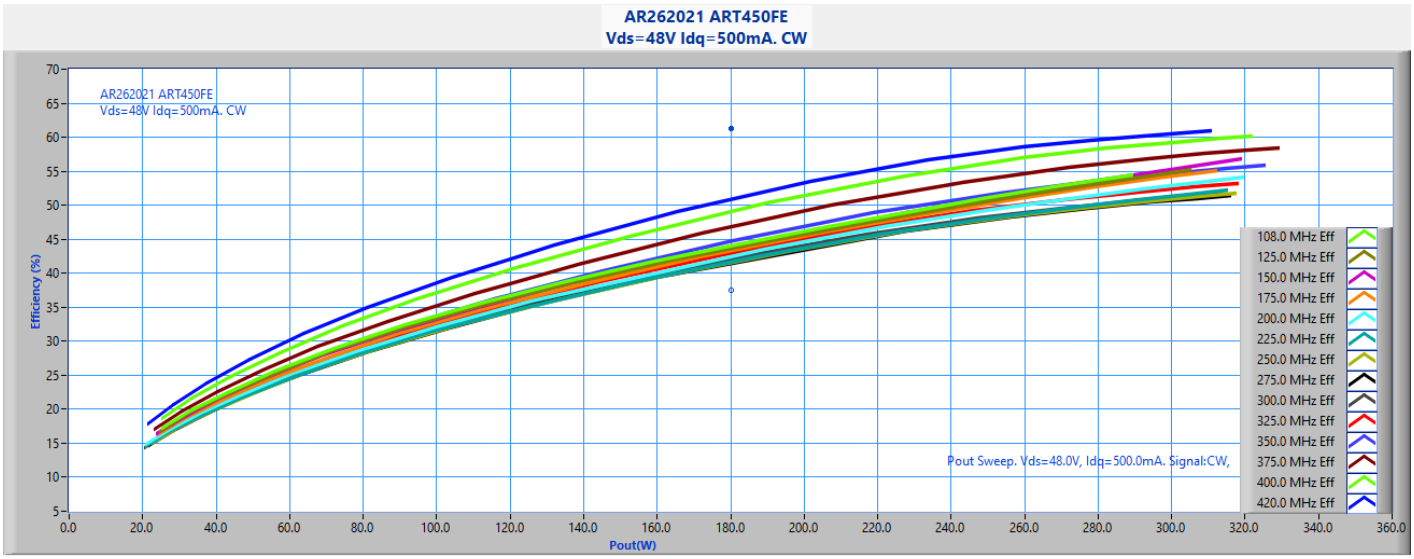


Figure 10. CW Efficiency vs. Pload (WATTS) Vds=48V Idq=500mA.

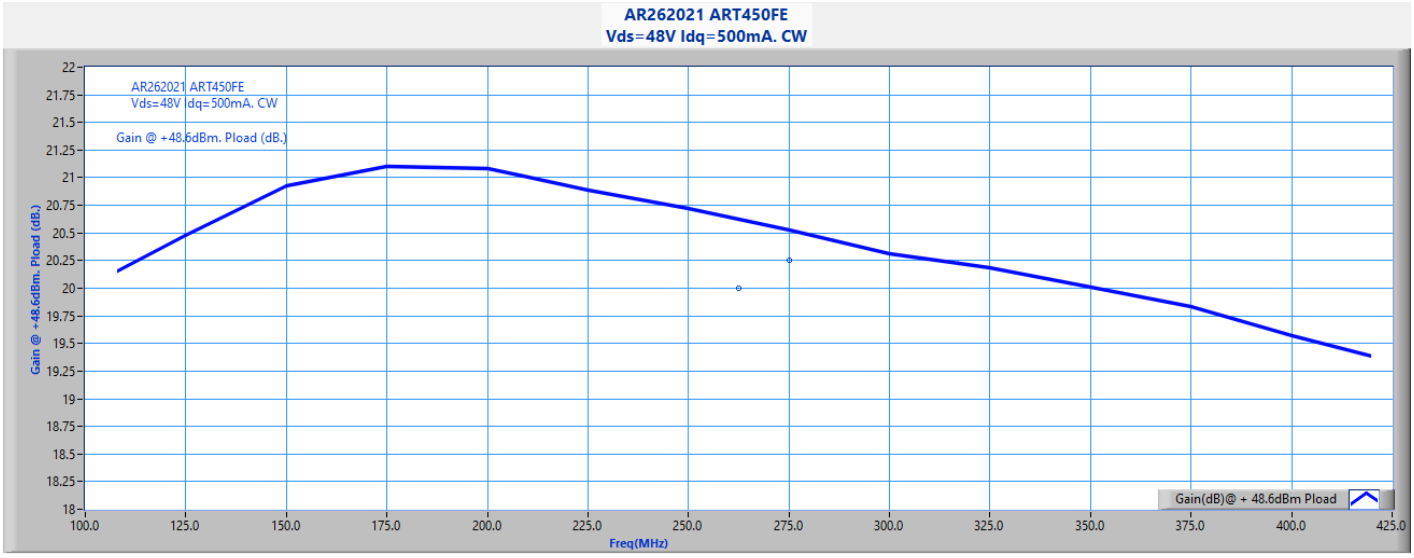


Figure 11. CW Gain at +48.6dBm. Pload vs. Frequency Vds=48V Idq=500mA.

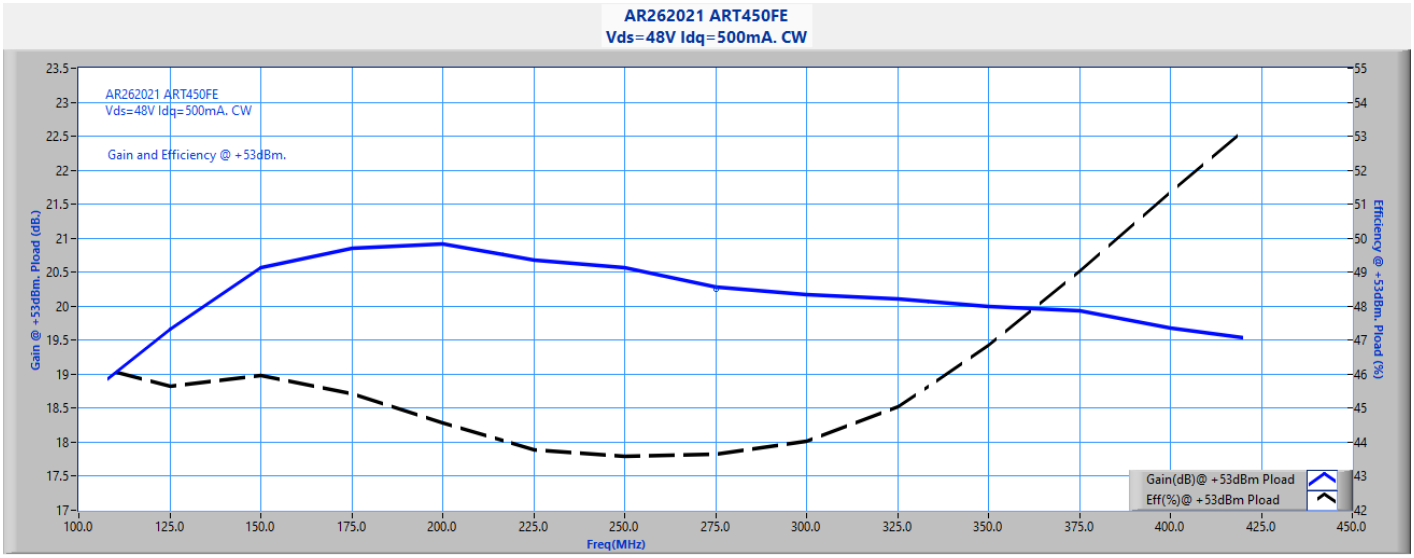


Figure 12. CW Gain and Efficiency at +53dBm. Pload vs. Frequency Vds=48V Idq=500mA.

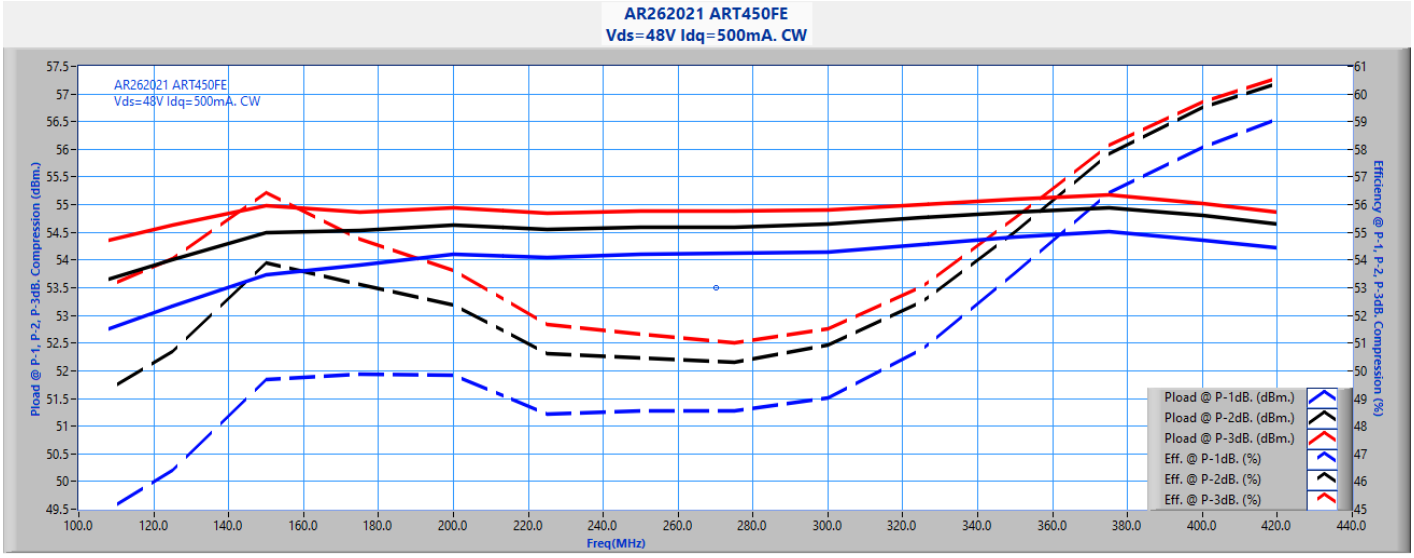


Figure 13. CW Pload (dBm.) P-1, P-2, and P-3dB Pload and Eff. vs. Frequency Vds=48V Idq=500mA.

10 Hardware

10.1 AR262021 DC and RF Connections

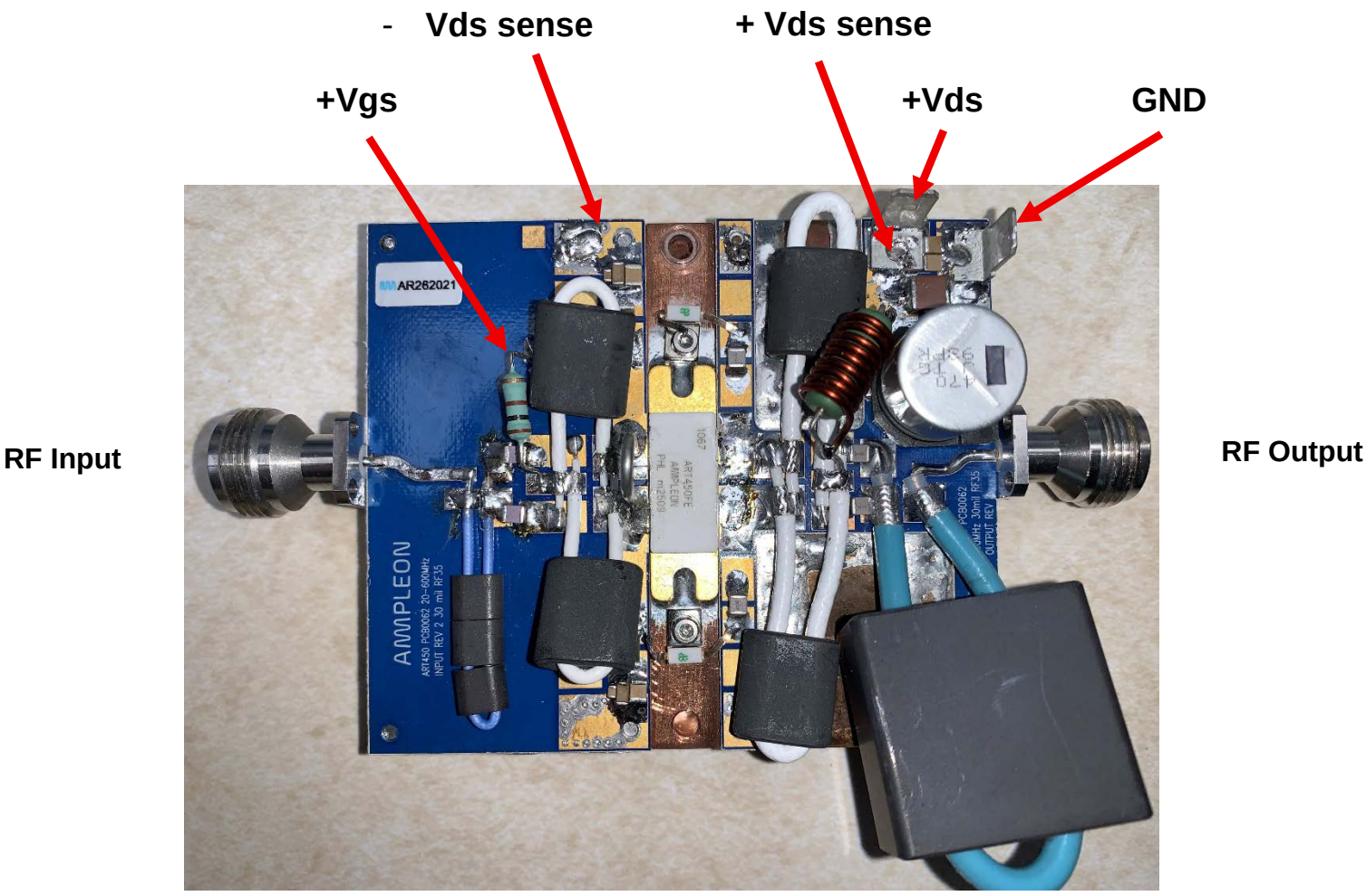
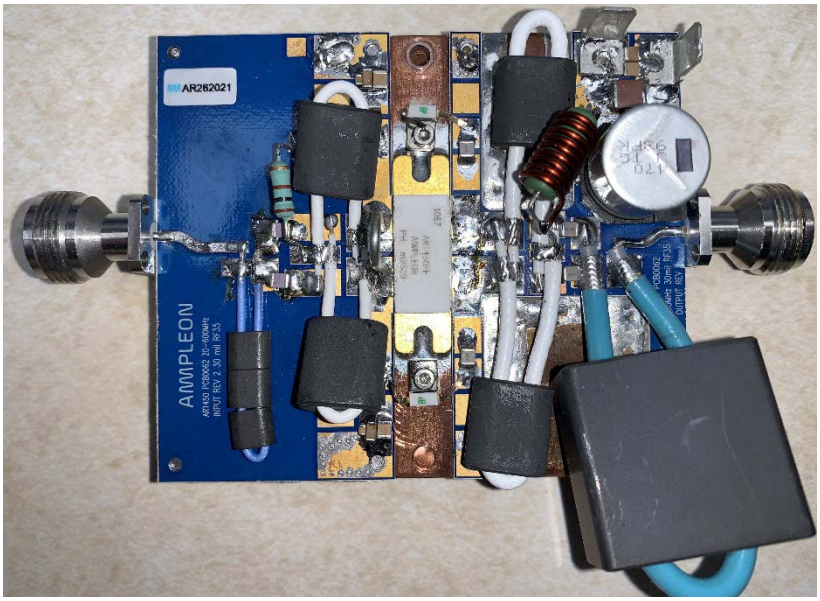
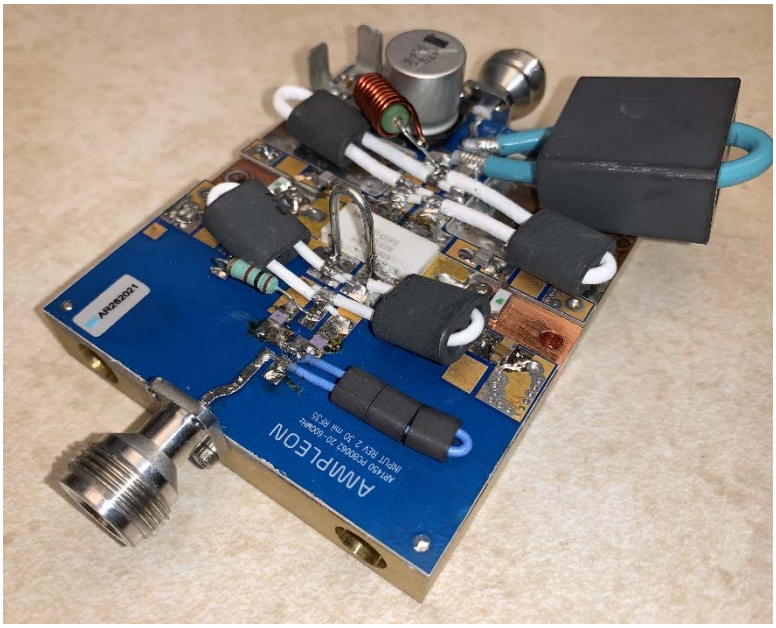


Figure 14. AR262021 DC and RF Connections

Note: Use DC remote sensing located at the Vds input

10.2 Board Photographs





10.3 PCB layout

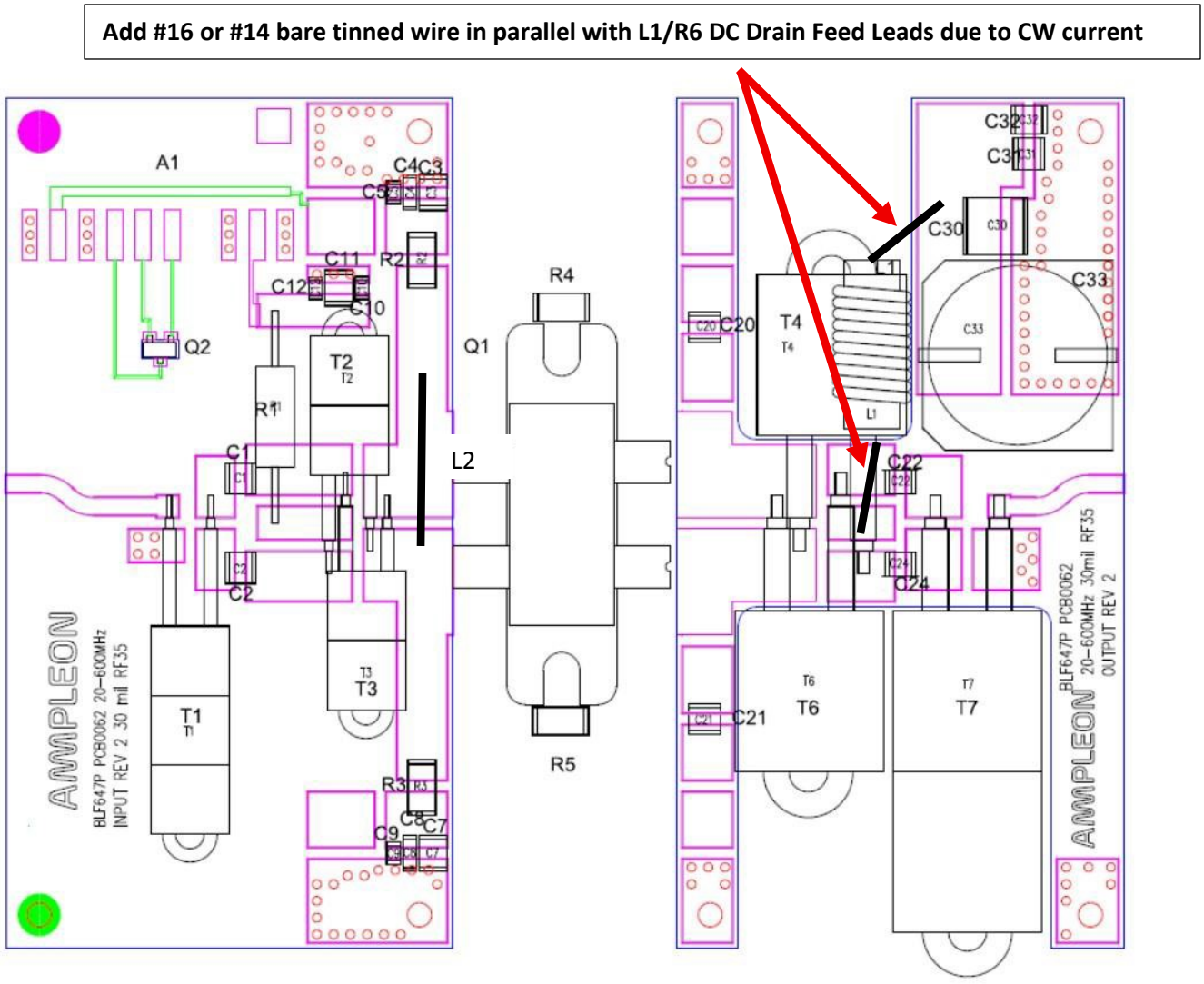


Figure 15. PCB Layout

10.4 Bill of materials

Table 4. BOM

Designator	Description	Manufacturer	Part#
PCB Input	Input PCB, 30mil thk.	Avanti Circuits	PCB00062 Input Rev2
PCB Output	Output PCB, 30 mil thk.	Avanti Circuits	PCB00062 Output Rev2
Q1	RF Transistor	Ampleon	ART750FE
R1	100Ω 0.5W5%	Generic	
R2, R3	20 Ω 5%	IMS	NADC-2010WA20R0J
R4, R5	OMIT	N/A	N/A feedback not used in design
R6	10 Ω 3W	Generic	
L1	9 Turns 16AWG. Wrapped over R6	Internal	
L2	Hairpin Inductor across gates. 3/16" dia. H=0.65" # 14 AWG. Tinned solid wire		
C1, C2	1000pf. 100V 5%	Kemet or Generic	1210 case
C3, C7, C11, C31	4.7nF. 100V 5% NPO	Generic	1210 case
C5, C9, C12	100nF. 50V 10% X7R		0805 case
C4, C8, C10	10uF. 100V10% X7R		1206 case
C30	10uF, 100V 10% X7S,	TDK	C5750X7S2A106M
C20, C21	OMIT	N/A	N/A
C22, C24	510pf. 500V 5%	Passive Plus or ATC	1111N case
C32	100nF. 100V 10% X7R	Generic	1210 case
C33	470uF, 63V, alum	Generic	
T1	1:1 Input Balun	Micro Coax	55mm PE-P047 50 flexible ohm coax + (3) Fair-Rite cores
		Fair-Rite	Fair-Rite 2861002402 cores
T2, T3	4:1 input transformer	Micro Coax	60mm.TF-25 25-ohm flexible coax
		Fair-Rite	(1) Fair-Rite 2861000202 core each
T4, T6	4:1 output transformer	Micro Coax	3.5" UT-0C-18 17-ohm coax
		Fair-Rite	(1) Fair-Rite 2861000202 core each
T7	1:1 output balun w 1 core	Micro Coax	4.1" UT-141 50-ohm flexible coax
		Fair-Rite	with one BN-61-002 core

10.5 PCB materials

Table 5. Board Specifications

Parameter	Value
Manufacturer	Taconic
Type	RF35
Thickness	30 mils, 1oz. copper
Layers	2, top/bottom. Bottom all copper

10.6 Device markings

Table 6. Device Specifications

Parameter	Value
Manufacturer	Ampleon
Device	ART450FE
Date Code	M2509

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