AR202063

BLP15H9S10 50V 768-870MHz

V4.0 — 04-27-2022

Application Report

Document information

Info	Content
Status	General Publication
Author(s)	Hannah Chalas
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Abstract	Measurement results of a Class AB design for the 768-870MHz band with BLP15H9S10.

1 Revision History

Table 1. Report revisions

Revision No.	Date	Description	Author
1.0	06-19-2020	Initial version.	Hannah Chalas
2.0	07-06-2020	Update Po graph.	Hannah Chalas
3.0	09-09-2020	Status Internal	Hannah Chalas
4.0	04-27-2022	Status General Publication	Hannah Chalas

2 Contents

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5 General Description

This report presents the measurement results of the Class AB demo board AR202063. The device used is a 10W, 9th generation LDMOS in a SOT1482-1 overmolded plastic package, BLP15H9S10. The presented demo is optimized for the frequency band 768-870MHz.

6 Biasing & Pinout

The efficiencies presented are based on the current of the drain feed.

Parameter		At board connector
V_{DD}	=	50V
I_{DQ}	=	32mA

Vgs ~ 2V.

7 Performance Indicators

Table 2. Typical performance at *center* frequency

Parameter	Condition	Unit	Pulsed-CW[1]
VDD		V	50
Normalized AM-PM[2]	Max, @P3dB	°	-0.25
P1dB[3]	GMAX-1dB	dBm	40.7
P3dB[3]	GMAX-3dB	dBm	41.5
POUT of operation[4]	Po	dBm	***40***
GAIN[1]	@Po	dB	19.3
Drain Efficiency[1]	@Po	%	53.1

Table 3. Device specifics

Parameter	Value
Manufacturer	AMPLEON
Device	BLP15H9S10
Marking	AMPLEON BLP15H9S10TA W6N927C01 rNH1916
Package	SOT1482-1

[1] *MXG CW Pulse sweep with 100µs Pulse Width, 10% Duty Cycle*
[2] *PCW Pulse sweep with 20µs Pulse Width, 10% Duty Cycle*
[3] *Pout at 1 and 3dB gain compression relative to the maximum gain in the power sweep*
[4] *Demonstrator is expected to operate at the Po average power level*

8 Performance Details

8.1 Network Analyzer Frequency Sweep — Gain, IRL, and Group Delay

Table 4. PNA-X Pulsed Results

Freq (MHz)	IRL (dB)	Gain (dB)	Group Delay (ns)
768	-9.3	19.1	4.3
788	-10.8	19.6	4.2
819	-9.6	19.5	3.9
839	-9.8	19.5	4.1
870	-10.2	19.0	4.6

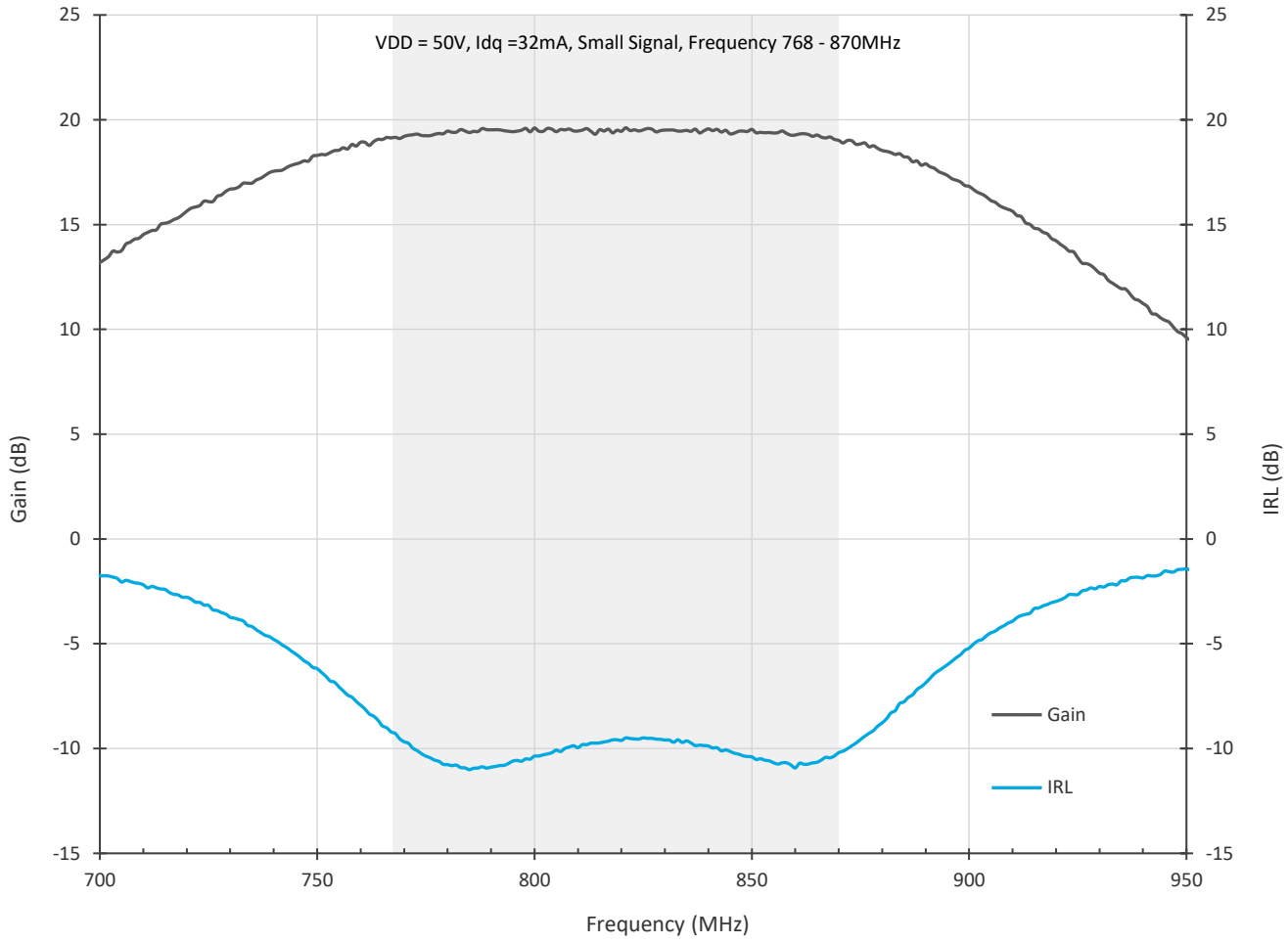

Figure 1. Gain & IRL vs Frequency

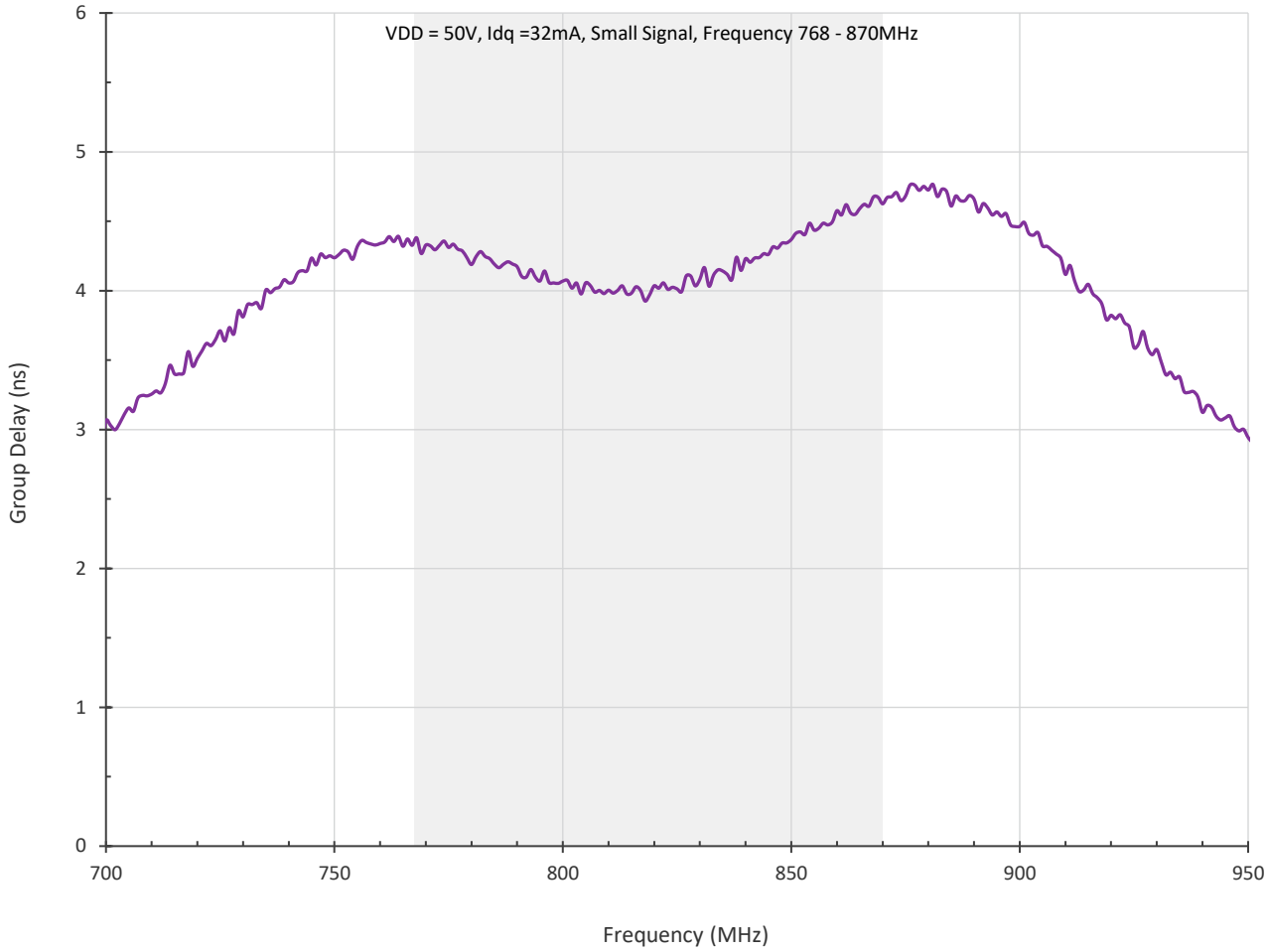

Figure 2. Group Delay vs Frequency

8.2 Network Analyzer Power Sweep — Pulsed (20µs Pulse Width, 10% DC)

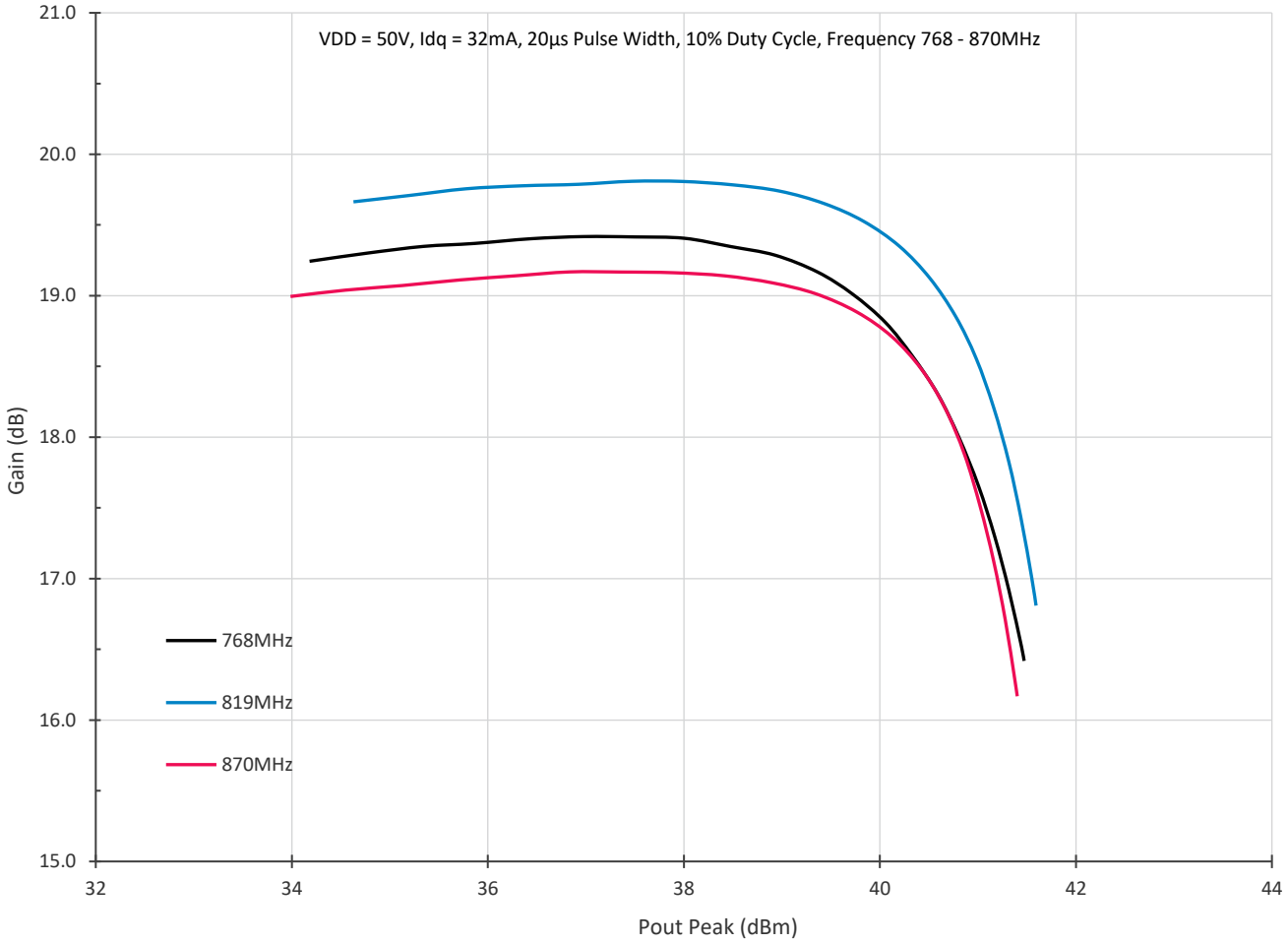

Figure 3. AM/AM

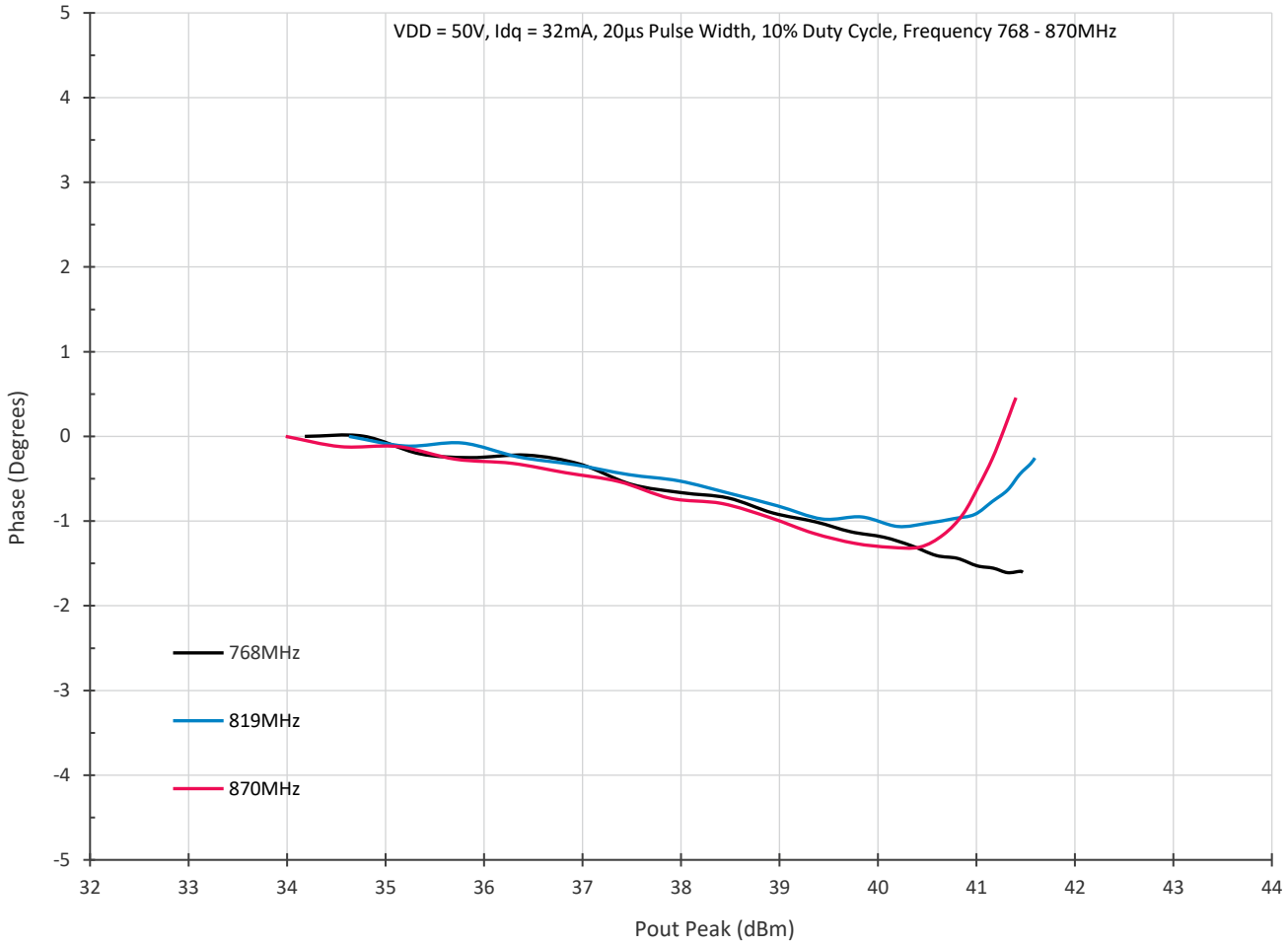

Figure 4. AM/PM

8.3 Pulsed Power Sweep — 100µs Pulse Width, 10% Duty Cycle

Table 5. MXG Pulsed Results

Freq (MHz)	Pout (dBm)	Pout (W)	Gain (dB)	Eff (%)	P1dB (dBm)	P3dB (dBm)	Eff@P3dB (%)
768	40.0	10.0	18.6	49.5	40.3	41.3	54.9
788	40.0	10.0	19.3	52.3	40.5	41.4	58.2
819	40.0	10.0	19.3	53.1	40.7	41.5	59.1
839	40.0	10.0	19.3	55.2	40.7	41.5	61.4
870	40.0	10.0	18.8	54.1	40.7	41.4	62.0

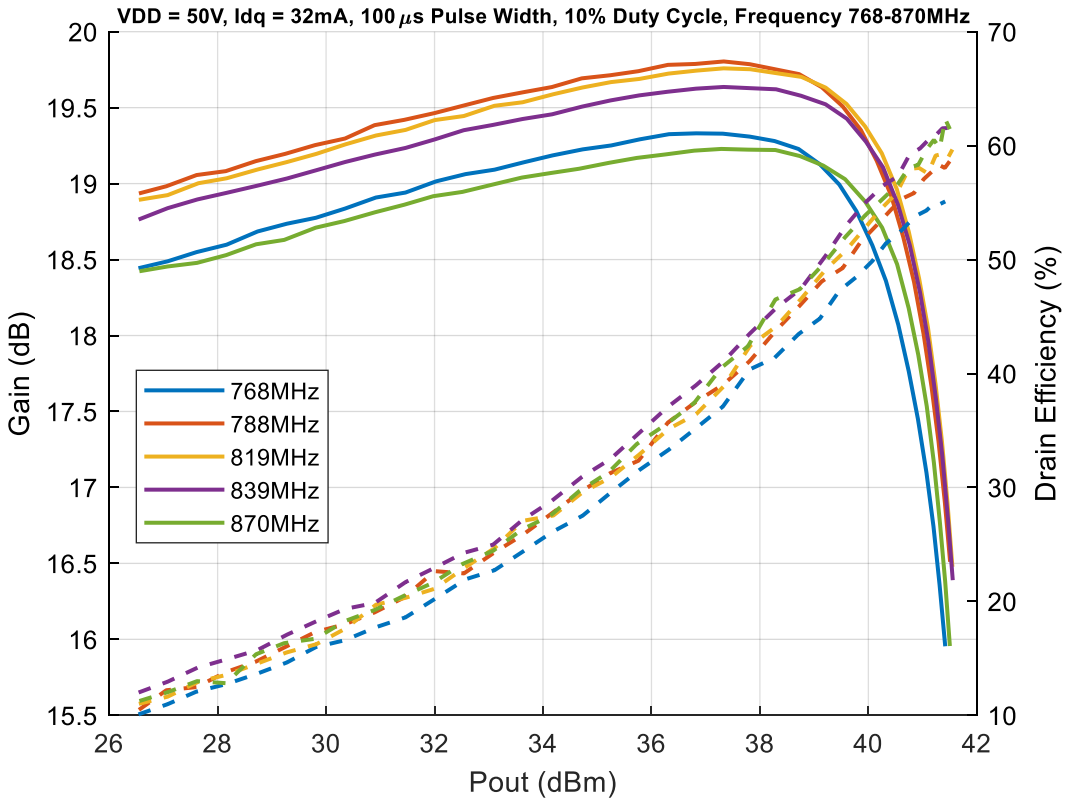

Figure 5. Pulsed Gain and Drain Efficiency vs Output Power

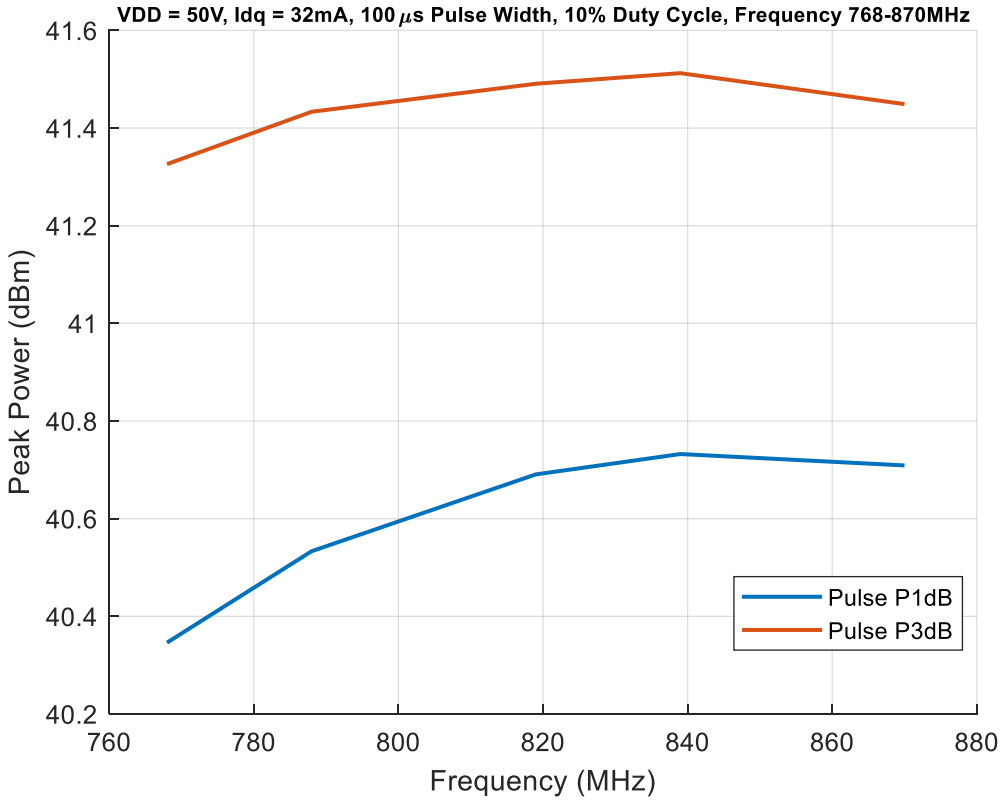

Figure 6. Pulsed Output compression point vs Frequency

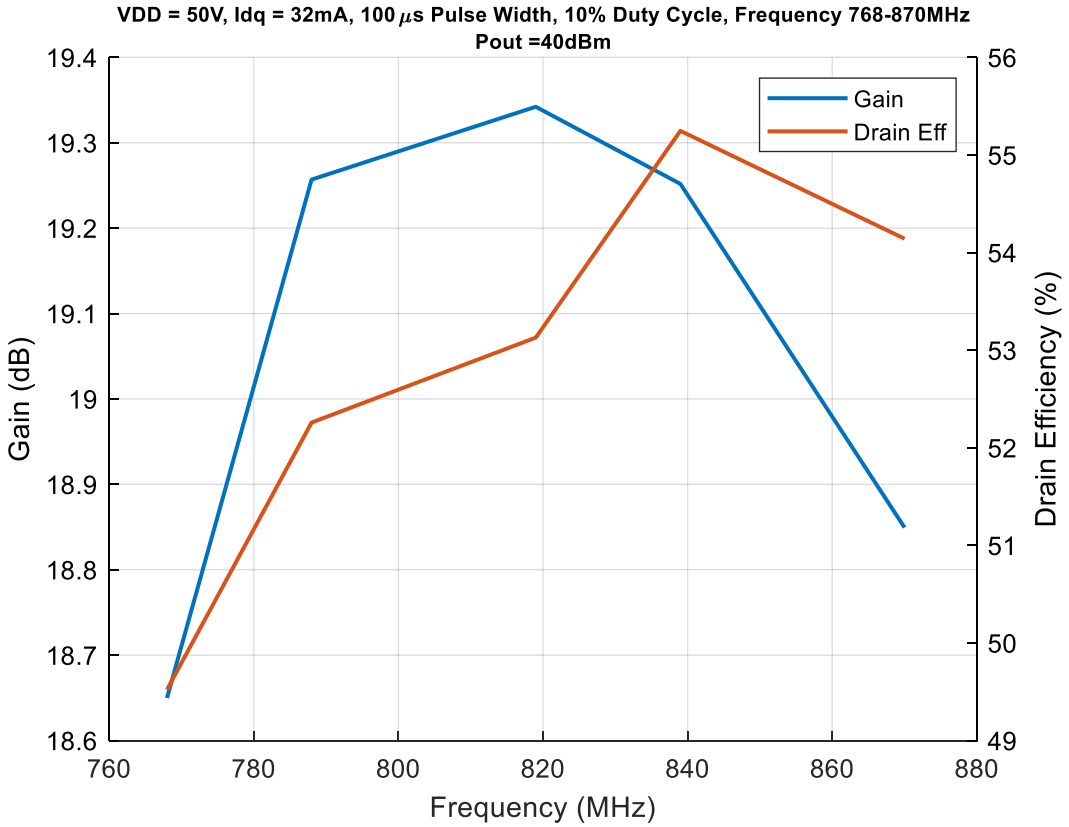

Figure 7. Pulsed Gain and Drain Efficiency vs Frequency at fixed Pout

8.4 CW Power Sweep

Table 6. MXG CW Results

Freq (MHz)	Pout (dBm)	Pout (W)	Gain (dB)	Eff (%)	P1dB (dBm)	P3dB (dBm)	Eff@P3dB (%)
768	40.0	10.0	17.4	49.6	39.5	40.6	51.7
788	40.0	10.0	18.3	51.2	39.8	40.8	54.2
819	40.0	10.0	18.6	53.2	40.1	41.0	57.0
839	40.0	10.0	18.5	53.8	40.1	41.0	58.0
870	40.0	10.0	18.2	54.3	40.2	41.0	58.6

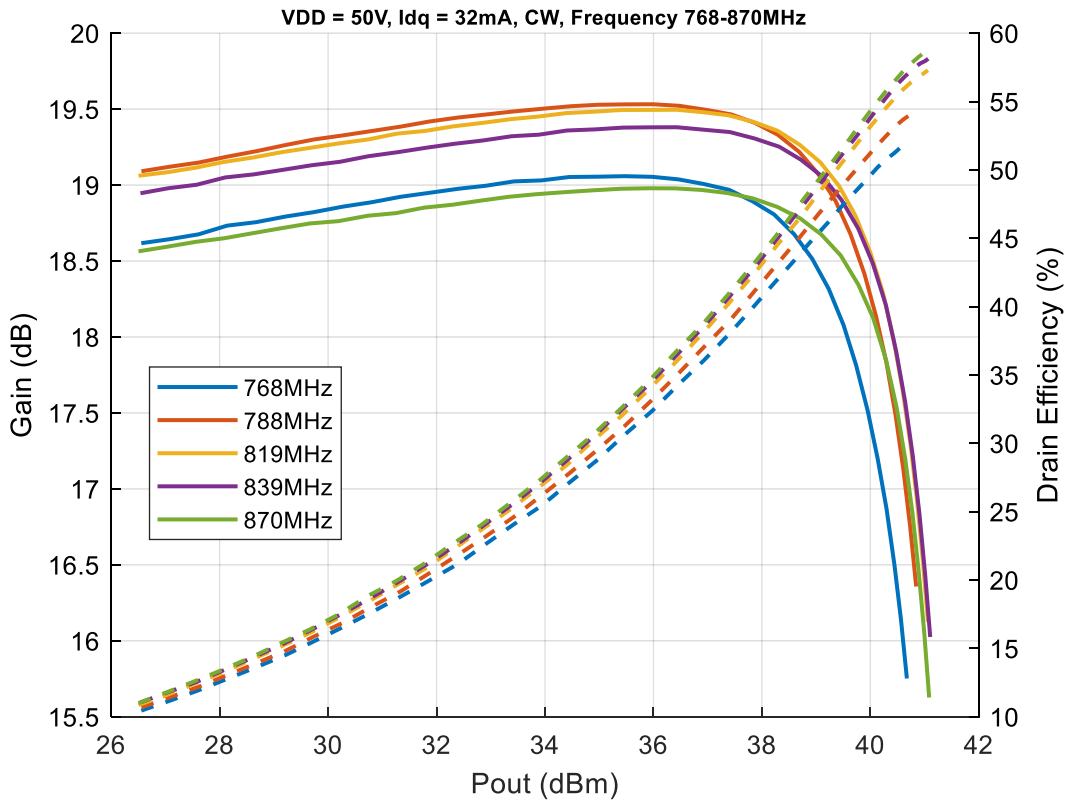

Figure 8. CW Gain and Drain Efficiency vs Output Power

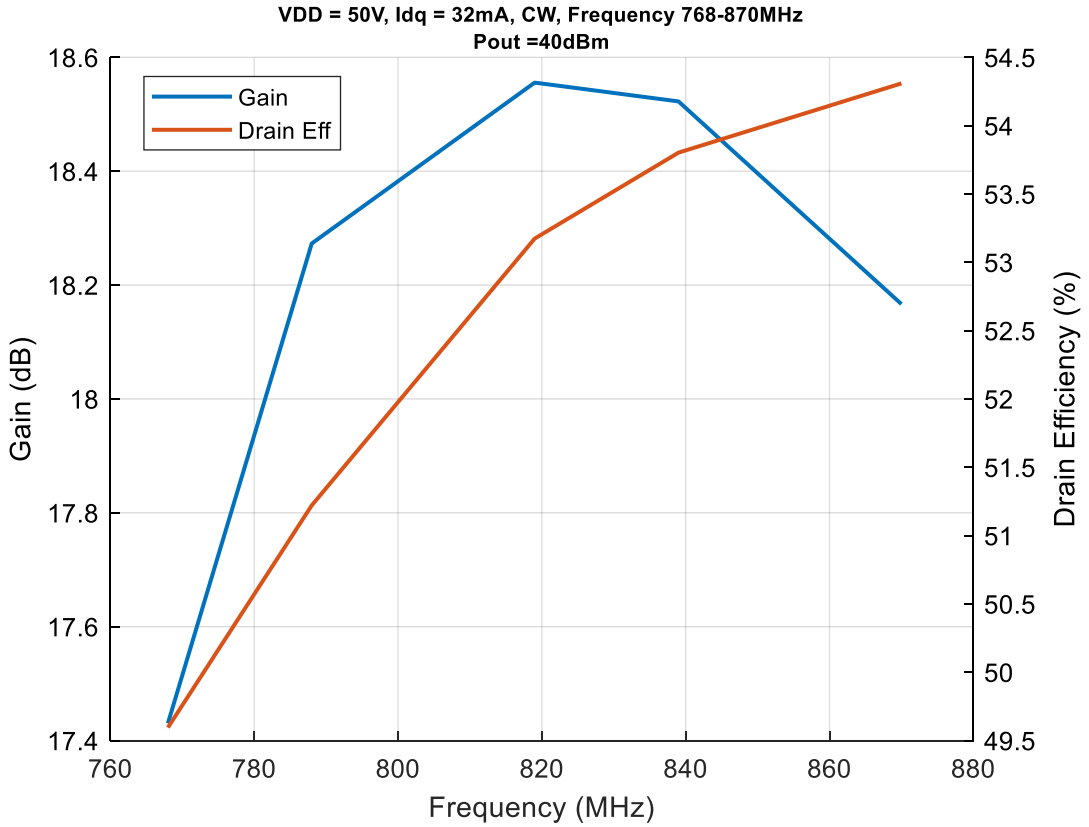

Figure 9. CW Gain and Drain Efficiency vs Frequency at fixed Pout

9 Hardware

9.1 Board photograph

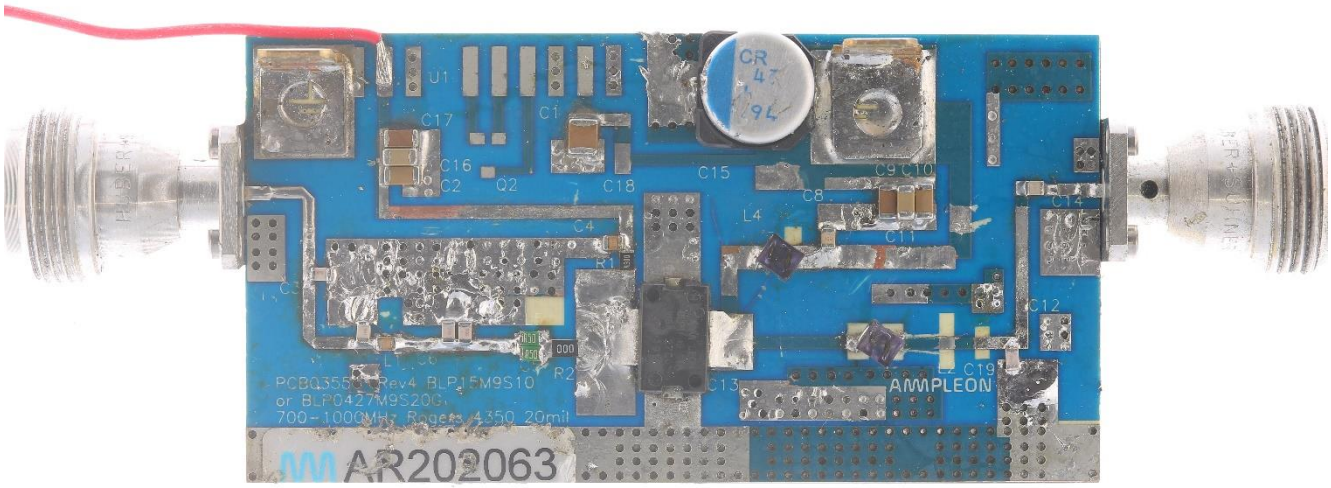

Figure 10. Demo board top view

9.2 PCB layout

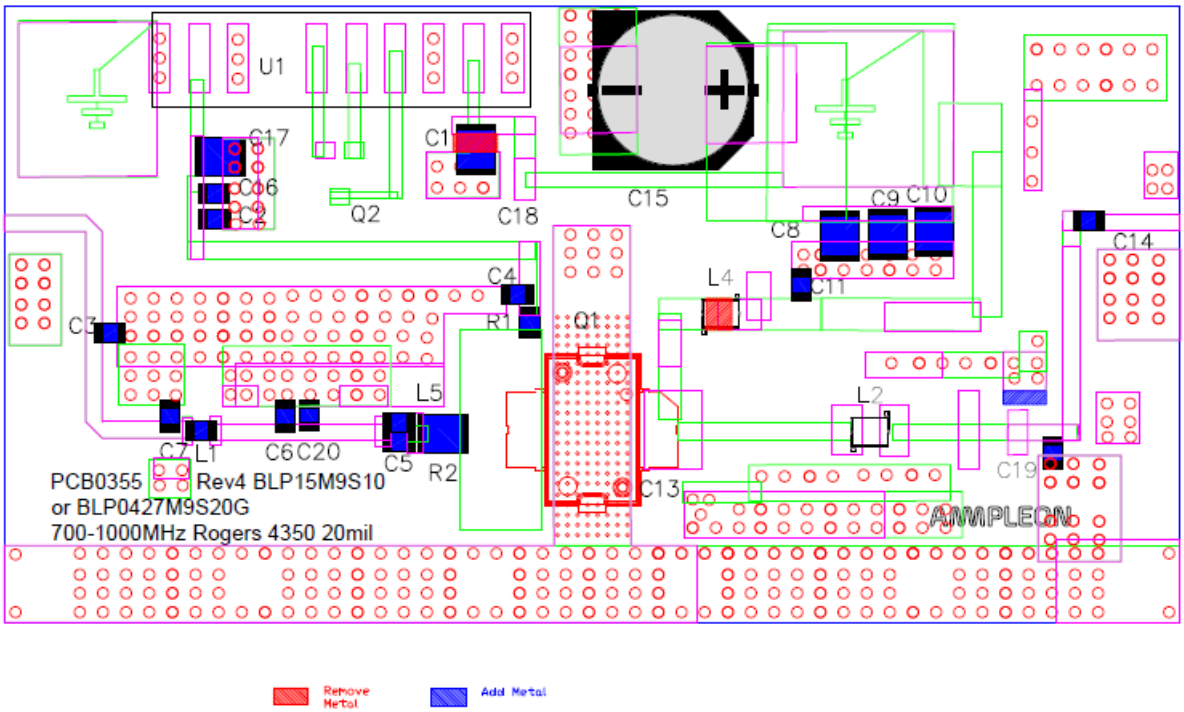

Figure 11. PCB layout and assembly

9.3 Bill of materials

Table 7. Bill of materials

Designator	Description	Manufacturer	Part #
PCB Board	20mil RO4350B 1oz	Avanti	PCB0355 Rev 4
Q1	LDMOS, Class AB 50V 10W	Ampleon	BLP15H9S-10
L2, L4	5nH	Coil Craft	AxxT
C1	10uF	Murata	GRM55DR61H106KA88L
C8, C17	1uF, 1206, 50V, ±10%	Murata	GRM31CR71H105K
C9, C16	0.1uF, 1206, 100V, X7R	Murata	GRM319R72A104KA01D
C2, C10	0.01uF, 1206, 100V, X7R	Murata	GRM319R72A103KA01D
C15	220uF	Panasonic	63V, Electrolytic capacitor
C4, L1, C11, C14	47pF	ATC	600F
C3	8.2pF, 0805, 250V, C0G, 0.1pF	Murata	GQM219
C6	22pF, 0805, 250V, C0G, 1%	Murata	GQM219
C20	20pF, 0805, 250V, C0G, 1%	Murata	GQM219
C7	9.1pF, 0805, 250V, C0G, 0.1pF	Murata	GQM219
C19	1pF, 0805, 250V, C0G, 0.1pF	Murata	GQM219
R1	430 Ohm	Generic	0805
R2	0 Ohm jumper	Generic	1206
C5	0.25Ohm or 2 of 0.5Ohm in parallel	Generic	0805

9.4 PCB materials

Table 8. Board specifications

Parameter	Value
Manufacturer	Rogers
Type	RO4350
Thickness	20mil
Layers	2, top/bottom. Bottom all copper, 1oz copper both sides

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