

AR212046

BLP15H9S30G, 1200-1400 MHz

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AMPLEON

Application Report

Document information

Info	Content
Status	General Publication
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Abstract	Measurement results of BLP15H9S30G LDMOS device in board #AR212046 tested over 1200-1400MHz at 40-50V

1 Revision History

Table 1. Report revisions

Revision No.	Date	Description	Author
1.0	20210415	Initial document	Bill Goumas
2.0	20220422	Changed Security status to General Publication	Bill Goumas

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5 General Description

This report presents the measurement results of the Class AB Demo board AR212046. The device used is a BLP15H9S30G which is a Gen9 30W LDMOS device in an overmolded plastic package.

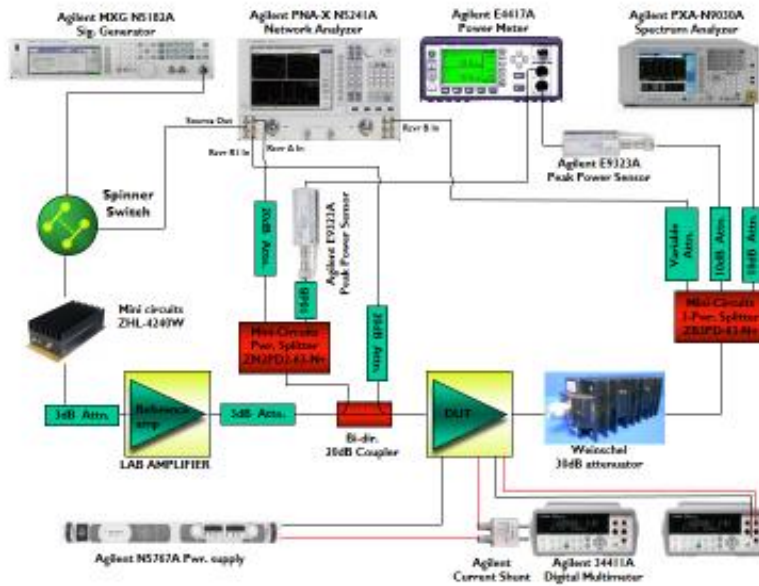
6 Biasing

6.1 Bias Details

For $V_{dd} = 50$, $V_{gs} \sim 2.2$ V for $I_{dq} = 150$ mA set with external Voltage supply.

7 Test Bench Set Up

Figure 1. Test Bench Equipment set up



8 Summary

Customer has application for L-Band Driver and requires a compact footprint. RF portion is ~1 x 0.6" with all components in a straight line.

Board was designed with the model and needed 1 component value change on the input. The demo easily delivers >30W over 1.2-1.4GHz at 50V.

Table 2. RF Performance Vdd=50V, Idq=150mA, 25%duty

Symbol	Parameter	Range	Unit
Freq.	Frequency Range	1200-1400	MHz
Compr	Gain Compression at Pout=30W	<1	dB
Eff.@20W	Efficiency	>47	%
G _{min.} @20W	Minimum Gain	17	dB
G _{flatness} @20W	Gain flatness	+/- 0.5	dB
Eff.@20W, Vdd=40V	Efficiency	>60	%

9 Performance Details

9.1 Small Signal Results

Vdd=50V, Idq=150mA

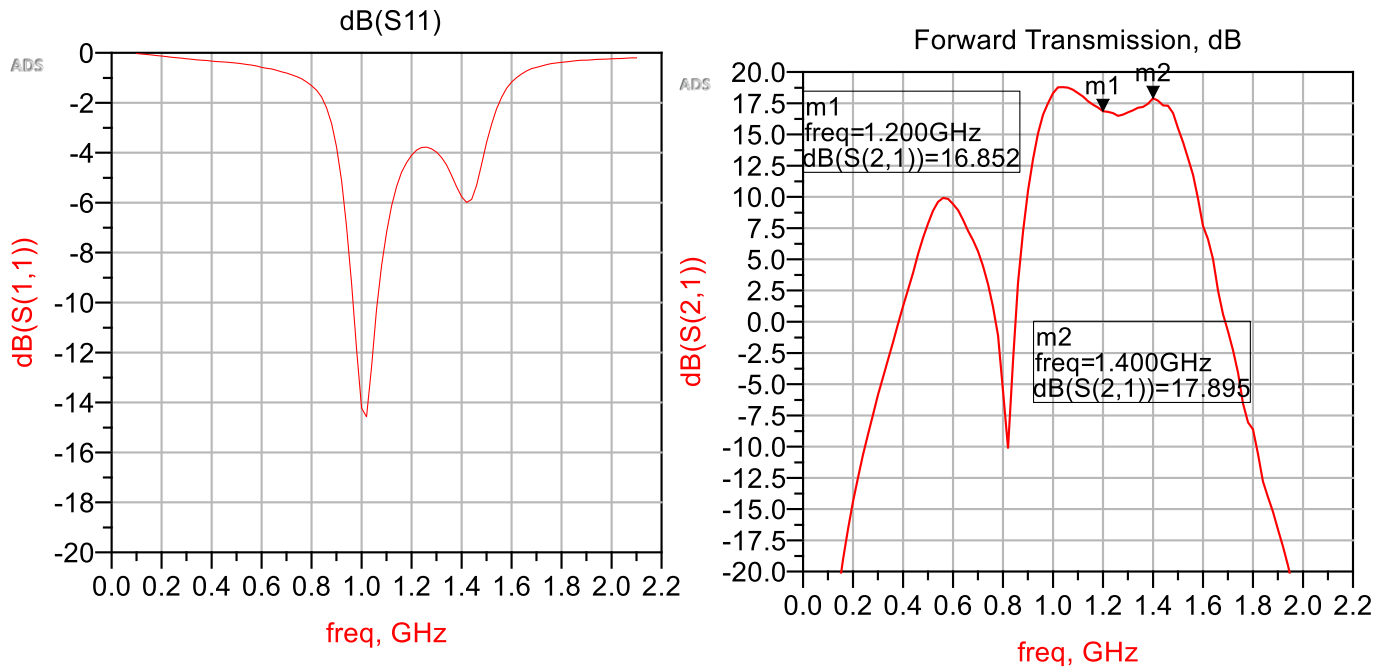


Figure 2. Small Signal Data, Vdd=50V, Idq=150mA, Pin=10dBm

9.2 Pulse Gain, Efficiency vs Pout and Frequency,

Vdd=50V, Idq=150mA, 25% Duty Cycle, PW=100usec

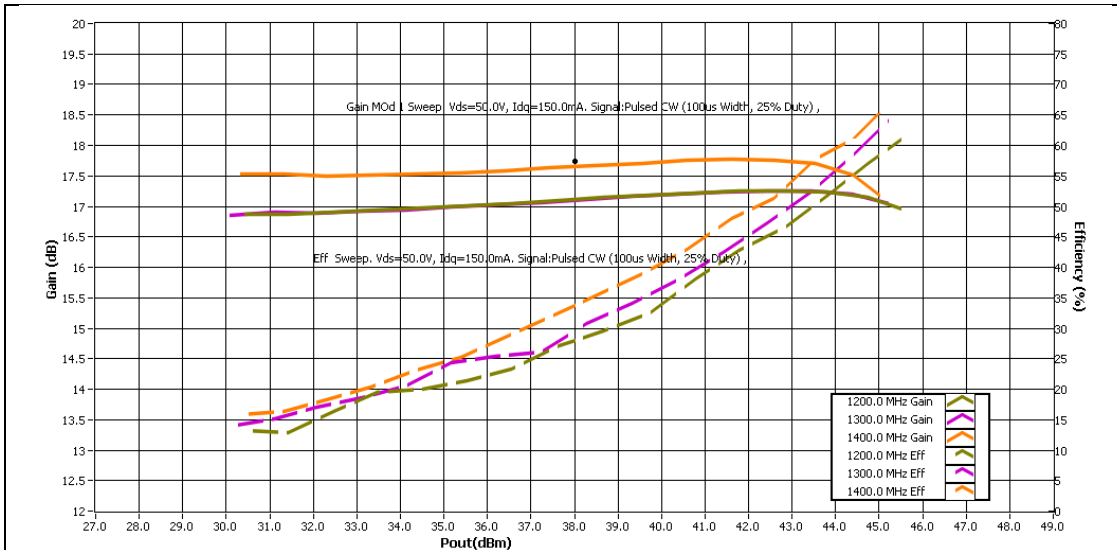


Figure 3. Pulse Gain(dB),Eff(%) vs Power Out(dBm),25% duty

Vdd=40V, Idq=150mA, 25% Duty Cycle

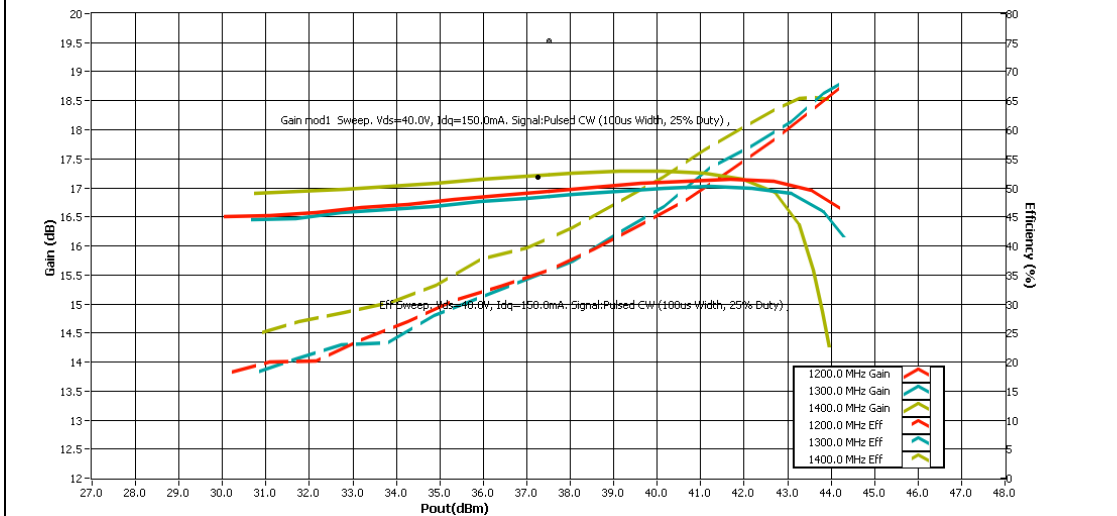


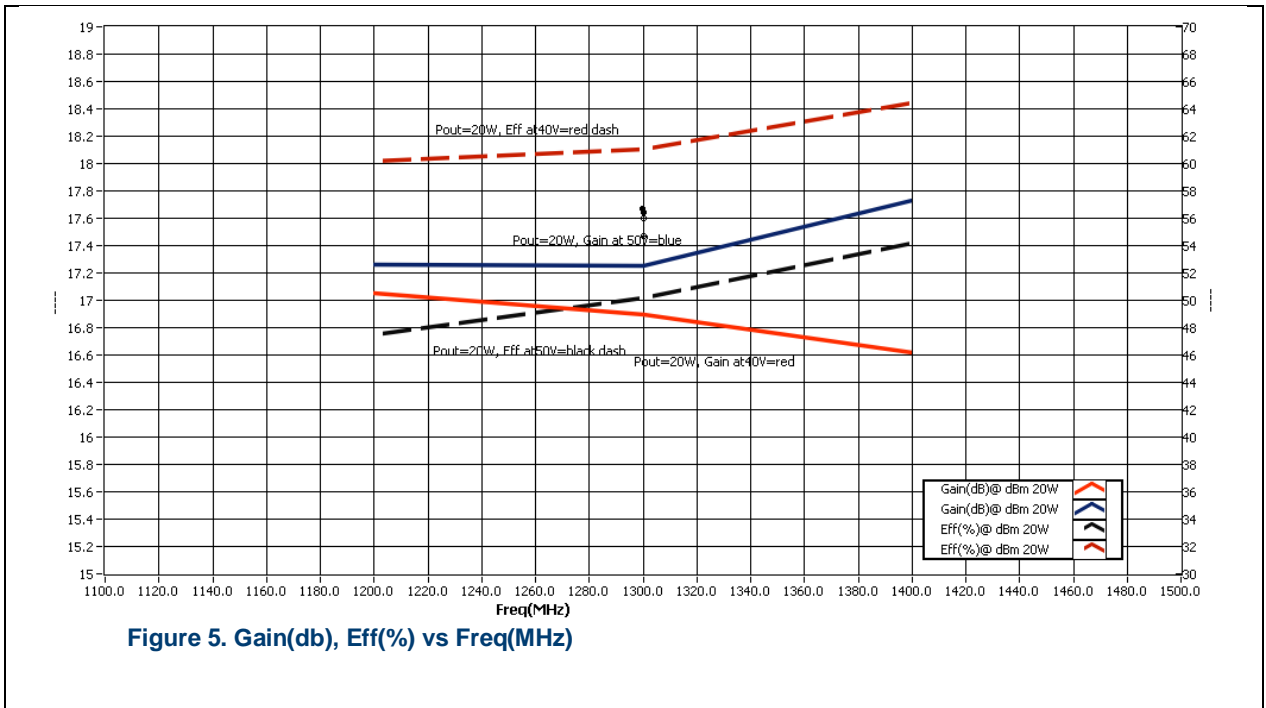
Figure 4. Gain(dB),Eff(%) vs Power Out(dBm),25% duty

9.3 Performance at Fixed Power Output

Idq=150mA, 25% Duty, 100usec PW , Power Output=20W

Red=Gain, Efficiency at 40V

Black=Gain, Efficiency at 50V

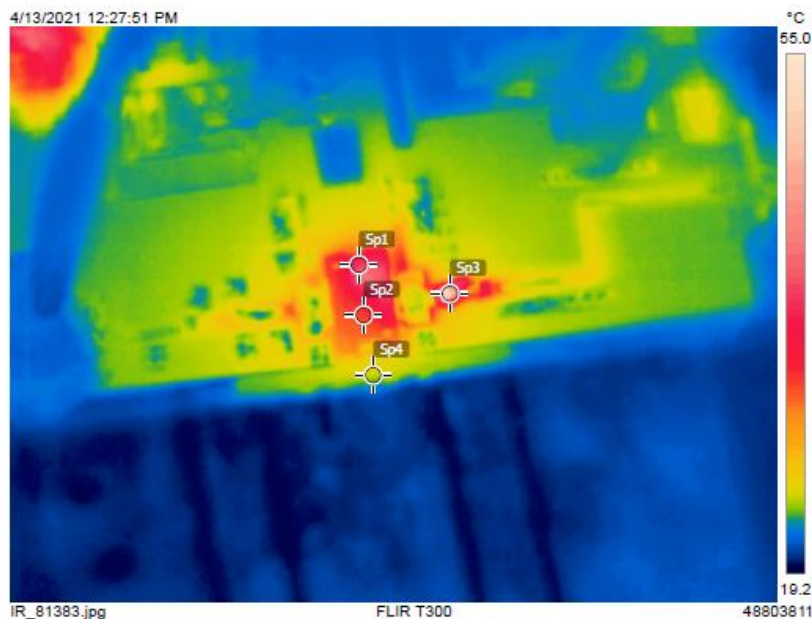


9.4 IR Scan

Vdd=50V, Idq=150mA



F=1.4GHz, Pout=30W, Duty=25%, Vdd=50V



Measurements

Sp1	39.3 °C
Sp2	33.5 °C
Sp3	51.0 °C
Sp4	25.2 °C

Parameters

Emissivity	0.95
Refl. temp.	20 °C

Figure 6. IR Scan, Pout=30W, Duty=25%

10 Hardware

10.1 Board photograph

Vgate thru red wire

Vdrain

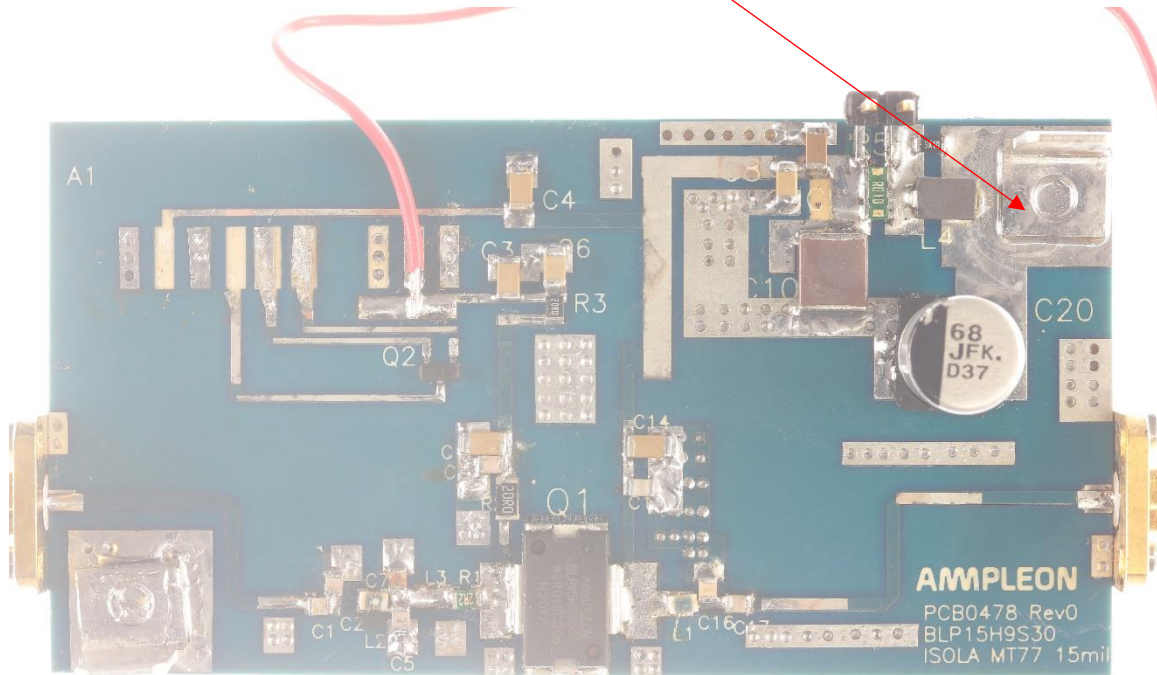


Figure 7. Board Photograph

10.2 PCB layout

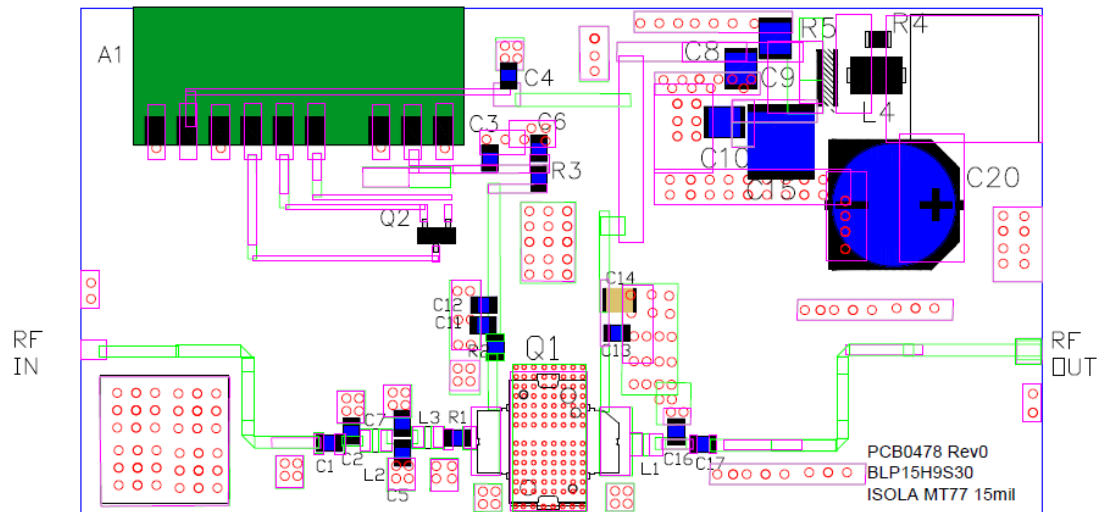


Figure 8.PCB Layout

10.3 Bill of materials

Table 3. BOM

Designator	Description	Manufacturer	Part#
PCB	15 mil thick Isola MT77	Avanti Circuits	PCB0478 Rev 0
Q1	RF Transistor 10W 50V LDMOS	Ampleon	BLP15H9S30G
Q2	2N2222 NPN Transistor	Fairchild	MMBT2222
A1	DNP	Ampleon	CA-330-11
R1	1 Ω	Generic	0805
R2	20 Ω	Generic	1206
R3	20 Ω	Generic	1206
R4	9.1 Ω	Vishay Dale	CRCW08059R09FKEA
R5	0.01 Ω	Vishay Dale	RL3720WT-R010-G
C1	2.4pF	ATC	600F
C2	1.6pF	ATC	600F
C3,C4,C12,C14	0.01uF,100V,X7R,1206	Murata	GRM319R72A103KA01D
C6,C8	0.1uF 100V,X7R	Murata	GRM319R72A104KA01D
C5	5.6pF	ATC	600F
C7	3.9pF	ATC	600F
C9	1uF, ceramic, 50V, $\pm 10\%$	Murata	GRM31CR71H105K
C10	DNP	ATC	600F
C11,C13,C17	30pF	ATC	600F
C15	10uF 2220 100V	TDK	C5750X7S2A106K230KE
C16	3.9pF	ATC	600F
C20	68uF, 63 V electrolytic SMT	Panasonic	EEE-FK1J680UP
L1	2nH	Coilcraft	0805HT-2N0
L2	4.3nH	Coilcraft	0805HT-4N3
L3	Short out with Copper Strip		
L4	FerroxCube bead	Fair Rite	2743019447

10.4 PCB materials

Table 4. Board Specifications

Parameter	Value
Manufacturer	Isola
Type	MT77
Thickness	15 mils, 1oz. copper
Layers	2, top/bottom. Bottom all copper

10.5 Device markings

Table 5. Device Specifications

Parameter	Value
Manufacturer	Ampleon
Device	BLP15H9S30G
Date Code	M2015

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