

AR201195

BLM2425M9S20, 2.4-2.5 GHz

v1.0 – September 18, 2020

AMPLEON

Application Report

Document information

Status v1.0

Abstract Measurement results of a demoboard design with the BLM2425M9S20 in the 2.4-2.5 GHz frequency band

1. Revision History

Table 1 – Report revisions

Revision	Date	Description	Author
1.0	2020.09.18	Initial document	

2. Contents

1.	Revision History	2
2.	Contents	2
3.	List of figures	2
4.	List of tables	2
5.	General description	3
6.	CW RF characteristics	4
7.	CW Performance Details	4
8.	User Guide	5
8.1	Biasing	5
8.1	Pin Headers	5
8.2	Bill of Materials	6
8.3	Temperature behavior	7
8.4	Device markings	7
9.	Legal information	8
9.1	Definitions	8
9.2	Disclaimers	8
9.3	Trademarks	8
9.4	Contact information	8

3. List of figures

Figure 1	– Demo front view	3
Figure 2	– View of the Input-Output 50 Ohm matching	3
Figure 3	– BLM2425M9S20 demo board CW performance	4
Figure 4	– BLM2425M9S20 application board pin configuration	5
Figure 5	– BLM2425M9S20 application board components placement	6

4. List of tables

Table 1	– Report revisions	2
Table 2	– Test circuit information	3
Table 3	– Performance indication	4
Table 4	– RF Performance overview	4
Table 5	– Pin description	5
Table 6	– Bill of Materials	6
Table 7	– Module specifics	7

5. General description

This report presents the measurement results of the demoboard designed for 2.4-2.5 GHz frequency band using the BLM2425M9S20, Gen9 LDMOS transistor. During assembly, PCB has been screwed down without soldering it and the transistor has been soldered.

A compact matching network was designed but input and output 50 Ω lines were extended to fit the available baseplate. These lines do not contribute as matching elements and can be shortened, as shown in the figure below.

The compact demo-circuit is matched to 50 Ω at input and output.

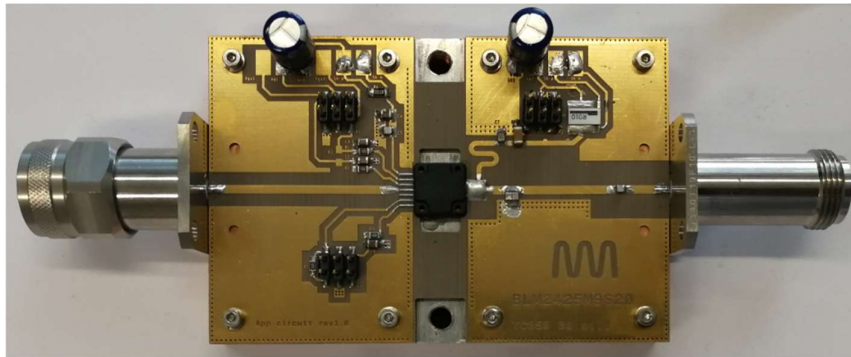


Figure 1 – Demo front view

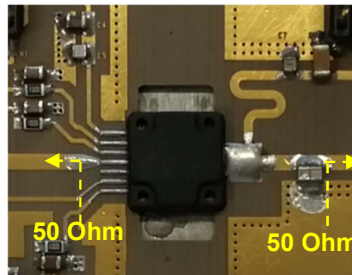


Figure 2 – View of the Input-Output 50 Ohm matching

Table 2 – Test circuit information

Parameter	Description	Unit
Laminate Type	Rogers TC350	
Dk	3.5	
Df	0.0020@10 GHz	
Laminate thickness	0.762	mm
Overall dimensions	90 x 60	mm
Cooling type	Indirect water cooling	
Device Package	OMP400	

6. CW RF characteristics

Table 3 – Performance indication

Test signal: CW; RF performance at $V_{DS}=32V$; Total $I_{Dq}=30mA$; $T_{cooling\ water}=25^{\circ}C$

Symbol	Parameter	Conditions	Typical	Unit
f	Frequency		2.45	GHz
V_{DS}	Drain-source voltage		32	V
V_{GS1}	Gate-source voltage1	$I_{Dq1} = 10mA$	2	V
V_{GS2}	Gate-source voltage2	$I_{Dq2} = 20mA$	1.88	V
G_p	Power Gain	$P_{1dBcp} = 22.51W$	27.11	dB
η_D	Drain Efficiency	$P_{1dBcp} = 22.51W$	47.19	%

7. CW Performance Details

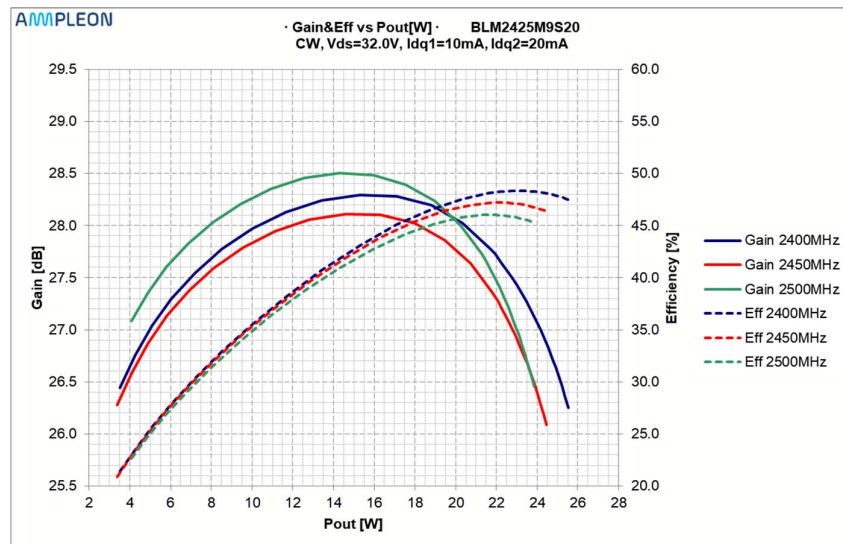


Figure 3 – BLM2425M9S20 demo board CW performance

Table 4 – RF Performance overview

Freq [MHz]	Gmax [dB]	Pout@ Gmax [W]	P1dB [W]	P2dB [W]	Effmax [%]	Pout@ Effmax [W]	Eff P1dB [%]	Eff P2dB [%]
2400	28.30	15.28	23.41	25.46	48.33	23.26	48.32	47.54
2450	28.11	14.58	22.51	24.42	47.21	22.07	47.19	46.38
2500	28.50	14.28	21.92	23.79	46.03	21.75	46.02	45.35

8. User Guide

8.1 Biasing

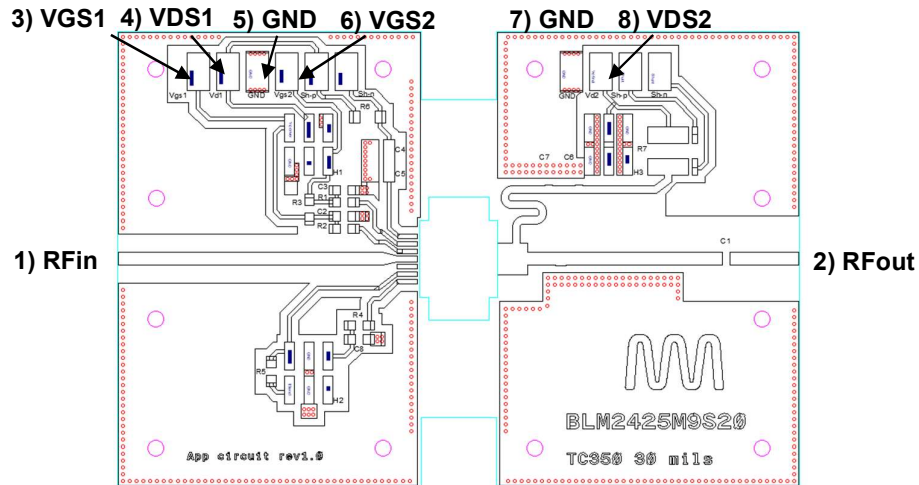
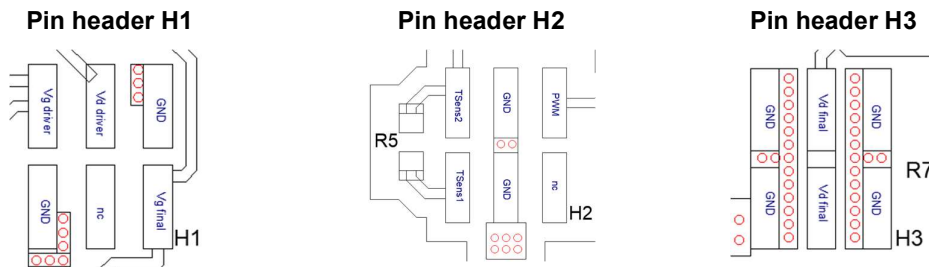


Figure 4 – BLM2425M9S20 application board pin configuration

Table 5 – Pin description

Symbol	Pin	Description
RF _{IN}	1	RF input
RF _{OUT}	2	RF output
V _{GS1}	3	Gate-source voltage of stage1
V _{DS1}	4	Drain-source voltage of stage1
V _{GS2}	6	Gate-source voltage of stage2
V _{DS2}	8	Drain-source voltage of stage2
GND	5,7	Negative supply terminal for V _{DS} and V _{GS}

8.1 Pin Headers



8.2 Bill of Materials

Table 6 – Bill of Materials

Part	Description	Value	PN/Remark
C1, C5, C7	Multilayer ceramic chip capacitor	20 pF	ATC800A
C2, C3, C4, C8	Multilayer ceramic chip capacitor	1uF, 100V	08051A102JAT2A
C6	Multilayer ceramic chip capacitor	4.7 uF, 50V	
C9, C10	Multilayer ceramic chip capacitor	0.5 pF	ATC800A
R1, R2	Chip Resistor	100 Ohm	0805
R4	Chip Resistor	100 Ohm	0805
R5	Chip Resistor	30 Ohm	0805
R6	Chip Resistor	0.1 ohm	CRM1206-FX-R100ELF Current sense Tol 1%
R7	Chip Resistor	0.01 Ohm	FC4L64R010FER Current sense Tol 1%
ELCO	Electrolytic capacitors	100uF, 63V	

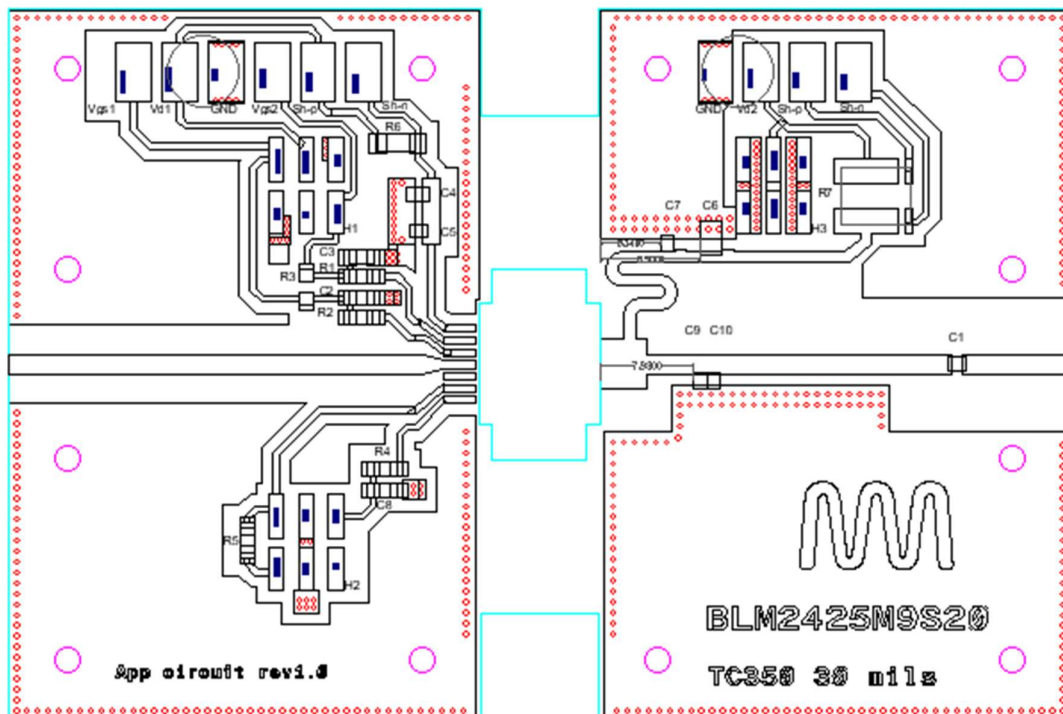


Figure 5 – BLM2425M9S20 application board components placement

8.3 Temperature behavior

For the operation of this demo board water or air cooling should be applied.

8.4 Device markings

Table 7 – Module specifics

Parameter	Value
Manufacturer	Ampleon
Device	BLM2425M9S20
Comments	Engineering sample

9. Legal information

9.1 Definitions

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