

AR194008

ART2K0FE, 60MHz

V1.0---11 October 2019

AMPLEON

Application
Measurement
Report

Document information

Status Public

Author(s) Rock Qiu, rock.qiu@ampleon.com

Abstract Measurement results of planar balun design with ART2K0FE, this circuit works at 60MHz.

Revision History

Table 1: *Report revisions*

Revision	Date	Description	Author
1.0	20190704	Initial document	Rock Qiu
2.0	20191011	Update the BOM, test at 65V	Rock Qiu

Contents

1. Revision History	2
2. Contents	3
3. List of figures	3
4. List of tables	3
5. General description	4
6. Biasing	5
7. Performance Indication	5
8. Performance Details	5
8.1 Return loss.....	6
8.2 Test data.....	7
9. Hardware	7
9.1 Board Image	7
9.2 Copper Layout and components mapping	8
9.3 Bill of materials.....	9
9.4 Board material.....	9
9.5 Device markings.....	9
10. Legal information	10
10.1 Definitions	10
10.2 Disclaimers	10
10.3 Trademarks.....	10
10.4 Contact information	10

List of figures

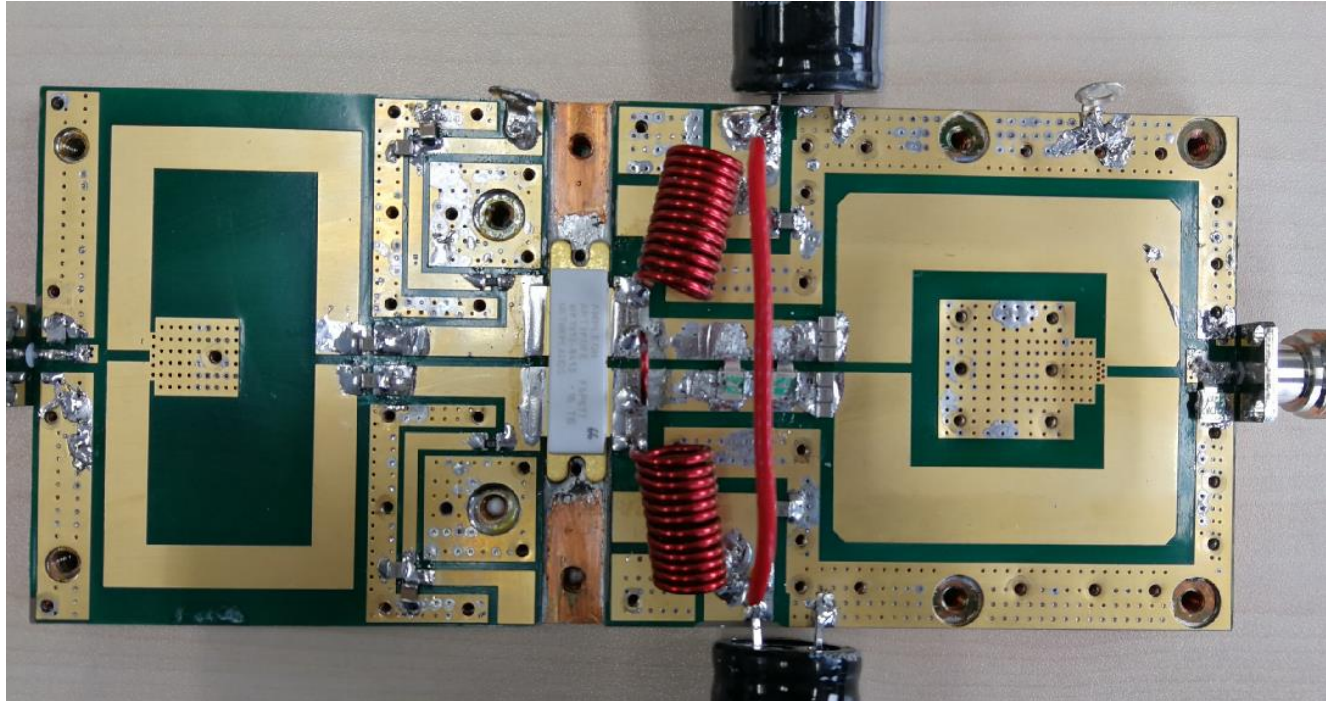
Figure 1	Return loss of input side.....	5
Figure 2 pulse	63V pulsed Gain vs Pout (10ms 10%).....	7
Figure 3 CW.....	63V CW test	8
Figure 4 photo.....	demo picture	9

List of tables

Table 1:.....	Report revisions	2
Table 2:.....	Performance Indication	5
Table 3:.....	Bill of Materials	9
Table 4:.....	Board specifications	9
Table 5:.....	Device specifics.....	9

General description

This report presents the measurement results of 60MHz demo. The device is 65V ART2K0FE LDMOS in a push-pull package, which can handle 65:1 VSWR.



Biasing

The biasing is as follows:

$V_{DS} = 65V$
 $I_{dq} = 100mA$

Performance Indication

Table 2: Performance indication

Parameter	Condition	Unit	Pulsed(10ms 10%)	CW
V_{DD}		V	65	65
S11 at input		dB	-12	-12
Gain		dB	27	26.5
Drain Efficiency		%	86	83

Performance Details

7.1 Return loss at input side

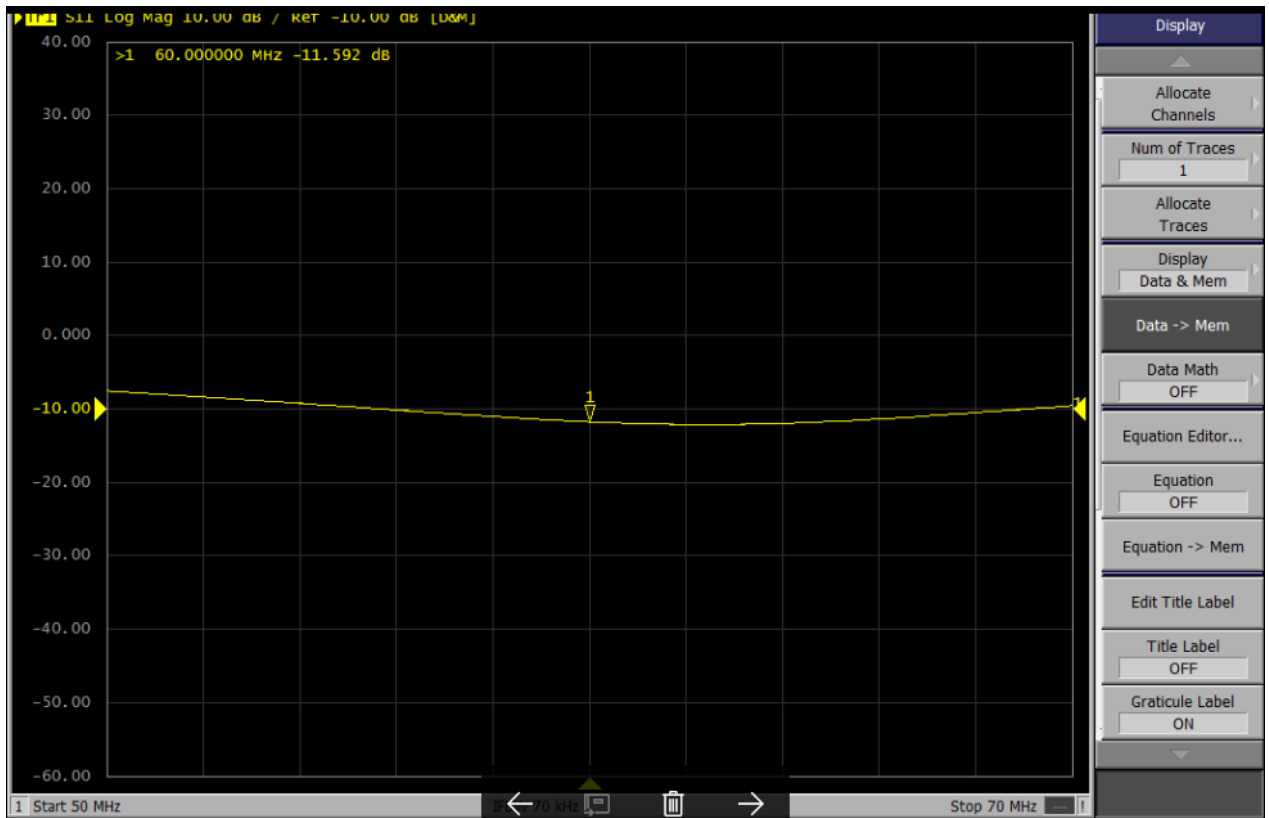


Figure 1 return loss

7.2 Test data 65V 100mA:

7.2.1 Pulsed test of 65V (10ms, 10% duty cycle)

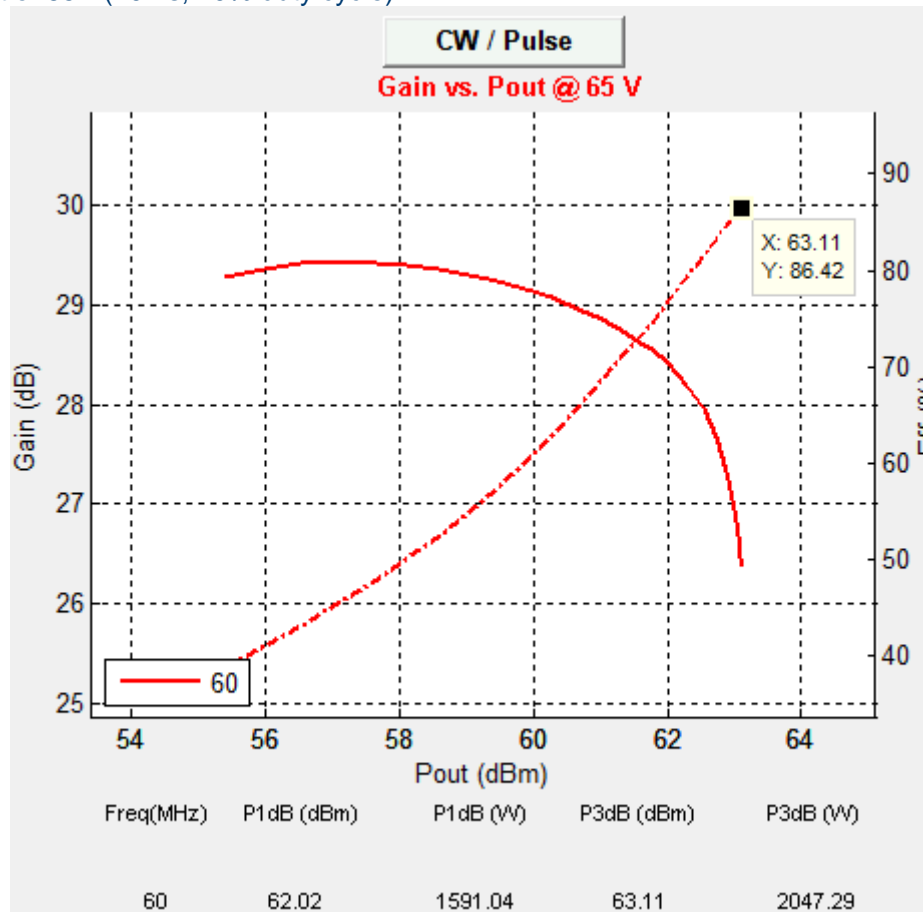


Figure 2 65V pulsed Gain vs Pout (10ms 10%)

7.2.2 CW test of 65V

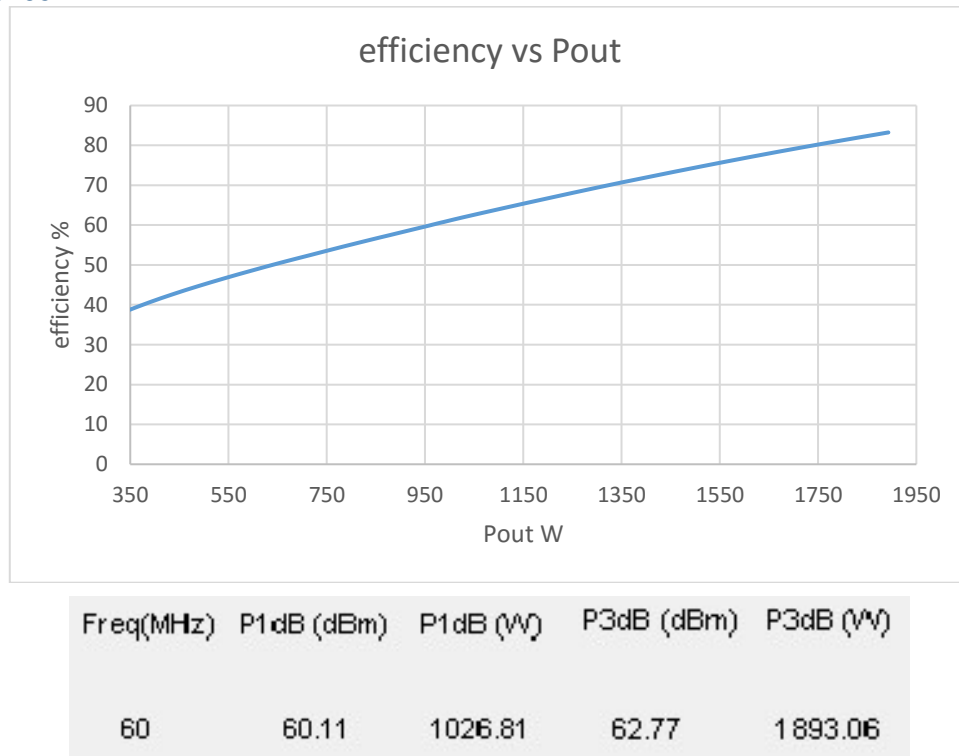


Figure 3 65V CW test

8. Hardware

8.1 Board Image

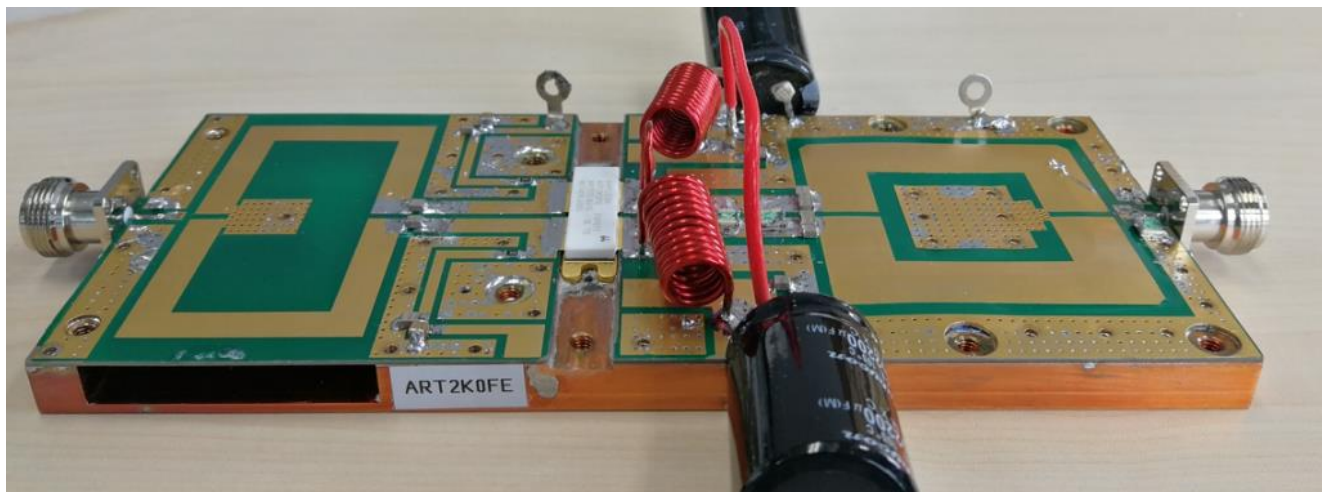
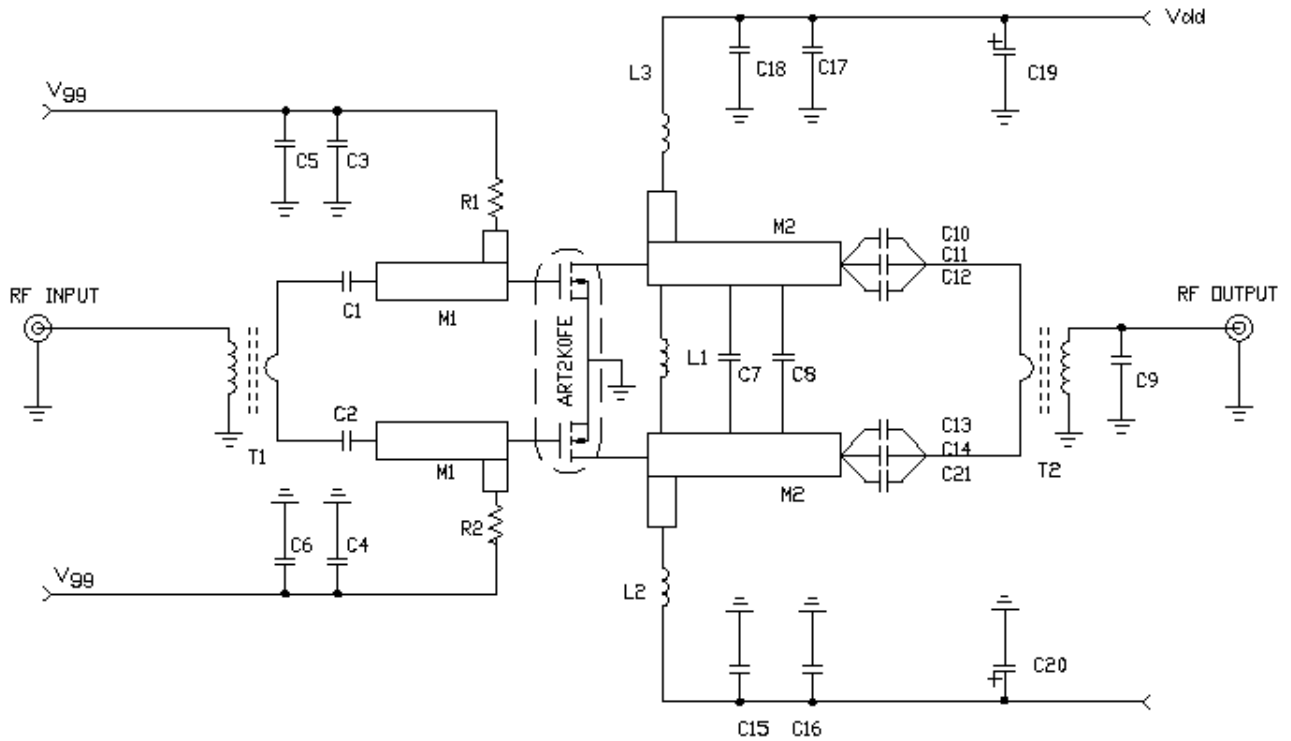
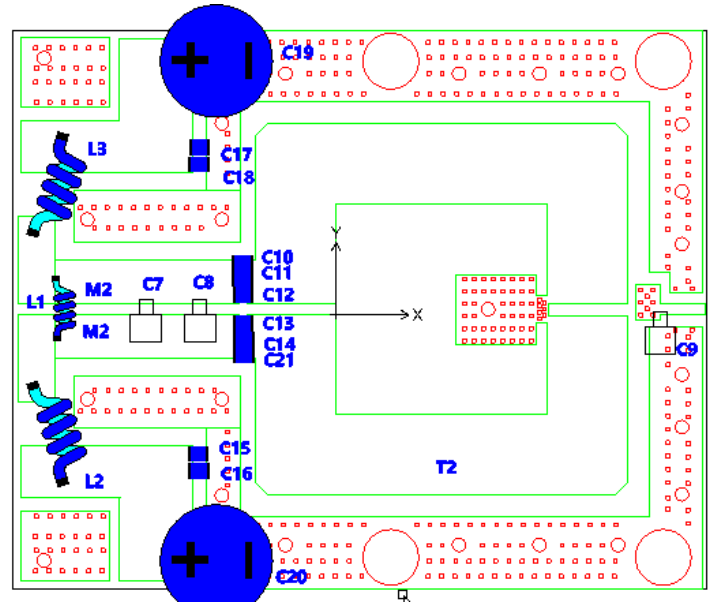
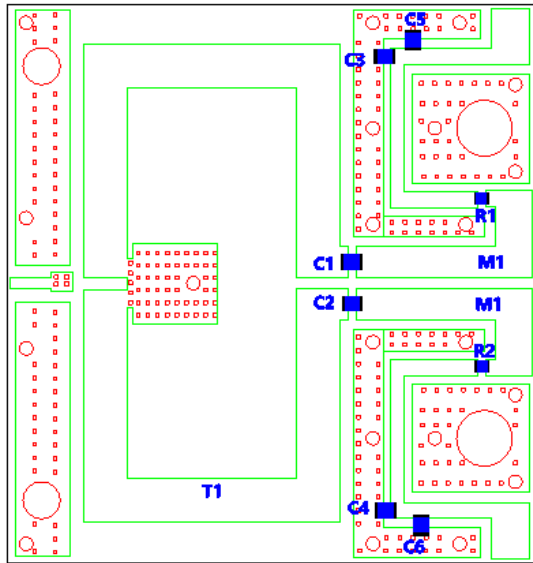


Figure 4 demo picture

8.2 Copper Layout and components mapping(layout, BOM is attached in the PDF report)



8.3 Bill of materials

Table 3: *Bill of Materials*

Quantity	Description	Part Number	Manufacturer
R1,R2	51ohm Resistor	1206	
C5,C6,C16,C17	10uF	GRM32DF51H106ZA01L	Murata
C1,C2,C3,C4, C10,C11,C12,C13,C14, C15,C18,C21	1000P	800B	ATC
C7	100P	MIN	CDE metal mica
C8	91P	MIN	CDE metal mica
C9	22P	MIN	CDE metal mica
L2	9mm inner diameter, 20.5mm height, (1.3mm wire)		Handwound
L2,L3	9mm inner diameter, 12T, (1.6mm wire)		Handwound
C19,C20	2200uF	100V	Rubycon
M1	Microstrip line		
M2	Microstrip line		
T1	Planar balun		
T2	Planar balun		
Thermal pad under the output planar balun	Thermipad TP 22626		Muller Ahlhorn

8.4 Board material

Table 4: *Board specifications*

Parameter	Value
Manufacturer	Rogers
Type	TC350
Thickness	30mil, 0.762mm
Layers	2, top/bottom. Bottom all copper

8.5 Device markings

Table 5: *Device specifics*

Parameter	Value
Manufacturer	Ampleon
Device	ART2K0FE

Legal information

9.1 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Ampleon does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

9.2 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, Ampleon does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. Ampleon takes no responsibility for the content in this document if provided by an information source outside of Ampleon.

In no event shall Ampleon be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, Ampleon's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of Ampleon.

Right to make changes — Ampleon reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — Ampleon products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an Ampleon product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Ampleon and its

suppliers accepts no liability for inclusion and/or use of Ampleon products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. Ampleon makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using Ampleon products, and Ampleon accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Ampleon product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

Ampleon does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Ampleon products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Ampleon does not accept any liability in this respect.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

9.3 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

Any reference or use of any 'NXP' trademark in this document or in or on the surface of Ampleon products does not result in any claim, liability or entitlement vis-à-vis the owner of this trademark. Ampleon is no longer part of the NXP group of companies and any reference to or use of the 'NXP' trademarks will be replaced by reference to or use of Ampleon's own trademarks.

9.4 Contact information

For more information, please visit: <http://www.ampleon.com>

For sales office addresses, please visit: <http://www.ampleon.com/sales>