

Document information

| Info | Content |
|-----------------|---|
| Keywords | BLF578, HV LDMOS |
| Abstract | This application note describes the dependency of the BLF578 transistor gate bias voltage on junction temperature |

Revision history

| Rev | Date | Description |
|-----|----------|---|
| 02 | 20150901 | Modifications <ul style="list-style-type: none">• The format of this document has been redesigned to comply with the new identity guidelines of Ampleon.• Legal texts have been adapted to the new company name where appropriate. |
| 01 | 20091217 | Initial version |

Contact information

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

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

1. Introduction

The BLF578 is a 50 V push-pull transistor using Ampleon’s sixth generation of HV LDMOS technology. The BLF578 has a high degree of ruggedness, critical for successful broadcasting, due to the carefully designed high voltage fabrication process.

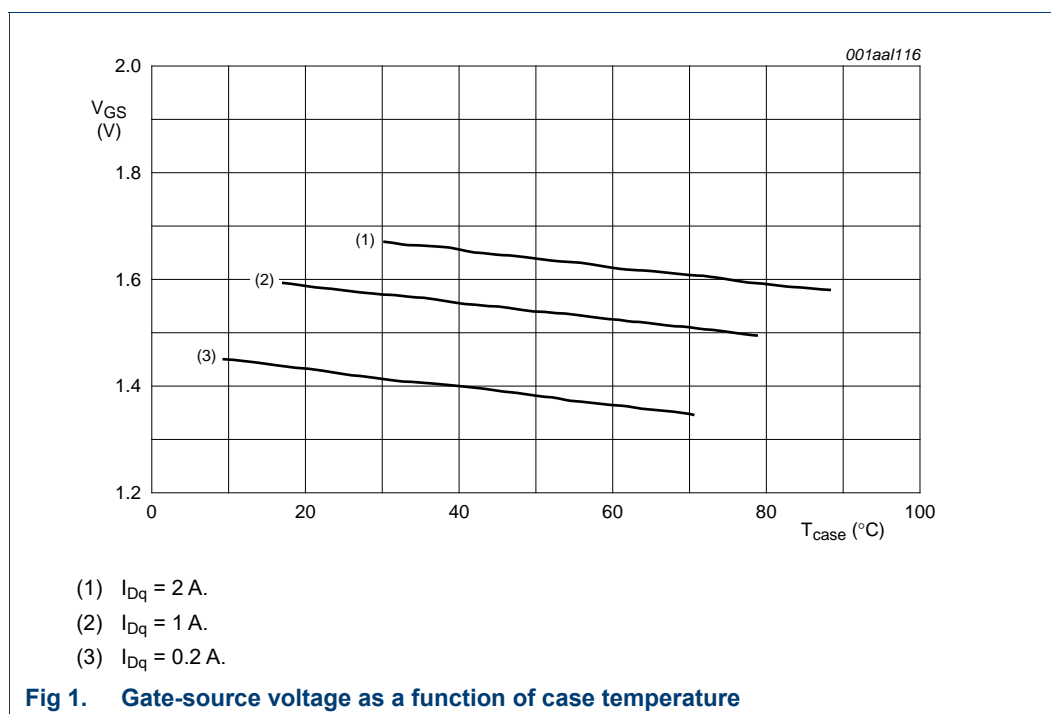
Within the BLF578 package, the two push-pull modules are completely independent of each other and the gates are protected by the integrated ElectroStatic Discharge (ESD) diode.

The BLF578 is unmatched and designed for use in applications where very high power and efficiency are required. At full operating power, the BLF578 can withstand a 13:1 VSWR for all phase angles. Typical uses are FM/VHF broadcasting, laser, and Industrial Scientific and Medical (ISM) applications.

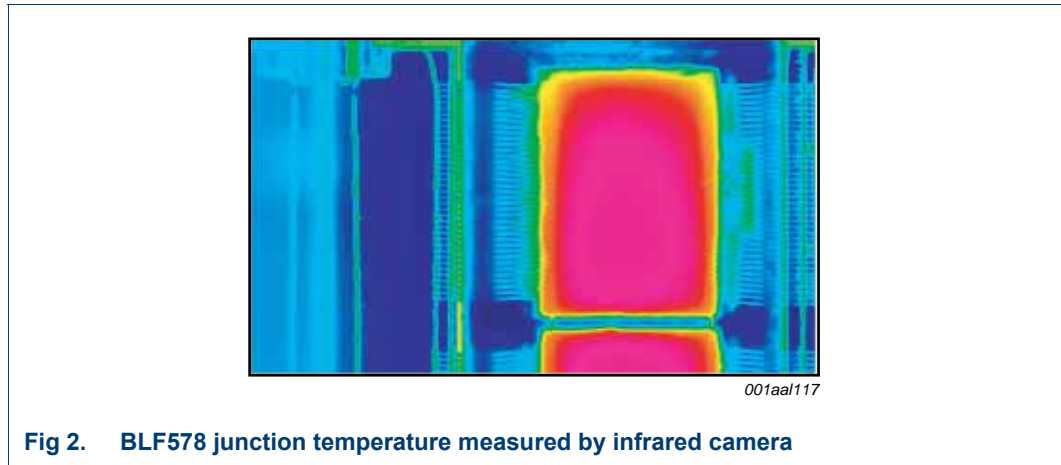
This application note describes the dependency of gate bias voltage on the BLF578 transistor junction temperature. This dependency can be used by a temperature compensated bias circuit to ensure that the quiescent drain current remains constant during RF operation.

2. Measurement results

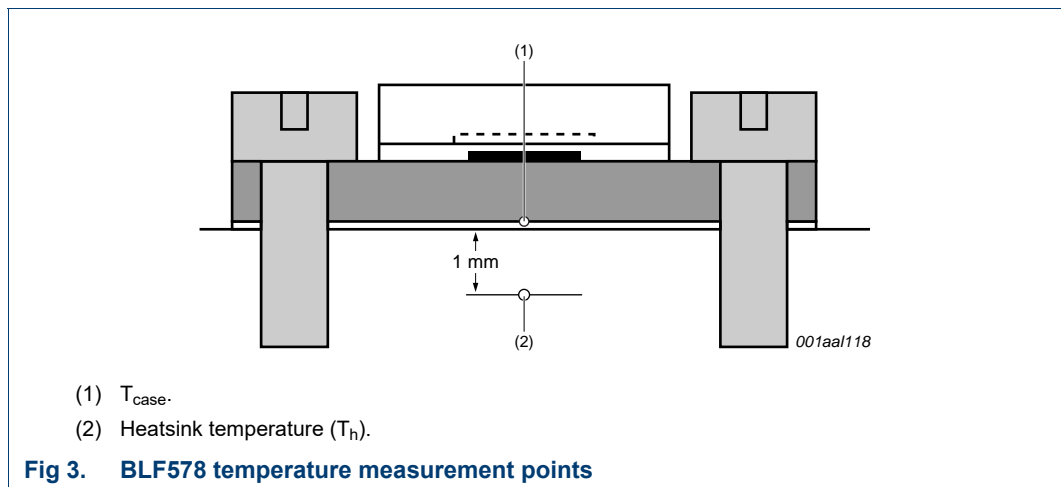
To determine the dependency of gate-bias voltage on temperature, the BLF578 case temperature (T_{case}) was allowed to reach 70 °C and gradually water cooled to 5 °C. Over this temperature range the gate-source voltage (V_{GS}) was adjusted to maintain a constant quiescent current (I_{Dq}) and the values of V_{GS} and T_{case} were recorded. The measurements were performed for I_{Dq} values of 0.2 A, 1 A and 2 A at a supply voltage (V_{DS}) of 50 V as shown in [Figure 1](#).



The values of the three quiescent currents used in the measurements were chosen to represent typical quiescent currents found in Ampleon applications.



The case temperature (T_{case}) was measured below the flange as shown in [Figure 3](#).



3. Abbreviations

Table 1. Abbreviations

| Acronym | Description |
|---------|--|
| HV | High Voltage |
| LDMOS | Laterally Diffused Metal Oxide Semiconductor |
| VSWR | Voltage Standing Wave Ratio |

4. Legal information

4.1 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.

4.2 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 accept 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.

4.3 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 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.

5. Contents

| | | |
|----------|----------------------------------|----------|
| 1 | Introduction | 3 |
| 2 | Measurement results | 3 |
| 3 | Abbreviations | 4 |
| 4 | Legal information | 5 |
| 4.1 | Definitions | 5 |
| 4.2 | Disclaimers | 5 |
| 4.3 | Trademarks | 5 |
| 5 | Contents | 6 |

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

© Ampleon The Netherlands B.V. 2015. All rights reserved.

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

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

Date of release: 1 September 2015

Document identifier: AN10882#2