Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!


## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

# BLP27M810

**Power LDMOS transistor**

**Rev. 1 — 11 February 2016**

AMPLEON

**Product data sheet**

## 1. Product profile

### 1.1 General description

10 W LDMOS power transistor for broadcast and Industrial, Scientific and Medical (ISM) applications at frequencies from HF to 2700 MHz.

The BLP27M810 driver is designed for high power CW applications and is assembled in a high performance thermally enhanced plastic package.

**Table 1. Typical performance**

*RF performance at $V_{DS}$ = 32 V; $I_{Dq}$ = 100 mA; $T_{case}$ = 25 °C in a class-AB application circuit.*

| Test signal | f | $I_{Dq}$ | $V_{DS}$ | $P_{L(AV)}$ | $G_p$ | $\eta_D$ |
|---|---|---|---|---|---|---|
| | (MHz) | (mA) | (V) | (W) | (dB) | (%) |
| CW | 2450 | 100 | 32 | 10 | 18.4 | 50.6 |
| Pulsed CW | 2700 | 110 | 28 | 2 | 17 | 19 |

### 1.2 Features and benefits

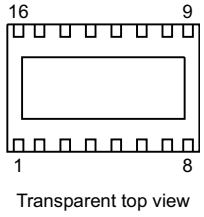
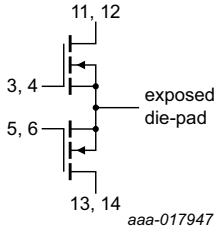
- High efficiency
- High power gain
- Excellent ruggedness
- Excellent thermal stability
- Integrated ESD protection
- Designed for broadband operation (HF to 2700 MHz)
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

### 1.3 Applications

- Broadcast and Industrial, Scientific and Medical applications in the frequency range from HF to 2700 MHz

## 2. Pinning information

**Table 2. Pinning**

| Pin | Description | Simplified outline | Graphic symbol [1] |
|---|---|---|---|
| 1, 2, 7, 8, 9, 10, 15, 16 | n.c. |   Transparent top view |   |
| 3, 4, 5, 6 | gate | | |
| 11, 12, 13, 14 | drain | | |
| exposed die-pad | source [2] | | |

[1] To be used in single ended applications only.

[2] Connected to flange.

## 3. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BLP27M810 | HVSON16 | plastic thermal enhanced very thin small outline package; no leads;16 terminals; body 4 × 6 × 0.85 mm | SOT1371-1 |

## 4. Limiting values

**Table 4. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

| Symbol | Parameter | Conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| $V_{DS}$ | drain-source voltage | | - | 65 | V |
| $V_{GS}$ | gate-source voltage | | −0.5 | +13 | V |
| $T_{stg}$ | storage temperature | | −65 | +150 | °C |
| $T_j$ | junction temperature | | - | 225 | °C |

## 5. Thermal characteristics

**Table 5. Thermal characteristics**

| Symbol | Parameter | Conditions | Typ | Unit |
|---|---|---|---|---|
| $R_{th(j-c)}$ | thermal resistance from junction to case | $T_{case}$ = 80 °C; $P_L$ = 2 W | 3.2 | K/W |

# 6. Characteristics

**Table 6. DC characteristics**

*$T_j$ = 25 °C; unless otherwise specified.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | drain-source breakdown voltage | $V_{GS}$ = 0 V; $I_D$ = 0.18 mA | 65 | - | - | V |
| $V_{GS(th)}$ | gate-source threshold voltage | $V_{DS}$ = 10 V; $I_D$ = 18 mA | 1.5 | 1.9 | 2.3 | V |
| $I_{DSS}$ | drain leakage current | $V_{GS}$ = 0 V; $V_{DS}$ = 28 V | −1.4 | - | +1.4 | μA |
| $I_{DSX}$ | drain cut-off current | $V_{GS}$ = $V_{GS(th)}$ + 3.75 V | - | 3.2 | - | A |
| $I_{GSS}$ | gate leakage current | $V_{GS}$ = 11 V; $V_{DS}$ = 0 V | - | - | 140 | nA |
| $g_{fs}$ | forward transconductance | $V_{DS}$ = 10 V; $I_D$ = 18 mA | - | 160 | - | mS |
| $R_{DS(on)}$ | drain-source on-state resistance | $V_{GS}$ = $V_{GS(th)}$ + 3.75 V; $V_{DS}$ = 10 V; $I_D$ = 630 mA | - | 1000 | - | mΩ |

**Table 7. RF characteristics**

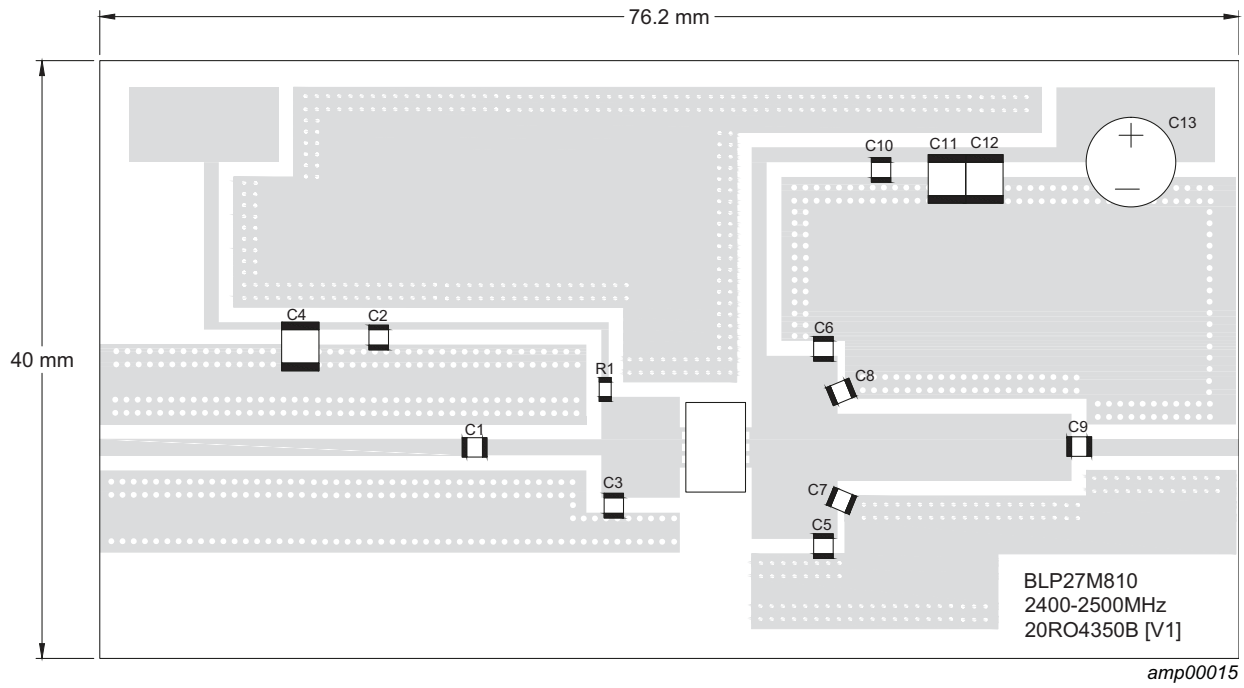
*A derivative functional RF test is performed in production. The performance as mentioned below is verified by design and characterization in an Ampleon class-AB application board.*

*Test signal: pulsed CW; $\delta$ = 10%; $t_p$ = 100 μs; $V_{DS}$ = 28 V; $I_{Dq}$ = 110 mA; $T_{case}$ = 25 °C; f = 2140 MHz*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $G_p$ | power gain | $P_{L(AV)}$ = 2 W | 16 | 17 | - | dB |
| $\eta_D$ | drain efficiency | $P_{L(AV)}$ = 2 W | 17 | 19 | - | % |
| $P_{L(1dB)}$ | output power at 1 dB gain compression | | 10 | - | - | W |

# 7. Application information

## 7.1 Application circuit




Printed-Circuit Board (PCB): Rogers RO4350B; $\varepsilon_r$ = 3.5; thickness = 0.508 mm; thickness copper plating = 35 μm.

See Table 8 for list of components.

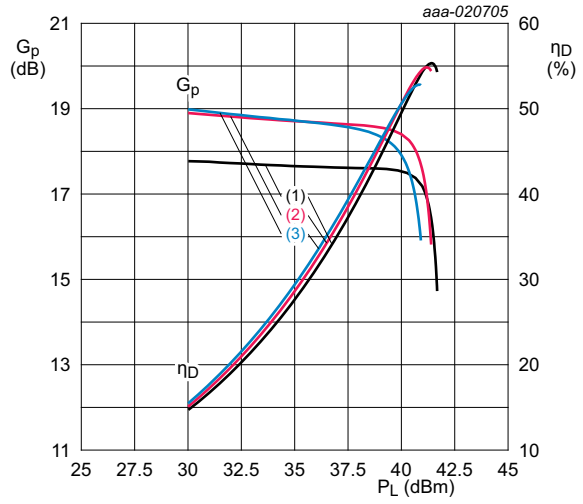
**Fig 1. Component layout**

**Table 8. List of components**

*See Figure 1 for component layout.*

| Component | Description | Value | Remarks |
|---|---|---|---|
| C1 | multilayer ceramic chip capacitor | 0.5 pF | ATC 100A |
| C2, C10 | multilayer ceramic chip capacitor | 15 pF | ATC 100A |
| C3 | multilayer ceramic chip capacitor | 2.2 pF | ATC 100A |
| C4, C11, C12 | multilayer ceramic chip capacitor | 1 μF, 50 V | Murata: GRM32RR71H105KA01L |
| C5, C6 | multilayer ceramic chip capacitor | 2.4 pF | ATC 100A |
| C7, C8 | multilayer ceramic chip capacitor | 1.5 pF | ATC 100A |
| C9 | multilayer ceramic chip capacitor | 15 pF | ATC 100A |
| C13 | electrolytic capacitor | 10 μF, 63 V | |
| R1 | chip resistor | 5.1 Ω | SMD 0805 |

## 7.2 Graphical data



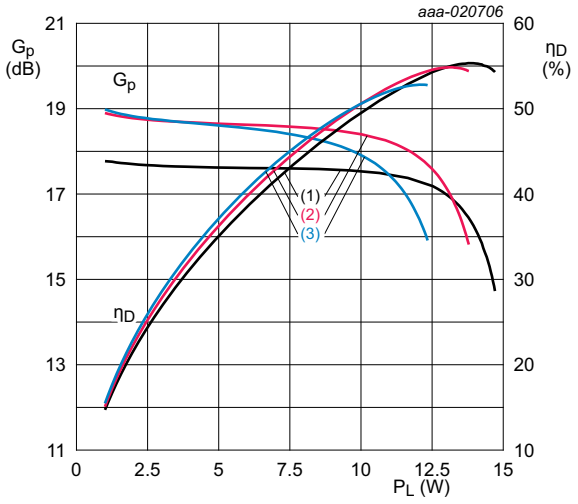

$V_{DS}$ = 32 V; $I_{Dq}$ = 100 mA.

(1) f = 2400 MHz

(2) f = 2450 MHz

(3) f = 2500 MHz

**Fig 2. Power gain and drain efficiency as function of output power; typical values**



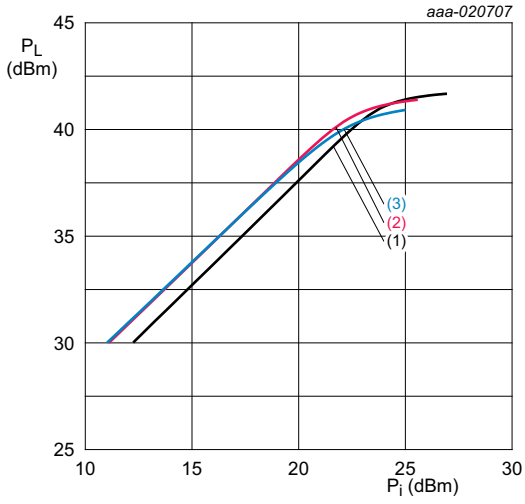

$V_{DS}$ = 32 V; $I_{Dq}$ = 100 mA.

(1) f = 2400 MHz

(2) f = 2450 MHz

(3) f = 2500 MHz

**Fig 3. Power gain and drain efficiency as function of output power; typical values**



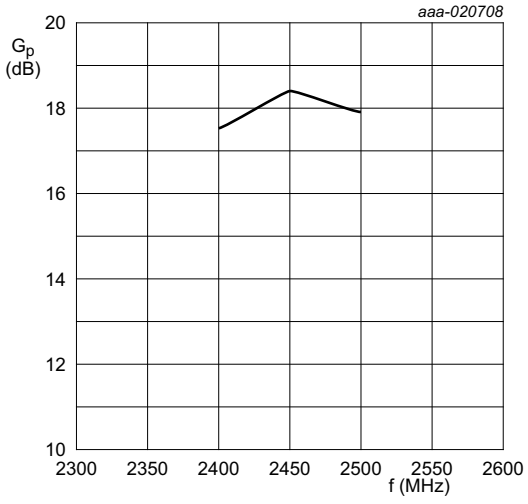

$V_{DS}$ = 32 V; $I_{Dq}$ = 100 mA.

(1) f = 2400 MHz

(2) f = 2450 MHz

(3) f = 2500 MHz

**Fig 4. Output power as a function of input power; typical values**




$V_{DS}$ = 32 V; $I_{Dq}$ = 100 mA; $P_L$ = 10 W.

**Fig 5. Power gain as a function of frequency; typical values**

# 8. Test information

## 8.1 Ruggedness in class-AB operation

The BLP27M810 is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: $V_{DS}$ = 32 V; $I_{Dq}$ = 100 mA; $P_L$ = 10 W.

**Table 9. Typical impedance**

*Measured load-pull data. Typical values unless otherwise specified. $I_{Dq}$ = 120 mA; $V_{DS}$ = 28 V.*

| f | $Z_S$ [1] | $Z_L$ [1] |
|---|---|---|
| (MHz) | (Ω) | (Ω) |
| 2400 | 0.6 – j3.0 | 2.2 + j0.2 |
| 2450 | 0.6 – j3.3 | 2.4 – j0.1 |
| 2500 | 0.6 – j3.5 | 2.5 – j0.3 |

[1] $Z_S$ and $Z_L$ defined in Figure 6.

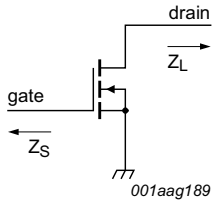
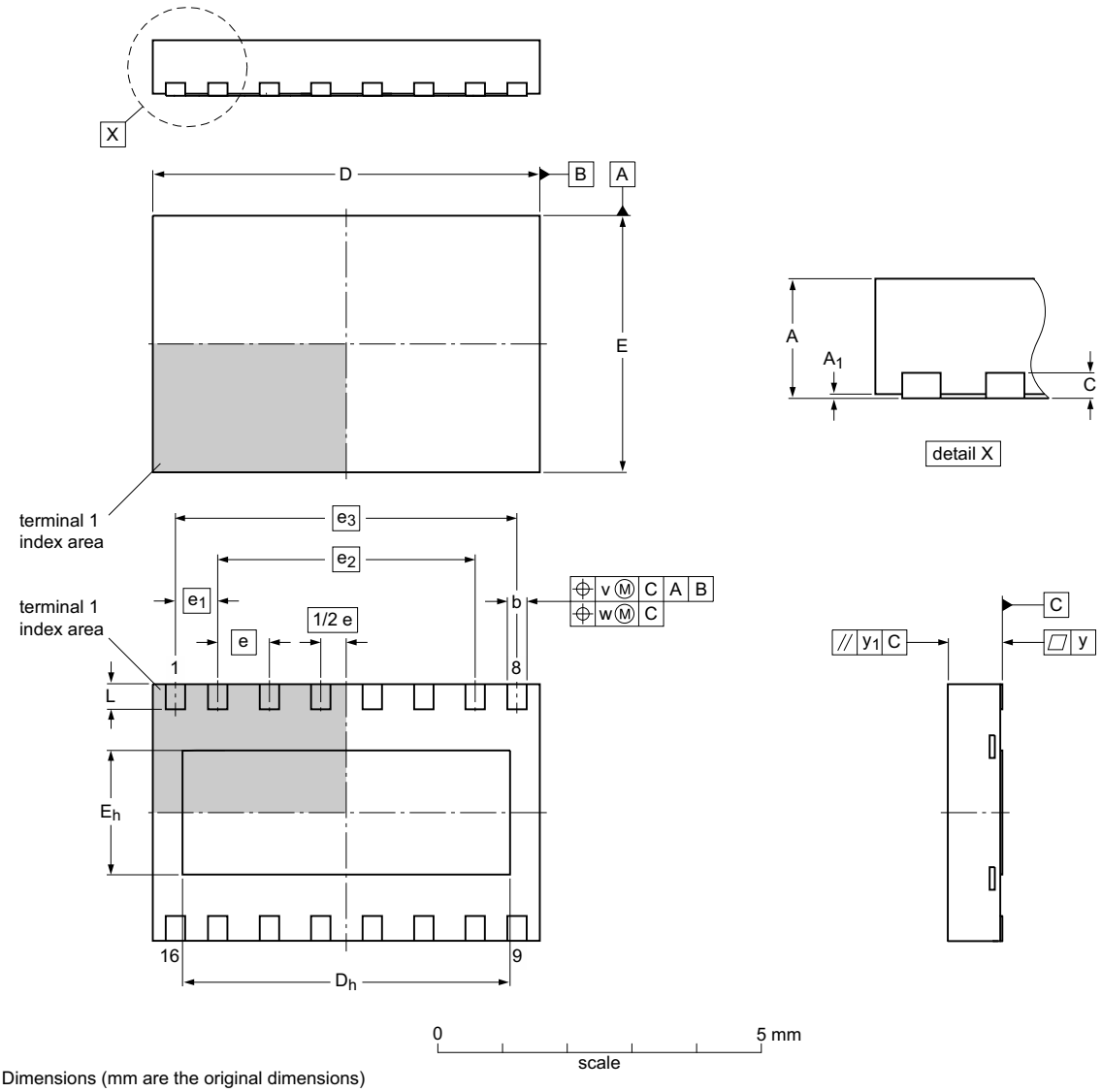



**Fig 6. Definition of transistor impedance**

# 9. Package outline

**HVSON16: plastic thermal enhanced very thin small outline package; no leads; 16 terminals; body 4 x 6 x 0.85 mm** **SOT1371-1**




Dimensions (mm are the original dimensions)

| Unit | | A | $A_1$ | b | C | $D^{(1)}$ | $D_h$ | $E^{(1)}$ | $E_h$ | e | $e_1$ | $e_2$ | $e_3$ | L | v | w | y | $y_1$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | max | 1.00 | 0.05 | 0.35 | | 6.1 | 5.2 | 4.1 | 2.0 | | | | | 0.5 | | | | |
| mm | nom | 0.85 | 0.03 | 0.30 | 0.2 | 6.0 | 5.1 | 4.0 | 1.9 | 0.8 | 0.65 | 4.0 | 5.3 | 0.4 | 0.1 | 0.05 | 0.05 | 0.1 |
| | min | 0.80 | 0.00 | 0.25 | | 5.9 | 5.0 | 3.9 | 1.8 | | | | | 0.3 | | | | |

Note
1. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

*sot1371-1_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT1371-1 | | MO-229 | | | | ~~14-05-14~~ 14-05-19 |

**Fig 7. Package outline SOT1371-1 (HVSON16)**

## 10. Handling information

| CAUTION | |
|---|---|
|  | This device is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices.<br>Such precautions are described in the *ANSI/ESD S20.20*, *IEC/ST 61340-5*, *JESD625-A* or equivalent standards. |

## 11. Abbreviations

**Table 10. Abbreviations**

| Acronym | Description |
|---|---|
| CW | Continuous Wave |
| ESD | ElectroStatic Discharge |
| HF | High Frequency |
| LDMOS | Laterally Diffused Metal-Oxide Semiconductor |
| SMD | Surface Mounted Device |
| VSWR | Voltage Standing-Wave Ratio |

## 12. Revision history

**Table 11. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BLP27M810 v.1 | 20160211 | Product data sheet | - | - |

# 13. Legal information

## 13.1 Data sheet status

| Document status[1][2] | Product status[3] | Definition |
|---|---|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.ampleon.com.

## 13.2 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.

**Short data sheet —** A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Ampleon sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

**Product specification —** The information and data provided in a Product data sheet shall define the specification of the product as agreed between Ampleon and its customer, unless Ampleon and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the Ampleon product is deemed to offer functions and qualities beyond those described in the Product data sheet.

## 13.3 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.

**Limiting values —** Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

**Terms and conditions of commercial sale —** Ampleon products are sold subject to the general terms and conditions of commercial sale, as published at http://www.ampleon.com/terms, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Ampleon hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of Ampleon products by customer.

**No offer to sell or license —** Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

**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.

**Non-automotive qualified products —** Unless this data sheet expressly states that this specific Ampleon product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. Ampleon accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without Ampleon' warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond Ampleon' specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies Ampleon for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond Ampleon' standard warranty and Ampleon' product specifications.

**Translations —** A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

### 13.4 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.

## 14. Contact information

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

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

## 15. Contents

**1 Product profile . . . . . 1**
1.1 General description . . . . . 1
1.2 Features and benefits . . . . . 1
1.3 Applications . . . . . 1
**2 Pinning information . . . . . 2**
**3 Ordering information . . . . . 2**
**4 Limiting values . . . . . 2**
**5 Thermal characteristics . . . . . 2**
**6 Characteristics . . . . . 3**
**7 Application information . . . . . 4**
7.1 Application circuit . . . . . 4
7.2 Graphical data . . . . . 5
**8 Test information . . . . . 6**
8.1 Ruggedness in class-AB operation . . . . . 6
**9 Package outline . . . . . 7**
**10 Handling information . . . . . 8**
**11 Abbreviations . . . . . 8**
**12 Revision history . . . . . 8**
**13 Legal information . . . . . 9**
13.1 Data sheet status . . . . . 9
13.2 Definitions . . . . . 9
13.3 Disclaimers . . . . . 9
13.4 Trademarks . . . . . 10
**14 Contact information . . . . . 10**
**15 Contents . . . . . 11**



For more information, please visit: http://www.ampleon.com
For sales office addresses, please visit: http://www.ampleon.com/sales

**Date of release: 11 February 2016**
**Document identifier: BLP27M810**