

# ANTREX Electronics

## Electronic Components Sourcing Information

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### Product Reference Information

**Part Number:** BLS6G2735L-30,112

**Manufacturer:** Ampleon USA Inc.

**Package:** Please confirm with sales

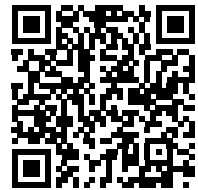
**Availability:** Please confirm with sales

**Product Page:**

<https://antrexco.com/product/details/ampleon-usa-inc/bls6g2735l-30-112.html>

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**Note:**

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

# BLS6G2735L-30; BLS6G2735LS-30

S-band LDMOS transistor

Rev. 4 — 1 September 2015

AMPLEON

Product data sheet

## 1. Product profile

### 1.1 General description

30 W LDMOS power transistor for S-band radar applications in the frequency range from 2.7 GHz to 3.5 GHz.

**Table 1. Application information**

*Typical RF performance at  $T_{case} = 25\text{ °C}$ ;  $t_p = 300\text{ }\mu\text{s}$ ;  $\delta = 10\%$ ;  $I_{Dq} = 50\text{ mA}$ .*

| Test signal                                                                                    | f<br>(GHz) | V <sub>DS</sub><br>(V) | P <sub>L</sub><br>(W) | G <sub>p</sub><br>(dB) | $\eta_D$<br>(%) | t <sub>r</sub><br>(ns) | t <sub>f</sub><br>(ns) |
|------------------------------------------------------------------------------------------------|------------|------------------------|-----------------------|------------------------|-----------------|------------------------|------------------------|
| <b>Typical RF performance in a class-AB production test circuit in band 3.1 GHz to 3.5 GHz</b> |            |                        |                       |                        |                 |                        |                        |
| pulsed RF                                                                                      | 3.1 to 3.5 | 32                     | 30                    | 13                     | 50              | 20                     | 10                     |
| <b>Typical RF performance in an application circuit in small band 2.7 GHz to 3.3 GHz</b>       |            |                        |                       |                        |                 |                        |                        |
| pulsed RF                                                                                      | 2.7 to 3.3 | 32                     | 35                    | 14                     | 50              | 20                     | 10                     |
| <b>Typical RF performance in an application circuit in small band 2.7 GHz to 3.5 GHz</b>       |            |                        |                       |                        |                 |                        |                        |
| pulsed RF                                                                                      | 2.7 to 3.5 | 32                     | 30                    | 12                     | 47              | 20                     | 10                     |

### 1.2 Features and benefits

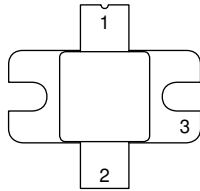
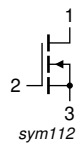
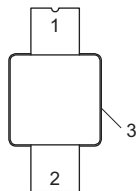
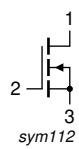
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (2.7 GHz to 3.5 GHz)
- Internally matched for ease of use
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

### 1.3 Applications

- S-band radar applications in the frequency range 2.7 GHz to 3.5 GHz

## 2. Pinning information

Table 2. Pinning

| Pin                              | Description | Simplified outline                                                                  | Graphic symbol                                                                      |
|----------------------------------|-------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>BLS6G2735L-30 (SOT1135A)</b>  |             |                                                                                     |                                                                                     |
| 1                                | drain       |   |  |
| 2                                | gate        |                                                                                     |                                                                                     |
| 3                                | source      |                                                                                     |                                                                                     |
| <b>BLS6G2735LS-30 (SOT1135B)</b> |             |                                                                                     |                                                                                     |
| 1                                | drain       |  |  |
| 2                                | gate        |                                                                                     |                                                                                     |
| 3                                | source      |                                                                                     |                                                                                     |

[1] Connected to flange.

## 3. Ordering information

Table 3. Ordering information

| Type number    | Package |                                                    |          |
|----------------|---------|----------------------------------------------------|----------|
|                | Name    | Description                                        | Version  |
| BLS6G2735L-30  | -       | flanged ceramic package; 2 mounting holes; 2 leads | SOT1135A |
| BLS6G2735LS-30 | -       | earless flanged ceramic package; 2 leads           | SOT1135B |

## 4. Limiting values

Table 4. Limiting values

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

| Symbol    | Parameter            | Min  | Max  | Unit |
|-----------|----------------------|------|------|------|
| $V_{DS}$  | drain-source voltage | -    | 60   | 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 |
|---------------|---------------------------------------------------|-----------------------------------------------|-------|------|
| $Z_{th(j-c)}$ | transient thermal impedance from junction to case | $T_h = 85\text{ °C}; P_{L(CW)} = 30\text{ W}$ |       |      |
|               |                                                   | $t_p = 100\text{ }\mu\text{s}; \delta = 10\%$ | 0.507 | K/W  |
|               |                                                   | $t_p = 200\text{ }\mu\text{s}; \delta = 10\%$ | 0.662 | K/W  |
|               |                                                   | $t_p = 300\text{ }\mu\text{s}; \delta = 10\%$ | 0.761 | K/W  |
|               |                                                   | $t_p = 100\text{ }\mu\text{s}; \delta = 20\%$ | 0.594 | K/W  |

## 6. Characteristics

**Table 6. DC characteristics**

$T_j = 25\text{ °C}$  unless otherwise specified.

| Symbol        | Parameter                        | Conditions                                                  | Min | Typ  | Max  | Unit          |
|---------------|----------------------------------|-------------------------------------------------------------|-----|------|------|---------------|
| $V_{(BR)DSS}$ | drain-source breakdown voltage   | $V_{GS} = 0\text{ V}; I_D = 0.5\text{ mA}$                  | 65  | -    | -    | V             |
| $V_{GS(th)}$  | gate-source threshold voltage    | $V_{DS} = 10\text{ V}; I_D = 40\text{ mA}$                  | 1.4 | 2    | 2.4  | V             |
| $I_{DSS}$     | drain leakage current            | $V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$                 | -   | -    | 1.4  | $\mu\text{A}$ |
| $I_{DSX}$     | drain cut-off current            | $V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$ | -   | 8.2  | -    | A             |
| $I_{GSS}$     | gate leakage current             | $V_{GS} = 8.3\text{ V}; V_{DS} = 0\text{ V}$                | -   | -    | 140  | nA            |
| $g_{fs}$      | forward transconductance         | $V_{DS} = 10\text{ V}; I_D = 1.4\text{ A}$                  | -   | 2.8  | -    | S             |
| $R_{DS(on)}$  | drain-source on-state resistance | $V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 1.4\text{ A}$   | -   | 0.37 | 0.58 | $\Omega$      |

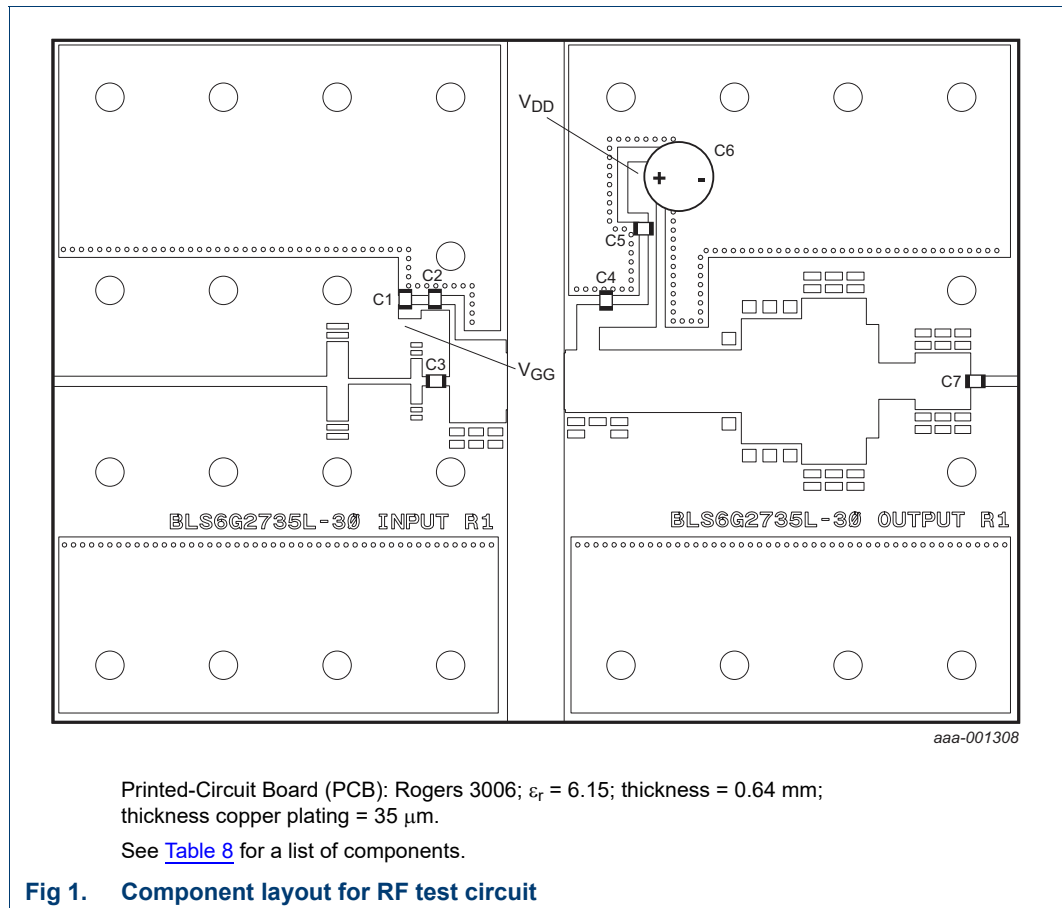
**Table 7. RF characteristics**

Test signal: pulsed RF;  $f_1 = 3100\text{ MHz}; f_2 = 3300\text{ MHz}; f_3 = 3500\text{ MHz}; t_p = 300\text{ }\mu\text{s}; \delta = 10\%$ ;  $V_{DS} = 32\text{ V}; I_{DQ} = 50\text{ mA}; T_{case} = 25\text{ °C}$ ; unless otherwise specified, in the class-AB RF production test circuit.

| Symbol   | Parameter        | Conditions          | Min | Typ | Max | Unit |
|----------|------------------|---------------------|-----|-----|-----|------|
| $P_L$    | output power     |                     | -   | 30  | -   | W    |
| $G_p$    | power gain       | $P_L = 30\text{ W}$ | 11  | 13  | -   | dB   |
| $\eta_D$ | drain efficiency | $P_L = 30\text{ W}$ | 43  | 50  | -   | %    |
| $t_r$    | rise time        | $P_L = 30\text{ W}$ | -   | 20  | 50  | ns   |
| $t_f$    | fall time        | $P_L = 30\text{ W}$ | -   | 10  | 50  | ns   |

## 7. Application information

### 7.1 Circuit information for application circuit (2.7 GHz to 3.5 GHz)



**Table 8. List of components**

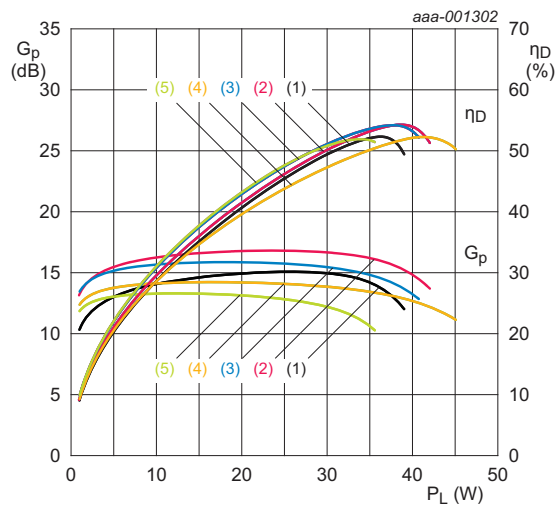
For test circuit see [Figure 1](#).

| Component | Description                       | Value                    | Remarks |
|-----------|-----------------------------------|--------------------------|---------|
| C1        | multilayer ceramic chip capacitor | 2 $\mu\text{F}$ , 50 V   | [1]     |
| C2        | multilayer ceramic chip capacitor | 100 pF                   | [2]     |
| C3        | multilayer ceramic chip capacitor | 0.6 pF                   | [2]     |
| C4, C7    | multilayer ceramic chip capacitor | 10 pF                    | [2]     |
| C5        | multilayer ceramic chip capacitor | 1 $\mu\text{F}$ , 50 V   | [1]     |
| C6        | electrolytic capacitor            | 470 $\mu\text{F}$ , 63 V |         |

[1] TDK or capacitor of same quality.

[2] American Technical Ceramics type 800A or capacitor of same quality.

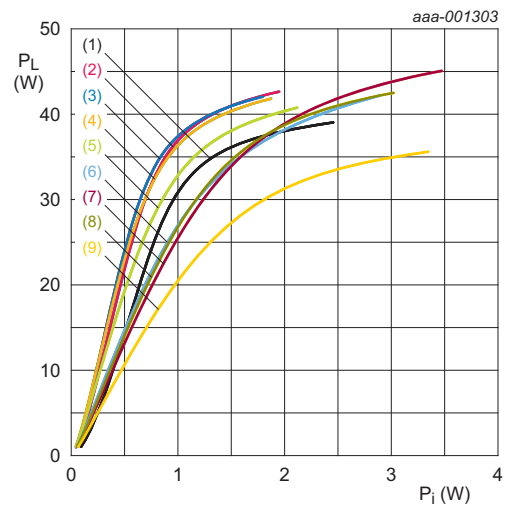
## 7.2 Measured in application circuit from 2.7 GHz to 3.5 GHz



$V_{DS} = 32$  V;  $I_{DQ} = 50$  mA;  $t_p = 300$   $\mu$ s;  $\delta = 10$  %

- (1)  $f = 2700$  MHz
- (2)  $f = 2900$  MHz
- (3)  $f = 3100$  MHz
- (4)  $f = 3300$  MHz
- (5)  $f = 3500$  MHz

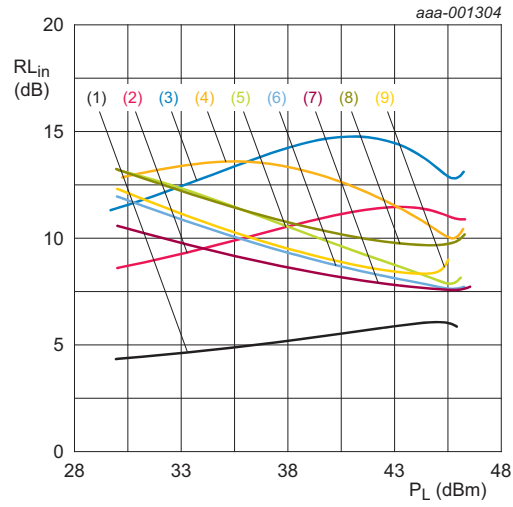
**Fig 2. Power gain and drain efficiency as function of output power; typical values**



$V_{DS} = 32$  V;  $I_{DQ} = 50$  mA;  $t_p = 300$   $\mu$ s;  $\delta = 10$  %

- (1)  $f = 2700$  MHz
- (2)  $f = 2800$  MHz
- (3)  $f = 2900$  MHz
- (4)  $f = 3000$  MHz
- (5)  $f = 3100$  MHz
- (6)  $f = 3200$  MHz
- (7)  $f = 3300$  MHz
- (8)  $f = 3400$  MHz
- (9)  $f = 3500$  MHz

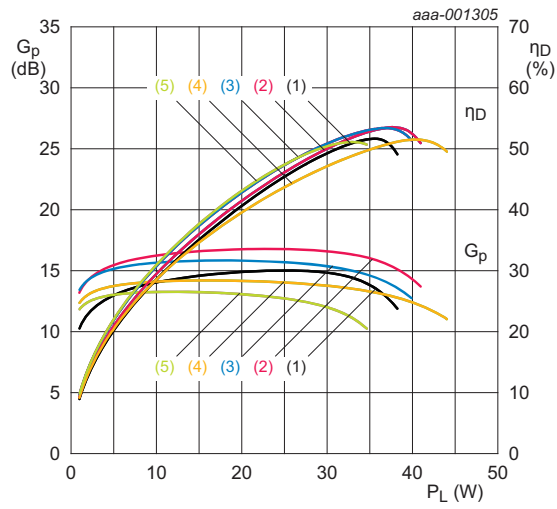
**Fig 3. Output power as a function of input power; typical values**



$V_{DS} = 32 \text{ V}$ ;  $I_{DQ} = 50 \text{ mA}$ ;  $t_p = 300 \text{ } \mu\text{s}$ ;  $\delta = 10 \%$

- (1)  $f = 2700 \text{ MHz}$
- (2)  $f = 2800 \text{ MHz}$
- (3)  $f = 2900 \text{ MHz}$
- (4)  $f = 3000 \text{ MHz}$
- (5)  $f = 3100 \text{ MHz}$
- (6)  $f = 3200 \text{ MHz}$
- (7)  $f = 3300 \text{ MHz}$
- (8)  $f = 3400 \text{ MHz}$
- (9)  $f = 3500 \text{ MHz}$

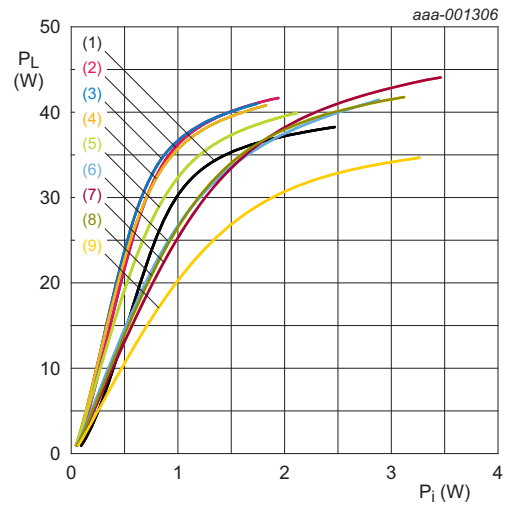
**Fig 4. Input return loss as a function of output power; typical values**



$V_{DS} = 32 \text{ V}$ ;  $I_{DQ} = 50 \text{ mA}$ ;  $t_p = 100 \text{ } \mu\text{s}$ ;  $\delta = 20 \%$

- (1)  $f = 2700 \text{ MHz}$
- (2)  $f = 2900 \text{ MHz}$
- (3)  $f = 3100 \text{ MHz}$
- (4)  $f = 3300 \text{ MHz}$
- (5)  $f = 3500 \text{ MHz}$

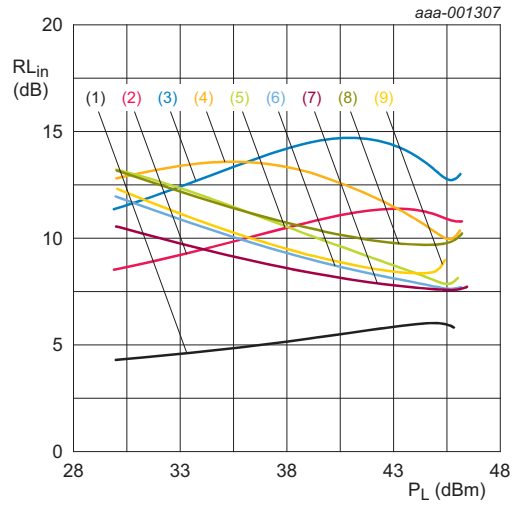
**Fig 5. Power gain and drain efficiency as function of output power; typical values**



$V_{DS} = 32 \text{ V}$ ;  $I_{DQ} = 50 \text{ mA}$ ;  $t_p = 100 \text{ } \mu\text{s}$ ;  $\delta = 20 \%$

- (1)  $f = 2700 \text{ MHz}$
- (2)  $f = 2800 \text{ MHz}$
- (3)  $f = 2900 \text{ MHz}$
- (4)  $f = 3000 \text{ MHz}$
- (5)  $f = 3100 \text{ MHz}$
- (6)  $f = 3200 \text{ MHz}$
- (7)  $f = 3300 \text{ MHz}$
- (8)  $f = 3400 \text{ MHz}$
- (9)  $f = 3500 \text{ MHz}$

**Fig 6. Output power as a function of input power; typical values**



$V_{DS} = 32 \text{ V}$ ;  $I_{DQ} = 50 \text{ mA}$ ;  $t_p = 100 \text{ } \mu\text{s}$ ;  $\delta = 20 \%$

- (1)  $f = 2700 \text{ MHz}$
- (2)  $f = 2800 \text{ MHz}$
- (3)  $f = 2900 \text{ MHz}$
- (4)  $f = 3000 \text{ MHz}$
- (5)  $f = 3100 \text{ MHz}$
- (6)  $f = 3200 \text{ MHz}$
- (7)  $f = 3300 \text{ MHz}$
- (8)  $f = 3400 \text{ MHz}$
- (9)  $f = 3500 \text{ MHz}$

**Fig 7. Input return loss as a function of output power; typical values**

## 8. Test information

### 8.1 Ruggedness in class-AB operation

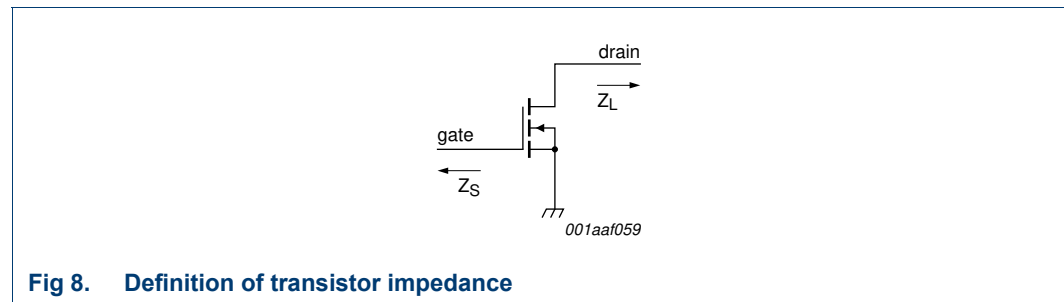
The BLS6G2735L-30 and BLS6G2735LS-30 are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions:  
 $V_{DS} = 32 \text{ V}$ ;  $I_{DQ} = 50 \text{ mA}$ ;  $P_L = 30 \text{ W}$ ;  $t_p = 300 \mu\text{s}$ ;  $\delta = 10 \%$ .

### 8.2 Impedance information

**Table 9. Typical impedance**

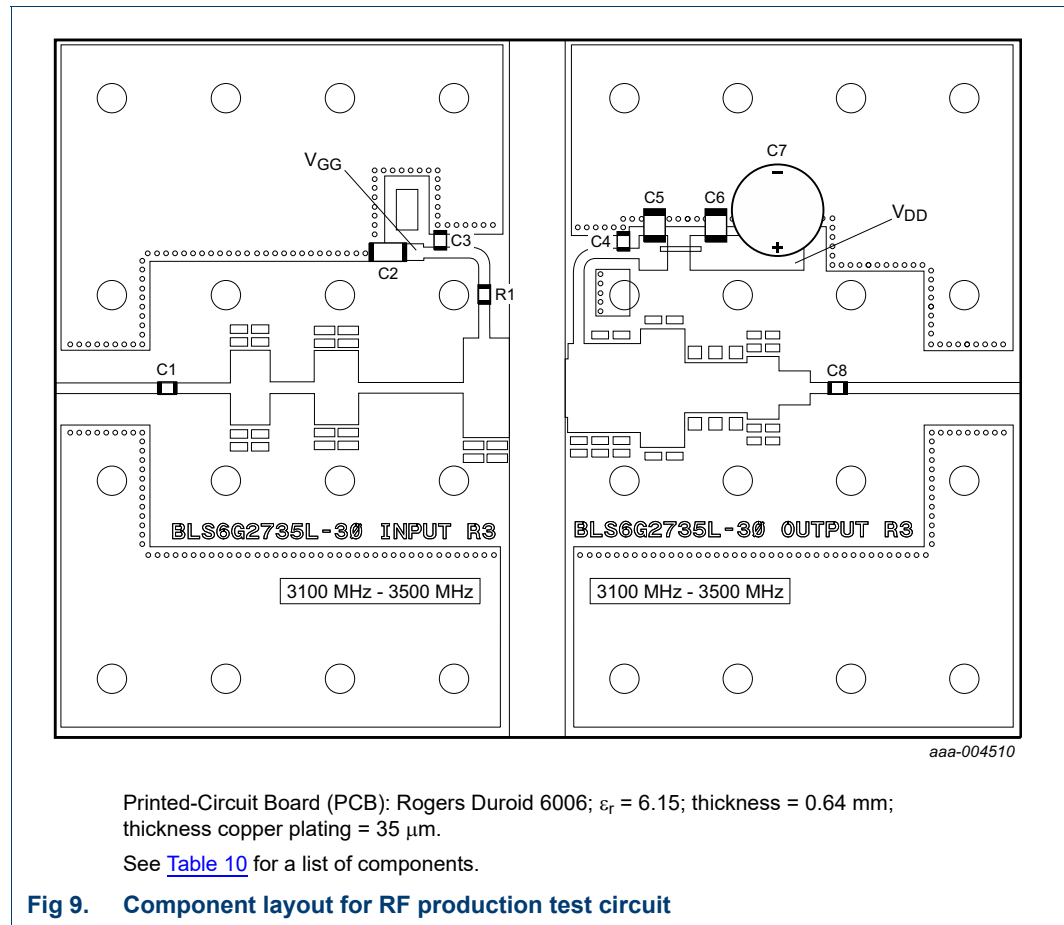
Source and load impedances obtained in a wideband test circuit.

| f<br>GHz | $Z_S$<br>$\Omega$ | $Z_L$<br>$\Omega$ |
|----------|-------------------|-------------------|
| 2.7      | $3.4 - j16.0$     | $32.7 - j3.8$     |
| 2.9      | $4.3 - j13.0$     | $20.3 - j4.2$     |
| 3.1      | $5.4 - j11.6$     | $18.3 - j3.9$     |
| 3.3      | $5.4 - j12.0$     | $15.0 - j7.2$     |
| 3.5      | $3.7 - j11.7$     | $8.4 - j6.6$      |



**Fig 8. Definition of transistor impedance**

### 8.3 Circuit information for production test circuit (3.1 GHz to 3.5 GHz)



**Table 10. List of components**

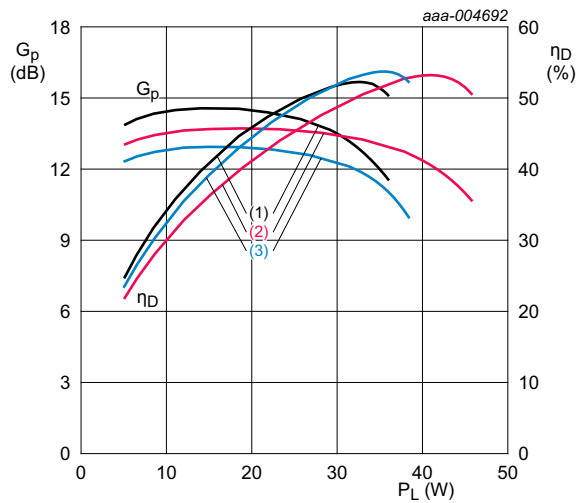
For test circuit see [Figure 9](#).

| Component      | Description                       | Value                    | Remarks |
|----------------|-----------------------------------|--------------------------|---------|
| C1, C3, C4, C8 | multilayer ceramic chip capacitor | 10 pF                    | [1]     |
| C2             | multilayer ceramic chip capacitor | 1 $\mu\text{F}$          | [2]     |
| C5             | multilayer ceramic chip capacitor | 4.7 $\mu\text{F}$ , 50 V | [2]     |
| C6             | multilayer ceramic chip capacitor | 10 $\mu\text{F}$ , 50 V  | [2]     |
| C7             | electrolytic capacitor            | 100 $\mu\text{F}$ , 63 V |         |
| R1             | SMD resistor                      | 10 $\Omega$              |         |

[1] American Technical Ceramics type 800A or capacitor of same quality.

[2] TDK or capacitor of same quality.

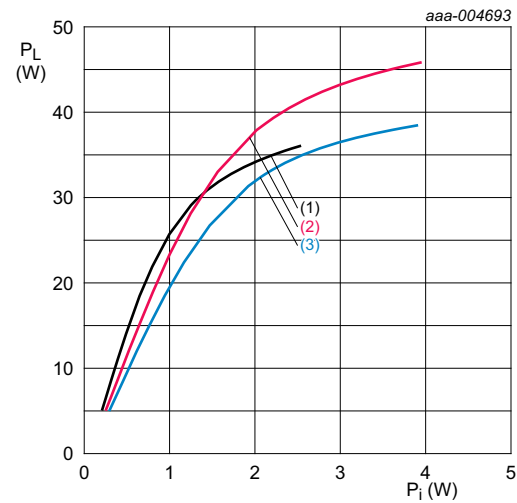
## 8.4 Measured in RF production test circuit from 3.1 GHz to 3.5 GHz



$V_{DS} = 32 \text{ V}$ ;  $I_{DQ} = 50 \text{ mA}$ ;  $t_p = 300 \text{ } \mu\text{s}$ ;  $\delta = 10 \text{ } \%$

- (1)  $f = 3100 \text{ MHz}$
- (2)  $f = 3300 \text{ MHz}$
- (3)  $f = 3500 \text{ MHz}$

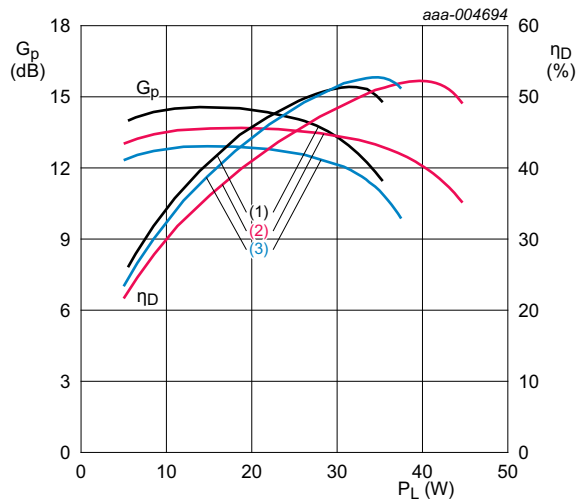
**Fig 10. Power gain and drain efficiency as function of output power; typical values**



$V_{DS} = 32 \text{ V}$ ;  $I_{DQ} = 50 \text{ mA}$ ;  $t_p = 300 \text{ } \mu\text{s}$ ;  $\delta = 10 \text{ } \%$

- (1)  $f = 3100 \text{ MHz}$
- (2)  $f = 3300 \text{ MHz}$
- (3)  $f = 3500 \text{ MHz}$

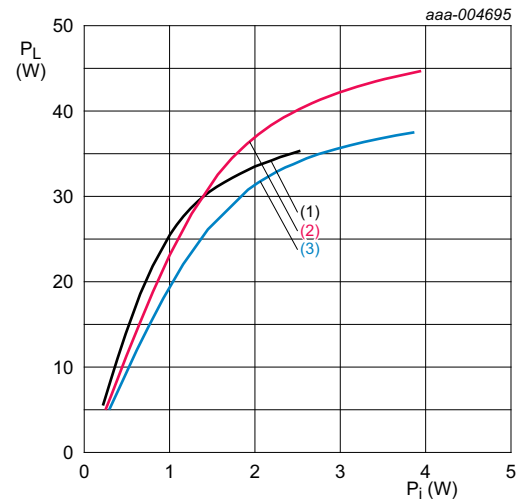
**Fig 11. Output power as a function of input power; typical values**



$V_{DS} = 32 \text{ V}$ ;  $I_{DQ} = 50 \text{ mA}$ ;  $t_p = 100 \text{ } \mu\text{s}$ ;  $\delta = 20 \text{ } \%$

- (1)  $f = 3100 \text{ MHz}$
- (2)  $f = 3300 \text{ MHz}$
- (3)  $f = 3500 \text{ MHz}$

**Fig 12. Power gain and drain efficiency as function of output power; typical values**



$V_{DS} = 32 \text{ V}$ ;  $I_{DQ} = 50 \text{ mA}$ ;  $t_p = 100 \text{ } \mu\text{s}$ ;  $\delta = 20 \text{ } \%$

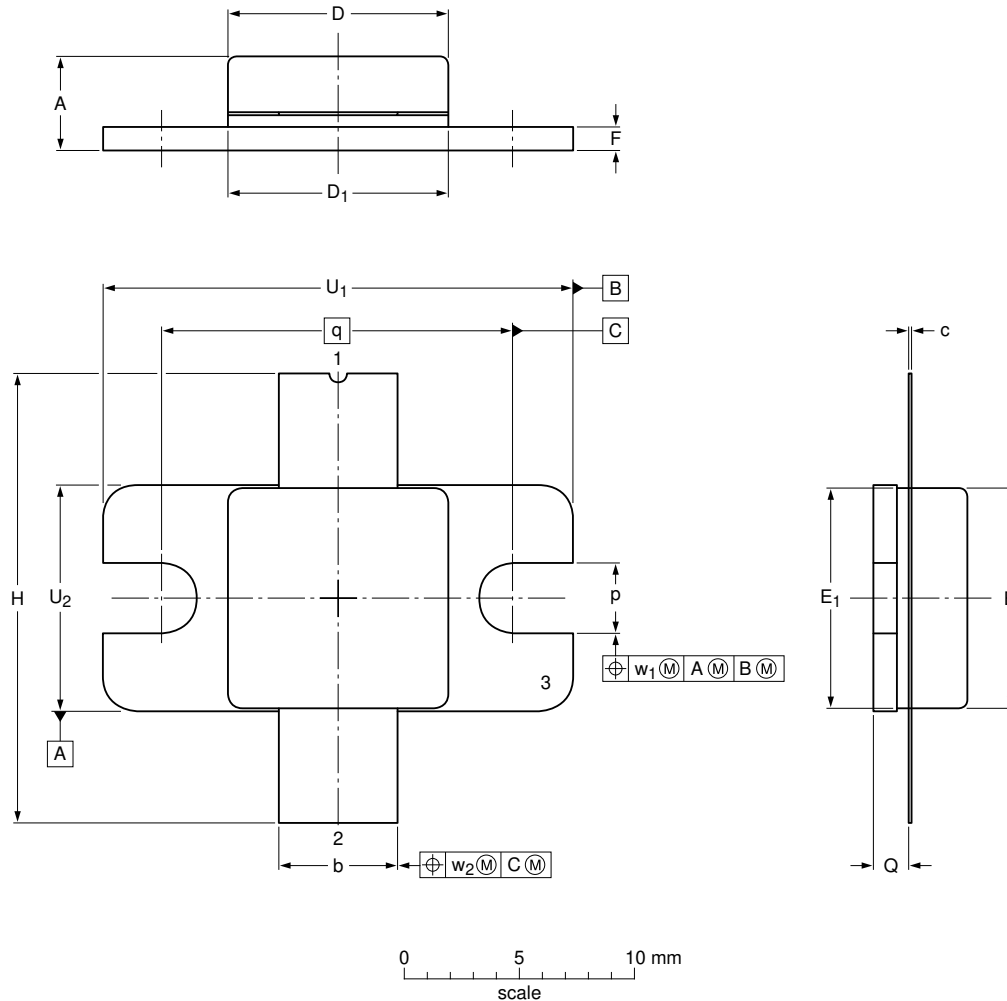
- (1)  $f = 3100 \text{ MHz}$
- (2)  $f = 3300 \text{ MHz}$
- (3)  $f = 3500 \text{ MHz}$

**Fig 13. Output power as a function of input power; typical values**

## 9. Package outline

Flanged ceramic package; 2 mounting holes; 2 leads

SOT1135A



Dimensions

| Unit <sup>(1)</sup> | A         | b     | c     | D    | D <sub>1</sub> | E    | E <sub>1</sub> | F     | H     | p     | Q     | q     | U <sub>1</sub> | U <sub>2</sub> | w <sub>1</sub> | w <sub>2</sub> |
|---------------------|-----------|-------|-------|------|----------------|------|----------------|-------|-------|-------|-------|-------|----------------|----------------|----------------|----------------|
| mm                  | max 4.65  | 5.26  | 0.18  | 9.65 | 9.65           | 9.65 | 9.65           | 1.14  | 19.94 | 3.30  | 1.70  | 15.24 | 20.45          | 9.91           | 0.25           | 0.51           |
|                     | nom 3.76  | 5.00  | 0.10  | 9.40 | 9.40           | 9.40 | 9.40           | 0.89  | 18.92 | 2.92  | 1.45  |       | 20.19          | 9.65           |                |                |
|                     | min 0.183 | 0.207 | 0.007 | 0.38 | 0.38           | 0.38 | 0.38           | 0.045 | 0.785 | 0.130 | 0.067 | 0.6   | 0.805          | 0.39           | 0.01           | 0.02           |
| inches              | max 0.183 | 0.207 | 0.007 | 0.38 | 0.38           | 0.38 | 0.38           | 0.045 | 0.785 | 0.130 | 0.067 | 0.6   | 0.805          | 0.39           | 0.01           | 0.02           |
|                     | nom 0.148 | 0.197 | 0.004 | 0.37 | 0.37           | 0.37 | 0.37           | 0.035 | 0.745 | 0.115 | 0.057 | 0.795 | 0.38           |                |                |                |
|                     | min 0.148 | 0.197 | 0.004 | 0.37 | 0.37           | 0.37 | 0.37           | 0.035 | 0.745 | 0.115 | 0.057 | 0.795 | 0.38           |                |                |                |

Note

1. millimeter dimensions are derived from the original inch dimensions.

2. dimension is measured 0.030 inch (0.76 mm) from the body.

sot1135a\_po

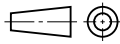
| Outline version | References |       |       |  | European projection                                                                   | Issue date           |
|-----------------|------------|-------|-------|--|---------------------------------------------------------------------------------------|----------------------|
|                 | IEC        | JEDEC | JEITA |  |                                                                                       |                      |
| SOT1135A        |            |       |       |  |  | 09-10-12<br>09-12-14 |

Fig 14. Package outline SOT1135A

Earless flanged ceramic package; 2 leads

SOT1135B

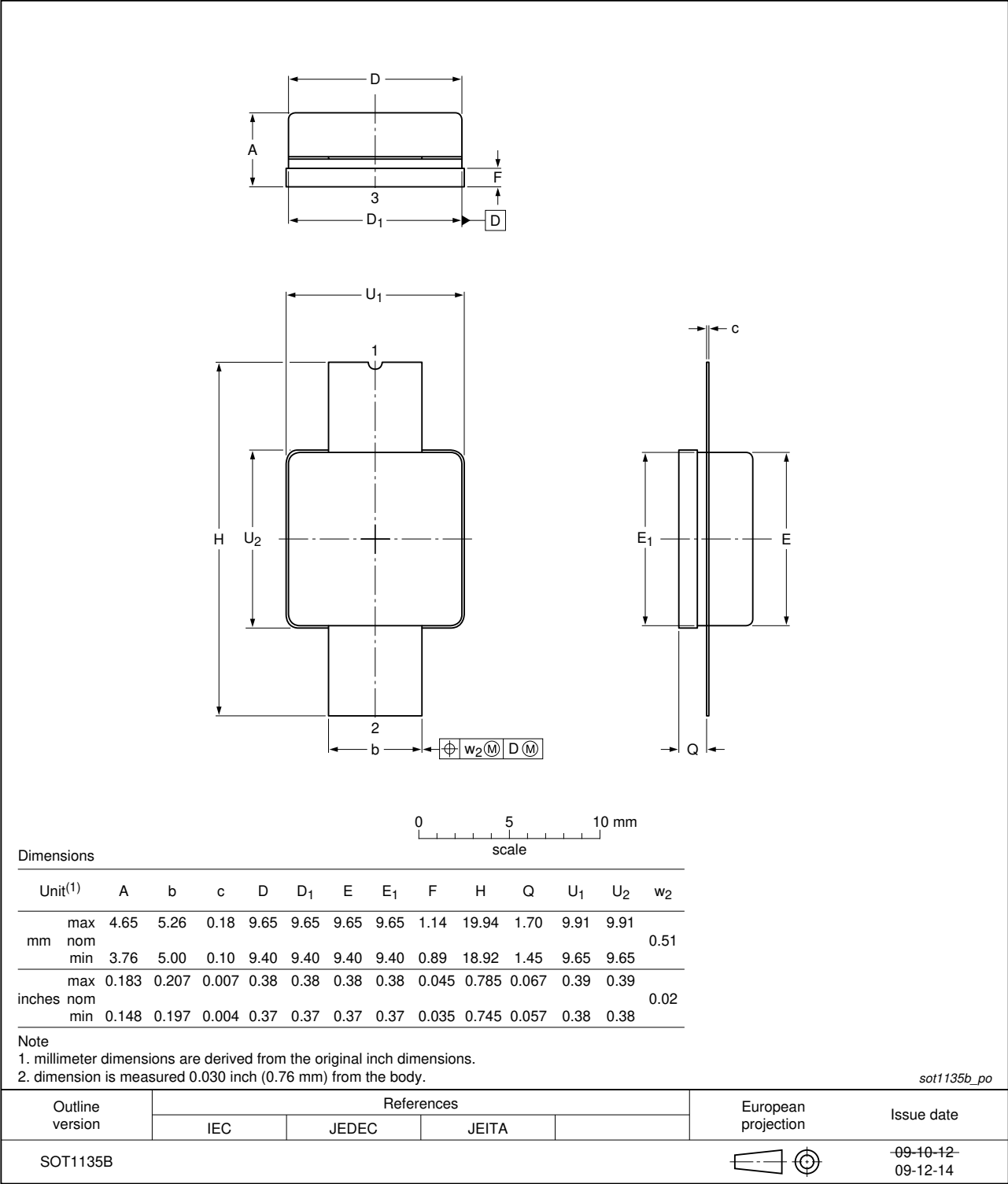


Fig 15. Package outline SOT1135B

## 10. Handling information

### CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices.

Such precautions are described in the *ANSI/ESD S20.20*, *IEC/ST 61340-5*, *JESD625-A* or equivalent standards.

## 11. Abbreviations

Table 11. Abbreviations

| Acronym | Description                                  |
|---------|----------------------------------------------|
| LDMOS   | Laterally Diffused Metal-Oxide Semiconductor |
| S-band  | Short wave Band                              |
| VSWR    | Voltage Standing-Wave Ratio                  |

## 12. Revision history

Table 12. Revision history

| Document ID                   | Release date                                                                                                                                                                                                                               | Data sheet status      | Change notice | Supersedes                    |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|-------------------------------|
| BLS6G2735L-30_6G2735LS-30#4   | 20150901                                                                                                                                                                                                                                   | Product data sheet     |               | BLS6G2735L-30_6G2735LS-30 v.3 |
| Modifications:                | <ul style="list-style-type: none"> <li>The format of this document has been redesigned to comply with the new identity guidelines of Ampleon.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> </ul> |                        |               |                               |
| BLS6G2735L-30_6G2735LS-30 v.3 | 20120924                                                                                                                                                                                                                                   | Product data sheet     | -             | BLS6G2735L-30_6G2735LS-30 v.2 |
| BLS6G2735L-30_6G2735LS-30 v.2 | 20120904                                                                                                                                                                                                                                   | Preliminary data sheet | -             | BLS6G2735L-30_6G2735LS-30 v.1 |
| BLS6G2735L-30_6G2735LS-30 v.1 | 20111011                                                                                                                                                                                                                                   | Objective data sheet   | -             | -                             |

## 13. Legal information

### 13.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | 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>.

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## 15. Contents

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|           |                                                                                   |           |
|-----------|-----------------------------------------------------------------------------------|-----------|
| <b>1</b>  | <b>Product profile</b> . . . . .                                                  | <b>1</b>  |
| 1.1       | General description . . . . .                                                     | 1         |
| 1.2       | Features and benefits . . . . .                                                   | 1         |
| 1.3       | Applications . . . . .                                                            | 1         |
| <b>2</b>  | <b>Pinning information</b> . . . . .                                              | <b>2</b>  |
| <b>3</b>  | <b>Ordering information</b> . . . . .                                             | <b>2</b>  |
| <b>4</b>  | <b>Limiting values</b> . . . . .                                                  | <b>2</b>  |
| <b>5</b>  | <b>Thermal characteristics</b> . . . . .                                          | <b>3</b>  |
| <b>6</b>  | <b>Characteristics</b> . . . . .                                                  | <b>3</b>  |
| <b>7</b>  | <b>Application information</b> . . . . .                                          | <b>4</b>  |
| 7.1       | Circuit information for application circuit<br>(2.7 GHz to 3.5 GHz) . . . . .     | 4         |
| 7.2       | Measured in application circuit from 2.7 GHz<br>to 3.5 GHz . . . . .              | 5         |
| <b>8</b>  | <b>Test information</b> . . . . .                                                 | <b>9</b>  |
| 8.1       | Ruggedness in class-AB operation . . . . .                                        | 9         |
| 8.2       | Impedance information . . . . .                                                   | 9         |
| 8.3       | Circuit information for production test circuit<br>(3.1 GHz to 3.5 GHz) . . . . . | 10        |
| 8.4       | Measured in RF production test circuit from<br>3.1 GHz to 3.5 GHz . . . . .       | 11        |
| <b>9</b>  | <b>Package outline</b> . . . . .                                                  | <b>12</b> |
| <b>10</b> | <b>Handling information</b> . . . . .                                             | <b>14</b> |
| <b>11</b> | <b>Abbreviations</b> . . . . .                                                    | <b>14</b> |
| <b>12</b> | <b>Revision history</b> . . . . .                                                 | <b>14</b> |
| <b>13</b> | <b>Legal information</b> . . . . .                                                | <b>15</b> |
| 13.1      | Data sheet status . . . . .                                                       | 15        |
| 13.2      | Definitions . . . . .                                                             | 15        |
| 13.3      | Disclaimers . . . . .                                                             | 15        |
| 13.4      | Trademarks . . . . .                                                              | 16        |
| <b>14</b> | <b>Contact information</b> . . . . .                                              | <b>16</b> |
| <b>15</b> | <b>Contents</b> . . . . .                                                         | <b>17</b> |

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