# BLF8G24LS-100V; BLF8G24LS-100GV

**Power LDMOS transistor**

AMPLEON

**Rev. 4 — 1 September 2015**

**Product data sheet**

## 1. Product profile

### 1.1 General description

100 W LDMOS power transistor with improved video bandwidth for base station applications at frequencies from 2300 MHz to 2400 MHz.

**Table 1. Typical performance**

*Typical RF performance at $T_{case}$ = 25 °C in a common source class-AB production test circuit.*

| Test signal | f | $I_{Dq}$ | $V_{DS}$ | $P_{L(AV)}$ | $G_p$ | $\eta_D$ | $ACPR_{5M}$ |
|---|---|---|---|---|---|---|---|
| | (MHz) | (mA) | (V) | (W) | (dB) | (%) | (dBc) |
| 2-carrier W-CDMA | 2300 to 2400 | 900 | 28 | 25 | 19 | 32 | −29 [1] |

[1] Test signal: 3GPP test model 1; 64 DPCH; PAR = 8.4 dB at 0.01 % probability on CCDF per carrier; 5 MHz carrier spacing.

### 1.2 Features and benefits

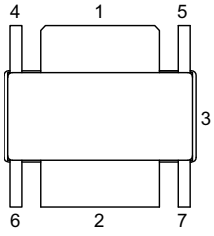
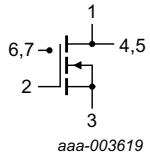
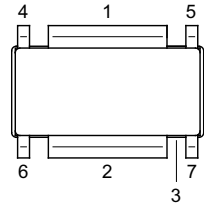
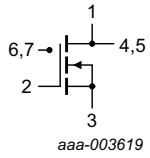
- Excellent ruggedness
- High efficiency
- Low thermal resistance providing excellent thermal stability
- Decoupling leads to enable improved video bandwidth (90 MHz typical)
- Designed for broadband operation (2300 MHz to 2400 MHz)
- Lower output capacitance for improved performance in Doherty applications
- Designed for low memory effects providing excellent pre-distortability
- Internally matched for ease of use
- Integrated ESD protection
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

### 1.3 Applications

- RF power amplifiers for base stations and multi carrier applications in the 2300 MHz to 2400 MHz frequency range

## 2. Pinning information

**Table 2. Pinning**

| Pin | Description | Simplified outline | Graphic symbol |
|---|---|---|---|
| **BLF8G24LS-100V (SOT1244B)** | | | |
| 1 | drain |  |  |
| 2 | gate | | |
| 3 | source [1] | | |
| 4 | decoupling lead | | |
| 5 | decoupling lead | | |
| 6 | n.c. | | |
| 7 | n.c. | | |
| **BLF8G24LS-100GV (SOT1244C)** | | | |
| 1 | drain |  |  |
| 2 | gate | | |
| 3 | source [1] | | |
| 4 | decoupling lead | | |
| 5 | decoupling lead | | |
| 6 | n.c. | | |
| 7 | n.c. | | |

[1] Connected to flange.

## 3. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BLF8G24LS-100V | - | earless flanged ceramic package; 6 leads | SOT1244B |
| BLF8G24LS-100GV | - | earless flanged ceramic package; 6 leads | SOT1244C |

## 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 | [1] | - | 225 | °C |

[1] Continuous use at maximum temperature will affect the reliability, for details refer to the on-line MTF calculator.


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# 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; $P_L$ = 48 W | 0.29 | 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; $I_D$ = 1 mA | 65 | - | - | V |
| $V_{GS(th)}$ | gate-source threshold voltage | $V_{DS}$ = 10 V; $I_D$ = 153 mA | 1.5 | 1.9 | 2.3 | V |
| $V_{GSq}$ | gate-source quiescent voltage | $V_{DS}$ = 28 V; $I_D$ = 900 mA | 1.6 | 2 | 2.4 | V |
| $I_{DSS}$ | drain leakage current | $V_{GS}$ = 0 V; $V_{DS}$ = 28 V | - | - | 4.2 | μA |
| $I_{DSX}$ | drain cut-off current | $V_{GS}$ = $V_{GS(th)}$ + 3.75 V; $V_{DS}$ = 10 V | - | 29 | - | A |
| $I_{GSS}$ | gate leakage current | $V_{GS}$ = 11 V; $V_{DS}$ = 0 V | - | - | 420 | nA |
| $g_{fs}$ | forward transconductance | $V_{DS}$ = 10 V; $I_D$ = 153 mA | - | 1.27 | - | S |
| $R_{DS(on)}$ | drain-source on-state resistance | $V_{GS}$ = $V_{GS(th)}$ + 3.75 V; $I_D$ = 5.35 A | - | 0.1 | - | Ω |

**Table 7. RF characteristics**

*Test signal: 2-carrier W-CDMA; 3GPP test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on the CCDF; $f_1$ = 2302.5 MHz; $f_2$ = 2307.5 MHz; $f_3$ = 2392.5 MHz; $f_4$ = 2397.5 MHz; RF performance at $V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA; $T_{case}$ = 25 °C; unless otherwise specified; in a class-AB production test circuit.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $G_p$ | power gain | $P_{L(AV)}$ = 25 W | 18 | 19 | - | dB |
| $\eta_D$ | drain efficiency | $P_{L(AV)}$ = 25 W | 29 | 32 | - | % |
| $RL_{in}$ | input return loss | $P_{L(AV)}$ = 25 W | - | −17 | −7 | dB |
| $ACPR_{5M}$ | adjacent channel power ratio (5 MHz) | $P_{L(AV)}$ = 25 W | - | −29 | −25 | dBc |

# 7. Test information

## 7.1 Ruggedness in class-AB operation

The BLF8G24LS-100V and BLF8G24LS-100GV are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: $V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA; $P_L$ = 100 W; f = 2300 MHz.


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## 7.2 Impedance information

**Table 8. Typical impedance**

*Measured load-pull data; $I_{Dq}$ = 900 mA; $V_{DS}$ = 28 V.*

| f | $Z_S$ [1] | $Z_L$ [1] |
|---|---|---|
| (MHz) | (Ω) | (Ω) |
| **BLF8G24LS-100V** | | |
| 2300 | 1.52 – j4.32 | 1.96 – j2.21 |
| 2400 | 2.54 – j5.05 | 1.83 – j2.03 |
| 2500 | 4.83 – j5.28 | 1.76 – j2.23 |
| **BLF8G24LS-100GV** | | |
| 2300 | 1.60 – j5.88 | 1.96 – j4.12 |
| 2400 | 2.53 – j6.66 | 1.81 – j4.12 |
| 2500 | 4.53 – j7.28 | 1.74 – j4.33 |

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

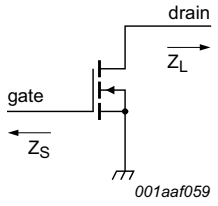
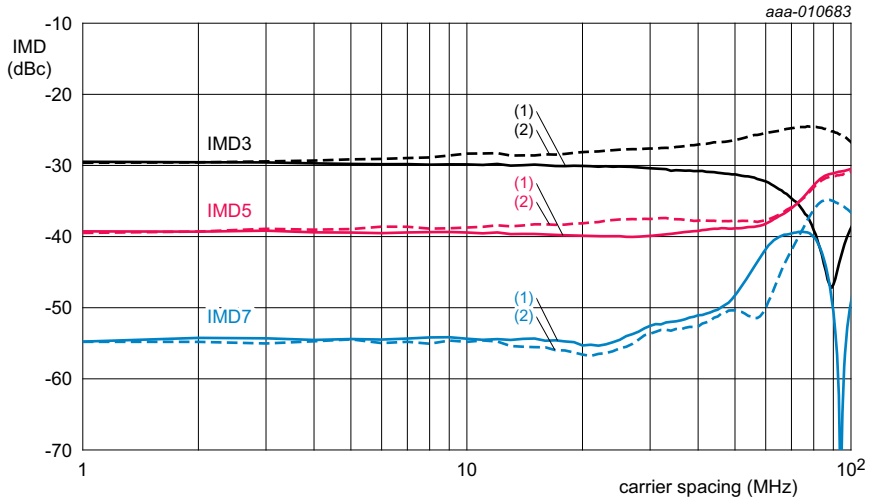



**Fig 1. Definition of transistor impedance**


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## 7.3 VBW in a class-AB operation

The BLF8G24LS-100V and BLF8G24LS-100GV show 90 MHz (typical) video bandwidth (IMD third-order intermodulation inflection point) in a class-AB test circuit in the 2.3 GHz to 2.4 GHz band at $V_{DS}$ = 28 V and $I_{Dq}$ = 0.9 A.




$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA; $f_c$ = 2350 MHz.

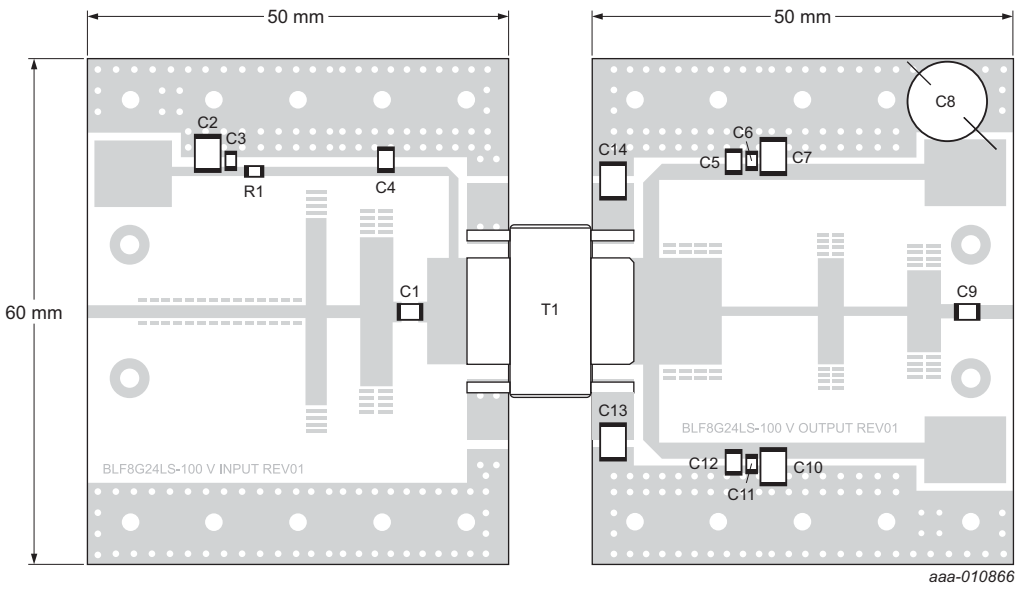
(1) low

(2) high

**Fig 2. VBW capacity in class-AB test circuit**


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## 7.4 Test circuit




Printed-Circuit Board (PCB): Rogers 4350B with a thickness of 0.76 mm. See Table 9 for a list of components.

**Fig 3. Component layout**

**Table 9. List of components**

*See Figure 3 for component layout.*

| Component | Description | Value | Remarks |
|---|---|---|---|
| C1 | multilayer ceramic chip capacitor | 1.0 pF [1] | ATC 800B |
| C2 | multilayer ceramic chip capacitor | 1 μF [2] | Murata |
| C3 | multilayer ceramic chip capacitor | 100 nF [2] | Murata |
| C4, C5, C9, C12 | multilayer ceramic chip capacitor | 24 pF [1] | ATC 800B |
| C6, C11 | multilayer ceramic chip capacitor | 220 nF [2] | Murata |
| C7, C10, C13, C14 | multilayer ceramic chip capacitor | 4.7 μF, 50 V [2] | Murata |
| C8 | electrolytic capacitor | > 470 μF, 63 V | |
| R1 | chip resistor | 4.7 Ω, 1 % tolerance | SMD 0805 |
| T1 | transistor | - | Ampleon BLF8G24LS-100V |

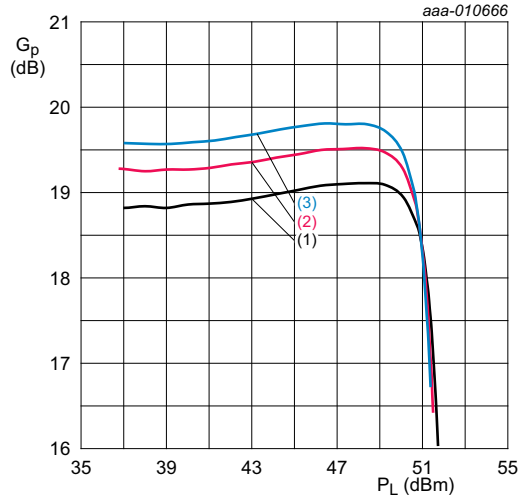
[1] American Technical Ceramics type 800B or capacitor of same quality.

[2] Murata or capacitor of same quality.


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## 7.5 Graphical data

### 7.5.1 Pulsed CW



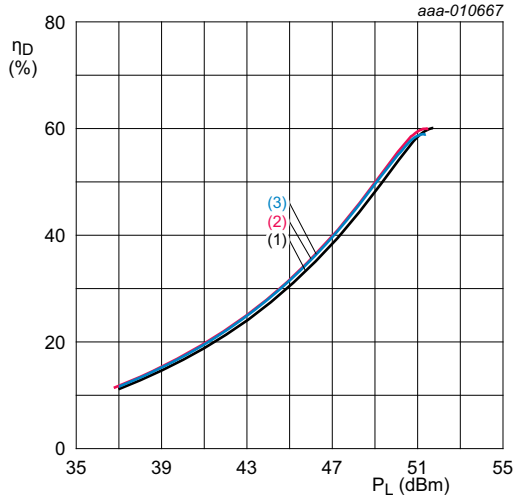

$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA; $t_p$ = 100 μs; δ = 10 %.

(1) f = 2300 MHz

(2) f = 2350 MHz

(3) f = 2400 MHz

**Fig 4. Power gain as a function of output power; typical values**




$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA; $t_p$ = 100 μs; δ = 10 %.

(1) f = 2300 MHz

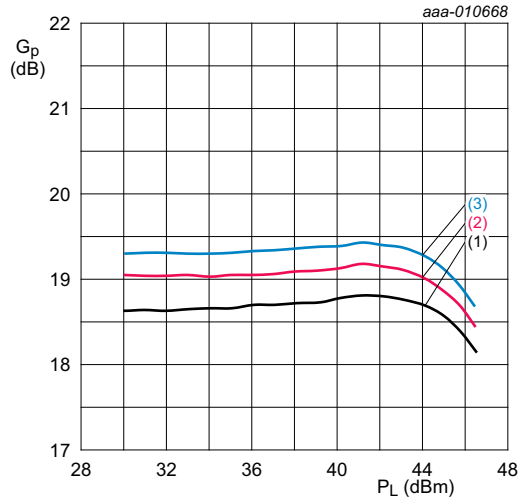
(2) f = 2350 MHz

(3) f = 2400 MHz

**Fig 5. Drain efficiency as a function of out power; typical values**


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### 7.5.2 IS-95



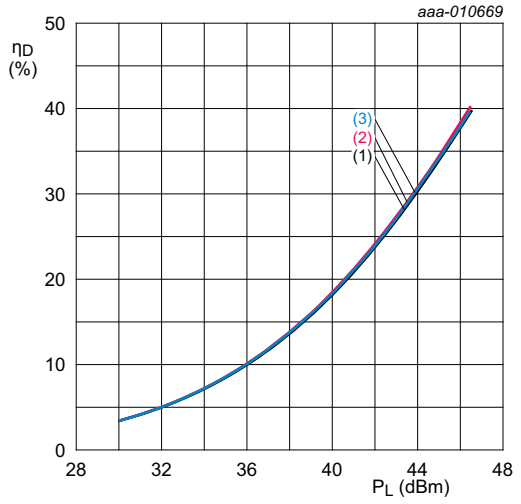

$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

(1) f = 2305 MHz

(2) f = 2350 MHz

(3) f = 2395 MHz

**Fig 6. Power gain as a function of output power; typical values**



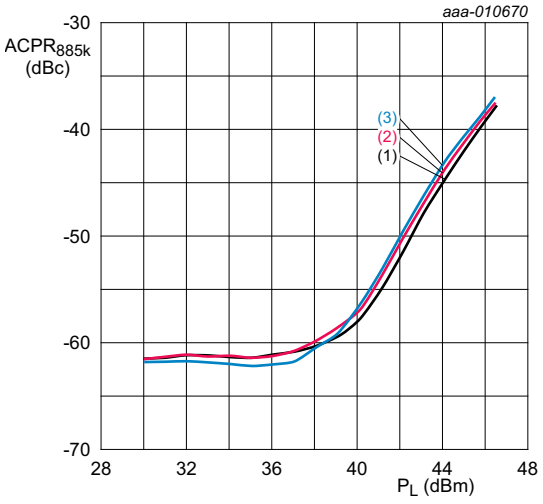

$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

(1) f = 2305 MHz

(2) f = 2350 MHz

(3) f = 2395 MHz

**Fig 7. Drain efficiency as a function of output power; typical values**



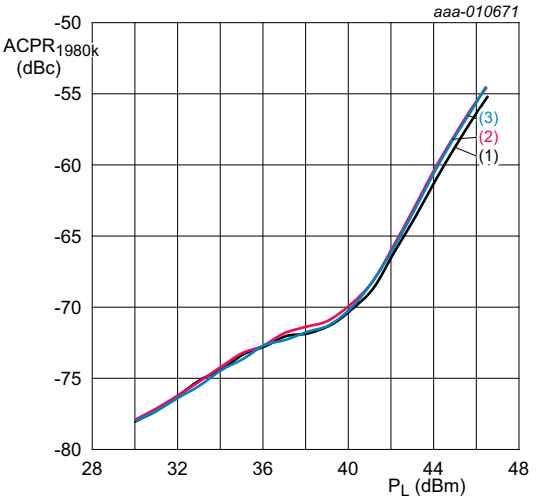

$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

(1) f = 2305 MHz

(2) f = 2350 MHz

(3) f = 2395 MHz

**Fig 8. Adjacent channel power ratio (885 kHz) as a function of output power; typical values**




$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

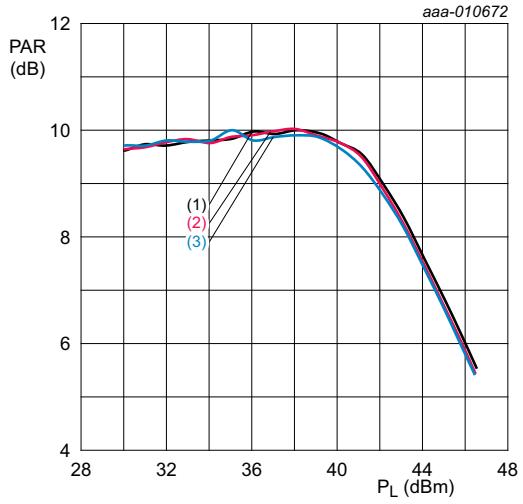
(1) f = 2305 MHz

(2) f = 2350 MHz

(3) f = 2395 MHz

**Fig 9. Adjacent channel power ratio (1980 kHz) as a function of output power; typical values**


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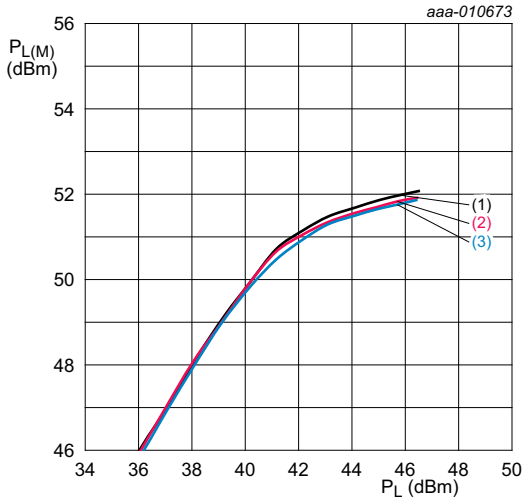

$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

(1) f = 2305 MHz

(2) f = 2350 MHz

(3) f = 2395 MHz

**Fig 10. Peak-to-average ratio as a function of output power; typical values**




$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

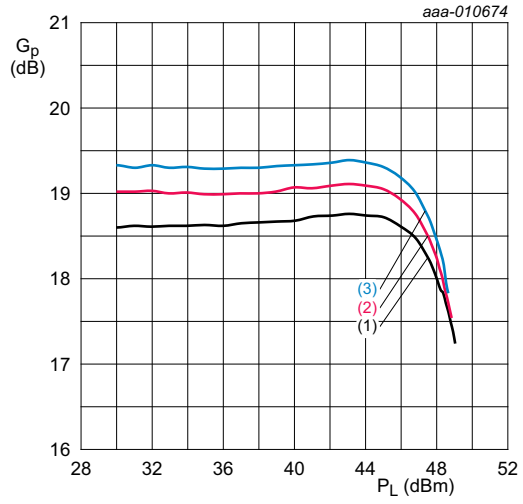
(1) f = 2305 MHz

(2) f = 2350 MHz

(3) f = 2395 MHz

**Fig 11. Peak output power as a function of output power; typical values**

### 7.5.3 1-Carrier W-CDMA



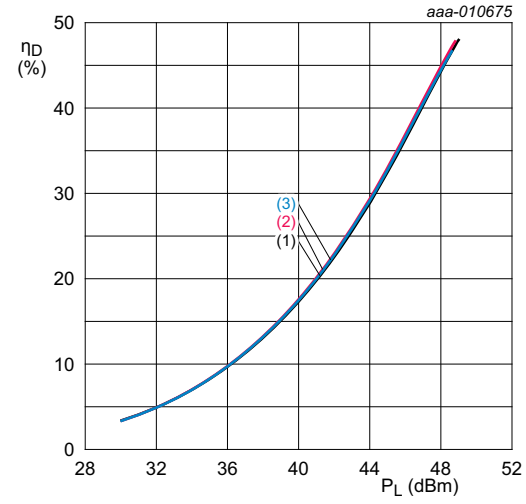

$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

(1) f = 2302.5 MHz

(2) f = 2350 MHz

(3) f = 2397.5 MHz

**Fig 12. Power gain as a function of output power; typical values**




$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

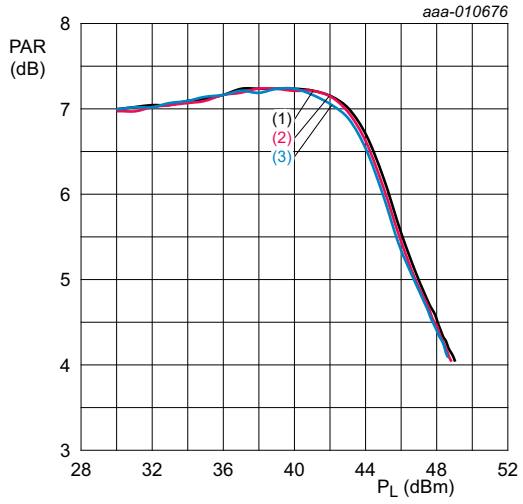
(1) f = 2302.5 MHz

(2) f = 2350 MHz

(3) f = 2397.5 MHz

**Fig 13. Drain efficiency as a function of output power; typical values**


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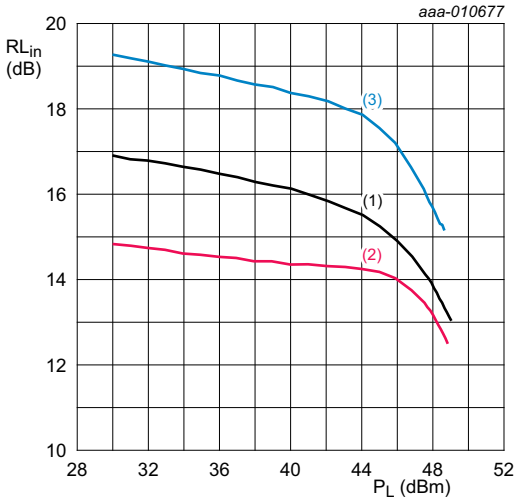

$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

(1) f = 2302.5 MHz

(2) f = 2350 MHz

(3) f = 2397.5 MHz

**Fig 14. Peak-to-average ratio as a function of output power; typical values**




$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

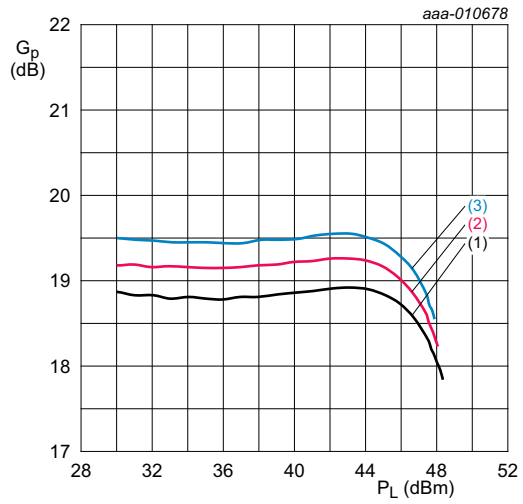
(1) f = 2302.5 MHz

(2) f = 2350 MHz

(3) f = 2397.5 MHz

**Fig 15. Input return loss as a function of output power; typical values**

### 7.5.4 2-Carrier W-CDMA



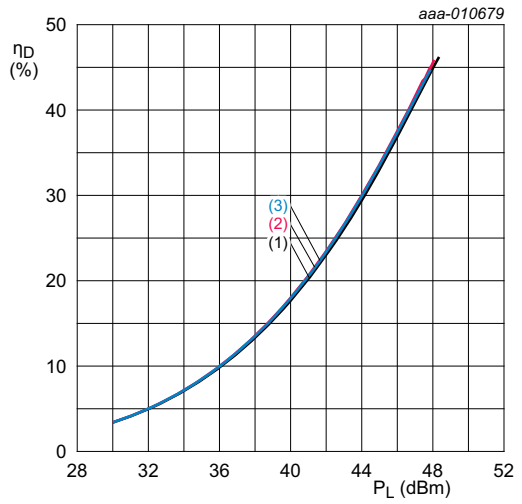

$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

(1) f = 2305 MHz

(2) f = 2350 MHz

(3) f = 2395 MHz

**Fig 16. Power gain as a function of output power; typical values**




$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

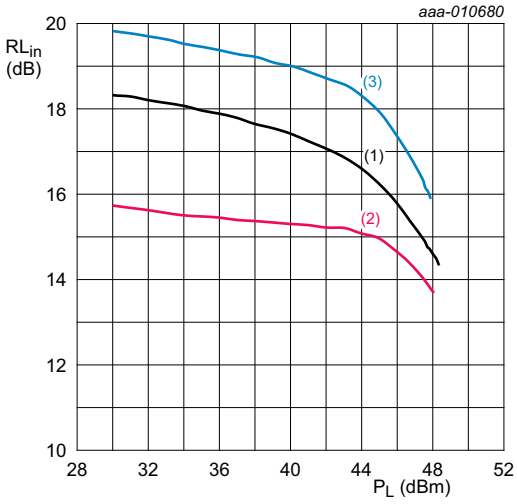
(1) f = 2305 MHz

(2) f = 2350 MHz

(3) f = 2395 MHz

**Fig 17. Drain efficiency as a function of output power; typical values**


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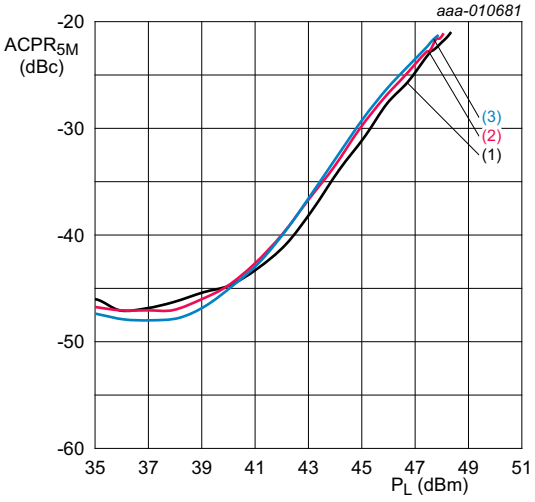

$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

(1) f = 2305 MHz

(2) f = 2350 MHz

(3) f = 2395 MHz

**Fig 18. Input return loss as a function of output power; typical values**



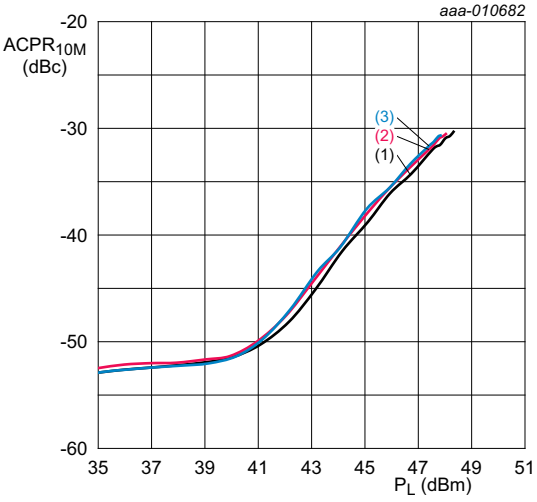

$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

(1) f = 2305 MHz

(2) f = 2350 MHz

(3) f = 2395 MHz

**Fig 19. Adjacent channel power ratio (5 MHz) as a function of output power; typical values**




$V_{DS}$ = 28 V; $I_{Dq}$ = 900 mA.

(1) f = 2305 MHz

(2) f = 2350 MHz

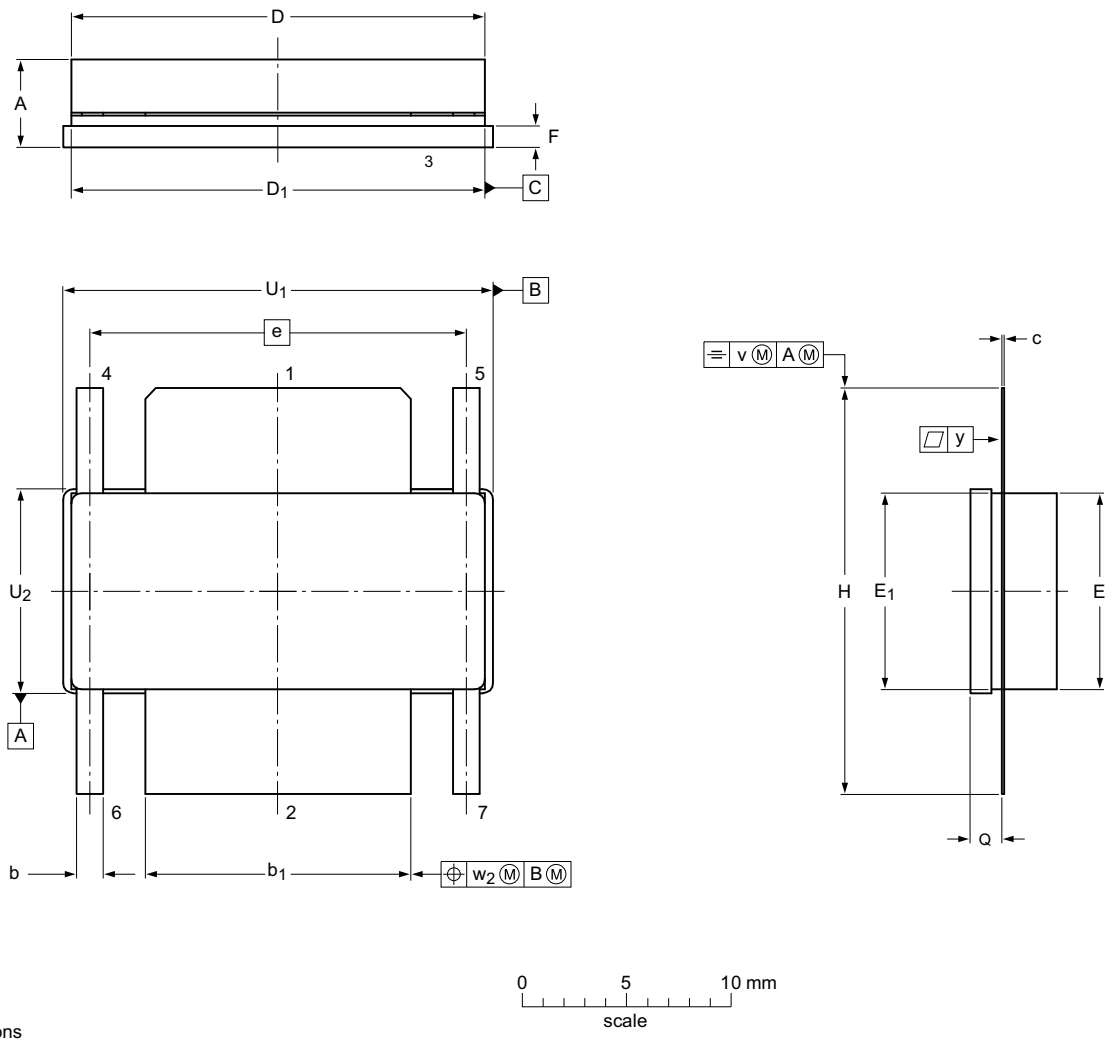
(3) f = 2395 MHz

**Fig 20. Adjacent channel power ratio (10 MHz) as a function of output power; typical values**


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## 8. Package outline

**Earless flanged ceramic package; 6 leads** **SOT1244B**




Dimensions

| Unit(1) | | A | b | $b_1$ | c | D | $D_1$ | e | E | $E_1$ | F | H | Q(2) | $U_1$ | $U_2$ | v | $w_2$ | y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 4.75 | 1.41 | 12.83 | 0.18 | 20.02 | 19.96 | | 9.53 | 9.53 | 1.14 | 19.94 | 1.70 | 20.70 | 9.91 | 0.25 | 0.25 | 0.25 |
| | nom | | | | | | | 18.03 | | | | | | | | | | |
| | min | 3.45 | 1.14 | 12.57 | 0.10 | 19.61 | 19.66 | | 9.27 | 9.27 | 0.89 | 18.92 | 1.45 | 20.45 | 9.65 | | | |
| inches | max | 0.187 | 0.055 | 0.505 | 0.007 | 0.788 | 0.786 | | 0.375 | 0.375 | 0.045 | 0.785 | 0.067 | 0.815 | 0.39 | 0.01 | 0.01 | 0.01 |
| | nom | | | | | | | 0.710 | | | | | | | | | | |
| | min | 0.136 | 0.045 | 0.495 | 0.004 | 0.772 | 0.774 | | 0.365 | 0.365 | 0.035 | 0.745 | 0.057 | 0.805 | 0.38 | | | |

Note
1. Millimeter dimensions are derived from the original inch dimensions.
2. Dimension is measured 0.030 inch (0.76 mm) from body.

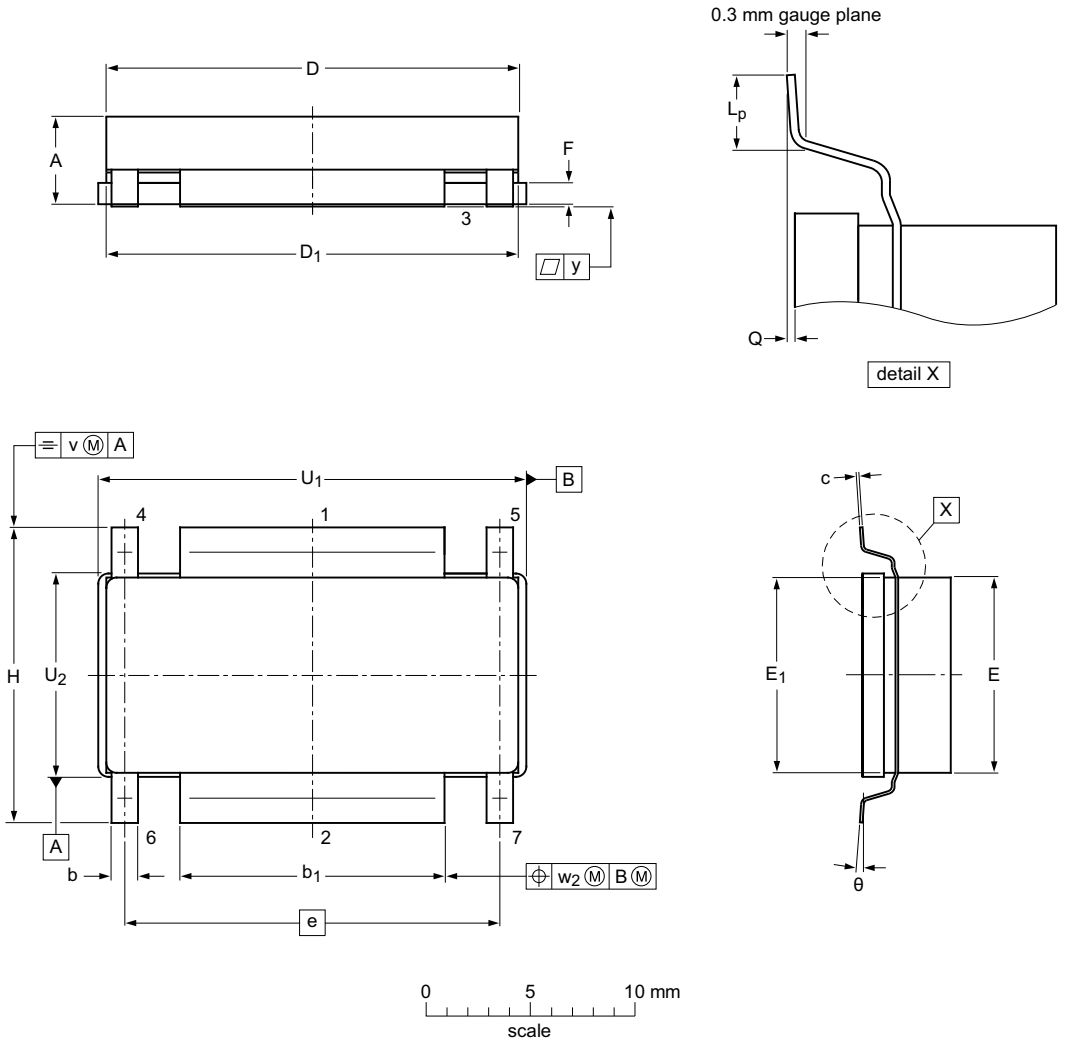
*sot1244b_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT1244B | | | | | | ~~12-04-18~~ 12-05-07 |

**Fig 21. Package outline SOT1244B**


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**Earless flanged ceramic package; 6 leads** **SOT1244C**




Dimensions

| Unit(1) | | A | b | $b_1$ | c | D | $D_1$ | e | E | $E_1$ | F | H | $L_p$ | Q | $U_1$ | $U_2$ | v | $w_2$ | y | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 4.75 | 1.41 | 12.83 | 0.18 | 20.02 | 19.96 | | 9.53 | 9.53 | 1.14 | 14.3 | 1.38 | 0.195 | 20.70 | 9.91 | 0.25 | 0.25 | 0.15 | 7° |
| | nom | | | | | | | 18.03 | | | | | | | | | | | | |
| | min | 3.45 | 1.14 | 12.57 | 0.10 | 19.61 | 19.66 | | 9.27 | 9.27 | 0.89 | 14.1 | 0.98 | 0.055 | 20.45 | 9.65 | | | | 0° |
| inches | max | 0.187 | 0.055 | 0.505 | 0.007 | 0.788 | 0.786 | | 0.375 | 0.375 | 0.045 | 0.563 | 0.055 | 0.008 | 0.815 | 0.39 | 0.01 | 0.01 | 0.006 | 7° |
| | nom | | | | | | | 0.710 | | | | | | | | | | | | |
| | min | 0.136 | 0.045 | 0.495 | 0.004 | 0.772 | 0.774 | | 0.365 | 0.365 | 0.035 | 0.555 | 0.039 | 0.002 | 0.805 | 0.38 | | | | 0° |

Note
1. Millimeter dimensions are derived from the original inch dimensions.

*sot1244c_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT1244C | | | | | | ~~12-05-10~~ 12-05-30 |

**Fig 22. Package outline SOT1244C**


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## 9. 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. |

## 10. Abbreviations

**Table 10. Abbreviations**

| Acronym | Description |
|---|---|
| 3GPP | 3rd Generation Partnership Project |
| CCDF | Complementary Cumulative Distribution Function |
| CW | Continuous Wave |
| DPCH | Dedicated Physical CHannel |
| ESD | ElectroStatic Discharge |
| IS-95 | Interim Standard 95 |
| LDMOS | Laterally Diffused Metal Oxide Semiconductor |
| MTF | Median Time to Failure |
| PAR | Peak-to-Average Ratio |
| SMD | Surface Mounted Device |
| VBW | Video BandWidth |
| VSWR | Voltage Standing Wave Ratio |
| W-CDMA | Wideband Code Division Multiple Access |

## 11. Revision history

**Table 11. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BLF8G24LS-100V_24LS-100GV#4 | 20150901 | Product data sheet | | BLF8G24LS-100V_24LS-100GV v.3 |
| Modifications: | • The format of this document has been redesigned to comply with the new identity guidelines of Ampleon.<br>• Legal texts have been adapted to the new company name where appropriate. | | | |
| BLF8G24LS-100V_24LS-100GV v.3 | 20140627 | Product data sheet | - | BLF8G24LS-100V_24LS-100GV v.2 |
| BLF8G24LS-100V_24LS-100GV v.2 | 20140228 | Objective data sheet | - | BLF8G24LS-100V_24LS-100GV v.1 |
| BLF8G24LS-100V_24LS-100GV v.1 | 20131104 | Objective data sheet | - | - |


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| 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.

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**Date of release: 1 September 2015**
**Document identifier: BLF8G24LS-100V_24LS-100GV#4**

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