

BLF7G24L-100; BLF7G24LS-100

Power LDMOS transistor

Rev. 5 — 1 September 2015

AMPLEON

Product data sheet

1. Product profile

1.1 General description

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

Table 1. Typical performance

Typical RF performance at $T_{case} = 25\text{ }^{\circ}\text{C}$ in a common source class-AB production test circuit.

Mode of operation	f (MHz)	I_{DQ} (mA)	V_{DS} (V)	$P_{L(AV)}$ (W)	G_p (dB)	η_D (%)	ACPR _{885k} (dBc)	ACPR _{5M} (dBc)
IS-95	2300 to 2400	900	28	20	18	27	-46 ^[1]	-
1 carrier W-CDMA	2300 to 2400	900	28	30	18.7	33	-	-40 ^[2]

[1] Single carrier IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 - 13). PAR = 9.7 dB at 0.01 % probability on the CCDF. Channel bandwidth is 1.2288 MHz.

[2] 3GPP; test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on CCDF. Channel bandwidth is 3.84 MHz.

1.2 Features and benefits

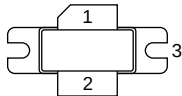
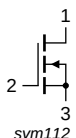
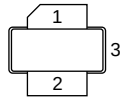
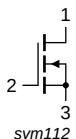
- Excellent ruggedness
- High efficiency
- Low R_{th} providing excellent thermal stability
- Designed for low memory effects providing excellent digital pre-distortion capability
- Internally matched for ease of use
- Integrated ESD protection
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

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
BLF7G24L-100 (SOT502A)			
1	drain		 sym112
2	gate		
3	source		
BLF7G24LS-100 (SOT502B)			
1	drain		 sym112
2	gate		
3	source		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF7G24L-100	-	flanged LDMOST ceramic package; 2 mounting holes; 2 leads	SOT502A
BLF7G24LS-100	-	earless flanged LDMOST ceramic package; 2 leads	SOT502B

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
I_D	drain current		-	28	A
T_{stg}	storage temperature		-65	+150	°C
T_j	junction temperature		-	200	°C

5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-c)}$	thermal resistance from junction to case	$T_{case} = 80\text{ °C}$; $P_L = 100\text{ W}$	0.3	K/W

6. Characteristics

Table 6. Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 1\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 150\text{ mA}$	1.5	1.8	2.3	V
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$	-	-	5	μA
I_{DSX}	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	25.1	29	-	A
I_{GSS}	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	500	nA
g_{fs}	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 5.35\text{ A}$	-	10.5	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 5.25\text{ A}$	-	0.1	-	Ω

7. Test information

Remark: All testing performed in a class-AB production test circuit.

Table 7. Functional test information

Mode of operation: 1-carrier N-CDMA, single carrier IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 - 13). PAR = 9.7 dB at 0.01 % probability on the CCDF; channel bandwidth is 1.2288 MHz; $f_1 = 2300\text{ MHz}$; $f_2 = 2400\text{ MHz}$; RF performance at $V_{DS} = 28\text{ V}$; $I_{Dq} = 900\text{ mA}$; $T_{case} = 25\text{ }^{\circ}\text{C}$; unless otherwise specified.

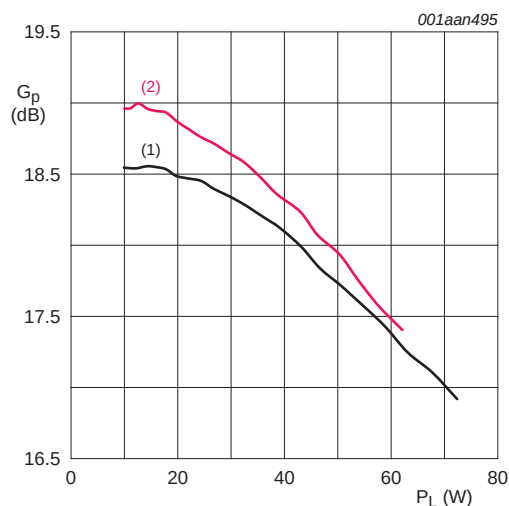
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_{L(AV)}$	average output power		-	20	-	W
G_p	power gain		17.3	18	-	dB
RL_{in}	input return loss		-	-14	-	dB
η_D	drain efficiency		22	27	-	%
$ACPR_{885k}$	adjacent channel power ratio (885 kHz)		-	-46	-40	dBc

7.1 Ruggedness in class-AB operation

The BLF7G24L-100 and BLF7G24LS-100 are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: $V_{DS} = 28\text{ V}$; $I_{Dq} = 900\text{ mA}$; $P_L = 100\text{ W}$ (CW); $f = 2300\text{ MHz}$.

7.2 Single carrier IS-95

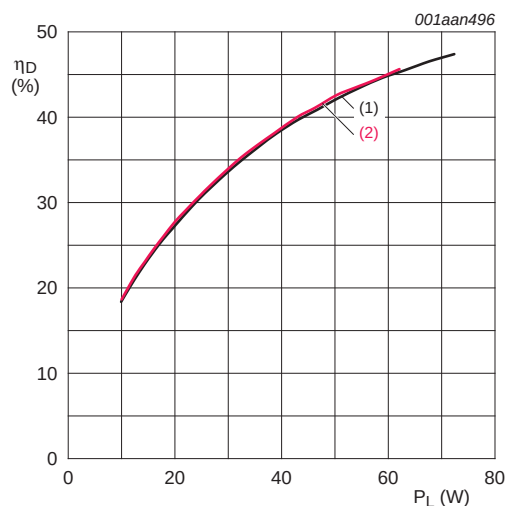
Single carrier IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 - 13).
PAR = 9.7 dB at 0.01 % probability on the CCDF. Channel bandwidth is 1.2288 MHz.



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

- (1) $f = 2300 \text{ MHz}$
- (2) $f = 2400 \text{ MHz}$

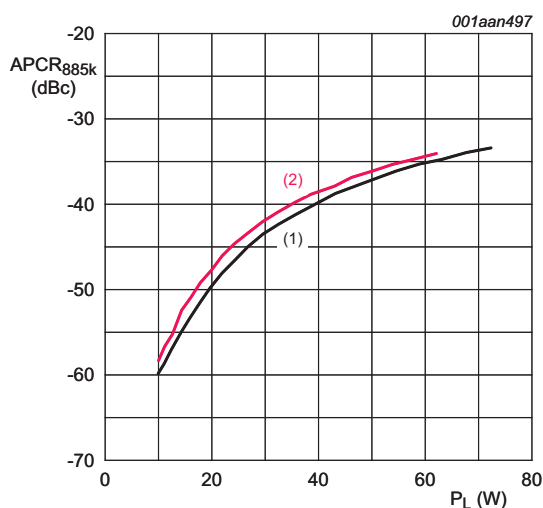
Fig 1. Single carrier IS-95 power gain as a function of load power; typical values



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

- (1) $f = 2300 \text{ MHz}$
- (2) $f = 2400 \text{ MHz}$

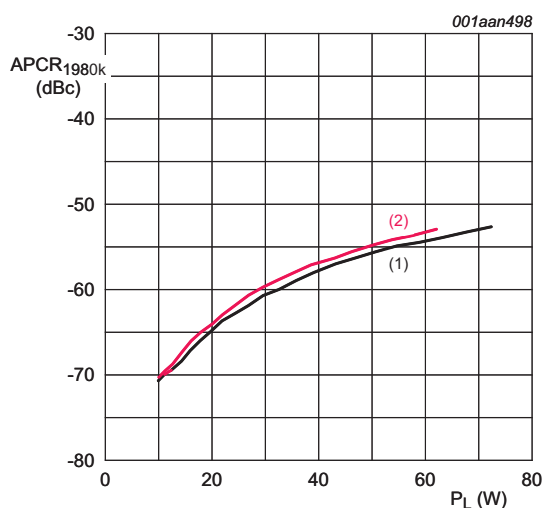
Fig 2. Single carrier IS-95 drain efficiency as a function of load power; typical values



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

- (1) $f = 2300 \text{ MHz}$
- (2) $f = 2400 \text{ MHz}$

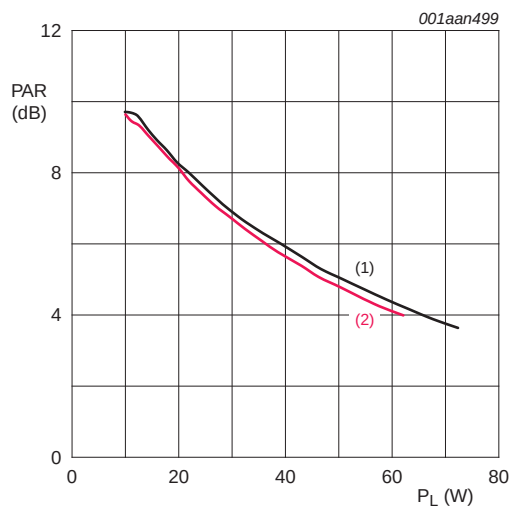
Fig 3. Single carrier IS-95 ACPR at 885 kHz as a function of load power; typical values



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

- (1) $f = 2300 \text{ MHz}$
- (2) $f = 2400 \text{ MHz}$

Fig 4. Single carrier IS-95 ACPR at 1980 kHz as a function of load power; typical values

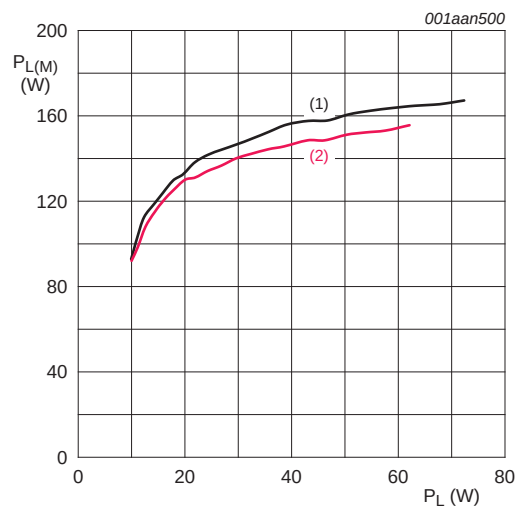


$V_{DS} = 28$ V; $I_{Dq} = 900$ mA.

(1) $f = 2300$ MHz

(2) $f = 2400$ MHz

Fig 5. Single carrier IS-95 peak-to-average power ratio as a function of load power; typical values



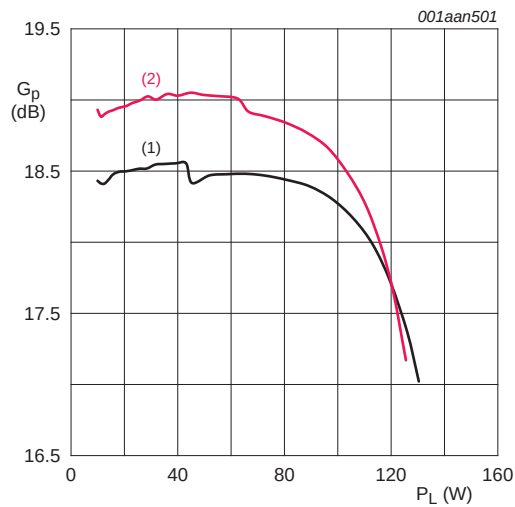
$V_{DS} = 28$ V; $I_{Dq} = 900$ mA.

(1) $f = 2300$ MHz

(2) $f = 2400$ MHz

Fig 6. Single carrier IS-95 peak power as a function of load power; typical values

7.3 Pulsed CW

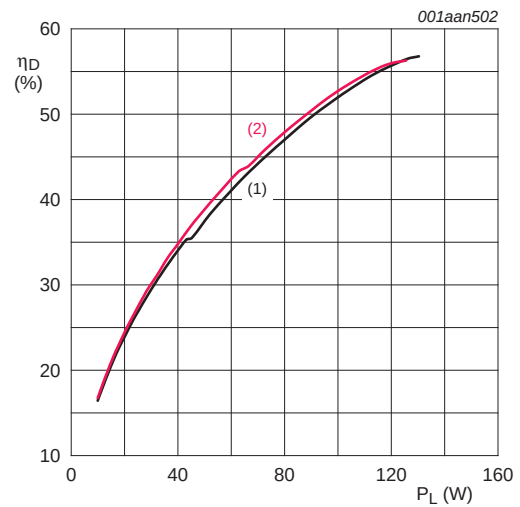


$V_{DS} = 28 \text{ V}$; $I_{DQ} = 900 \text{ mA}$.

(1) $f = 2300 \text{ MHz}$

(2) $f = 2400 \text{ MHz}$

Fig 7. Pulsed CW power gain as a function of load power; typical values



$V_{DS} = 28 \text{ V}$; $I_{DQ} = 900 \text{ mA}$.

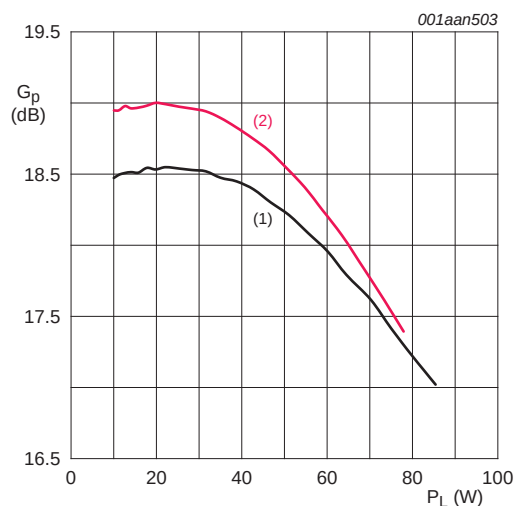
(1) $f = 2300 \text{ MHz}$

(2) $f = 2400 \text{ MHz}$

Fig 8. Pulsed CW drain efficiency as a function of load power; typical values

7.4 Single carrier W-CDMA

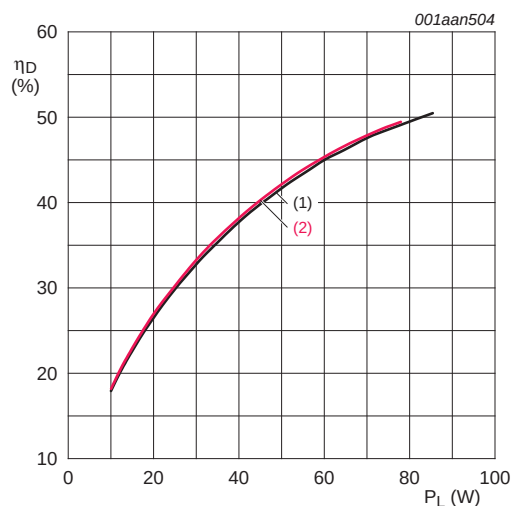
3GPP; test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on CCDF. Channel bandwidth is 3.84 MHz.



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

- (1) $f = 2300\text{ MHz}$
- (2) $f = 2400\text{ MHz}$

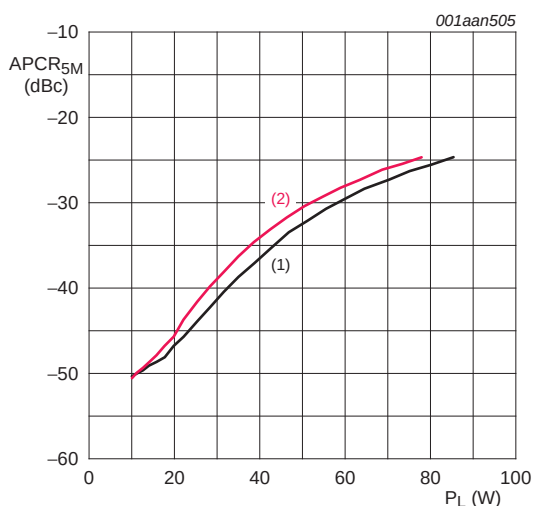
Fig 9. Single carrier W-CDMA power gain as a function of load power; typical values



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

- (1) $f = 2300\text{ MHz}$
- (2) $f = 2400\text{ MHz}$

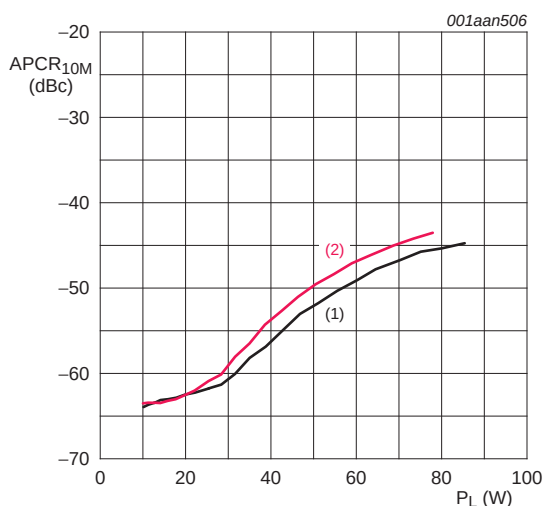
Fig 10. Single carrier W-CDMA drain efficiency as a function of load power; typical values



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

- (1) $f = 2300\text{ MHz}$
- (2) $f = 2400\text{ MHz}$

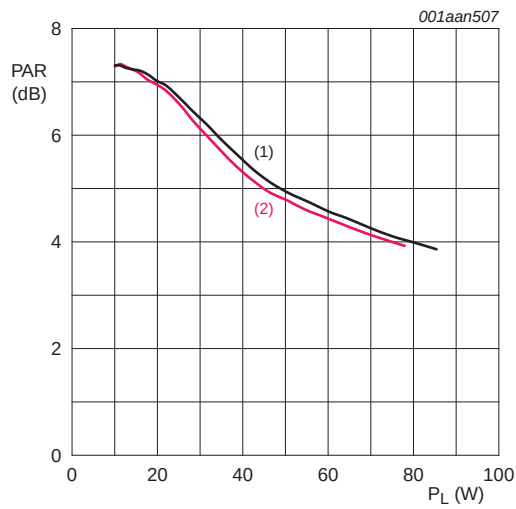
Fig 11. Single carrier W-CDMA ACPR at 5 MHz as a function of load power; typical values



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

- (1) $f = 2300\text{ MHz}$
- (2) $f = 2400\text{ MHz}$

Fig 12. Single carrier W-CDMA ACPR at 10 MHz as a function of load power; typical values

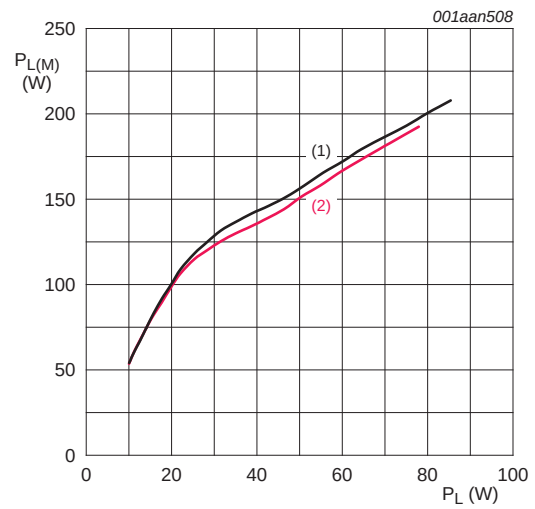


$V_{DS} = 28 \text{ V}$; $I_{Dq} = 900 \text{ mA}$.

(1) $f = 2300 \text{ MHz}$

(2) $f = 2400 \text{ MHz}$

Fig 13. Single carrier W-CDMA peak-to-average power ratio as a function of load power; typical values



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

(1) $f = 2300 \text{ MHz}$

(2) $f = 2400 \text{ MHz}$

Fig 14. Single carrier W-CDMA peak output power as a function of load power; typical values

8. Package outline

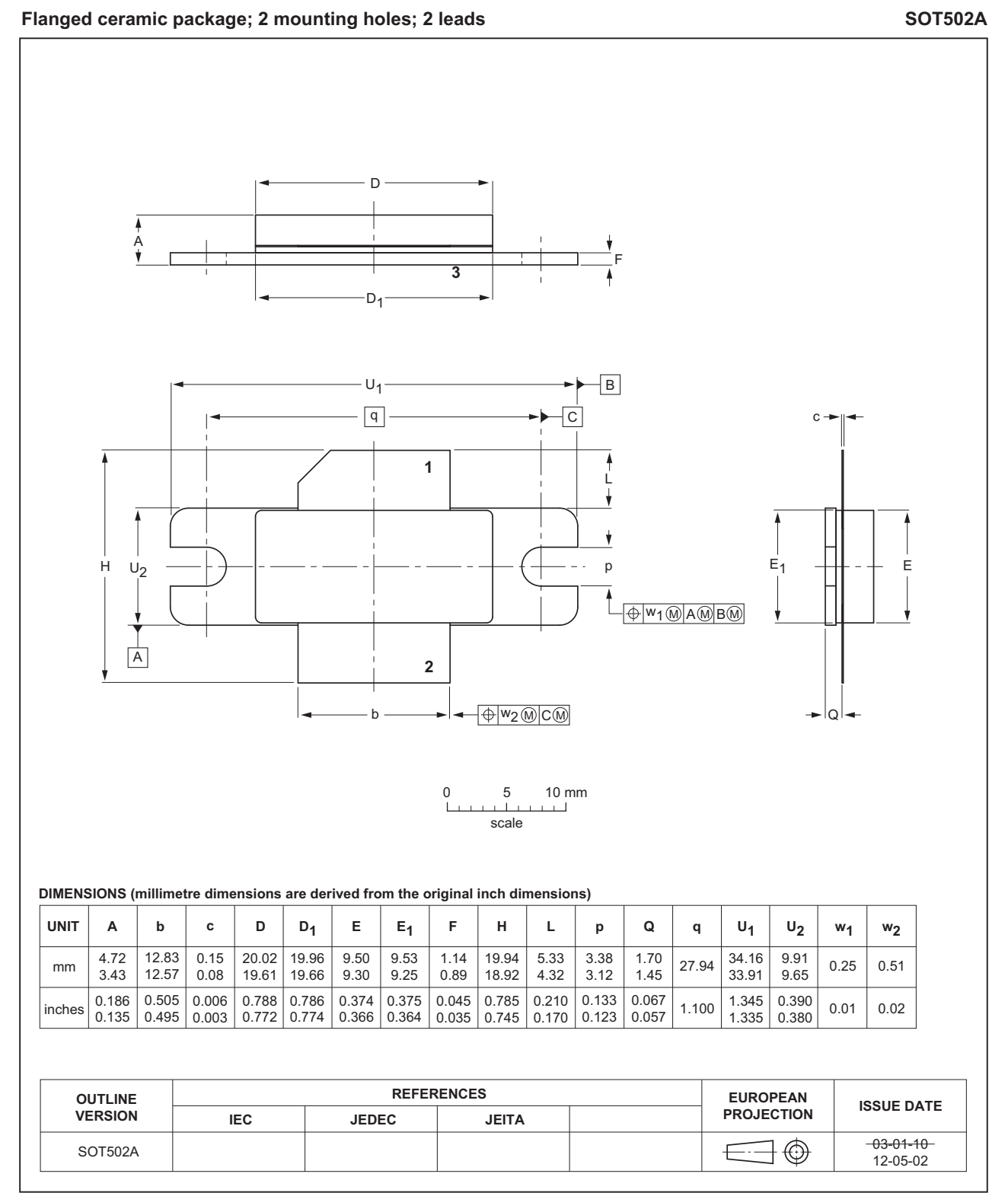
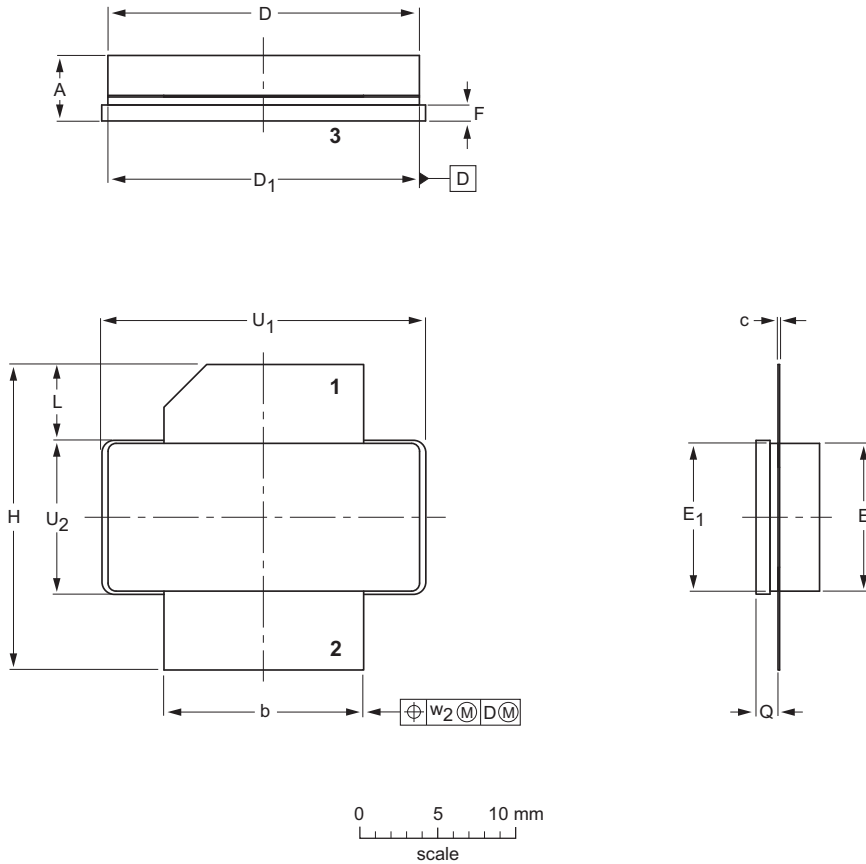


Fig 15. Package outline SOT502A

Earless flanged ceramic package; 2 leads

SOT502B



DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

UNIT	A	b	c	D	D ₁	E	E ₁	F	H	L	Q	U ₁	U ₂	w ₂
mm	4.72 3.43	12.83 12.57	0.15 0.08	20.02 19.61	19.96 19.66	9.50 9.30	9.53 9.25	1.14 0.89	19.94 18.92	5.33 4.32	1.70 1.45	20.70 20.45	9.91 9.65	0.25
inches	0.186 0.135	0.505 0.495	0.006 0.003	0.788 0.772	0.786 0.774	0.374 0.366	0.375 0.364	0.045 0.035	0.785 0.745	0.210 0.170	0.067 0.057	0.815 0.805	0.390 0.380	0.010

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT502B						07-05-09- 12-05-02

Fig 16. Package outline SOT502B

9. Abbreviations

Table 8. Abbreviations

Acronym	Description
3GPP	Third Generation Partnership Project
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Wave
DPCH	Dedicated Physical CHannel
IS-95	Interim Standard 95
ESD	ElectroStatic Discharge
LDMOS	Laterally Diffused Metal Oxide Semiconductor
LDMOST	Laterally Diffused Metal Oxide Semiconductor Transistor
N-CDMA	Narrowband Code Division Multiple Access
PAR	Peak-to-Average power Ratio
RF	Radio Frequency
VSWR	Voltage Standing Wave Ratio
W-CDMA	Wideband Code Division Multiple Access

10. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF7G24L-100_7G24LS-100 v.5	20150901	Product data sheet	-	BLF7G24L-100_7G24LS-100 v.4
Modifications:	- 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.			
BLF7G24L-100_7G24LS-100 v.4	20110722	Product data sheet	-	BLF7G24L-100_7G24LS-100 v.3
BLF7G24L-100_7G24LS-100 v.3	20110405	Preliminary data sheet	-	BLF7G24L-100_7G24LS-100 v.2
BLF7G24L-100_7G24LS-100 v.2	20100714	Objective data sheet	-	BLF7G24L-100_7G24LS-100 v.1
BLF7G24L-100_7G24LS-100 v.1	20100414	Objective data sheet	-	-

11. Legal information

11.1 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>.

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Date of release: 1 September 2015

Document identifier: BLF7G24L-100_7G24LS-100#5