

# BLF6G15L-500H; BLF6G15LS-500H

Power LDMOS transistor

Rev. 4 — 1 September

AMPLEON

Product data sheet

## 1. Product profile

### 1.1 General description

A 500 W LDMOS RF power transistor for transmitter applications and industrial applications. The transistor is optimized for digital applications and can deliver 65 W average DVB-T at 1.5 GHz. The excellent ruggedness of this device makes it ideal for digital transmitter applications.

**Table 1. Test information**

RF performance at  $V_{DS} = 50\text{ V}$ ;  $I_{Dq} = 1.3\text{ A}$ .

Mode of operation	f (MHz)	$P_{L(AV)}$ (W)	$G_p$ (dB)	$\eta_D$ (%)	IMD3 (dBc)	IMD <sub>shldr</sub> (dBc)	PAR (dB)
2-tone, class-AB	1452 to 1492	250	15	34	-24	-	-
DVB-T (8k OFDM)	1452 to 1492	65	16	19	-	-32 <a href="#">[1]</a>	9 <a href="#">[2]</a>

[1] Measured [dBc] with delta marker at 4.3 MHz from center frequency.

[2] PAR (of output signal) at 0.01 % probability on CCDF; PAR of input signal = 9.5 dB at 0.01 % probability on CCDF.

### 1.2 Features and benefits

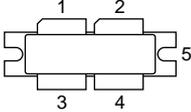
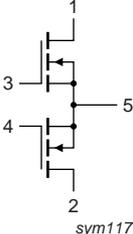
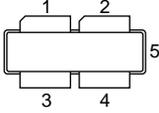
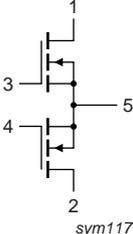
- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Internally matched for ease of use
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

### 1.3 Applications

- Digital transmitter applications DVB at 1.5 GHz
- Industrial applications at 1.5 GHz

## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
<b>BLF6G15L-500H (SOT539A)</b>			
1	drain1		 sym117
2	drain2		
3	gate1		
4	gate2		
5	source		
<b>BLF6G15LS-500H (SOT539B)</b>			
1	drain1		 sym117
2	drain2		
3	gate1		
4	gate2		
5	source		

[1] Connected to flange.

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF6G15L-500H	-	flanged balanced LDMOST ceramic package; 2 mounting holes; 4 leads	SOT539A
BLF6G15LS-500H	-	earless flanged balanced LDMOST ceramic package; 4 leads	SOT539B

## 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		-	100	V
$V_{GS}$	gate-source voltage		-0.5	+13	V
$I_D$	drain current		-	45	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
$R_{th(j-case)}$	thermal resistance from junction to case	$T_{case} = 85\text{ °C}; P_L = 65\text{ W}$	0.18	K/W

## 6. Characteristics

Table 6. DC characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 2.7\text{ mA}$	100	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 270\text{ mA}$	1.4	1.8	2.4	V
$I_{DSS}$	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V}$	-	-	2.8	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	38	42	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	280	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 270\text{ mA}$	1.33	2.3	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 9.5\text{ A}$	-	100	193	$\text{m}\Omega$

Table 7. RF characteristics

RF characteristics in Ampleon class-AB production circuit, in frequency range 1452 MHz to 1492 MHz;  $T_{case} = 25\text{ °C}$ .

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>DVB-T (8k OFDM), class-AB</b>						
$V_{DS}$	drain-source voltage		-	50	-	V
$I_{Dq}$	quiescent drain current		-	1.3	-	A
$P_{L(AV)}$	average output power		-	65	-	W
$G_p$	power gain		14.5	16	-	dB
$\eta_D$	drain efficiency		16	19	-	%
$IMD_{shldr}$	intermodulation distortion shoulder		[1] -	-32	-30	dBc
PAR	peak-to-average ratio		[2] 8.5	9	-	dB

[1] Measured [dBc] with delta marker at 4.3 MHz from center frequency.

[2] PAR (of output signal) at 0.01 % probability on CCDF; PAR of input signal = 9.5 dB at 0.01 % probability on CCDF.

### 6.1 Ruggedness in class-AB operation

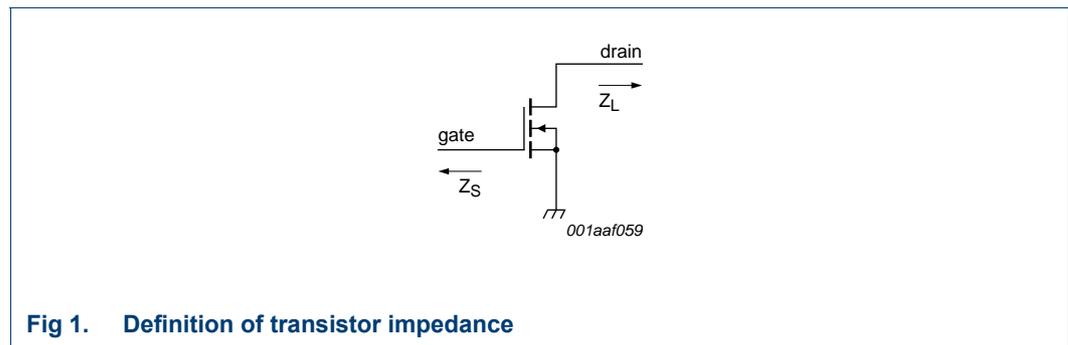
The BLF6G15L-500H and BLF6G15LS-500H are capable of withstanding a load mismatch corresponding to  $V_{SWR} = 10 : 1$  through all phases under the following conditions:  $V_{DS} = 50\text{ V}; I_{Dq} = 1.3\text{ A}$  at rated power.

## 7. Application information

### 7.1 Impedance information

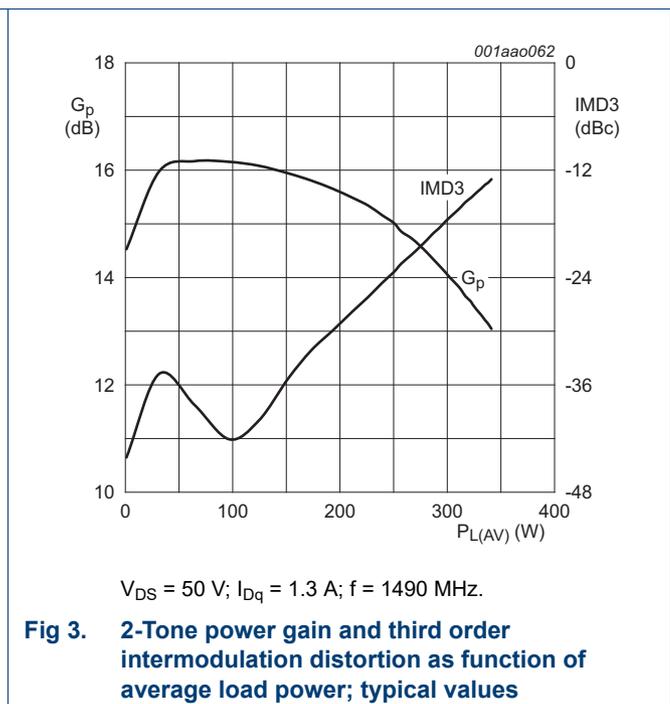
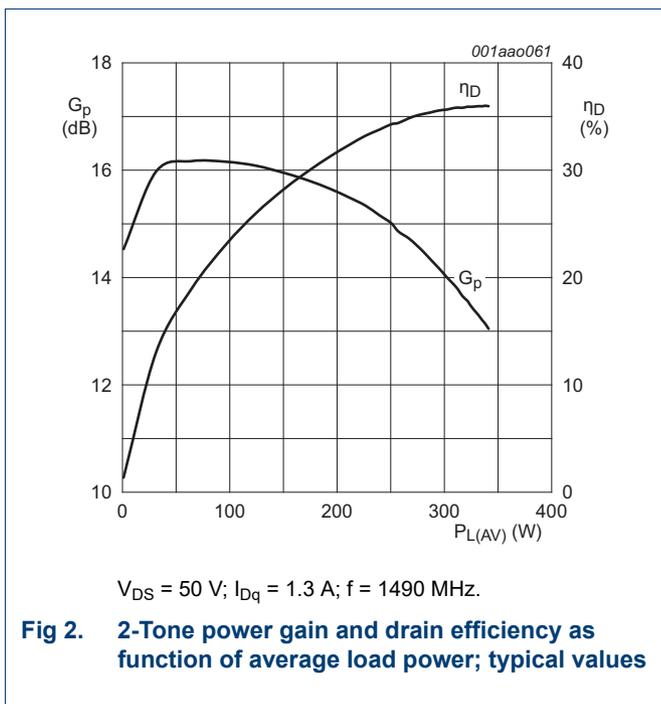
**Table 8. Typical impedance**  
 Typical values per section unless otherwise specified.

f MHz	Z <sub>S</sub> Ω	Z <sub>L</sub> Ω
1452	1.226 – j2.663	2.137 – j2.750
1472	1.375 – j2.757	1.869 – j2.378
1492	1.15 – j2.735	1.817 – j2.684

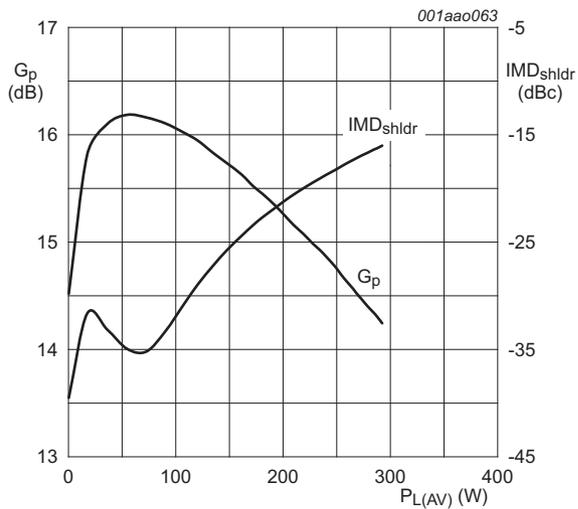


### 7.2 Graphs

#### 7.2.1 2-Tone

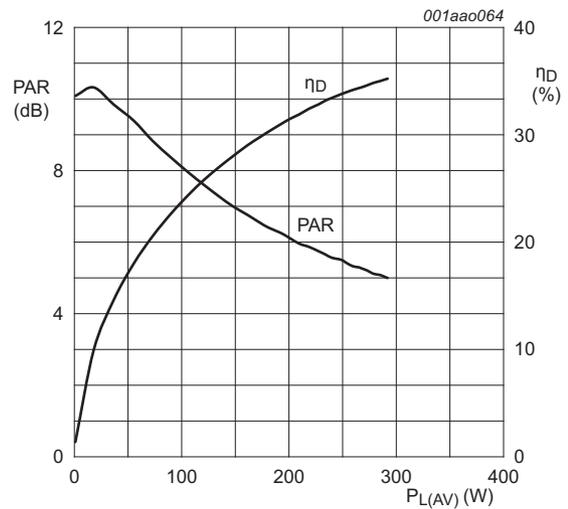


7.2.2 DVB-T



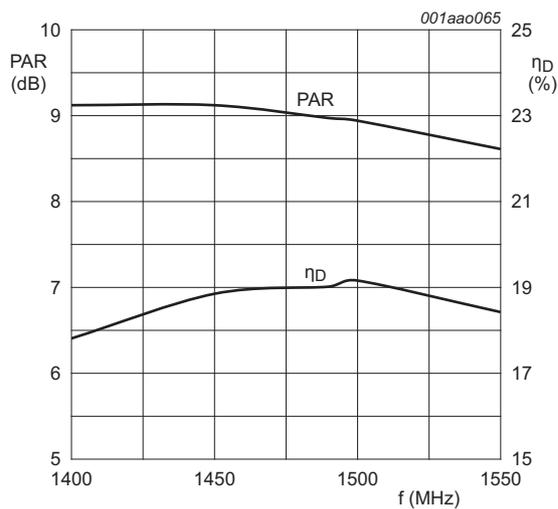
$V_{DS} = 50 \text{ V}$ ;  $I_{Dq} = 1.3 \text{ A}$ ;  $f = 1490 \text{ MHz}$ .

**Fig 4. DVB-T power gain and intermodulation distortion shoulder as function of average load power; typical values**



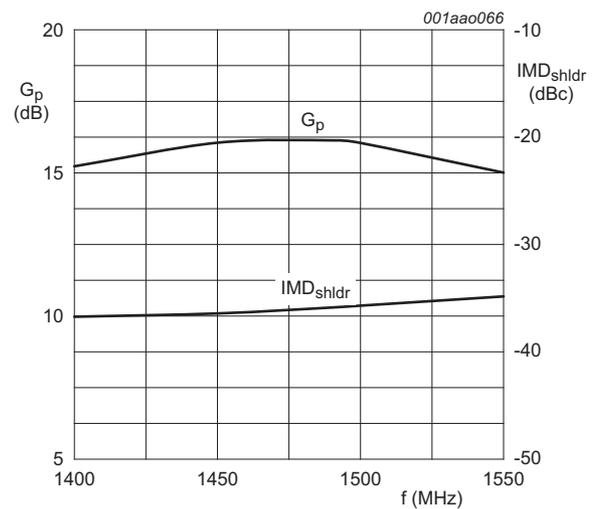
$V_{DS} = 50 \text{ V}$ ;  $I_{Dq} = 1.3 \text{ A}$ ;  $f = 1490 \text{ MHz}$ .

**Fig 5. DVB-T peak-to-average ratio and drain efficiency as function of average load power; typical values**



$V_{DS} = 50 \text{ V}$ ;  $I_{Dq} = 1.3 \text{ A}$ ;  $P_{L(AV)} = 65 \text{ W}$ .

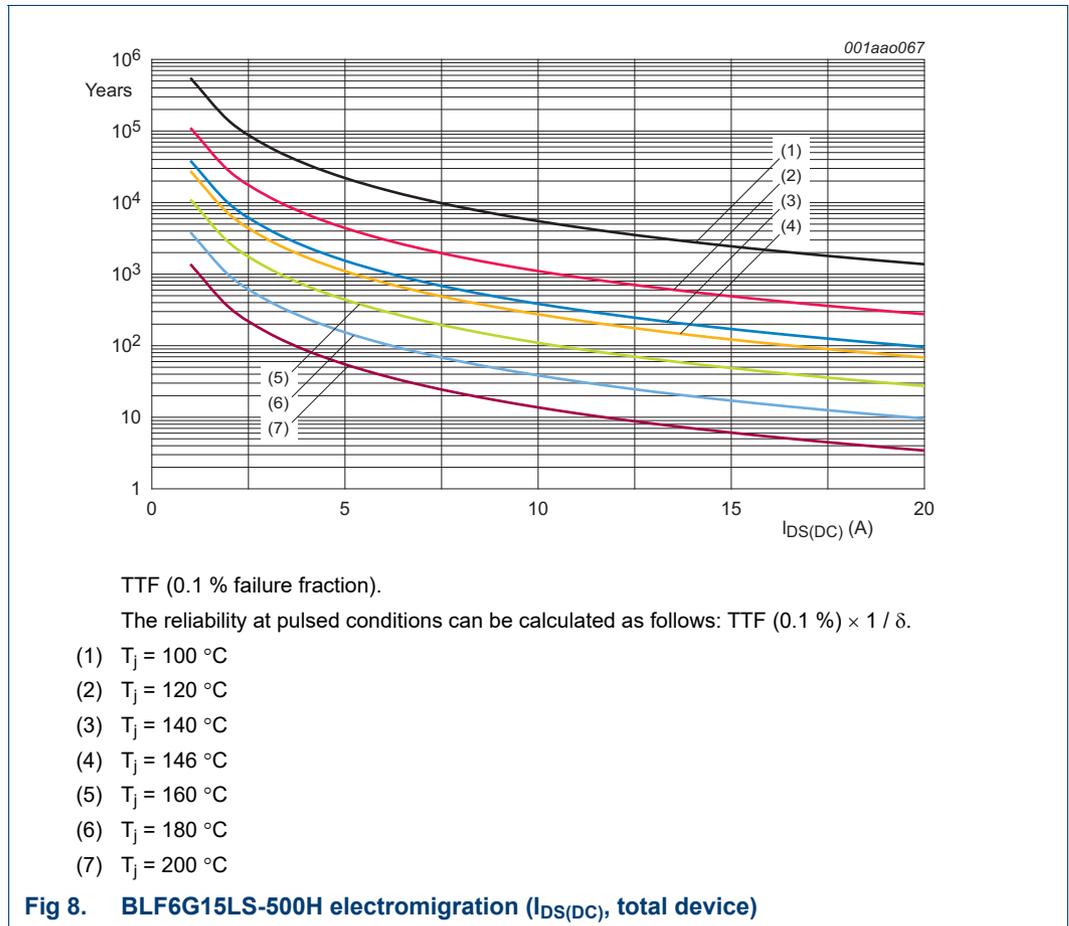
**Fig 6. DVB-T peak-to-average ratio and drain efficiency as function of frequency; typical values**



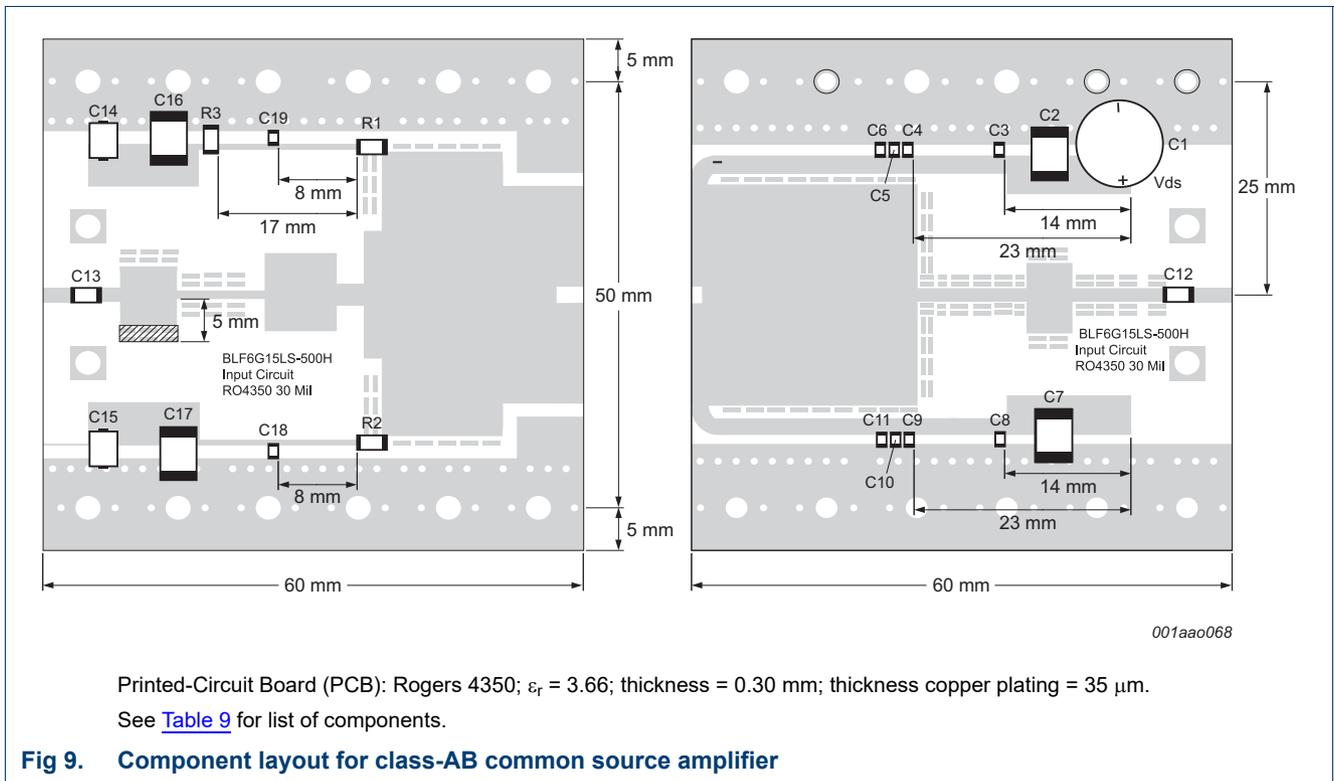
$V_{DS} = 50 \text{ V}$ ;  $I_{Dq} = 1.3 \text{ A}$ ;  $P_{L(AV)} = 65 \text{ W}$ .

**Fig 7. DVB-T power gain and intermodulation distortion shoulder as function of frequency; typical values**

7.2.3 Reliability



7.3 Test circuit



**Table 9. List of components**

See [Figure 9](#) for component layout.

Component	Description	Value	Remarks
C1	electrolytic capacitor	470 $\mu\text{F}$ , 63 V	Elco
C2, C7, C16, C17	multilayer ceramic chip capacitor	10 $\mu\text{F}$	TDK
C3, C8	multilayer ceramic chip capacitor	6.2 pF	ATC800B
C4, C5, C9, C10	multilayer ceramic chip capacitor	1.0 $\mu\text{F}$	1206 10 %
C6, C11	multilayer ceramic chip capacitor	10 nF	1205 10 %
C12, C13	multilayer ceramic chip capacitor	22 pF	ATC800B
C18, C19	multilayer ceramic chip capacitor	22 pF	ATC800B
C15	electrolytic capacitor	470 $\mu\text{F}$ ; 63 V	
R1, R2	SMD resistor	5R1 $\Omega$	0805
R3	SMD resistor	470 $\Omega$ (not fitted)	1206

8. Package outline

Flanged balanced ceramic package; 2 mounting holes; 4 leads

SOT539A

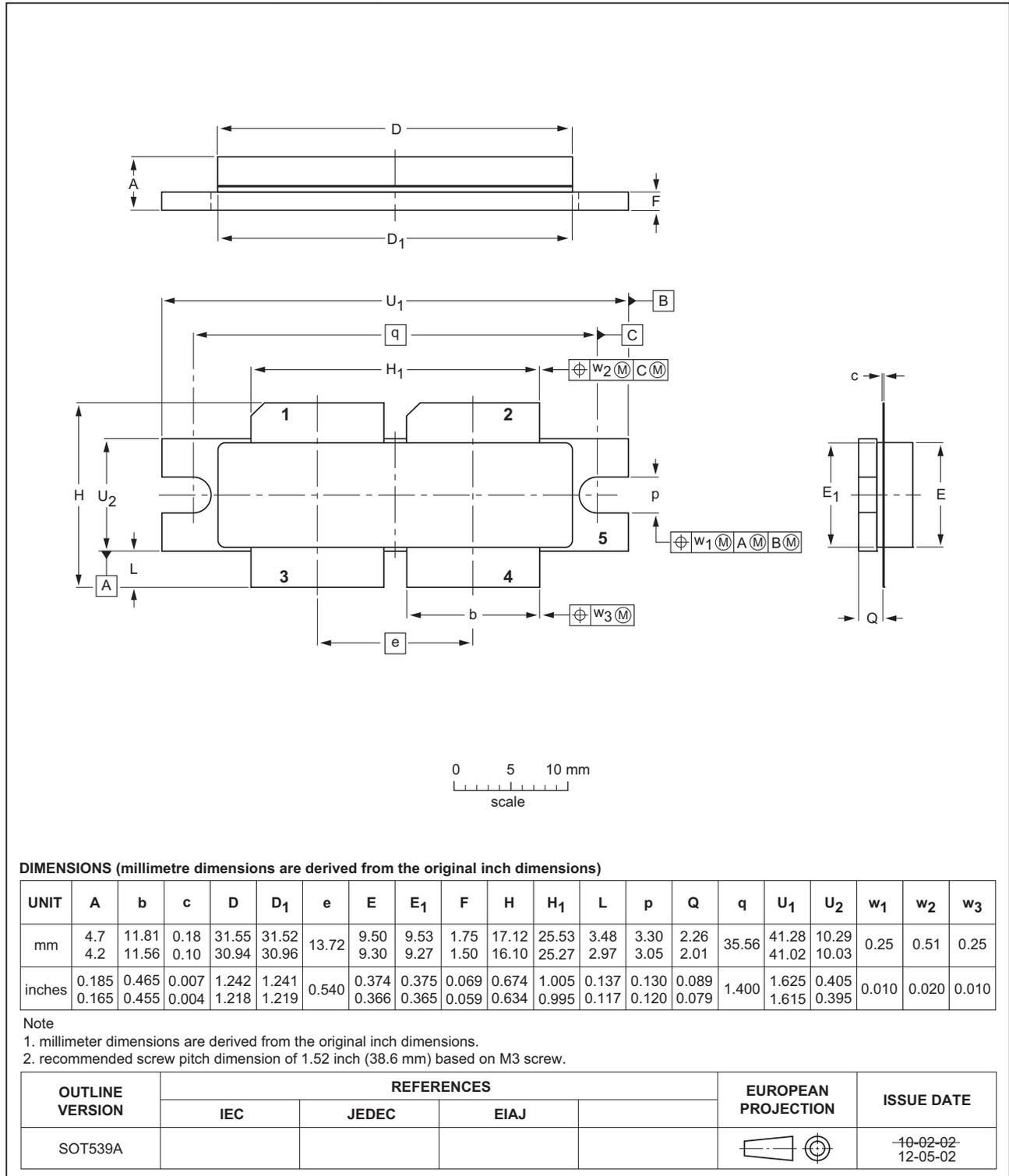


Fig 10. Package outline SOT539A

Earless flanged balanced ceramic package; 4 leads

SOT539B

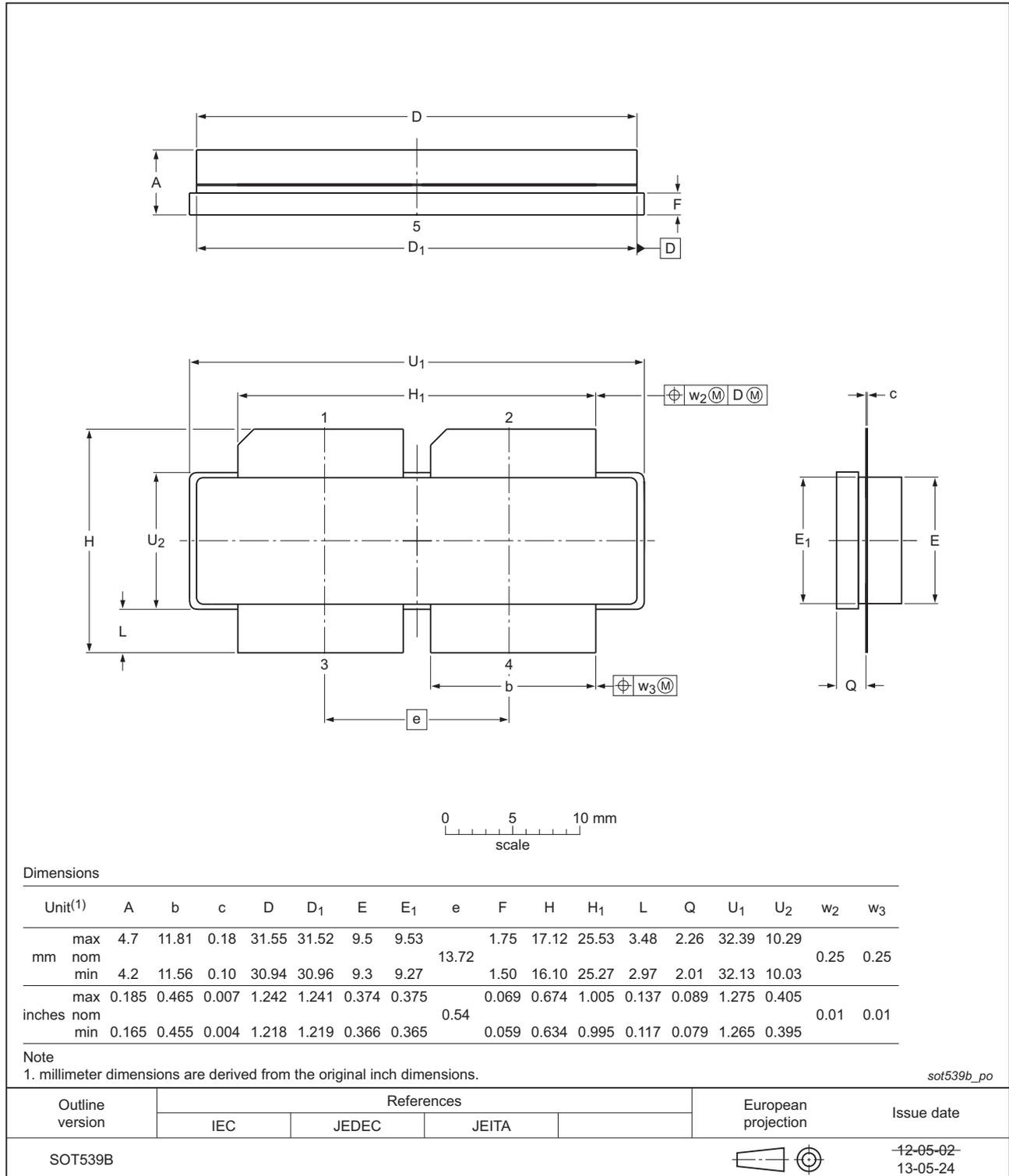


Fig 11. Package outline SOT539B

## 9. 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.

## 10. Abbreviations

Table 10. Abbreviations

Acronym	Description
CCDF	Complementary Cumulative Distribution Function
DVB-T	Digital Video Broadcast - Terrestrial
DVB	Digital Video Broadcast
ESD	ElectroStatic Discharge
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
LDMOST	Laterally Diffused Metal-Oxide Semiconductor Transistor
OFDM	Orthogonal Frequency Division Multiplexing
PAR	Peak-to-Average power Ratio
RF	Radio Frequency
SMD	Surface Mounted Device
TTF	Time To Failure
VSWR	Voltage Standing-Wave Ratio

## 11. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF6G15L-500H_6G15LS-500H#4	20150901	Product data sheet	-	BLF6G15L-500H_6G15LS-500H 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>			
BLF6G15L-500H_6G15LS-500H v.3	20130712	Product data sheet	-	BLF6G15L-500H_6G15LS-500H v.2
BLF6G15L-500H_6G15LS-500H v.2	20110916	Product data sheet	-	BLF6G15L-500H_6G15LS-500H v.1
BLF6G15L-500H_6G15LS-500H v.1	20110511	Objective data sheet	-	-

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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.

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

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