

BLA8G1011L(S)-300; BLA8G1011L(S)-300G

Power LDMOS transistor

Rev. 4 — 4 August 2016

AMMPLÉON

Product data sheet

1. Product profile

1.1 General description

300 W LDMOS power transistor for avionics applications at frequencies from 1030 MHz to 1090 MHz.

Table 1. Test information

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

Test signal	f (MHz)	V _{DS} (V)	P _L (W)	G _p (dB)	η_D (%)	t _r (ns)	t _f (ns)
pulsed RF	1060	32	300	16.5	56	14	5

1.2 Features and benefits

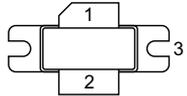
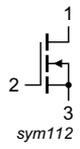
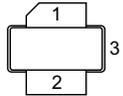
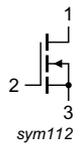
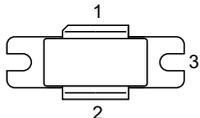
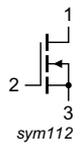
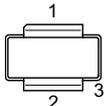
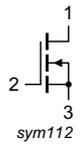
- Easy power control
- Integrated ESD protection
- Enhanced ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (1030 MHz to 1090 MHz)
- Internally matched for ease of use
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

1.3 Applications

- Avionics transmitter applications in the 1030 MHz to 1090 MHz frequency range

2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
BLA8G1011L-300 (SOT502A)			
1	drain		
2	gate		
3	source [1]		
BLA8G1011LS-300 (SOT502B)			
1	drain		
2	gate		
3	source [1]		
BLA8G1011L-300G (SOT502F)			
1	drain		
2	gate		
3	source [1]		
BLA8G1011LS-300G (SOT502E)			
1	drain		
2	gate		
3	source [1]		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
BLA8G1011L-300	-	flanged ceramic package; 2 mounting holes; 2 leads	SOT502A
BLA8G1011LS-300	-	earless flanged ceramic package; 2 leads	SOT502B
BLA8G1011L-300G	-	eared flanged ceramic package; 2 leads; 2 mounting holes	SOT502F
BLA8G1011LS-300G	-	earless flanged ceramic package; 2 leads	SOT502E

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.

5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$Z_{th(j-c)}$	transient thermal impedance from junction to case	$T_{case} = 25\text{ °C}$; $t_p = 10\ \mu\text{s}$; $\delta = 10\%$	0.112	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	$V_{GS} = 0\text{ V}$; $I_D = 4.5\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}$; $I_D = 450\text{ mA}$	1.5	1.8	2.3	V
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}$; $V_{DS} = 28\text{ V}$	-	-	4.2	μA
I_{DSX}	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $V_{DS} = 10\text{ V}$	67.9	82	-	A
I_{GSS}	gate leakage current	$V_{GS} = 11\text{ V}$; $V_{DS} = 0\text{ V}$	-	-	420	nA
g_{fs}	forward transconductance	$V_{DS} = 10\text{ V}$; $I_D = 450\text{ mA}$	2.67	3.92	5.25	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $I_D = 15.75\text{ A}$	0.008	0.04	0.079	Ω

Table 7. RF characteristics

Test signal: pulsed RF; $t_p = 50\ \mu\text{s}$; $\delta = 2\%$; $V_{DS} = 32\text{ V}$; $f = 1060\text{ MHz}$; $I_{DQ} = 150\text{ mA}$; $T_{case} = 25\text{ °C}$; unless otherwise specified; in a class-AB production test circuit for straight leads.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$P_L = 300\text{ W}$	15	16.5	-	dB
RL_{in}	input return loss	$P_L = 300\text{ W}$	-	-16	-11	dB
η_D	drain efficiency	$P_L = 300\text{ W}$	52	56	-	%
t_r	rise time	$P_L = 300\text{ W}$	-	14	-	ns
t_f	fall time	$P_L = 300\text{ W}$	-	5	-	ns

7. Test information

7.1 Ruggedness in class-AB operation

The BLA8G1011L-300, BLA8G1011LS-300, BLA8G1011L-300G and BLA8G1011LS-300G are enhanced rugged devices and are capable of withstanding a load mismatch corresponding to $V_{SWR} = 10 : 1$ through all phases under the following conditions: $t_p = 50 \mu s$; $\delta = 2 \%$; $V_{DS} = 32 V$; $I_{Dq} = 100 mA$; $P_L = 300 W$; $f = 1030 MHz$ to $1090 MHz$.

7.2 Impedance information

Table 8. Typical impedance
Typical values unless otherwise specified.

f (MHz)	Z _S (Ω)	Z _L (Ω)
1000	2.84 – j3.69	0.80 – j1.00
1050	3.98 – j3.26	0.62 – j1.26
1100	5.22 – j2.92	0.66 – j1.17

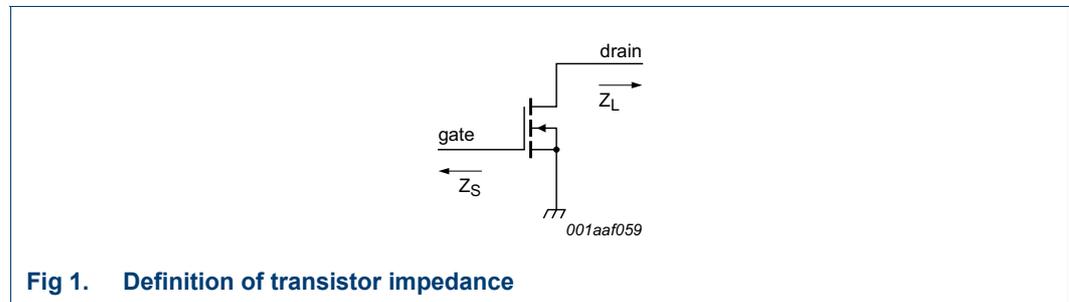


Fig 1. Definition of transistor impedance

7.3 Test circuit

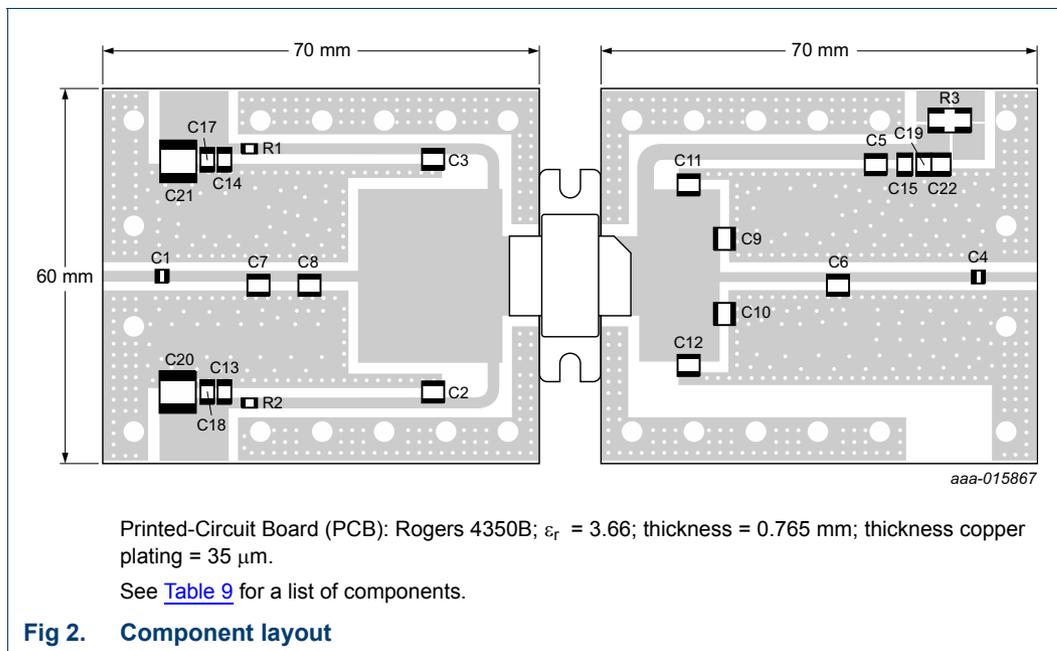
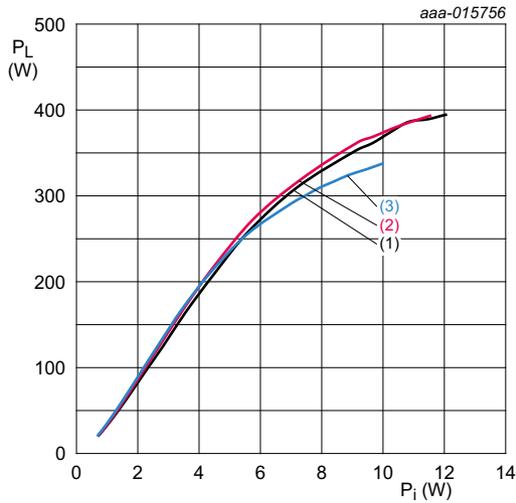


Table 9. List of components

See [Figure 2](#) for component layout.

Component	Description	Value	Remarks
C1, C4	multilayer ceramic chip capacitor	91 pF	ATC: ATC100A910FT150XT
C2, C3, C5	multilayer ceramic chip capacitor	39 pF	ATC: ATC100B390FT500XTV
C6	multilayer ceramic chip capacitor	1.5 pF	ATC: ATC800B1R5BT500XTV
C7	multilayer ceramic chip capacitor	3.3 pF	ATC: ATC100B3R3BT500XTV
C8	multilayer ceramic chip capacitor	2.4 pF	ATC: ATC100B2R4BT500XTV
C9, C10	multilayer ceramic chip capacitor	0.6 pF	ATC: ATC100B0R6BT500XTV
C11, C12	multilayer ceramic chip capacitor	2.7 pF	ATC: ATC100B2R7BT500XTV
C13, C14, C15	multilayer ceramic chip capacitor	0.1 μF	Murata: GRM31C5C1H104JA01K
C17, C18, C19	multilayer ceramic chip capacitor	1 μF	Murata: GRM31MR71H105KA88L
C20, C21	multilayer ceramic chip capacitor	4.7 μF	TDK: C5750X7R2A475K230KA
C22	multilayer ceramic chip capacitor	4.7 μF	Murata: GRM32ER71H475KA88L
R1, R2	SMD resistor	9.1 Ω	Yageo: RC0805FR-079R1L
R3	SMD resistor	0.01 Ω	Ohmite: LVK25R010FER

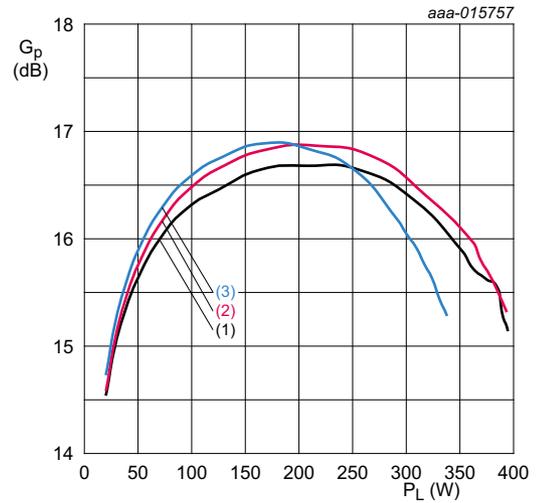
7.4 Graphical data



$V_{DS} = 32\text{ V}; I_{Dq} = 150\text{ mA}; t_p = 50\text{ }\mu\text{s}; \delta = 2\text{ }\%$.

- (1) $f = 1030\text{ MHz}$
- (2) $f = 1060\text{ MHz}$
- (3) $f = 1090\text{ MHz}$

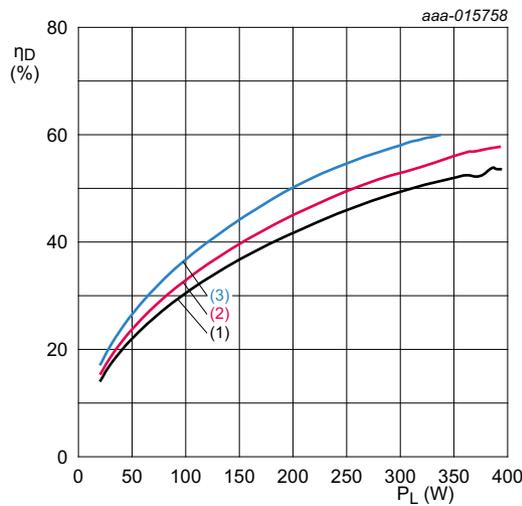
Fig 3. Output power as a function of input power; typical values



$V_{DS} = 32\text{ V}; I_{Dq} = 150\text{ mA}; t_p = 50\text{ }\mu\text{s}; \delta = 2\text{ }\%$.

- (1) $f = 1030\text{ MHz}$
- (2) $f = 1060\text{ MHz}$
- (3) $f = 1090\text{ MHz}$

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



$V_{DS} = 32\text{ V}; I_{Dq} = 150\text{ mA}; t_p = 50\text{ }\mu\text{s}; \delta = 2\text{ }\%$.

- (1) $f = 1030\text{ MHz}$
- (2) $f = 1060\text{ MHz}$
- (3) $f = 1090\text{ MHz}$

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

8. Package outline

Flanged ceramic package; 2 mounting holes; 2 leads

SOT502A

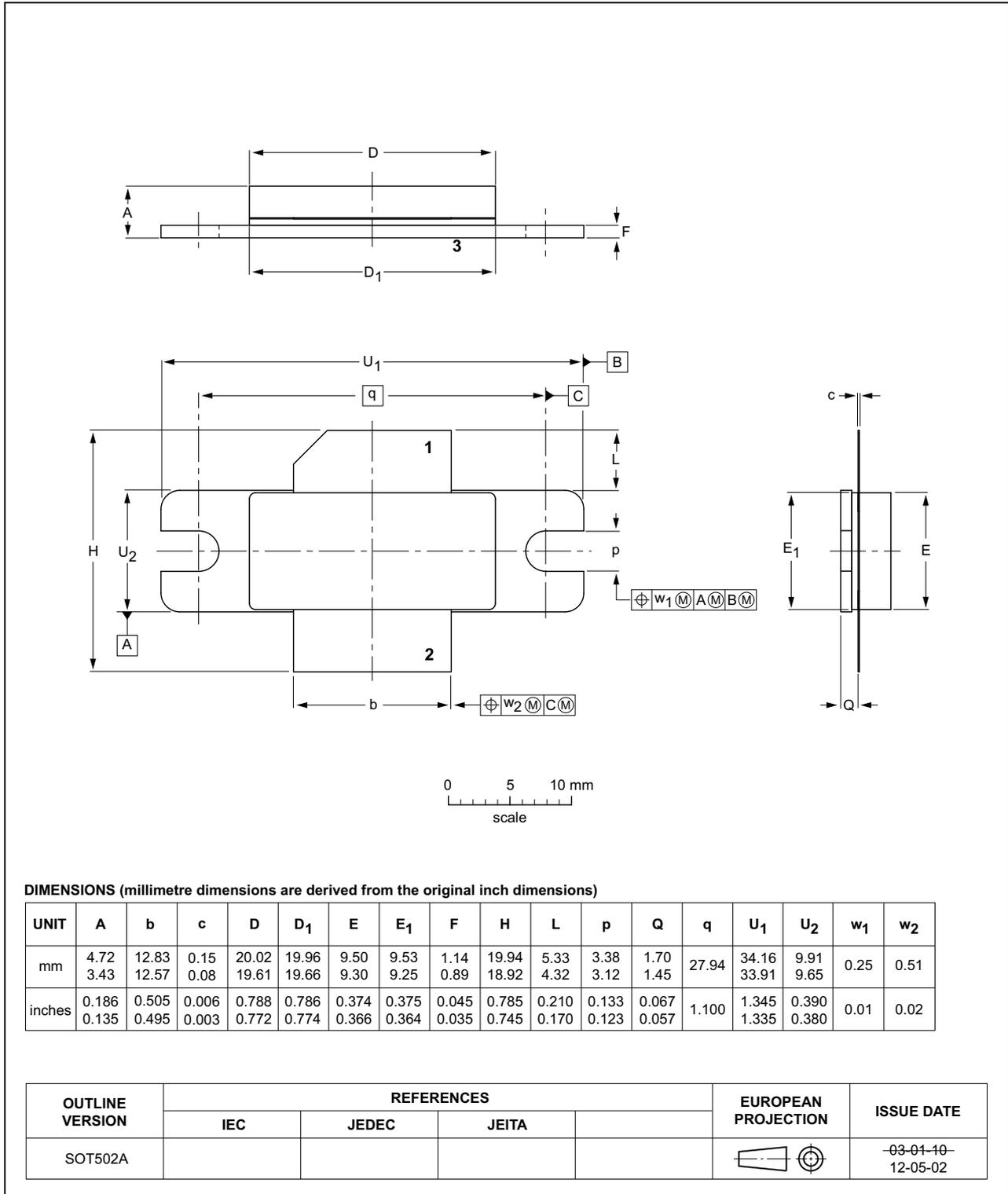


Fig 6. Package outline SOT502A

Earless flanged ceramic package; 2 leads

SOT502B

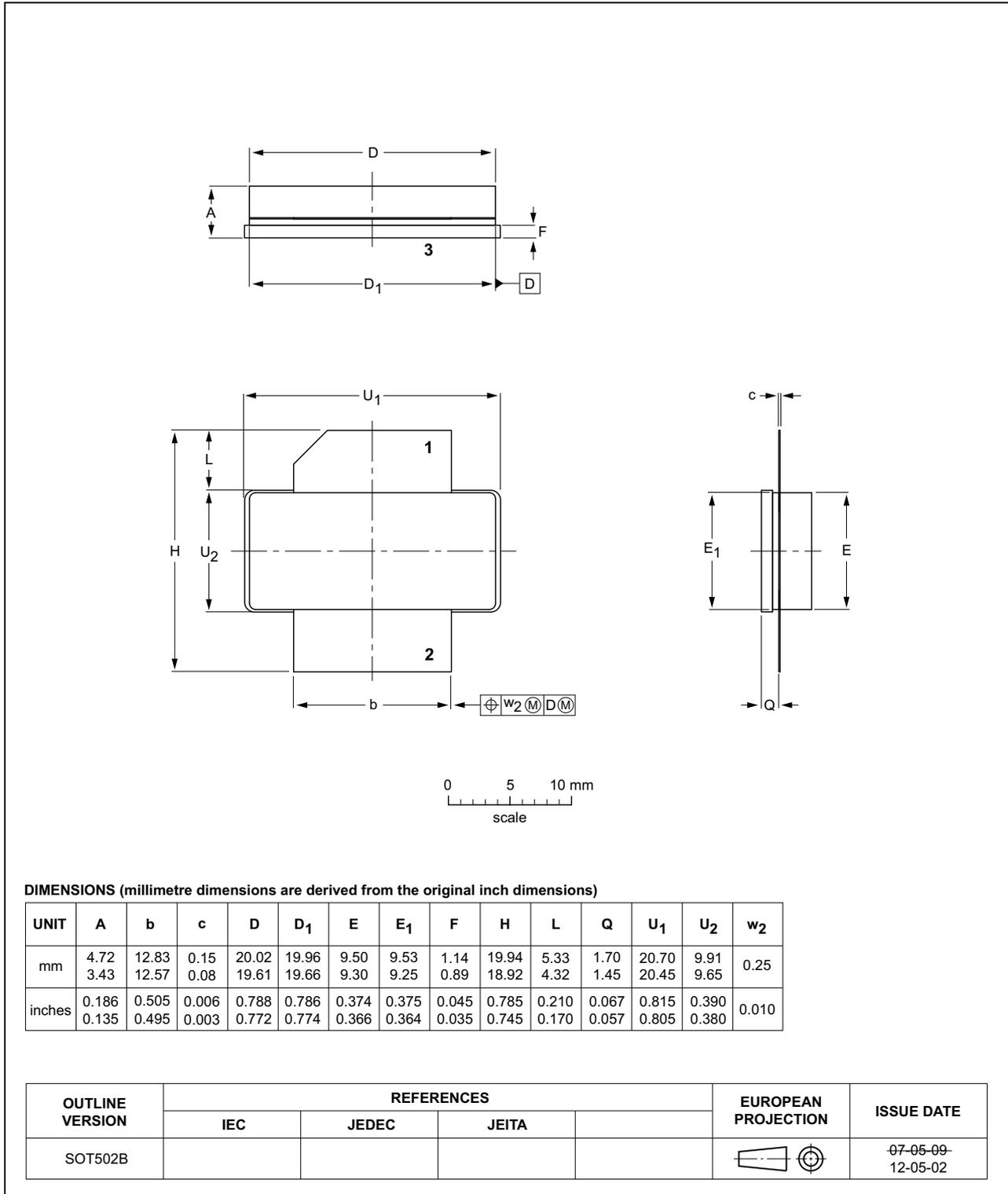


Fig 7. Package outline SOT502B

Earless flanged ceramic package; 2 leads

SOT502E

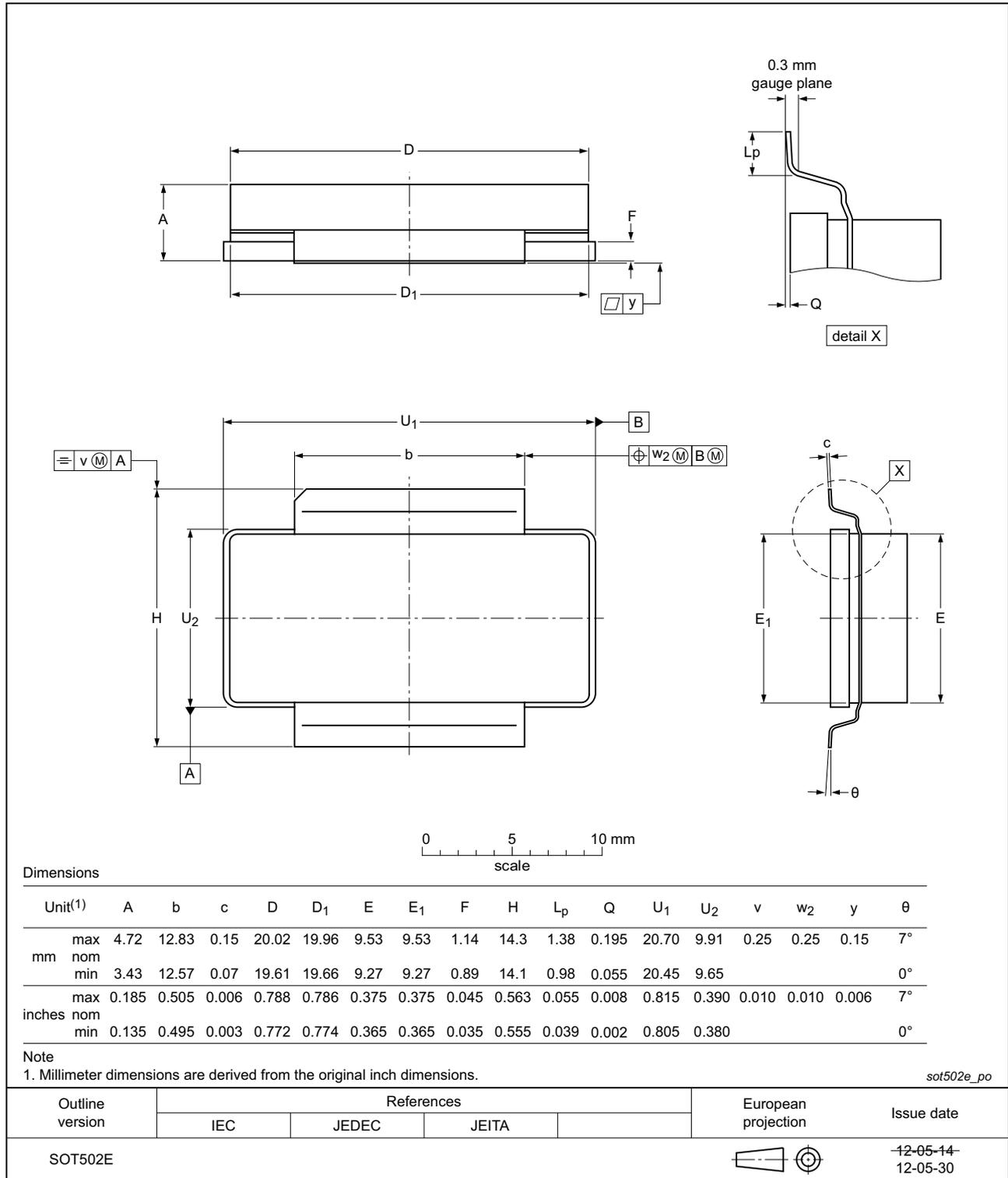


Fig 8. Package outline SOT502E

Eared flanged ceramic package; 2 leads; 2 mounting holes

SOT502F

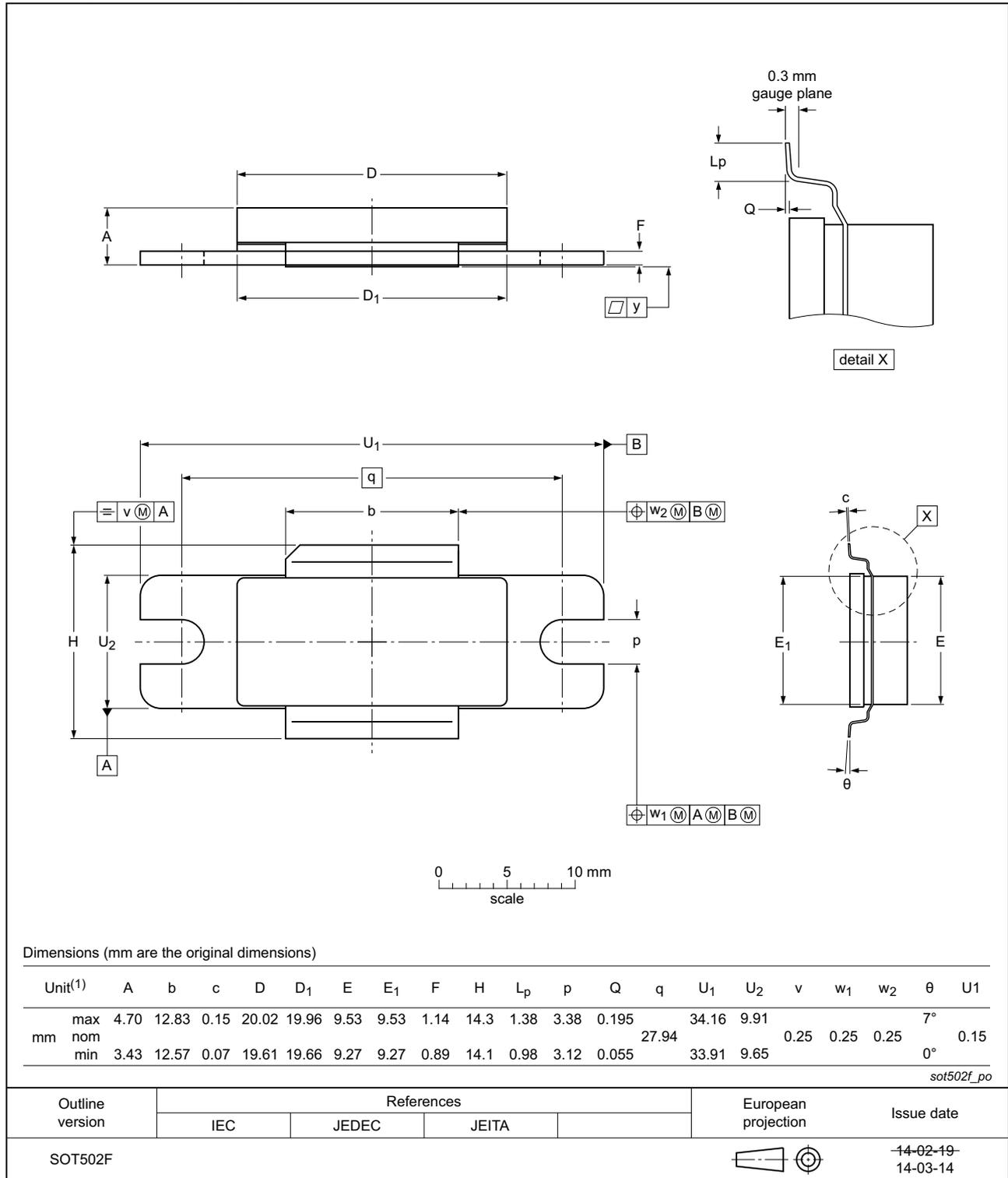


Fig 9. Package outline SOT502F

9. Handling information

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

10. Abbreviations

Table 10. Abbreviations

Acronym	Description
ESD	ElectroStatic Discharge
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
MTF	Median Time to Failure
SMD	Surface Mounted Device
VSWR	Voltage Standing-Wave Ratio

11. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLA8G1011L-300_LS-300_L-300G_LS-300G v.4	20160804	Product data sheet		BLA8G1011L-300_LS-300_L-300G_LS-300G v.3
Modifications:	<ul style="list-style-type: none"> Table 9 on page 5: row 4 to row 7, value units corrected from nF to pF 			
BLA8G1011L-300_LS-300_L-300G_LS-300G v.3	20150901	Product data sheet		BLA8G1011L-300_LS-300_L-300G_LS-300G v.2
BLA8G1011L-300_LS-300_L-300G_LS-300G v.2	20150126	Product data sheet		BLA8G1011L-300_LS-300_L-300G_LS-300G v.1
BLA8G1011L-300_LS-300_L-300G_LS-300G v.1	20140929	Objective data sheet		-

12. Legal information

12.1 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".

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14. 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** 3

5 **Thermal characteristics** 3

6 **Characteristics** 3

7 **Test information** 4

7.1 Ruggedness in class-AB operation 4

7.2 Impedance information 4

7.3 Test circuit 5

7.4 Graphical data 6

8 **Package outline** 7

9 **Handling information** 11

10 **Abbreviations** 11

11 **Revision history** 11

12 **Legal information** 12

12.1 Data sheet status 12

12.2 Definitions 12

12.3 Disclaimers 12

12.4 Trademarks 13

13 **Contact information** 13

14 **Contents** 14

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Date of release: 4 August 2016

Document identifier: BLA8G1011L-300_LS-300_L-300G_LS-300G