

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

Power LDMOS transistor

Rev. 2 — 26 January 2015

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)

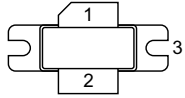
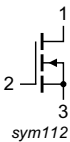
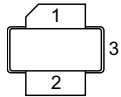
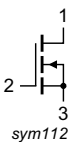
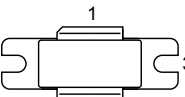
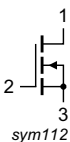
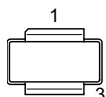
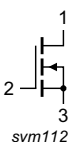
1.3 Applications

- 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		 sym112
2	gate		
3	source [1]		
BLA8G1011LS-300 (SOT502B)			
1	drain		 sym112
2	gate		
3	source [1]		
BLA8G1011L-300G (SOT502F)			
1	drain		 sym112
2	gate		
3	source [1]		
BLA8G1011LS-300G (SOT502E)			
1	drain		 sym112
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	$T_{case} = 25\text{ °C}$; $t_p = 10\text{ }\mu\text{s}$; $\delta = 10\%$	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; $t_p = 50\text{ }\mu\text{s}$; $\delta = 2\%$; $V_{DS} = 32\text{ V}$; $f = 1060\text{ MHz}$; $I_{Dq} = 150\text{ mA}$; $T_{case} = 25\text{ °C}$; 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

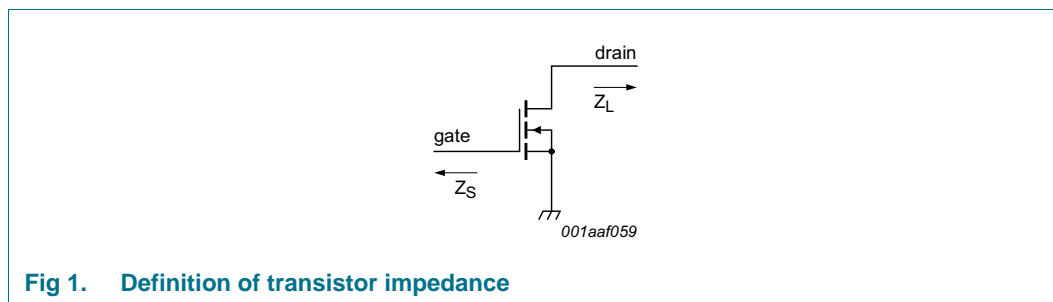


Fig 1. Definition of transistor impedance

7.3 Test circuit

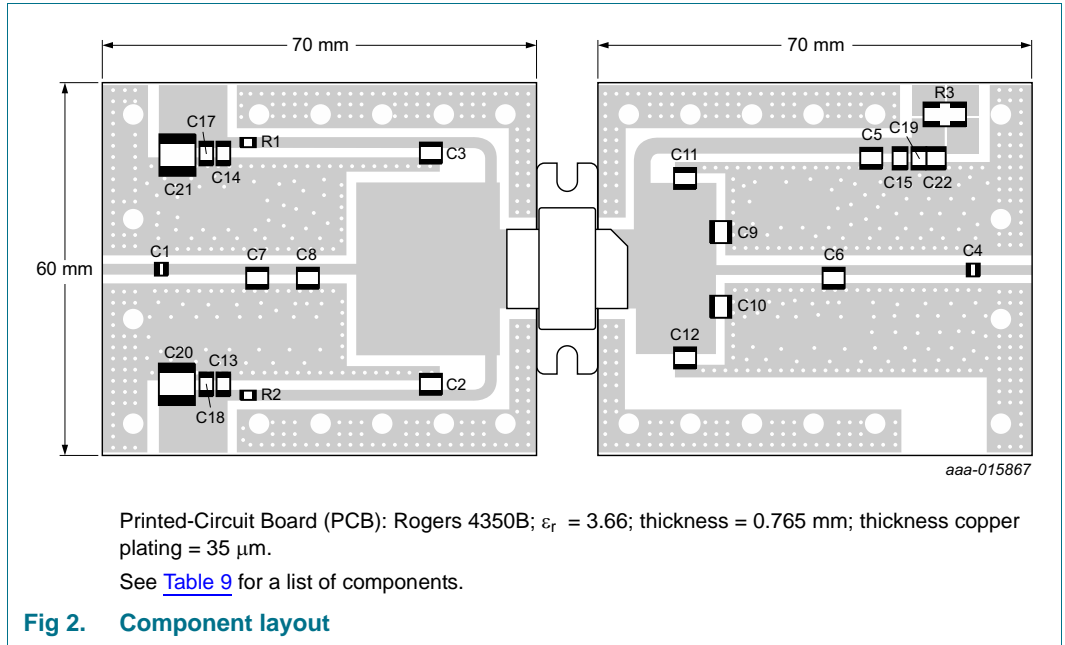
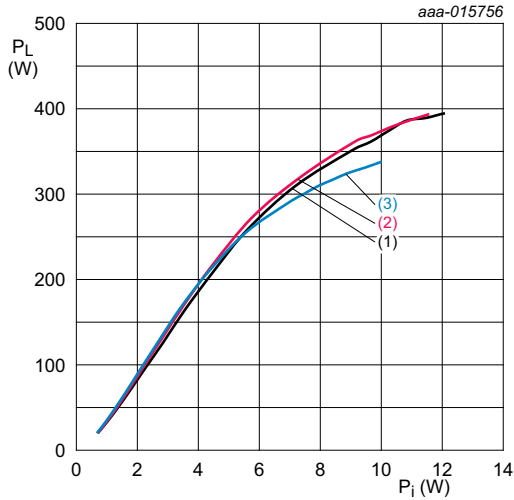


Table 9. List of components

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

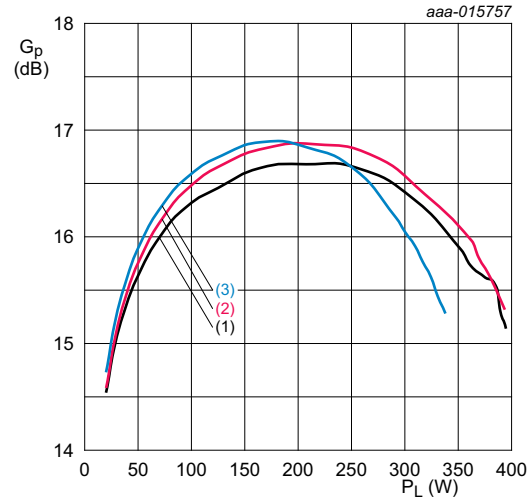
Component	Description	Value	Remarks
C1, C4	multilayer ceramic chip capacitor	91 pF	ATC: ATC100A910FT150XT
C2, C3, C5	multilayer ceramic chip capacitor	39 pF	ATC: ATC100B390FT500XTV
C6	multilayer ceramic chip capacitor	1.5 pF	ATC: ATC800B1R5BT500XTV
C7	multilayer ceramic chip capacitor	3.3 nF	ATC: ATC100B3R3BT500XTV
C8	multilayer ceramic chip capacitor	2.4 nF	ATC: ATC100B2R4BT500XTV
C9, C10	multilayer ceramic chip capacitor	0.6 nF	ATC: ATC100B0R6BT500XTV
C11, C12	multilayer ceramic chip capacitor	2.7 nF	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



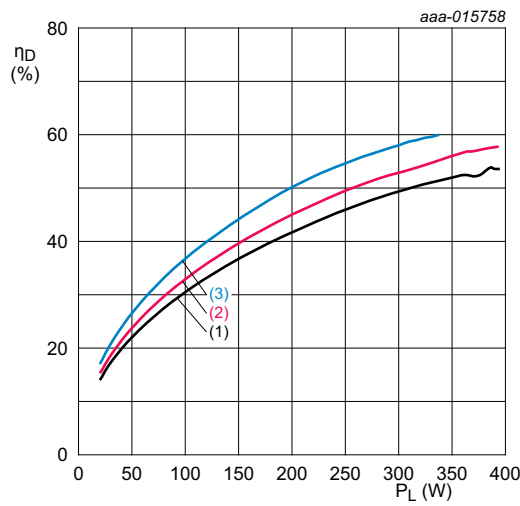
$V_{DS} = 32\text{ V}; I_{DQ} = 150\text{ mA}; t_p = 50\text{ }\mu\text{s}; \delta = 2\text{ }\%$.
 (1) $f = 1030\text{ MHz}$
 (2) $f = 1060\text{ MHz}$
 (3) $f = 1090\text{ MHz}$

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

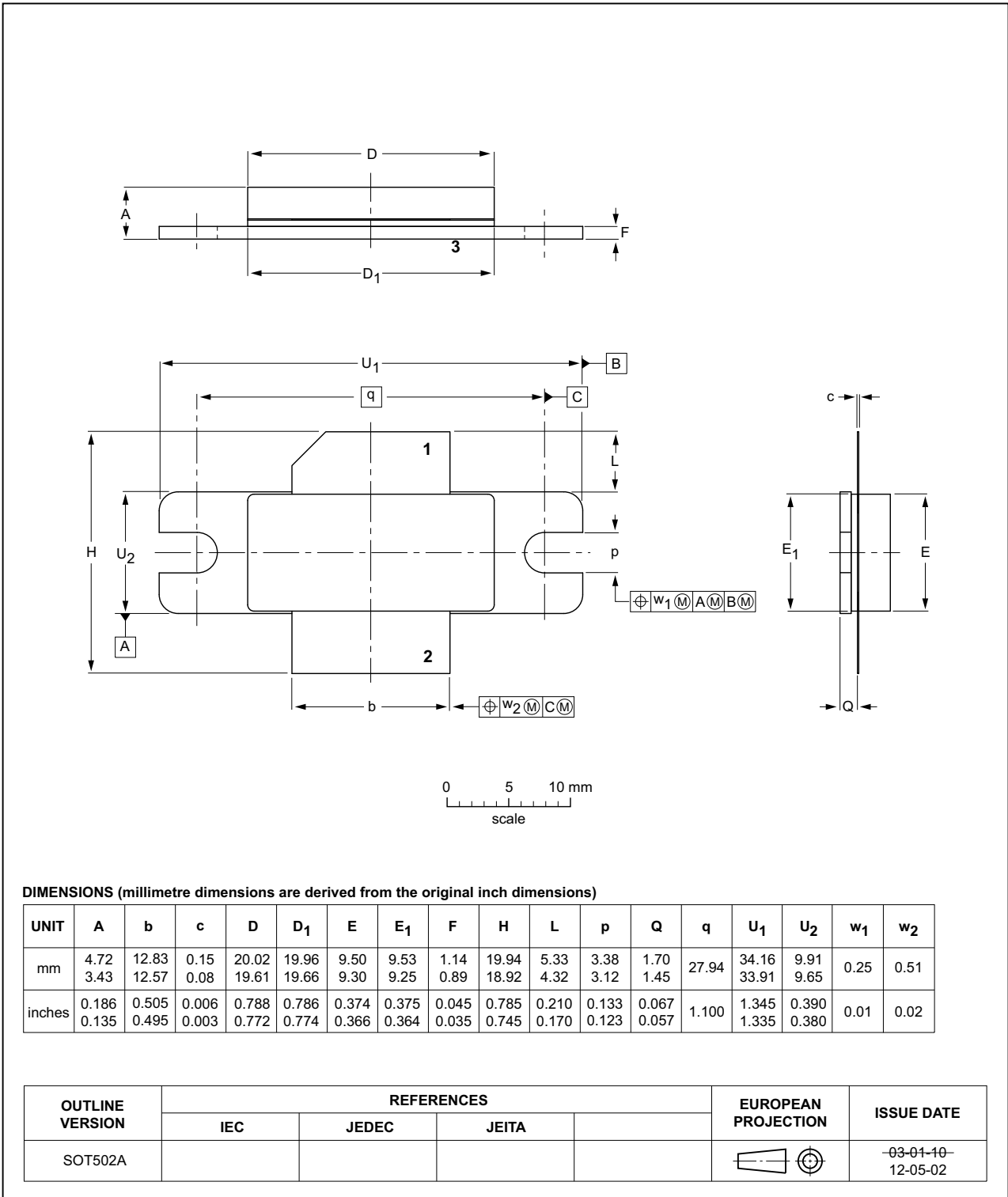


Fig 6. Package outline SOT502A

Earless flanged ceramic package; 2 leads

SOT502B

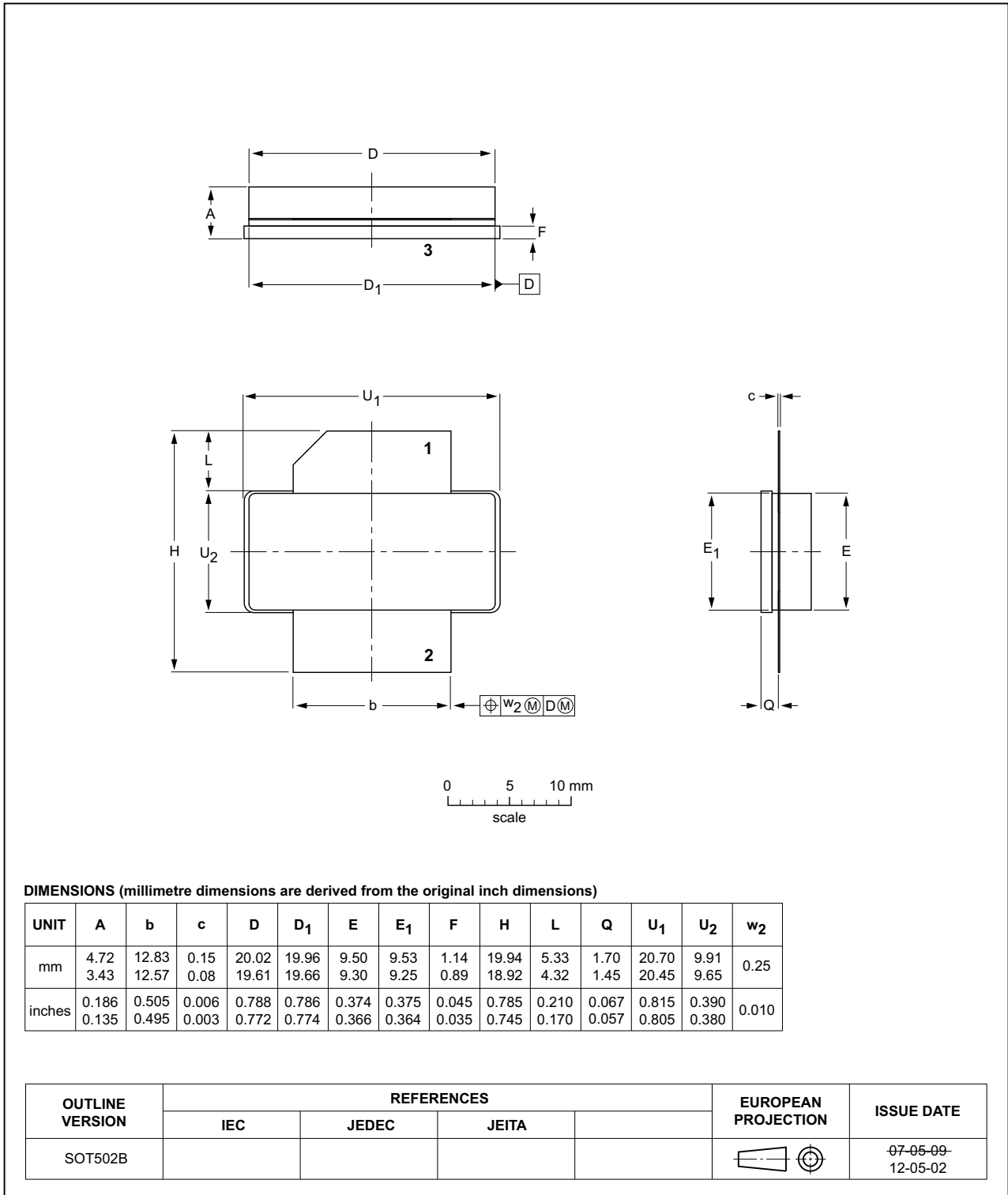


Fig 7. Package outline SOT502B

Earless flanged ceramic package; 2 leads

SOT502E

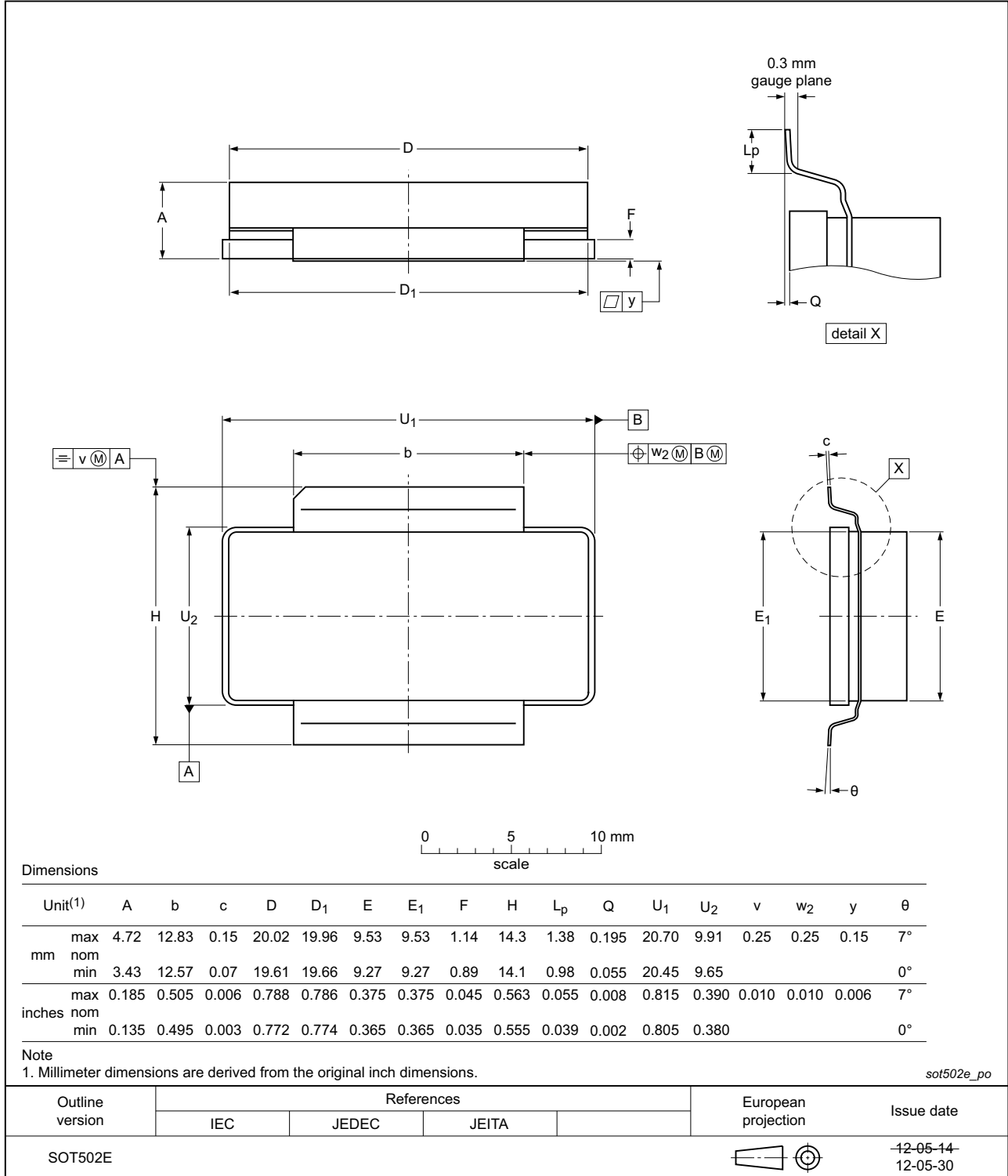


Fig 8. Package outline SOT502E

Eared flanged ceramic package; 2 leads; 2 mounting holes

SOT502F

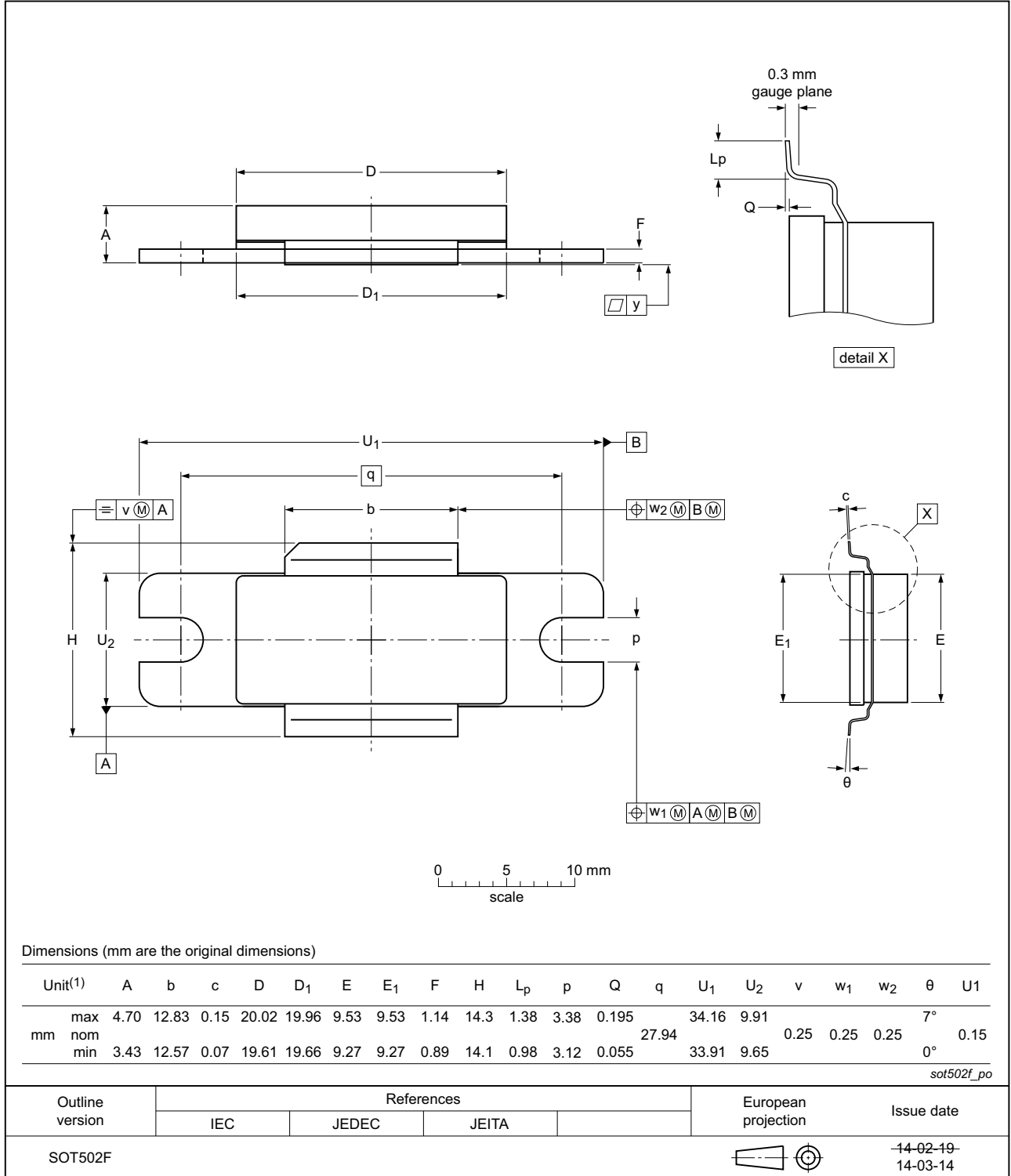


Fig 9. Package outline SOT502F

9. Handling information

CAUTION



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
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.2	20150126	Product data sheet		BLA8G1011L-300_LS-300_L-300G_LS-300G v.1
Modifications	<ul style="list-style-type: none"> • Table 1 on page 1: table updated • Table 5 on page 3: table updated • Table 6 on page 3: table updated • Table 7 on page 3: table updated • Section 7.1 on page 4: added value of VSWR • Section 7.2 on page 4: section added • Section 7.3 on page 5: section added • Section 7.4 on page 6: section added 			
BLA8G1011L-300_LS-300_L-300G_LS-300G v.1	20140929	Objective data sheet		-

12. Legal information

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Document status ^{[1][2]}	Product status ^[3]	Definition
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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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