BLA6H0912-500

LDMOS avionics radar power transistor

Rev. 01 — 5 March 2009 Objective data sheet

1. Product profile

1.1 General description

500 W LDMOS power transistor intended for avionics transmitter applications in the 960 MHz to 1215 MHz range such as Mode-S, TCAS, JTIDS, DME and TACAN.

Table 1. Test information

Typical RF performance at T_{case} = 25 °C; t_p = 128 µs; δ = 10 %; I_{Dq} = 100 mA; in a class-AB production test circuit.

Mode of operation	f (MHz)	V_{DS} (V)	P_L (W)	G_p (dB)	η_D (%)	t_r (ns)	t_f (ns)
pulsed RF	960 to 1200	50	500	17	50	20	6

CAUTION

This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

1.2 Features

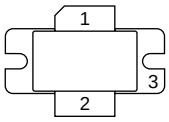
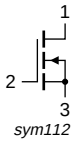
- Typical pulsed RF performance at a frequency of 960 MHz to 1215 MHz, a supply voltage of 50 V, an I_{Dq} of 100 mA, a t_p of 128 µs with δ of 10 %:
  - Output power = 500 W
  - Power gain = 17 dB
  - Efficiency = 50 %
- Easy power control
- Integrated ESD protection
- High flexibility with respect to pulse formats
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (960 MHz to 1215 MHz)
- Internally matched for ease of use
- Compliant to Directive 2002/95/EC, regarding restriction of hazardous substances (RoHS)

1.3 Applications

- L-band power amplifiers for radar applications in the 1.2 GHz to 1.4 GHz frequency range

2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	drain		
2	gate		
3	source [1]		

sym112

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLA6H0912-500	-	flanged ceramic package; 2 mounting holes; 2 leads	SOT634A

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		-	54	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
$Z_{th(j-c)}$	transient thermal impedance from junction to case	T_{case} = 85 °C; P_L = 500 W		
		t_p = 100 µs; δ = 10 %	<tbd>	K/W
		t_p = 200 µs; δ = 10 %	<tbd>	K/W
		t_p = 300 µs; δ = 10 %	<tbd>	K/W
		t_p = 100 µs; δ = 20 %	<tbd>	K/W

6. Characteristics

Table 6. DC characteristics

T_j = 25 °C; per section unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	V_{GS} = 0 V; I_D = 2.7 mA	100	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	V_{DS} = 10 V; I_D = 270 mA	1.3	1.8	2.2	V
I_{DSS}	drain leakage current	V_{GS} = 0 V; V_{DS} = 50 V	-	-	1.1	µA
I_{DSX}	drain cut-off current	V_{GS} = $V_{GS(th)}$ + 3.75 V; V_{DS} = 10 V	48	54	-	A
I_{GSS}	gate leakage current	V_{GS} = 11 V; V_{DS} = 0 V	-	-	110	nA
g_{fs}	forward transconductance	V_{DS} = 10 V; I_D = 270 mA	<tbd>	<tbd>	-	S
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = $V_{GS(th)}$ + 3.75 V; I_D = 9.5 A	-	67	120	mΩ

Table 7. RF characteristics

Mode of operation: pulsed RF; t_p = 128 µs; δ = 10 %; RF performance at V_{DS} = 50 V; I_{Dq} = 100 mA; T_{case} = 25 °C; unless otherwise specified, in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
P_L	output power		500	-	-	W
V_{CC}	supply voltage	P_L = 500 W	-	-	50	V
G_p	power gain	P_L = 500 W	15	17	-	dB
RL_{in}	input return loss	P_L = 500 W	-	10	-	dB
η_D	drain efficiency	P_L = 500 W	45	50	-	%
$P_{droop(pulse)}$	pulse droop power	P_L = 500 W	-	0	0.3	dB
t_r	rise time	P_L = 500 W	-	20	50	ns
t_f	fall time	P_L = 500 W	-	6	50	ns

6.1 Ruggedness in class-AB operation

The BLA6H0912-500 is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: V_{DS} = 50 V; I_{Dq} = 100 mA; P_L = 500 W; t_p = 128 µs; δ = 10 %.

7. Application information

7.1 Impedance information

Table 8. Typical impedance

Typical values per section unless otherwise specified.

f	Z_S	Z_L
GHz	**Ω**	**Ω**
960	0.75 – j0.94	1.43 – j0.95
1030	0.91 – j1.08	1.29 – j0.95
1060	1.00 – j1.13	1.23 – j0.96
1090	1.10 – j1.18	1.17 – j0.99
1215	1.71 – j1.20	0.96 – j1.16

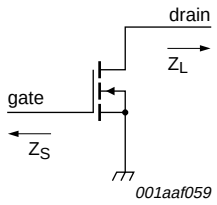
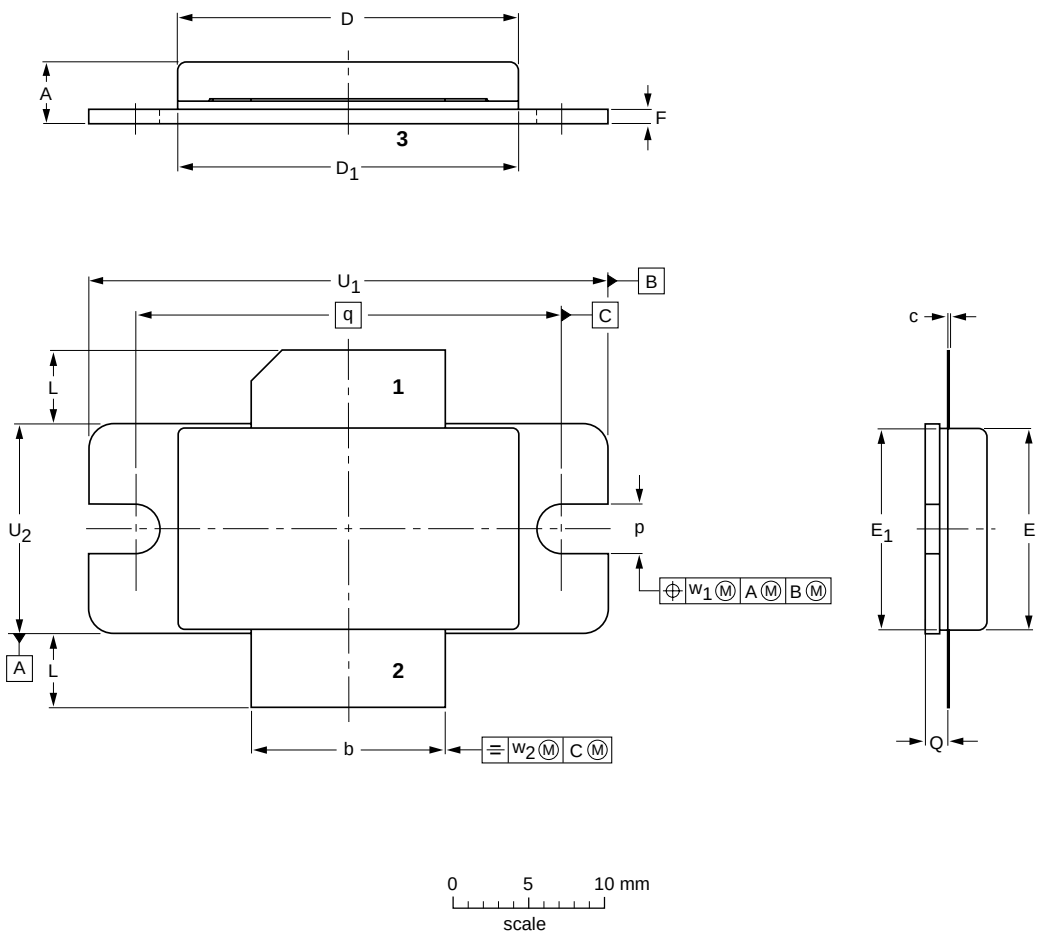


Fig 1. Definition of transistor impedance

8. Package outline

Flanged ceramic package; 2 mounting holes; 2 leads **SOT634A**



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

UNIT	A	b	c	D	D_1	E	E_1	F	L	p	Q	q	U_1	U_2	w_1	w_2
mm	4.83 3.68	12.82 12.57	0.15 0.08	22.58 22.12	22.56 22.15	13.34 13.08	13.34 13.08	1.14 0.89	5.33 4.32	3.38 3.12	1.70 1.45	27.94	34.16 33.91	13.84 13.59	0.25	0.51
inches	0.190 0.145	0.505 0.495	0.006 0.003	0.889 0.871	0.888 0.872	0.525 0.515	0.525 0.515	0.045 0.035	0.210 0.170	0.133 0.123	0.067 0.057	1.100	1.345 1.335	0.545 0.535	0.010	0.020

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT634A						~~01-11-27~~ 03-05-01

Fig 2. Package outline SOT634A

9. Abbreviations

Table 9. Abbreviations

Acronym	Description
DME	Distance Measuring Equipment
JTIDS	Joint Tactical Information Distribution System
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
Mode-S	Mode Select
RF	Radio Frequency
TACAN	TACtical Air Navigation
TCAS	Traffic Collision Avoidance System
VSWR	Voltage Standing-Wave Ratio

10. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLA6H0912-500_1	20090305	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".

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