

# BLS6G2731S-130

## LDMOS S-band radar power transistor

Rev. 01 — 26 July 2010

Objective data sheet

## 1. Product profile

### 1.1 General description

130 W LDMOS power transistor intended for radar applications in the 2.7 GHz to 3.1 GHz range.

**Table 1. Typical performance**

Typical RF performance at  $T_{case} = 25\text{ °C}$ ;  $t_p = 300\text{ }\mu\text{s}$ ;  $\delta = 10\%$ ;  $I_{DQ} = 100\text{ mA}$ ; in a class-AB production test circuit.

Mode of operation	f (GHz)	V <sub>DS</sub> (V)	P <sub>L</sub> (W)	G <sub>p</sub> (dB)	$\eta_D$ (%)	t <sub>r</sub> (ns)	t <sub>f</sub> (ns)
pulsed RF	2.7 to 3.1	32	130	12.5	47	20	6

### CAUTION



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

### 1.2 Features and benefits

- Typical pulsed RF performance at a frequency of 2.7 GHz to 3.1 GHz, a supply voltage of 32 V, an  $I_{DQ}$  of 100 mA, a  $t_p$  of 300  $\mu\text{s}$  with  $\delta$  of 10 %:
  - ◆ Output power = 130 W
  - ◆ Power gain = 12.5 dB
  - ◆ Efficiency = 47 %
- Easy power control
- Integrated ESD protection
- High flexibility with respect to pulse formats
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (2.7 GHz to 3.1 GHz)
- Internally matched for ease of use
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

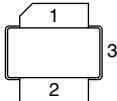
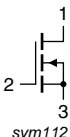
### 1.3 Applications

- S-band power amplifiers for radar applications in the 2.7 GHz to 3.1 GHz frequency range



## 2. Pinning information

**Table 2. Pinning**

Pin	Description	Simplified outline	Graphic symbol
1	drain		 sym112
2	gate		
3	source		

[1] Connected to flange.

## 3. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
BLS6G2731S-130	-	ceramic earless flanged cavity package; 2 leads	SOT922-1

## 4. Limiting values

**Table 4. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Min	Max	Unit
$V_{DS}$	drain-source voltage	-	60	V
$V_{GS}$	gate-source voltage	-0.5	+13	V
$I_D$	drain current	-	33	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
$Z_{th(j-mb)}$	transient thermal impedance from junction to mounting base	$T_{case} = 85\text{ °C}; P_L = 130\text{ W}$		
		$t_p = 100\text{ }\mu\text{s}; \delta = 10\text{ }\%$	0.23	K/W
		$t_p = 200\text{ }\mu\text{s}; \delta = 10\text{ }\%$	0.28	K/W
		$t_p = 300\text{ }\mu\text{s}; \delta = 10\text{ }\%$	0.32	K/W
		$t_p = 100\text{ }\mu\text{s}; \delta = 20\text{ }\%$	0.33	K/W

## 6. Characteristics

**Table 6. Characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 0.6\text{ mA}$	60	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 180\text{ mA}$	1.4	1.8	2.4	V
$I_{DSS}$	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$	-	-	4.2	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $V_{DS} = 10\text{ V}$	27	33	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	450	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 9\text{ A}$	8.1	13	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $I_D = 6.3\text{ A}$	-	0.085	0.135	$\Omega$

## 7. Application information

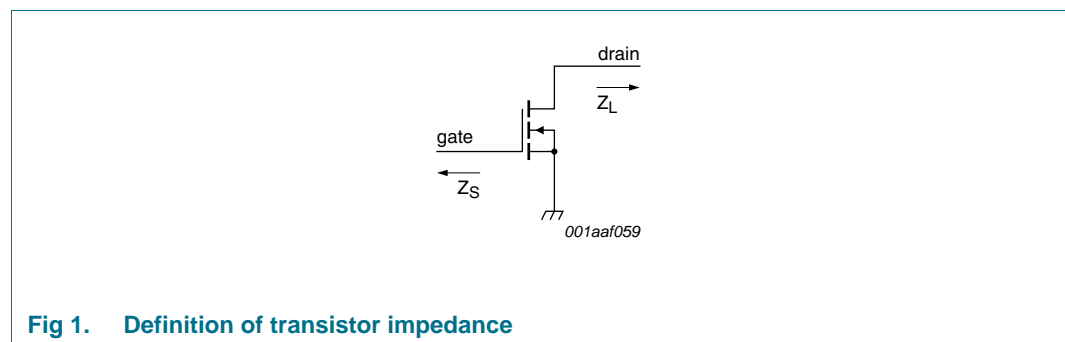
**Table 7. Application information**

Mode of operation: pulsed RF;  $t_p = 300\text{ }\mu\text{s}$ ;  $\delta = 10\%$ ; RF performance at  $V_{DS} = 32\text{ V}$ ;  $I_{Dq} = 100\text{ mA}$ ;  $T_{case} = 25\text{ °C}$ ; unless otherwise specified, in a class-AB production circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_L$	output power		-	130	-	W
$V_{CC}$	supply voltage	$P_L = 130\text{ W}$	-	-	32	V
$G_p$	power gain	$P_L = 130\text{ W}$	10	12.5	-	dB
$RL_{in}$	input return loss	$P_L = 130\text{ W}$	-	10	-	dB
$P_{L(1dB)}$	output power at 1 dB gain compression		-	140	-	W
$\eta_D$	drain efficiency	$P_L = 130\text{ W}$	40	47	-	%
$P_{droop(pulse)}$	pulse droop power	$P_L = 130\text{ W}$	-	0	0.5	dB
$t_r$	rise time	$P_L = 130\text{ W}$	-	20	50	ns
$t_f$	fall time	$P_L = 130\text{ W}$	-	6	50	ns

**Table 8. Typical impedance**

<b>f</b> <b>GHz</b>	<b>Z<sub>S</sub></b> <b>Ω</b>	<b>Z<sub>L</sub></b> <b>Ω</b>
2.7	<td>	<td>
2.8	<td>	<td>
2.9	<td>	<td>
3.0	<td>	<td>
3.1	<td>	<td>

**Fig 1. Definition of transistor impedance**

### 7.1 Ruggedness in class-AB operation

The BLS6G2731S-130 is capable of withstanding a load mismatch corresponding to  $V_{SWR} = 5 : 1$  through all phases under the following conditions:  $V_{DS} = 32 \text{ V}$ ;  $I_{DQ} = 100 \text{ mA}$ ;  $P_L = 130 \text{ W}$ ;  $t_p = 300 \text{ } \mu\text{s}$ ;  $\delta = 10 \%$ .

**8. Package outline**

Ceramic earless flanged cavity package; 2 leads

SOT922-1

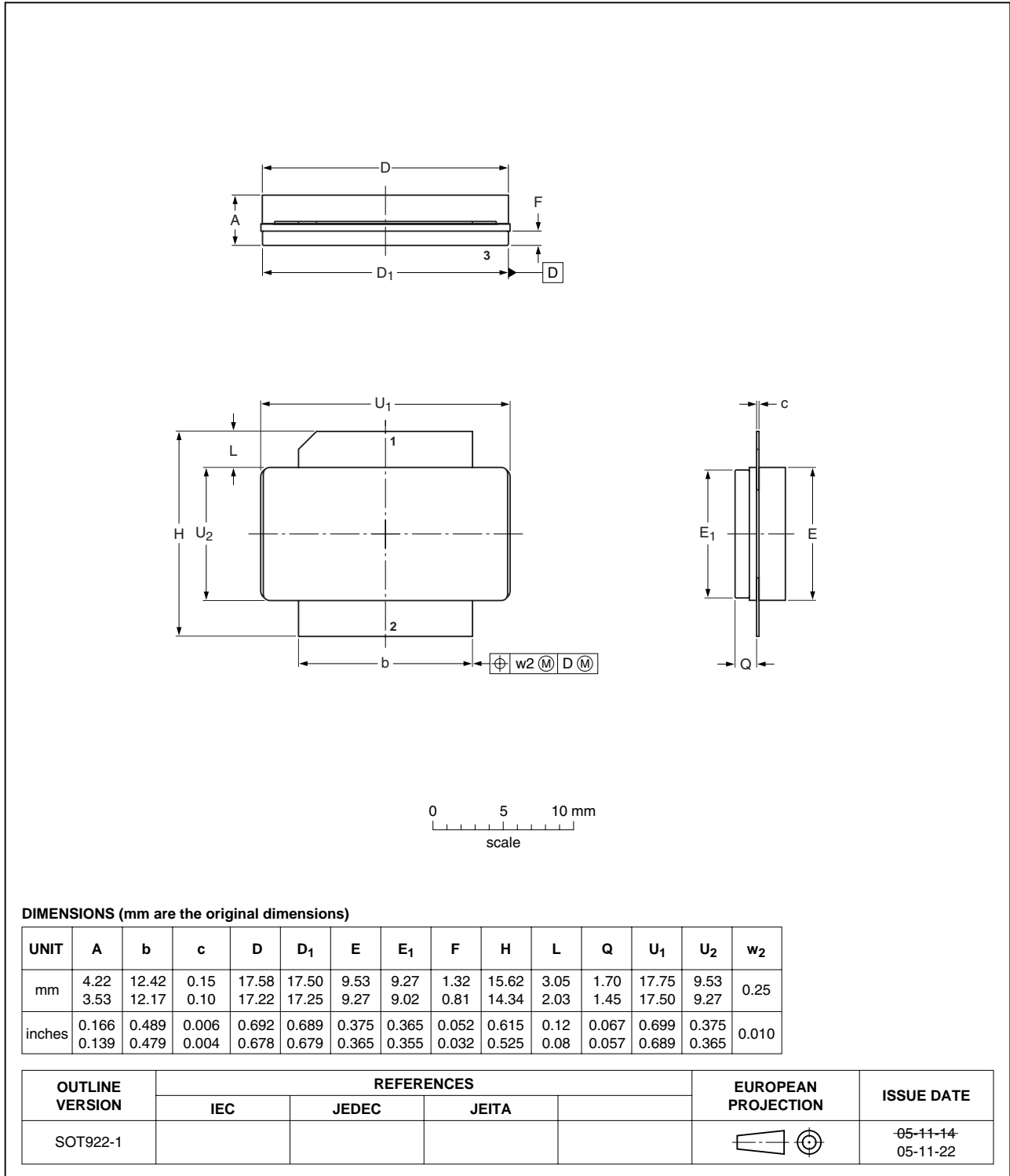


Fig 2. Package outline SOT922-1

## 9. Abbreviations

**Table 9. Abbreviations**

Acronym	Description
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
RF	Radio Frequency
VSWR	Voltage Standing-Wave Ratio

## 10. Revision history

**Table 10. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLS6G2731S-130 v.1	20100726	Objective data sheet	-	-

## 11. Legal information

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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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