

# BLF7G10L-250; BLF7G10LS-250

Power LDMOS transistor

Rev. 1 — 25 February 2011

Objective data sheet

## 1. Product profile

### 1.1 General description

250 W LDMOS power transistor for base station applications at frequencies from 920 MHz to 960 MHz.

**Table 1. Typical performance**

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

Mode of operation	f (MHz)	$I_{Dq}$ (mA)	$V_{DS}$ (V)	$P_{L(AV)}$ (W)	$G_p$ (dB)	$\eta_D$ (%)	ACPR (dBc)
2-carrier W-CDMA	920 to 960	2000	30	60	19	30	-32 <sup>[1]</sup>

[1] Test signal: 3GPP; test model 1; 64 DPCH; PAR = 7.5 dB at 0.01 % probability on CCDF per carrier. Carrier spacing 5 MHz.

### 1.2 Features and benefits

- Excellent ruggedness
- High efficiency
- Low  $R_{th}$  providing excellent thermal stability
- Designed for broadband operation (920 MHz to 960 MHz)
- Lower output capacitance for improved performance in Doherty applications
- Designed for low memory effects providing excellent pre-distortability
- Internally matched for ease of use
- Integrated ESD protection
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

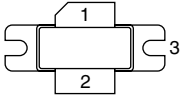
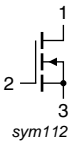
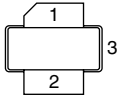
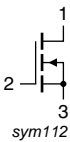
### 1.3 Applications

- RF power amplifiers for W-CDMA base stations and multi carrier applications in the 920 MHz to 960 MHz frequency range



## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
<b>BLF7G10L-250 (SOT502A)</b>			
1	drain		 sym112
2	gate		
3	source		
<b>BLF7G10LS-250 (SOT502B)</b>			
1	drain		 sym112
2	gate		
3	source		

[1] Connected to flange

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF7G10L-250	-	flanged LDMOST ceramic package; 2 mounting holes; 2 leads	SOT502A
BLF7G10LS-250	-	earless flanged LDMOST ceramic package; 2 leads	SOT502B

## 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
$I_D$	drain current		-	56	A
$T_{stg}$	storage temperature		-65	+150	°C
$T_j$	junction temperature		-	225	°C

## 5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-c)}$	thermal resistance from junction to case	$T_{case} = 80\text{ °C}$ ; $P_L = 60\text{ W}$ ; $V_{DS} = 30\text{ V}$ ; $I_{Dq} = 2000\text{ mA}$	0.30	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	$V_{GS} = 0\text{ V}; I_D = 2.7\text{ mA}$	-	67	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 270\text{ mA}$	-	1.9	-	V
$I_{DSS}$	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$	-	-	-	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	-	49	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	-	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 13.5\text{ A}$	-	19.3	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 9.45\text{ A}$	-	0.048	-	$\Omega$

**7. Test information**

**Table 7. Functional test information**

Mode of operation: 2-carrier W-CDMA; PAR = 7.5 dB at 0.01 % probability on the CCDF; 3GPP test model 1; 64 DPCH;  $f_1 = 920\text{ MHz}; f_2 = 925\text{ MHz}; f_3 = 955\text{ MHz}; f_4 = 960\text{ MHz}$ ; RF performance at  $V_{DS} = 30\text{ V}; I_{Dq} = 2000\text{ mA}; T_{case} = 25\text{ °C}$ ; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_{L(AV)}$	average output power		-	60	-	W
$G_p$	power gain	$P_{L(AV)} = 60\text{ W}$	-	19	-	dB
$RL_{in}$	input return loss	$P_{L(AV)} = 60\text{ W}$	-	-10	-	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 60\text{ W}$	-	30	-	%
ACPR	adjacent channel power ratio	$P_{L(AV)} = 60\text{ W}$	-	-32	-	dBc

**Table 8. PAR performance**

Mode of operation: 1-carrier W-CDMA; PAR = 7.5 dB at 0.01 % probability on the CCDF; 3GPP test model 1; 64 DPCH;  $f_1 = 960\text{ MHz}$ ; RF performance at  $V_{DS} = 30\text{ V}; I_{Dq} = 2000\text{ mA}; T_{case} = 25\text{ °C}$ ; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$PAR_O$	output peak-to-average ratio	$P_{L(AV)} = 100\text{ W}$ at 0.01 % probability on CCDF	-	4.6	-	dB

**7.1 Ruggedness in class-AB operation**

The BLF7G10L-250 and BLF7G10LS-250 are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions:  $V_{DS} = 30\text{ V}; I_{Dq} = 2000\text{ mA}; P_L = 200\text{ W (CW)}; f = 920\text{ MHz to }960\text{ MHz}$ .

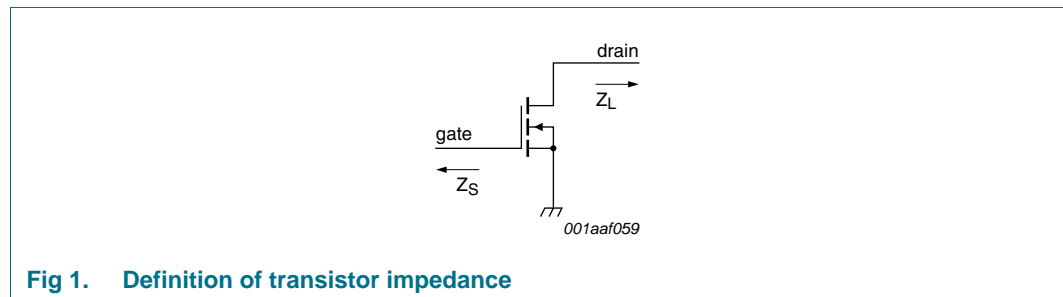
## 7.2 Impedance information

**Table 9. Typical impedance information**

$I_{Dq} = 2000\text{ mA}$ ; main transistor  $V_{DS} = 30\text{ V}$ .

$Z_S$  and  $Z_L$  defined in [Figure 1](#).

f (MHz)	$Z_S$ ( $\Omega$ )	$Z_L$ ( $\Omega$ )
925	$3.46 - j3.57$	$1.10 - j1.20$
942	$3.55 - j3.64$	$0.98 - j1.00$
960	$3.77 - j4.88$	$0.92 - j0.96$



**Fig 1. Definition of transistor impedance**

8. Package outline

Flanged LDMOST ceramic package; 2 mounting holes; 2 leads

SOT502A

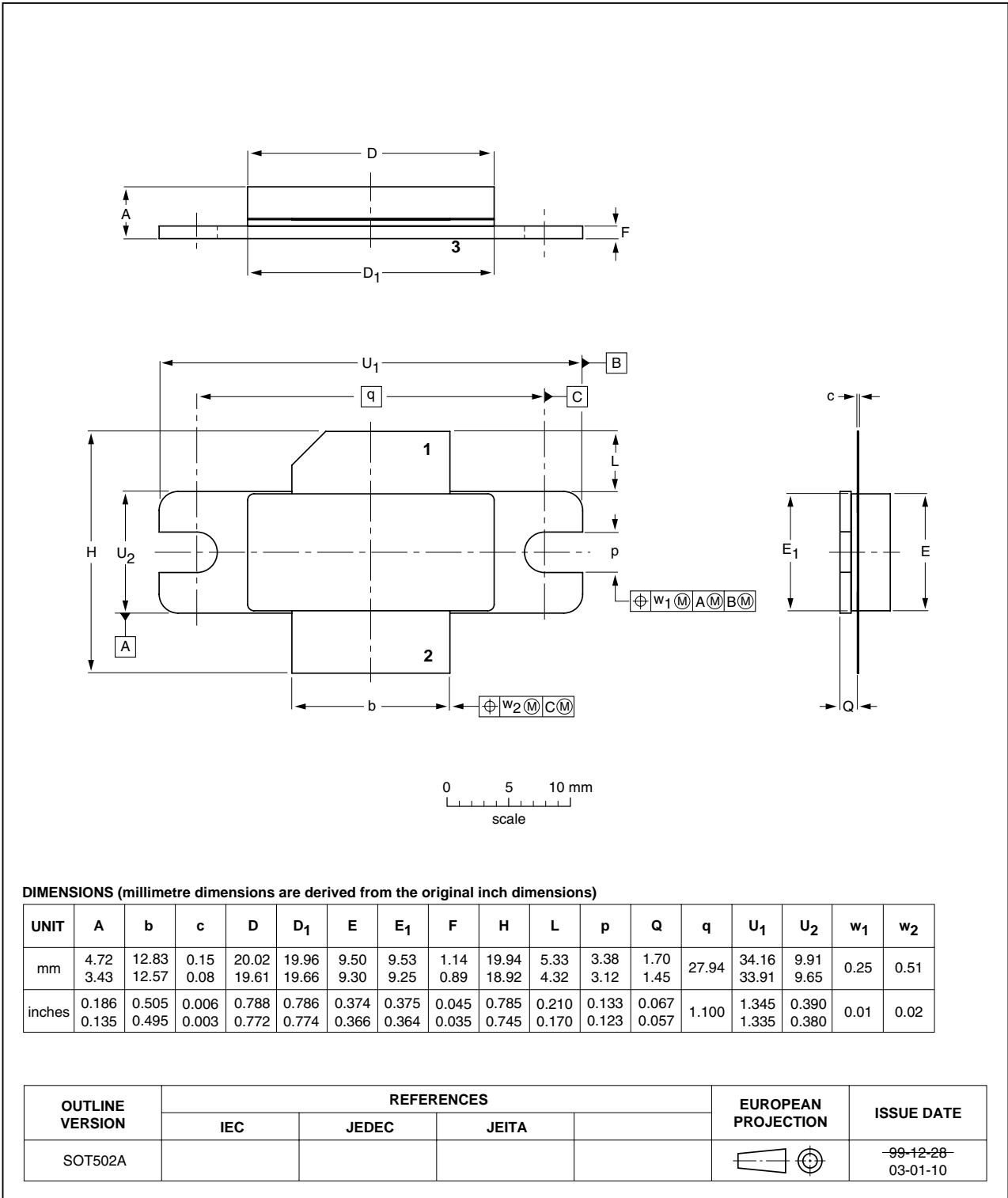


Fig 2. Package outline SOT502A

Earless flanged LDMOST ceramic package; 2 leads

SOT502B

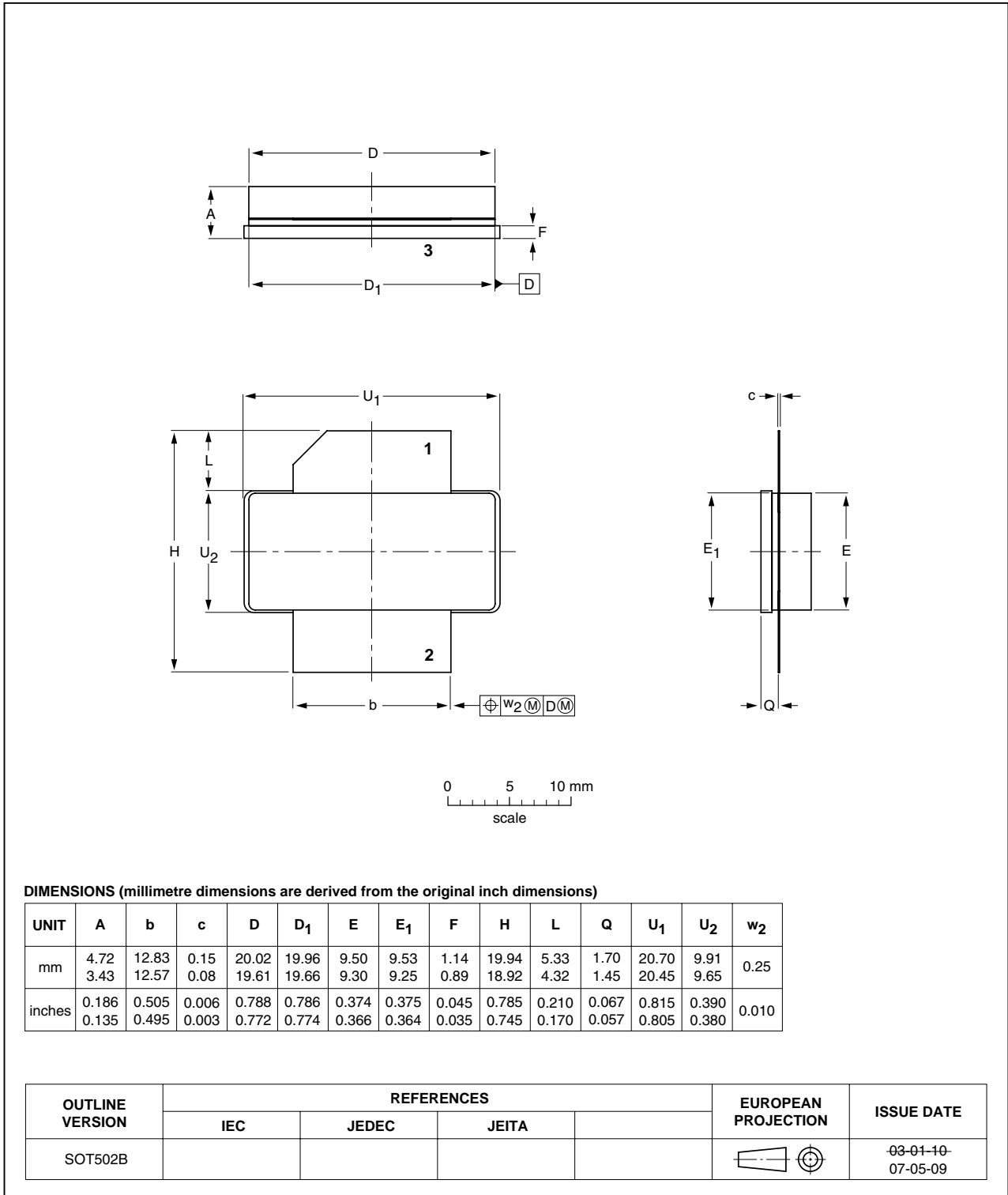


Fig 3. Package outline SOT502B

## 9. Abbreviations

**Table 10. Abbreviations**

Acronym	Description
3GPP	Third Generation Partnership Project
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Wave
DPCH	Dedicated Physical CHannel
ESD	ElectroStatic Discharge
LDMOS	Laterally Diffused Metal Oxide Semiconductor
LDMOST	Laterally Diffused Metal Oxide Semiconductor Transistor
PAR	Peak-to-Average power Ratio
RF	Radio Frequency
VSWR	Voltage Standing Wave Ratio
W-CDMA	Wideband Code Division Multiple Access

## 10. Revision history

**Table 11. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF7G10L-250_7G10LS-250 v.1	20110225	Objective data sheet	-	-

## 11. Legal information

### 11.1 Data sheet status

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.
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Product [short] data sheet	Production	This document contains the product specification.

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