

# BLF6G22LS-75

Power LDMOS transistor

Rev. 01 — 8 February 2008

Preliminary data sheet

## 1. Product profile

### 1.1 General description

75 W LDMOS power transistor for base station applications at frequencies from 2000 MHz to 2200 MHz.

**Table 1. Typical performance**

*RF performance at  $T_{case} = 25\text{ }^{\circ}\text{C}$  in a common source class-AB production test circuit.*

Mode of operation	f (MHz)	$V_{DS}$ (V)	$P_{L(AV)}$ (W)	$G_p$ (dB)	$\eta_D$ (%)	IMD3 (dBc)	ACPR (dBc)
2-carrier W-CDMA	2110 to 2170	28	17	18.7	30.5	-37.5 <sup>[1]</sup>	-41.5 <sup>[1]</sup>

[1] Test signal: 3GPP; test model 1; 64 DPCH; PAR = 7 dB at 0.01 % probability on CCDF per carrier; carrier spacing 10 MHz.

#### CAUTION



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

### 1.2 Features

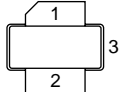
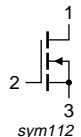
- Typical 2-carrier W-CDMA performance at frequencies of 2110 MHz and 2170 MHz, a supply voltage of 28 V and an  $I_{Dq}$  of 690 mA:
  - ◆ Average output power = 17 W
  - ◆ Gain = 18.7 dB
  - ◆ Efficiency = 30.5 %
  - ◆ IMD3 = -37.5 dBc
  - ◆ ACPR = -41.5 dBc
- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (2000 MHz to 2200 MHz)
- Internally matched for ease of use
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

**1.3 Applications**

- RF power amplifiers for W-CDMA base stations and multicarrier applications in the 2000 MHz to 2200 MHz frequency range

**2. Pinning information**

**Table 2. Pinning**

Pin	Description	Simplified outline	Symbol
1	drain		
2	gate		
3	source		

[1] Connected to flange.

**3. Ordering information**

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
BLF6G22LS-75	-	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		-	18	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
$R_{th(j-case)}$	thermal resistance from junction to case	$T_{case} = 80\text{ °C}; P_L = 17\text{ W}$	0.75	K/W

## 6. Characteristics

**Table 6. Characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 0.5\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 100\text{ mA}$	1.4	2	2.4	V
$V_{GSq}$	gate-source quiescent voltage	$V_{DS} = 28\text{ V}; I_D = 690\text{ mA}$	1.75	2.16	2.75	V
$I_{DSS}$	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$	-	-	3	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	14.9	18.7	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	300	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 5\text{ A}$	-	7.3	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 3.5\text{ A}$	-	0.14	0.24	$\Omega$
$C_{rs}$	feedback capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}; f = 1\text{ MHz}$	-	1.5	-	pF

## 7. Application information

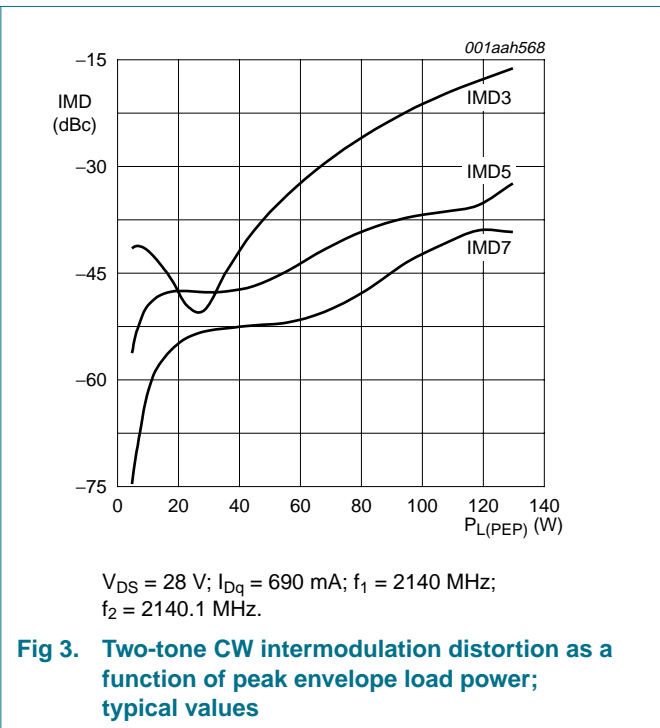
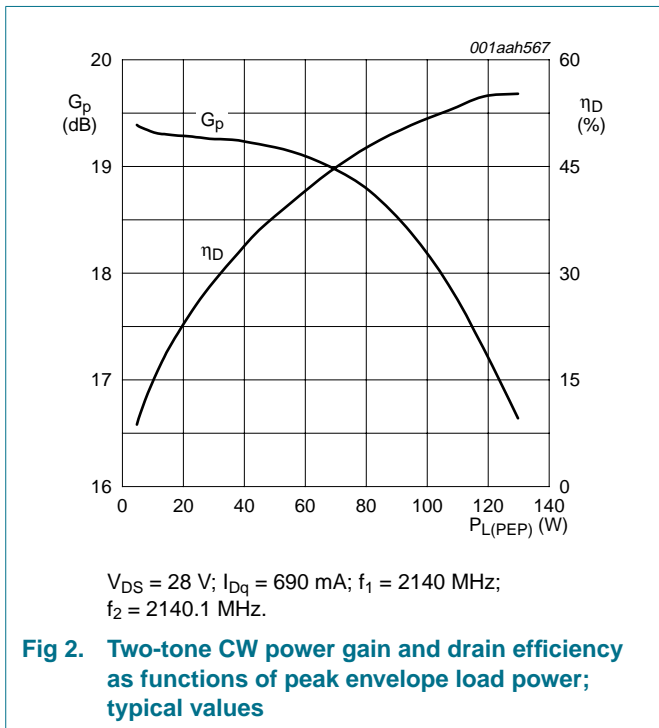
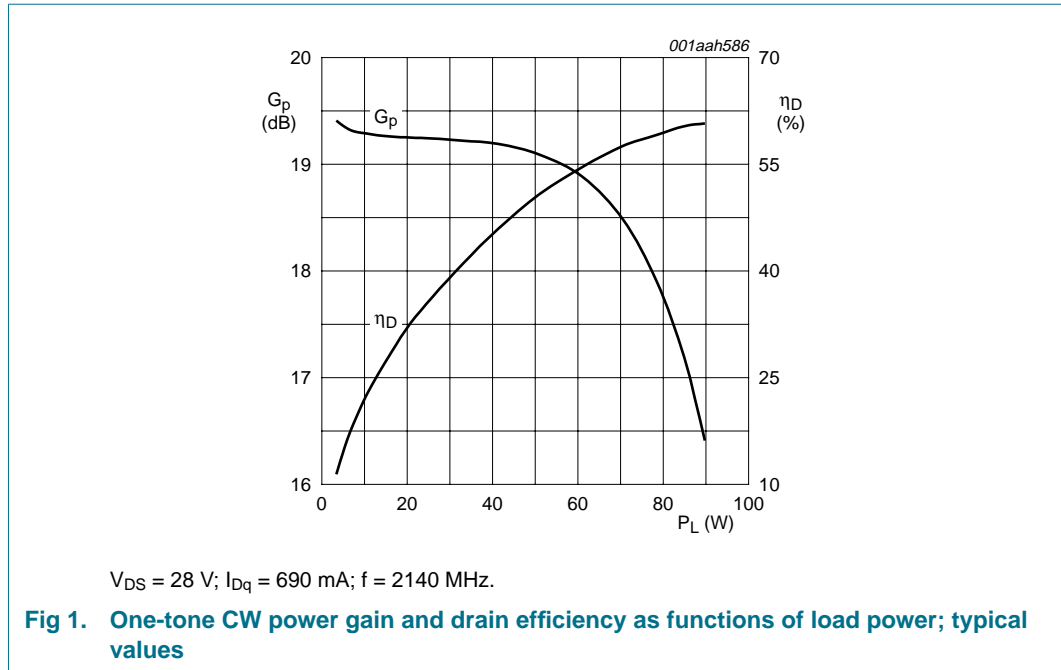
**Table 7. Application information**

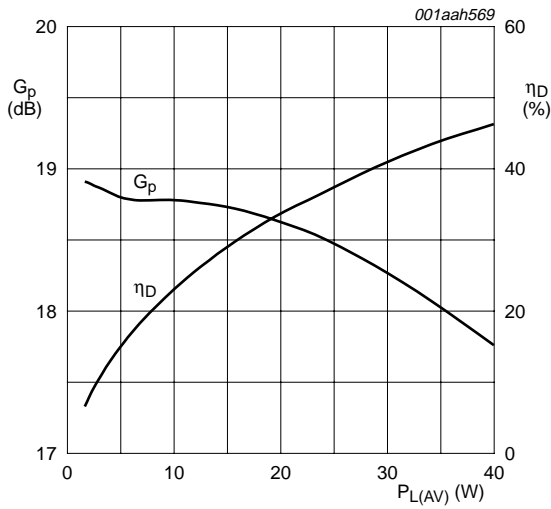
Mode of operation: 2-carrier W-CDMA; PAR 7 dB at 0.01 % probability on CCDF; 3GPP test model 1; 1-64 PDPCH;  $f_1 = 2112.5\text{ MHz}; f_2 = 2122.5\text{ MHz}; f_3 = 2157.5\text{ MHz}; f_4 = 2167.5\text{ MHz}$ ; RF performance at  $V_{DS} = 28\text{ V}; I_{Dq} = 690\text{ mA}; T_{case} = 25\text{ }^\circ\text{C}$ ; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$P_{L(AV)} = 17\text{ W}$	17.6	18.7	-	dB
IRL	input return loss	$P_{L(AV)} = 17\text{ W}$	-	-9.5	-6.5	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 17\text{ W}$	28	30.5	-	%
IMD3	third order intermodulation distortion	$P_{L(AV)} = 17\text{ W}$	-	-37.5	-34	dBc
ACPR	adjacent channel power ratio	$P_{L(AV)} = 17\text{ W}$	-	-41.5	-38.5	dBc

### 7.1 Ruggedness in class-AB operation

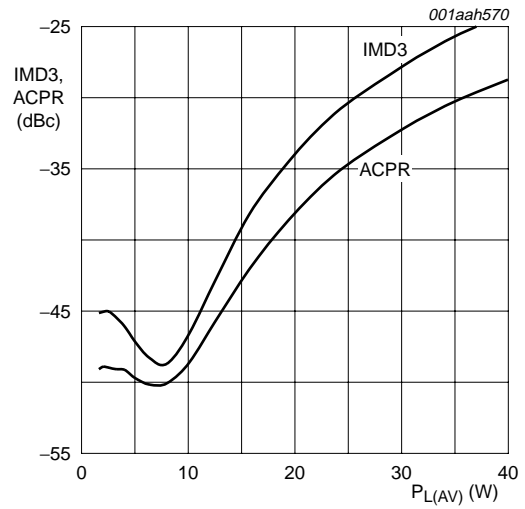
The BLF6G22LS-75 is capable of withstanding a load mismatch corresponding to  $V_{SWR} = 10 : 1$  through all phases under the following conditions:  $V_{DS} = 28\text{ V}; I_{Dq} = 690\text{ mA}; P_L = 75\text{ W (CW)}; f = 2170\text{ MHz}$ .





$V_{DS} = 28\text{ V}$ ;  $I_{Dq} = 690\text{ mA}$ ;  $f_1 = 2135\text{ MHz}$ ;  $f_2 = 2145\text{ MHz}$ ; carrier spacing 10 MHz.

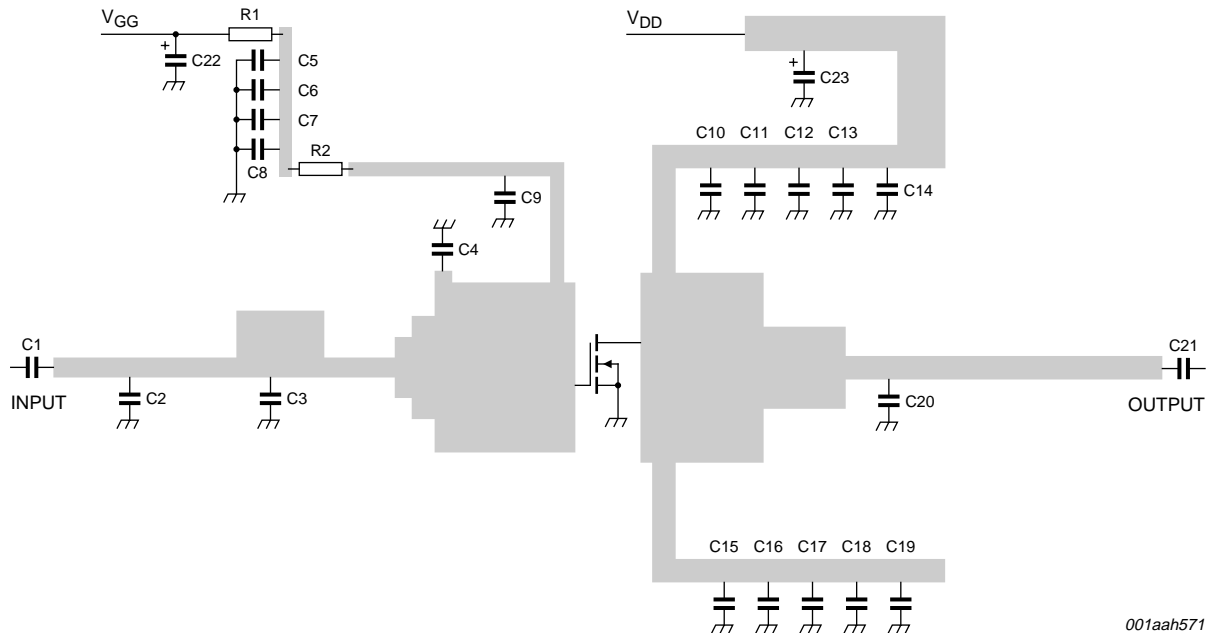
Fig 4. 2-carrier W-CDMA power gain and drain efficiency as functions of average load power; typical values



$V_{DS} = 28\text{ V}$ ;  $I_{Dq} = 690\text{ mA}$ ;  $f_1 = 2135\text{ MHz}$ ;  $f_2 = 2145\text{ MHz}$ ; carrier spacing 10 MHz.

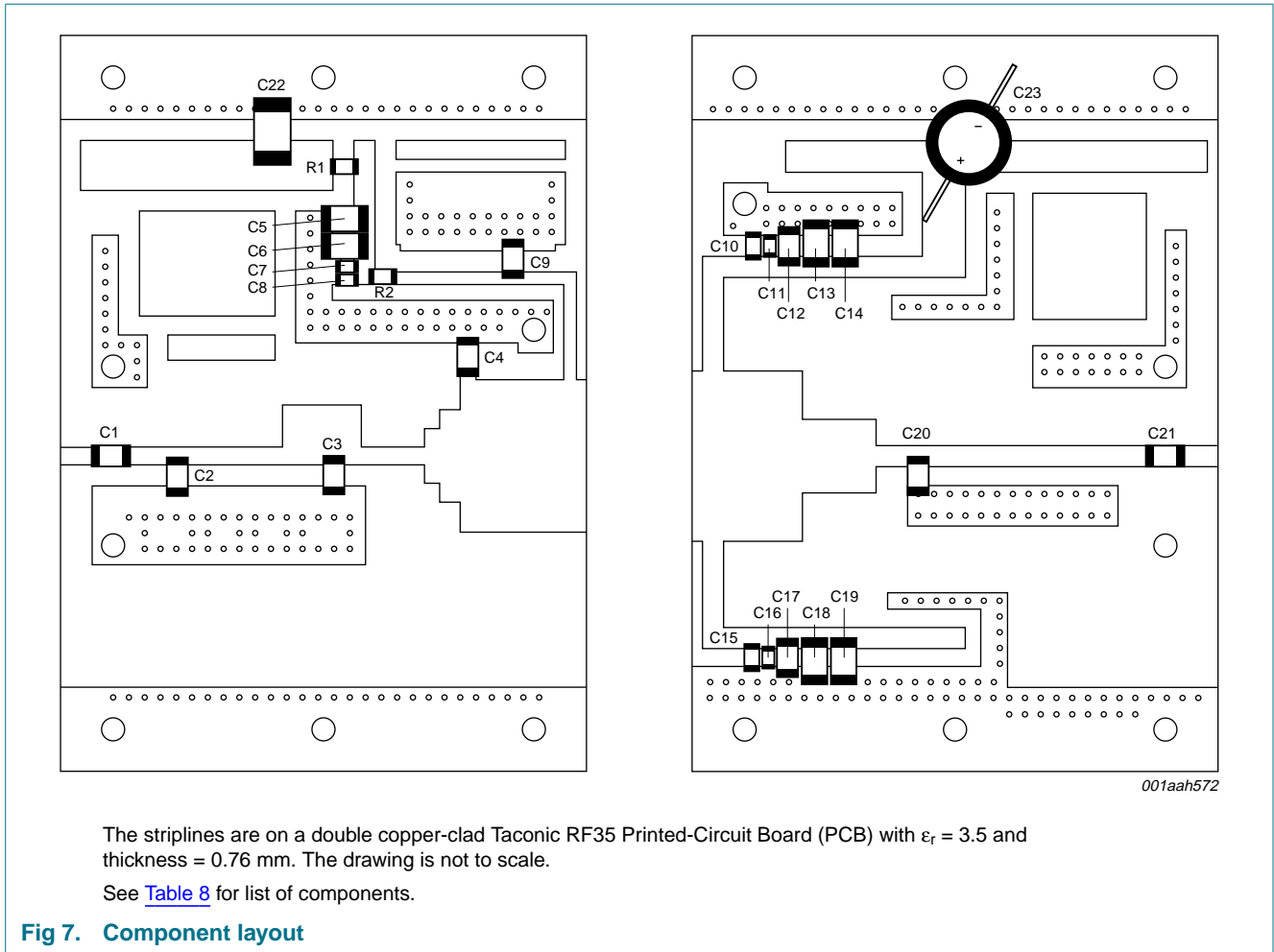
Fig 5. 2-carrier W-CDMA adjacent power channel ratio and third order intermodulation distortion as functions of average load power; typical values

## 8. Test information



The drawing is not to scale.

Fig 6. Test circuit for operation at 800 MHz



**Table 8. List of components (see [Figure 6](#) and [Figure 7](#))**

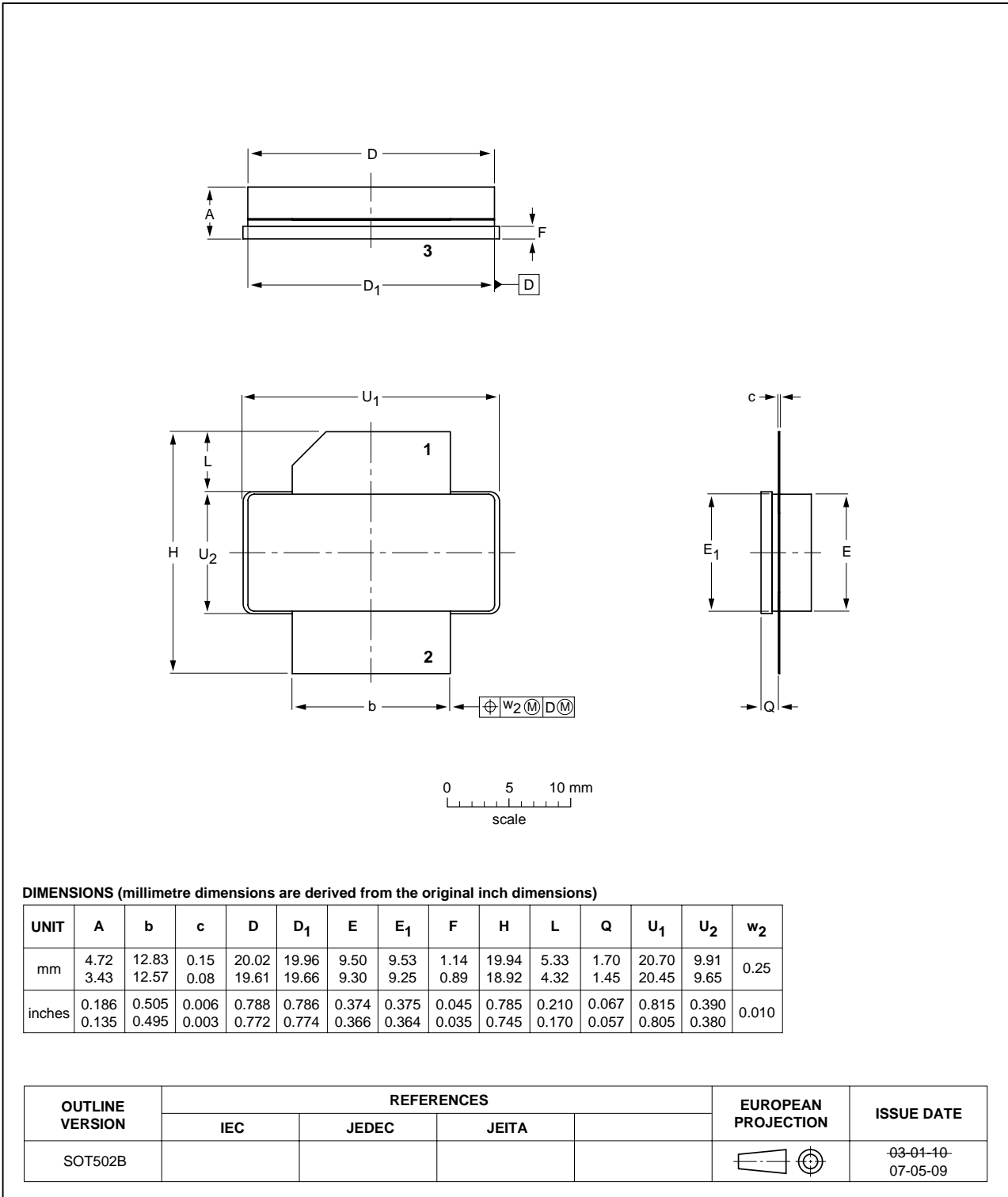
Component	Description	Value	Remarks
C1	multilayer ceramic chip capacitor	5.6 pF	[1]
C2, C3	multilayer ceramic chip capacitor	0.5 pF	[1]
C4	multilayer ceramic chip capacitor	0.6 pF	[1]
C5, C6, C13, C14, C18, C19	multilayer ceramic chip capacitor	1.5 $\mu$ F	TDK 1206 or capacitor of same quality
C7, C8, C11, C16	multilayer ceramic chip capacitor	100 nF	Murata 0603 or capacitor of same quality
C9	multilayer ceramic chip capacitor	15 pF	[1]
C10, C15	multilayer ceramic chip capacitor	220 nF	AVX 0805 or capacitor of same quality
C12, C17	multilayer ceramic chip capacitor	10 pF	[1]
C20	multilayer ceramic chip capacitor	0.7 pF	[1]
C21	multilayer ceramic chip capacitor	20 pF	[1]
C22	tantalum capacitor	10 $\mu$ F; 35 V	
C23	electrolytic capacitor	220 $\mu$ F; 35 V	
R1	SMD resistor	3.3 $\Omega$	
R2	SMD resistor	5.1 $\Omega$	

[1] American Technical Ceramics type 100B or capacitor of same quality.

**9. Package outline**

Earless flanged LDMOST ceramic package; 2 leads

SOT502B



**Fig 8. Package outline SOT502B**

## 10. Abbreviations

**Table 9. Abbreviations**

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

## 11. Revision history

**Table 10. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF6G22LS-75_1	20080208	Preliminary data sheet	-	-



## 12. Legal information

### 12.1 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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