

# BLF6G10LS-200R

Power LDMOS transistor

Rev. 01 — 21 January 2008

Preliminary data sheet

## 1. Product profile

### 1.1 General description

200 W LDMOS power transistor for base station applications at frequencies from 800 MHz to 1000 MHz.

**Table 1. Typical performance**

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

Mode of operation	f (MHz)	V <sub>DS</sub> (V)	P <sub>L(AV)</sub> (W)	G <sub>p</sub> (dB)	η <sub>D</sub> (%)	ACPR (dBc)
2-carrier W-CDMA	869 to 894	28	40	20	27.5	-40 <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.

#### CAUTION



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

### 1.2 Features

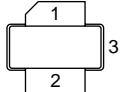
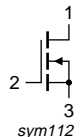
- Typical 2-carrier W-CDMA performance at frequencies of 869 MHz and 894 MHz, a supply voltage of 28 V and an I<sub>DQ</sub> of 1400 mA:
  - ◆ Average output power = 40 W
  - ◆ Power gain = 20 dB
  - ◆ Efficiency = 27.5 %
  - ◆ ACPR = -40 dBc
- Easy power control
- Integrated ESD protection
- Enhanced ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (800 MHz to 1000 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 GSM, GSM EDGE, W-CDMA and CDMA base stations and multi carrier applications in the 800 MHz to 1000 MHz frequency range.

**2. Pinning information**

**Table 2. Pinning**

Pin	Description	Simplified outline	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
BLF6G10LS-200R	-	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		-	49	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	$T_{case} = 80\text{ °C}; P_L = 40\text{ W}$	0.35	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	$V_{GS} = 0\text{ V}; I_D = 0.9\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 270\text{ mA}$	1.4	2.0	2.4	V
$V_{GSq}$	gate-source quiescent voltage	$V_{DS} = 28\text{ V}; I_D = 1620\text{ mA}$	1.7	2.2	2.7	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	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	40	48	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	420	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 9.45\text{ A}$	11	18	26	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 9.45\text{ A}$	0.012	0.07	0.093	$\Omega$
$C_{rs}$	feedback capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}; f = 1\text{ MHz}$	-	3	-	pF

## 7. Application information

**Table 7. Application information**

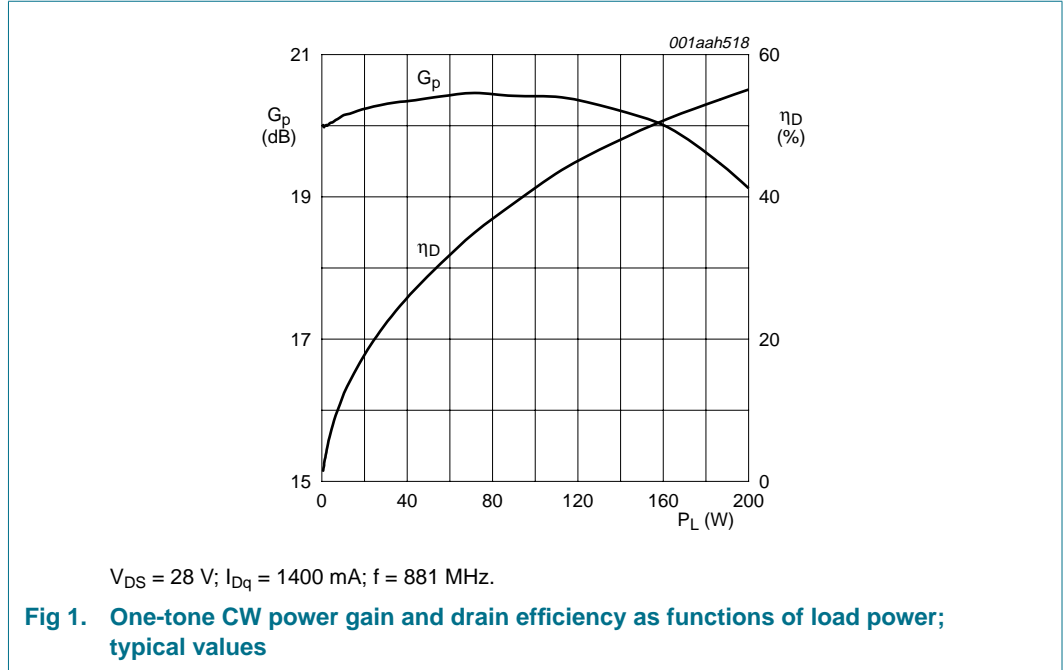
Mode of operation: 2-carrier W-CDMA; PAR 7.5 dB at 0.01 % probability on CCDF; 3GPP test model 1; 1-64 PDPCH;  $f_1 = 871.5\text{ MHz}; f_2 = 876.5\text{ MHz}; f_3 = 886.5\text{ MHz}; f_4 = 891.5\text{ MHz}$ ; RF performance at  $V_{DS} = 28\text{ V}; I_{Dq} = 1400\text{ mA}; T_{case} = 25\text{ }^\circ\text{C}$ ; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_{L(AV)}$	average output power		-	40	-	W
$G_p$	power gain	$P_{L(AV)} = 40\text{ W}$	19	20	21	dB
IRL	input return loss	$P_{L(AV)} = 40\text{ W}$	-	-6.7	-5.0	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 40\text{ W}$	25	27.5	-	%
ACPR	adjacent channel power ratio	$P_{L(AV)} = 40\text{ W}$	-	-40.5	-38.0	dBc

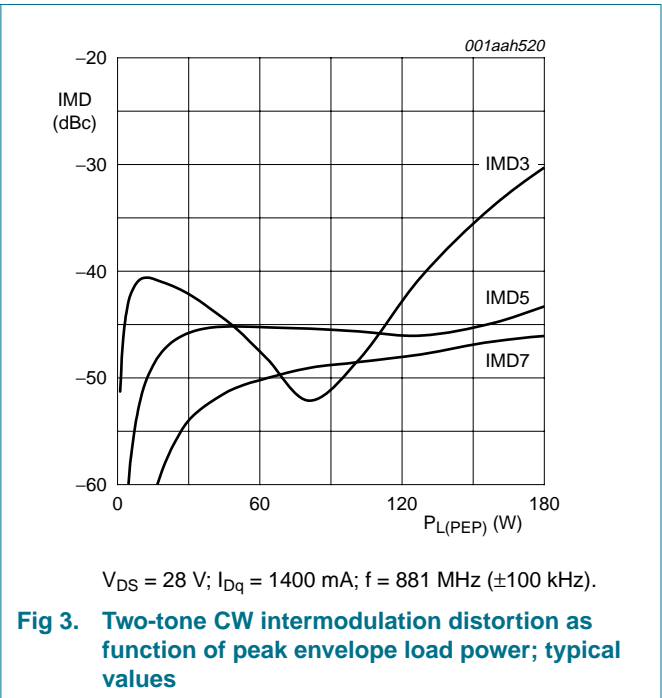
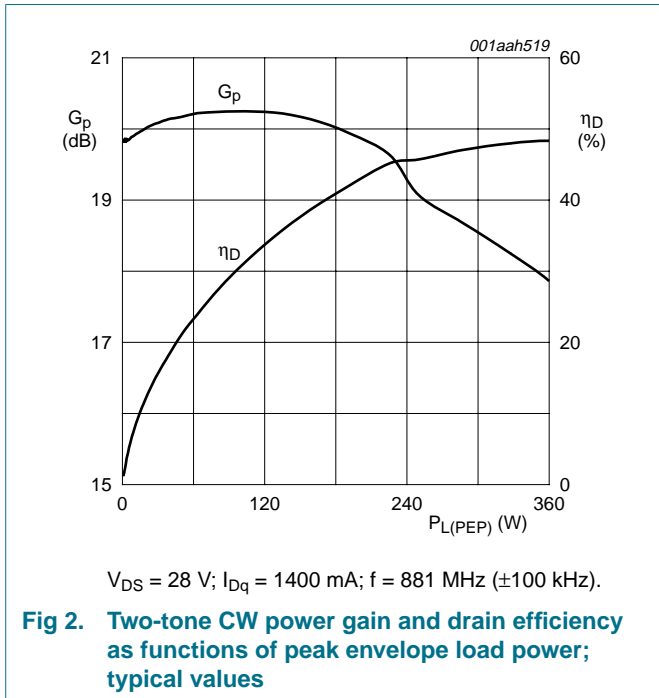
### 7.1 Ruggedness in class-AB operation

The BLF6G10LS-200R is an enhanced rugged device and is capable of withstanding a load mismatch corresponding to  $VSWR = 10 : 1$  through all phases under the following conditions:  $V_{DS} = 28\text{ V}; I_{Dq} = 1400\text{ mA}; P_L = 200\text{ W}; f = 894\text{ MHz}$ .

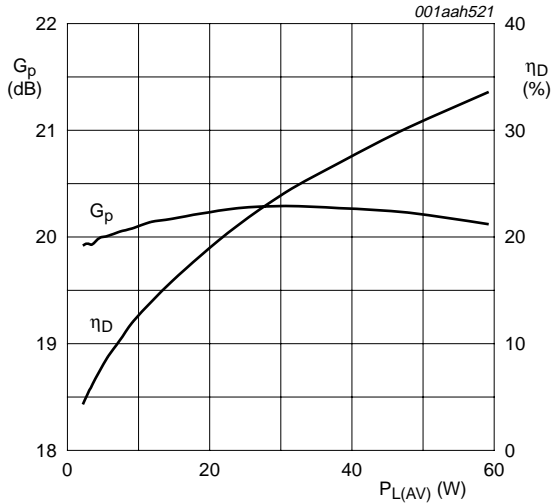
**7.2 One-tone CW**



**7.3 Two-tone CW**

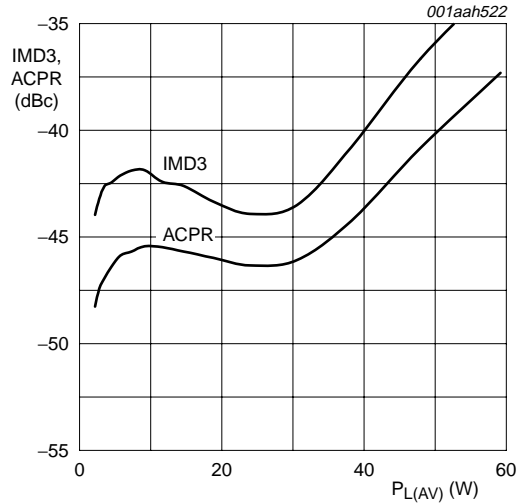


7.4 2-carrier W-CDMA



$V_{DS} = 28\text{ V}$ ;  $I_{Dq} = 1400\text{ mA}$ ;  $f = 881\text{ MHz}$  ( $\pm 5\text{ MHz}$ ); carrier spacing 10 MHz.

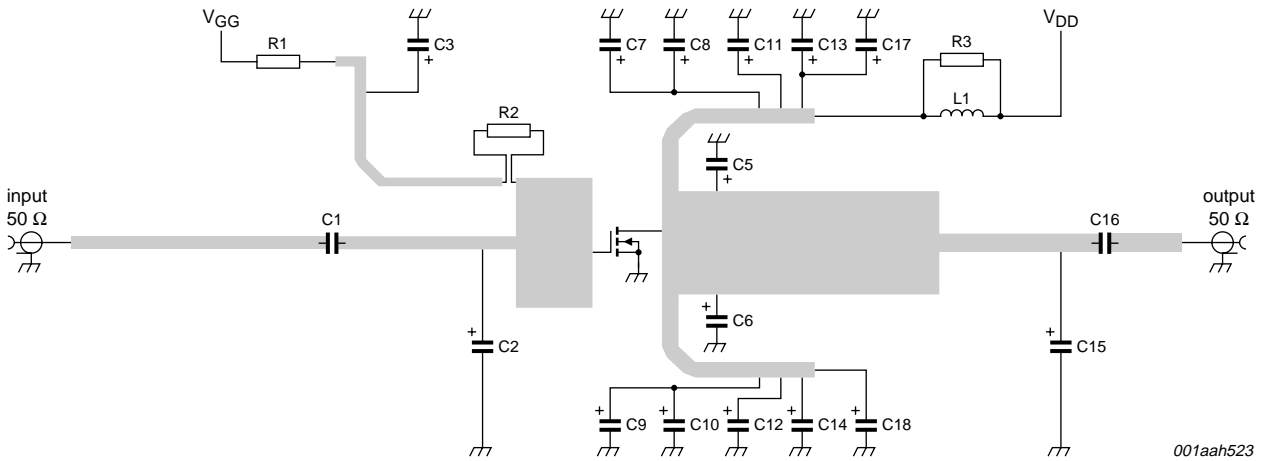
Fig 4. 2-carrier W-CDMA power gain and drain efficiency as functions of average load power; typical values



$V_{DS} = 28\text{ V}$ ;  $I_{Dq} = 1400\text{ mA}$ ;  $f = 881\text{ MHz}$  ( $\pm 5\text{ MHz}$ ); carrier spacing 10 MHz.

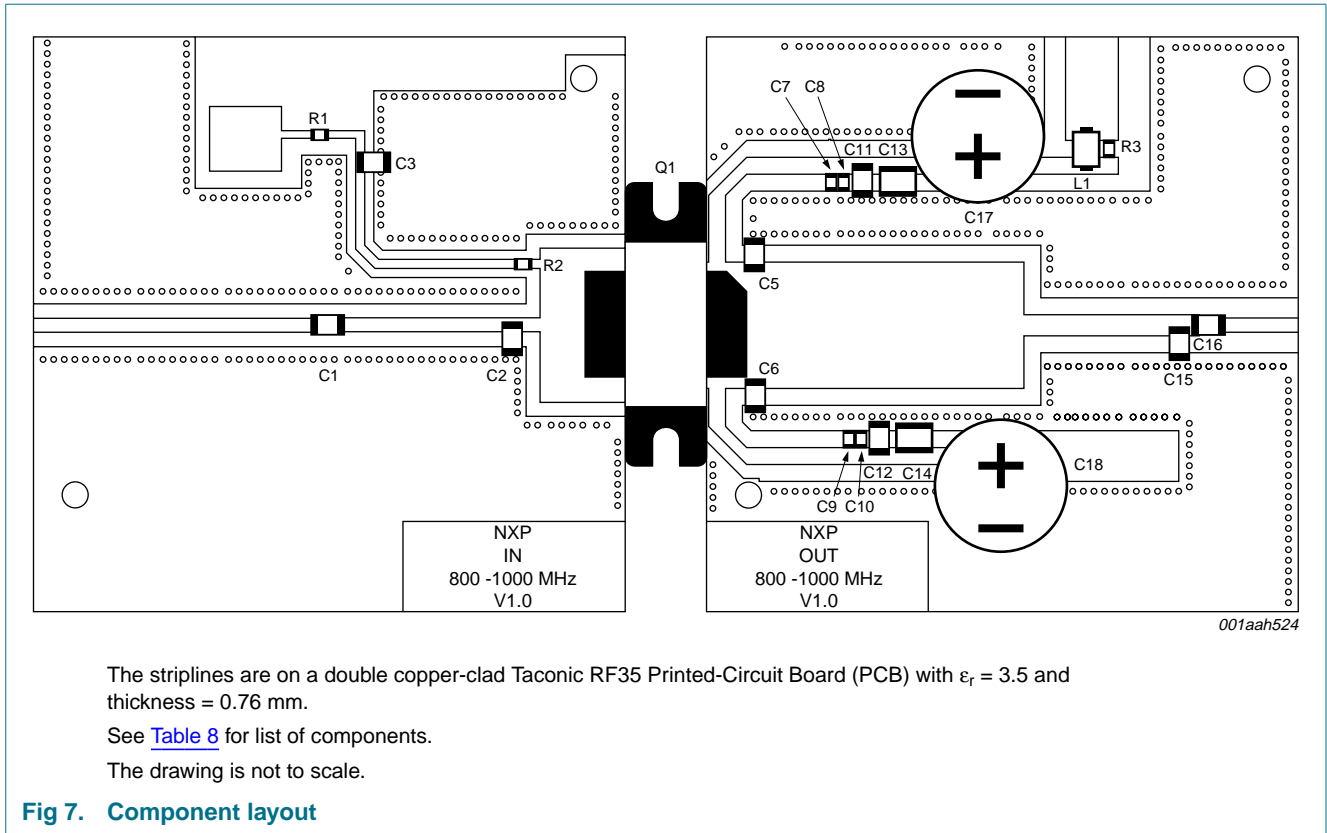
Fig 5. 2-carrier W-CDMA adjacent channel power ratio and third order intermodulation distortion as functions of average load power; typical values

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)**

All capacitors should be soldered vertically except C20.

Component	Description	Value	Remarks
C1, C3, C11, C12, C16	multilayer ceramic chip capacitor	68 pF	[1] solder vertically
C2	multilayer ceramic chip capacitor	13 pF	[1] solder vertically
C5, C6	multilayer ceramic chip capacitor	10 pF	[1] solder vertically
C7, C8, C9, C10	Electrolytic capacitor	220 nF	Vishay VJ1206Y224KXB
C13, C14	multilayer ceramic chip capacitor	4.7 $\mu$ F; 50 V	[2]
C15	multilayer ceramic chip capacitor	1.5 pF	[1] solder vertically
C17, C18	Electrolytic capacitor	220 $\mu$ F; 63 V	
L1	Ferrite SMD bead	-	Ferroxcube BDS 3/3/4.6-4S2 or equivalent
Q1	BLF6G10LS-200R	-	
R1, R2, R3	SMD resistor	9.1 $\Omega$ ; 0.1 W	

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

[2] TDK or capacitor of same quality.

9. Package outline

Earless flanged LDMOST ceramic package; 2 leads

SOT502B

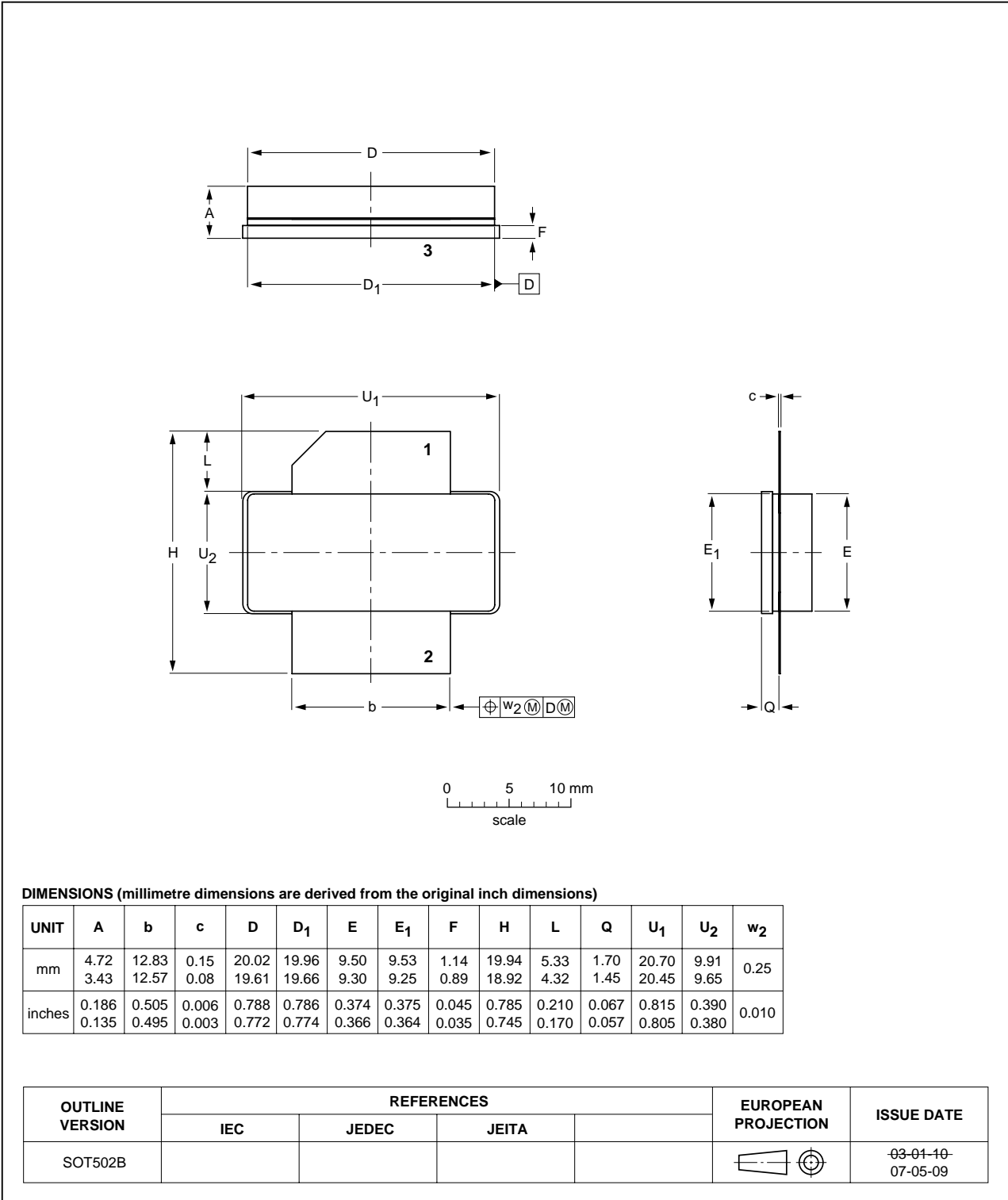


Fig 8. Package outline SOT502B

## 10. Abbreviations

**Table 9. Abbreviations**

Acronym	Description
3GPP	Third Generation Partnership Project
CCDF	Complementary Cumulative Distribution Function
CDMA	Code Division Multiple Access
CW	Continuous Wave
DPCH	Dedicated Physical CHannel
EDGE	Enhanced Data rates for GSM Evolution
GSM	Global System for Mobile communications
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
BLF6G10LS-200R_1	20080121	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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[2] The term 'short data sheet' is explained in section "Definitions".

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