

# BLF6G22-45

Power LDMOS transistor

Rev. 02 — 21 April 2008

Product data sheet

## 1. Product profile

### 1.1 General description

45 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 <sub>DS</sub> (V)	P <sub>L(AV)</sub> (W)	G <sub>p</sub> (dB)	$\eta_D$ (%)	ACPR (dBc)
2-carrier W-CDMA	2110 to 2170	28	2.5	18.5	13	-49 <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

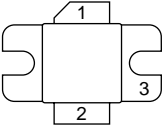
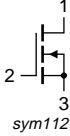
- Typical 2-carrier W-CDMA performance at frequencies of 2110 MHz and 2170 MHz, a supply voltage of 28 V and an I<sub>DQ</sub> of 405 mA:
  - ◆ Average output power = 2.5 W
  - ◆ Power gain = 18.5 dB (typ)
  - ◆ Efficiency = 13 %
  - ◆ ACPR = -49 dBc
- Easy power control
- Integrated ESD protection
- 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	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
BLF6G22-45	-	flanged ceramic package; 2 mounting holes; 2 leads	SOT608A

## 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
$T_{stg}$	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	$T_{case} = 80\text{ °C};$ $P_L = 12.5\text{ W (CW)}$	1.7	K/W

## 6. Characteristics

**Table 6. Characteristics**

$T_j = 25^\circ\text{C}$  per section; 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	$V_{DS} = 10\text{ V}; I_D = 72\text{ mA}$	1.4	1.9	2.4	V
$V_{GSq}$	gate-source quiescent voltage	$V_{DS} = 28\text{ V}; I_D = 300\text{ mA}$	1.65	2.15	2.65	V
$I_{DSS}$	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$	-	-	1.5	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	-	12.5	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	150	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 3.5\text{ A}$	-	5	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 2.5\text{ A}$	-	0.2	-	$\Omega$

## 7. Application information

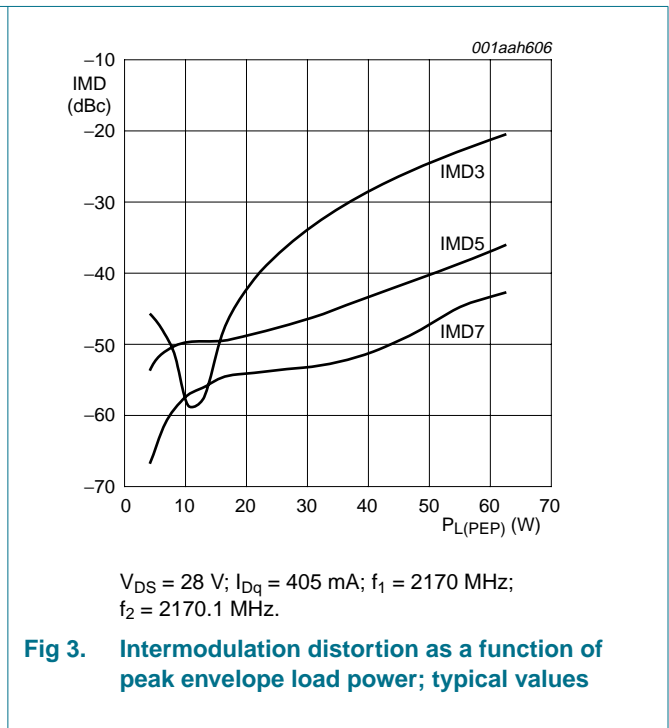
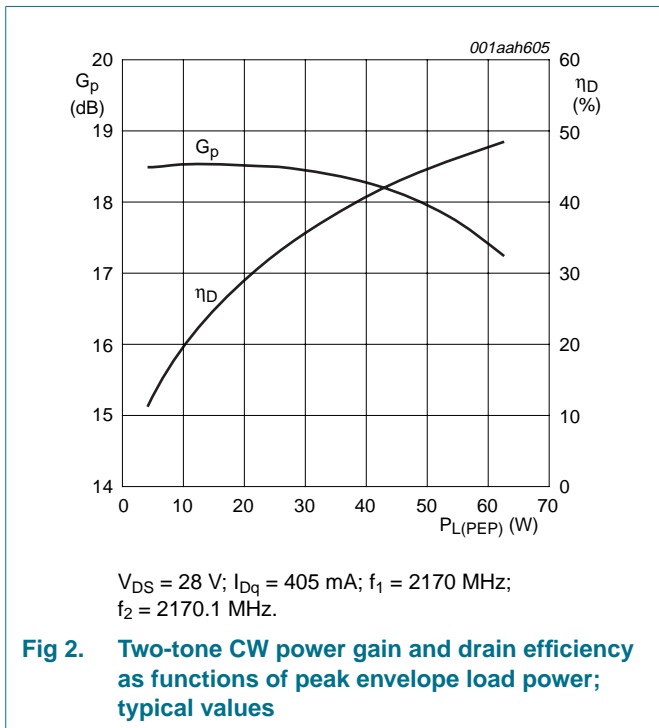
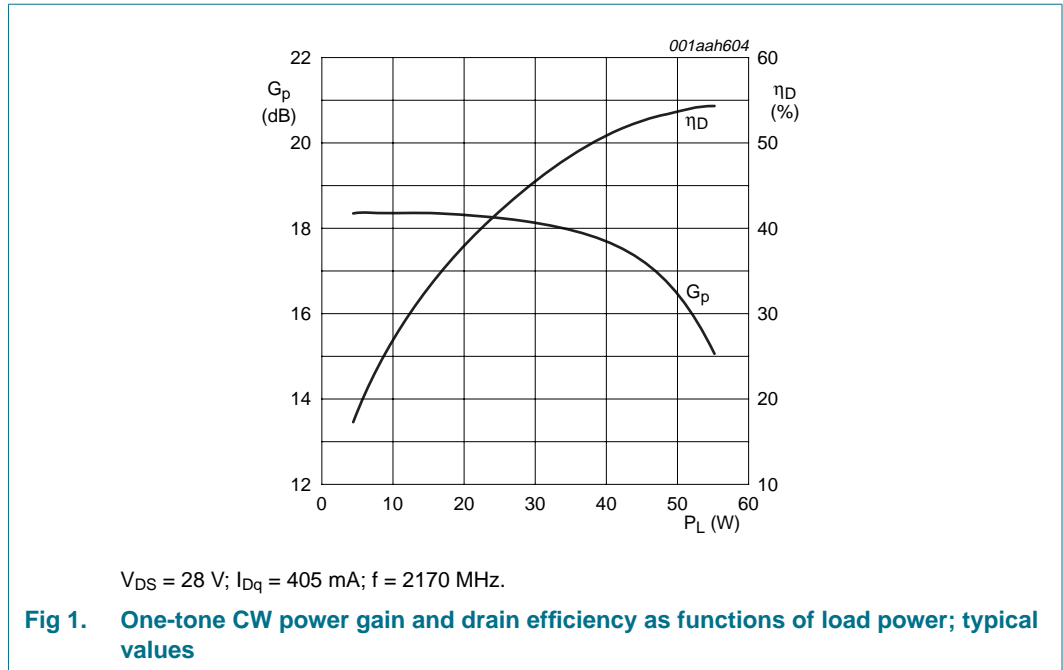
**Table 7. Application information**

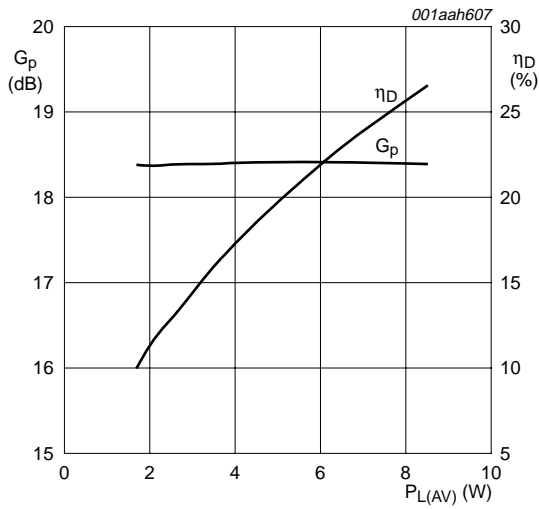
Mode of operation: 2-carrier W-CDMA; PAR 7.5 dB at 0.01 % probability on CCDF; 3GPP test model 1; 1 to 64 PDPCH;  $f_1 = 2112.5\text{ MHz}; f_2 = 2117.5\text{ MHz}; f_3 = 2162.5\text{ MHz}; f_4 = 2167.5\text{ MHz}$ ; RF performance at  $V_{DS} = 28\text{ V}; I_{Dq} = 405\text{ mA}; T_{case} = 25^\circ\text{C}$ ; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_{L(AV)}$	average output power		-	2.5	-	W
$G_p$	power gain	$P_{L(AV)} = 2.5\text{ W}$	17.3	18.5	19.7	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 2.5\text{ W}$	10.5	13	-	%
ACPR	adjacent channel power ratio	$P_{L(AV)} = 2.5\text{ W}$	-	-49	-46	dBc

### 7.1 Ruggedness in class-AB operation

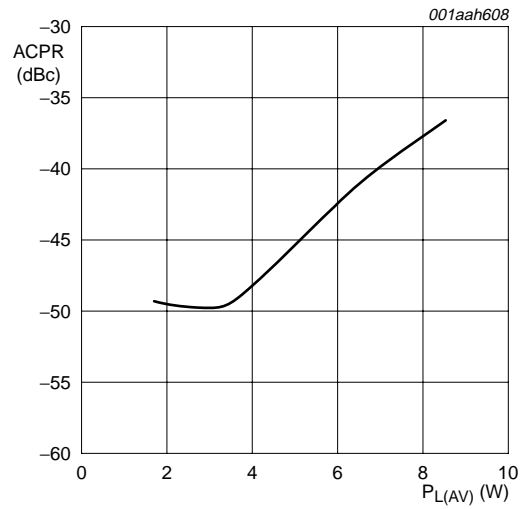
The BLF6G22-45 is capable of withstanding a load mismatch corresponding to  $V_{SWR} = 10 : 1$  through all phases under the following conditions:  $V_{DS} = 28\text{ V}; I_{Dq} = 405\text{ mA}; P_L = 45\text{ W (CW)}; f = 2170\text{ MHz}$ .





$V_{DS} = 28\text{ V}$ ;  $I_{DQ} = 405\text{ mA}$ ;  $f_1 = 2162.5\text{ MHz}$ ;  $f_2 = 2167.5\text{ MHz}$ ; carrier spacing 5 MHz.

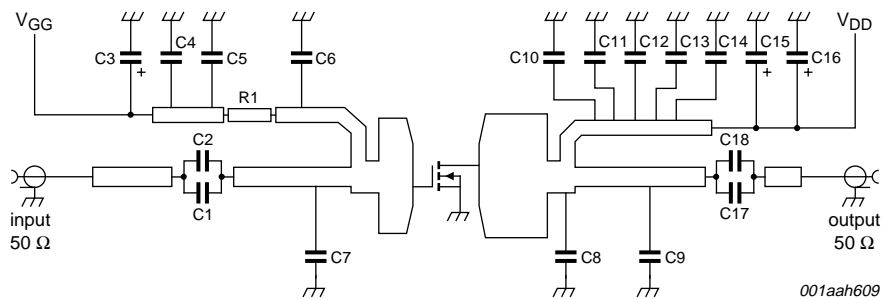
Fig 4. 2-carrier W-CDMA power gain and drain efficiency as functions of average load power; typical values



$V_{DS} = 28\text{ V}$ ;  $I_{DQ} = 405\text{ mA}$ ;  $f_1 = 2162.5\text{ MHz}$ ;  $f_2 = 2167.5\text{ MHz}$ ; carrier spacing 5 MHz.

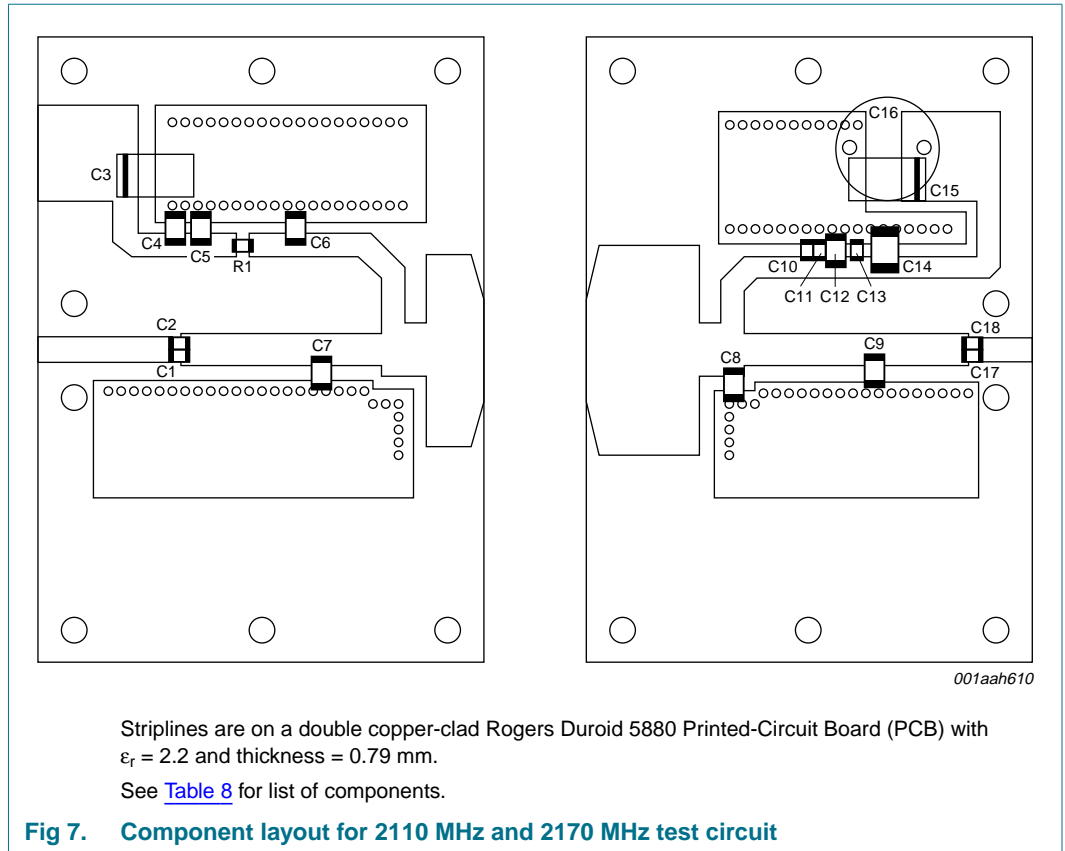
Fig 5. 2-carrier W-CDMA adjacent power channel ratio as a function of average load power; typical values

## 8. Test information



See Table 8 for list of components.

Fig 6. Test circuit for operation at 2110 MHz and 2170 MHz



**Table 8. List of components**

For test circuit, see [Figure 6](#) and [Figure 7](#).

Component	Description	Value	Remarks
C1, C2, C17, C18	multilayer ceramic chip capacitor	6.8 pF	[1]
C3, C15	tantalum capacitor	10 $\mu$ F	
C4, C5	multilayer ceramic chip capacitor	1.5 $\mu$ F	
C6, C12	multilayer ceramic chip capacitor	10 pF	[2]
C7	multilayer ceramic chip capacitor	0.5 pF	[2]
C8	multilayer ceramic chip capacitor	1.2 pF	[2]
C9	multilayer ceramic chip capacitor	1.0 pF	[2]
C10, C11	multilayer ceramic chip capacitor	100 nF	
C13	multilayer ceramic chip capacitor	220 nF	
C14	multilayer ceramic chip capacitor	4.7 $\mu$ F	
C16	electrolytic capacitor	220 $\mu$ F, 63 V	
R1	chip resistor	5.6 $\Omega$	

[1] American technical ceramics type 100A or capacitor of same quality.

[2] American technical ceramics type 100B or capacitor of same quality.

**9. Package outline**

Flanged ceramic package; 2 mounting holes; 2 leads

SOT608A

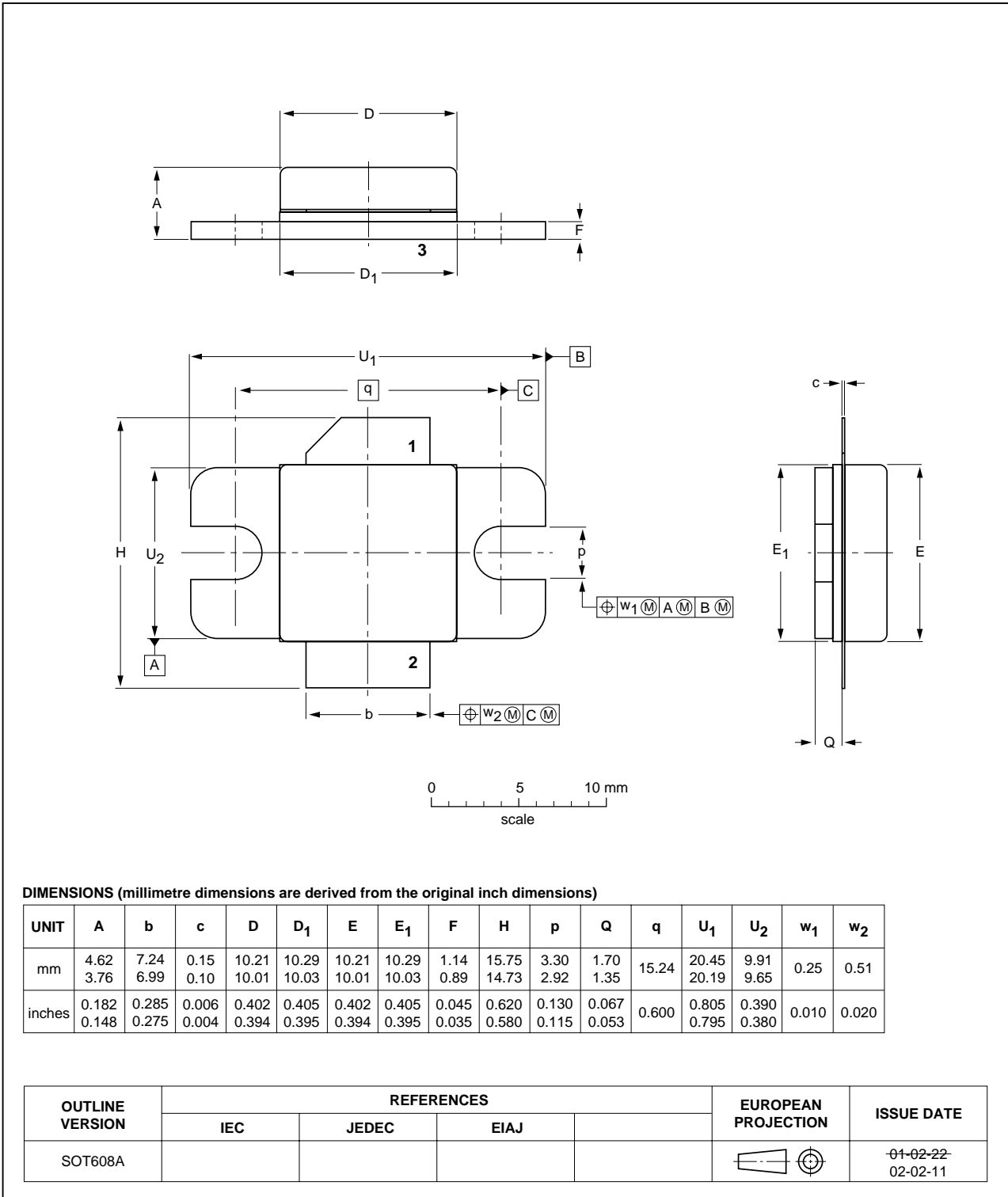


Fig 8. Package outline SOT608A

## 10. Abbreviations

**Table 9. Abbreviations**

Acronym	Description
3GPP	3rd Generation Partnership Project
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Waveform
DPCH	Dedicated Physical CHannel
IMD	InterModulation Distortion
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
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
BLF6G22-45_2	20080421	Product data sheet	-	BLF6G22-45_BLF6G22S-45_1
Modifications:				
			<ul style="list-style-type: none"> <li>The combined data sheet is split up into two separate data sheets.</li> <li><a href="#">Table 1</a> and <a href="#">Table 7</a>: ACPR values changed.</li> </ul>	
BLF6G22-45_BLF6G22S-45_1	20080219	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.
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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