

# BLC6G22-75; BLC6G22LS-75

Power LDMOS transistor

Rev. 01 — 7 February 2008

Objective 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	18.5	31	-37 <sup>[1]</sup>	-41 <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

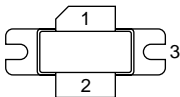
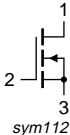
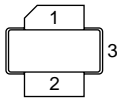
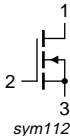
- Typical 2-carrier W-CDMA performance at frequencies of 2110 MHz and 2170 MHz, a supply voltage of 28 V and an  $I_{DQ}$  of 690 mA:
  - ◆ Average output power = 17 W
  - ◆ Gain = 18.5 dB
  - ◆ Efficiency = 31 %
  - ◆ IMD3 = -37 dBc
  - ◆ ACPR = -41 dBc
- Easy power control
- Integrated ESD protection
- 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
<b>BLC6G22-75 (SOT895A)</b>			
1	drain		 sym112
2	gate		
3	source		
<b>BLC6G22LS-75 (SOT896B)</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
BLC6G22-75	-	plastic flanged cavity package; 2 mounting slots; 2 leads	SOT895A
BLC6G22LS-75	-	plastic earless flanged cavity package; 2 leads	SOT896B

## 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	Type	Typ	Unit
$R_{th(j-case)}$	thermal resistance from junction to case	$T_{case} = 80\text{ °C};$ $P_L = 17\text{ W}$	BLC6G22-75	0.9	K/W
			BLC6G22LS-75	0.75	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	$V_{GS} = 0\text{ V}; I_D = 0.5\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 100\text{ mA}$	1.40	2	2.40	V
$V_{GSq}$	gate-source quiescent voltage	$V_{DS} = 28\text{ V}; I_D = 690\text{ mA}$	1.60	2.2	2.60	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	18.5	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	280	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 5\text{ A}$	-	7.2	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $I_D = 3.5\text{ A}$	-	0.15	-	$\Omega$
$C_{rs}$	feedback capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V};$ $f = 1\text{ MHz}$	-	1.4	-	pF

## 7. Application information

**Table 7. Application information**

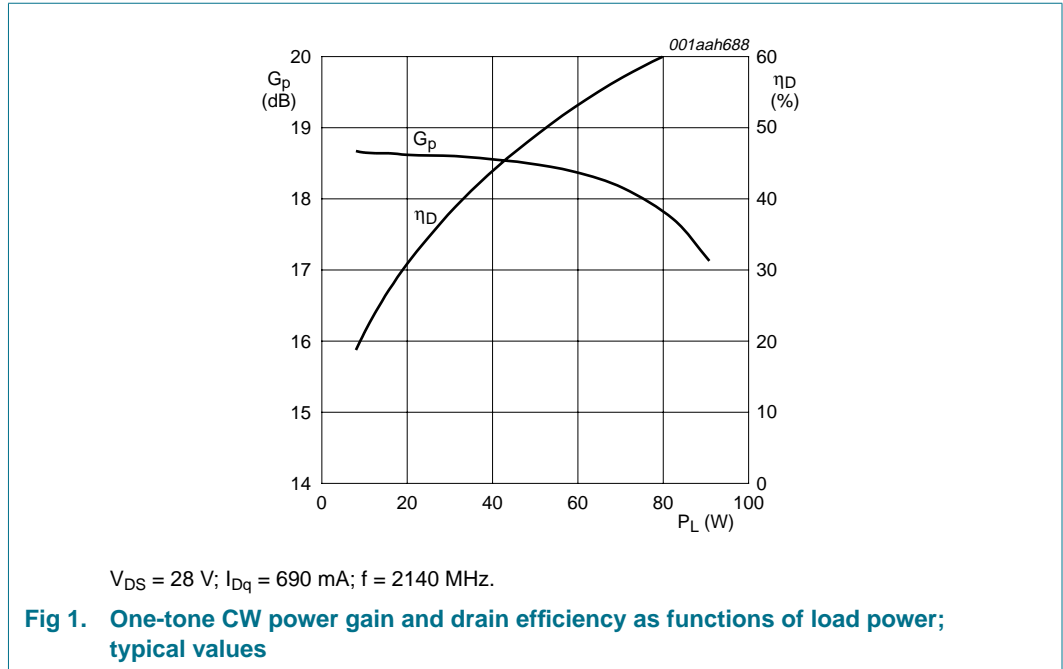
Mode of operation: 2-carrier W-CDMA; PAR 7 dB at 0.01 % probability on CCDF; 3GPP test model 1; 1-64 PDPCH;  $f_1 = 2112.5\text{ MHz}; f_2 = 2122.5\text{ MHz}; f_3 = 2157.5\text{ MHz}; f_4 = 2167.5\text{ MHz};$  RF performance at  $V_{DS} = 28\text{ V}; I_{Dq} = 690\text{ mA}; T_{case} = 25\text{ °C};$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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_{L(AV)}$	average output power		-	17	-	W
$G_p$	power gain	$P_{L(AV)} = 17\text{ W}$	17.3	18.5	-	dB
IRL	input return loss	$P_{L(AV)} = 17\text{ W}$	-	-9.2	-6.5	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 17\text{ W}$	28	31	-	%
IMD3	third order intermodulation distortion	$P_{L(AV)} = 17\text{ W}$	-	-37	-34	dBc
ACPR	adjacent channel power ratio	$P_{L(AV)} = 17\text{ W}$	-	-41	-38.5	dBc

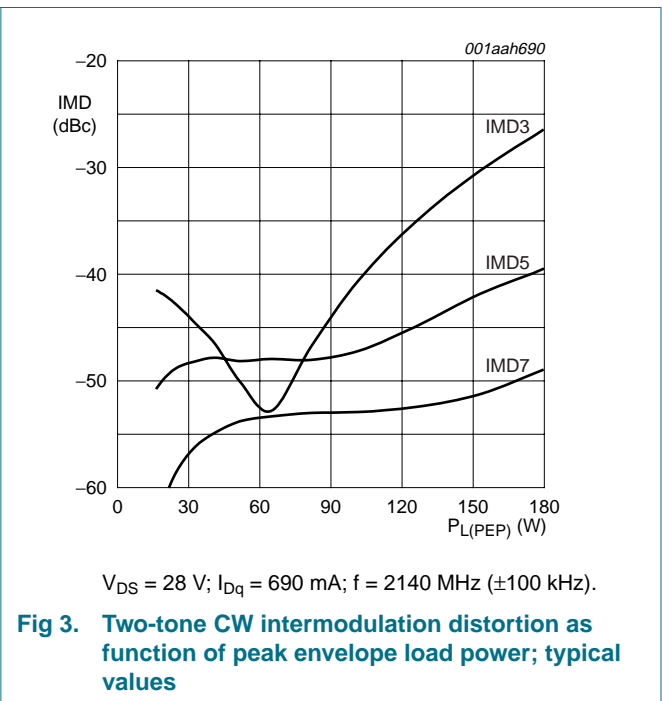
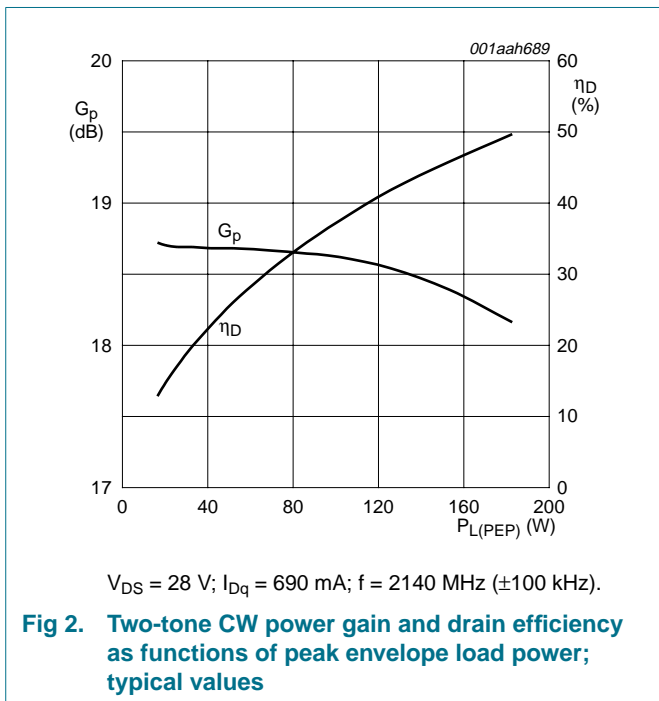
### 7.1 Ruggedness in class-AB operation

The BLC6G22-75 and BLC6G22LS-75 are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions:  $V_{DS} = 28\text{ V}; I_{Dq} = 690\text{ mA}; P_L = 75\text{ W (CW)}; f = 2170\text{ MHz}.$

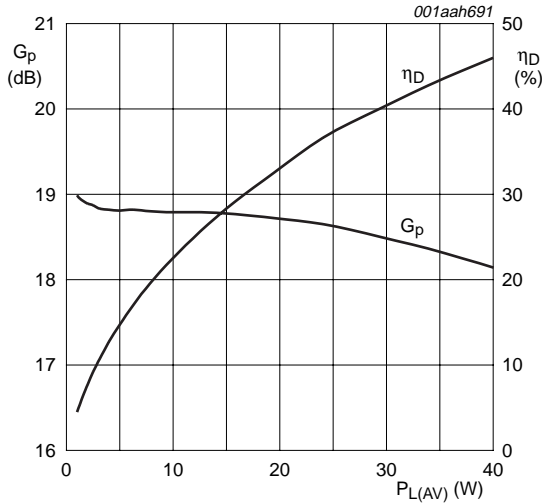
**7.2 One-tone CW**



**7.3 Two-tone CW**

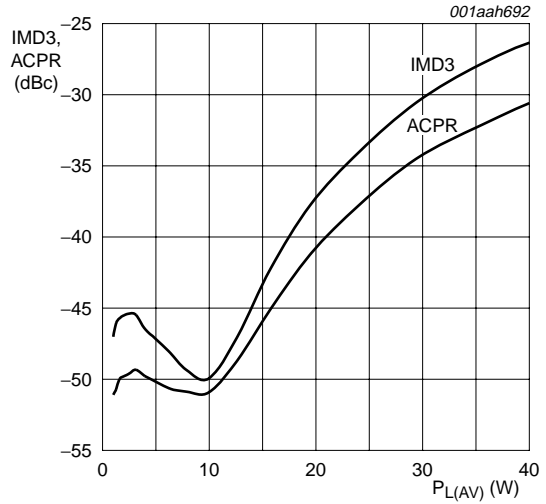


7.4 2-carrier W-CDMA



$V_{DS} = 28$  V;  $I_{Dq} = 950$  mA;  $f = 2140$  MHz ( $\pm 5$  MHz); carrier spacing 10 MHz.

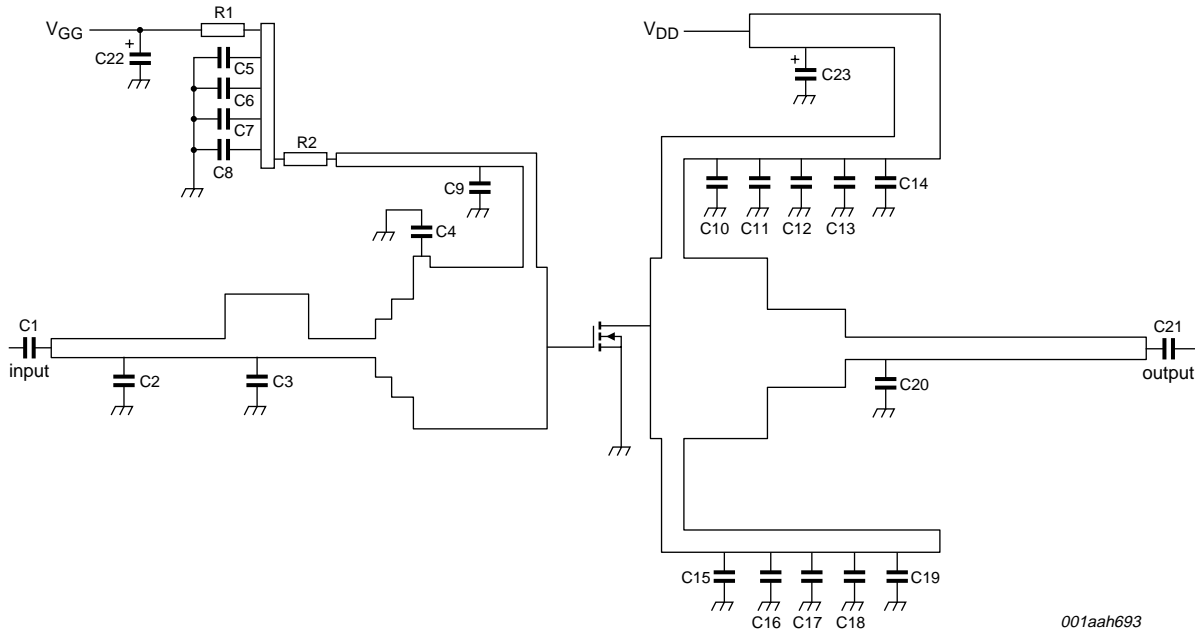
Fig 4. 2-carrier W-CDMA power gain and drain efficiency as functions of average load power; typical values



$V_{DS} = 28$  V;  $I_{Dq} = 690$  mA;  $f = 2140$  MHz ( $\pm 5$  MHz); carrier spacing 10 MHz.

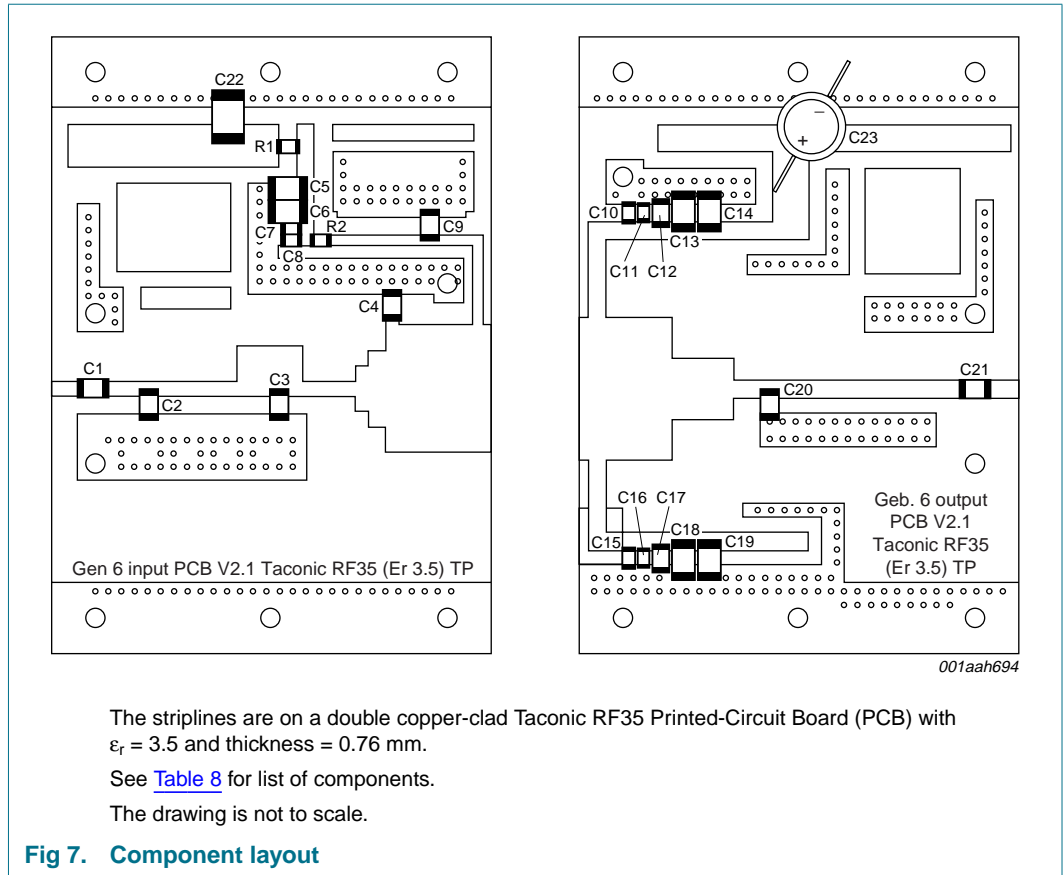
Fig 5. 2-carrier W-CDMA adjacent channel power ratio and third order intermodulation distortion as functions of average load power; typical values

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](#))**

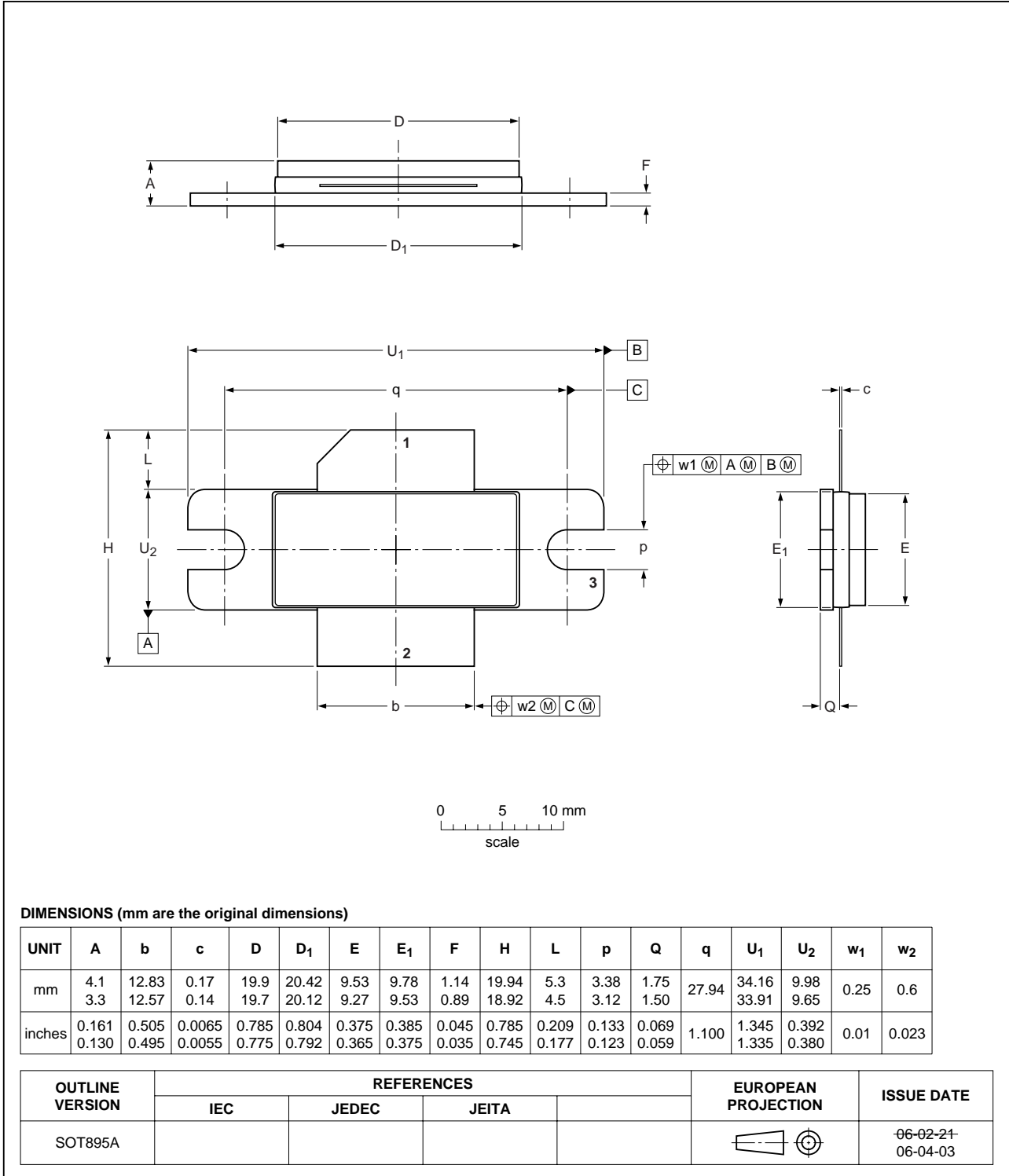
Component	Description	Value	Remarks
C1	multilayer ceramic chip capacitor	5.6 pF	[1]
C2, C3	multilayer ceramic chip capacitor	0.5 pF	[1]
C4	multilayer ceramic chip capacitor	0.6 pF	[1]
C5, C6, C13, C14, C18, C19	multilayer ceramic chip capacitor	1.5 $\mu$ F	Murata 0603 or capacitor of same quality
C7, C8, C11, C16	multilayer ceramic chip capacitor	100 nF	
C9	multilayer ceramic chip capacitor	15 pF	[1]
C10, C15	multilayer ceramic chip capacitor	220 nF	
C12, C17	multilayer ceramic chip capacitor	10 pF	[1]
C20	multilayer ceramic chip capacitor	0.3 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	3.6 $\Omega$	
R2	SMD resistor	5.1 $\Omega$	

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

**9. Package outline**

Plastic flanged cavity package; 2 mounting slots; 2 leads

SOT895A



**Fig 8. Package outline SOT895A**

Plastic earless flanged cavity package; 2 leads

SOT896B

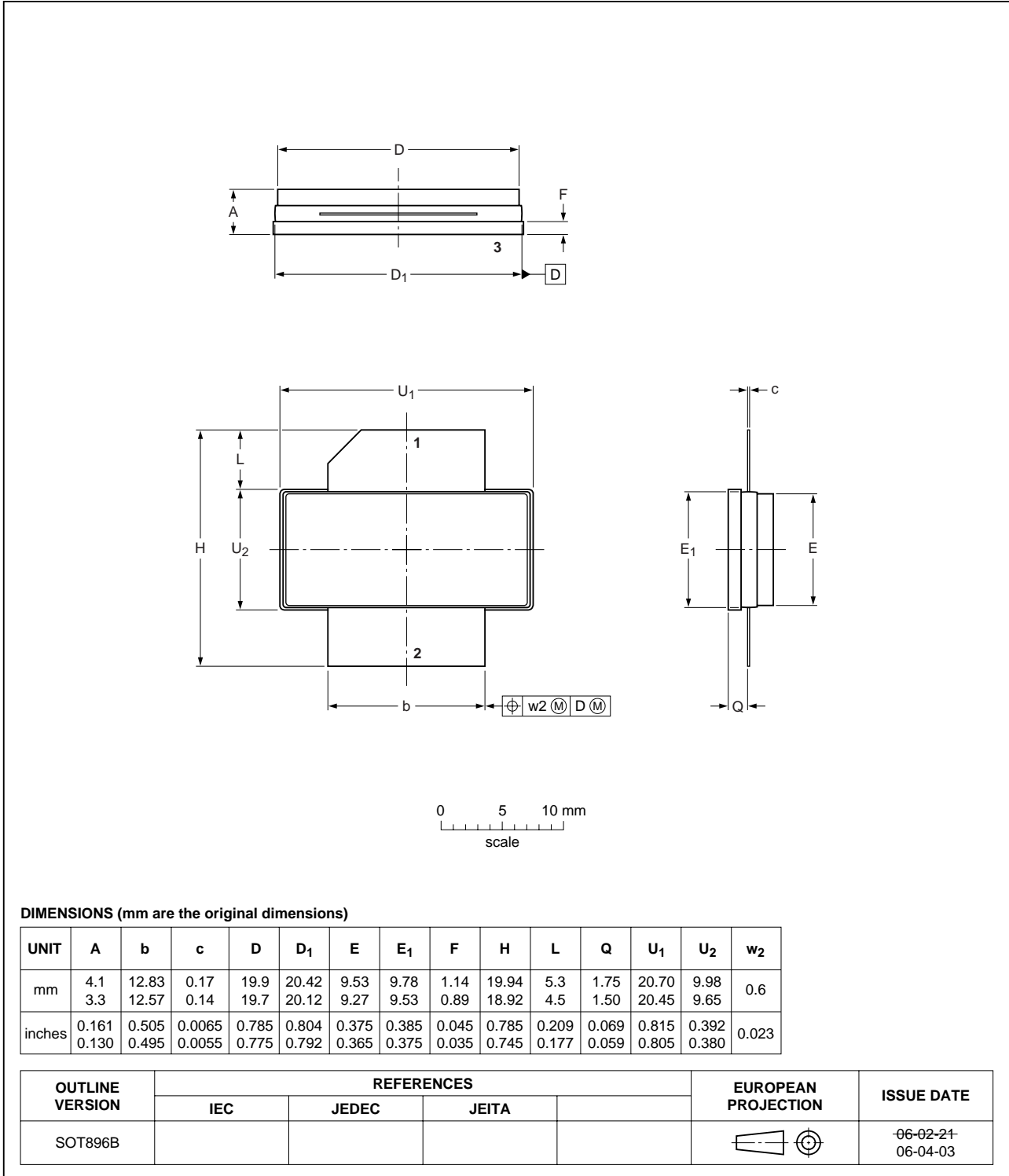


Fig 9. Package outline SOT896B



## 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
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
BLC6G22-75_BLC6G22LS-75_1	20080207	Objective 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.

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