

# BLC6G20-75; BLC6G20LS-75

UHF power LDMOS transistor

Rev. 01 — 30 January 2006

Objective data sheet

## 1. Product profile

### 1.1 General description

75 W LDMOS power transistor for base station applications at frequencies from 1800 MHz to 2000 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 <sub>400</sub> (dBc)	ACPR <sub>600</sub> (dBc)	EVM <sub>rms</sub> (%)
CW	1930 to 1990	28	63	19	52	-	-	-
GSM EDGE	1930 to 1990	28	29.5	19	38.5	-62.5	-72	1.5

#### CAUTION



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

### 1.2 Features

- Typical GSM EDGE performance at frequencies of 1930 MHz and 1990 MHz, a supply voltage of 28 V and an I<sub>Dq</sub> of 550 mA:
  - ◆ Output power = 29.5 W (AV)
  - ◆ Gain = 19 dB
  - ◆ Efficiency = 38.5 %
  - ◆ ACPR<sub>400</sub> = -62.5 dBc
  - ◆ ACPR<sub>600</sub> = -72 dBc
  - ◆ EVM<sub>rms</sub> = 1.5 %
- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (1800 MHz to 2000 MHz)
- Internally matched for ease of use

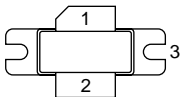
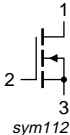
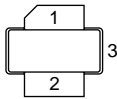
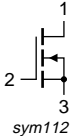
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**1.3 Applications**

- RF power amplifiers for GSM, GSM EDGE, W-CDMA and CDMA base stations and multi carrier applications in the 1800 MHz to 2000 MHz frequency range.

**2. Pinning information**

**Table 2: Pinning**

Pin	Description	Simplified outline	Symbol
<b>BLC6G20-75 (SOT895-1)</b>			
1	drain		 sym112
2	gate		
3	source		
<b>BLC6G20LS-75 (SOT896-1)</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
BLC6G20-75	-	plastic flanged cavity package; 2 mounting slots; 2 leads	SOT895-1
BLC6G20LS-75	-	plastic earless flanged cavity package; 2 leads	SOT896-1

**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		-	<td>	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	Min	Typ	Max	Unit
$R_{th(j-case)}$	thermal resistance from junction to case	$T_{case} = 80\text{ °C};$ $P_L = 75\text{ W}$	BLC6G20-75	<tbid>	<tbid>	<tbid>	K/W
			BLC6G20LS-75	<tbid>	<tbid>	<tbid>	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	$V_{DS} = 10\text{ V}; I_D = 100\text{ mA}$	<tbid>	2	<tbid>	V
$V_{GSq}$	gate-source quiescent voltage	$V_{DS} = 28\text{ V}; I_D = 550\text{ mA}$	<tbid>	<tbid>	<tbid>	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	$V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $V_{DS} = 10\text{ V}$	15.5	18	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 13\text{ V}; V_{DS} = 0\text{ V}$	-	-	300	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 5\text{ A}$	-	7	-	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	0.185	$\Omega$
$C_{rs}$	feedback capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V};$ $f = 1\text{ MHz}$	-	1.6	-	pF

## 7. Application information

**Table 7: Application information**

Mode of operation: GSM EDGE;  $f = 1930\text{ MHz}$  and  $1990\text{ MHz}$ ; RF performance at  $V_{DS} = 28\text{ V};$   
 $I_{Dq} = 550\text{ mA}; T_{case} = 25\text{ °C};$  unless otherwise specified; in a class-AB production test circuit

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_{L(AV)}$	average output power		-	29.5	-	W
$G_p$	power gain	$P_{L(AV)} = 29.5\text{ W}$	17.5	19	20	dB
IRL	input return loss	$P_{L(AV)} = 29.5\text{ W}$	-	-10	-7	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 29.5\text{ W}$	36.5	38.5	-	%
ACPR <sub>400</sub>	adjacent channel power ratio (400 kHz)	$P_{L(AV)} = 29.5\text{ W}$	-	-62.2	-60	dBc
ACPR <sub>600</sub>	adjacent channel power ratio (600 kHz)	$P_{L(AV)} = 29.5\text{ W}$	-	-72	-70	dBc
$EVM_{rms}$	RMS EDGE signal distortion error	$P_{L(AV)} = 29.5\text{ W}$	-	1.5	2.3	%
$EVM_M$	peak EDGE signal distortion error	$P_{L(AV)} = 29.5\text{ W}$	-	4.8	8	%

### 7.1 Ruggedness in class-AB operation

The BLC6G20-75 and BLC6G20LS-75 are capable of withstanding a load mismatch corresponding to  $V_{SWR} = 10 : 1$  through all phases under the following conditions:  
 $V_{DS} = 28\text{ V}; I_{Dq} = 550\text{ mA}; P_L = 75\text{ W (CW)}; f = 1990\text{ MHz}.$

**8. Package outline**

Plastic flanged cavity package; 2 mounting slots; 2 leads

SOT895-1

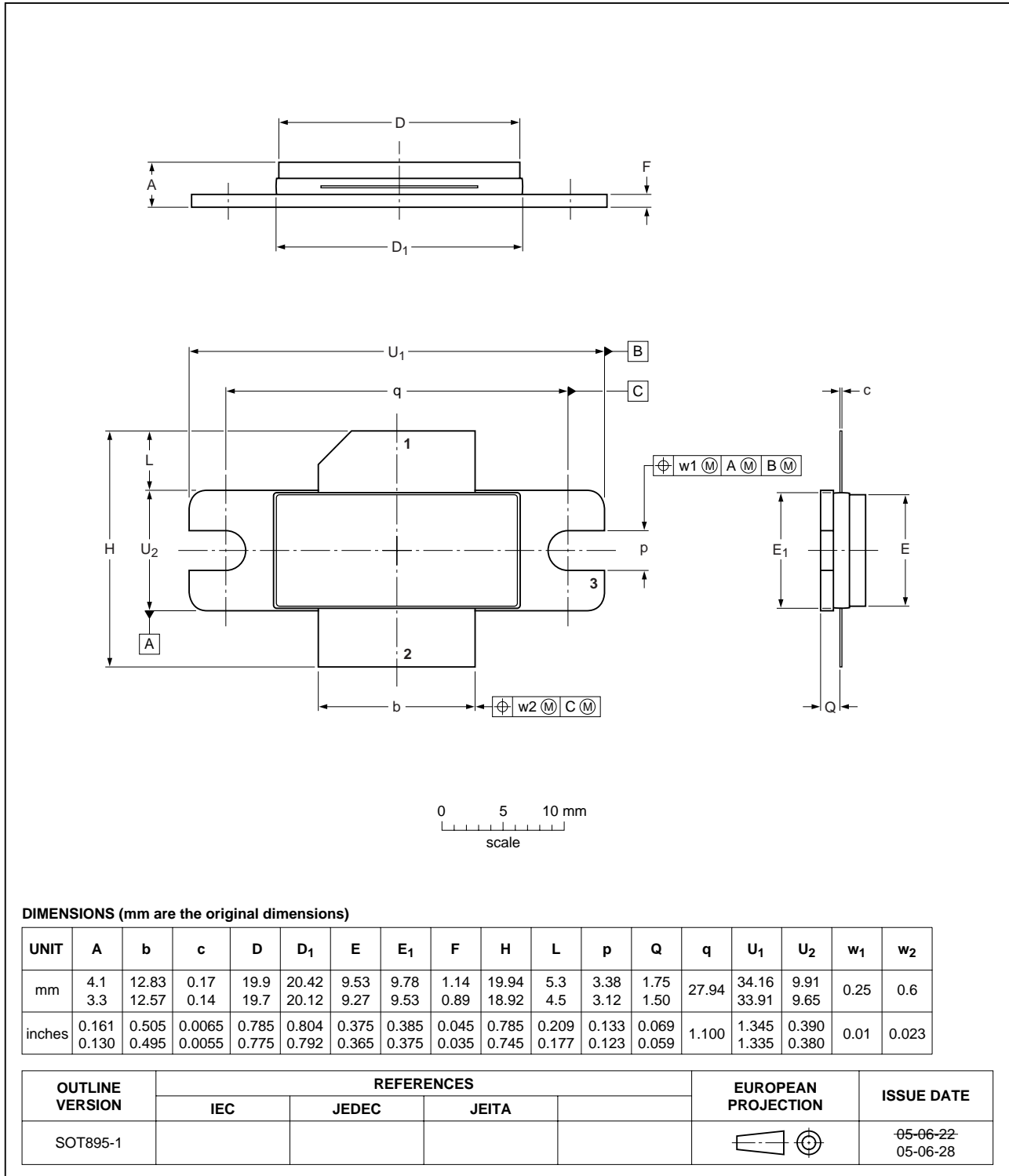


Fig 1. Package outline SOT895-1

Plastic earless flanged cavity package; 2 leads

SOT896-1

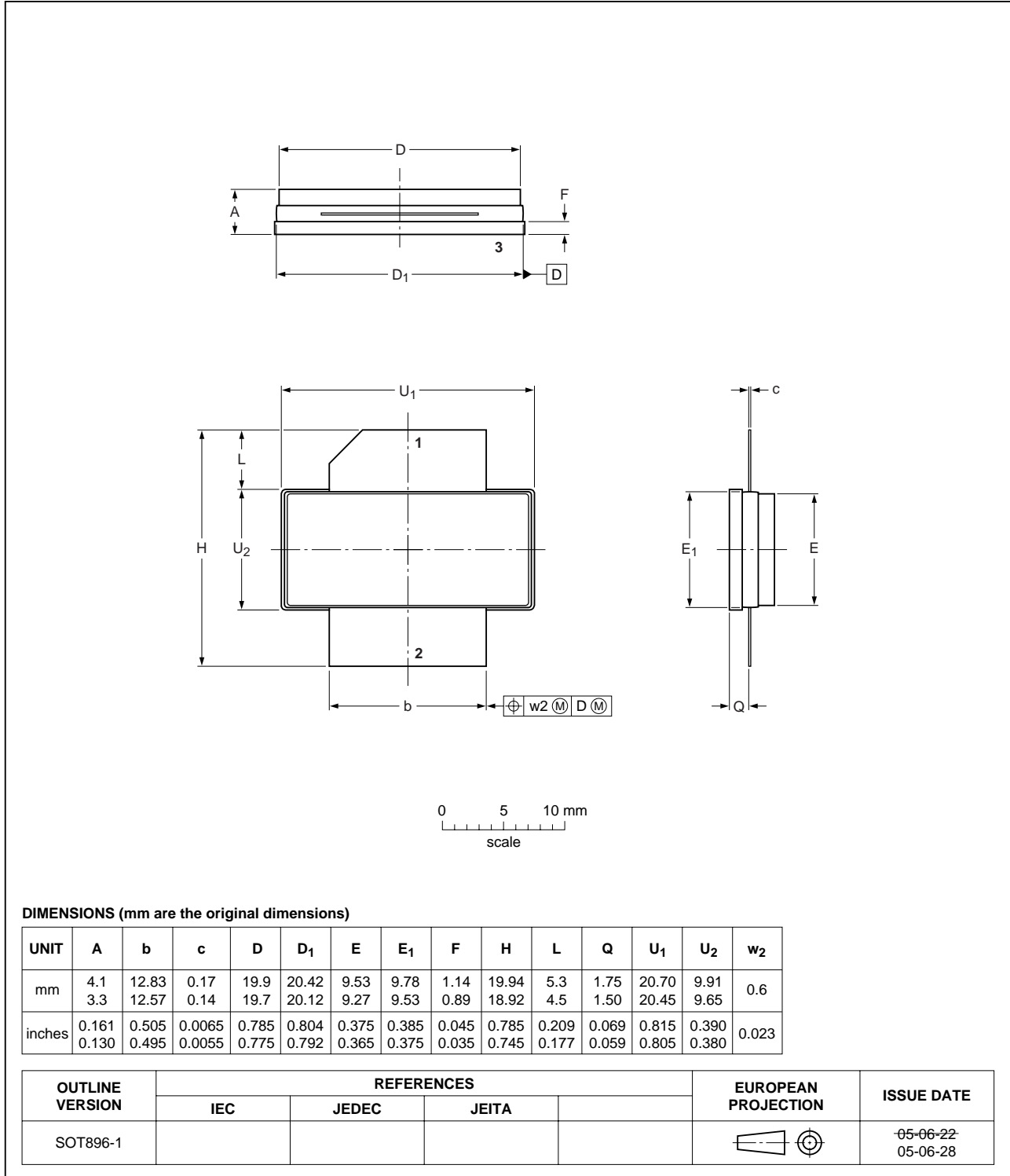


Fig 2. Package outline SOT896-1

## 9. Abbreviations

**Table 8: Abbreviations**

<b>Acronym</b>	<b>Description</b>
CDMA	Code Division Multiple Access
CW	Continuous Wave
EDGE	Enhanced Data rates for GSM Evolution
EVM	Error Vector Magnitude
GSM	Global System for Mobile communications
LDMOS	Laterally Diffused Metal Oxide Semiconductor
RF	Radio Frequency
RMS	Root Mean Square
VSWR	Voltage Standing Wave Ratio
W-CDMA	Wideband Code Division Multiple Access

## 10. Revision history

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**Table 9: Revision history**

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BLC6G20-75_6G20L S-75_1	20060130	Objective data sheet	-	-	-

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## 11. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2] [3]</sup>	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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