

BLC6G20-140; BLC6G20LS-140

UHF power LDMOS transistor

Rev. 01 — 30 January 2006

Objective data sheet

1. Product profile

1.1 General description

140 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_{DS} (V)	$P_{L(AV)}$ (W)	G_p (dB)	η_D (%)	IMD3 (dBc)	ACPR (dBc)
2-carrier W-CDMA	1930 to 1990	28	35.5	16.5	31	-37 [1]	-40 [1]

[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 1930 MHz and 1990 MHz, a supply voltage of 28 V and an I_{DQ} of 1000 mA:
 - ◆ Average output power = 35.5 W
 - ◆ Power gain = 16.5 dB (typ)
 - ◆ Efficiency = 31 %
 - ◆ IMD3 = -37 dBc
 - ◆ ACPR = -40 dBc
- 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

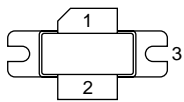
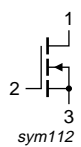
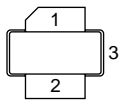
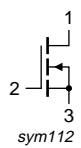
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1.3 Applications

- 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
BLC6G20-140 (SOT895-1)			
1	drain		
2	gate		
3	source		
BLC6G20LS-140 (SOT896-1)			
1	drain		
2	gate		
3	source		

[1] Connected to flange

3. Ordering information

Table 3: Ordering information

Type number	Package		
	Name	Description	Version
BLC6G20-140	-	plastic flanged cavity package; 2 mounting slots; 2 leads	SOT895-1
BLC6G20LS-140	-	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		-	<tbid>	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	$T_{case} = 80\text{ °C}$; $P_L = 35.5\text{ W}$	BLC6G20-140	<tbid>	<tbid>	<tbid>	K/W
			BLC6G20LS-140	<tbid>	0.43	0.52	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	$V_{DS} = 10\text{ V}$; $I_D = 216\text{ mA}$	<tbid>	2	<tbid>	V
V_{GSq}	gate-source quiescent voltage	$V_{DS} = 28\text{ V}$; $I_D = 950\text{ mA}$	<tbid>	<tbid>	<tbid>	V
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}$; $V_{DS} = 28\text{ V}$	-	-	5	μA
I_{DSX}	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $V_{DS} = 10\text{ V}$	32	39	-	A
I_{GSS}	gate leakage current	$V_{GS} = 13\text{ V}$; $V_{DS} = 0\text{ V}$	-	-	450	nA
g_{fs}	forward transconductance	$V_{DS} = 10\text{ V}$; $I_D = 10.8\text{ A}$	-	13.5	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $I_D = 7.56\text{ A}$	-	0.07	-	Ω
C_{rs}	feedback capacitance	$V_{GS} = 0\text{ V}$; $V_{DS} = 28\text{ V}$; $f = 1\text{ MHz}$	-	<tbid>	-	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; $f_1 = 1932.5\text{ MHz}$; $f_2 = 1942.5\text{ MHz}$; $f_3 = 1977.5\text{ MHz}$; $f_4 = 1987.5\text{ MHz}$; RF performance at $V_{DS} = 28\text{ V}$; $I_{Dq} = 1000\text{ mA}$; $T_{case} = 25\text{ °C}$; unless otherwise specified; in a class-AB production test circuit

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_{L(AV)}$	average output power		-	35.5	-	W
G_p	power gain	$P_{L(AV)} = 35.5\text{ W}$	<tbid>	16.5	-	dB
IRL	input return loss	$P_{L(AV)} = 35.5\text{ W}$	-	<tbid>	<tbid>	dB
η_D	drain efficiency	$P_{L(AV)} = 35.5\text{ W}$	<tbid>	31	-	%
IMD3	third order intermodulation distortion	$P_{L(AV)} = 35.5\text{ W}$	-	-37	<tbid>	dBc
ACPR	adjacent channel power ratio	$P_{L(AV)} = 35.5\text{ W}$	-	-40	<tbid>	dBc

7.1 Ruggedness in class-AB operation

The BLC6G20-140 and BLC6G20LS-140 are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: $V_{DS} = 28\text{ V}$; $I_{Dq} = 1000\text{ mA}$; $P_L = 140\text{ W (CW)}$; $f = 1990\text{ MHz}$.

8. Package outline

Plastic flanged cavity package; 2 mounting slots; 2 leads

SOT895-1

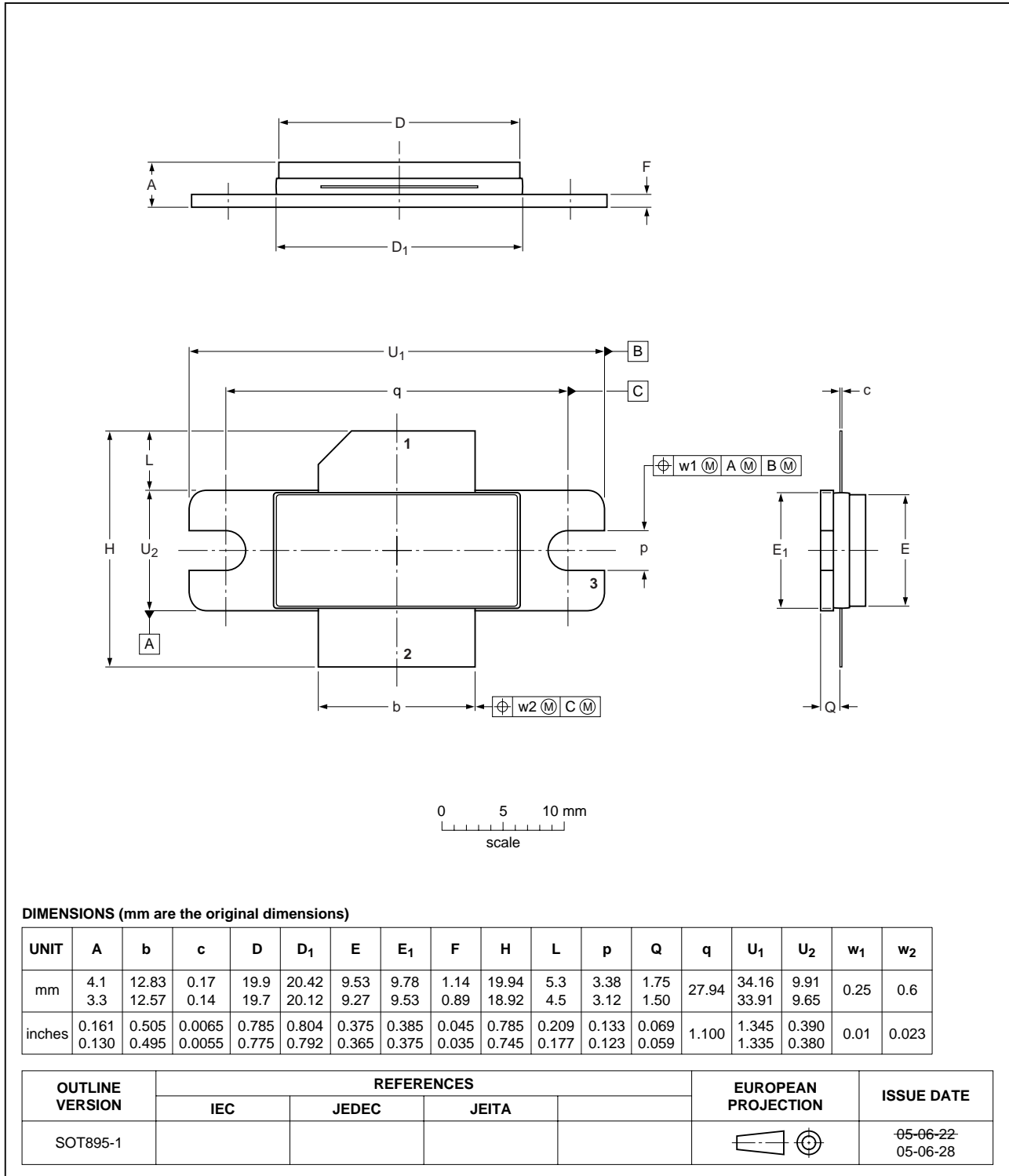


Fig 1. Package outline SOT895-1

Plastic earless flanged cavity package; 2 leads

SOT896-1

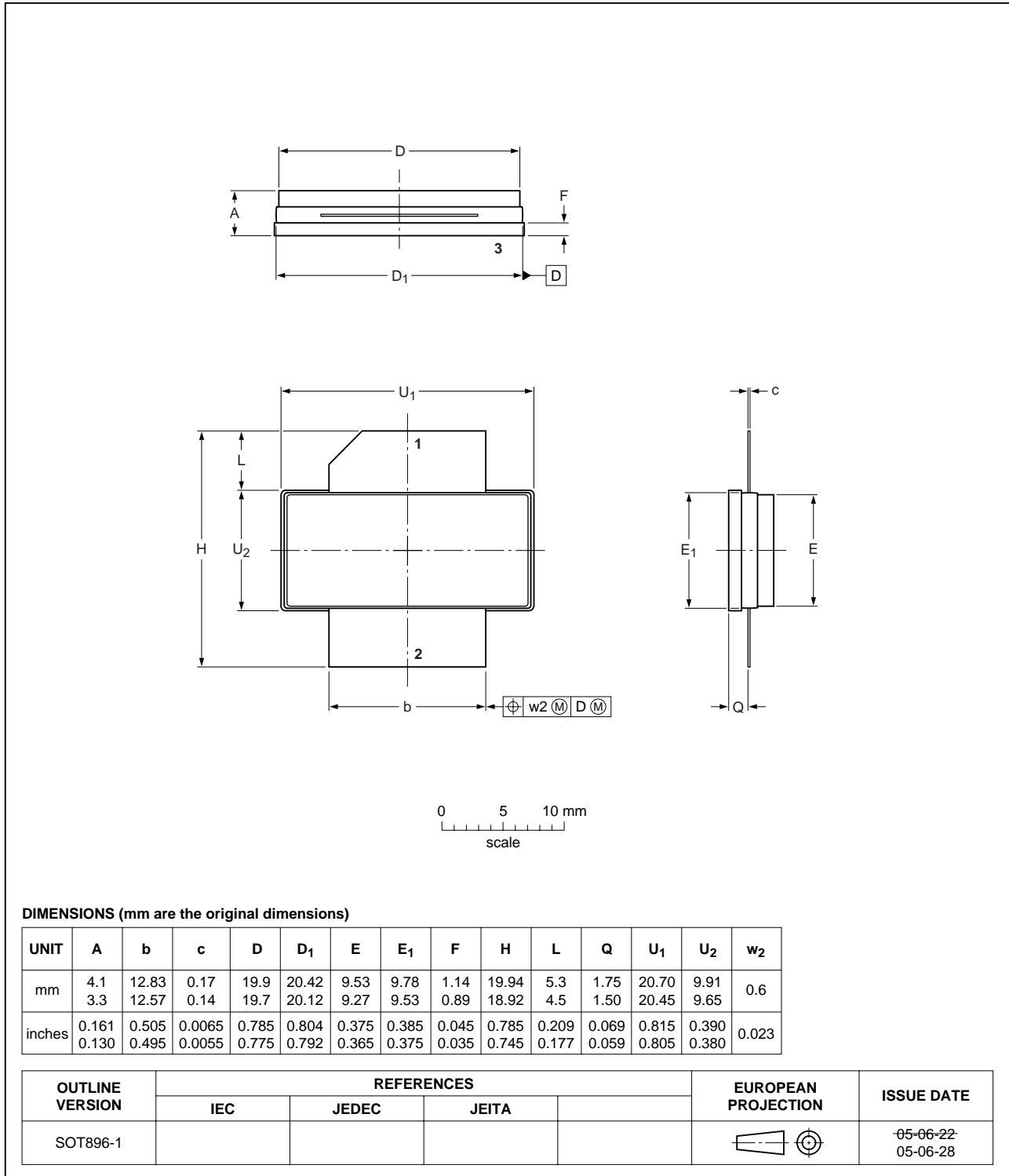


Fig 2. Package outline SOT896-1

9. Abbreviations

Table 8: Abbreviations

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
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

10. Revision history

Table 9: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BLC6G20-140_6G20LS-140_1	20060130	Objective data sheet	-	-	-

11. Data sheet status

Level	Data sheet status ^[1]	Product status ^[2] ^[3]	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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