

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 _{DS} (V) | P _{L(AV)} (W) | G _p (dB) | η_D (%) | ACPR ₄₀₀ (dBc) | ACPR ₆₀₀ (dBc) | EVM _{rms} (%) |
|-------------------|--------------|------------------------|---------------------------|------------------------|-----------------|------------------------------|------------------------------|---------------------------|
| 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_{Dq} of 550 mA:
 - ◆ Output power = 29.5 W (AV)
 - ◆ Gain = 19 dB
 - ◆ Efficiency = 38.5 %
 - ◆ ACPR₄₀₀ = -62.5 dBc
 - ◆ ACPR₆₀₀ = -72 dBc
 - ◆ EVM_{rms} = 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

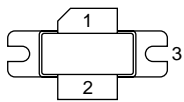
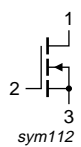
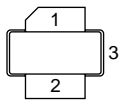
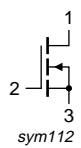
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1.3 Applications

- 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 |
|--------------------------------|-------------|--|--|
| BLC6G20-75 (SOT895-1) | | | |
| 1 | drain |  |  sym112 |
| 2 | gate | | |
| 3 | source | | |
| BLC6G20LS-75 (SOT896-1) | | | |
| 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 | μA |
| 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 | Ω |
| 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 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 |
| η_D | drain efficiency | $P_{L(AV)} = 29.5\text{ W}$ | 36.5 | 38.5 | - | % |
| ACPR ₄₀₀ | adjacent channel power ratio (400 kHz) | $P_{L(AV)} = 29.5\text{ W}$ | - | -62.2 | -60 | dBc |
| ACPR ₆₀₀ | 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

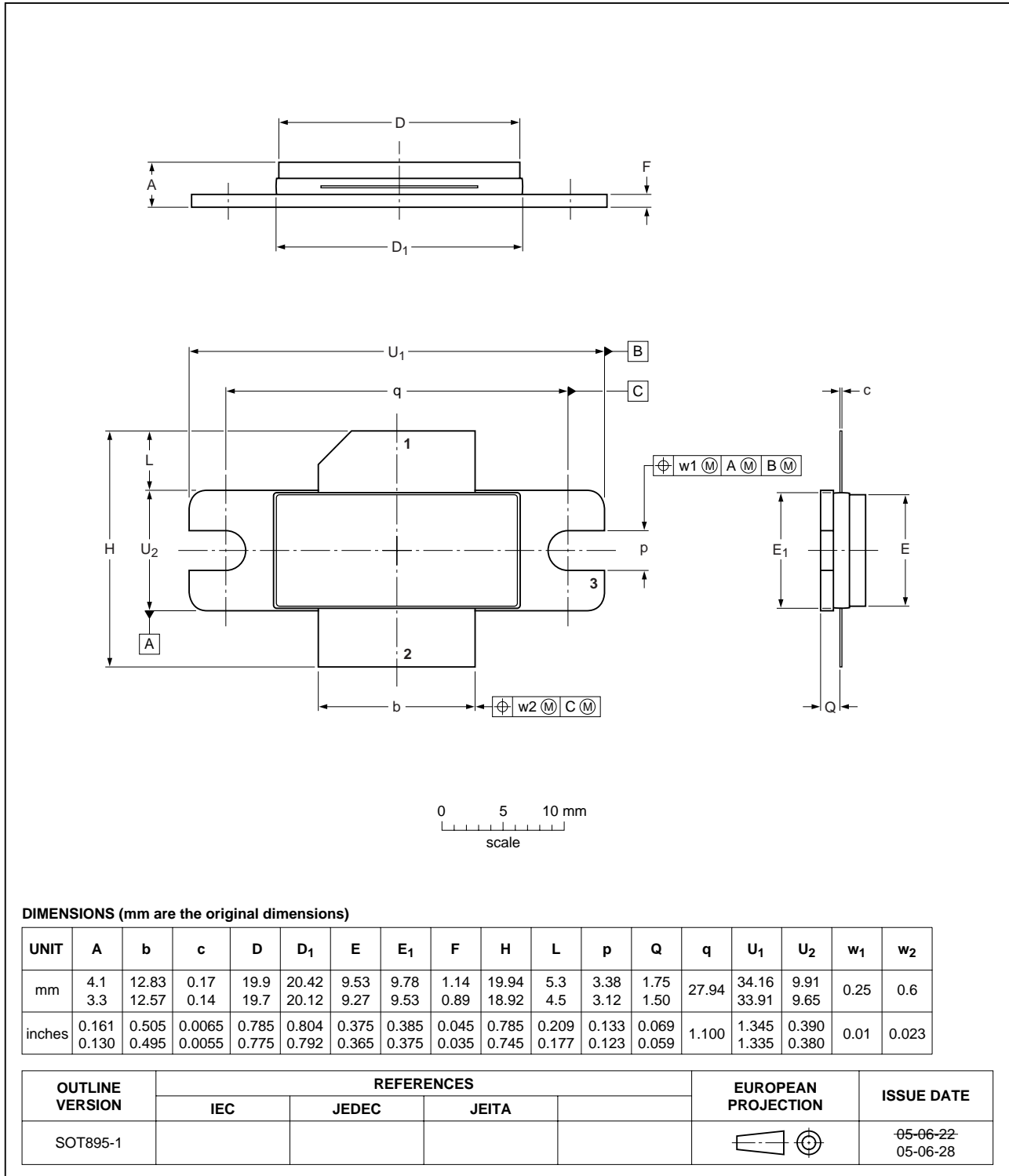


Fig 1. Package outline SOT895-1

Plastic earless flanged cavity package; 2 leads

SOT896-1

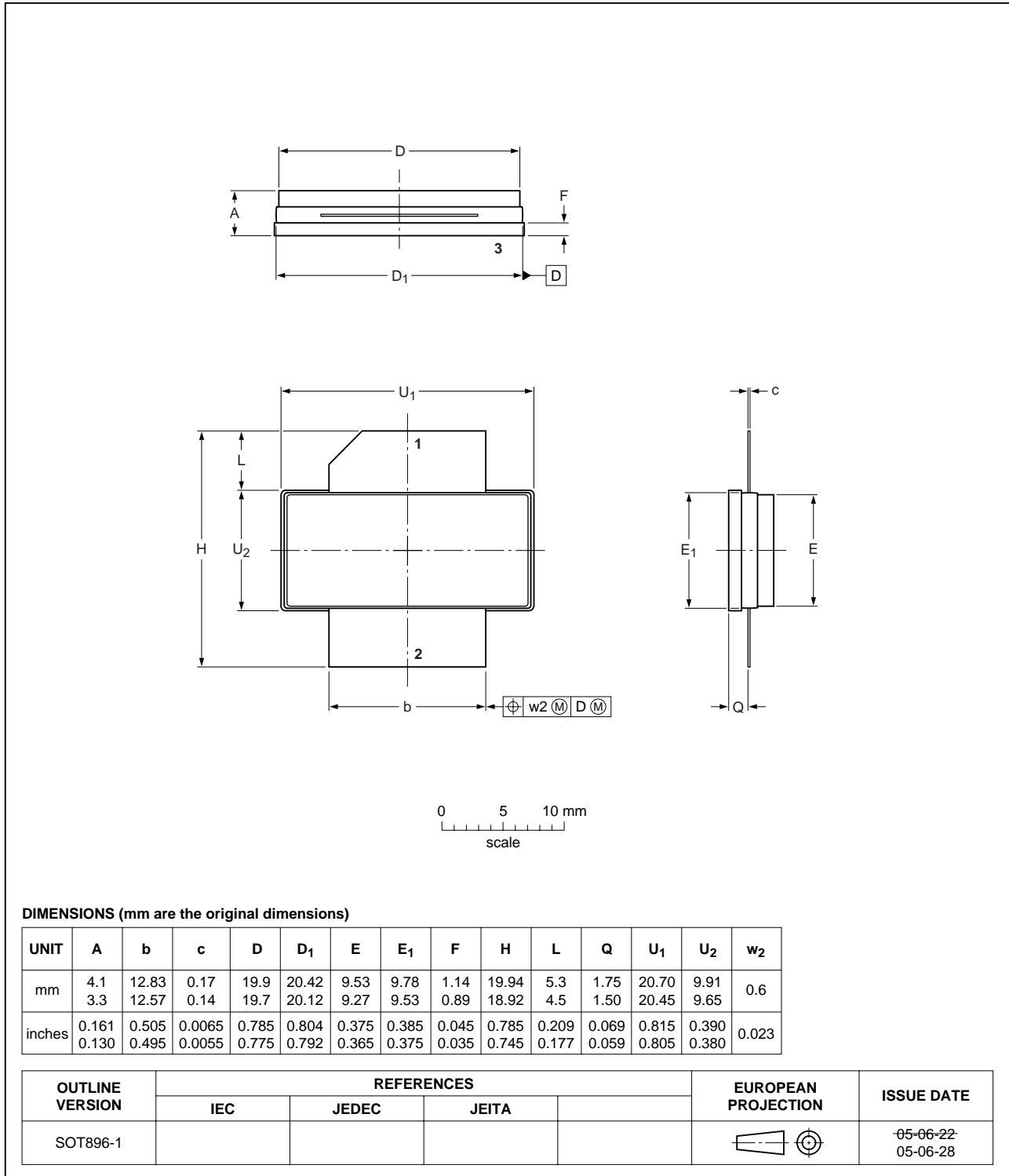


Fig 2. Package outline SOT896-1

9. Abbreviations

Table 8: Abbreviations

| Acronym | Description |
|----------------|--|
| 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

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 | - | - | - |

11. Data sheet status

| Level | Data sheet status ^[1] | Product status ^[2] ^[3] | Definition |
|-------|----------------------------------|--|--|
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