

# BLM6G10-30; BLM6G10-30G

W-CDMA 900 MHz - 1000 MHz power MMIC

Rev. 01 — 28 August 2009

Objective data sheet

## 1. Product profile

### 1.1 General description

30 W LDMOS 2-stage power MMIC for base station applications at frequencies from 920 MHz to 960 MHz. Available in Gull Wing for surface mount (SOT822-1) or flat lead (SOT834-1)

**Table 1. Typical performance**  
Typical RF performance at  $T_h = 25^\circ\text{C}$ .

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	$f_1 = 935; f_2 = 945$	28	2	29	11.5	-48.5 <sup>[1]</sup>	-52 <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



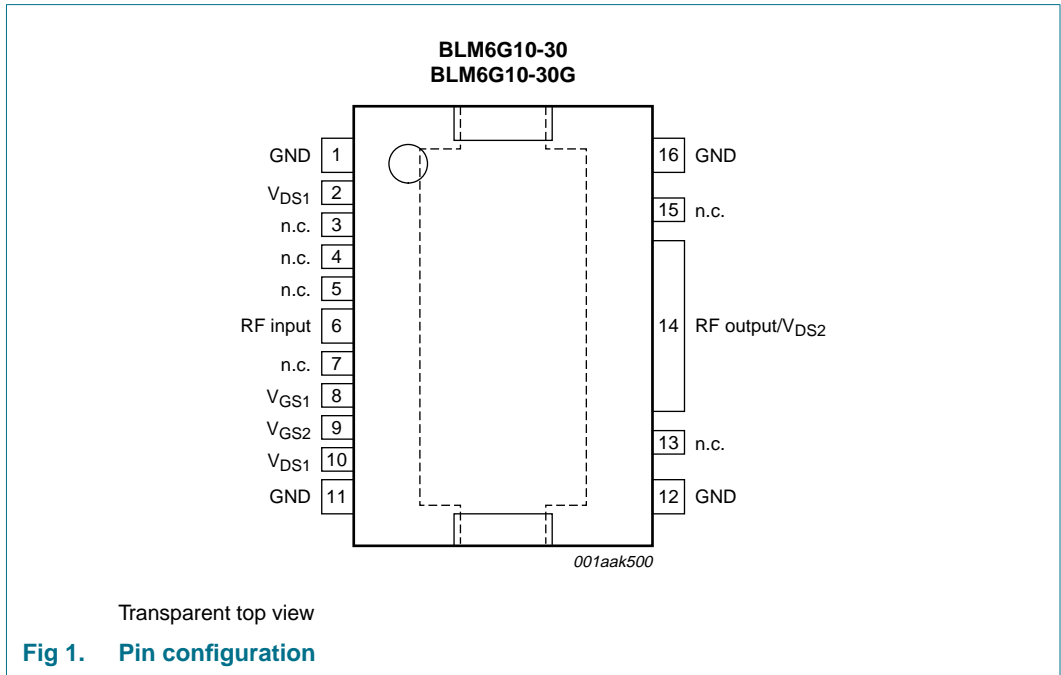
This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

### 1.2 Features

- Typical 2-carrier W-CDMA performance at a frequency of 940 MHz:
  - ◆ Average output power = 2 W
  - ◆ Gain = 29 dB (typ)
  - ◆ Efficiency = 11.5 %
  - ◆ IMD3 = -48.5 dBc
  - ◆ ACPR = -52 dBc
- Integrated temperature compensated bias
- Excellent thermal stability
- Biasing of individual stages is externally accessible
- Integrated ESD protection
- Small component size, very suitable for PA size reduction
- On-chip matching (input matched to 50 ohm, output partially matched)
- High power gain
- Designed for broadband operation (920 MHz to 960 MHz)

**2. Pinning information**

**2.1 Pinning**



**2.2 Pin description**

**Table 2. Pin description**

Pin	Description
1, 11, 12, 16	GROUND
2	V <sub>DS1</sub>
3, 4, 5, 7, 13, 15	n.c.
6	RF_INPUT
8	V <sub>GS1</sub>
9	V <sub>GS2</sub>
10	V <sub>DS1</sub>
14	RF_OUTPUT/V <sub>DS2</sub>
flange	RF_GROUND

### 3. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
BLM6G10-30	-	HSOP16F: plastic, heatsink small outline package; 16 leads (flat)	SOT834-1
BLM6G10-30G	-	HSOP16: plastic, heatsink small outline package; 16 leads	SOT822-1

### 4. Block diagram

<td>

### 5. 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	+13	V
$I_{D1}$	first stage drain current		-	3	A
$I_{D2}$	second stage drain current		-	9	A
$T_{stg}$	storage temperature		-65	+150	°C
$T_j$	junction temperature		-	200	°C

### 6. Thermal characteristics

**Table 5. Thermal characteristics**

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)1}$	first stage thermal resistance from junction to case	$T_{case} = 80\text{ °C}$ ; $P_L = 2\text{ W}$ ; 2-carrier W-CDMA	[1] 7.5	K/W
$R_{th(j-c)2}$	second stage thermal resistance from junction to case	$T_{case} = 80\text{ °C}$ ; $P_L = 2\text{ W}$ ; 2-carrier W-CDMA	[1] 2.3	K/W

[1] Thermal resistance is determined under specific RF operating conditions.

## 7. Characteristics

**Table 6. Characteristics**

Mode of operation: 2-carrier W-CDMA; PAR 7 dB at 0.01 % probability on CCDF; 3GPP test model 1; 1-64 PDPCH;  $f_1 = 922.5$  MHz;  $f_2 = 932.5$  MHz;  $f_3 = 947.5$  MHz;  $f_4 = 957.5$  MHz;  $V_{DS} = 28$  V;  $I_{Dq1} = 105$  mA;  $I_{Dq2} = 288$  mA;  $T_h = 25$  °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$P_{L(AV)}$	average output power		-	2	-	W
$G_p$	power gain	$P_{L(AV)} = 2$ W	27	29	31	dB
$RL_{in}$	input return loss	$P_{L(AV)} = 2$ W	12	15	-	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 2$ W	10	11.5	-	%
IMD3	third-order intermodulation distortion	$P_{L(AV)} = 2$ W	-	-48.5	-45	dBc
ACPR	adjacent channel power ratio	$P_{L(AV)} = 2$ W	-	-52	-48.5	dBc

## 8. Application information

### 8.1 Ruggedness

The BLMG10-30 and BLM6G10-30G are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions:  $V_{DS} = 32$  V;  $I_{Dq1} = 105$  mA;  $I_{Dq2} = 288$  mA;  $P_L = 30$  W (CW).

### 8.2 Impedance information

**Table 7. Typical impedance**

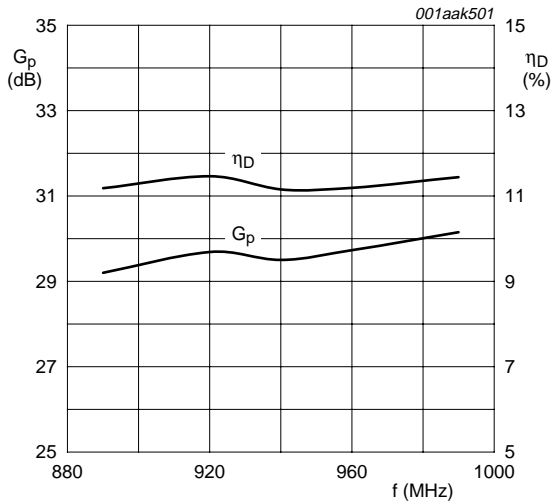
f MHz	$Z_i$ <sup>[1]</sup> $\Omega$	$Z_L$ <sup>[2]</sup> $\Omega$
850	43.6 – j0	3 – j0.8
860	43.5 – j0.25	3.2 – j0.7
880	43.4 – j0.4	3.4 – j0.5
900	43.4 – j0.6	3.5 – j0.2
920	43.5 – j0.9	3.45 – j0
940	43.6 – j1.3	3.2 – j0.1
960	43.6 – j1.7	3 – j0.1
980	43.6 – j2	2.7 – j0.1

[1] Device input impedance as measured from gate to ground.

[2] Test circuit impedance as measured from drain to ground.

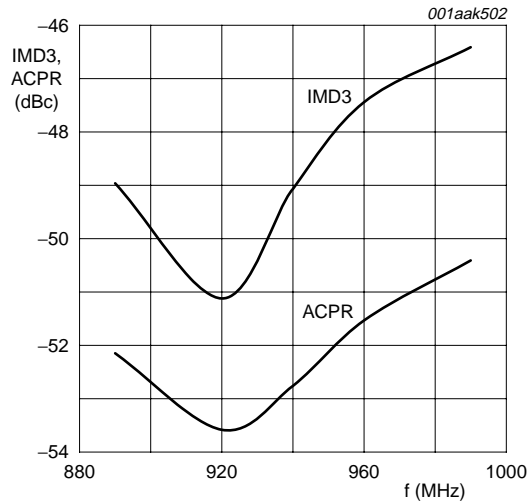
8.3 Performance curves

Performance curves are measured in a BLM6G22-30G application circuit.



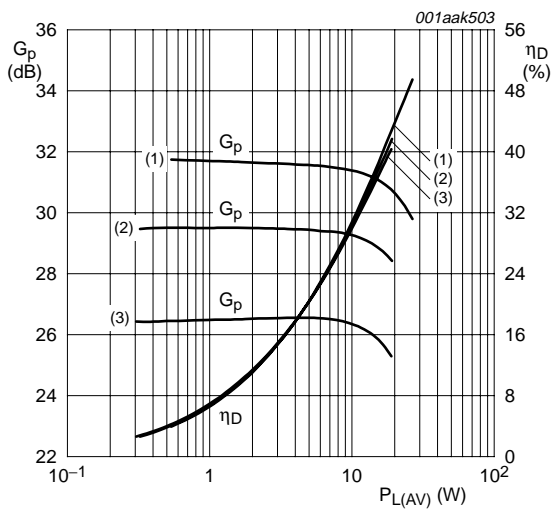
$T_{case} = 25\text{ }^{\circ}\text{C}$ ;  $V_{DS} = 28\text{ V}$ ;  $P_{L(AV)} = 2\text{ W}$ ;  $I_{Dq1} = 105\text{ mA}$ ;  $I_{Dq2} = 288\text{ mA}$ ; carrier spacing = 10 MHz.

Fig 2. 2-carrier W-CDMA power gain and drain efficiency as function of frequency; typical values



$T_{case} = 25\text{ }^{\circ}\text{C}$ ;  $V_{DS} = 28\text{ V}$ ;  $P_{L(AV)} = 2\text{ W}$ ;  $I_{Dq1} = 105\text{ mA}$ ;  $I_{Dq2} = 288\text{ mA}$ ; carrier spacing = 10 MHz.

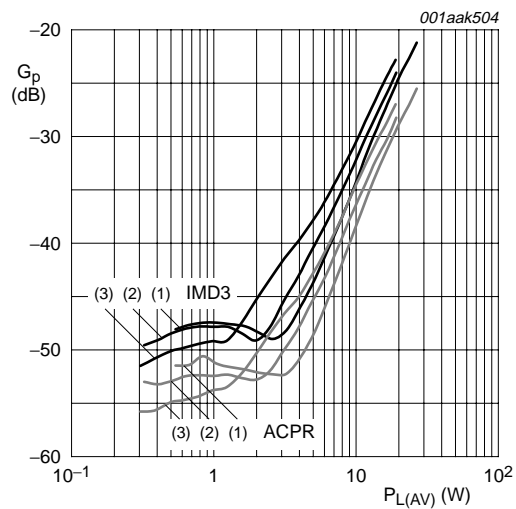
Fig 3. 2-carrier W-CDMA adjacent power channel ratio and third order intermodulation distortion as function of frequency; typical values



$V_{DS} = 28\text{ V}$ ;  $I_{Dq1} = 105\text{ mA}$ ;  $I_{Dq2} = 288\text{ mA}$ ;  $f = 940\text{ MHz}$ ; carrier spacing = 10 MHz.

- (1)  $T_{case} = -30\text{ }^{\circ}\text{C}$
- (2)  $T_{case} = 25\text{ }^{\circ}\text{C}$
- (3)  $T_{case} = 85\text{ }^{\circ}\text{C}$

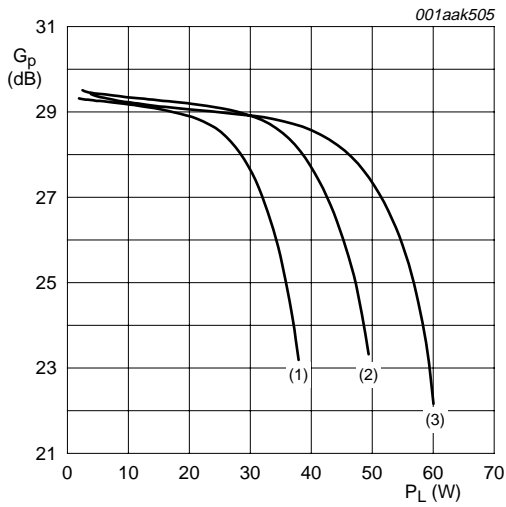
Fig 4. 2-carrier W-CDMA power gain and drain efficiency as function of average output power and temperature; typical values



$V_{DS} = 28\text{ V}$ ;  $I_{Dq1} = 105\text{ mA}$ ;  $I_{Dq2} = 288\text{ mA}$ ;  $f = 940\text{ MHz}$ ; carrier spacing = 10 MHz.

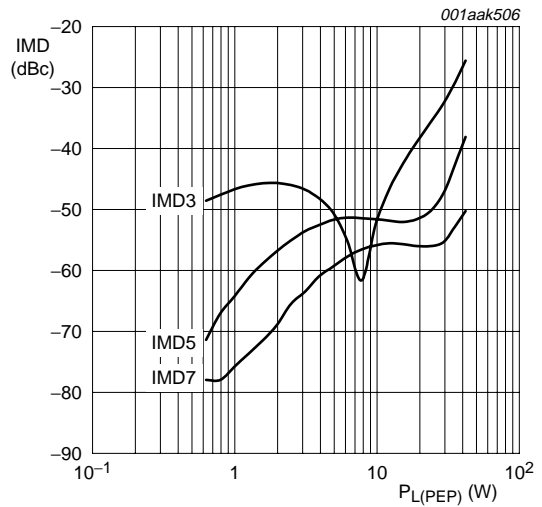
- (1)  $T_{case} = -30\text{ }^{\circ}\text{C}$
- (2)  $T_{case} = 25\text{ }^{\circ}\text{C}$
- (3)  $T_{case} = 85\text{ }^{\circ}\text{C}$

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



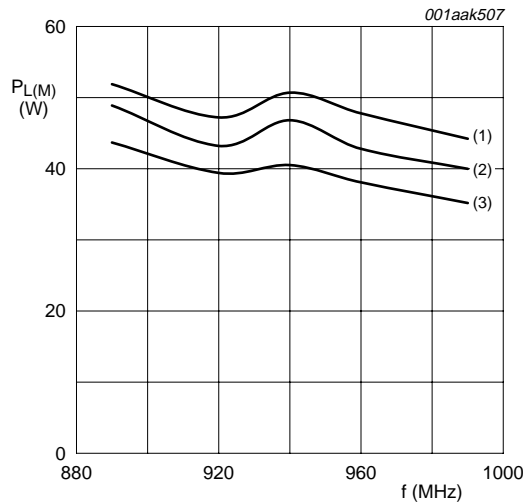
$f = 940$  MHz;  $I_{DQ1} = 105$  mA;  $I_{DQ2} = 288$  mA.  
 (1)  $V_{DS} = 24$  V  
 (2)  $V_{DS} = 28$  V  
 (3)  $V_{DS} = 32$  V

**Fig 6. One-tone CW power gain as function of output power and drain-source voltage; typical value**



$I_{DQ1} = 105$  mA;  $I_{DQ2} = 288$  mA;  $f_1 = 940$  MHz;  
 $f_2 = 940.1$  MHz.

**Fig 7. Two-tone CW intermodulation distortion as function of peak envelope load power; typical value**



Test signal: IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13). PAR = 9.7 dB at 0.01 % probability on the CCDF.  
 (1)  $T_{case} = -30$  °C  
 (2)  $T_{case} = 25$  °C  
 (3)  $T_{case} = 85$  °C

**Fig 8. Single-carrier peak output power (peaks 3 dB compressed) as function of frequency and temperature; typical values**

9. Package outline

HSOP16F: plastic, heatsink small outline package; 16 leads (flat)

SOT834-1

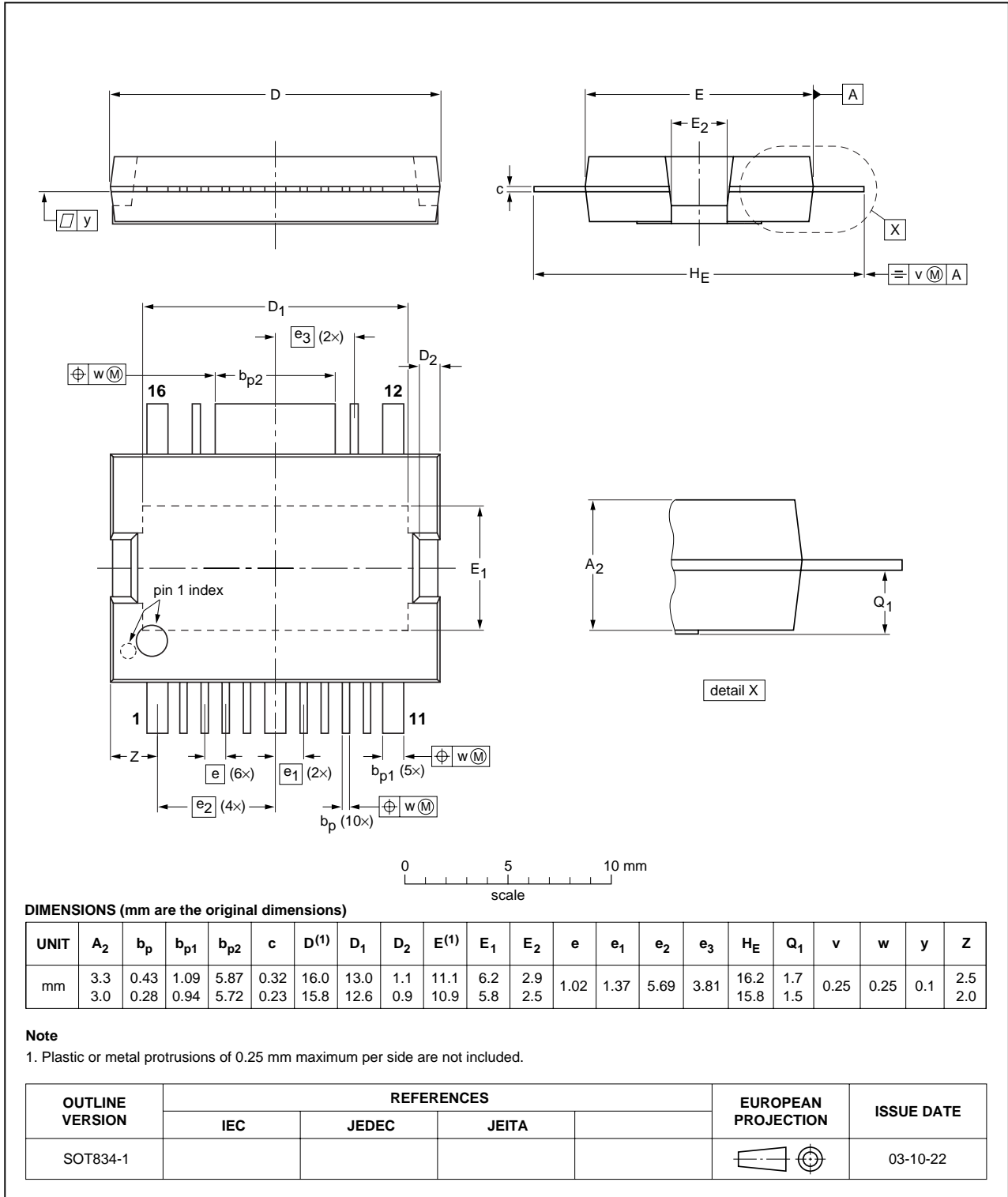


Fig 9. Package outline SOT834-1

HSOP16: plastic, heatsink small outline package; 16 leads

SOT822-1

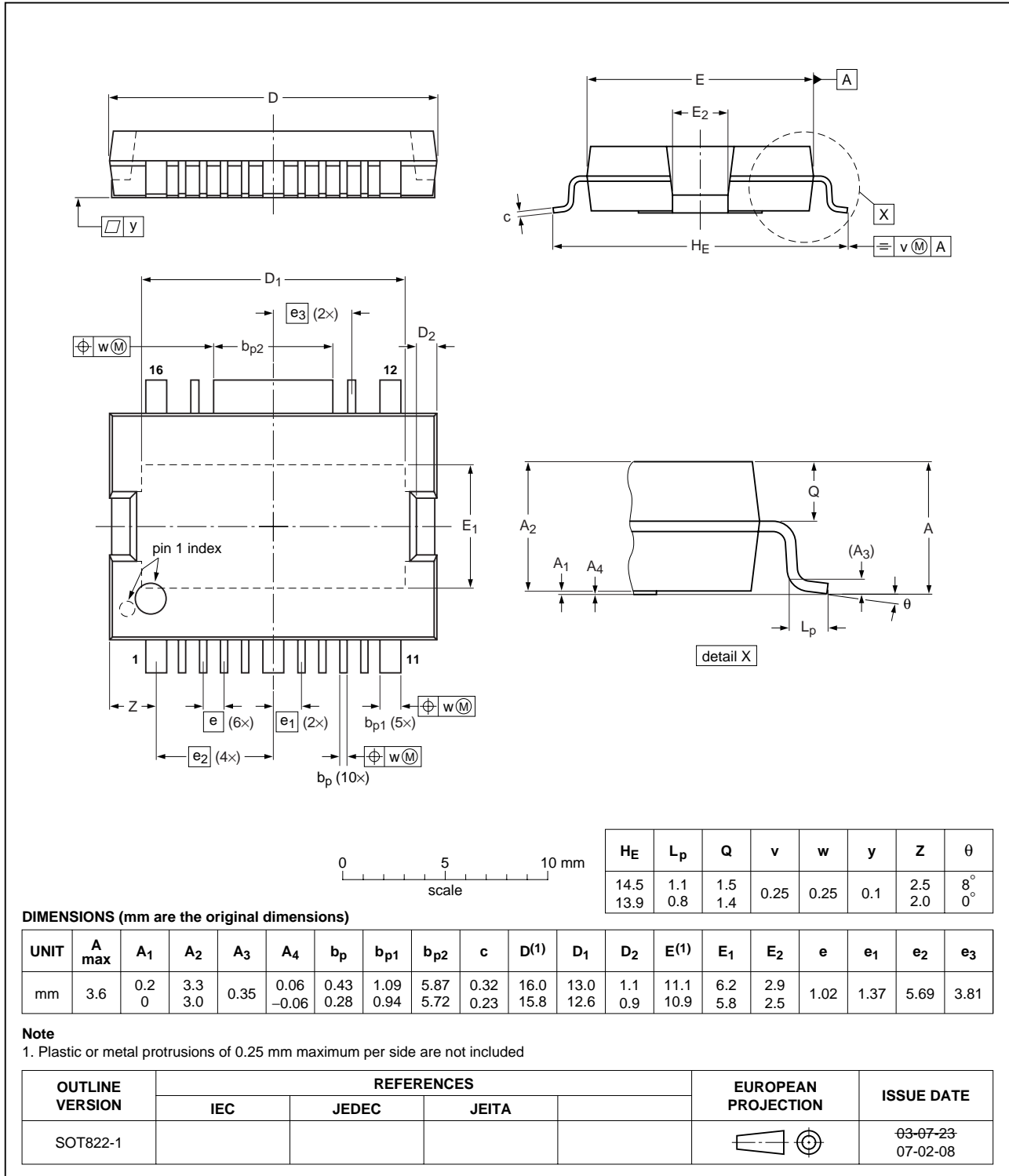


Fig 10. Package outline SOT822-1



## 10. Handling information

### 10.1 Moisture sensitivity

Table 8. Moisture sensitivity level

Test methodology	Class
JESD-22-A113	3

## 11. 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
MMIC	Monolithic Microwave Integrated Circuit
PA	Power Amplifier
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

## 12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLM6G10-30_BLM6G10-30G_1	20090828	Objective data sheet	-	-

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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.
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Product [short] data sheet	Production	This document contains the product specification.

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[2] The term 'short data sheet' is explained in section "Definitions".

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