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 °C.

Mode of operation	f	V_{DS}	$P_{L(AV)}$	G_p	η_D	IMD3	ACPR
	(MHz)	(V)	(W)	(dB)	(%)	(dBc)	(dBc)
2-carrier W-CDMA	f_1 = 935; f_2 = 945	28	2	29	11.5	–48.5[1]	–52[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

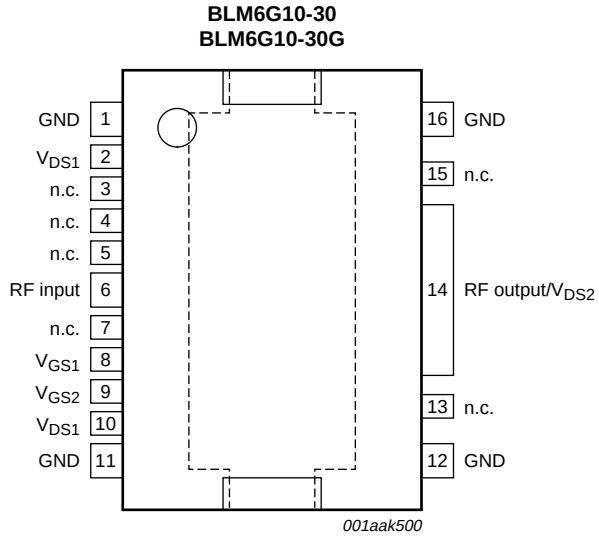
This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

1.2 Features

- Typical 2-carrier W-CDMA performance at 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



Transparent top view

Fig 1. Pin configuration

2.2 Pin description

Table 2. Pin description

Pin	Description
1, 11, 12, 16	GROUND
2	V_{DS1}
3, 4, 5, 7, 13, 15	n.c.
6	RF_INPUT
8	V_{GS1}
9	V_{GS2}
10	V_{DS1}
14	RF_OUTPUT/V_{DS2}
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

<tbd>

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 °C; P_L = 2 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 °C; P_L = 2 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
η_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

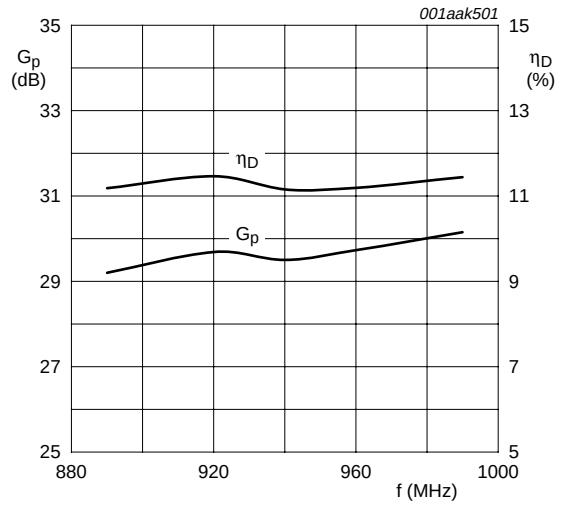
f	Z_i[1]	Z_L[2]
MHz	Ω	Ω
850	43.6 – j0	3 – j0.8
860	43.5 – j0.25	3.2 – j0.7
880	43.4 – j0.4	3.4 – j0.5
900	43.4 – j0.6	3.5 – j0.2
920	43.5 – j0.9	3.45 – j0
940	43.6 – j1.3	3.2 – j0.1
960	43.6 – j1.7	3 – j0.1
980	43.6 – j2	2.7 – j0.1

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

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

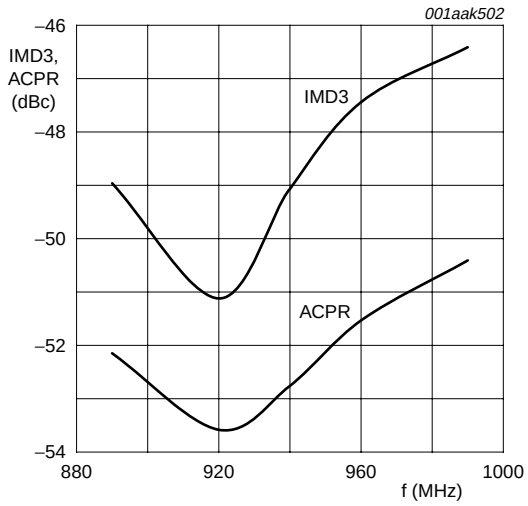
8.3 Performance curves

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



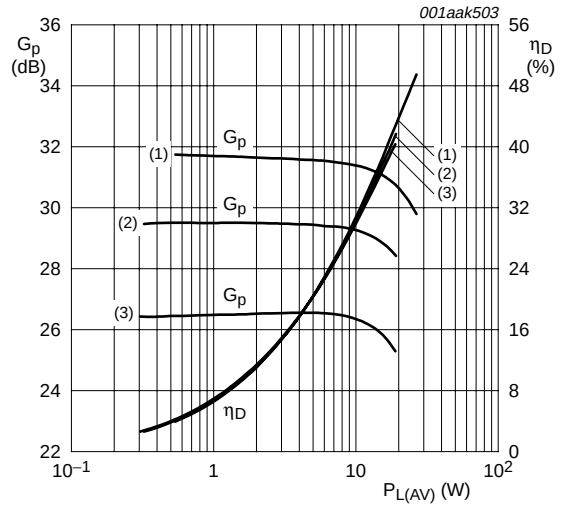
T_{case} = 25 °C; V_{DS} = 28 V; $P_{L(AV)}$ = 2 W; I_{Dq1} = 105 mA; I_{Dq2} = 288 mA; carrier spacing = 10 MHz.

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



T_{case} = 25 °C; V_{DS} = 28 V; $P_{L(AV)}$ = 2 W; I_{Dq1} = 105 mA; I_{Dq2} = 288 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



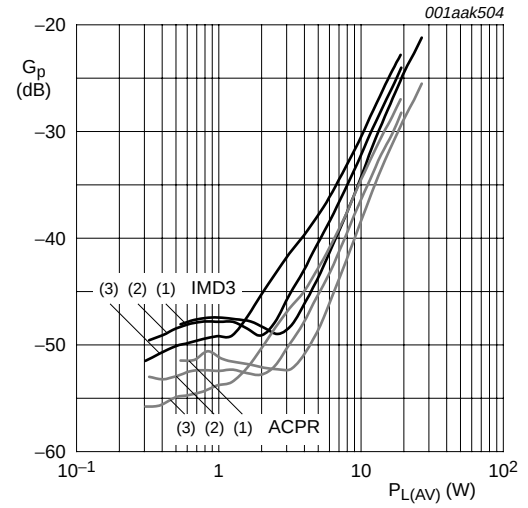
V_{DS} = 28 V; I_{Dq1} = 105 mA; I_{Dq2} = 288 mA; f = 940 MHz; carrier spacing = 10 MHz.

(1) T_{case} = –30 °C

(2) T_{case} = 25 °C

(3) T_{case} = 85 °C

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



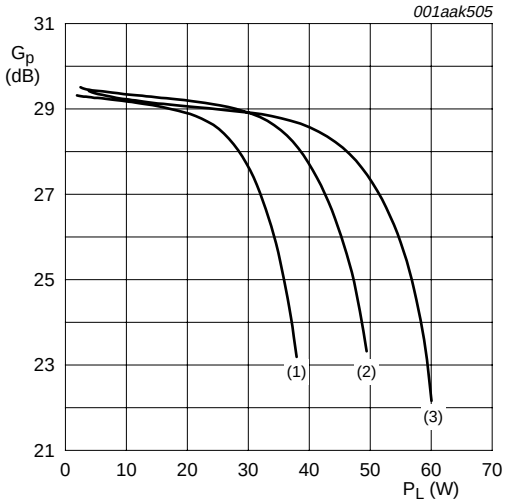
V_{DS} = 28 V; I_{Dq1} = 105 mA; I_{Dq2} = 288 mA; f = 940 MHz; carrier spacing = 10 MHz.

(1) T_{case} = –30 °C

(2) T_{case} = 25 °C

(3) T_{case} = 85 °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



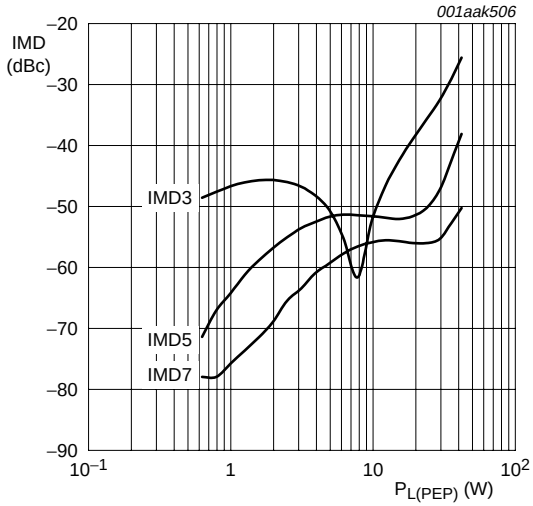
f = 940 MHz; I_{Dq1} = 105 mA; I_{Dq2} = 288 mA.

(1) V_{DS} = 24 V

(2) V_{DS} = 28 V

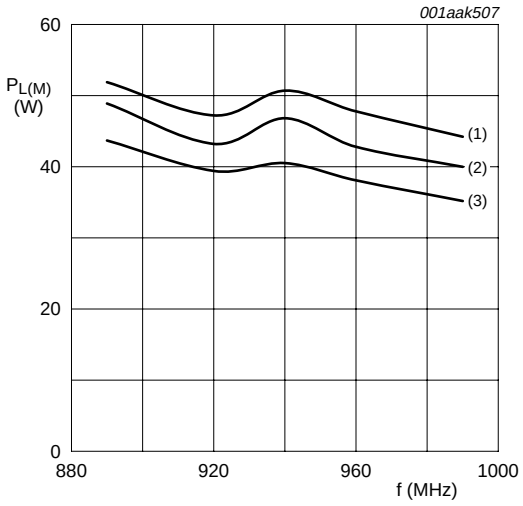
(3) V_{DS} = 32 V

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

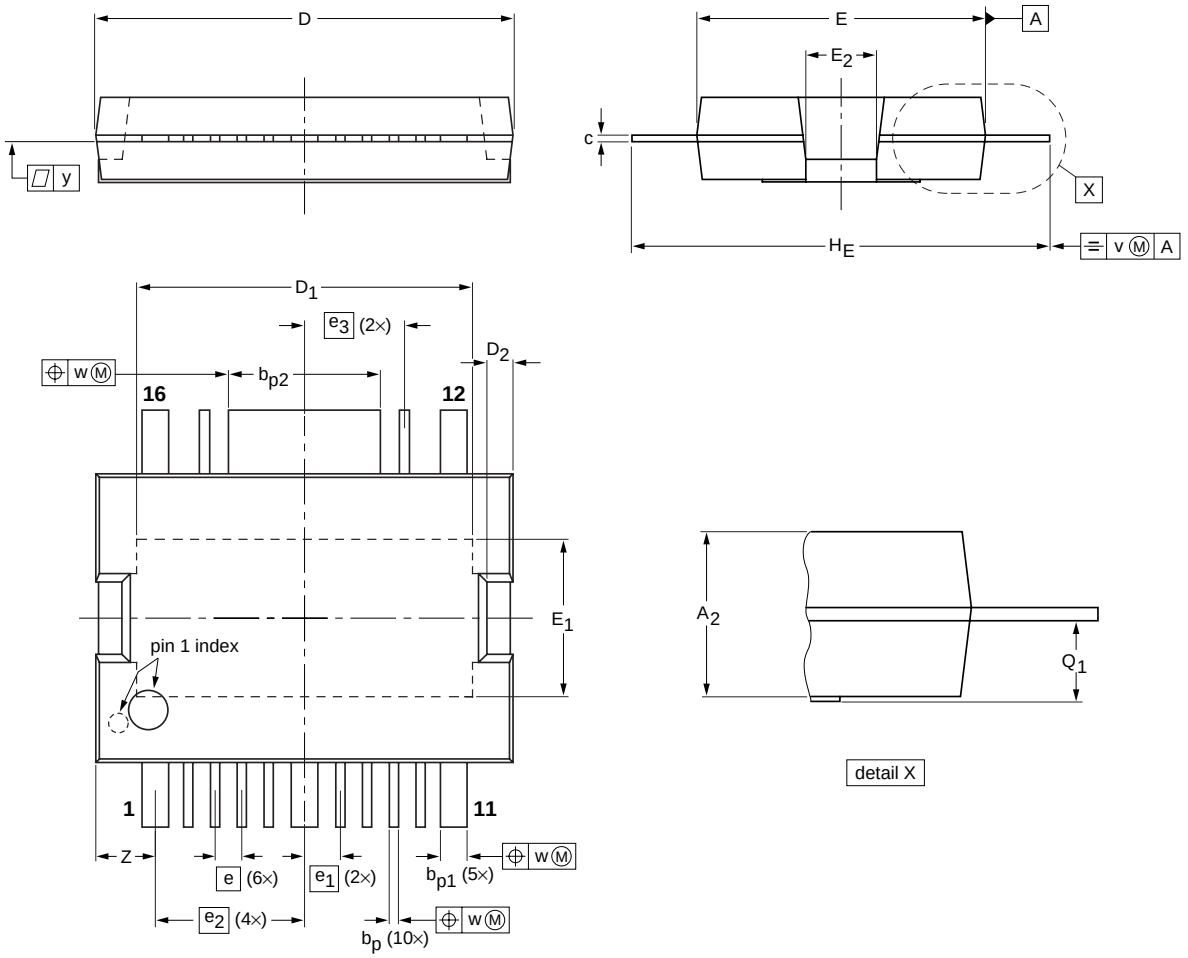
(2) T_{case} = 25 °C

(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**



DIMENSIONS (mm are the original dimensions)

UNIT	A_2	b_p	b_{p1}	b_{p2}	c	$D^{(1)}$	D_1	D_2	$E^{(1)}$	E_1	E_2	e	e_1	e_2	e_3	H_E	Q_1	v	w	y	Z
mm	3.3 3.0	0.43 0.28	1.09 0.94	5.87 5.72	0.32 0.23	16.0 15.8	13.0 12.6	1.1 0.9	11.1 10.9	6.2 5.8	2.9 2.5	1.02	1.37	5.69	3.81	16.2 15.8	1.7 1.5	0.25	0.25	0.1	2.5 2.0

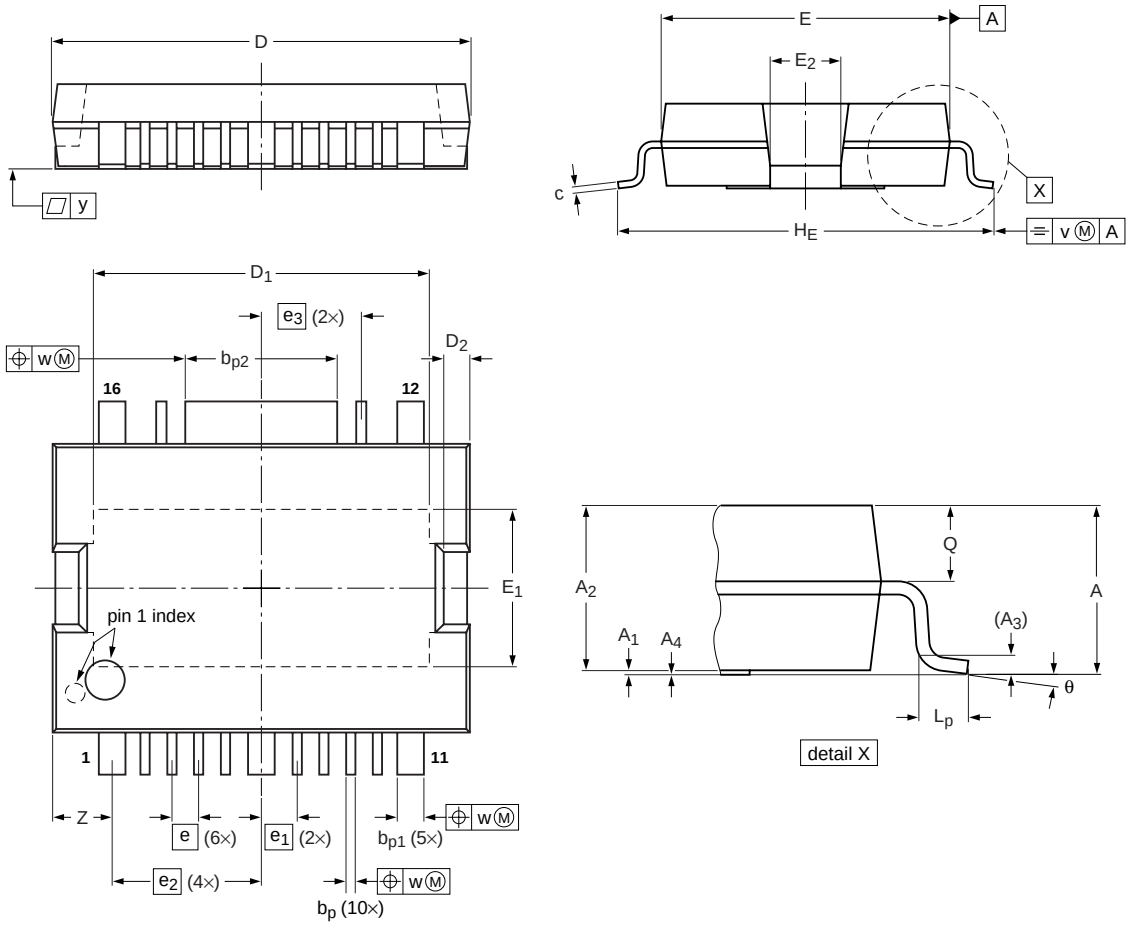
Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT834-1						03-10-22

Fig 9. Package outline SOT834-1

HSOP16: plastic, heatsink small outline package; 16 leads **SOT822-1**



H_E	L_p	Q	v	w	y	Z	θ
14.5 13.9	1.1 0.8	1.5 1.4	0.25	0.25	0.1	2.5 2.0	8° 0°

DIMENSIONS (mm are the original dimensions)

UNIT	A max	A_1	A_2	A_3	A_4	b_p	b_{p1}	b_{p2}	c	$D^{(1)}$	D_1	D_2	$E^{(1)}$	E_1	E_2	e	e_1	e_2	e_3
mm	3.6	0.2 0	3.3 3.0	0.35	0.06 –0.06	0.43 0.28	1.09 0.94	5.87 5.72	0.32 0.23	16.0 15.8	13.0 12.6	1.1 0.9	11.1 10.9	6.2 5.8	2.9 2.5	1.02	1.37	5.69	3.81

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT822-1						~~03-07-23~~ 07-02-08

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	-	-

13. Legal information

13.1 Data sheet status

Document status[1][2]	Product status[3]	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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[2] The term 'short data sheet' is explained in section "Definitions".

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