

1. Product profile

1.1 General description

A 5 W plastic LDMOS power transistor for base station applications from 700 MHz to 2700 MHz band.

Table 1. Application information

Typical RF performance at $T_{case} = 25\text{ °C}$; in a class-AB application circuit.

Test signal	f (MHz)	I_{Dq} (mA)	V_{DS} (V)	$P_{L(AV)}$ (W)	G_p (dB)	η_D (%)	ACPR (dBc)
IS-95 [1]	788	60	28	1	23.9	25	-41
2-carrier W-CDMA [2]	2140	55	28	1	16.7	27	-40
Pulsed CW	2700	55	28	5	14.5	45	-

[1] Single carrier IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 - 13). PAR = 9.7 dB at 0.01 % probability on the CCDF. Channel bandwidth is 1.2288 MHz.

[2] Test signal: 2-carrier W-CDMA: carrier spacing = 5 MHz. PAR = 8.4 dB at 0.01% probability on CCDF; RF performance at $V_{DS} = 28\text{ V}$; $I_{Dq} = 55\text{ mA}$.

1.2 Features and benefits

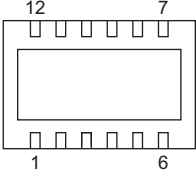
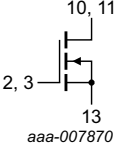
- High efficiency
- Excellent ruggedness
- Designed for broadband operation
- Excellent thermal stability
- High power gain
- Integrated ESD protection
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

1.3 Applications

- CDMA
- W-CDMA
- GSM EDGE
- MC-GSM
- LTE
- WiMAX

2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1, 4, 5, 6, 7, 8, 9, 12	n.c.	 Transparent top view	 aaa-007870
2, 3	gate		
10, 11	drain		
13	source [1]		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLP7G22-05	HVSON12	plastic thermal enhanced very thin small outline package; no leads; 12 terminals; body 6 × 4 × 0.85 mm	SOT1179-2

4. Limiting values

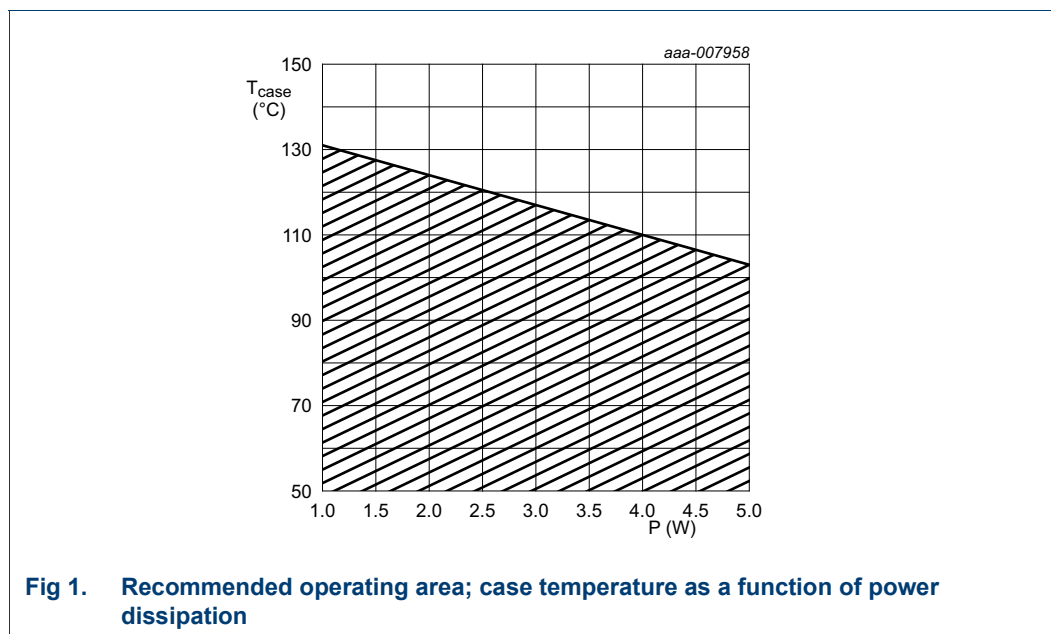
Table 4. Limiting values

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
T_{stg}	storage temperature		-65	+150	°C
T_j	junction temperature		-	150	°C

5. Recommended operating conditions

See application note AN11198 for more details.



6. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-c)}$	thermal resistance from junction to case	$T_{case} = 80\text{ °C}$; $P_L = 5\text{ W}$	[1] 6.4	K/W

[1] $R_{th(j-c)}$ is measured under RF conditions.

7. Characteristics

Table 6. DC characteristics

$T_j = 25\text{ °C}$; per section unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}$; $I_D = 0.09\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}$; $I_D = 9\text{ mA}$	1.5	1.9	2.3	V
V_{GSq}	gate-source quiescent voltage	$V_{DS} = 28\text{ V}$; $I_D = 55\text{ mA}$	1.45	2.0	2.55	V
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}$; $V_{DS} = 28\text{ V}$	-	-	1.4	μA
I_{DSX}	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $V_{DS} = 10\text{ V}$	-	1.6	-	A
I_{GSS}	gate leakage current	$V_{GS} = 11\text{ V}$; $V_{DS} = 0\text{ V}$	-	-	140	nA
g_{fs}	forward transconductance	$V_{DS} = 10\text{ V}$; $I_D = 9\text{ mA}$	-	80	-	mS
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $I_D = 315\text{ mA}$	-	2	-	Ω

Table 7. RF characteristics

Test signal: 1-tone pulsed; $t_p = 50 \mu\text{s}$; $\delta = 10 \%$; $f = 2140 \text{ MHz}$; RF performance at $V_{DS} = 28 \text{ V}$; $I_{DQ} = 55 \text{ mA}$; $T_{case} = 25 \text{ }^\circ\text{C}$; unless otherwise specified, in a production circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$P_{L(AV)} = 1 \text{ W}$	15	16	-	dB
η_D	drain efficiency	$P_{L(AV)} = 1 \text{ W}$	20	23	-	%
$P_{L(1dB)}$	output power at 1 dB gain compression		5.5	-	-	W
RL_{in}	input return loss	$P_{L(AV)} = 1 \text{ W}$	-	-16	-12	dB

8. Application information

8.1 Application circuit

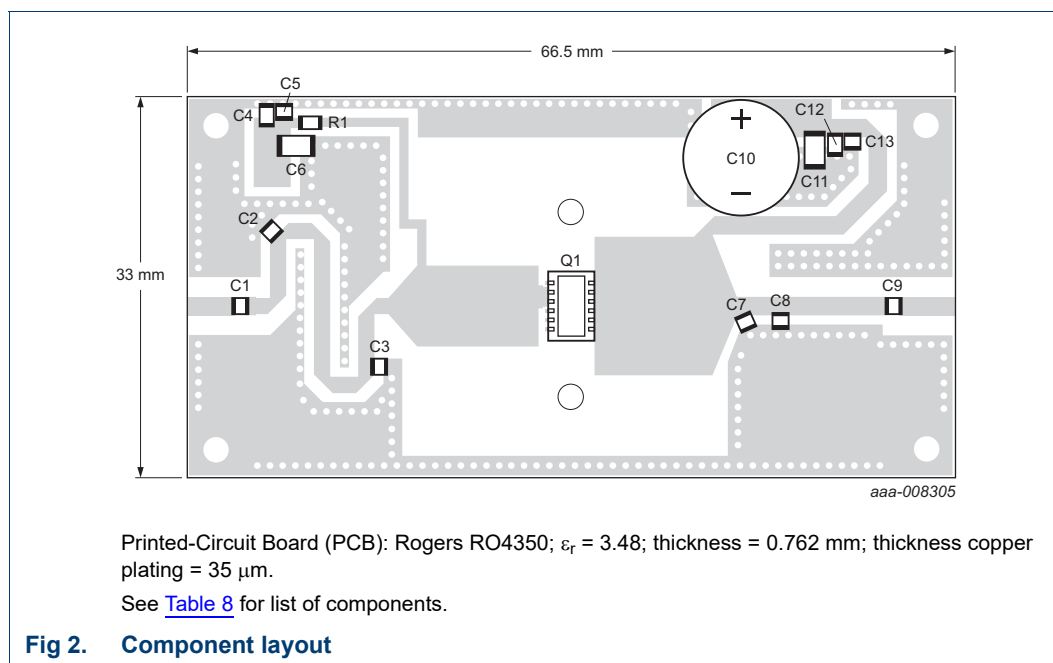


Table 8. List of components

See [Figure 2](#) for component layout.

Component	Description	Value	Remarks
C1, C9	multilayer ceramic chip capacitor	15 pF	[1]
C2	multilayer ceramic chip capacitor	1.8 pF	[1]
C3	multilayer ceramic chip capacitor	1.6 pF	[1]
C4, C12	multilayer ceramic chip capacitor	100 nF, 50 V	[2]
C5, C13	multilayer ceramic chip capacitor	10 pF	[1]
C6, C11	multilayer ceramic chip capacitor	1 μF , 50 V	[2]
C7	multilayer ceramic chip capacitor	3.0 pF	[1]
C8	multilayer ceramic chip capacitor	1.6 pF	[1]

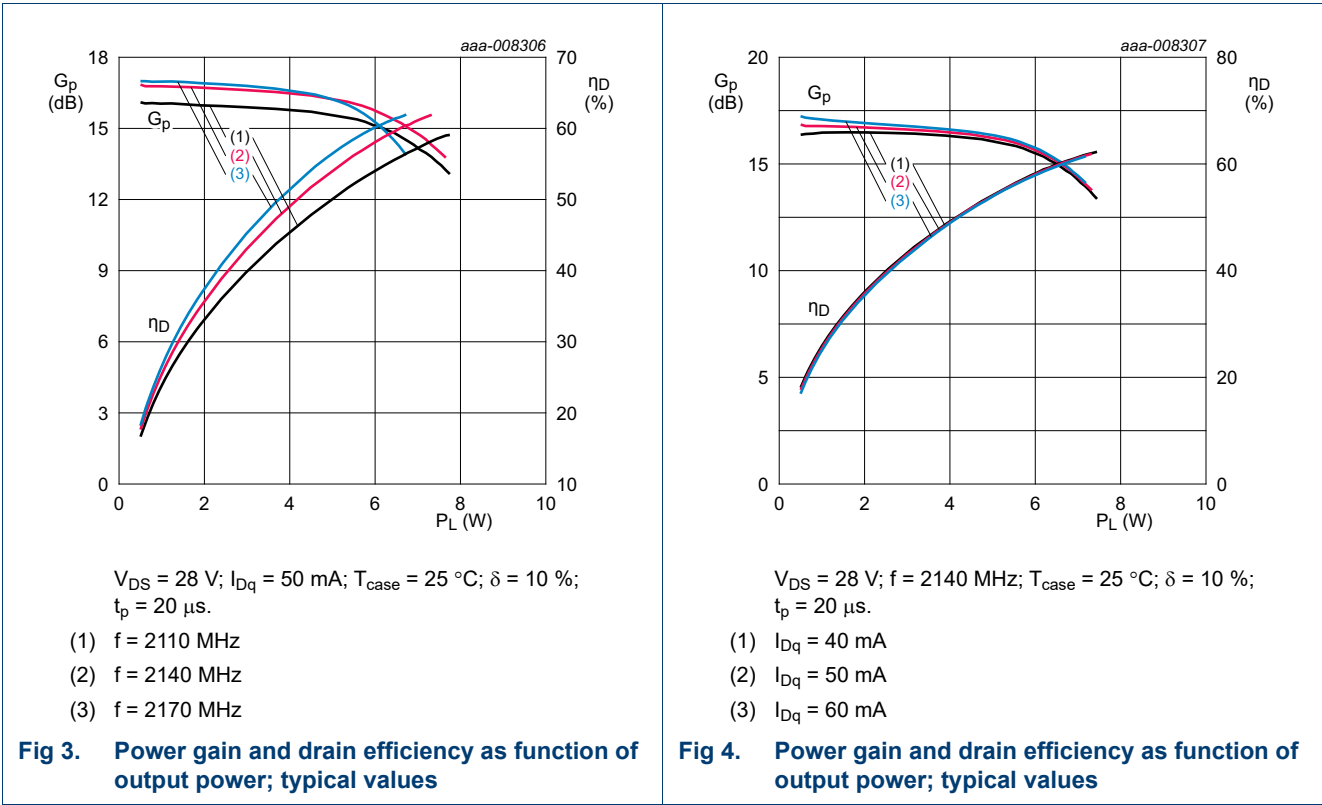
Table 8. List of components ...continued
See Figure 2 for component layout.

Component	Description	Value	Remarks
C10	electrolytic capacitor	220 μF, 63 V	
R1	chip resistor	4.7 Ω	SMD 0805
Q1	transistor	-	BLP7G22-05

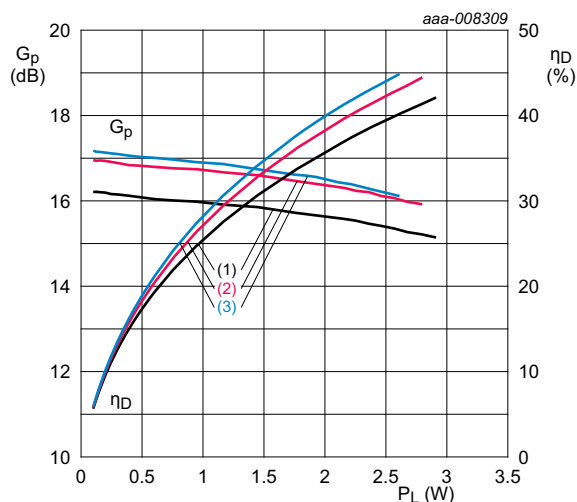
- [1] American Technical Ceramics type 100A or capacitor of same quality.
[2] Murata GRM32RR71H05KA01L or capacitor of same quality.

8.2 Graphical data

8.2.1 Pulsed CW



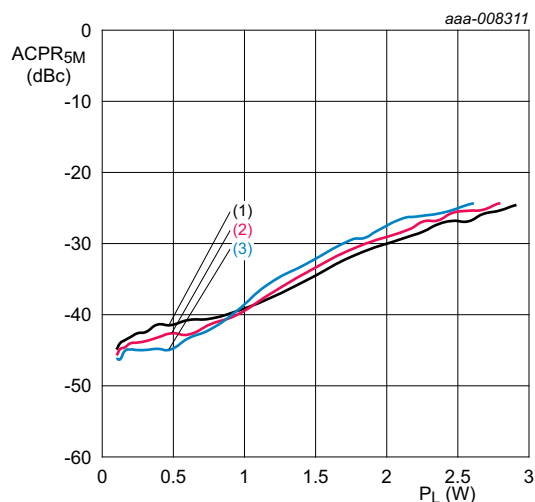
8.2.2 2-Carrier W-CDMA



$V_{DS} = 28 \text{ V}$; $I_{DQ} = 50 \text{ mA}$; $T_{case} = 25 \text{ }^{\circ}\text{C}$;
carrier spacing = 5 MHz; 46 % clipping; PAR = 8.4 dB at
0.01 % probability on CCDF.

- (1) $f = 2110 \text{ MHz}$
- (2) $f = 2140 \text{ MHz}$
- (3) $f = 2170 \text{ MHz}$

Fig 5. Power gain and drain efficiency as function of output power; typical values



$V_{DS} = 28 \text{ V}$; $I_{DQ} = 50 \text{ mA}$; $T_{case} = 25 \text{ }^{\circ}\text{C}$;
carrier spacing = 5 MHz; 46 % clipping; PAR = 8.4 dB at
0.01 % probability on CCDF.

- (1) $f = 2110 \text{ MHz}$
- (2) $f = 2140 \text{ MHz}$
- (3) $f = 2170 \text{ MHz}$

Fig 6. Adjacent channel power ratio (5 MHz) as a function of output power; typical values

9. Test information

9.1 Ruggedness in class-AB operation

The BLP7G22-05 is capable of withstanding a load mismatch corresponding to $V_{SWR} = 10:1$ through all phases under the following conditions: $V_{DS} = 28 \text{ V}$; $I_{DQ} = 55 \text{ mA}$; $P_L = 5 \text{ W (CW)}$.

10. Package outline

HVSON12: plastic thermal enhanced very thin small outline package; no leads;
12 terminals; body 4 x 6 x 0.85 mm

SOT1179-2

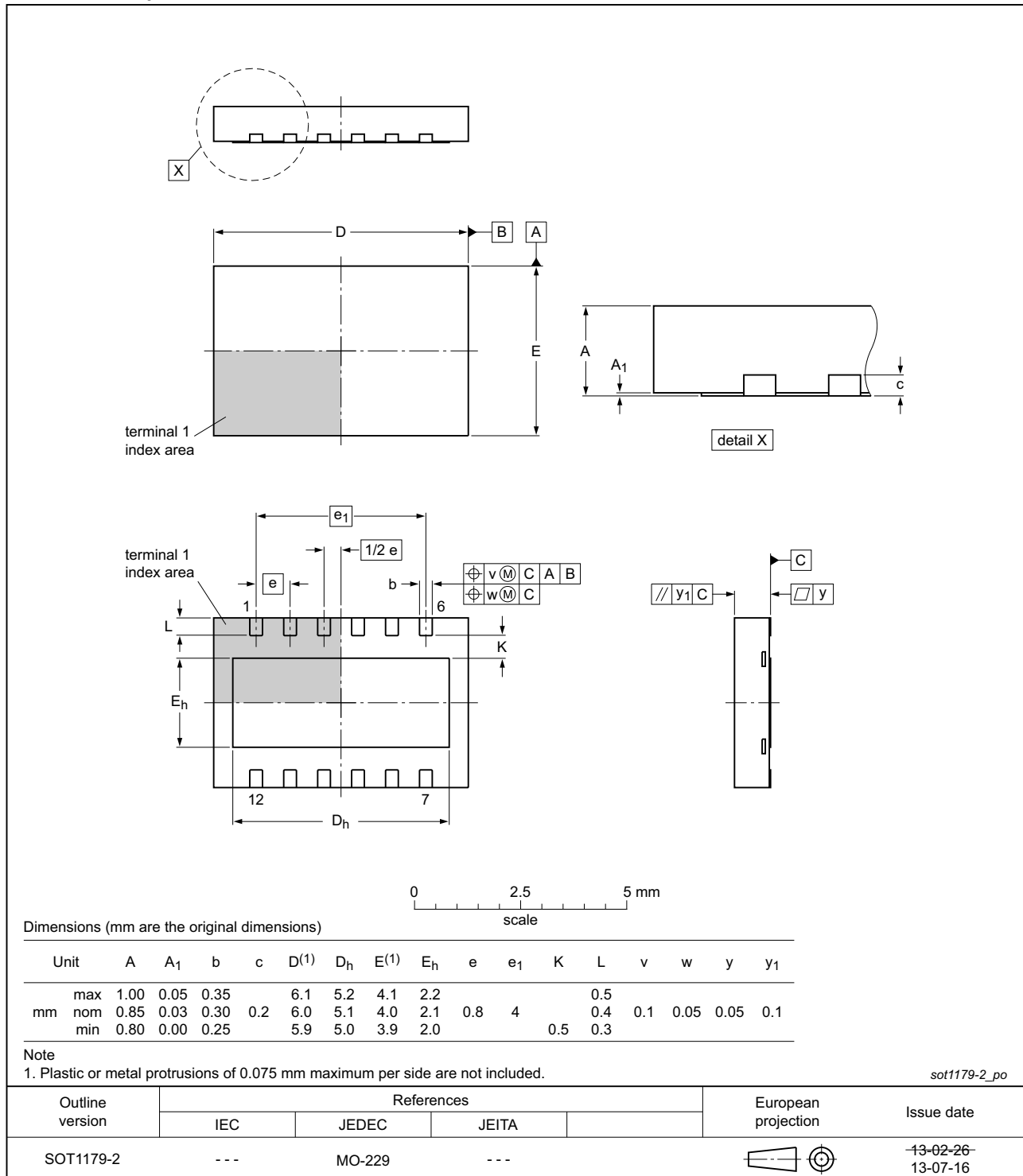


Fig 7. Package outline SOT1179-2 (HVSON12)

11. Handling information

CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices.

Such precautions are described in the *ANSI/ESD S20.20*, *IEC/ST 61340-5*, *JESD625-A* or equivalent standards.

12. Abbreviations

Table 9. Abbreviations

Acronym	Description
CCDF	Complementary Cumulative Distribution Function
CDMA	Code Division Multiple Access
CW	Continuous Wave
EDGE	Enhanced Data rates for GSM Evolution
ESD	ElectroStatic Discharge
GSM	Global System for Mobile Communication
IS-95	Interim Standard 95
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
LTE	Long Term Evolution
MC-GSM	Multi Carrier GSM
PAR	Peak-to-Average Ratio
SMD	Surface Mounted Device
VSWR	Voltage Standing-Wave Ratio
W-CDMA	Wideband Code Division Multiple Access
WiMAX	Worldwide Interoperability for Microwave Access

13. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLP7G22-05#3	20150901	Product data sheet		BLP7G22-05 v.2
Modifications:	- The format of this document has been redesigned to comply with the new identity guidelines of Ampleon. - Legal texts have been adapted to the new company name where appropriate.			
BLP7G22-05 v.2	20130820	Product data sheet	-	BLP7G22-05 v.1
BLP7G22-05 v.1	20130528	Objective data sheet	-	-

14. Legal information

14.1 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.

[1] Please consult the most recently issued document before initiating or completing a design.

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

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