

# BLL8H0514-25

Power LDMOS transistor

Rev. 2 — 1 September 2015

AMPLEON

Product data sheet

## 1. Product profile

### 1.1 General description

25 W LDMOS transistor intended for pulsed applications in the 0.5 GHz to 1.4 GHz range.

**Table 1. Application information**

Typical RF performance at  $T_{case} = 25\text{ °C}$ ;  $I_{Dq} = 50\text{ mA}$ ; in a class-AB application circuit.

Test signal	f	t <sub>p</sub>	δ	V <sub>DS</sub>	P <sub>L</sub>	G <sub>p</sub>	RL <sub>in</sub>	η <sub>D</sub>	P <sub>droop(pulse)</sub>	t <sub>r</sub>	t <sub>f</sub>
	(MHz)	(μs)	(%)	(V)	(W)	(dB)	(dB)	(%)	(dB)	(ns)	(ns)
pulsed RF	960 to 1215	128	10	50	25	21	10	58	0.05	8	6
	1200 to 1400	300	10	50	25	19	10	50	0.05	8	6

### 1.2 Features and benefits

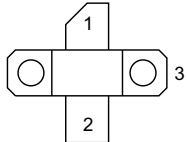
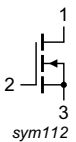
- Easy power control
- Integrated dual side ESD protection
- High flexibility with respect to pulse formats
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (0.5 GHz to 1.4 GHz)
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

### 1.3 Applications

- Amplifiers for pulsed applications in the 0.5 GHz to 1.4 GHz frequency range

## 2. Pinning information

**Table 2. Pinning**

Pin	Description	Simplified outline	Graphic symbol
1	drain		
2	gate		
3	source <sup>[1]</sup>		

[1] Connected to flange.

### 3. Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
BLL8H0514-25	-	flanged ceramic package; 2 mounting holes; 2 leads	SOT467C

### 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		-	100	V
$V_{GS}$	gate-source voltage		-6	+13	V
$T_{stg}$	storage temperature		-65	+150	°C
$T_j$	junction temperature	[1]	-	225	°C

[1] Continuous use at maximum temperature will affect the reliability, for details refer to the on-line MTF calculator.

### 5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$Z_{th(j-c)}$	transient thermal impedance from junction to case	$T_{case} = 85\text{ °C}; P_L = 25\text{ W}$		
		$t_p = 100\text{ }\mu\text{s}; \delta = 10\text{ }\%$	0.86	K/W
		$t_p = 200\text{ }\mu\text{s}; \delta = 10\text{ }\%$	1.11	K/W
		$t_p = 300\text{ }\mu\text{s}; \delta = 10\text{ }\%$	1.29	K/W
		$t_p = 100\text{ }\mu\text{s}; \delta = 20\text{ }\%$	1.15	K/W

### 6. 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	$V_{GS} = 0\text{ V}; I_D = 630\text{ mA}$	110	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 18\text{ mA}$	1.4	1.9	2.4	V
$I_{DSS}$	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V}$	-	-	1	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	2.1	2.5	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	100	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 18\text{ mA}$	120	150	-	mS
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 63\text{ mA}$	-	1500	2750	$\text{m}\Omega$

**Table 7. RF characteristics**

Test signal: pulsed RF;  $t_p = 128 \mu\text{s}$ ;  $\delta = 10 \%$ ; RF performance at  $V_{DS} = 50 \text{ V}$ ;  $I_{Dq} = 50 \text{ mA}$ ;  $f = 1.2 \text{ GHz}$ ;  $T_{case} = 25 \text{ }^\circ\text{C}$ ; unless otherwise specified, in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{DS}$	drain-source voltage	$P_L = 25 \text{ W}$	-	-	50	V
$G_p$	power gain	$P_L = 25 \text{ W}$	20	21	-	dB
$RL_{in}$	input return loss	$P_L = 25 \text{ W}$	-	-15	-10	dB
$\eta_D$	drain efficiency	$P_L = 25 \text{ W}$	57	59	-	%
$P_{droop(pulse)}$	pulse droop power	$P_L = 25 \text{ W}$	-	0	0.3	dB
$t_r$	rise time	$P_L = 25 \text{ W}$	-	20	50	ns
$t_f$	fall time	$P_L = 25 \text{ W}$	-	6	50	ns

## 7. Application information

### 7.1 Ruggedness in class-AB operation

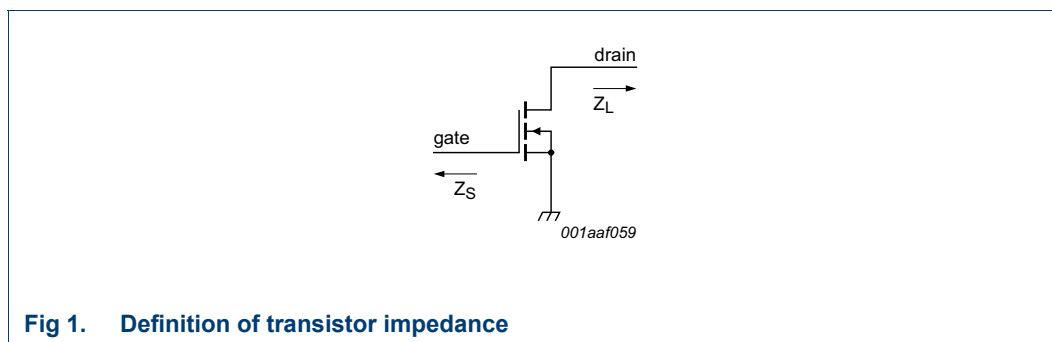
The BLL8H0514-25 is capable of withstanding a load mismatch corresponding to  $VSWR = 10 : 1$  through all phases under the following conditions:  $V_{DS} = 50 \text{ V}$ ;  $I_{Dq} = 50 \text{ mA}$ ;  $P_L = 25 \text{ W}$ ;  $f = 1.2 \text{ GHz}$ ;  $t_p = 128 \mu\text{s}$ ;  $\delta = 10 \%$ .

### 7.2 Impedance information

**Table 8. Typical impedance**

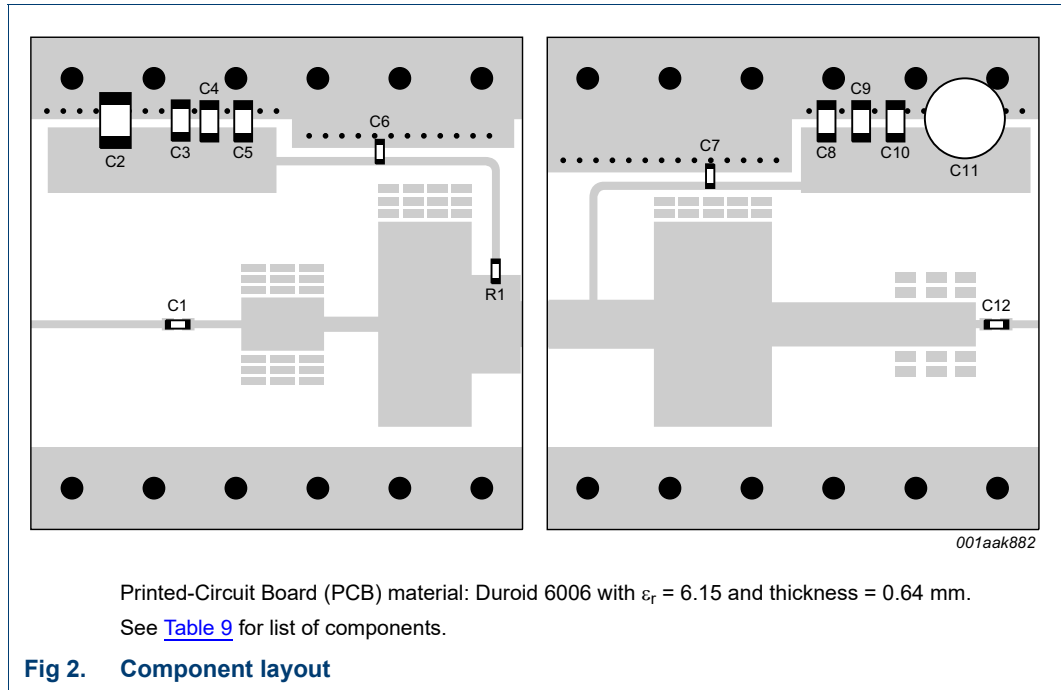
Typical values per section unless otherwise specified.

f (MHz)	$Z_S$ ( $\Omega$ )	$Z_L$ ( $\Omega$ )
950	$2.37 + j3.30$	$6.11 + j11.1$
1000	$2.44 + j2.65$	$7.00 + j16.0$
1050	$2.34 + j2.67$	$7.39 + j14.2$
1100	$2.56 + j2.06$	$7.00 + j16.0$
1150	$2.54 + j1.70$	$5.77 + j13.85$
1200	$2.25 + j1.29$	$7.39 + j14.2$
1300	$2.21 + j0.15$	$6.11 + j11.1$
1400	$2.46 - j0.52$	$5.00 + j10.0$



**Fig 1. Definition of transistor impedance**

7.3 Application circuit



**Table 9. List of components**

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

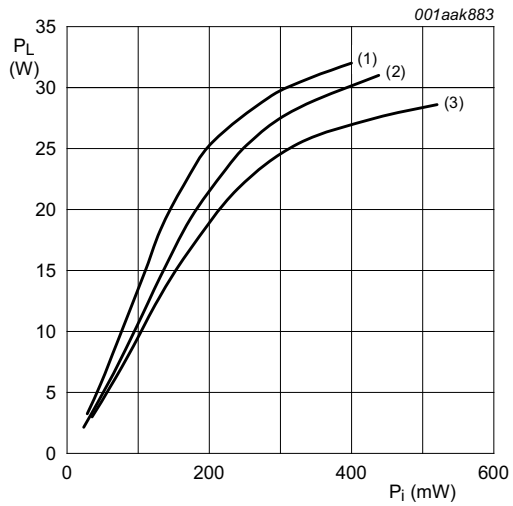
Component	Description	Value	Remarks
C1, C6, C7, C12	multilayer ceramic chip capacitor	56 pF <a href="#">[1]</a>	
C2	multilayer ceramic chip capacitor	10 $\mu$ F, 25 V	
C3, C4, C8, C9	multilayer ceramic chip capacitor	100 pF <a href="#">[1]</a>	
C5, C10	multilayer ceramic chip capacitor	1 nF <a href="#">[2]</a>	
C11	electrolytic capacitor	68 $\mu$ F, 63 V	
R1	SMD resistor	10 $\Omega$	SMD 0603

[1] American Technical Ceramics type 100A or capacitor of same quality.

[2] American Technical Ceramics type 100B or capacitor of same quality.

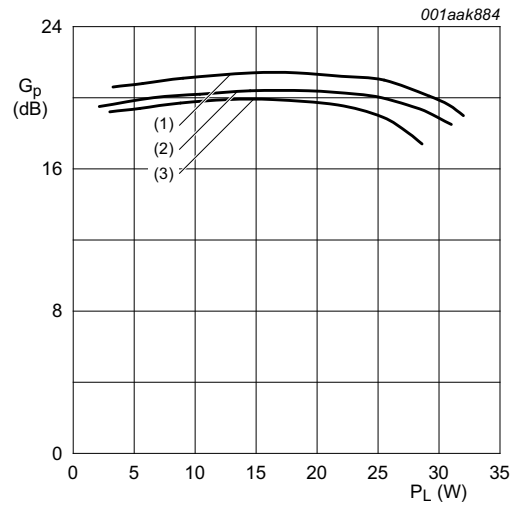
8. Test information

8.1 Performance curves



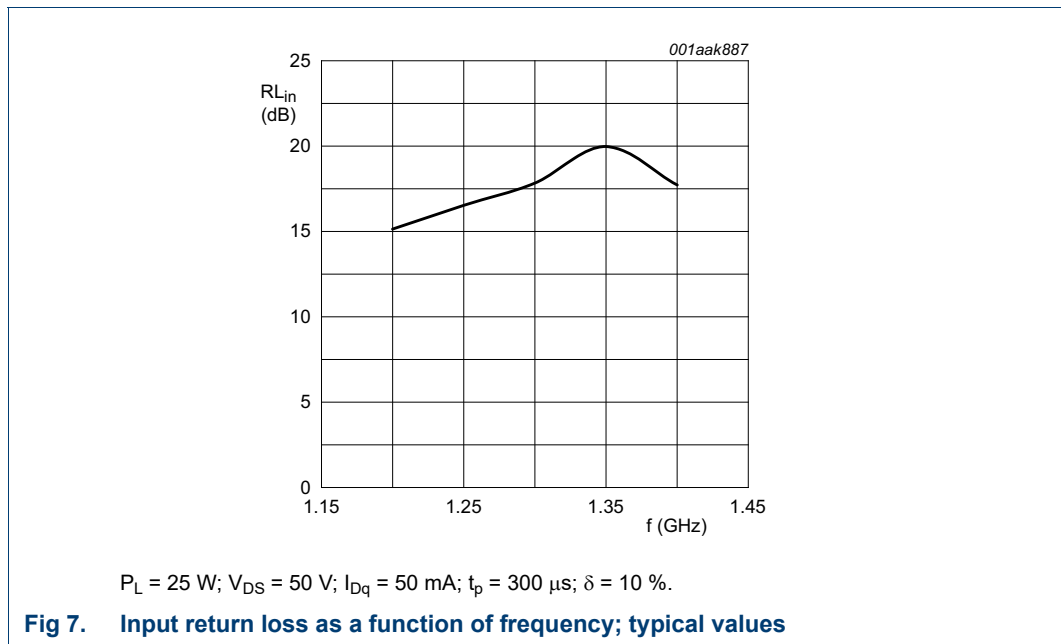
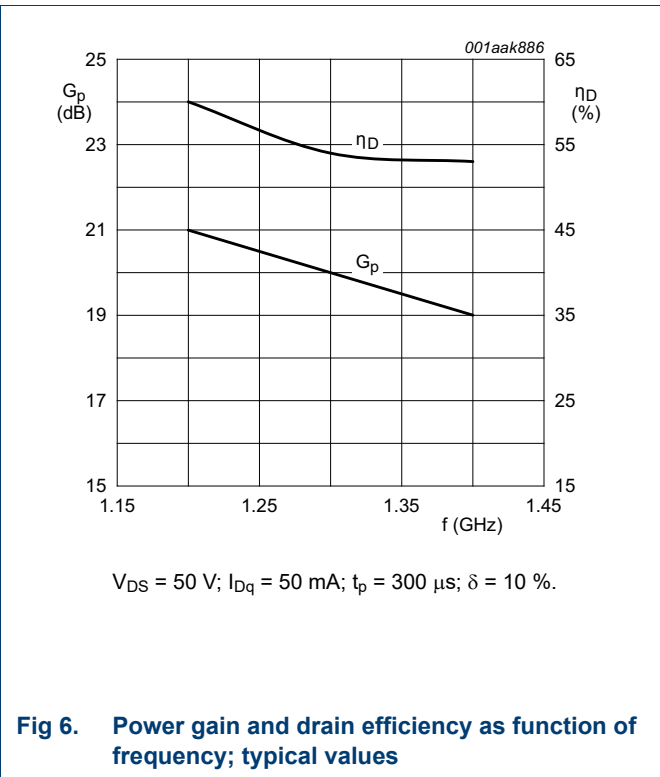
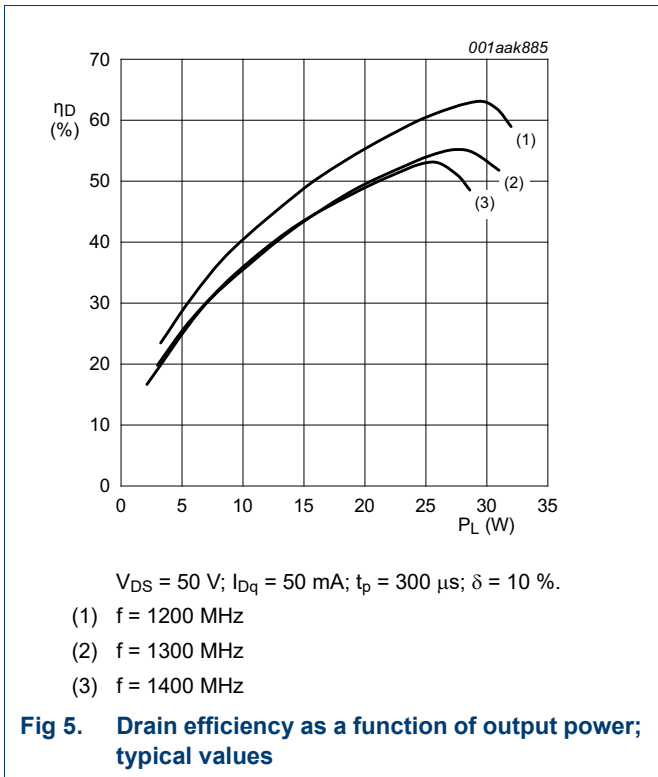
$V_{DS} = 50\text{ V}; I_{Dq} = 50\text{ mA}; t_p = 300\ \mu\text{s}; \delta = 10\ \%$   
 (1)  $f = 1200\text{ MHz}$   
 (2)  $f = 1300\text{ MHz}$   
 (3)  $f = 1400\text{ MHz}$

**Fig 3. Output power as a function of input power; typical values**



$V_{DS} = 50\text{ V}; I_{Dq} = 50\text{ mA}; t_p = 300\ \mu\text{s}; \delta = 10\ \%$   
 (1)  $f = 1200\text{ MHz}$   
 (2)  $f = 1300\text{ MHz}$   
 (3)  $f = 1400\text{ MHz}$

**Fig 4. Power gain as a function of output power; typical values**



9. Package outline

Flanged ceramic package; 2 mounting holes; 2 leads

SOT467C

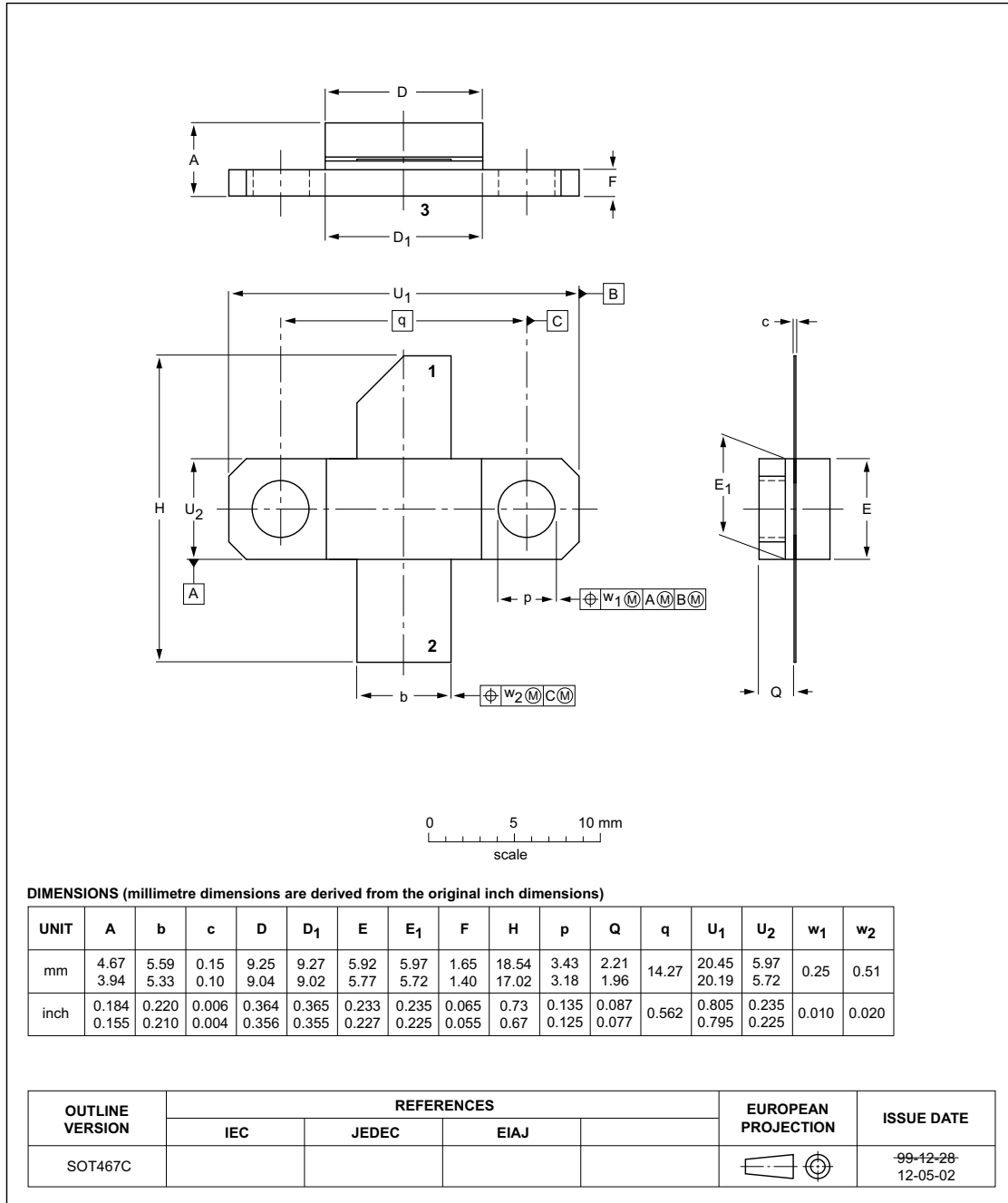


Fig 8. Package outline SOT467C

## 10. 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.

## 11. Abbreviations

Table 10. Abbreviations

Acronym	Description
ESD	ElectroStatic Discharge
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
MTF	Median Time to Failure
SMD	Surface Mounted Device
VSWR	Voltage Standing-Wave Ratio

## 12. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLL8H0514-25#2	20150901	Product data sheet	-	BLL8H0514-25 #1
Modifications:	<ul style="list-style-type: none"> <li>The format of this document has been redesigned to comply with the new identity guidelines of Ampleon.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> </ul>			
BLL8H0514-25 #1	20150209	Product 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.
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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