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# BLL6H1214P2S-250

LDMOS L-band radar power module

Rev. 2 — 1 September 2015

AMPLEON

Product data sheet

## 1. Product profile

### 1.1 General description

250 W LDMOS power module intended for L-band radar applications in the frequency range from 1.2 GHz to 1.4 GHz.

**Table 1. Test information**

Typical RF performance at  $T_{case} = 25\text{ °C}$ ;  $t_p = 1.8\text{ ms}$ ;  $\delta = 30\%$ ;  $I_{Dq} = 200\text{ mA}$ ;  $P_i = 26\text{ dBm}$ ; in a class-AB production test circuit.

Test signal	f	V <sub>DS</sub>	P <sub>L</sub>	G <sub>p</sub>	$\eta_{add}$	t <sub>r</sub>	t <sub>f</sub>
	(MHz)	(V)	(W)	(dB)	(%)	(ns)	(ns)
pulsed RF	1195 to 1405	45	190 to 290	27	48	15	5

### 1.2 Features and benefits

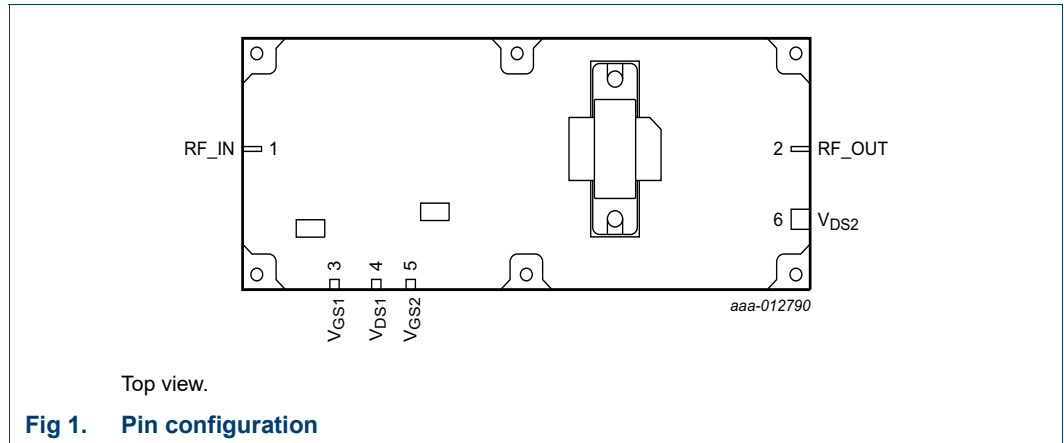
- Input/output 50  $\Omega$  matched
- High flexibility with respect to pulse formats
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (1.2 GHz to 1.4 GHz)
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

### 1.3 Applications

- L-band radar applications in the frequency range 1.2 GHz to 1.4 GHz

## 2. Pinning information

### 2.1 Pinning



### 2.2 Pin description

Table 2. Pin description

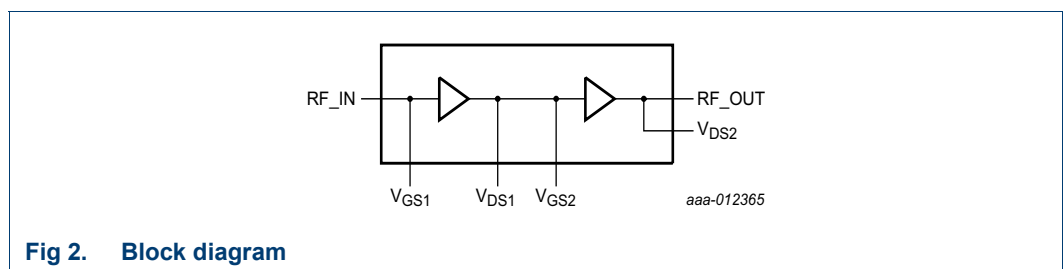
Symbol	Pin	Description
RF_IN	1	RF input
RF_OUT	2	RF output
V <sub>GS1</sub>	3	gate-source voltage 1
V <sub>DS1</sub>	4	drain-source voltage 1
V <sub>GS2</sub>	5	gate-source voltage 2
V <sub>DS2</sub>	6	drain-source voltage 2

## 3. Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
BLL6H1214P2S-250	-	pallet LDMOS; 6 mounting holes; 6 terminations	SOM039

## 4. Block diagram



## 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		-	50	V
$V_{GS}$	gate-source voltage		-0.5	+13	V
$T_{amb}$	ambient temperature		5	60	°C
$T_{mb}$	mounting base temperature		0	50	°C
$T_{stg}$	storage temperature		-20	+70	°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.

## 6. Thermal characteristics

**Table 5. Thermal characteristics**

Symbol	Parameter	Conditions	Typ	Unit
$Z_{th(j-c)}$	transient thermal impedance from junction to case	$T_{case} = 50\text{ °C}$ ; $P_i = 26\text{ dBm}$ ; $t_p = 1.8\text{ ms}$ ; $\delta = 30\%$	0.39	K/W

## 7. Characteristics

**Table 6. RF characteristics**

Test signal: pulsed RF;  $P_i = 26\text{ dBm}$ ;  $t_p = 1.8\text{ ms}$ ;  $\delta = 30\%$ ; RF performance at  $V_{DS} = 45\text{ V}$ ;  
 $I_{DQ} = 200\text{ mA}$ ;  $T_{case} = 25\text{ °C}$ ; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
f	frequency		1210	1300	1405	MHz
$V_{DD}$	supply voltage		44.7	45	45.3	V
$V_{GS}$	gate-source voltage		-	5	6.5	V
$P_{L(sat)}$	saturated output power		52.8	53.0	54.3	dBm
FL	flatness of frequency response	[1]	-	-	1.2	dB
$\Delta P_L$	output power variation	$P_i = 26\text{ dBm} \pm 0.4\text{ dBm}$	-0.2	-	+0.2	
$P_{droop(pulse)}$	pulse droop power		-	-	0.5	dB
$G_p$	power gain	3 dB gain compression	-	27	-	dB
$\eta_{add}$	power added efficiency		45	48	-	%
$t_r$	rise time		-	-	50	ns
$t_f$	fall time		-	-	50	ns
$\alpha_{resp(sp)}$	spurious response		-	-	-60	dBc
$\alpha_{sup(H)}$	harmonic suppression		-	-	-40	dBc
MTTF	mean time to failure		$1 \times 10^6$	-	-	h

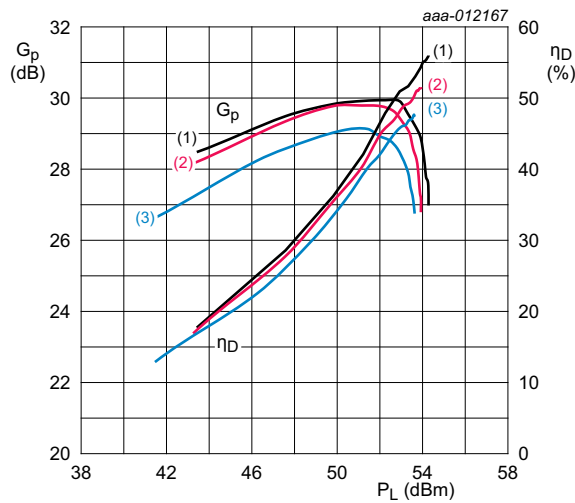
[1] Power flatness; testing at fixed  $P_i$ .

7.1 Ruggedness in class-AB operation

The BLL6H1214P2S-250 is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions:  $V_{DS} = 45\text{ V}$ ;  $I_{Dq} = 200\text{ mA}$ ;  $P_i = 26\text{ dBm}$ ;  $t_p = 1.8\text{ ms}$ ;  $\delta = 30\%$ .

8. Test information

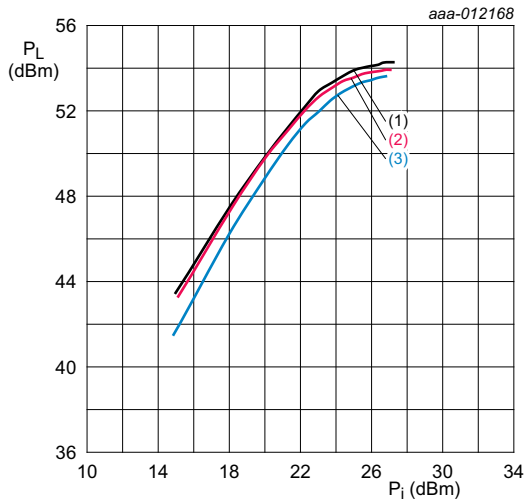
8.1 Graphical data



$V_{DS} = 45\text{ V}$ ;  $I_{Dq} = 200\text{ mA}$ .

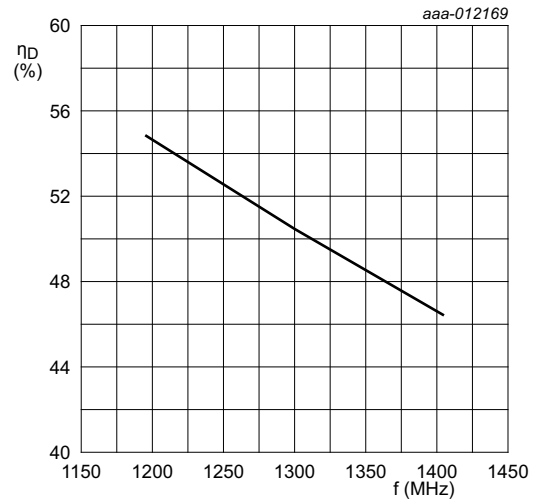
- (1)  $f = 1195\text{ MHz}$
- (2)  $f = 1300\text{ MHz}$
- (3)  $f = 1405\text{ MHz}$

Fig 3. Power gain and drain efficiency as function of output power; typical values



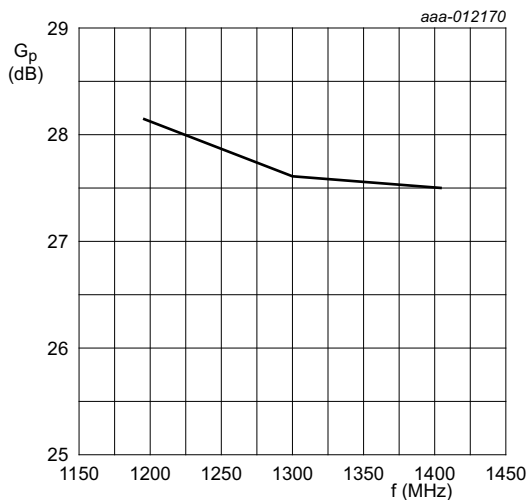
$V_{DS} = 45\text{ V}$ ;  $I_{Dq} = 200\text{ mA}$ ;  $t_p = 1.8\text{ ms}$ ;  $\delta = 30\%$ .  
 (1)  $f = 1195\text{ MHz}$   
 (2)  $f = 1300\text{ MHz}$   
 (3)  $f = 1405\text{ MHz}$

**Fig 4. Output power as a function of input power; typical values**



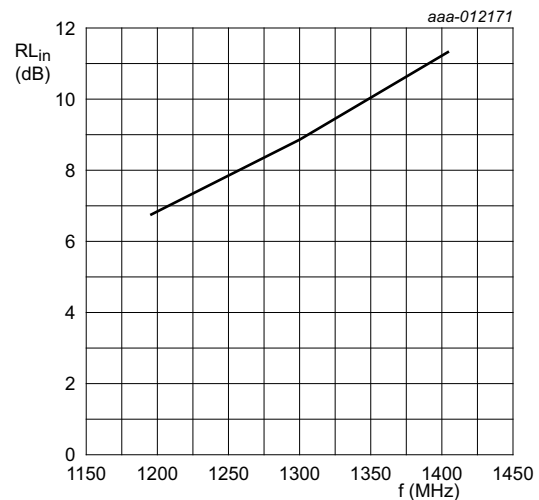
$V_{DS} = 45\text{ V}$ ;  $I_{Dq} = 200\text{ mA}$ ;  $t_p = 1.8\text{ ms}$ ;  $\delta = 30\%$ ;  
 $P_i = 26\text{ dBm}$ .

**Fig 5. Drain efficiency as a function of frequency; typical values**



$V_{DS} = 45\text{ V}$ ;  $I_{Dq} = 200\text{ mA}$ ;  $t_p = 1.8\text{ ms}$ ;  $\delta = 30\%$ ;  
 $P_i = 26\text{ dBm}$ .

**Fig 6. Power gain as a function of frequency; typical values**



$V_{DS} = 45\text{ V}$ ;  $I_{Dq} = 200\text{ mA}$ ;  $t_p = 1.8\text{ ms}$ ;  $\delta = 30\%$ ;  
 $P_i = 26\text{ dBm}$ .

**Fig 7. Input return loss as a function of frequency; typical values**

9. Package outline

Pallet LDMOS; 6 mounting holes; 6 terminations

SOM039

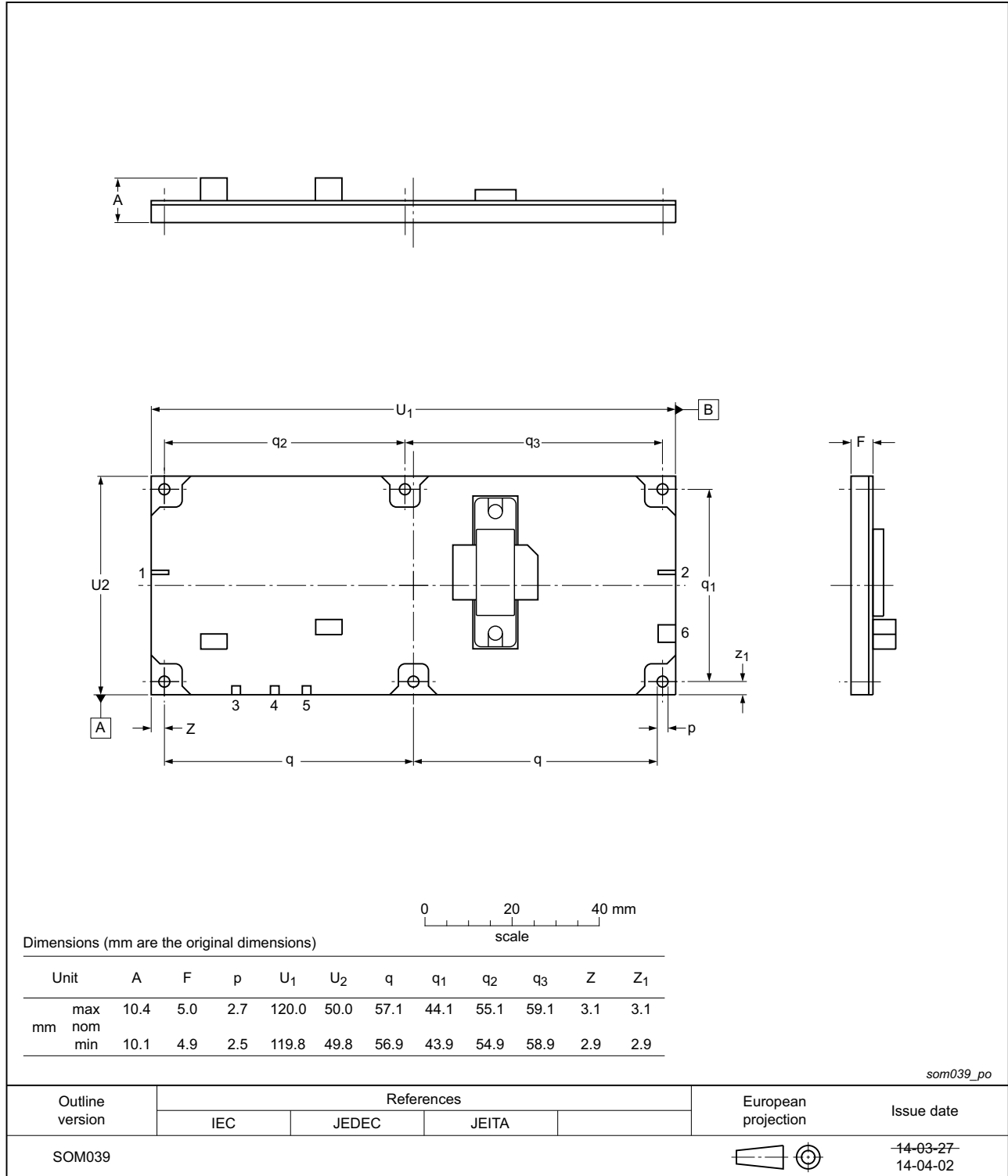



Fig 8. Package outline SOM039

## 10. Handling information

CAUTION	
	<p>This device is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices.</p> <p>Such precautions are described in the <i>ANSI/ESD S20.20</i>, <i>IEC/ST 61340-5</i>, <i>JESD625-A</i> or equivalent standards.</p>

## 11. Abbreviations

Table 7. Abbreviations

Acronym	Description
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
L-band	Long wave band
MTF	Median Time to Failure
VSWR	Voltage Standing-Wave Ratio

## 12. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLL6H1214P2S-250#2	20150901	Product data sheet	-	BLL6H1214P2S-250#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>			
BLL6H1214P2S-250#1	20140812	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.

[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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