

BLL6H0514-25

LDMOS driver transistor

Rev. 02 — 17 March 2009

Objective data sheet

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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 $T_{case} = 25^{\circ}C$; $I_{Dq} = 50\text{ mA}$; in a class-AB application circuit.

Mode of operation	f (MHz)	t _p (μs)	δ (%)	V _{DS} (V)	P _L (W)	G _p (dB)	RL _{in} (dB)	η _D (%)	P _{droop(pulse)} (dB)	t _r (ns)	t _f (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

CAUTION



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

1.2 Features

- Easy power control
- Integrated 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)

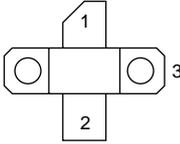
1.3 Applications

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

2. Pinning information

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Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	drain		
2	gate		
3	source		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLL6H0514-25	-	flanged LDMOST 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		0.5	13	V
I_D	drain current		-	2.5	A
T_{stg}	storage temperature		-65	+150	°C
T_j	junction temperature		-	200	°C

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

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Table 6. DC characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}$; $I_D = <tbid>\text{ mA}$	110	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}$; $I_D = 18\text{ mA}$	1.4	-	2.2	V
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}$; $V_{DS} = 50\text{ V}$	-	-	1	μA
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	m Ω

Table 7. RF characteristics

Mode of operation: pulsed RF; $t_p = 128\text{ }\mu\text{s}$; $\delta = 10\text{ }\%$; RF performance at $V_{DS} = 50\text{ V}$; $I_{Dq} = 50\text{ mA}$; $f = 1.4\text{ GHz}$; $T_{case} = 25\text{ }^\circ\text{C}$; unless otherwise specified, in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
P_L	output power		25	-	-	W
V_{DS}	drain-source voltage	$P_L = 25\text{ W}$	-	-	50	V
G_p	power gain	$P_L = 25\text{ W}$	18	20	-	dB
RL_{in}	input return loss	$P_L = 25\text{ W}$	-	10	-	dB
η_D	drain efficiency	$P_L = 25\text{ W}$	50	55	-	%
$P_{droop(pulse)}$	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

6.1 Ruggedness in class-AB operation

The BLL6H0514-25 is capable of withstanding a load mismatch corresponding to $V_{SWR} = 10 : 1$ through all phases under the following conditions: $V_{DS} = 50\text{ V}$; $I_{Dq} = 50\text{ mA}$; $P_L = 25\text{ W}$; $f = 1.4\text{ GHz}$; $t_p = 128\text{ }\mu\text{s}$; $\delta = 10\text{ }\%$.

7. Application information

7.1 Impedance information

Table 8. Typical impedance

Typical values per section unless otherwise specified.

f	Z_S	Z_L
GHz	Ω	Ω
0.5	<tbid>	<tbid>
0.6	<tbid>	<tbid>
0.7	<tbid>	<tbid>

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Table 8. Typical impedance
 Typical values per section unless otherwise specified.

f GHz	Z _S Ω	Z _L Ω
0.8	<td>	<td>
0.9	<td>	<td>
1.0	<td>	<td>
1.1	<td>	<td>
1.2	<td>	<td>
1.3	<td>	<td>
1.4	<td>	<td>

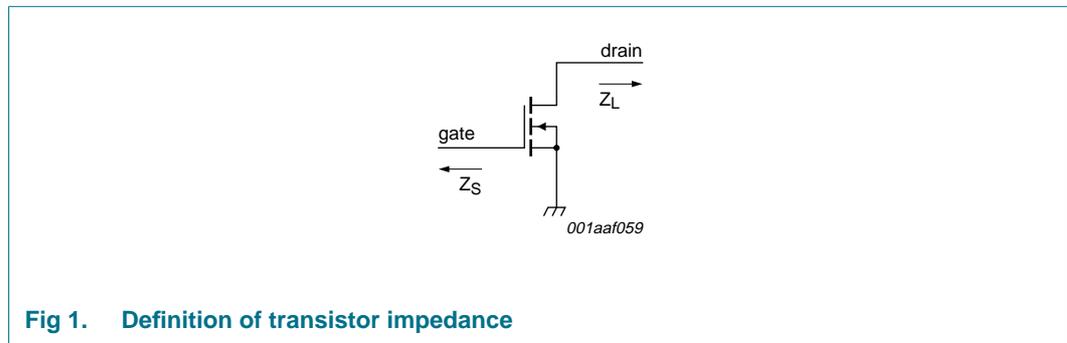


Fig 1. Definition of transistor impedance

7.2 Typical data

Table 9. Application information
 Typical RF performance at $T_{case} = 25\text{ }^\circ\text{C}$; $I_{DQ} = 50\text{ mA}$; in a class-AB application circuit.

Mode of operation	f (MHz)	t _p (μs)	δ (%)	V _{DS} (V)	P _L (W)	G _p (dB)	RL _{in} (dB)	η _D (%)	P _{droop(pulse)} (dB)	t _r (ns)	t _f (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

8. Package outline

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Flanged LDMOST ceramic package; 2 mounting holes; 2 leads

SOT467C

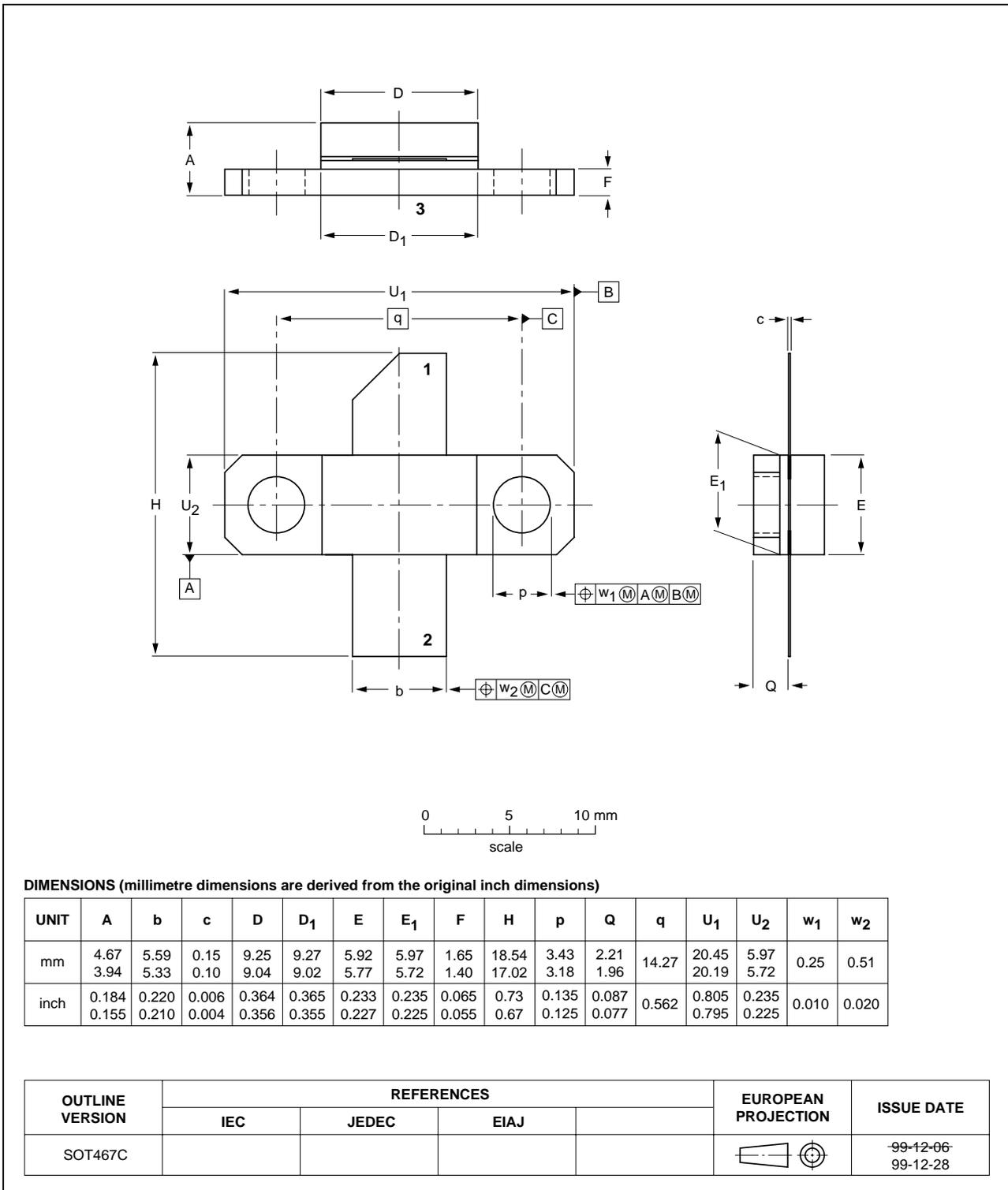


Fig 2. Package outline SOT467C

9. Abbreviations

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Table 10. Abbreviations

Acronym	Description
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
LDMOST	Laterally Diffused Metal-Oxide Semiconductor Transistor
RF	Radio Frequency
SMD	Surface Mounted Device
VSWR	Voltage Standing-Wave Ratio

10. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLL6H0514-25_2	20090317	Objective data sheet	-	BLL6H0514-25_1
Modifications:				
<ul style="list-style-type: none"> • Descriptive title changed • Corrected output power notation from 500 W to 25 W where applicable • Section 1.2 on page 1: Updated features • Table 4 on page 2: added I_D value • Table 5 on page 2: added $Z_{th(j-c)}$ values • Corrected some typos 				
BLL6H0514-25_1	20090305	Objective data sheet	-	-

11. Legal information

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11.1 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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