

BLP05H6110XR

Power LDMOS transistor

Rev. 1 — 18 May 2015

Objective data sheet

1. Product profile

1.1 General description

A 110 W extremely rugged LDMOS power transistor for broadcast and industrial applications in the HF to 600 MHz band.

Table 1. Application information

Test signal	f (MHz)	V _{DS} (V)	P _L (W)	G _p (dB)	η _D (%)
pulsed RF	108	50	110	27	75

1.2 Features and benefits

- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (HF to 600 MHz)
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

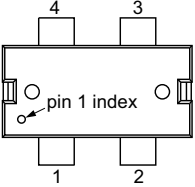
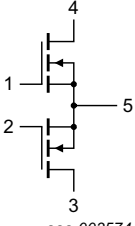
1.3 Applications

- Industrial, scientific and medical applications
- Broadcast transmitter applications



2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	gate 2		 aaa-003574
2	gate 1		
3	drain 1		
4	drain 2		
5	source [1]		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLP05H6110XR	HSOP4F	plastic, heatsink small outline package; 4 leads(flat)	SOT1223-2

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		-	135	V
V_{GS}	gate-source voltage		-6	+11	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
$R_{th(j-c)}$	thermal resistance from junction to case	$T_j = 150\text{ °C}$ [1][2]	<tdb>	K/W
$Z_{th(j-c)}$	transient thermal impedance from junction to case	$T_j = 150\text{ °C}$; $t_p = 100\text{ }\mu\text{s}$; $\delta = 20\%$ [3]	<tdb>	K/W

[1] T_j is the junction temperature.

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

[3] See <tdb>.

6. Characteristics

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	$V_{GS} = 0\text{ V}$; $I_D = 0.375\text{ mA}$	135	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}$; $I_D = 37.5\text{ mA}$	1.25	1.8	2.25	V
V_{GSq}	gate-source quiescent voltage	$V_{DS} = 50\text{ V}$; $I_D = 10\text{ mA}$	-	1.7	-	V
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}$; $V_{DS} = 50\text{ V}$	-	-	1.4	μA
I_{DSX}	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $V_{DS} = 10\text{ V}$	-	5.4	-	A
I_{GSS}	gate leakage current	$V_{GS} = 11\text{ V}$; $V_{DS} = 0\text{ V}$	-	-	140	nA
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $I_D = 1.31\text{ A}$	-	1.1	-	Ω

Table 7. AC characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
C_{rs}	feedback capacitance	$V_{GS} = 0\text{ V}$; $V_{DS} = 50\text{ V}$; $f = 1\text{ MHz}$	-	0.4	-	pF
C_{iss}	input capacitance	$V_{GS} = 0\text{ V}$; $V_{DS} = 50\text{ V}$; $f = 1\text{ MHz}$	-	46	-	pF
C_{oss}	output capacitance	$V_{GS} = 0\text{ V}$; $V_{DS} = 50\text{ V}$; $f = 1\text{ MHz}$	-	17	-	pF

Table 8. RF characteristics

Test signal: pulsed RF; $t_p = 100\text{ }\mu\text{s}$; $\delta = 20\%$; $f = 108\text{ MHz}$; RF performance at $V_{DS} = 50\text{ V}$;
 $I_{Dq} = 20\text{ mA}$; $T_{case} = 25\text{ }^\circ\text{C}$; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$P_L = 110\text{ W}$	<td>	27	-	dB
RL_{in}	input return loss	$P_L = 110\text{ W}$	-	<td>	-	dB
η_D	drain efficiency	$P_L = 110\text{ W}$	<td>	75	-	%

7. Test information

7.1 Ruggedness in class-AB operation

The BLP05H6110XR is capable of withstanding a load mismatch corresponding to $V_{SWR} > 65 : 1$ through all phases under the following conditions: $V_{DS} = 50\text{ V}$;
 $I_{Dq} = 20\text{ mA}$; $P_L = 110\text{ W}$ pulsed; $f = 108\text{ MHz}$.

7.2 Impedance information

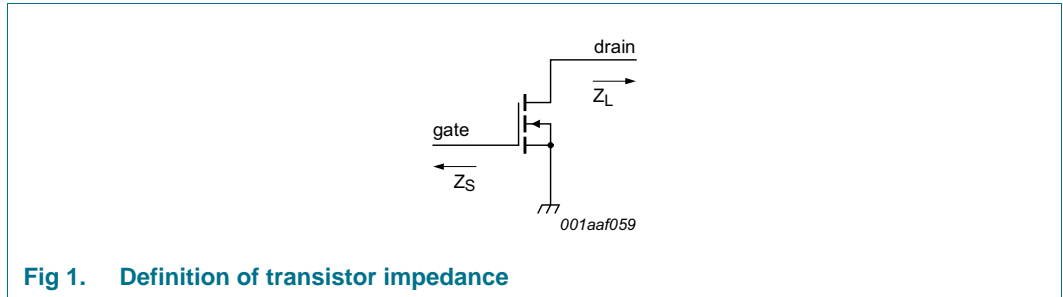


Fig 1. Definition of transistor impedance

Table 9. Typical push-pull impedance

Simulated Z_i and Z_L device impedance; impedance info at $V_{DS} = 50\text{ V}$ and $P_L = 110\text{ W}$.

f	Z_i	Z_L
(MHz)	(Ω)	(Ω)
108	<td>	<td>

7.3 UIS avalanche energy

Table 10. Typical avalanche data per section

$T_{amb} = 25\text{ }^\circ\text{C}$; typical test data; test jig without water cooling.

I_{AS}	E_{AS}
(A)	(J)
<td>	<td>
<td>	<td>
<td>	<td>

For information see application note AN10273.

8. Package outline

HSOP4F: plastic, heatsink small outline package; 4 leads(flat)

SOT1223-2

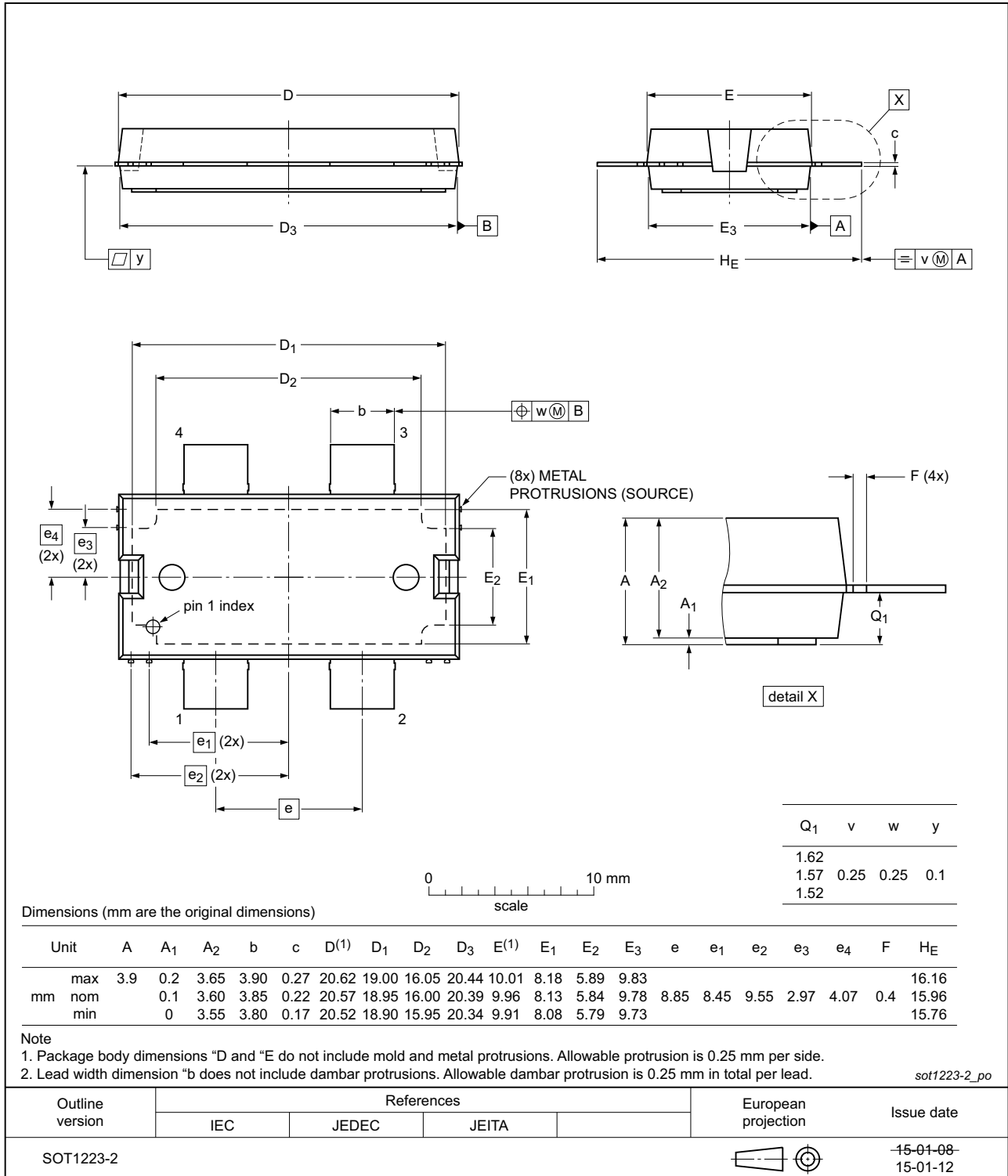


Fig 2. Package outline SOT1223-2 (HSOP4F)

9. 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.

10. Abbreviations

Table 11. Abbreviations

Acronym	Description
CW	Continuous Wave
ESD	ElectroStatic Discharge
HF	High Frequency
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
MTF	Median Time to Failure
UIS	Unclamped Inductive Switching
VSWR	Voltage Standing-Wave Ratio

11. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLP05H6110XR v.1	20150518	Objective data sheet	-	-

12. Legal information

12.1 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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14. Contents

1 Product profile 1

1.1 General description 1

1.2 Features and benefits 1

1.3 Applications 1

2 Pinning information 2

3 Ordering information 2

4 Limiting values 2

5 Thermal characteristics 2

6 Characteristics 3

7 Test information 3

7.1 Ruggedness in class-AB operation 3

7.2 Impedance information 4

7.3 UIS avalanche energy 4

8 Package outline 5

9 Handling information 6

10 Abbreviations 6

11 Revision history 6

12 Legal information 7

12.1 Data sheet status 7

12.2 Definitions 7

12.3 Disclaimers 7

12.4 Trademarks 8

13 Contact information 8

14 Contents 9

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