

# BLP05H635XR

Power LDMOS transistor

Rev. 1 — 18 May 2015

Objective data sheet

## 1. Product profile

### 1.1 General description

A 35 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 <sub>DS</sub> (V)	P <sub>L</sub> (W)	G <sub>p</sub> (dB)	η <sub>D</sub> (%)
pulsed RF	108	50	35	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)

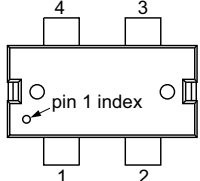
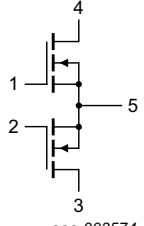
### 1.3 Applications

- 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 <sup>[1]</sup>		

[1] Connected to flange.

## 3. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
BLP05H635XR	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 <sup>[1]</sup>		-	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	$T_j = 150\text{ °C}$ <sup>[1][2]</sup>	<tdb>	K/W
$Z_{th(j-c)}$	transient thermal impedance from junction to case	$T_j = 150\text{ °C}$ ; $t_p = 100\text{ }\mu\text{s}$ ; $\delta = 20\%$ <sup>[3]</sup>	<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	$V_{GS} = 0\text{ V}$ ; $I_D = 0.125\text{ mA}$	135	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}$ ; $I_D = 12.5\text{ mA}$	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	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$ ; $V_{DS} = 10\text{ V}$	-	1.8	-	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	$V_{GS} = V_{GS(th)} + 3.75\text{ V}$ ; $I_D = 437.5\text{ mA}$	-	3.2	-	$\Omega$

**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	$V_{GS} = 0\text{ V}$ ; $V_{DS} = 50\text{ V}$ ; $f = 1\text{ MHz}$	-	0.2	-	pF
$C_{iss}$	input capacitance	$V_{GS} = 0\text{ V}$ ; $V_{DS} = 50\text{ V}$ ; $f = 1\text{ MHz}$	-	17	-	pF
$C_{oss}$	output capacitance	$V_{GS} = 0\text{ V}$ ; $V_{DS} = 50\text{ V}$ ; $f = 1\text{ MHz}$	-	7.5	-	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.

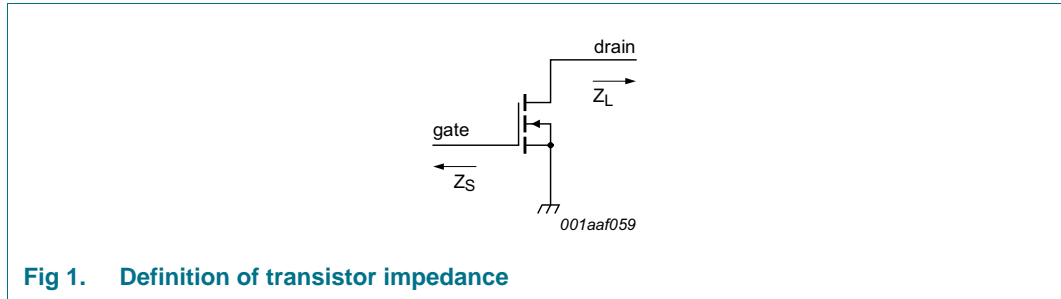
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$P_L = 35\text{ W}$	<td>	27	-	dB
$RL_{in}$	input return loss	$P_L = 35\text{ W}$	-	<td>	-	dB
$\eta_D$	drain efficiency	$P_L = 35\text{ W}$	<td>	75	-	%

## 7. Test information

### 7.1 Ruggedness in class-AB operation

The BLP05H635XR is capable of withstanding a load mismatch corresponding to  $V_{SWR} > 65 : 1$  through all phases under the following conditions:  $V_{DS} = 50\text{ V}$ ;  $I_{Dq} = 20\text{ mA}$ ;  $P_L = 35\text{ W}$  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  $P_L = 35\text{ W}$ .

f	$Z_i$	$Z_L$
(MHz)	( $\Omega$ )	( $\Omega$ )
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

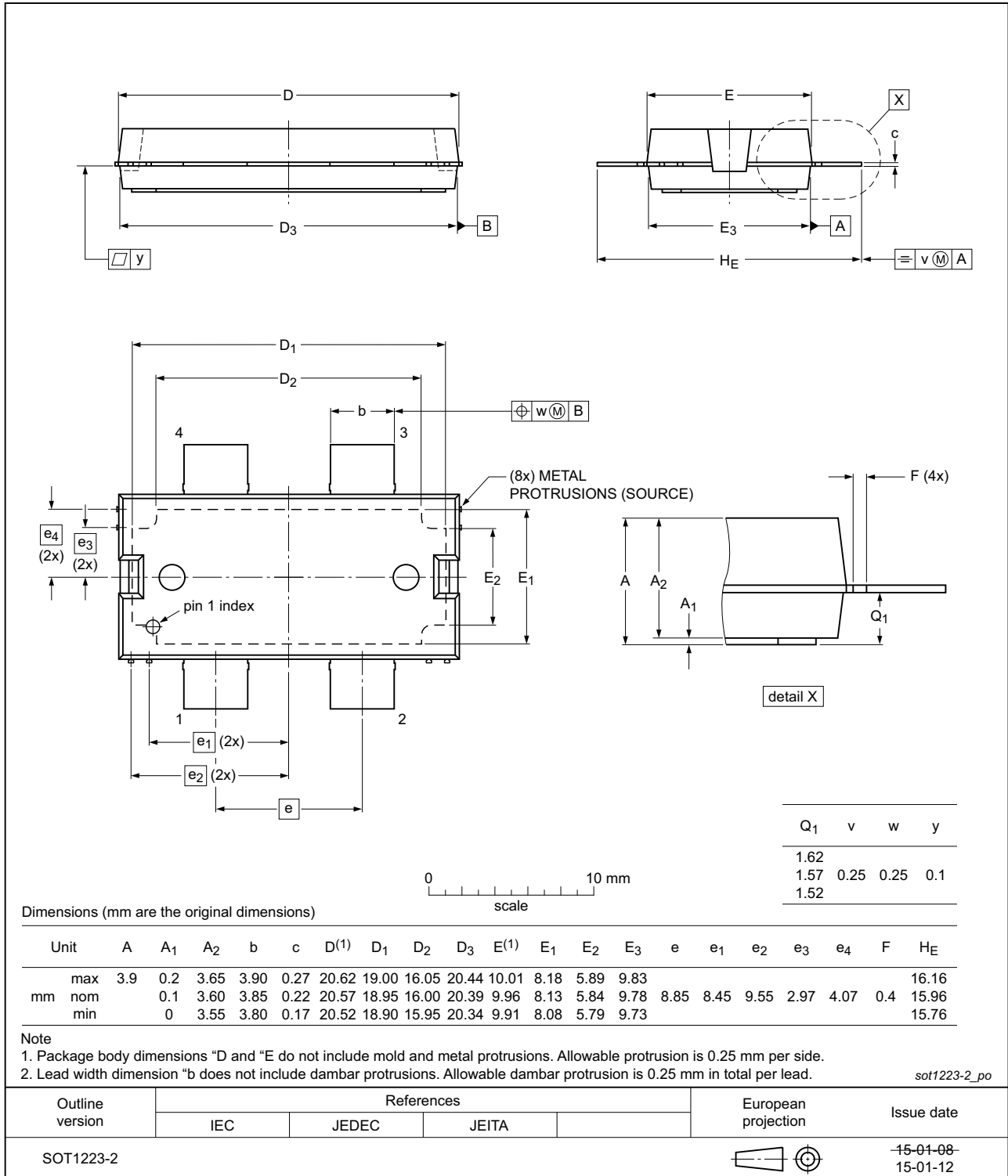


Fig 2. Package outline SOT1223-2 (HSOP4F)

## 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
BLP05H635XR v.1	20150518	Objective data sheet	-	-

## 12. Legal information

### 12.1 Data sheet status

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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