

BLP05M7200

Power LDMOS transistor

Rev. 2 — 18 November 2013

Product data sheet

1. Product profile

1.1 General description

200 W LDMOS power transistor for various applications such as ISM and RF plasma lighting at frequencies from 425 MHz to 450 MHz.

Table 1. Typical performance

RF performance at $T_{case} = 25\text{ }^{\circ}\text{C}$, $I_{Dq} = 2\text{ mA}$ in an application circuit.

Test signal	f (MHz)	V_{DS} (V)	$P_{L(AV)}$ (W)	G_p (dB)	η_D (%)
CW	440	28	210	21	81

1.2 Features and benefits

- High efficiency
- Excellent ruggedness
- Excellent thermal stability
- Integrated ESD protection
- Easy power control
- Designed for ISM operation (425 MHz to 450 MHz)
- Input integration for simple board design
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

1.3 Applications

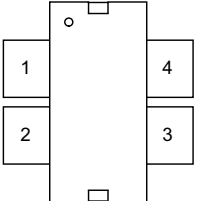
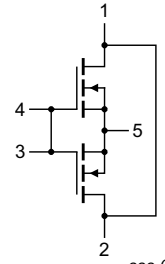
- RF power amplifiers for CW applications in the 425 MHz to 450 MHz frequency range such as ISM and RF plasma lighting.



2. Pinning information

Table 2. Pinning

All pins must be connected for correct operation and to prevent damage to the device.

Pin	Description	Simplified outline	Graphic symbol
1, 2	drain		
3, 4	gate		
5	source		

aaa-008976

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
BLP05M7200	HSOP4F	plastic, heatsink small outline package; 4 leads (flat)	SOT1138-1

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		-	65	V
V_{GS}	gate-source voltage		-0.5	+13	V
T_{stg}	storage temperature		-65	+150	°C
T_{case}	case temperature		-	150	°C
T_j	junction temperature	[1]	-	225	°C

[1] Continuous use at maximum temperature will affect the reliability.

5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-case)}$	thermal resistance from junction to case	$T_{case} = 80\text{ °C}; P_L = 200\text{ W}$	0.5	K/W

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	$V_{GS} = 0\text{ V}; I_D = 3.2\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 320\text{ mA}$	1.5	1.9	2.3	V
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$	-	-	2.8	μA
I_{DSX}	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $V_{DS} = 10\text{ V}$	-	52	-	A
I_{GSS}	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	280	nA
g_{fs}	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 11.2\text{ A}$	-	20	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V};$ $I_D = 11.2\text{ A}$	-	0.08	-	Ω

Table 7. RF characteristics

Test signal: CW at 440 MHz; RF performance at $V_{DS} = 28\text{ V}; I_{Dq} = 2\text{ mA}; T_{case} = 25\text{ }^\circ\text{C}$; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$P_L = 210\text{ W}$	19.5	21	-	dB
RL_{in}	input return loss	$P_L = 210\text{ W}$	-	-15	-11	dB
η_D	drain efficiency	$P_L = 210\text{ W}$	73	77	-	%

7. Test information

7.1 Ruggedness in class-AB operation

The BLP05M7200 is capable of withstanding a load mismatch corresponding to $VSWR = 10 : 1$ through all phases under the following conditions: $V_{DS} = 28\text{ V}; I_{Dq} = 20\text{ mA}; P_L = 200\text{ W (CW)}; f = 440\text{ MHz}$.

7.2 Impedance information

Table 8. Typical impedance

Measured load-pull data. Typical values unless otherwise specified. $I_{Dq} = 20\text{ mA}; V_{DS} = 28\text{ V}$. Z_S and Z_L defined in [Figure 1](#).

f (MHz)	Z_S (Ω)	Z_L (Ω)
440	$1.5 + j0.7$	$1.1 + j0.14$

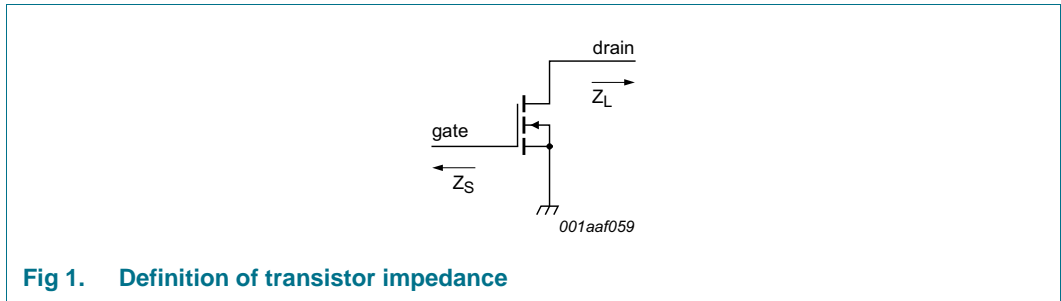
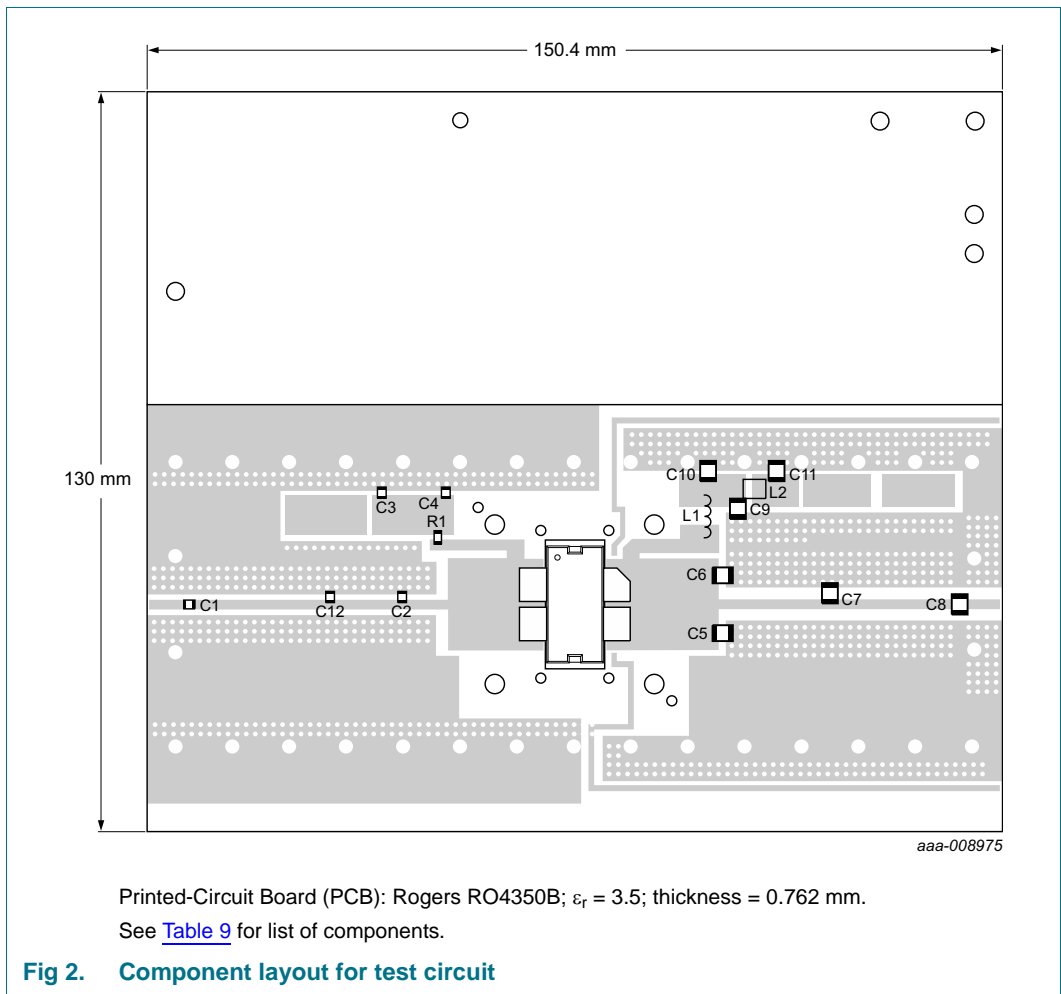


Fig 1. Definition of transistor impedance

7.3 Test circuit



Printed-Circuit Board (PCB): Rogers RO4350B; $\epsilon_r = 3.5$; thickness = 0.762 mm.

See [Table 9](#) for list of components.

Fig 2. Component layout for test circuit

Table 9. List of components

For test circuit, see [Figure 2](#).

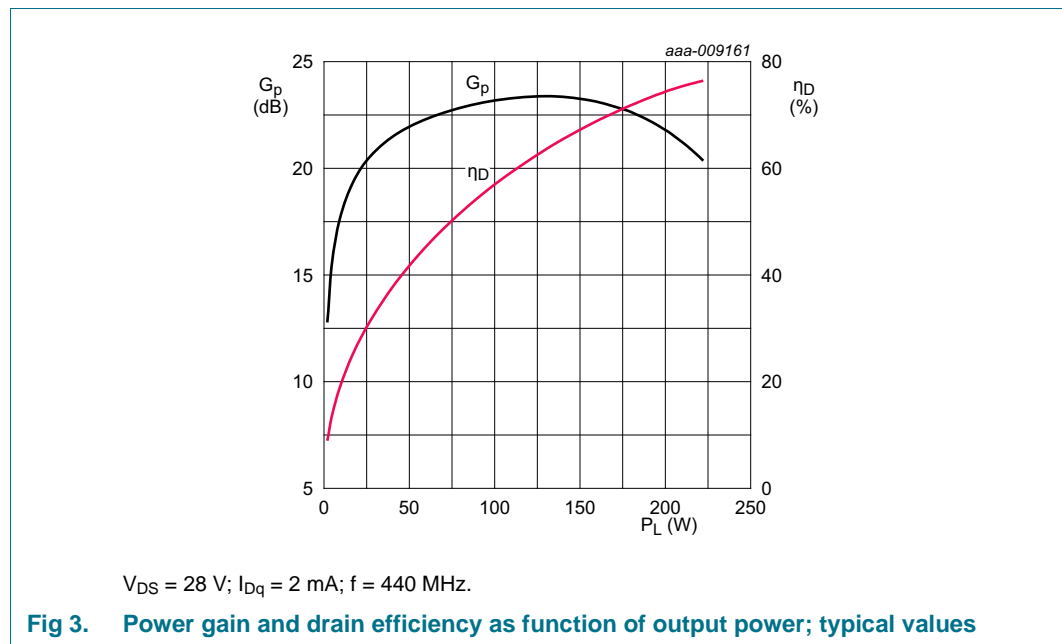
Component	Description	Value	Remarks
C1, C3	multilayer ceramic chip capacitor	160 pF	ATC800A
C2	multilayer ceramic chip capacitor	39 pF	ATC800A
C4, C9	multilayer ceramic chip capacitor	910 pF	ATC800B
C5, C6	multilayer ceramic chip capacitor	33 pF	ATC800B

Table 9. List of components ...continued
For test circuit, see [Figure 2](#).

Component	Description	Value	Remarks
C7	multilayer ceramic chip capacitor	15 pF	ATC800B
C8, C10	multilayer ceramic chip capacitor	130 pF	ATC800B
C11	electrolytic capacitor	220 μ F, 63 V	
C12	multilayer ceramic chip capacitor	4.3 pF	ATC800A
R1	chip resistor	10 Ω	Philips SMD 1206
L1	copper wire	6 turns	
L2	copper foil	-	

7.4 Graphical data

7.4.1 CW



8. Package outline

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

SOT1138-1

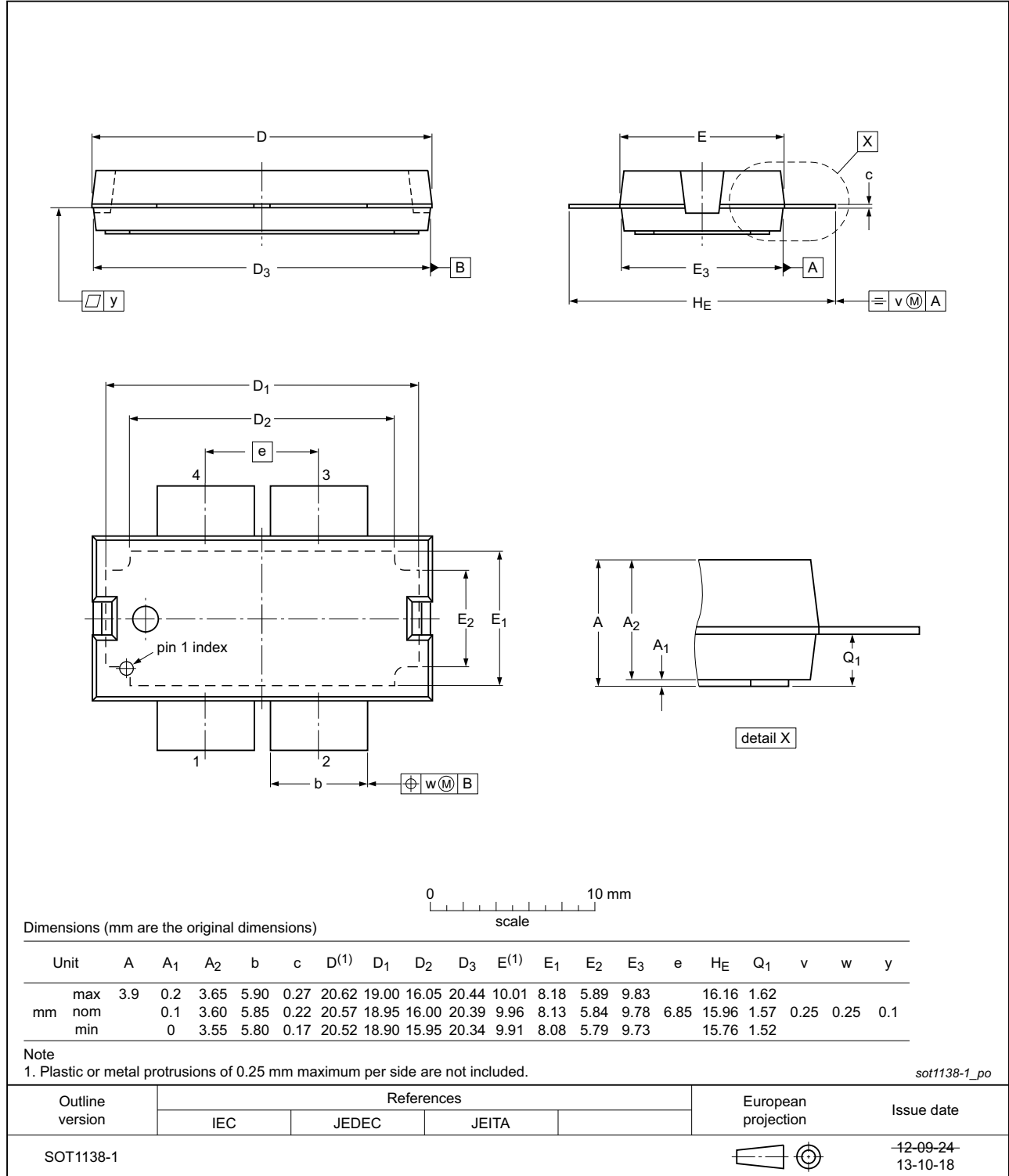


Fig 4. Package outline SOT1138-1 (HSOP4F)

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 10. Abbreviations

Acronym	Description
CW	Continuous Wave
ESD	ElectroStatic Discharge
ISM	Industrial, Scientific and Medical
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
SMD	Surface Mounted Device
VSWR	Voltage Standing-Wave Ratio

11. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLP05M7200 v.2	20131118	Product data sheet	-	BLP05M7200 v.1
Modifications:	<ul style="list-style-type: none"> • Table 1 on page 1: several changes have been made. • Section 1.2 on page 1: list order has been changed • Table 2 on page 2: graphic symbol has been updated. • Table 6 on page 3: several changes have been made. • Table 7 on page 3: several changes have been made. • Section 7.3 on page 4: section has been added. • Section 7.4 on page 5: section has been added. 			
BLP05M7200 v.1	20120906	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".

[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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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	3
7.3	Test circuit	4
7.4	Graphical data	5
7.4.1	CW	5
8	Package outline	6
9	Handling information	7
10	Abbreviations	7
11	Revision history	7
12	Legal information	8
12.1	Data sheet status	8
12.2	Definitions	8
12.3	Disclaimers	8
12.4	Trademarks	9
13	Contact information	9
14	Contents	10

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