

BLF178P

Power LDMOS transistor

Rev. 1 — 5 April 2011

Objective data sheet

1. Product profile

1.1 General description

A 1200 W LDMOS power transistor for broadcast applications and industrial applications in the HF to 110 MHz band.

Table 1. Application information

Mode of operation	f (MHz)	V _{DS} (V)	P _L (W)	G _p (dB)	η _D (%)
CW	108	50	1000	26	75
pulsed RF	108	50	1200	26	75

CAUTION



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

1.2 Features and benefits

- Typical pulsed performance at frequency of 108 MHz, a supply voltage of 50 V and an I_{DQ} of 40 mA, a t_p of 100 μs with δ of 20 %:
 - ◆ Output power = 1200 W
 - ◆ Power gain = 26 dB
 - ◆ Efficiency = 75 %
- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (10 MHz to 108 MHz)
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

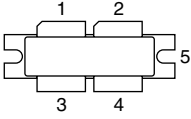
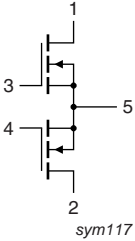
1.3 Applications

- Industrial, scientific and medical applications
- FM transmitter applications



2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	drain1		 sym117
2	drain2		
3	gate1		
4	gate2		
5	source		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF178P	-	flanged balanced LDMOST ceramic package; 2 mounting holes; 4 leads	SOT539A

4. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

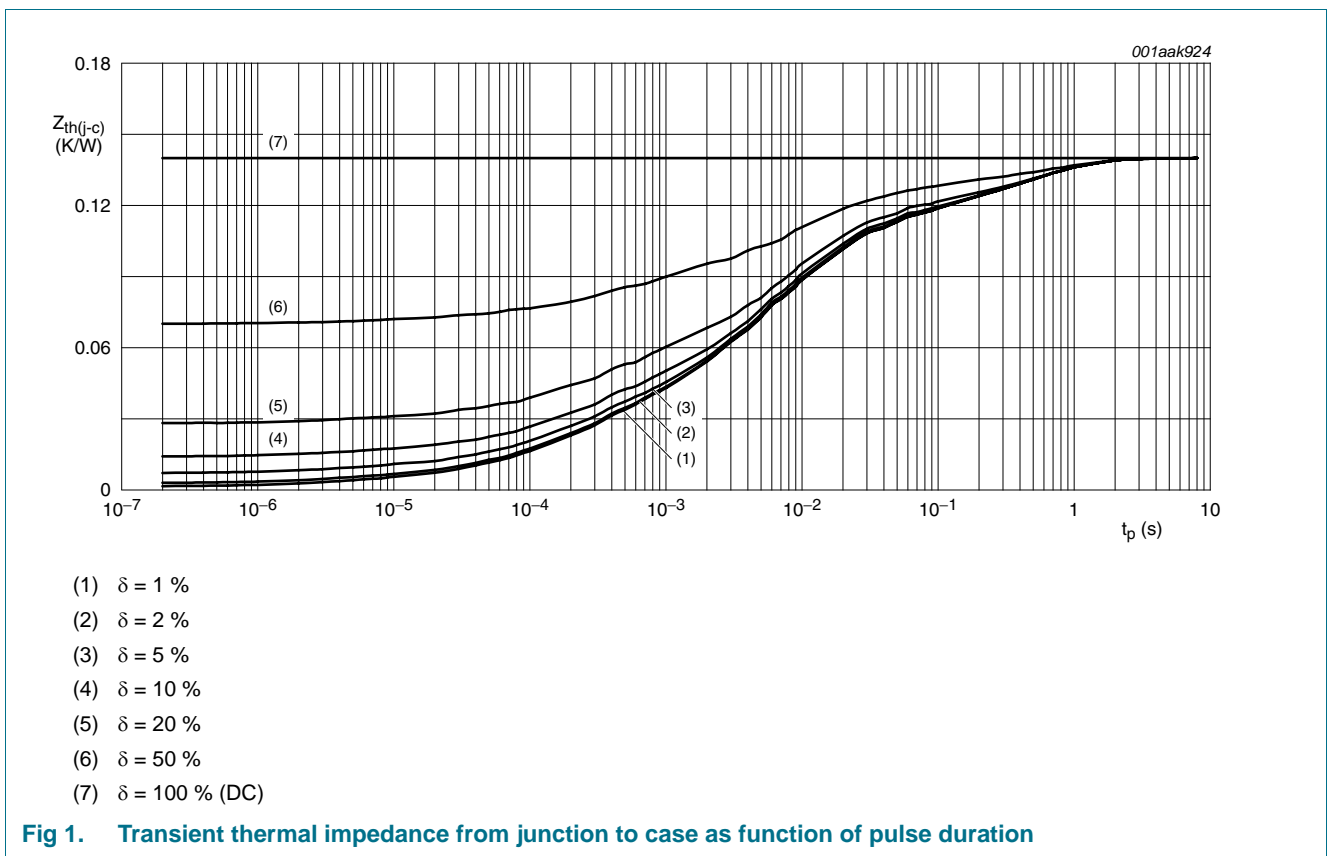
Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	drain-source voltage		-	110	V
V_{GS}	gate-source voltage		-0.5	+11	V
I_D	drain current		-	88	A
T_{stg}	storage temperature		-65	+150	°C
T_j	junction temperature		-	225	°C

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] 0.14	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] 0.04	K/W

- [1] T_j is the junction temperature.
- [2] $R_{th(j-c)}$ is measured under RF conditions.
- [3] See [Figure 1](#).



6. Characteristics

Table 6. DC characteristics

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

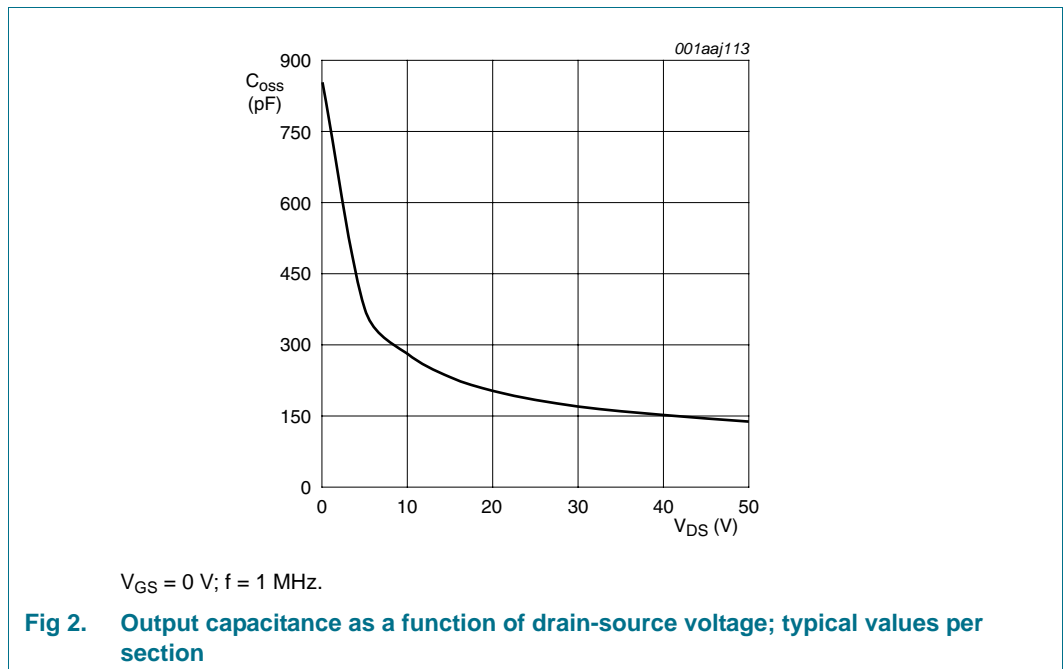
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 2.5\text{ mA}$	110	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 500\text{ mA}$	1.25	1.7	2.25	V
V_{GSq}	gate-source quiescent voltage	$V_{DS} = 50\text{ V}; I_D = 20\text{ mA}$	0.8	1.3	1.8	V
I_{DSS}	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V}$	-	-	2.8	μA

Table 6. DC characteristics ...continued
T_j = 25 °C; per section unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I _{DSX}	drain cut-off current	V _{GS} = V _{GS(th)} + 3.75 V; V _{DS} = 10 V	58	70	-	A
I _{GSS}	gate leakage current	V _{GS} = 11 V; V _{DS} = 0 V	-	-	280	nA
R _{DS(on)}	drain-source on-state resistance	V _{GS} = V _{GS(th)} + 3.75 V; I _D = 16.66 A	-	0.07	-	Ω
C _{rs}	feedback capacitance	V _{GS} = 0 V; V _{DS} = 50 V; f = 1 MHz	-	3	-	pF
C _{iss}	input capacitance	V _{GS} = 0 V; V _{DS} = 50 V; f = 1 MHz	-	403	-	pF
C _{oss}	output capacitance	V _{GS} = 0 V; V _{DS} = 50 V; f = 1 MHz	-	138	-	pF

Table 7. RF characteristics
Mode of operation: pulsed RF; t_p = 100 μs; δ = 20 %; f = 108 MHz; RF performance at V_{DS} = 50 V; I_{Dq} = 40 mA; T_{case} = 25 °C; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G _p	power gain	P _L = 1200 W	<td>	26	<td>	dB
RL _{in}	input return loss	P _L = 1200 W	<td>	<td>	-	dB
η _D	drain efficiency	P _L = 1200 W	<td>	75	-	%

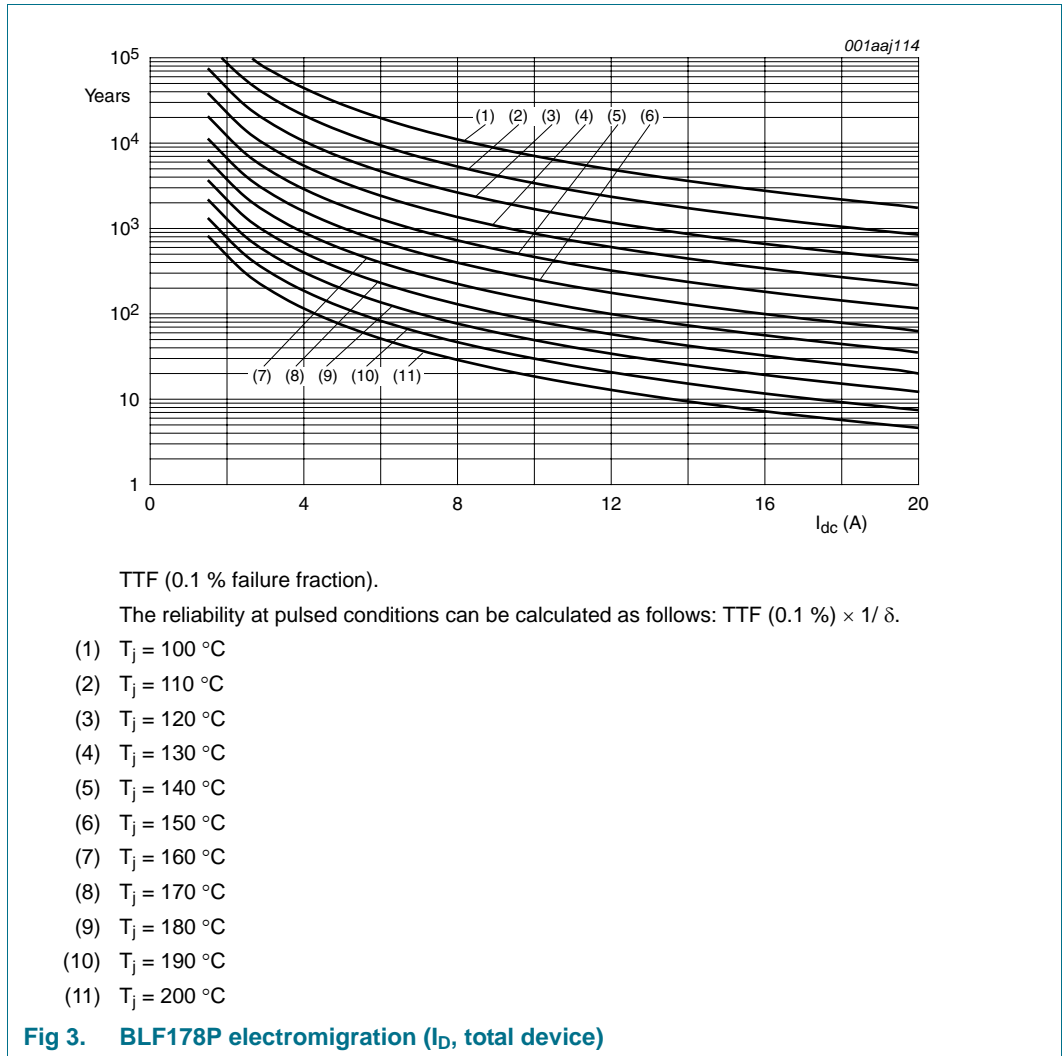


6.1 Ruggedness in class-AB operation

The BLF178P is capable of withstanding a load mismatch corresponding to VSWR = 13 : 1 through all phases under the following conditions: V_{DS} = 50 V; I_{Dq} = 40 mA; P_L = 1200 W pulsed; f = 108 MHz.

7. Application information

7.1 Reliability



8. Package outline

Flanged balanced LDMOST ceramic package; 2 mounting holes; 4 leads

SOT539A

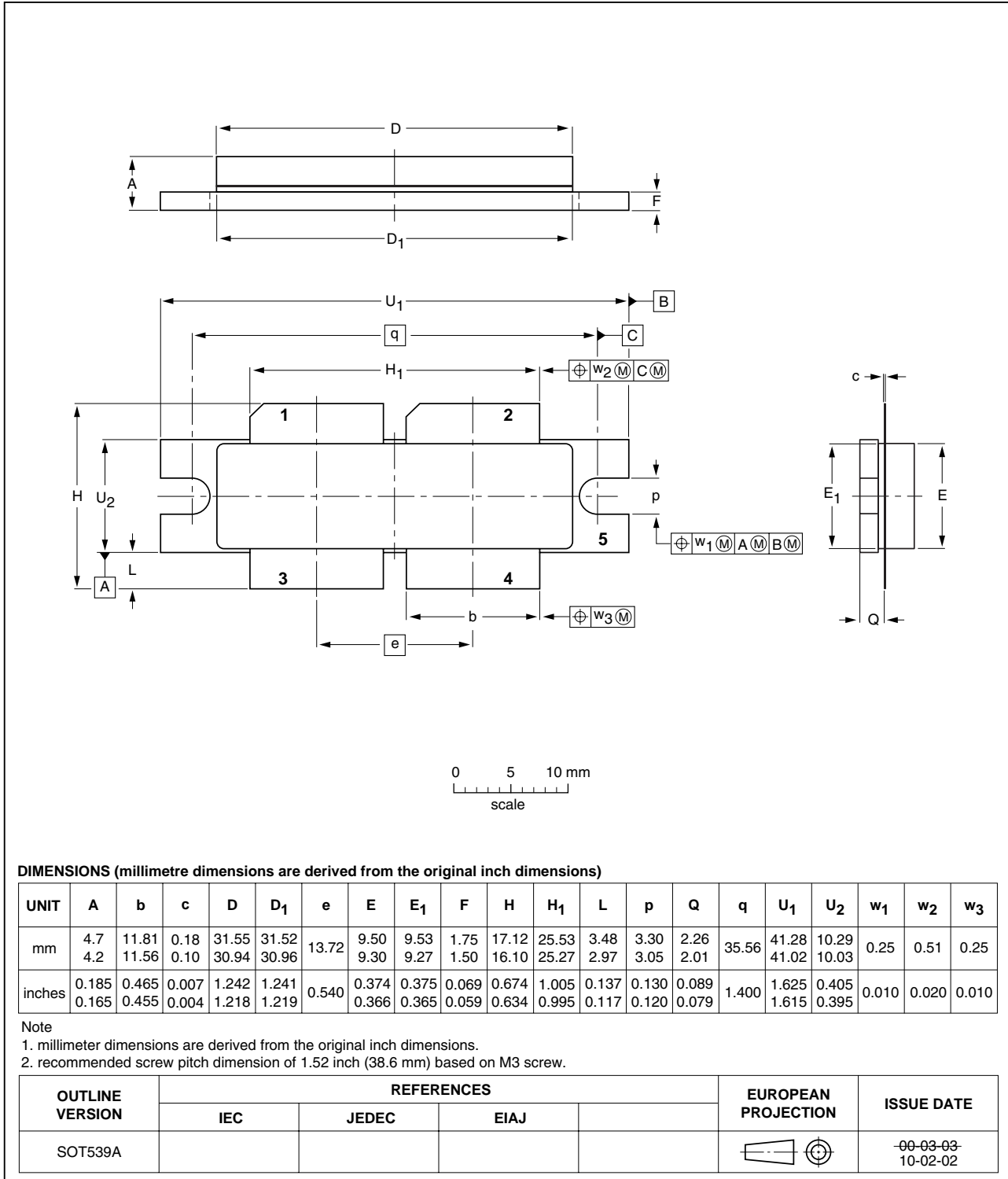


Fig 4. Package outline SOT539A

9. Abbreviations

Table 8. Abbreviations

Acronym	Description
CW	Continuous Wave
FM	Frequency Modulation
HF	High Frequency
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
LDMOST	Laterally Diffused Metal-Oxide Semiconductor Transistor
RF	Radio Frequency
TTF	Time To Failure
VSWR	Voltage Standing-Wave Ratio

10. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF178P v.1	20110405	Objective data sheet	-	-

11. Legal information

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".

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