BLF888

UHF power LDMOS transistor

Rev. 01 — 16 December 2008 **Objective data sheet**

1. Product profile

1.1 General description

A 500 W LDMOS RF power transistor for broadcast transmitter applications and industrial applications. The transistor is optimized for digital applications and can deliver 110 W average DVB-T broadband over the full UHF band from 470 MHz to 860 MHz. The excellent ruggedness of this device makes it ideal for digital transmitter applications.

Table 1. Application information

RF performance at V_{DS} = 50 V in a common source 860 MHz narrowband test circuit unless otherwise specified.

Mode of operation	f (MHz)	$P_{L(PEP)}$ (W)	$P_{L(AV)}$ (W)	G_p (dB)	η_D (%)	IMD3 (dBc)	IMD_{shldr} (dBc)
2-tone, class AB	f_1 = 860; f_2 = 860.1	500	250	20	45	<tbd>	-
DVB-T (8k OFDM)	858	-	110	20	30	-	≡32 [1]

[1] Measured [dBc] with delta marker at 4.3 MHz from center frequency.

CAUTION

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

1.2 Features

- 2-tone performance at 860 MHz, a drain-source voltage V_{DS} of 50 V and a quiescent drain current I_{Dq} = 1.4 A:
  - Peak envelope power load power = 500 W
  - Power gain = 20 dB
  - Drain efficiency = 45 %
  - Third order intermodulation distortion = <tbd> dBc
- DVB performance at 858 MHz, a drain-source voltage V_{DS} of 50 V and a quiescent drain current I_{Dq} = 1.4 A:
  - Average output power = 110 W
  - Power gain = 20 dB
  - Drain efficiency = 30 %
  - Shoulder distance = ≡32 dBc (4.3 MHz from center frequency)
- Integrated ESD protection
- Advanced flange material for optimum thermal behavior and reliability

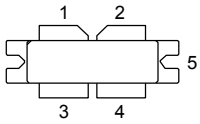
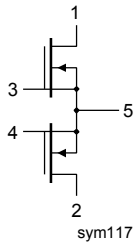
- Excellent ruggedness
- High power gain
- High efficiency
- Designed for broadband operation (470 MHz to 860 MHz)
- Excellent reliability
- Internal input matching for high gain and optimum broadband operation
- Easy power control
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

1.3 Applications

- Communication transmitter applications in the UHF band
- Industrial applications in the UHF band

2. Pinning information

Table 2. Pinning

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

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF888	-	flanged LDMOST ceramic package; 2 mounting holes; 4 leads	SOT979A

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		-	104	V
V_{GS}	gate-source voltage		−0.5	+13	V
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
$R_{th(j-c)}$	thermal resistance from junction to case	T_{case} = 80 ◊C; $P_{L(AV)}$ = 110 W	[1]	0.23	K/W

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

6. Characteristics

Table 6. DC characteristics

T_j = 25 ◊C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	V_{GS} = 0 V; I_D = 2.7 mA	[1]	104	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	V_{DS} = 10 V; I_D = 270 mA	[1]	1.4	1.9	2.4	V
I_{DSS}	drain leakage current	V_{GS} = 0 V; V_{DS} = 50 V		-	-	2.8	⑨A
I_{DSX}	drain cut-off current	V_{GS} = $V_{GS(th)}$ + 3.75 V; V_{DS} = 10 V		-	44	-	A
I_{GSS}	gate leakage current	V_{GS} = 10 V; V_{DS} = 0 V		-	-	280	nA
g_{fs}	forward transconductance	V_{GS} = 10 V; I_D = 13.5 A	[1]	-	<tbd>	-	S
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = $V_{GS(th)}$ + 3.75 V; I_D = 9.5 A	[1]	-	105	-	m⍉
C_{iss}	input capacitance	V_{GS} = 0 V; V_{DS} = 50 V; f = 1 MHz	[2]	-	205	-	pF
C_{oss}	output capacitance	V_{GS} = 0 V; V_{DS} = 50 V; f = 1 MHz	[2]	-	65	-	pF
C_{rss}	reverse transfer capacitance	V_{GS} = 0 V; V_{DS} = 50 V; f = 1 MHz	[2]	-	2.2	-	pF

[1] I_D is the drain current.

[2] Capacitance values without internal matching.

Table 7. RF characteristics

T_h = 25 ◊C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
2-tone, class AB						
V_{DS}	drain-source voltage		-	50	-	V
I_{Dq}	quiescent drain current	total device	-	1.4	-	A
$P_{L(PEP)}$	peak envelope power load power		250	-	-	W
$P_{L(AV)}$	average output power		250	-	-	W
G_p	power gain		18	-	-	dB
⑨D	drain efficiency		42	-	-	%
IMD3	third order intermodulation distortion		-	-	<tbd> dB	
DVB-T (8k OFDM)						
V_{DS}	drain-source voltage		-	50	-	V
I_{Dq}	quiescent drain current	total device	-	1.4	-	A
$P_{L(AV)}$	average output power		110	-	-	W
G_p	power gain		18	-	-	dB

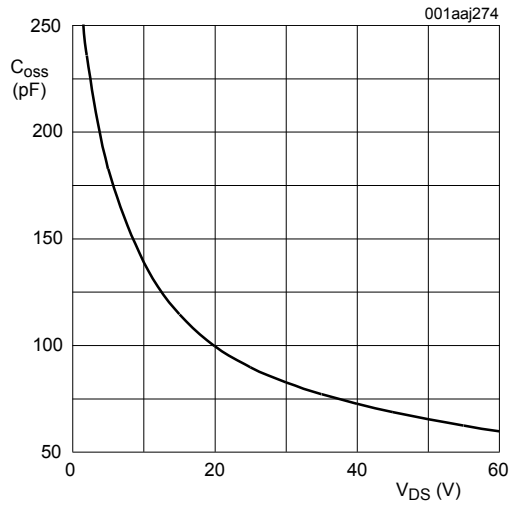
Table 7. RF characteristics ...continued

T_h = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
η_D	drain efficiency		<tbd>	-	-	%
IMD_{shldr}	intermodulation distortion shoulder	[1]	-	-	<tbd>	
PAR	peak-to-average ratio	[2]	-	8	-	dB

[1] Measured [dBc] with delta marker at 4.3 MHz from center frequency.

[2] PAR (of output signal) at 0.01 % probability on CCDF; PAR of input signal = 9.5 dB at 0.01 % probability on CCDF.



V_{GS} = 0 V; f = 1 MHz.

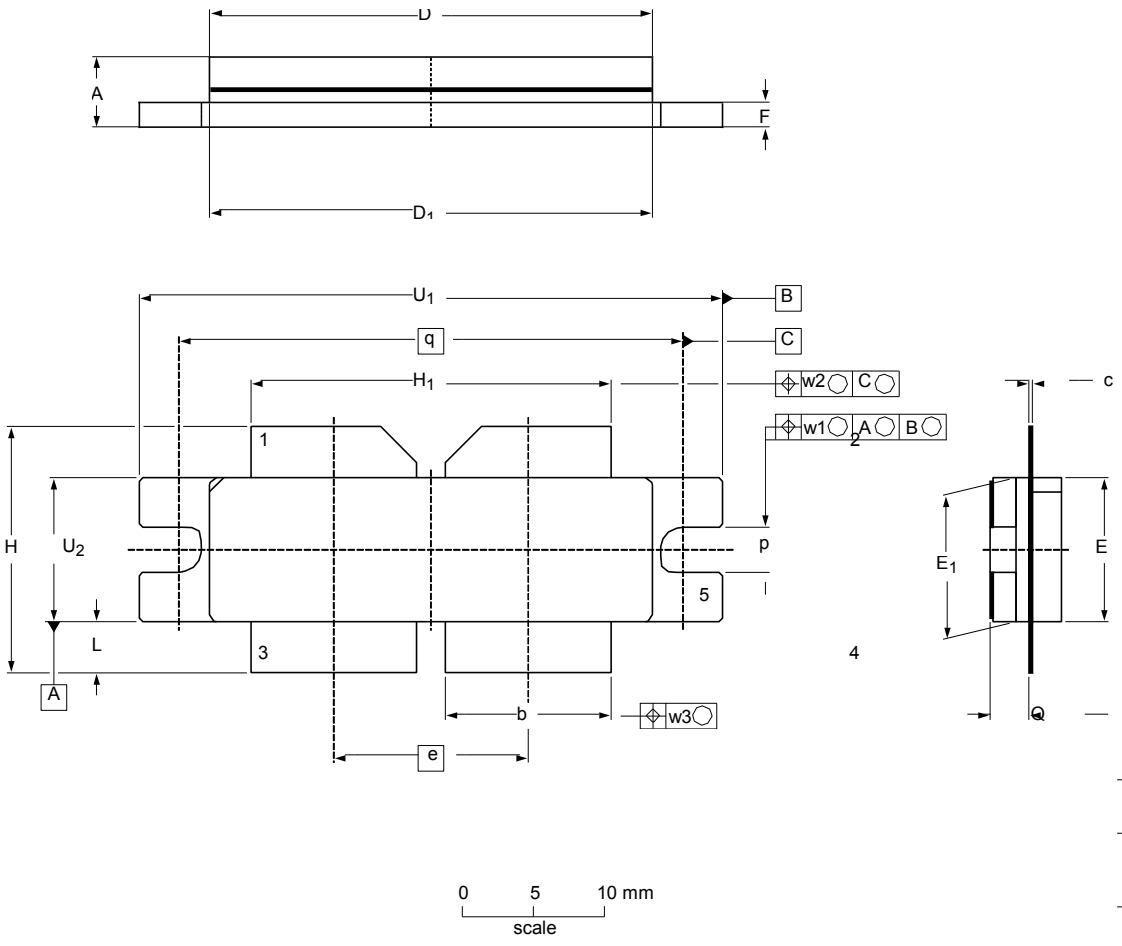
Fig 1. Output capacitance as a function of drain-source voltage; typical values per section; capacitance value without internal matching

6.1 Ruggedness in class-AB operation

The BLF888 is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: V_{DS} = 50 V; f = 860 MHz at rated power.

7. Package outline

Flanged LDMOST ceramic package; 2 mounting holes; 4 leads **SOT979A**



Dimensions

Unit[1]	A	b	c	D	D_1	E	E_1	e	F	H	H_1	L	p	Q	q	U_1	U_2	w_1	w_2	w_3
mm	max	5.77	11.81	0.15	31.55	31.37	10.29	10.29								1.969	17.50	25.53		0.25
	nom	3.86	3.30	3.02					41.28	10.29										
	min							13.72							35.56			0.25	0.51	
	max	4.80	11.56	0.10	30.94	31.12	10.03	10.03								1.689	17.25	25.27		0.010
	nom	3.35	3.05	2.77					41.02	10.03										
	min																			
inches	max	0.227	0.465	0.006	1.242	1.235	0.405	0.405								0.078	0.689	1.005		
	nom	0.152	0.130	0.119					1.625	0.405										
	min							0.540							1.400			0.010	0.020	
	min	0.189	0.455	0.004	1.218	1.225	0.395	0.395								0.067	0.679	0.995		

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT979A						08-04-24 08-09-04

Fig 2. Package outline SOT979A

8. Abbreviations

Table 8. Abbreviations

Acronym	Description
CCDF	Complementary Cumulative Distribution Function
DVB	Digital Video Broadcast
DVB-T	Digital Video Broadcast - Terrestrial
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
LDMOST	Laterally Diffused Metal-Oxide Semiconductor Transistor
OFDM	Orthogonal Frequency Division Multiplexing
PAR	Peak-to-Average power Ratio
RF	Radio Frequency
UHF	Ultra High Frequency
VSWR	Voltage Standing-Wave Ratio

9. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF888_1	20081216	Objective data sheet	-	-

10. Legal information

10.1 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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12. Contents

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