1. Product profile

1.1 General description

A 160 W LDMOS RF power transistor for base station applications. The transistor can deliver 160 W from 729 MHz to 960 MHz. The excellent ruggedness and broadband performance of this device makes it ideal for base station applications.

Table 1. Typical performance

RF performance at V_{DS} = 50 V in a common-source Class-AB test circuit.

Test signal	f (MHz)	I_{Dq} (mA)	V_{DS} (V)	$P_{L(AV)}$ (W)	G_p (dB)	η_D (%)	ACPR (dBc)
2-carrier W-CDMA	960	600	50	38	20	34	−32[1]

[1] Test signal: 3GPP test model 1; 64 DPCH; PAR = 8.4 dB at 0.01% probability on CCDF.

1.2 Features and benefits

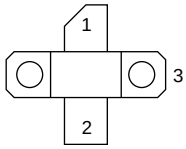
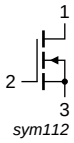
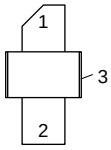
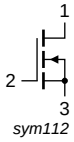
- Integrated ESD protection
- Excellent ruggedness
- High power gain
- High efficiency
- Excellent reliability
- Easy power control
- Low R_{th} providing excellent thermal stability
- Low output capacitance for wideband performance in Doherty applications
- Designed for low memory effects providing excellent digital pre-distortion capability
- No internal matching for broadband applications
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

1.3 Applications

- RF power applications for GSM, GSM EDGE, W-CDMA, CDMA base stations and multi carrier applications in the 729 MHz to 960 MHz frequency range

2. Pinning information

Table 2. Pinning

Pin	Description		Simplified outline	Graphic symbol
BLF6H10L-160 (SOT467C)				
1	drain			
2	gate			
3	source	[1]		
BLF6H10LS-160 (SOT467B)				
1	drain			
2	gate			
3	source	[1]		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BLF6H10L-160	-	flanged ceramic package; 2 mounting holes; 2 leads	SOT467C
BLF6H10LS-160	-	earless ceramic package; 2 leads	SOT467B

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; $P_{L(AV)}$ = 70 W	[1]	0.95	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 = 4.5 mA	[1]	104	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	V_{DS} = 10 V; I_D = 450 mA	[1]	1.4	1.7	2.4	V
I_{DSS}	drain leakage current	V_{GS} = 0 V; V_{DS} = 28 V		-	-	1.4	μA
I_{DSX}	drain cut-off current	V_{GS} = V_{GSth} + 3.75 V; V_{DS} = 10 V		-	20.47	-	A
I_{GSS}	gate leakage current	V_{GS} = 11 V; V_{DS} = 0 V		-	-	140	nA
g_{fs}	forward transconductance	V_{DS} = 10 V; I_D = 135 mA	[1]	-	1.2	-	S
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = V_{GSth} + 3.75 V; I_D = 15.75 A	[1]	-	0.2	-	Ω

[1] I_D is the drain current.

Table 7. RF characteristics

Test signal: 2-carrier W-CDMA; PAR = 8.5 dB at 0.01 % probability on the CCDF; carrier spacing 5 MHz; 3GPP test model 1; 1-64 DPCH; f_1 = 952.5 MHz; f_2 = 957.5 MHz; RF performance at V_{DS} = 50 V; I_{Dq} = 600 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	$P_{L(AV)}$ = 38 W	18.8	20	-	dB
η_D	drain efficiency	$P_{L(AV)}$ = 38 W	29	34	-	%
RL_{in}	input return loss	$P_{L(AV)}$ = 38 W	-	−12	−6	dBc
ACPR	adjacent channel power ratio	$P_{L(AV)}$ = 38 W	-	−32	−27	dBc

7. Test information

7.1 Ruggedness in class-AB operation

The BLF6H10L-160 and BLF6H10LS-160 are 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.

7.2 Impedance information

Table 8. Typical impedance

Simulated Z_S and Z_L test circuit impedances.

f (MHz)	Z_S (Ω)	Z_L (Ω)
729	1.0 – j0.8	3.1 + j1.7
760	1.0 – j0.7	3.0 + j1.5
790	1.0 – j0.7	2.8 + j1.4
820	1.0 – j0.6	2.7 + j1.2
869	1.0 – j0.5	2.5 + j1.0

Table 8. Typical impedance *...continued*

Simulated Z_S and Z_L test circuit impedances.

f (MHz)	Z_S (Ω)	Z_L (Ω)
881	1.0 – j0.4	2.5 + j0.9
894	1.0 – j0.4	2.4 + j0.8
920	1.0 – j0.4	2.3 + j0.7
940	1.0 – j0.4	2.3 + j0.6
960	1.0 – j0.3	2.2 + j0.5

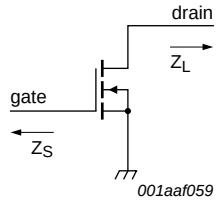
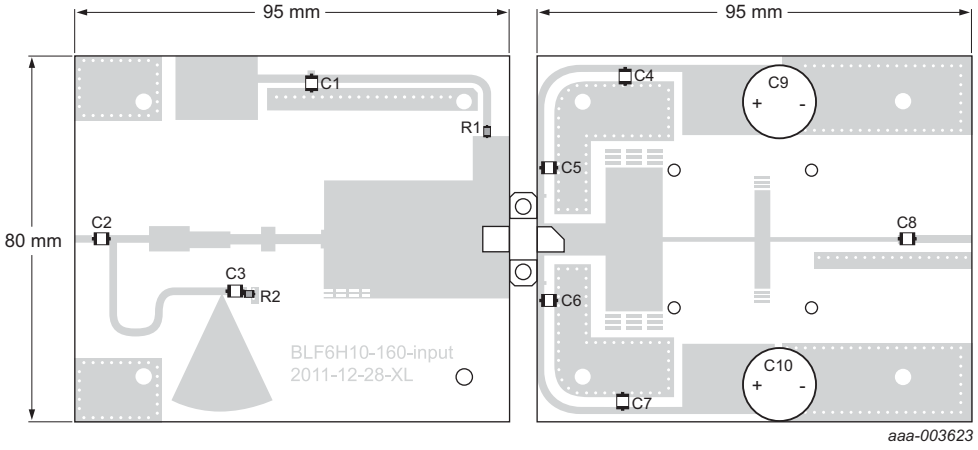


Fig 1. Definition of transistor impedance

7.3 Test circuit information



See Table 9 for list of components.

Fig 2. Component layout

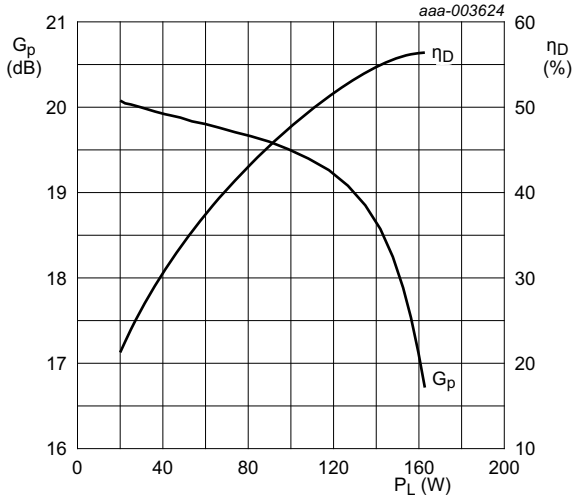
Table 9. List of components

See Figure 2 for component layout.

Component	Description	Value	Remarks
C1, C2, C3, C5, C6, C8	multilayer ceramic chip capacitor	47 pF	ATC100B
C4, C7	multilayer ceramic chip capacitor	1 μF	Murata
C9, C10	electrolytic capacitor	1000 μF, 100 V	
R1, R2	chip resistor	9.1 Ω	Vishale Dale 0805

7.4 Graphical data

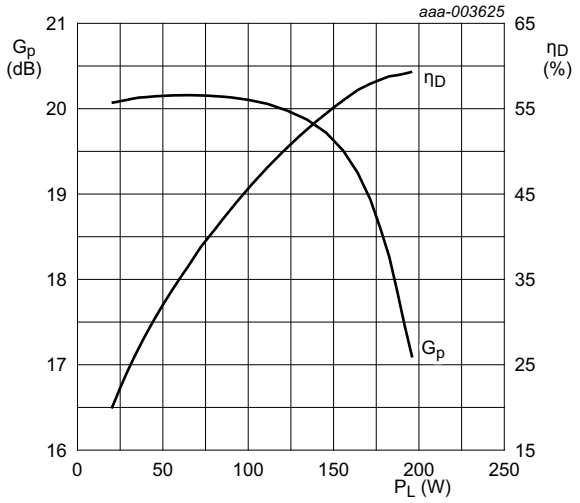
7.4.1 CW



V_{DS} = 50 V; I_{Dq} = 600 mA; f = 960 MHz.

Fig 3. Power gain and drain efficiency as function of load power; typical values

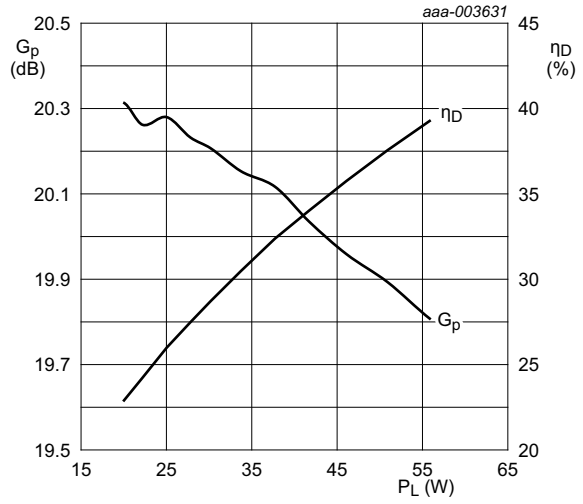
7.4.2 CW pulsed



V_{DS} = 50 V; I_{Dq} = 600 mA; f = 960 MHz.

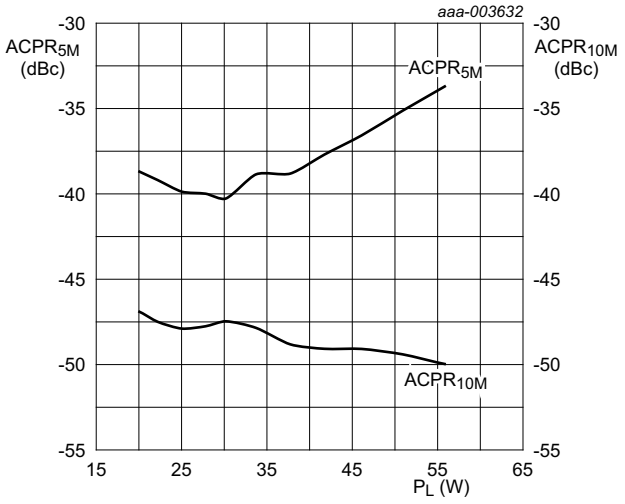
Fig 4. Power gain and drain efficiency as function of load power; typical values

7.4.3 1-Carrier W-CDMA



V_{DS} = 50 V; I_{Dq} = 600 mA; f = 960 MHz.

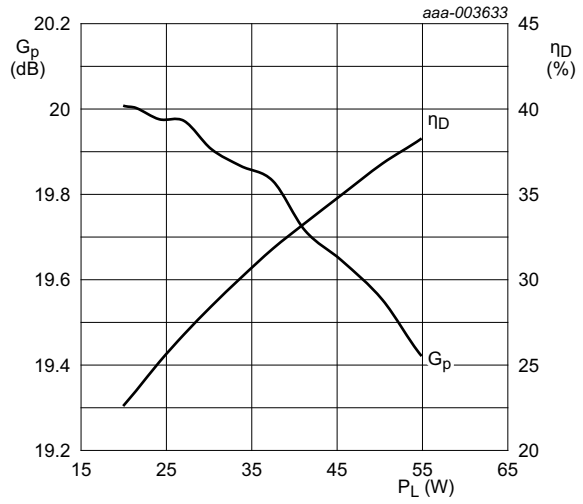
Fig 5. Power gain and drain efficiency as function of load power; typical values



V_{DS} = 50 V; I_{Dq} = 600 mA; f = 960 MHz.

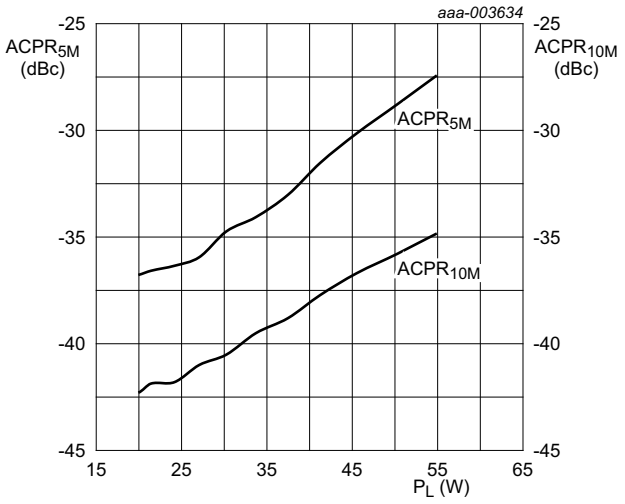
Fig 6. Adjacent channel power ratio (5 MHz) and Adjacent channel power ratio (10 MHz) as function of load power; typical values

7.4.4 2-carrier W-CDMA



V_{DS} = 50 V; I_{Dq} = 600 mA; f_1 = 952.5 MHz; f_2 = 957.5 MHz.

Fig 7. Power gain and drain efficiency as function of load power; typical values

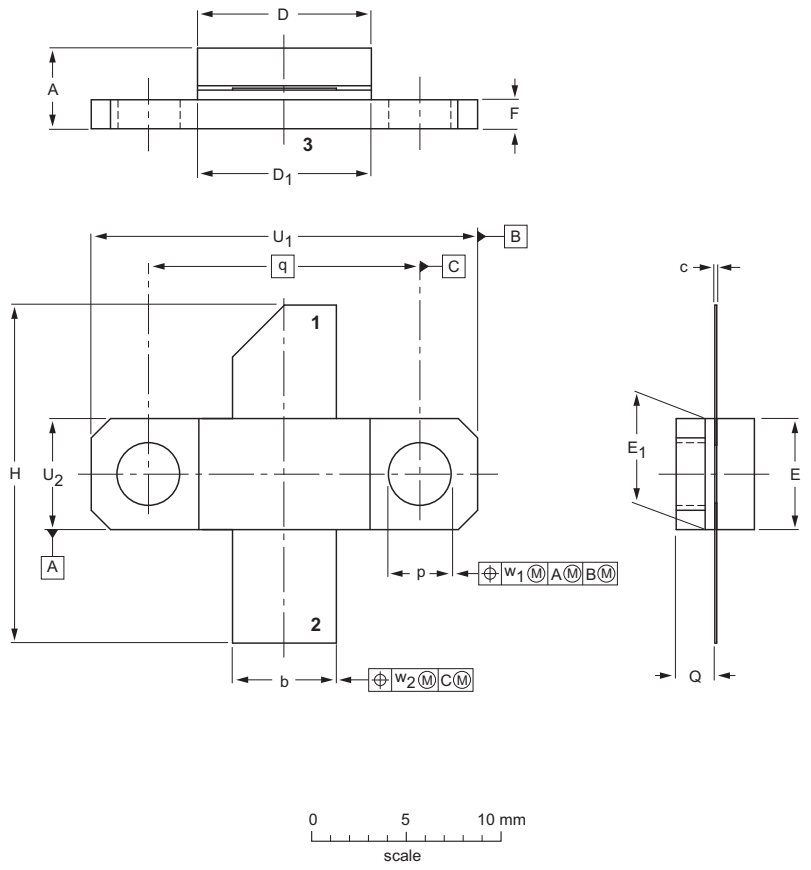


V_{DS} = 50 V; I_{Dq} = 600 mA; f_1 = 952.5 MHz; f_2 = 957.5 MHz.

Fig 8. Adjacent channel power ratio (5 MHz) and Adjacent channel power ratio (10 MHz) as function of load power; typical values

8. Package outline

Flanged ceramic package; 2 mounting holes; 2 leads **SOT467C**



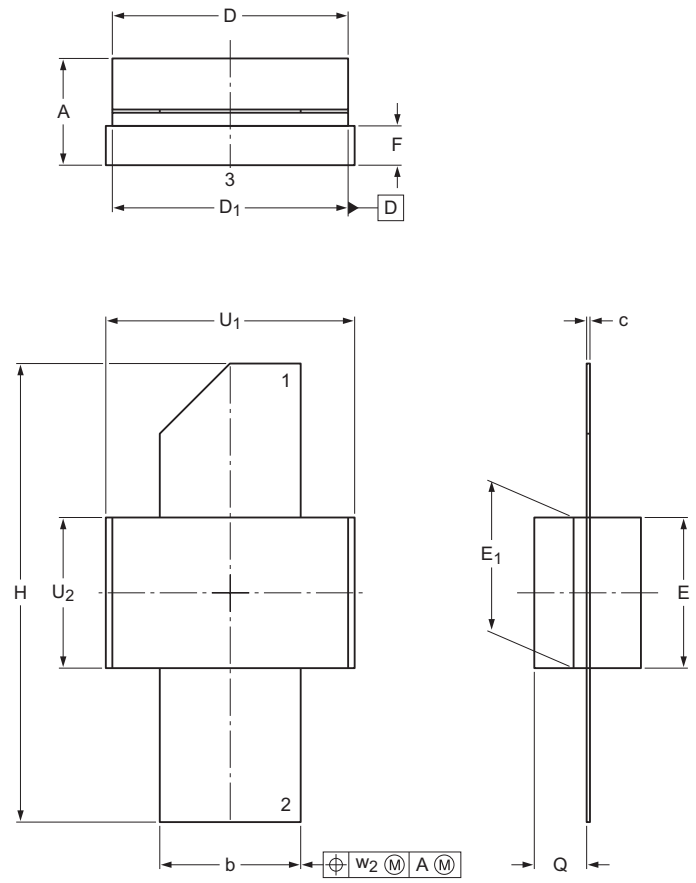
DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

UNIT	A	b	c	D	D_1	E	E_1	F	H	p	Q	q	U_1	U_2	w_1	w_2
mm	4.67 3.94	5.59 5.33	0.15 0.10	9.25 9.04	9.27 9.02	5.92 5.77	5.97 5.72	1.65 1.40	18.54 17.02	3.43 3.18	2.21 1.96	14.27	20.45 20.19	5.97 5.72	0.25	0.51
inch	0.184 0.155	0.220 0.210	0.006 0.004	0.364 0.356	0.365 0.355	0.233 0.227	0.235 0.225	0.065 0.055	0.73 0.67	0.135 0.125	0.087 0.077	0.562	0.805 0.795	0.235 0.225	0.010	0.020

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT467C						~~99-12-28~~ 12-05-02

Fig 9. Package outline SOT467C

Earless ceramic package; 2 leads **SOT467B**



Dimensions

Unit[1]		A	b	c	D	D_1	E	E_1	F	H	Q	U_1	U_2	w_2
mm	max	4.67	5.59	0.15	9.25	9.27	5.92	5.97	1.65	18.29	2.21	9.78	5.97	0.25
	nom													
	min	3.94	5.33	0.10	9.04	9.02	5.77	5.72	1.40	17.27	1.96	9.53	5.72	
inches	max	0.184	0.22	0.006	0.364	0.365	0.233	0.235	0.065	0.72	0.087	0.385	0.235	0.01
	nom													
	min	0.155	0.21	0.004	0.356	0.355	0.227	0.225	0.055	0.68	0.077	0.375	0.225	

Note
1. millimeter dimensions are derived from the original inch dimensions.

sot467b_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT467B						~~11-08-18~~ 12-05-01

Fig 10. Package outline SOT467B

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
3GPP	3rd Generation Partnership Project
CDMA	Code Division Multiple Access
CCDF	Complementary Cumulative Distribution Function
DPCH	Dedicated Physical CHannel
EDGE	Enhanced Data rates for GSM Evolution
GSM	Global System for Mobile Communications
HF	High Frequency
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
PAR	Peak-to-Average Ratio
VSWR	Voltage Standing-Wave Ratio
W-CDMA	Wideband Code Division Multiple Access

11. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLF6H10L-160_6H10LS-160#3	20150901	Product data sheet	-	BLF6H10L-160_6H10LS-160 v.2
Modifications:	• The format of this document has been redesigned to comply with the new identity guidelines of Ampleon. • Legal texts have been adapted to the new company name where appropriate.			
BLF6H10L-160_6H10LS-160 v.2	20121212	Product data sheet	-	BLF6H10L-160_6H10LS-160 v.1
BLF6H10L-160_6H10LS-160 v.1	20120210	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.ampleon.com.

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14. Contents

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