

# BLP8G20S-80P

Power LDMOS transistor

Rev. 4 — 6 April 2016

AMPLEON

Product data sheet

## 1. Product profile

### 1.1 General description

80 W LDMOS transistor for base station applications at frequencies from 1800 MHz to 2200 MHz.

**Table 1. Typical performance**

*Typical RF performance per section at  $T_{case} = 25\text{ °C}$  in a common Doherty demo board.*

Test signal	f	$I_{Dq}$	$V_{DS}$	$P_{L(AV)}$	$G_p$	$\eta_D$	ACPR
	(MHz)	(mA)	(V)	(W)	(dB)	(%)	(dBc)
2-carrier W-CDMA	1805 to 1880	300	28	14.2	17	47	-30 <a href="#">[1]</a>
	1880 to 1920	300	28	14.2	16.8	46	-30 <a href="#">[1]</a>
	2110 to 2170	300	28	14.2	16	43	-30 <a href="#">[1]</a>

[1] Test signal: 3GPP test model 1; 64 DPCH; PAR = 8.4 dB at 0.01 % probability on CCDF; carrier spacing = 5 MHz.

### 1.2 Features and benefits

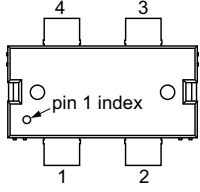
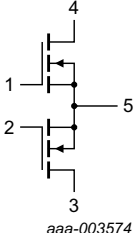
- Designed for broadband operation (1800 MHz to 2200 MHz)
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Internally matched for ease of use
- High power gain
- Integrated ESD protection
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

### 1.3 Applications

- RF power amplifiers for base station and multi-carrier applications in the 1800 MHz to 2200 MHz frequency range

## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	gate 2		
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
BLP8G20S-80P	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		-	65	V
$V_{GS}$	gate-source voltage		-0.5	+13	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 online MTF calculator.

## 5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-case)}$	thermal resistance from junction to case	$T_{case} = 80\text{ °C}; P_L = 10\text{ W}$	0.85	K/W

## 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	$V_{GS} = 0\text{ V}; I_D = 0.5\text{ mA}$	65	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	$V_{DS} = 10\text{ V}; I_D = 47\text{ mA}$	1.55	1.9	2.25	V
$I_{DSS}$	drain leakage current	$V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$	-	-	1.2	$\mu\text{A}$
$I_{DSX}$	drain cut-off current	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$	-	8.5	-	A
$I_{GSS}$	gate leakage current	$V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$	-	-	120	nA
$g_{fs}$	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 47\text{ mA}$	-	0.41	-	S
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 1.645\text{ A}$	-	0.32	-	$\Omega$

**Table 7. RF characteristics**

Test signal: 2-carrier W-CDMA; PAR = 8.4 dB at 0.01 % probability on CCDF; carrier spacing = 5 MHz; 3GPP test model 1; 64 DPCH;  $f_1 = 1882.5\text{ MHz}; f_2 = 1887.5\text{ MHz}; f_3 = 1912.5\text{ MHz}; f_4 = 1917.5\text{ MHz}$ ; RF performance per section at  $V_{DS} = 28\text{ V}; I_{Dq} = 300\text{ mA}; T_{case} = 25\text{ °C}$ ; unless otherwise specified; in a class-AB production test circuit.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$P_{L(AV)} = 10\text{ W}$	16.5	17.5	-	dB
$\eta_D$	drain efficiency	$P_{L(AV)} = 10\text{ W}$	29	33	-	%
$RL_{in}$	input return loss	$P_{L(AV)} = 10\text{ W}$	-	-10	-7	dB
ACPR	adjacent channel power ratio	$P_{L(AV)} = 10\text{ W}$	-	-32	-28	dBc

## 7. Test information

### 7.1 Ruggedness in class-AB operation

The BLP8G20S-80P is capable of withstanding a load mismatch corresponding to a VSWR = 10 : 1 through all phases under the following conditions:  $V_{DS} = 28\text{ V}; I_{Dq} = 300\text{ mA}; P_L = 40\text{ W (CW)}; f = 1805\text{ MHz}$ .

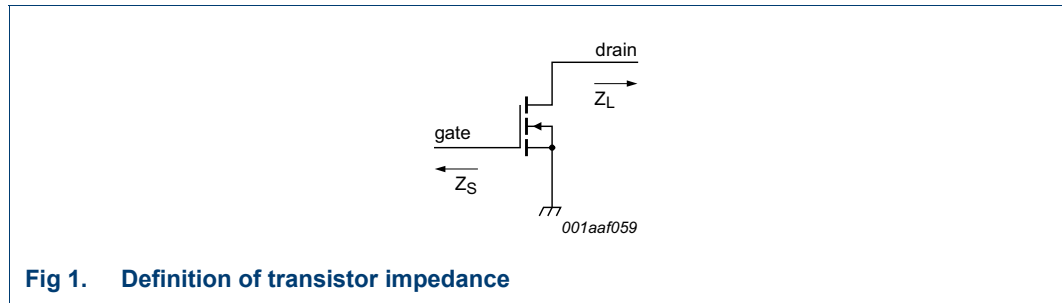
### 7.2 Impedance information

**Table 8. Typical impedance**

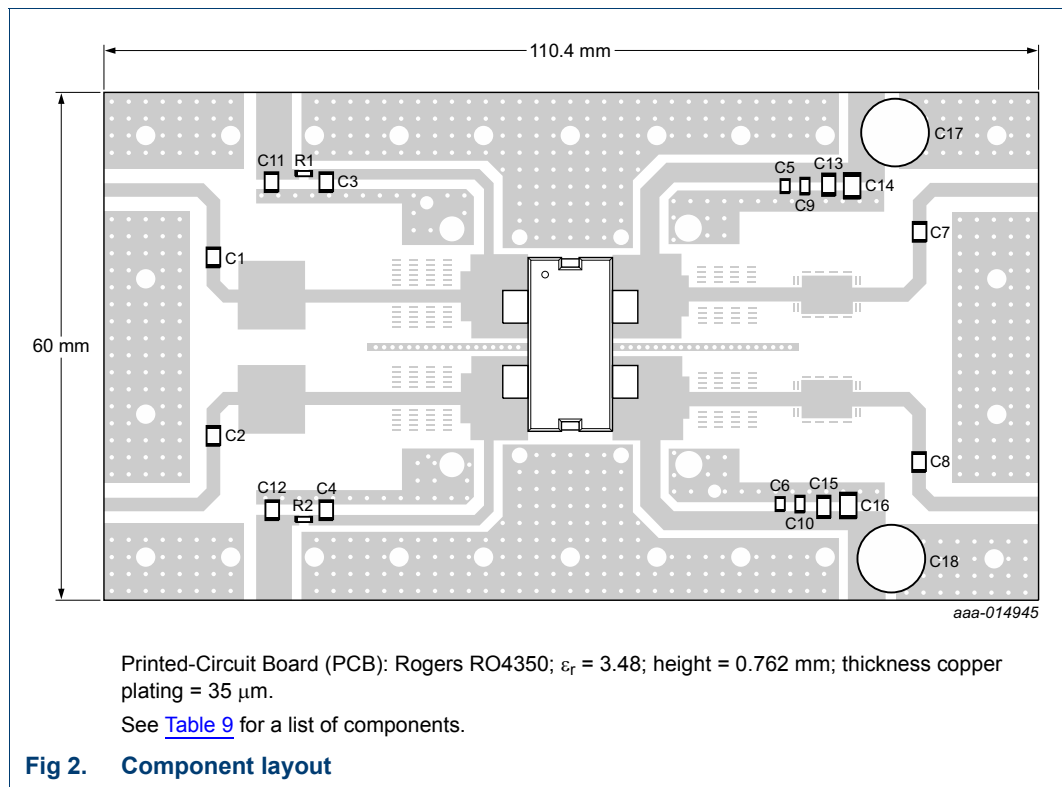
Measured load-pull data.

f (MHz)	$Z_S$ [1] ( $\Omega$ )	$Z_L$ [1] ( $\Omega$ )
1880	2.3 – 14.0j	4.5 – 10.5j
1920	3.0 – 15.7j	4.1 – 10.6j

[1]  $Z_S$  and  $Z_L$  defined in [Figure 1](#).



7.3 Test circuit



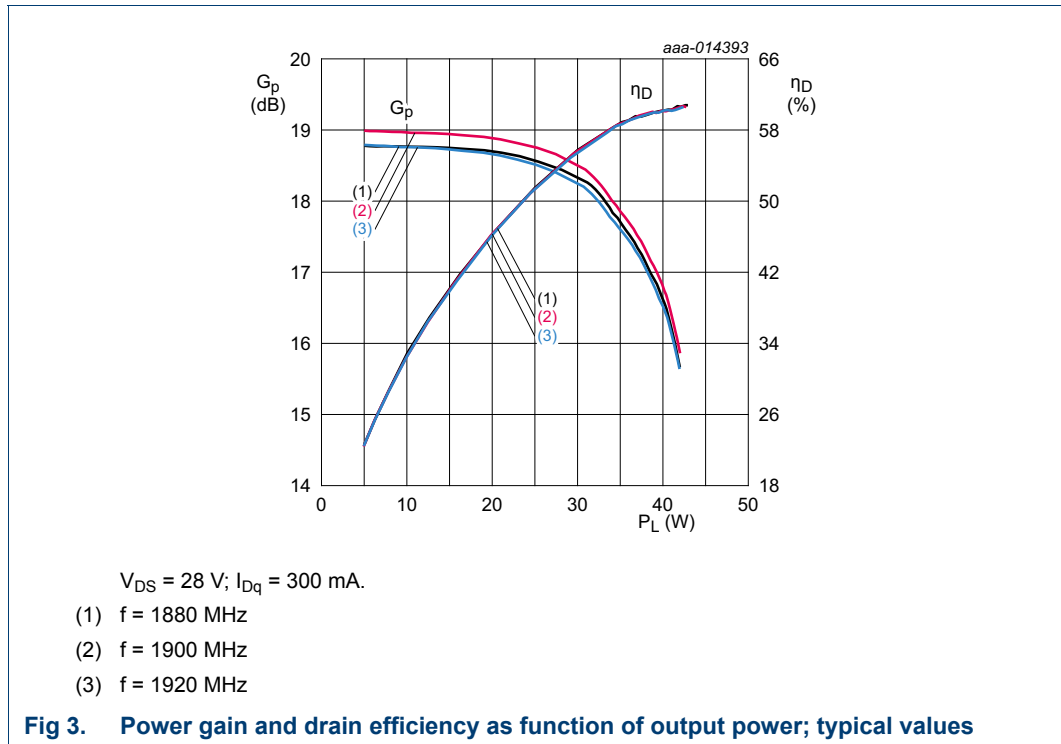
**Table 9. List of components**

See [Figure 2](#) for component layout.

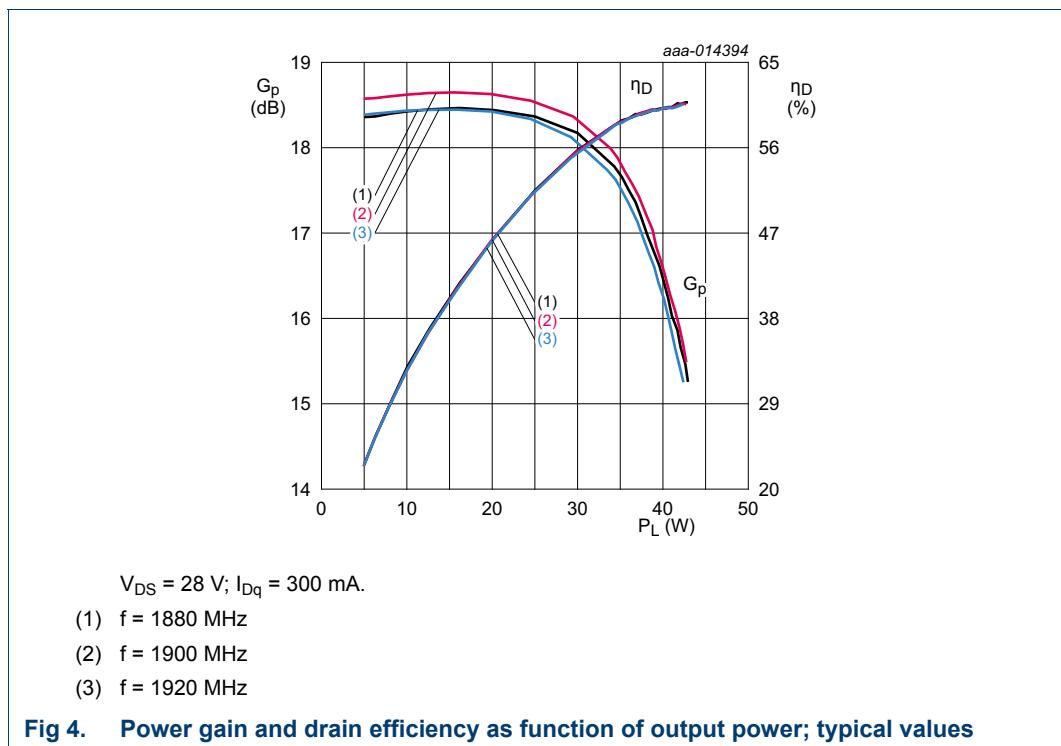
Component	Description	Value	Remarks
C1, C2, C3, C4, C5, C6, C7, C8	multilayer ceramic chip capacitor	11 pF	ATC 600F series or capacitor of same quality
C9, C10	multilayer ceramic chip capacitor	1 $\mu\text{F}$ , 50 V	Murata or capacitor of same quality
C11, C12, C13, C14, C15, C16	multilayer ceramic chip capacitor	4.7 $\mu\text{F}$ , 50 V	Murata or capacitor of same quality
C17, C18	multilayer ceramic chip capacitor	2200 $\mu\text{F}$ , 50 V	
R1, R2	SMD resistor	9.1 $\Omega$	SMD 0805

7.4 Graphical data

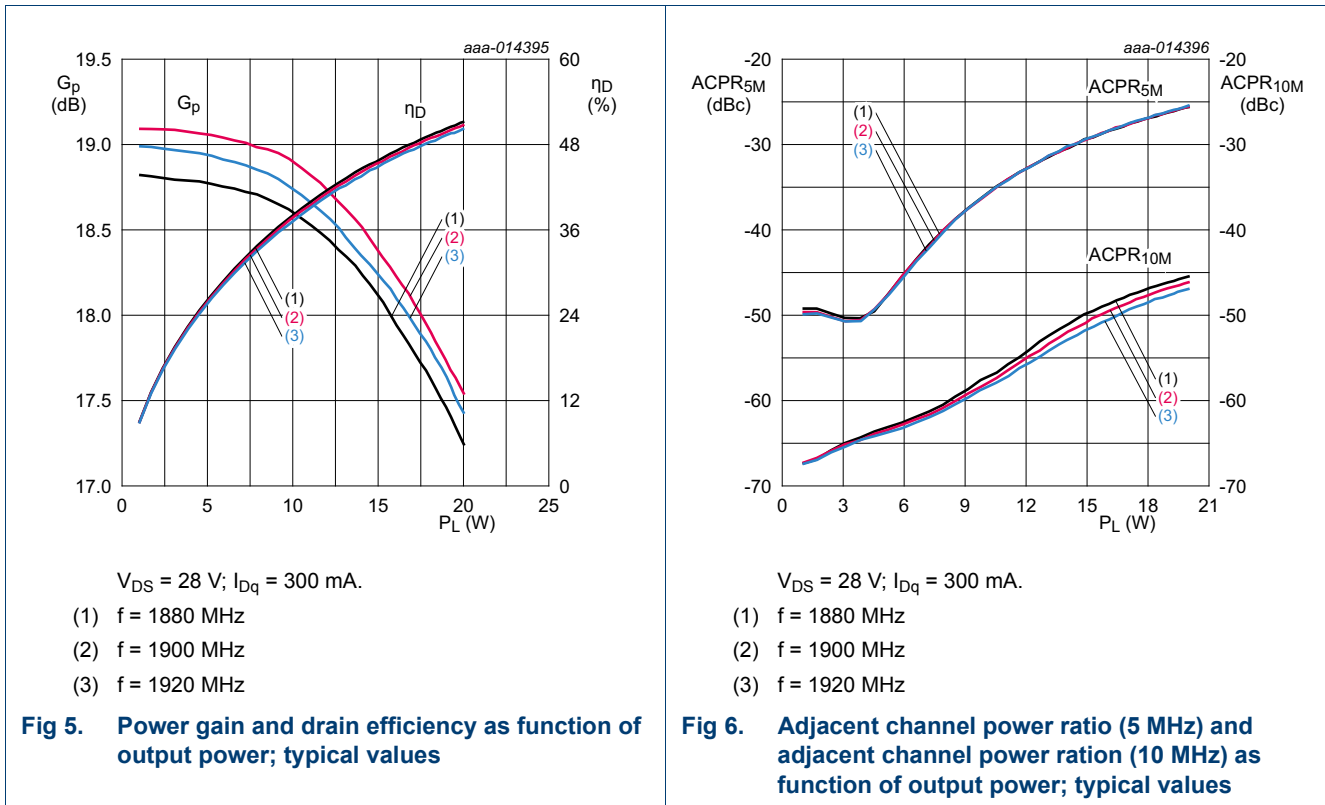
7.4.1 CW



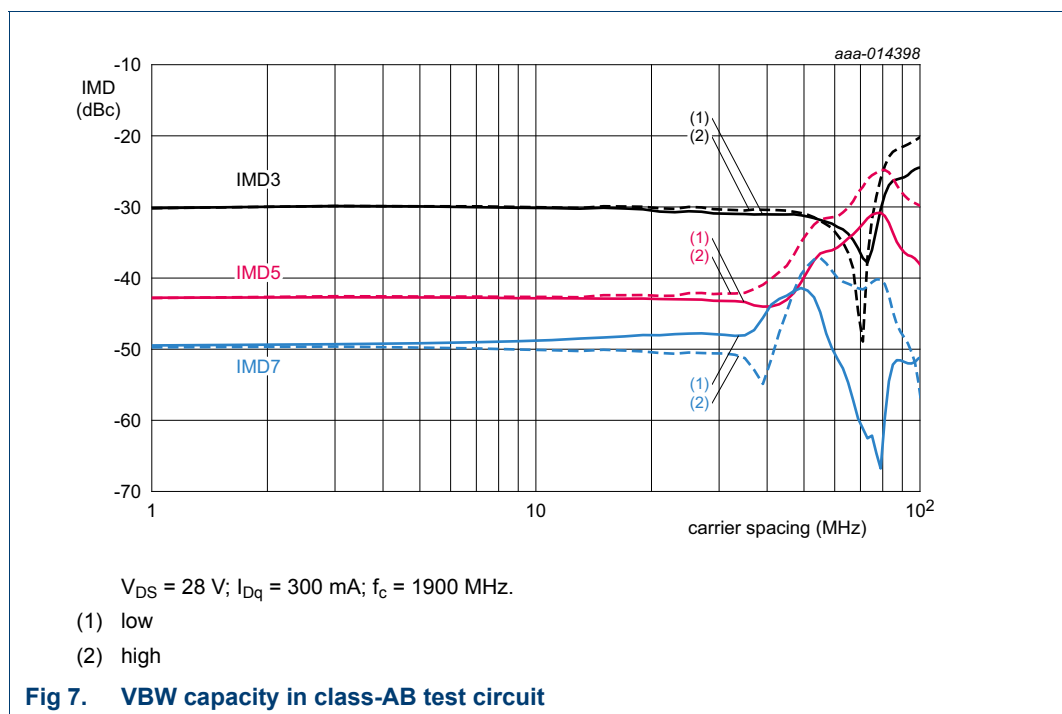
7.4.2 Pulsed CW



7.4.3 1-Carrier W-CDMA



7.4.4 VBW



8. Package outline

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

SOT1223-2

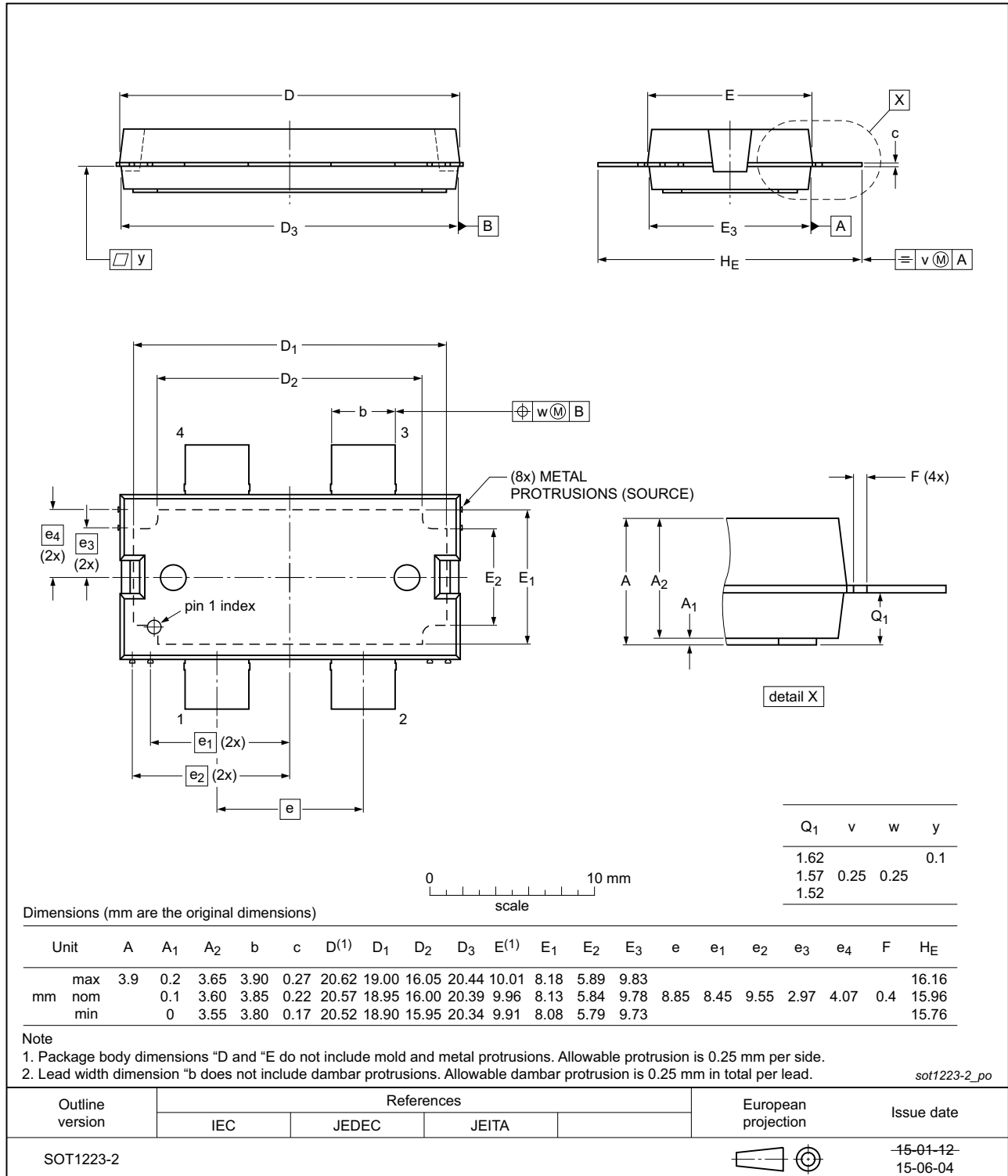


Fig 8. Package outline SOT1223-2 (HSOP4F)

## 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 10. Abbreviations

Acronym	Description
3GPP	3rd Generation Partnership Project
CCDF	Complementary Cumulative Distribution Function
CW	Continuous Wave
DPCH	Dedicated Physical CHannel
ESD	ElectroStatic Discharge
LDMOS	Laterally Diffused Metal Oxide Semiconductor
MTF	Median Time to Failure
PAR	Peak-to-Average Ratio
SMD	Surface Mounted Device
VBW	Video BandWidth
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
BLP8G20S-80P v.4	20160406	Product data sheet		BLP8G20S-80P v.3
Modifications:		<ul style="list-style-type: none"> <li>• <a href="#">Table 2 on page 2</a>: simplified outline drawing changed from SOT1223-1 to SOT1223-2</li> <li>• <a href="#">Table 3 on page 2</a>: package version changed from SOT1223-1 to SOT1223-2</li> <li>• <a href="#">Figure 8 on page 7</a>: package outline drawing changed from SOT1223-1 to SOT1223-2</li> </ul>		
BLP8G20S-80P v.3	20150901	Product data sheet		BLP8G20S-80P v.2
BLP8G20S-80P v.2	20141013	Product data sheet	-	BLP8G20S-80P v.1
BLP8G20S-80P v.1	20140630	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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