

# BPC10M6X2S200

LDMOS 433 MHz power module

Rev. 1 — 29 March 2018

AMPLEON

Product data sheet

## 1. Product profile

### 1.1 General description

200 W LDMOS power module intended for plasma lighting, RF cooking, defrosting and ISM applications driving at the frequency of 433 MHz.

**Table 1. Test information**

Typical RF performance at  $T_{mb} = 25\text{ °C}$ ; CW and pulsed mode ( $\delta = 90\%$ ; repetition 100 kHz);  $V_{DS} = 28\text{ V}$ ;  $I_{Dq1} = 50\text{ mA}$ ;  $I_{Dq2} = 100\text{ mA}$ ; unless otherwise specified.

Test signal	f	$P_L$	$RL_{in}$	$G_p$	$\eta_{add}$
	(MHz)	(W)	(dB)	(dB)	(%)
pulsed RF	433	200	13	38	74
CW	433	200	13	38	74

### 1.2 Features and benefits

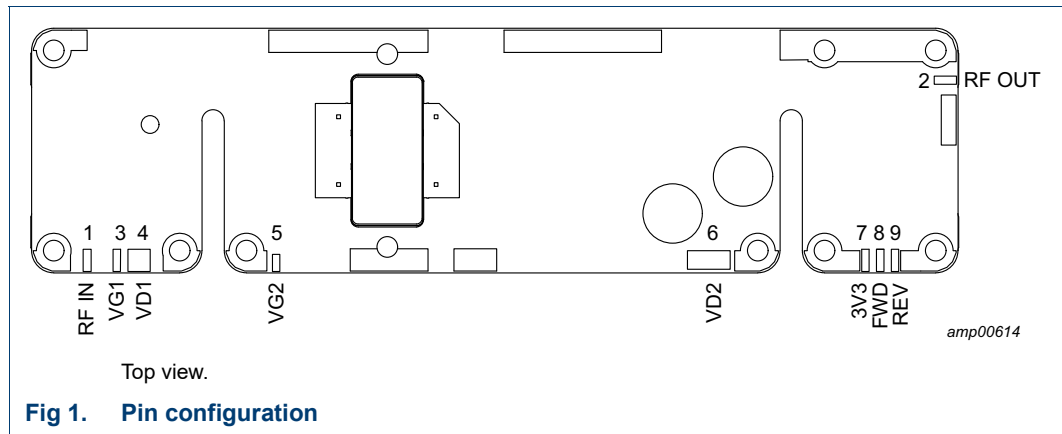
- 200 W pulsed RF power
- Small size: 125 × 33 mm
- Low weight: 85 g
- Sensing forward and reflected power
- Excellent ruggedness, VSWR 10 : 1
- High gain
- Input/output 50  $\Omega$  matched
- High efficiency
- Excellent thermal stability
- 100 % RF testing in production
- For RoHS compliance see the product details on the Ampleon website

### 1.3 Applications

- Plasma lighting, industrial heating, RF cooking and defrosting, medical and scientific

## 2. Pinning information

### 2.1 Pinning



### 2.2 Pin description

Table 2. Pin description

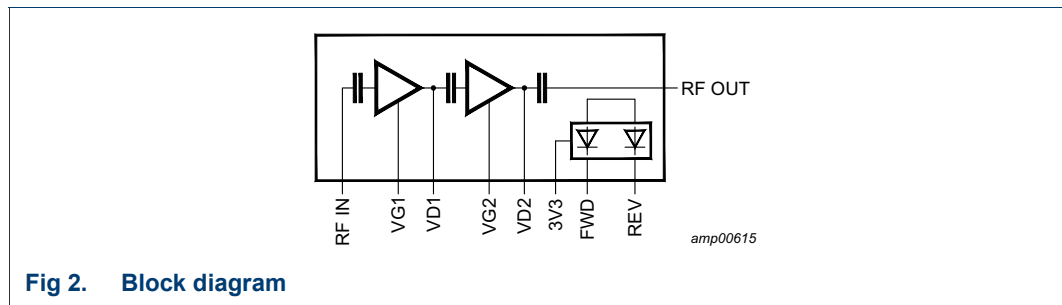
Symbol	Pin	Description
RF IN	1	RF input
RF OUT	2	RF output
VG1	3	gate voltage driver stage
VD1	4	drain voltage driver stage
VG2	5	gate voltage final stage
VD2	6	drain voltage final stage
3V3	7	detector power supply
FWD	8	video output of the forward power detector
REV	9	video output of the reverse (reflected) power detector

## 3. Ordering information

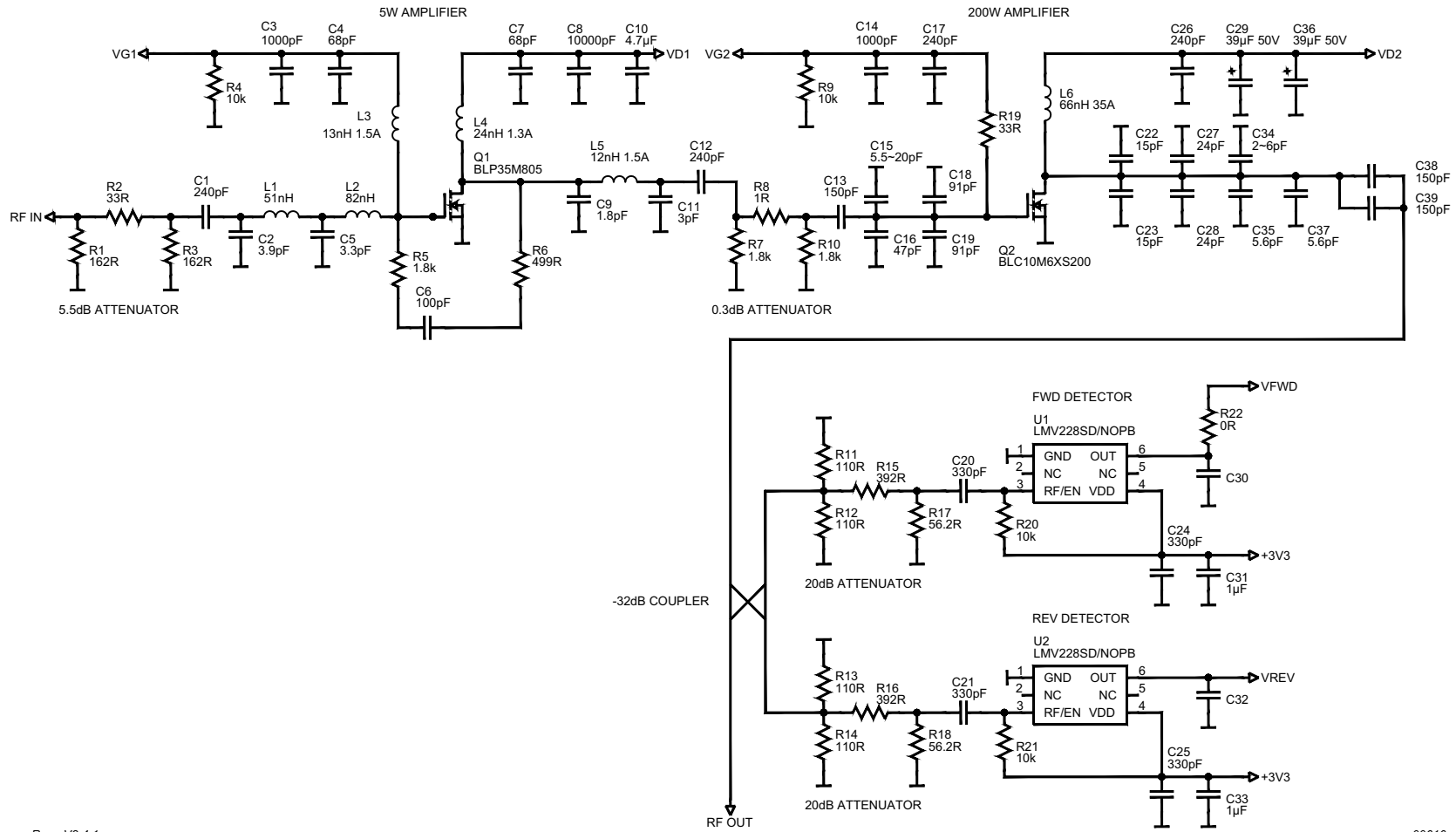
Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BPC10M6X2S200	-	pallet; 12 mounting holes; 9 terminations	-

4. Block diagram



# 5. Internal circuitry



Rev.: V2.4.1

amp00616

Fig 3. Electric schematic

## 6. 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		0	65	V
$V_{GS}$	gate-source voltage		-6	+3	V
$T_{stg}$	storage temperature		-40	+60	°C
$T_{mb}$	mounting base temperature		-40	+80	°C

## 7. Characteristics

**Table 5. RF characteristics**

Test signal: CW;  $V_{DS} = 28$  V;  $I_{Dq1} = 50$  mA;  $I_{Dq2} = 100$  mA.;  $T_{mb} = 25$  °C; unless otherwise specified.

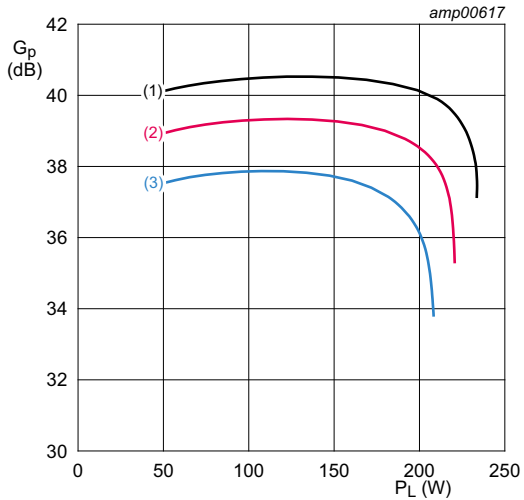
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
f	frequency	operating	423	433	443	MHz
$P_L$	output power		-	200	-	W
$P_i$	input power		-	15	23	dBm
$G_p$	power gain		30.3	38	42.5	dB
$\eta_D$	drain efficiency		69	74	80	%
$\alpha_{sup(H)}$	harmonic suppression		-	-30	-	dBc
$P_{cons}$	power consumption	DC	-	270	-	W
$D_{cpl}$	coupler directivity		-	28	-	dB

### 7.1 Ruggedness

The BPC10M6X2S200 is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases for an output power of 200 W CW and pulsed mode (90 % DC, repetition 100 kHz).

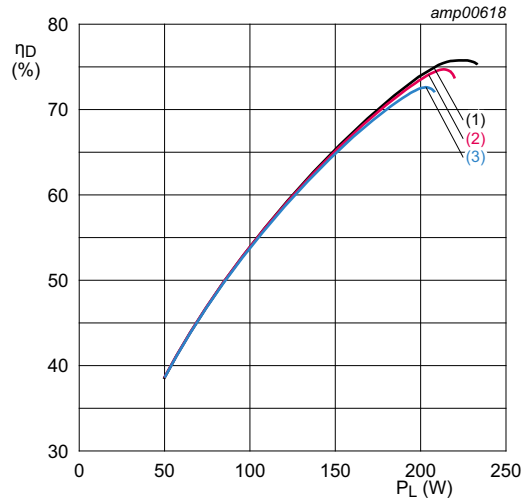
8. Test information

8.1 Graphical data



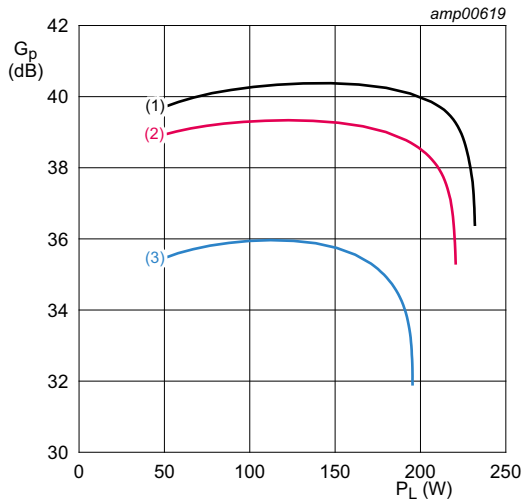
$I_{Dq1} = 50 \text{ mA}; I_{Dq2} = 100 \text{ mA}; V_{DS} = 28 \text{ V}; f = 433 \text{ MHz}.$   
 (1)  $T_{mb} = -40 \text{ }^\circ\text{C}$   
 (2)  $T_{mb} = +25 \text{ }^\circ\text{C}$   
 (3)  $T_{mb} = +80 \text{ }^\circ\text{C}$

**Fig 4. Power gain as a function of output power; typical values**



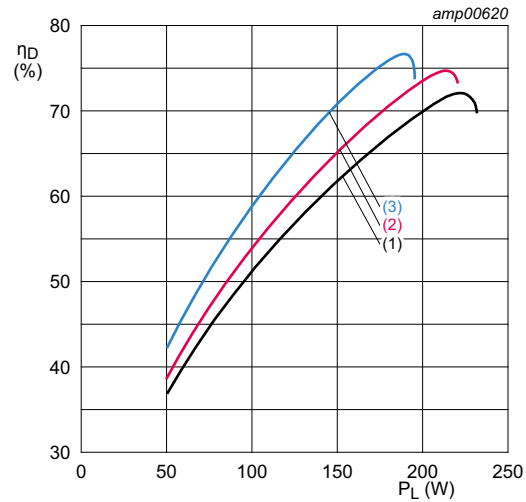
$I_{Dq1} = 50 \text{ mA}; I_{Dq2} = 100 \text{ mA}; V_{DS} = 28 \text{ V}; f = 433 \text{ MHz}.$   
 (1)  $T_{mb} = -40 \text{ }^\circ\text{C}$   
 (2)  $T_{mb} = +25 \text{ }^\circ\text{C}$   
 (3)  $T_{mb} = +80 \text{ }^\circ\text{C}$

**Fig 5. Drain efficiency as a function of output power; typical values**



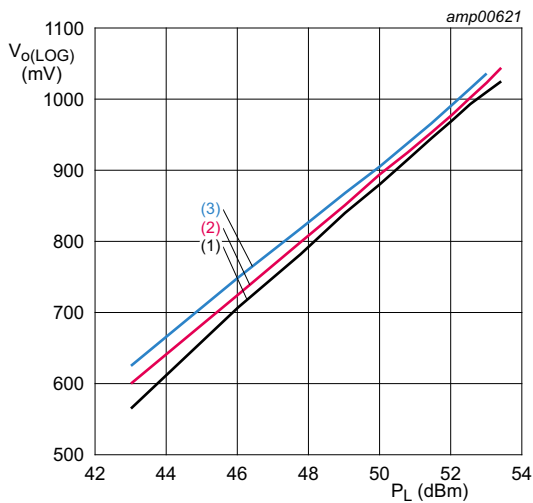
$I_{DQ1} = 50 \text{ mA}; I_{DQ2} = 100 \text{ mA}; V_{DS} = 28 \text{ V}; T_{mb} = 25 \text{ }^\circ\text{C}.$   
 (1)  $f = 423 \text{ MHz}$   
 (2)  $f = 433 \text{ MHz}$   
 (3)  $f = 443 \text{ MHz}$

**Fig 6. Power gain as a function of output power; typical values**



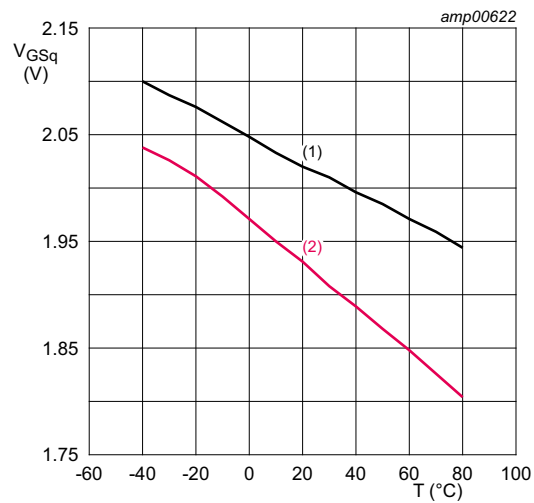
$I_{DQ1} = 50 \text{ mA}; I_{DQ2} = 100 \text{ mA}; V_{DS} = 28 \text{ V}; T_{mb} = 25 \text{ }^\circ\text{C}.$   
 (1)  $f = 423 \text{ MHz}$   
 (2)  $f = 433 \text{ MHz}$   
 (3)  $f = 443 \text{ MHz}$

**Fig 7. Drain efficiency as a function of output power; typical values**



(1)  $T_{mb} = -40 \text{ }^\circ\text{C}$   
 (2)  $T_{mb} = +25 \text{ }^\circ\text{C}$   
 (3)  $T_{mb} = +80 \text{ }^\circ\text{C}$

**Fig 8. LOG detector output voltage as a function of output power; typical values**



$V_{DS} = 28 \text{ V}; T_{mb} = 25 \text{ }^\circ\text{C}.$   
 (1)  $V_{GS1}$  at  $I_{DQ1} = 50 \text{ mA}$   
 (2)  $V_{GS2}$  at  $I_{DQ2} = 100 \text{ mA}$

**Fig 9. Gate-source quiescent currents as a function of temperature; typical values**

9. Package outline

Pallet; 12 mounting holes; 9 terminations

BPC10M6X2S200

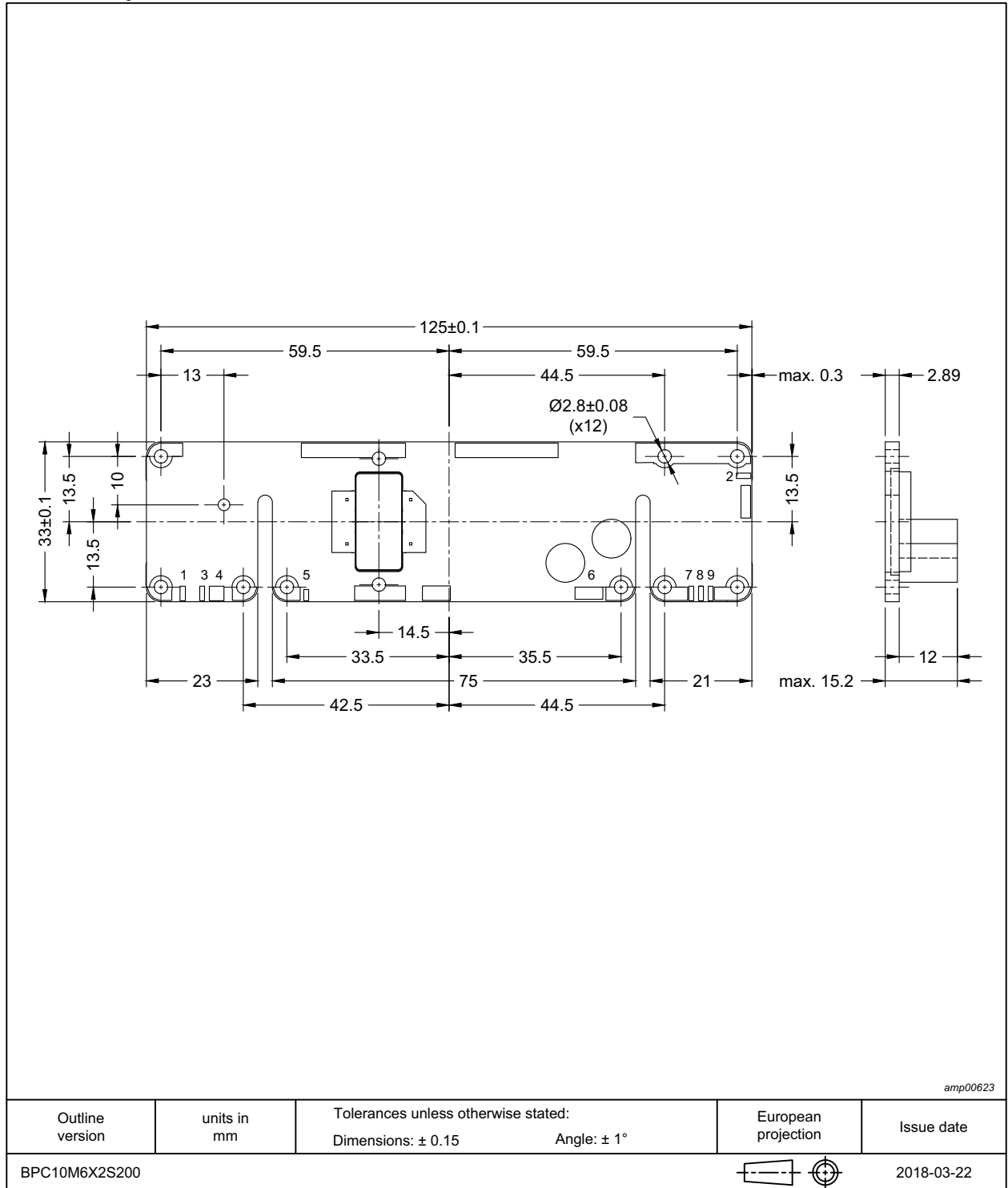


Fig 10. Package outline



## 10. 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.

**Table 6. ESD sensitivity**

ESD model	Class
Charged Device Model (CDM); According to ANSI/ESDA/JEDEC standard JS-002	C1 <a href="#">[1]</a>
Human Body Model (HBM); According to ANSI/ESDA/JEDEC standard JS-001	2 <a href="#">[2]</a>

[1] CDM classification C1 is granted to any part that passes after exposure to an ESD pulse of 250 V, but fails after exposure to an ESD pulse of 500 V.

[2] HBM classification 2 is granted to any part that passes after exposure to an ESD pulse of 2000 V, but fails after exposure to an ESD pulse of 4000 V.

## 11. Abbreviations

**Table 7. Abbreviations**

Acronym	Description
CW	Continuous Wave
ISM	Industrial, Scientific and Medical
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
RoHS	Restriction of Hazardous Substances
VSWR	Voltage Standing Wave Ratio

## 12. Revision history

**Table 8. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BPC10M6X2S200 v.1	20180329	Product data sheet	-	-

## 13. Legal information

### 13.1 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.

[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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