

BPC2425M9X2S250-1

Power LDMOS module

Rev. 1 — 18 October 2018

AMPLEON

Product data sheet

1. Product profile

1.1 General description

250 W LDMOS power module for Industrial, Scientific and Medical (ISM) applications at frequencies from 2400 MHz to 2500 MHz. The module is designed for high-power CW applications.

Table 1. Test information

Typical RF performance at $V_{DS} = 32\text{ V}$; $T_{mb} = 25\text{ °C}$; $I_{Dq1} = 25\text{ mA}$; $I_{Dq2} = 50\text{ mA}$.

Test signal	f	V_{DS}	P_L	G_p	η_D
	(MHz)	(V)	(W)	(dB)	(%)
CW	2450	32	290	31	59
CW pulsed [1]	2450	32	300	32	61

[1] Pulse width is 300 μs ; duty cycle is 50 %.

1.2 Features and benefits

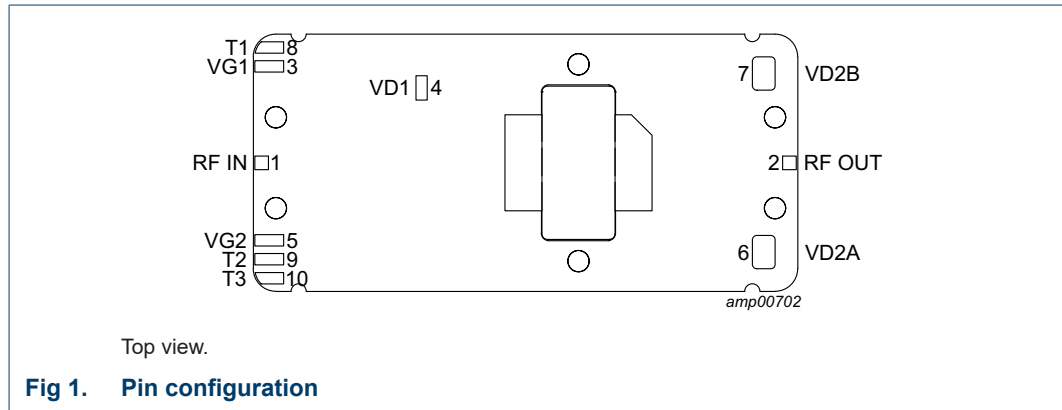
- High efficiency
- Small size: 72 × 34 mm
- Input/output 50 Ω matched
- Designed for broadband operation (2400 MHz to 2500 MHz)
- Built-in temperature sensors
- 100 % RF testing in production
- For RoHS compliance see the product details on the Ampleon website

1.3 Applications

- RF power amplifiers for CW applications in the 2400 MHz to 2500 MHz frequency range such as industrial heating and drying, scientific, medical, plasma lighting and solid state cooking

2. Pinning information

2.1 Pinning



2.2 Pin description

Table 2. Pin description

Symbol	Pin	Description
RF IN	1	RF input (50 Ω line)
RF OUT	2	RF output (50 Ω line)
VG1	3	gate voltage V_{GS1} (driver stage)
VD1	4	drain voltage V_{DS1} (driver stage)
VG2	5	gate voltage V_{GS2} (final stage)
VD2A	6	drain voltage V_{DS2} (final stage) ^[1]
VD2B	7	drain voltage V_{DS2} (final stage) ^[1]
T1	8	temperature sensor
T2	9	temperature sensor
T3	10	temperature sensor

[1] Drain voltage must be applied for both pins VD2A and VD2B

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BPC2425M9X2S250-1	-	pallet; 6 mounting holes; 10 terminations	-

Table 5. DC characteristics ...continued

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
C _{iss}	input capacitance	VG1 pin input	-	0.01	-	μF
		VG2 pin input	-	0.01	-	μF
		VD1 pin input	-	0.47	-	μF
		VD2 pin input	-	1	-	μF

Table 6. RF Characteristics

Test signal: CW; RF performance at $T_{mb} = 25\text{ °C}$; $V_{DS} = 32\text{ V}$; $I_{Dq1} = 25\text{ mA}$; $I_{Dq2} = 50\text{ mA}$; unless otherwise specified; shielded.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G _p	power gain	$P_L = 250\text{ W}$; $f = 2400\text{ MHz}$ to $f = 2500\text{ MHz}$ ^[1]	28	32.5	-	dB
P _{L(1dB)}	output power at 1 dB gain compression	$f = 2400\text{ MHz}$ to $f = 2500\text{ MHz}$	240	290	-	W
P _{L(3dB)}	output power at 3 dB gain compression	$f = 2400\text{ MHz}$ to $f = 2500\text{ MHz}$	260	300	-	W
f	frequency	$P_L = 250\text{ W}$	2400	-	2500	MHz
G _{flat}	gain flatness	$P_L = 250\text{ W}$; $f = 2400\text{ MHz}$ to $f = 2500\text{ MHz}$	-	4	-	dB
RL _{in}	input return loss	$P_L = 250\text{ W}$; $f = 2400\text{ MHz}$ to $f = 2500\text{ MHz}$	-	-	-3	dB
η _D	drain efficiency	1 dB gain compression; $f = 2450\text{ MHz}$	55	59	-	%
α _{sup(H)}	harmonic suppression	$P_L = 250\text{ W}$; $f = 2450\text{ MHz}$	-	30	-	dBc

[1] The gain may be influenced by the type of shielding.

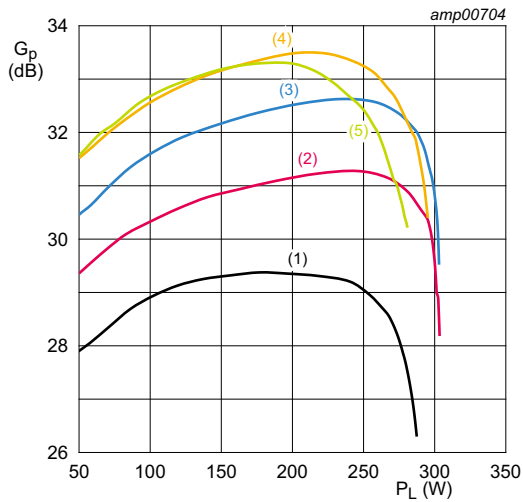
6.1 Ruggedness in class-AB operation

The BPC2425M9X2S250-1 is capable of withstanding a load mismatch corresponding to $VSWR = 2 : 1$ through all phases with a time rate of 15 ms/degree under the following conditions: $V_{DS} = 32\text{ V}$; $I_{Dq1} = 25\text{ mA}$; $I_{Dq2} = 50\text{ mA}$; $P_L = 250\text{ W}$ (CW); $f = 2450\text{ MHz}$; $T_{mb} = 25\text{ °C}$; shielded.

7. Test information

7.1 Graphical data

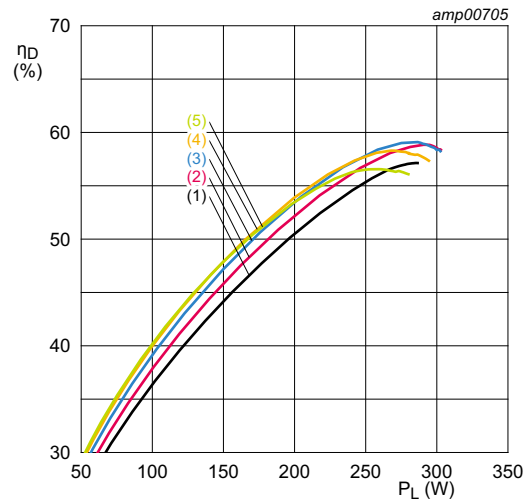
7.2 CW



$I_{Dq1} = 25 \text{ mA}; I_{Dq2} = 50 \text{ mA}; V_{DS} = 32 \text{ V}; T_{mb} = 25 \text{ }^\circ\text{C}.$

- (1) $f = 2400 \text{ MHz}$
- (2) $f = 2425 \text{ MHz}$
- (3) $f = 2450 \text{ MHz}$
- (4) $f = 2475 \text{ MHz}$
- (5) $f = 2500 \text{ MHz}$

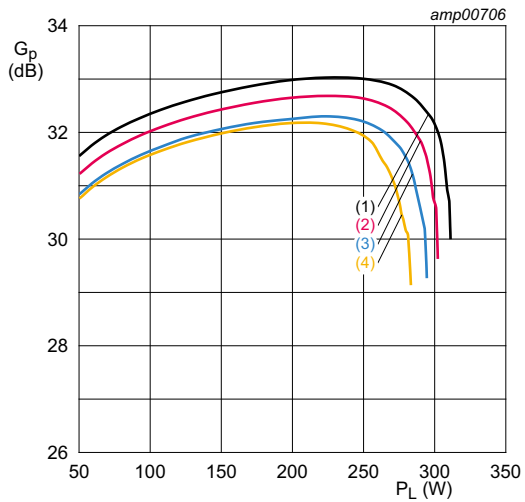
Fig 3. Power gain as a function of output power; typical values



$I_{Dq1} = 25 \text{ mA}; I_{Dq2} = 50 \text{ mA}; V_{DS} = 32 \text{ V}; T_{mb} = 25 \text{ }^\circ\text{C}.$

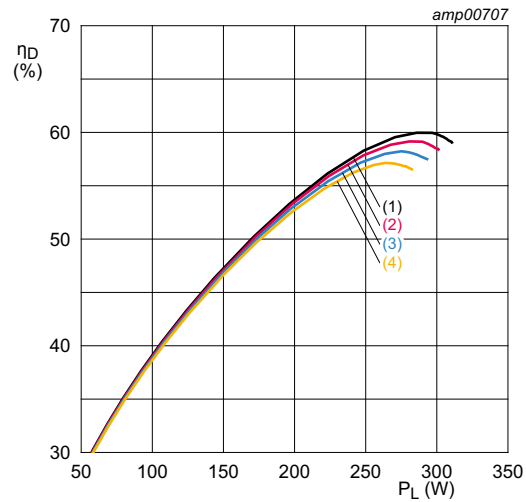
- (1) $f = 2400 \text{ MHz}$
- (2) $f = 2425 \text{ MHz}$
- (3) $f = 2450 \text{ MHz}$
- (4) $f = 2475 \text{ MHz}$
- (5) $f = 2500 \text{ MHz}$

Fig 4. Drain efficiency as a function of output power; typical values



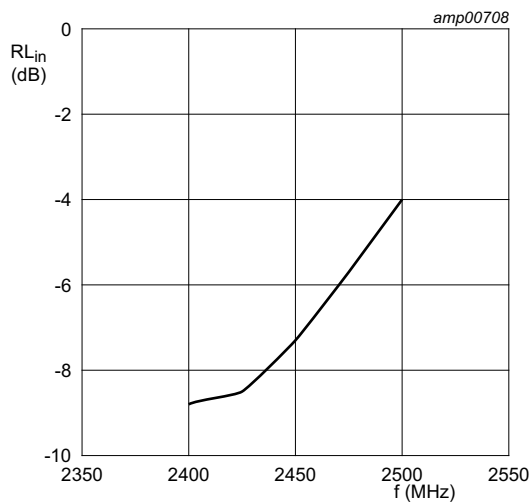
$I_{Dq1} = 25 \text{ mA}; I_{Dq2} = 50 \text{ mA}; V_{DS} = 32 \text{ V}; f = 2450 \text{ MHz}.$
 (1) $T_{mb} = 5 \text{ }^\circ\text{C}$
 (2) $T_{mb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{mb} = 40 \text{ }^\circ\text{C}$
 (4) $T_{mb} = 60 \text{ }^\circ\text{C}$

Fig 5. Power gain as a function of output power; typical values



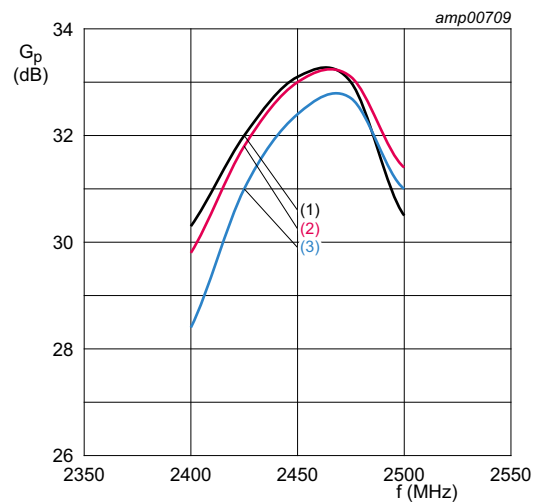
$I_{Dq1} = 25 \text{ mA}; I_{Dq2} = 50 \text{ mA}; V_{DS} = 32 \text{ V}; f = 2450 \text{ MHz}.$
 (1) $T_{mb} = 5 \text{ }^\circ\text{C}$
 (2) $T_{mb} = 25 \text{ }^\circ\text{C}$
 (3) $T_{mb} = 40 \text{ }^\circ\text{C}$
 (4) $T_{mb} = 60 \text{ }^\circ\text{C}$

Fig 6. Drain efficiency as a function of output power; typical values



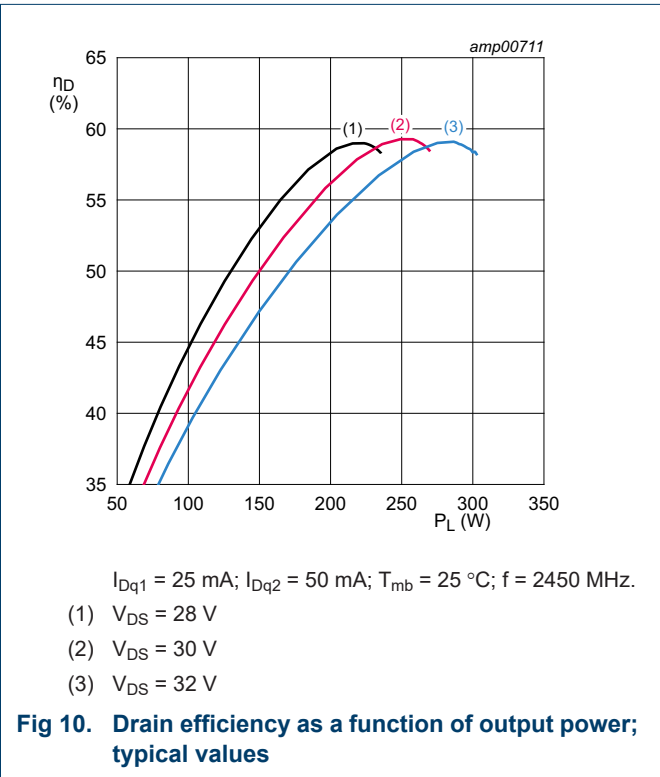
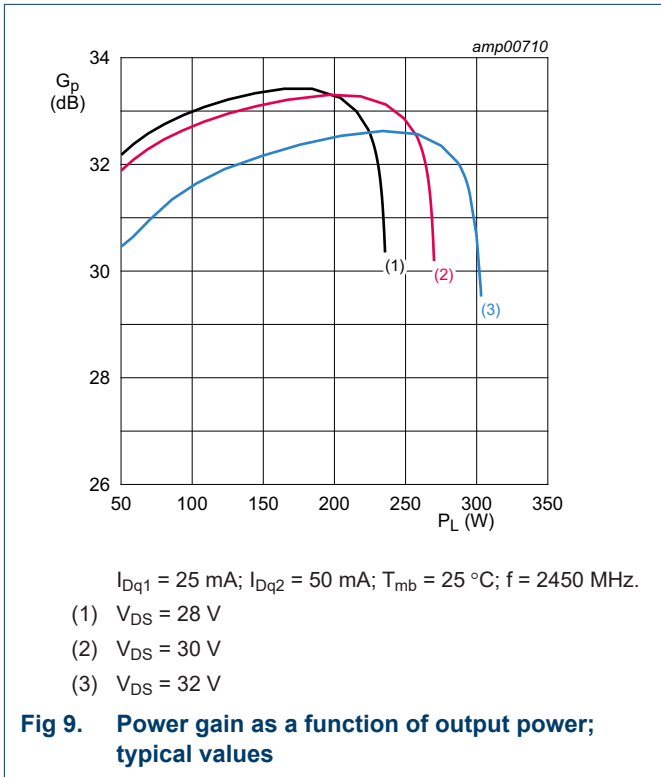
$I_{Dq1} = 25 \text{ mA}; I_{Dq2} = 50 \text{ mA}; V_{DS} = 32 \text{ V}; P_L = 250 \text{ W}; T_{mb} = 25 \text{ }^\circ\text{C}.$

Fig 7. Input return loss as a function of frequency; typical values

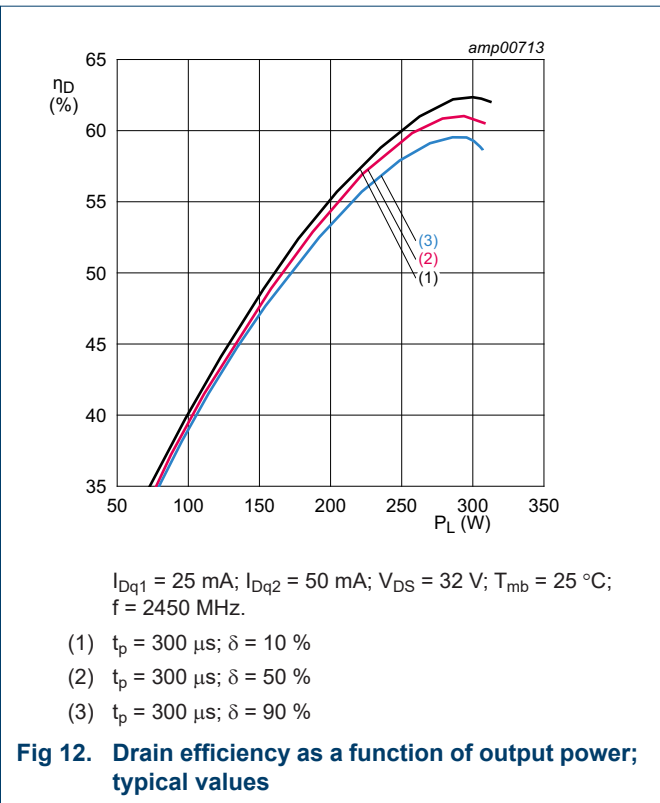
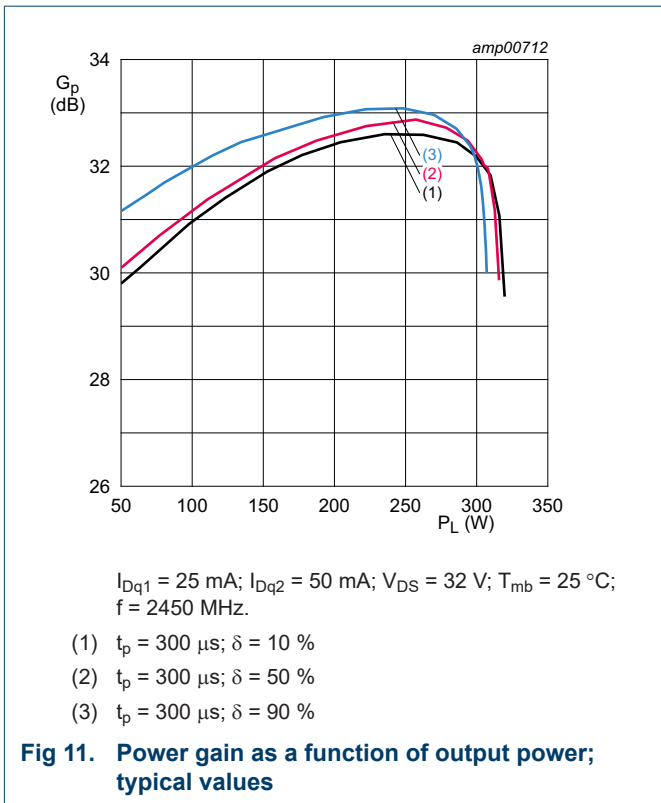


$I_{Dq1} = 25 \text{ mA}; I_{Dq2} = 50 \text{ mA}; T_{mb} = 25 \text{ }^\circ\text{C}.$
 (1) $V_{DS} = 28 \text{ V}; P_L = 210 \text{ W}$
 (2) $V_{DS} = 30 \text{ V}; P_L = 240 \text{ W}$
 (3) $V_{DS} = 32 \text{ V}; P_L = 270 \text{ W}$

Fig 8. Power gain as a function of frequency; typical values



7.3 CW pulsed



8. Package outline

Pallet; 6 mounting holes; 10 terminations

BPC2425M9X2S250-1

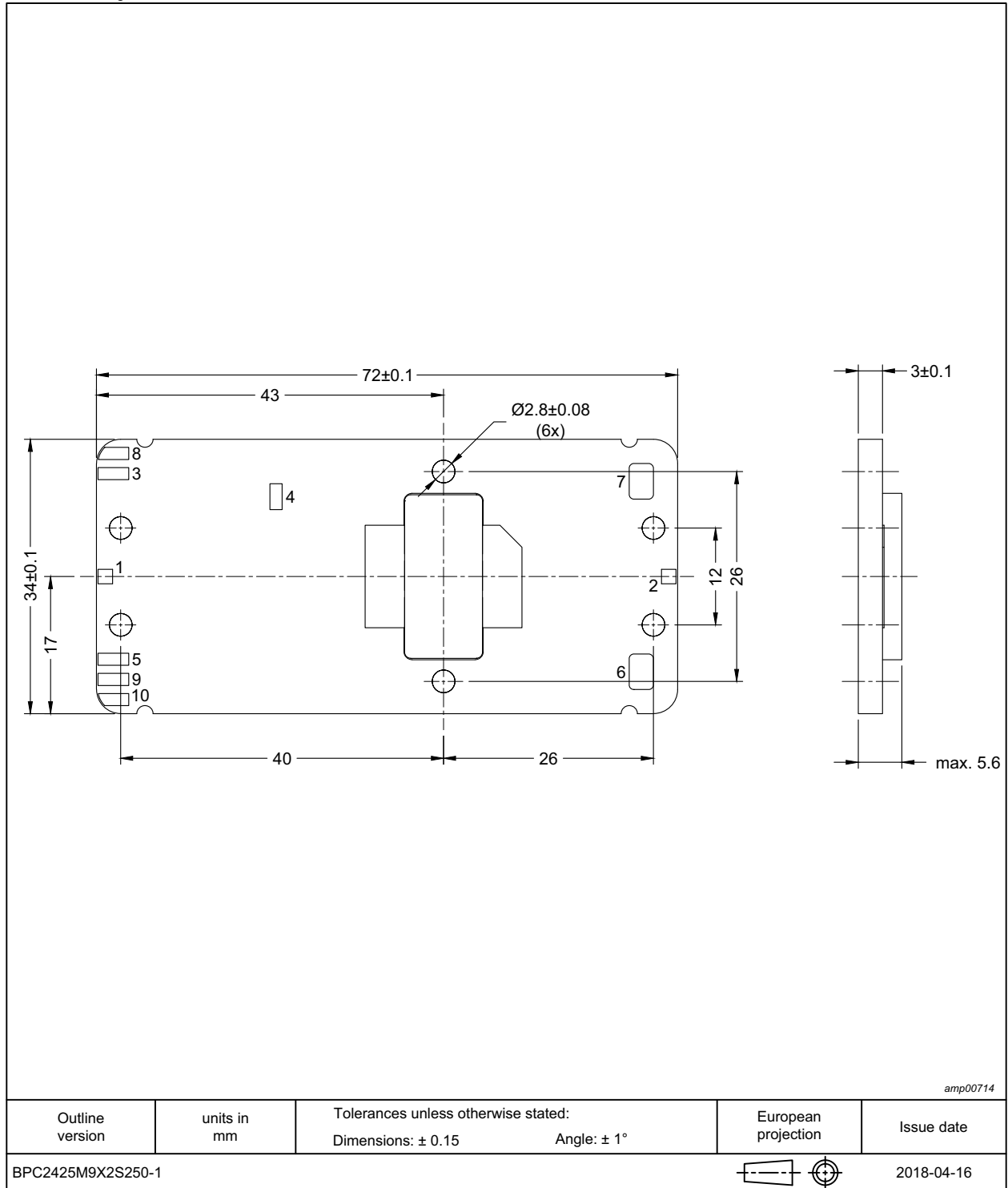


Fig 13. Package outline

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.

Table 7. ESD sensitivity

ESD model	Class
Charged Device Model (CDM); According to ANSI/ESDA/JEDEC standard JS-002	C1 ^[1]
Human Body Model (HBM); According to ANSI/ESDA/JEDEC standard JS-001	1C ^[2]

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

[2] HBM classification 1C is granted to any part that passes after exposure to an ESD pulse of 1000 V.

10. Abbreviations

Table 8. Abbreviations

Acronym	Description
CW	Continuous Wave
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
MTF	Median Time to Failure
RoHS	Restriction of Hazardous Substances
VSWR	Voltage Standing Wave Ratio

11. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BPC2425M9X2S250-1 v.1	20181018	Product 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.

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[2] The term 'short data sheet' is explained in section "Definitions".

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