



# PMEG045V050EPD

45 V, 5 A low VF MEGA Schottky barrier rectifier

3 July 2014

Preliminary data sheet

## 1. General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a CFP15 (SOT1289) power and flat lead Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Average forward current:  $I_{F(AV)} \leq 5$  A
- Reverse voltage:  $V_R \leq 45$  V
- Extremely low forward voltage
- High power capability due to clip-bonding technology and heat sink
- Small and thin SMD power plastic package, typical height 0.78 mm
- AEC-Q101 qualified

## 3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Freewheeling application
- Reverse polarity protection
- Low power consumption application

## 4. Quick reference data

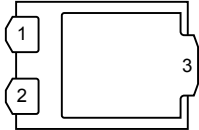
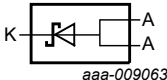
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $f = 20$ kHz; $T_{sp} \leq tbd$ °C; square wave	-	-	5	A
$V_R$	reverse voltage	$T_j = 25$ °C	-	-	45	V
$V_F$	forward voltage	$I_F = 5$ A; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_j = 25$ °C; pulsed	-	425	490	mV
$I_R$	reverse current	$V_R = 10$ V; $t_p \leq 3$ ms; $\delta = 0.3$ ; $T_j = 25$ °C; pulsed	-	10	30	$\mu$ A
		$V_R = 45$ V; $t_p \leq 3$ ms; $\delta = 0.3$ ; $T_j = 25$ °C; pulsed	-	120	300	$\mu$ A



## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode	 <p>CFP15 (SOT1289)</p>	 <p>aaa-009063</p>
2	A	anode		
3	K	cathode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG045V050EPD	CFP15	plastic, thermal enhanced ultra thin SMD package; 3 leads; body: 5.8 x 4.3 x 0.78 mm	SOT1289

## 7. Marking

Table 4. Marking codes

Type number	Marking code
PMEG045V050EPD	045V 050E

## 8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
$V_R$	reverse voltage	$T_j = 25\text{ }^\circ\text{C}$		-	45	V
$I_F$	forward current	$T_{sp} = tbd\text{ }^\circ\text{C}; \delta = 1$		-	7	A
$I_{F(AV)}$	average forward current	$\delta = 0.5; f = 20\text{ kHz}; T_{sp} \leq tbd\text{ }^\circ\text{C};$ square wave		-	5	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ }^\circ\text{C}$	[1]	-	780	mW
			[2]	-	1080	mW
$T_j$	junction temperature			-	150	$^\circ\text{C}$
$T_{amb}$	ambient temperature			-55	150	$^\circ\text{C}$
$T_{stg}$	storage temperature			-65	150	$^\circ\text{C}$

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1][2]	-	-	160	K/W
			[1][3]	-	-	115	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	4	K/W

[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses  $P_R$  are a significant part of the total power losses.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

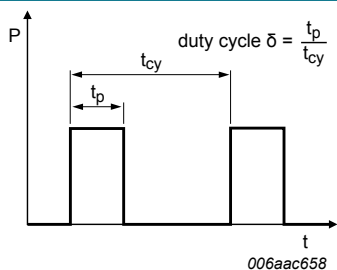
[4] Soldering point of cathode tab.

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 1 \text{ A}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ } ^\circ\text{C}$ ; pulsed		-	340	390	mV
		$I_F = 2 \text{ A}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ } ^\circ\text{C}$ ; pulsed		-	370	-	mV
		$I_F = 5 \text{ A}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ } ^\circ\text{C}$ ; pulsed		-	425	490	mV
$I_R$	reverse current	$V_R = 5 \text{ V}$ ; $t_p \leq 3 \text{ ms}$ ; $\delta = 0.3$ ; $T_j = 25 \text{ } ^\circ\text{C}$ ; pulsed		-	7	-	$\mu\text{A}$
		$V_R = 10 \text{ V}$ ; $t_p \leq 3 \text{ ms}$ ; $\delta = 0.3$ ; $T_j = 25 \text{ } ^\circ\text{C}$ ; pulsed		-	10	30	$\mu\text{A}$
		$V_R = 30 \text{ V}$ ; $t_p \leq 3 \text{ ms}$ ; $\delta = 0.3$ ; $T_j = 25 \text{ } ^\circ\text{C}$ ; pulsed		-	35	-	$\mu\text{A}$
		$V_R = 45 \text{ V}$ ; $t_p \leq 3 \text{ ms}$ ; $\delta = 0.3$ ; $T_j = 25 \text{ } ^\circ\text{C}$ ; pulsed		-	120	300	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 1 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_j = 25 \text{ } ^\circ\text{C}$		-	570	-	pF
		$V_R = 10 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_j = 25 \text{ } ^\circ\text{C}$		-	200	-	pF
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 5 \text{ mA}$ ; $T_j = 25 \text{ } ^\circ\text{C}$ ; $t_p \leq 1.2 \text{ ms}$ ; $\delta = 0.12$ ; pulsed		45	-	-	V

## 11. Test information



**Fig. 1. Duty cycle definition**

The current ratings for the typical waveforms are calculated according to the equations:  
 $I_{F(AV)} = I_M \times \delta$  with  $I_M$  defined as peak current,  $I_{RMS} = I_{F(AV)}$  at DC, and  $I_{RMS} = I_M \times \sqrt{\delta}$  with  $I_{RMS}$  defined as RMS current.

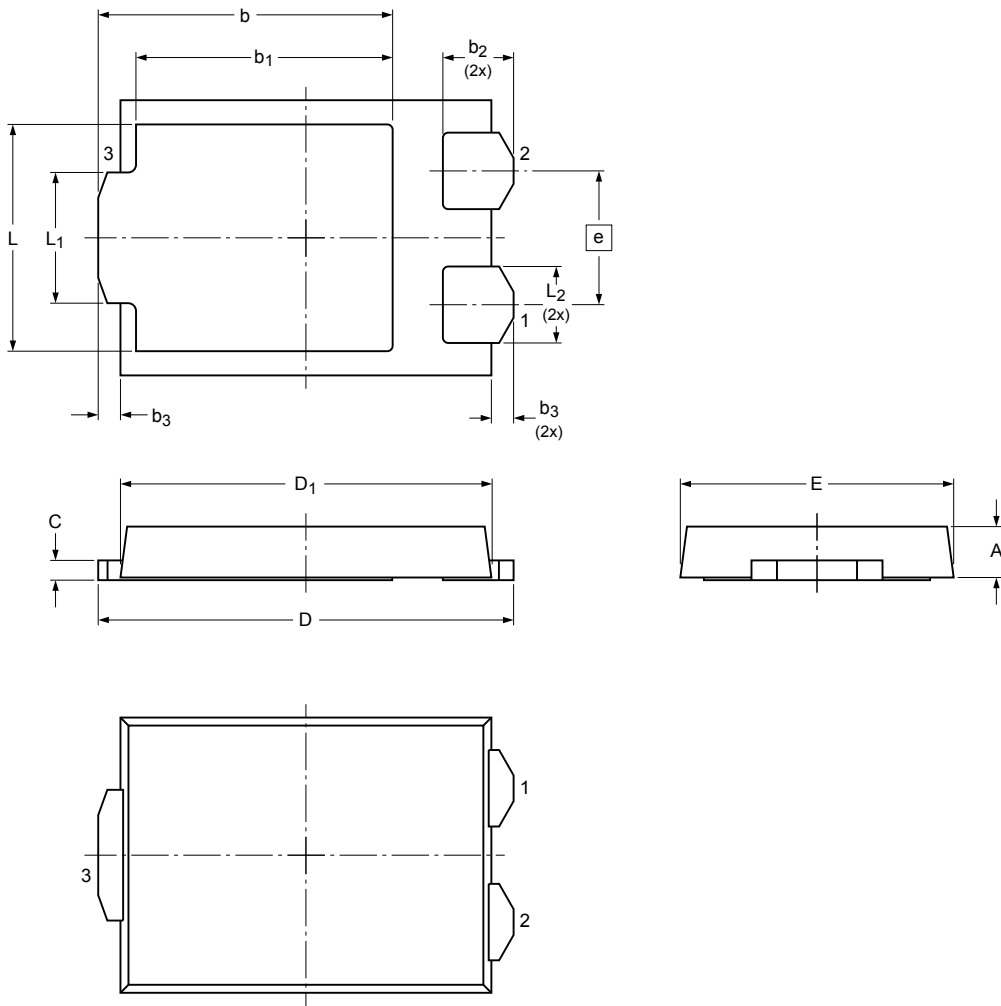
### 11.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

## 12. Package outline

CFP15: plastic, thermal enhanced ultra thin SMD package; 3 leads; body: 5.8 x 4.3 x 0.78 mm

SOT1289



Dimensions (mm are the original dimensions)

Unit	A	C	D	D <sub>1</sub>	E	e	b	b <sub>1</sub>	b <sub>2</sub>	b <sub>3</sub>	L	L <sub>1</sub>	L <sub>2</sub>	
max			6.6	5.9	4.4		4.71	4.11	1.19	0.45	3.41	2.15	1.3	
mm	nom	0.78	0.2	6.5	5.8	4.3	2.13	4.61	4.01	1.09	0.35	3.31	2.05	1.2
	min			6.4	5.7	4.2		4.51	3.91	0.99	0.25	3.21	1.95	1.1

Note

1. Dimension A is excluding plating thickness.

sot1289\_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT1289					<del>13-08-27</del> 14-04-29

Fig. 2. Package outline CFP15 (SOT1289)

### 13. Soldering

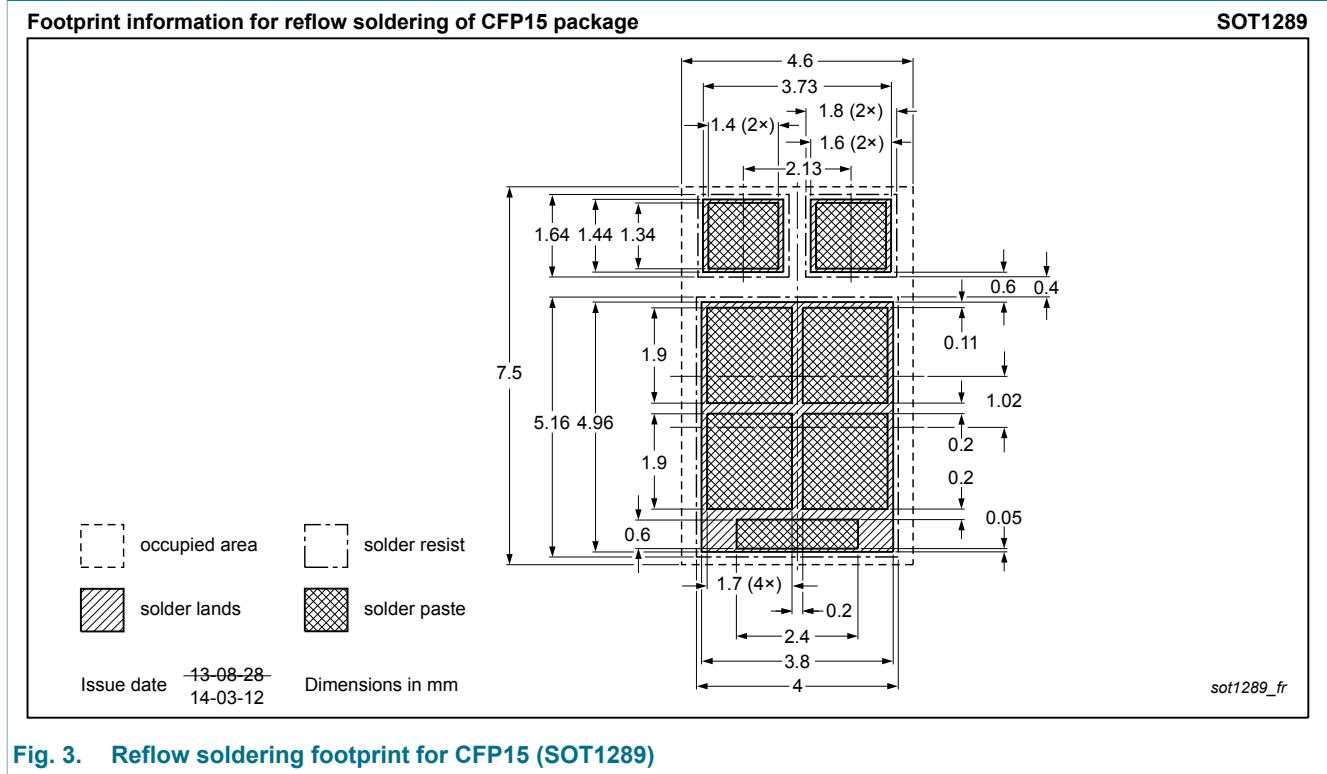


Fig. 3. Reflow soldering footprint for CFP15 (SOT1289)

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG045V050EPD v.1	20140703	Preliminary data sheet	-	-

## 15. Legal information

### 15.1 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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