

PMEG045V100EPD

45 V, 10 A low VF MEGA Schottky barrier rectifier

4 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: $I_{F(AV)} \leq 10$ 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; $T_{sp} \leq t_{bd}$ °C; square wave	-	-	10	A
V_R	reverse voltage	$T_j = 25$ °C	-	-	45	V
V_F	forward voltage	$I_F = 10$ A; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_j = 25$ °C; pulsed	-	420	490	mV
I_R	reverse current	$V_R = 10$ V; $t_p \leq 3$ ms; $\delta = 0.3$; $T_j = 25$ °C; pulsed	-	25	50	μ A
		$V_R = 45$ V; $t_p \leq 3$ ms; $\delta = 0.3$; $T_j = 25$ °C; pulsed	-	250	600	μ A

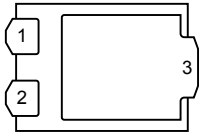
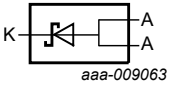


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5. Pinning information

Table 2. Pinning information

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

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG045V100EPD	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
PMEG045V100EPD	045V 100E

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	$T_{sp} = tbd\text{ }^{\circ}\text{C}$; $\delta = 1$		-	14	A
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $f = 20\text{ kHz}$; $T_{sp} \leq tbd\text{ }^{\circ}\text{C}$; square wave		-	10	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 cm².

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 cm².

[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		-	320	360	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		-	340	-	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		-	380	430	mV
		$I_F = 10\text{ A}$; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25\text{ }^\circ\text{C}$; pulsed		-	420	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		-	15	-	μA
		$V_R = 10\text{ V}$; $t_p \leq 3\text{ ms}$; $\delta = 0.3$; $T_j = 25\text{ }^\circ\text{C}$; pulsed		-	25	50	μA
		$V_R = 30\text{ V}$; $t_p \leq 3\text{ ms}$; $\delta = 0.3$; $T_j = 25\text{ }^\circ\text{C}$; pulsed		-	70	-	μA
		$V_R = 45\text{ V}$; $t_p \leq 3\text{ ms}$; $\delta = 0.3$; $T_j = 25\text{ }^\circ\text{C}$; pulsed		-	250	600	μA
C_d	diode capacitance	$V_R = 1\text{ V}$; $f = 1\text{ MHz}$; $T_j = 25\text{ }^\circ\text{C}$		-	1190	-	pF
		$V_R = 10\text{ V}$; $f = 1\text{ MHz}$; $T_j = 25\text{ }^\circ\text{C}$		-	390	-	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

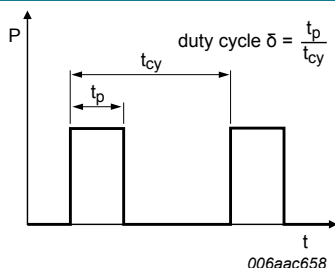


Fig. 1. Duty cycle definition

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

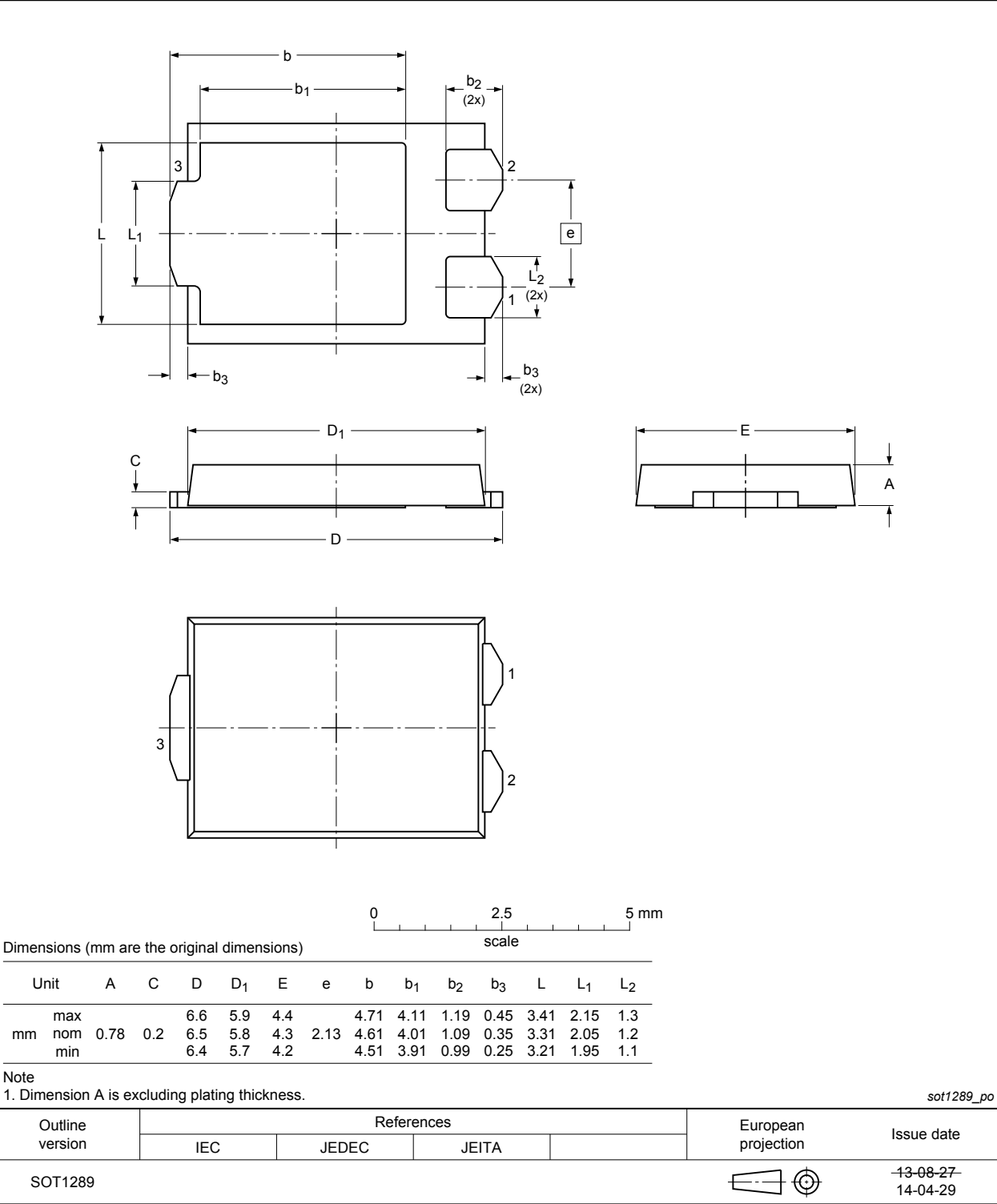


Fig. 2. Package outline CFP15 (SOT1289)

13. Soldering

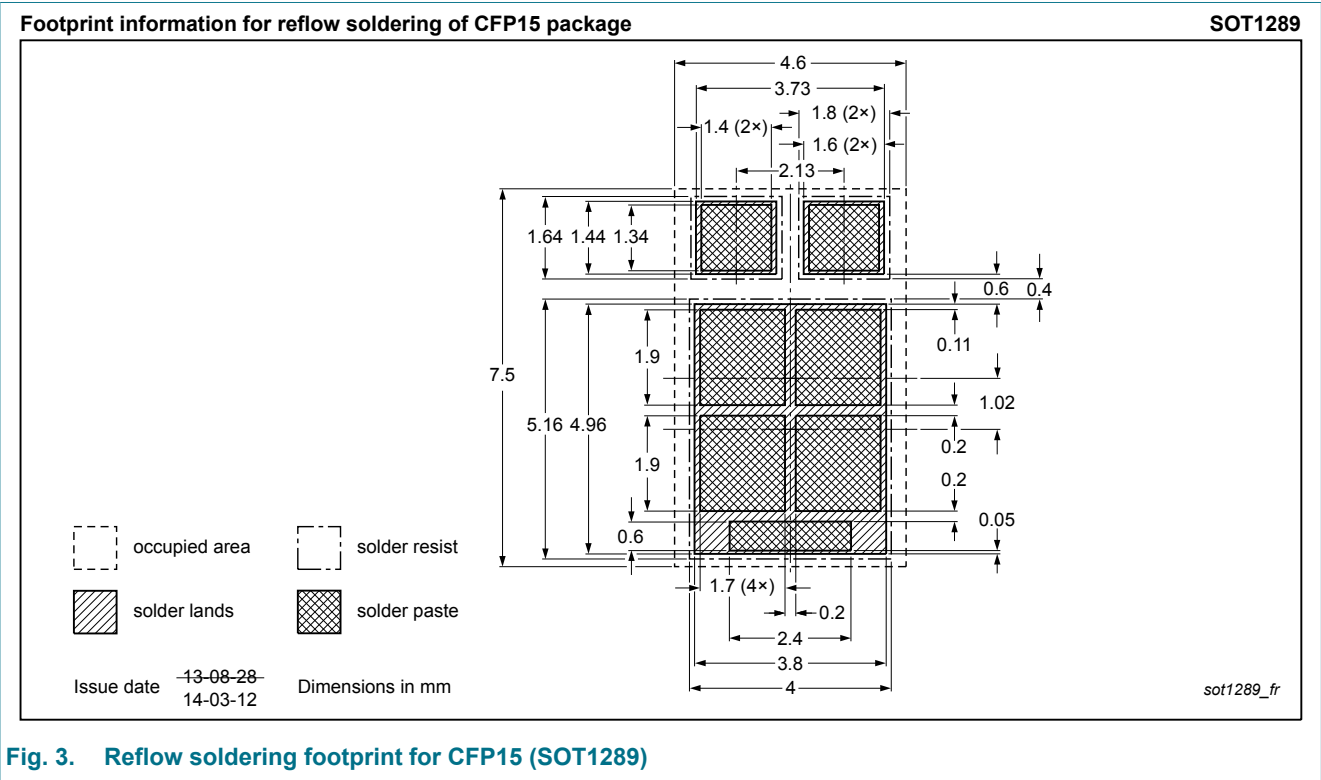


Fig. 3. Reflow soldering footprint for CFP15 (SOT1289)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG045V100EPD v.1	20140704	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.
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