



# PMEG100V080ELPD

100 V, 8 A low leakage current Schottky barrier rectifier

4 October 2016

Product data sheet

## 1. General description

Maximum Efficiency General Application (MEGA) Schottky barrier rectifier, encapsulated in a CFP15 (SOT1289) power and flat lead Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Average forward current:  $I_{F(AV)} \leq 8$  A
- Reverse voltage:  $V_R \leq 100$  V
- Low leakage current due to high Schottky barrier technology
- Low forward voltage
- High power capability due to clip-bonding technology and heat sink
- High temperature  $T_j \leq 175$  °C
- Small and thin SMD power plastic package, typical height 0.78 mm
- AEC-Q101 qualified

## 3. Applications

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

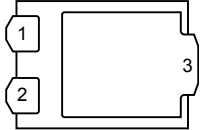
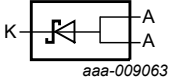
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_F$	forward current	$T_{sp} \leq 150$ °C; $\delta = 1$	-	-	11.2	A
$V_R$	reverse voltage	$T_j = 25$ °C	-	-	100	V
$V_F$	forward voltage	$I_F = 5$ A; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_j = 25$ °C	-	725	-	mV
$I_R$	reverse current	$V_R = 80$ V; $t_p \leq 3$ ms; $T_j = 25$ °C; $\delta \leq 0.03$	-	0.075	-	$\mu$ A

## 5. Pinning information

Table 2. Pinning information

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

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG100V080ELPD	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
PMEG100V080ELPD	100V L08E

## 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	$T_j = 25\text{ °C}$		-	100	V
$I_F$	forward current	$T_{sp} \leq 150\text{ °C}; \delta = 1$		-	11.2	A
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $f = 20\text{ kHz}$ ; $T_{amb} \leq 155\text{ °C}$ ; square wave		-	8	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8\text{ ms}$ ; $T_{j(init)} = 25\text{ °C}$ ; square wave		-	160	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	-	1.66	W
			[2]	-	2.15	W
			[3]	-	3.75	W
$T_j$	junction temperature			-	175	°C
$T_{amb}$	ambient temperature			-55	175	°C
$T_{stg}$	storage temperature			-65	175	°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  $1\text{ cm}^2$ .

[3] Device mounted on a ceramic Printed-Circuit Board (PCB),  $Al_2O_3$ , standard footprint.

## 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]	-	-	90	K/W
			[1][3]	-	-	70	K/W
			[1][4]	-	-	40	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[5]	-	-	3	K/W

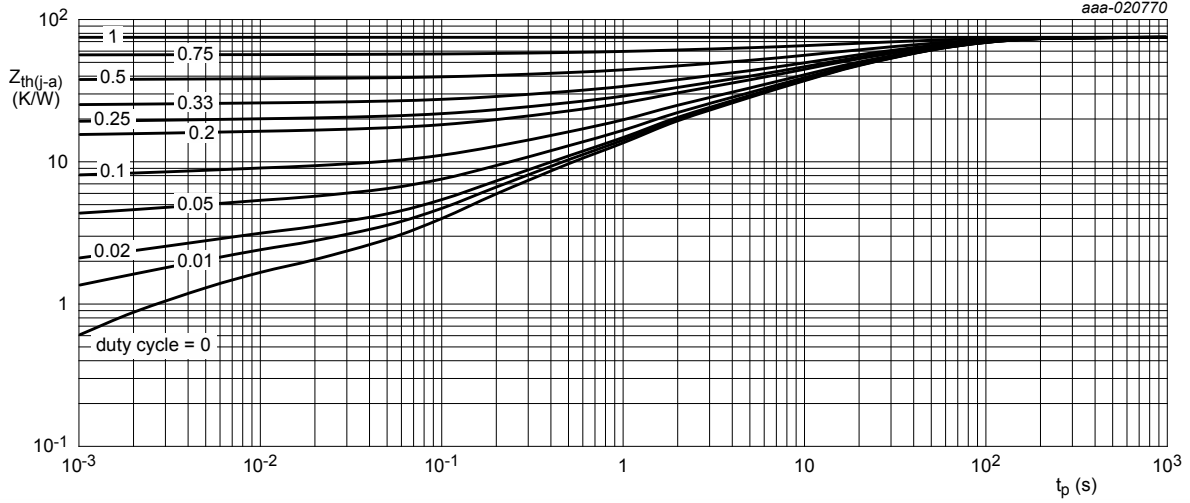
[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses  $P_R$  are a significant part of the total power losses.

[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  $1\text{ cm}^2$ .

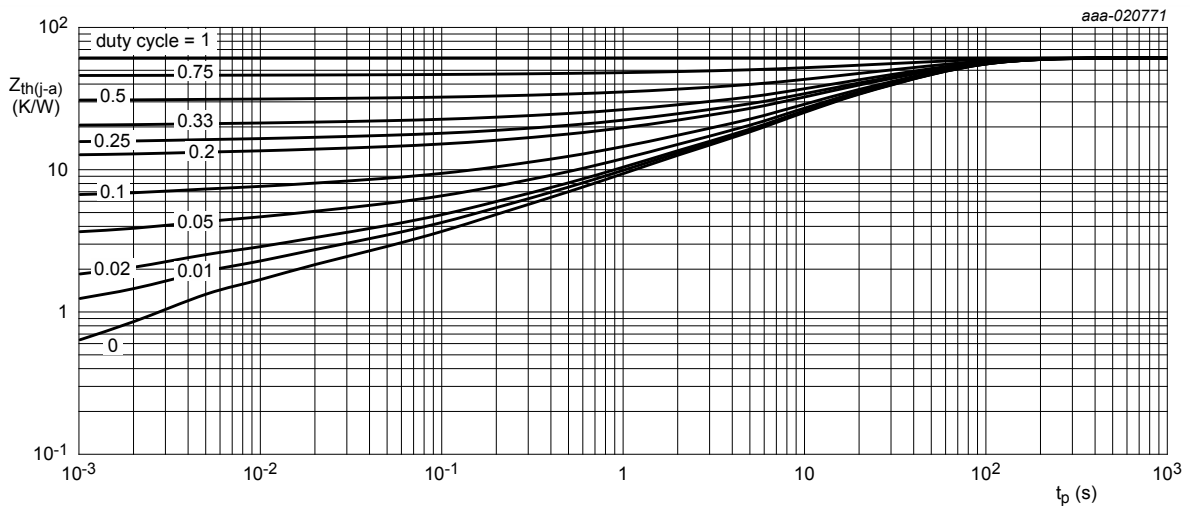
[4] Device mounted on a ceramic PCB,  $Al_2O_3$ , standard footprint.

[5] Soldering point of cathode tab.



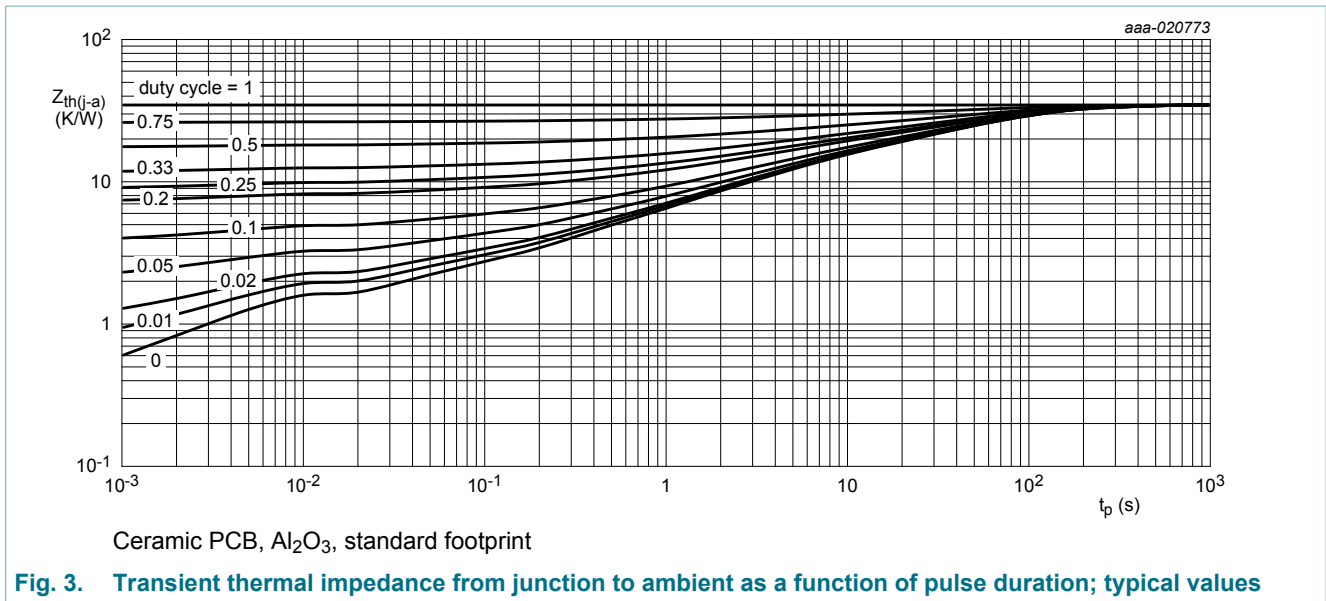
FR4 PCB, standard footprint

Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, mounting pad for cathode  $1\text{ cm}^2$

Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

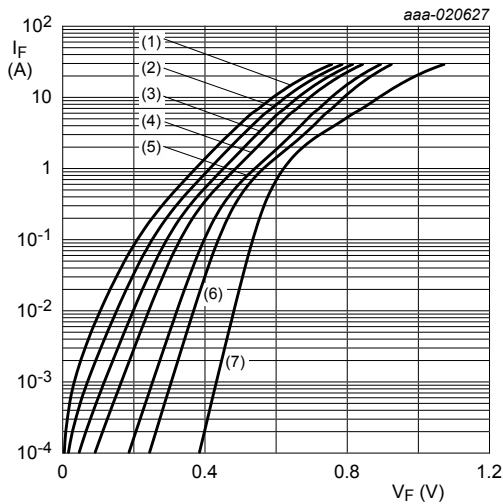


## 10. Characteristics

Table 7. Characteristics

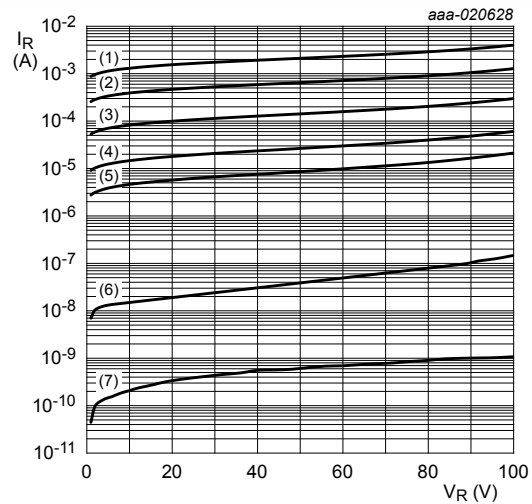
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>(BR)R</sub>	reverse breakdown voltage	I <sub>R</sub> = 1 mA; t <sub>p</sub> ≤ 1.2 ms; δ ≤ 0.12 ; T <sub>j</sub> = 25 °C; pulsed	100	-	-	V
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 0.1 A; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02 ; T <sub>j</sub> = 25 °C	-	440	-	mV
		I <sub>F</sub> = 1 A; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02 ; T <sub>j</sub> = 25 °C	-	565	-	mV
		I <sub>F</sub> = 2 A; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02 ; T <sub>j</sub> = 25 °C	-	635	740	mV
		I <sub>F</sub> = 4 A; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02 ; T <sub>j</sub> = 25 °C	-	705	790	mV
		I <sub>F</sub> = 5 A; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02 ; T <sub>j</sub> = 25 °C	-	725	-	mV
		I <sub>F</sub> = 6 A; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02 ; T <sub>j</sub> = 25 °C	-	740	-	mV
		I <sub>F</sub> = 8 A; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02 ; T <sub>j</sub> = 25 °C	-	770	850	mV
		I <sub>F</sub> = 8 A; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02 ; T <sub>j</sub> = -40 °C	-	870	970	mV
		I <sub>F</sub> = 4 A; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02 ; T <sub>j</sub> = 125 °C	-	570	-	mV
		I <sub>F</sub> = 8 A; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02 ; T <sub>j</sub> = 125 °C	-	635	740	mV
I <sub>R</sub>	reverse current	V <sub>R</sub> = 60 V; t <sub>p</sub> ≤ 3 ms; T <sub>j</sub> = 25 °C; δ ≤ 0.03	-	0.05	-	μA

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		$V_R = 80 \text{ V}; t_p \leq 3 \text{ ms}; T_j = 25 \text{ }^\circ\text{C}; \delta \leq 0.03$	-	0.075	-	$\mu\text{A}$
		$V_R = 100 \text{ V}; t_p \leq 3 \text{ ms}; T_j = 25 \text{ }^\circ\text{C}; \delta \leq 0.03$	-	0.14	0.5	$\mu\text{A}$
		$V_R = 100 \text{ V}; t_p \leq 3 \text{ ms}; T_j = 125 \text{ }^\circ\text{C}; \delta \leq 0.03$	-	0.3	1.5	$\text{mA}$
		$V_R = 60 \text{ V}; t_p \leq 3 \text{ ms}; T_j = 150 \text{ }^\circ\text{C}; \delta \leq 0.03$	-	0.72	2	$\text{mA}$
$C_d$	diode capacitance	$V_R = 1 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$	-	275	-	$\text{pF}$
		$V_R = 4 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$	-	170	-	$\text{pF}$
		$V_R = 10 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$	-	110	-	$\text{pF}$
$t_{rr}$	reverse recovery time	$I_F = 0.5 \text{ A}; I_R = 0.5 \text{ A}; I_{R(\text{meas})} = 0.1 \text{ A}; T_j = 25 \text{ }^\circ\text{C}$	-	10	-	$\text{ns}$
$V_{FRM}$	peak forward recovery voltage	$I_F = 0.5 \text{ A}; dI_F/dt = 20 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}$	-	535	-	$\text{mV}$



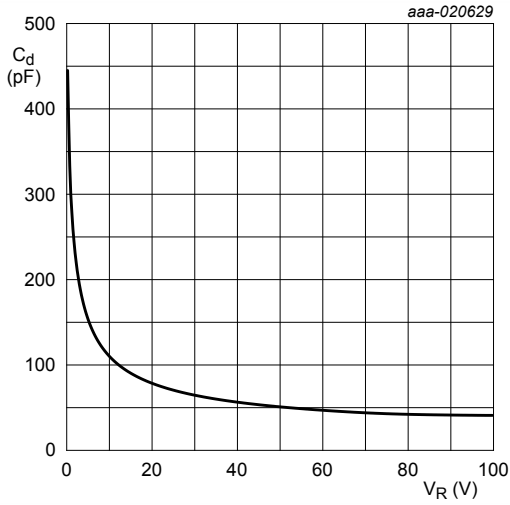
pulsed condition  
 (1)  $T_j = 175 \text{ }^\circ\text{C}$   
 (2)  $T_j = 150 \text{ }^\circ\text{C}$   
 (3)  $T_j = 125 \text{ }^\circ\text{C}$   
 (4)  $T_j = 100 \text{ }^\circ\text{C}$   
 (5)  $T_j = 85 \text{ }^\circ\text{C}$   
 (6)  $T_j = 25 \text{ }^\circ\text{C}$   
 (7)  $T_j = -40 \text{ }^\circ\text{C}$

**Fig. 4. Forward current as a function of forward voltage; typical values**



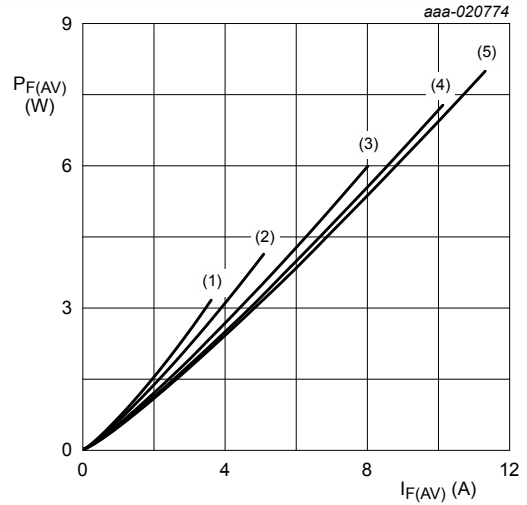
pulsed condition  
 (1)  $T_j = 175 \text{ }^\circ\text{C}$   
 (2)  $T_j = 150 \text{ }^\circ\text{C}$   
 (3)  $T_j = 125 \text{ }^\circ\text{C}$   
 (4)  $T_j = 100 \text{ }^\circ\text{C}$   
 (5)  $T_j = 85 \text{ }^\circ\text{C}$   
 (6)  $T_j = 25 \text{ }^\circ\text{C}$   
 (7)  $T_j = -40 \text{ }^\circ\text{C}$

**Fig. 5. Reverse current as a function of reverse voltage; typical values**



$f = 1 \text{ MHz}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$

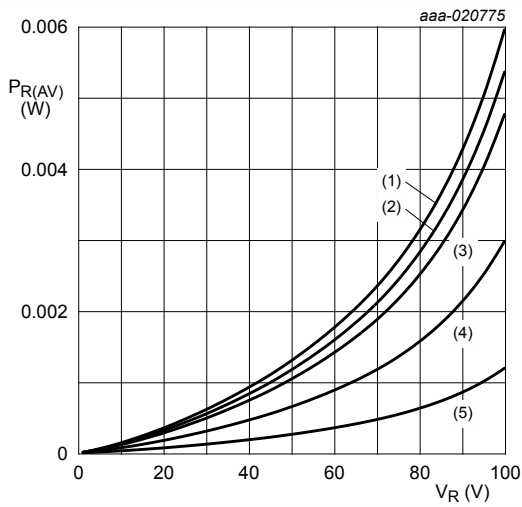
**Fig. 6. Diode capacitance as a function of reverse voltage; typical values**



$T_j = 100 \text{ }^\circ\text{C}$

- (1)  $\delta = 0.1$
- (2)  $\delta = 0.2$
- (3)  $\delta = 0.5$
- (4)  $\delta = 0.8$
- (5)  $\delta = 1$

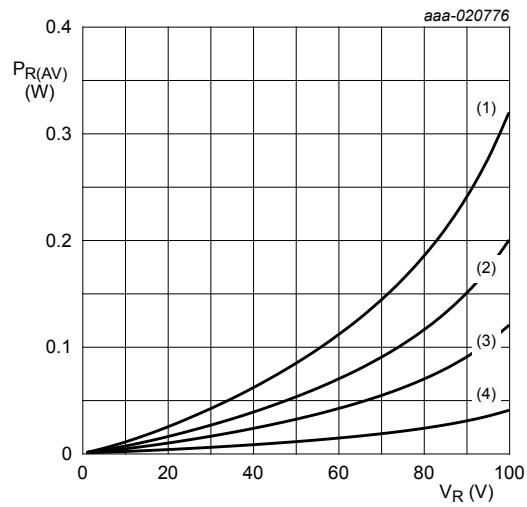
**Fig. 7. Average forward power dissipation as a function of average forward current; typical values**



$T_j = 100 \text{ }^\circ\text{C}$

- (1)  $\delta = 1$
- (2)  $\delta = 0.9$
- (3)  $\delta = 0.8$
- (4)  $\delta = 0.5$
- (5)  $\delta = 0.2$

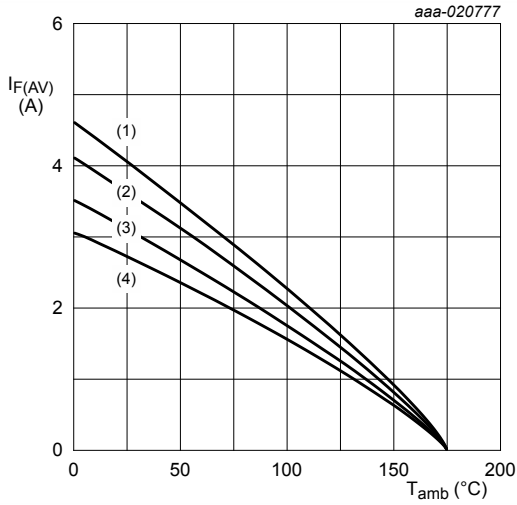
**Fig. 8. Average reverse power dissipation as a function of reverse voltage; typical values**



$T_j = 175 \text{ }^\circ\text{C}$

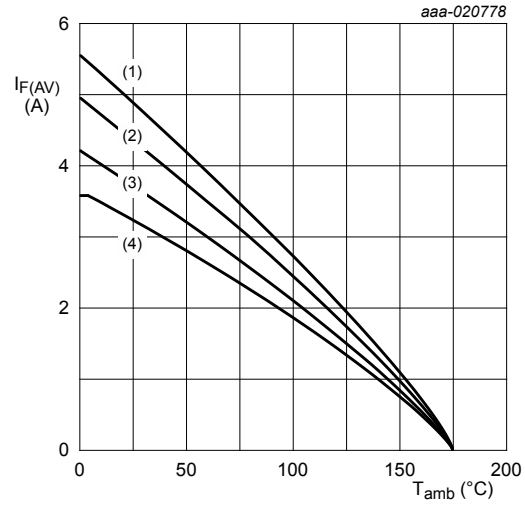
- (1)  $\delta = 1$
- (2)  $\delta = 0.5$
- (3)  $\delta = 0.2$
- (4)  $\delta = 0.1$

**Fig. 9. Average reverse power dissipation as a function of reverse voltage; typical values**



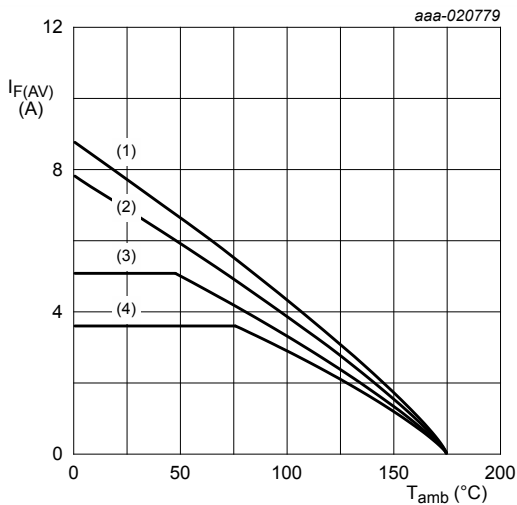
FR4 PCB, standard footprint  
 $T_j = 175\text{ °C}$   
 (1)  $\delta = 1$ ; DC  
 (2)  $\delta = 0.5$ ;  $f = 20\text{ kHz}$   
 (3)  $\delta = 0.2$ ;  $f = 20\text{ kHz}$   
 (4)  $\delta = 0.1$ ;  $f = 20\text{ kHz}$

**Fig. 10. Average forward current as a function of ambient temperature; typical values**



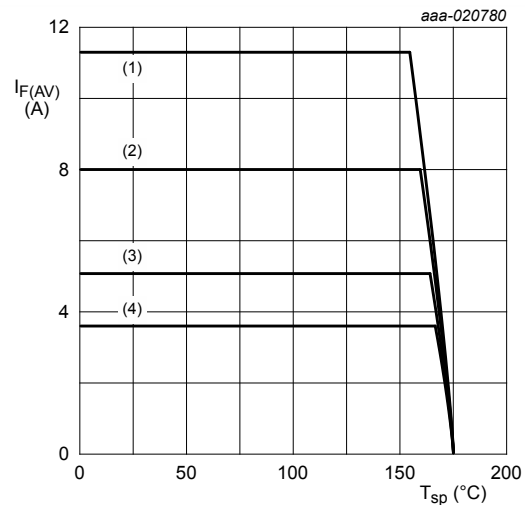
FR4 PCB, mounting pad for cathode  $1\text{ cm}^2$   
 $T_j = 175\text{ °C}$   
 (1)  $\delta = 1$ ; DC  
 (2)  $\delta = 0.5$ ;  $f = 20\text{ kHz}$   
 (3)  $\delta = 0.2$ ;  $f = 20\text{ kHz}$   
 (4)  $\delta = 0.1$ ;  $f = 20\text{ kHz}$

**Fig. 11. Average forward current as a function of ambient temperature; typical values**



Ceramic PCB,  $\text{Al}_2\text{O}_3$ , standard footprint  
 $T_j = 175\text{ °C}$   
 (1)  $\delta = 1$  (DC)  
 (2)  $\delta = 0.5$ ;  $f = 20\text{ kHz}$   
 (3)  $\delta = 0.2$ ;  $f = 20\text{ kHz}$   
 (4)  $\delta = 0.1$ ;  $f = 20\text{ kHz}$

**Fig. 12. Average forward current as a function of ambient temperature; typical values**



$T_j = 175\text{ °C}$   
 (1)  $\delta = 1$  (DC)  
 (2)  $\delta = 0.5$ ;  $f = 20\text{ kHz}$   
 (3)  $\delta = 0.2$ ;  $f = 20\text{ kHz}$   
 (4)  $\delta = 0.1$ ;  $f = 20\text{ kHz}$

**Fig. 13. Average forward current as a function of solder point temperature; typical values**



### 11. Test information

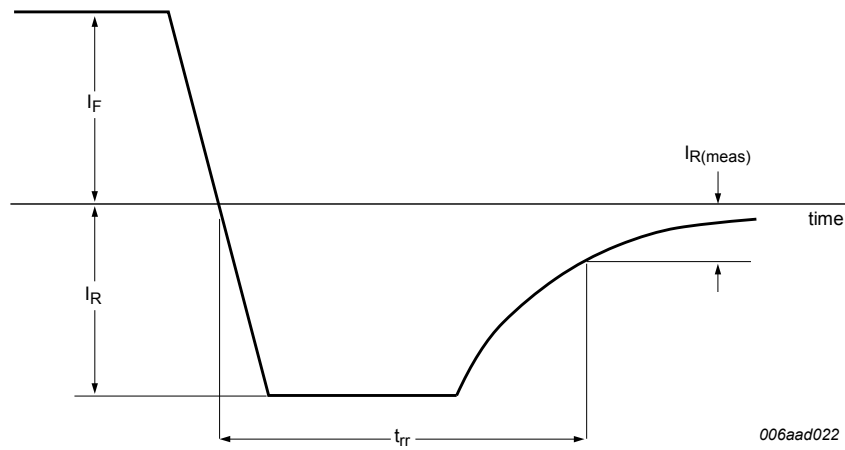


Fig. 14. Reverse recovery definition

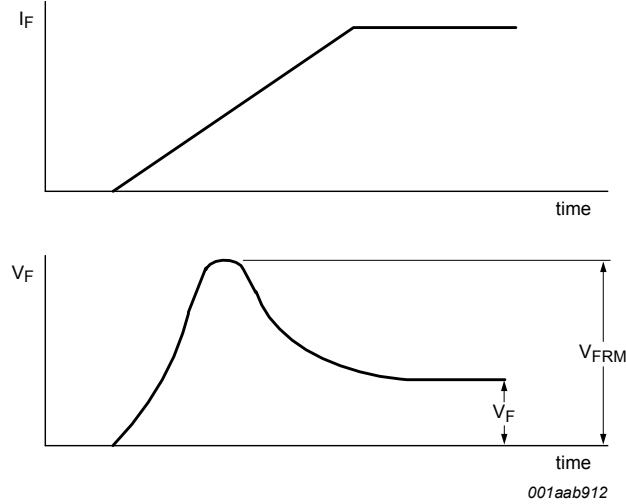


Fig. 15. Forward recovery definition

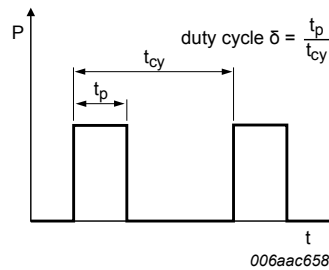


Fig. 16. Duty cycle definition

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.

**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**

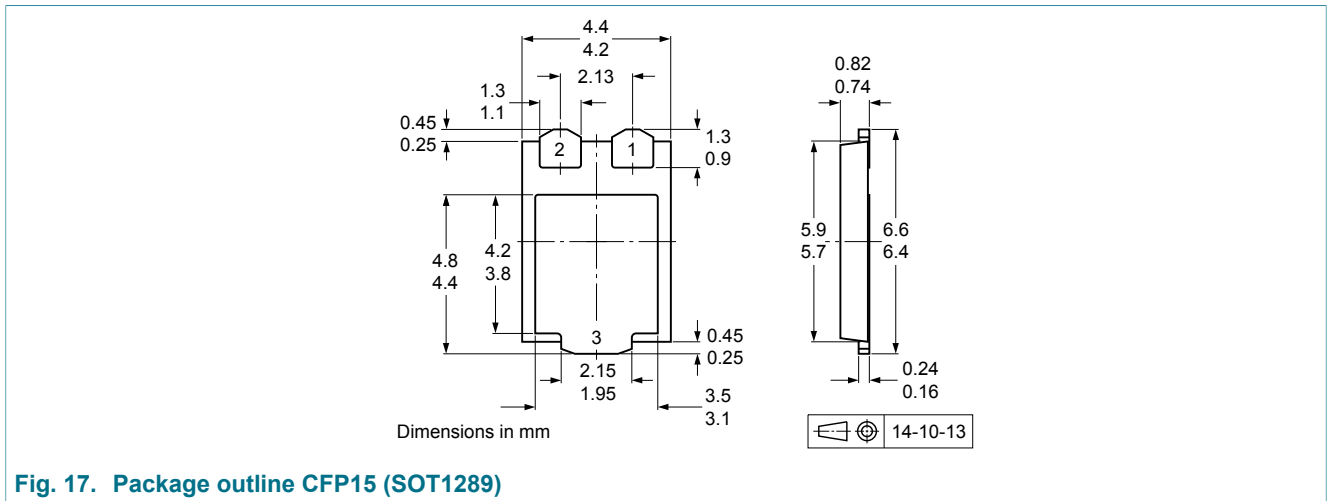


Fig. 17. Package outline CFP15 (SOT1289)

**13. Soldering**

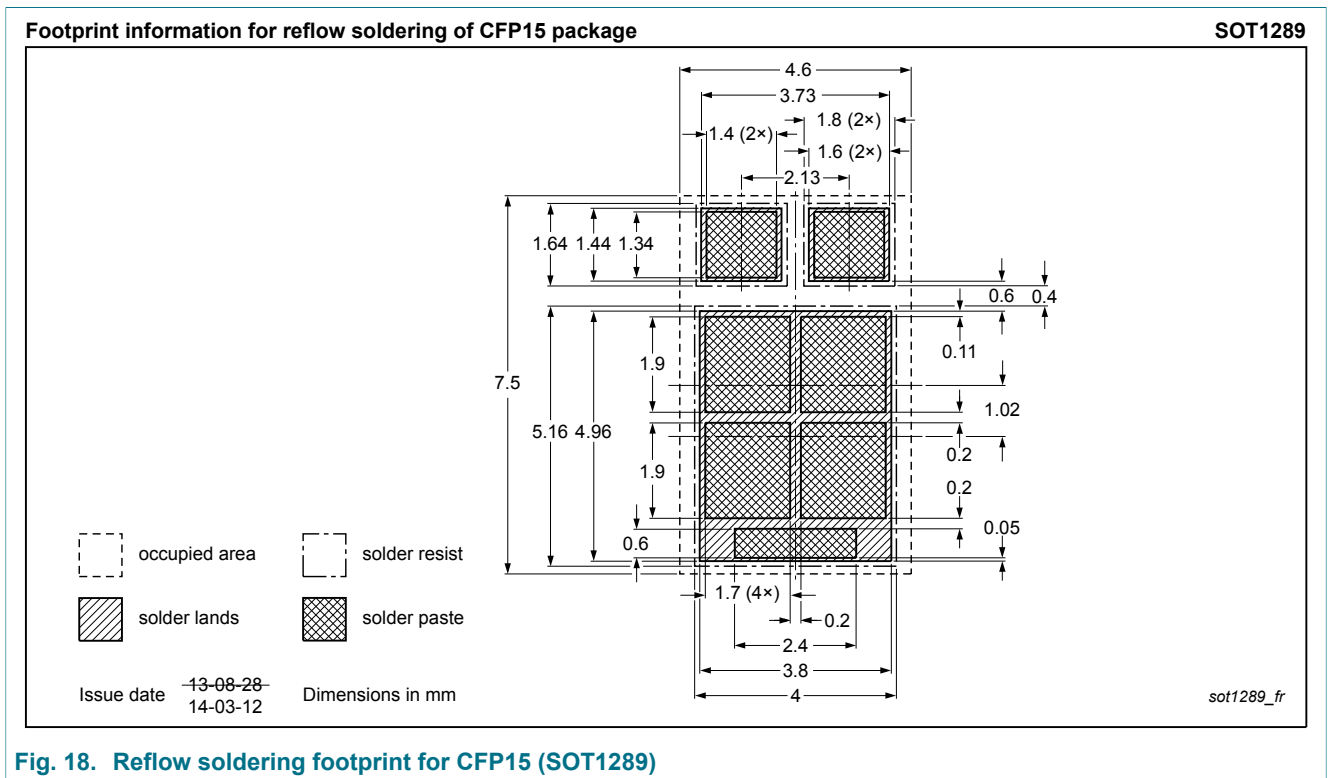


Fig. 18. Reflow soldering footprint for CFP15 (SOT1289)

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG100V080ELPD v.3	20161004	Product data sheet	-	PMEG100V080ELPD v.2
Modifications:	<ul style="list-style-type: none"><li>Updated <math>I_R</math> maximum value at 100 V, 25 °C</li></ul>			
PMEG100V080ELPD v.2	20160203	Product data sheet	-	PMEG100V080ELPD v.1
PMEG100V080ELPD v.1	20151117	Preliminary data sheet	-	-

## 15. Legal information

### 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.

- [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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Date of release: 04 October 2016

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