



# 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

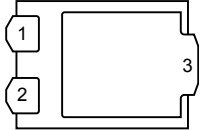
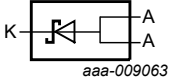
## 4. Quick reference data

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 cm<sup>2</sup>.

[3] Device mounted on a ceramic Printed-Circuit Board (PCB), Al<sub>2</sub>O<sub>3</sub>, 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

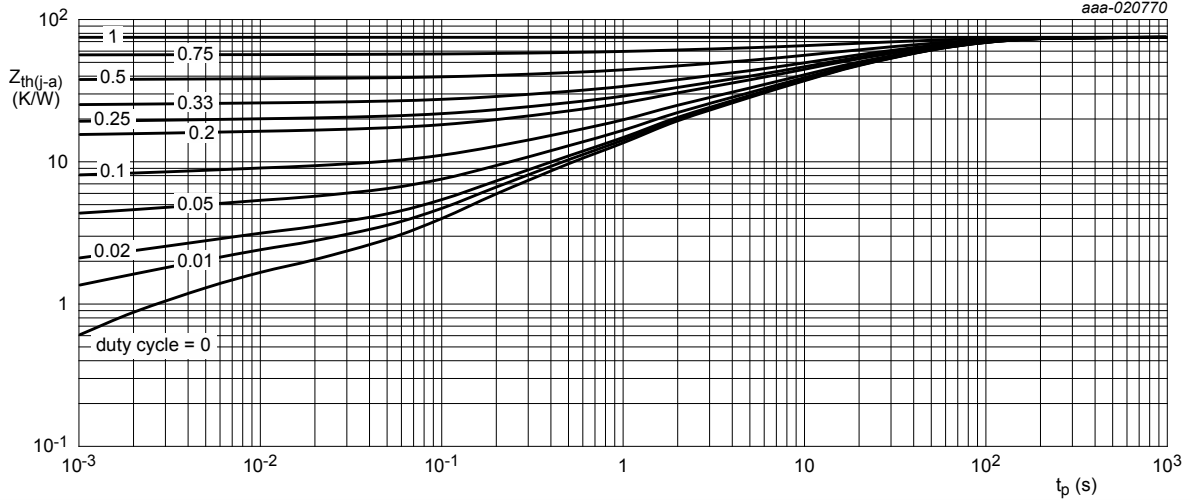
[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses  $P_R$  are a significant part of the total power losses.

[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 cm<sup>2</sup>.

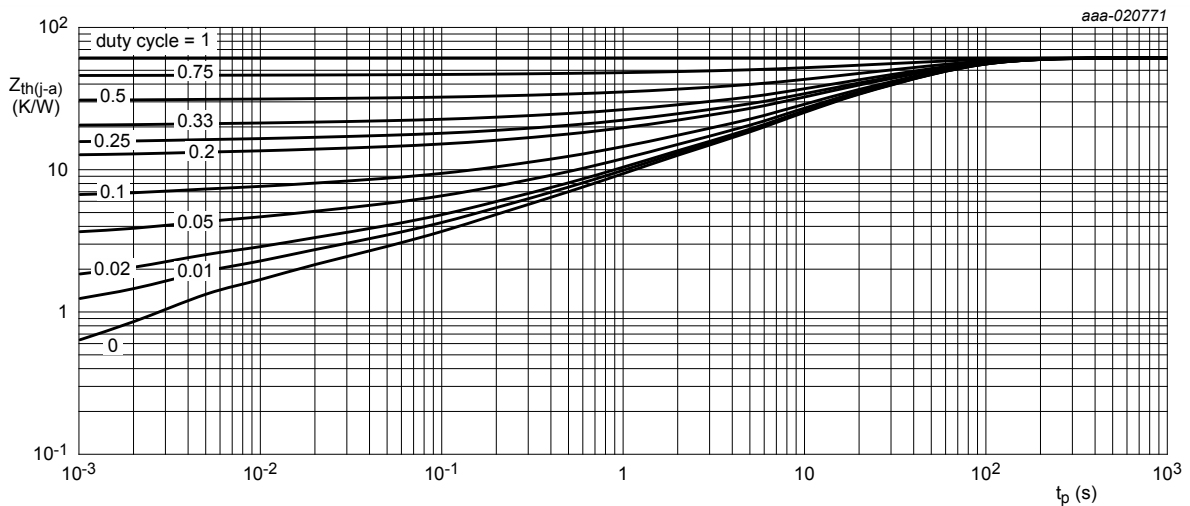
[4] Device mounted on a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.

[5] Soldering point of cathode tab.



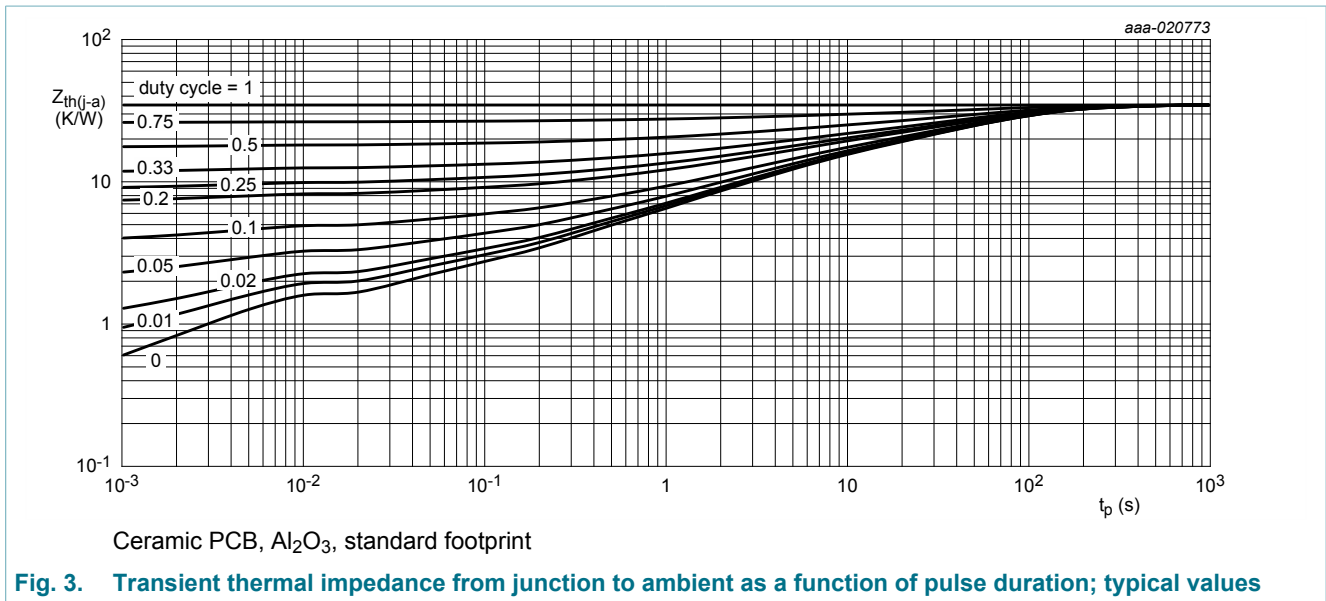
FR4 PCB, standard footprint

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



FR4 PCB, mounting pad for cathode 1 cm<sup>2</sup>

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

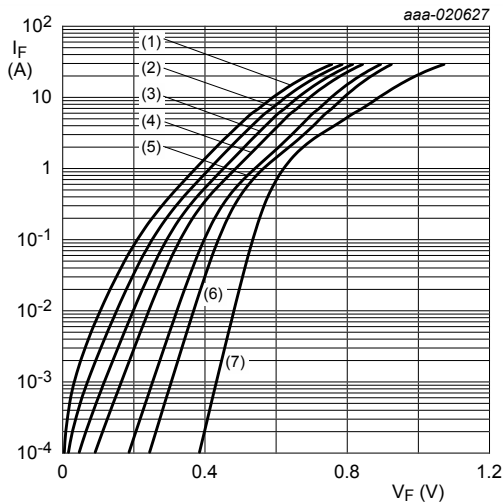


## 10. Characteristics

Table 7. Characteristics

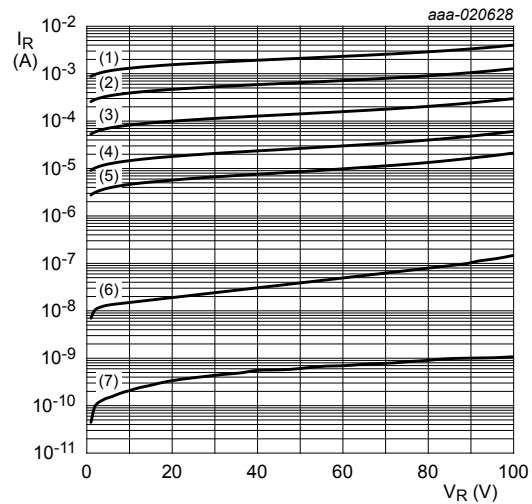
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 1 \text{ mA}; t_p \leq 1.2 \text{ ms}; \delta \leq 0.12 ; T_j = 25 \text{ }^\circ\text{C}; \text{pulsed}$	100	-	-	V
$V_F$	forward voltage	$I_F = 0.1 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = 25 \text{ }^\circ\text{C}$	-	440	-	mV
		$I_F = 1 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = 25 \text{ }^\circ\text{C}$	-	565	-	mV
		$I_F = 2 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = 25 \text{ }^\circ\text{C}$	-	635	740	mV
		$I_F = 4 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = 25 \text{ }^\circ\text{C}$	-	705	790	mV
		$I_F = 5 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = 25 \text{ }^\circ\text{C}$	-	725	-	mV
		$I_F = 6 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = 25 \text{ }^\circ\text{C}$	-	740	-	mV
		$I_F = 8 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = 25 \text{ }^\circ\text{C}$	-	770	850	mV
		$I_F = 8 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = -40 \text{ }^\circ\text{C}$	-	870	970	mV
		$I_F = 4 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = 125 \text{ }^\circ\text{C}$	-	570	-	mV
		$I_F = 8 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = 125 \text{ }^\circ\text{C}$	-	635	740	mV
$I_R$	reverse current	$V_R = 60 \text{ V}; t_p \leq 3 \text{ ms}; T_j = 25 \text{ }^\circ\text{C}; \delta \leq 0.03$	-	0.05	-	$\mu\text{A}$

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

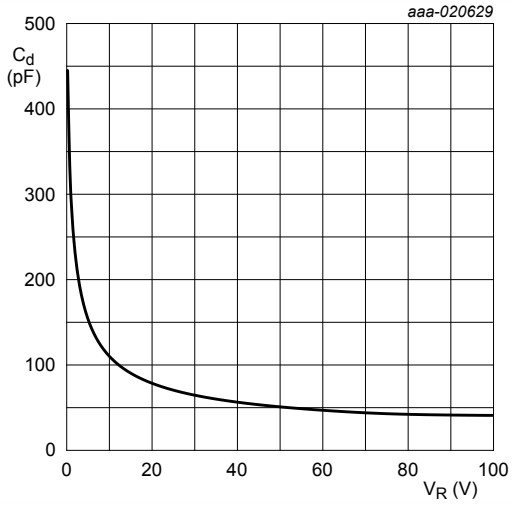
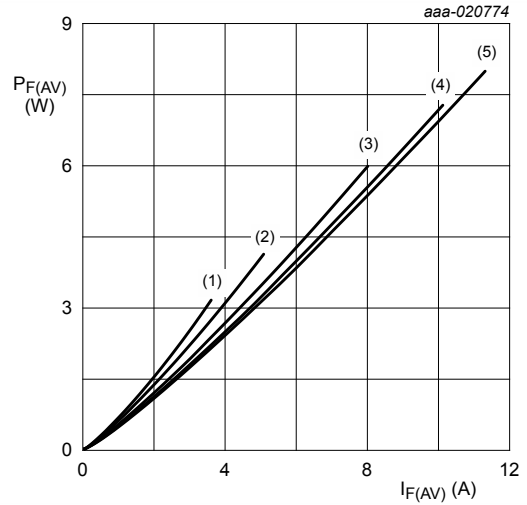
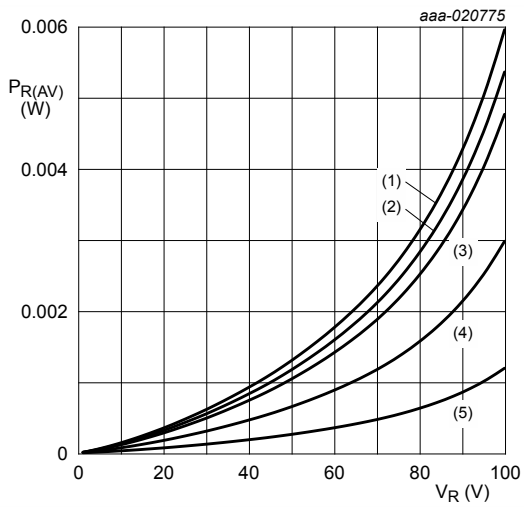


Fig. 6. Diode capacitance as a function of reverse voltage; typical values



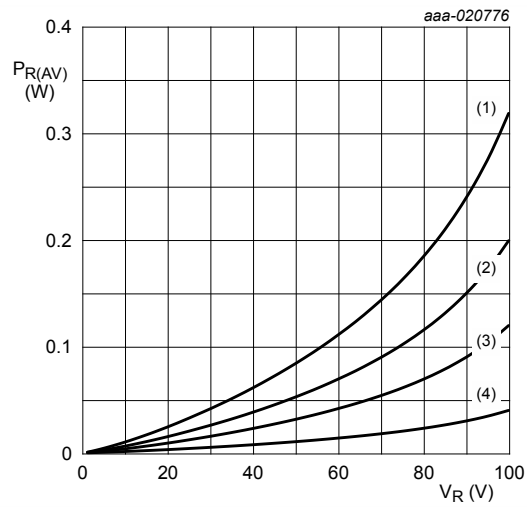
- (1)  $\delta = 0.1$
- (2)  $\delta = 0.2$
- (3)  $\delta = 0.5$
- (4)  $\delta = 0.8$
- (5)  $\delta = 1$

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



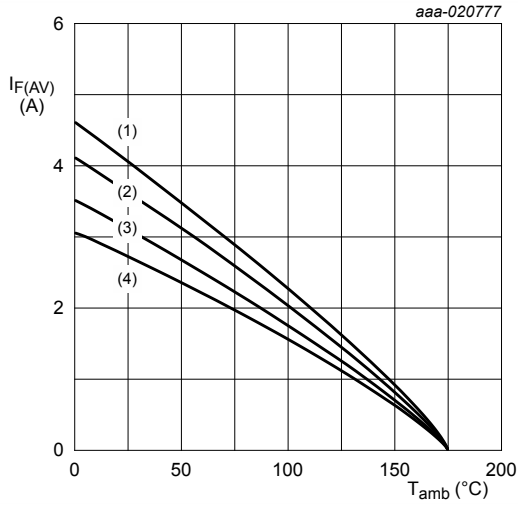
- (1)  $\delta = 1$
- (2)  $\delta = 0.9$
- (3)  $\delta = 0.8$
- (4)  $\delta = 0.5$
- (5)  $\delta = 0.2$

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



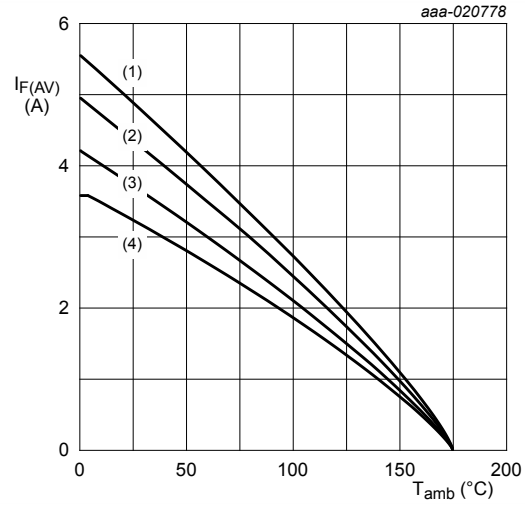
- (1)  $\delta = 1$
- (2)  $\delta = 0.5$
- (3)  $\delta = 0.2$
- (4)  $\delta = 0.1$

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



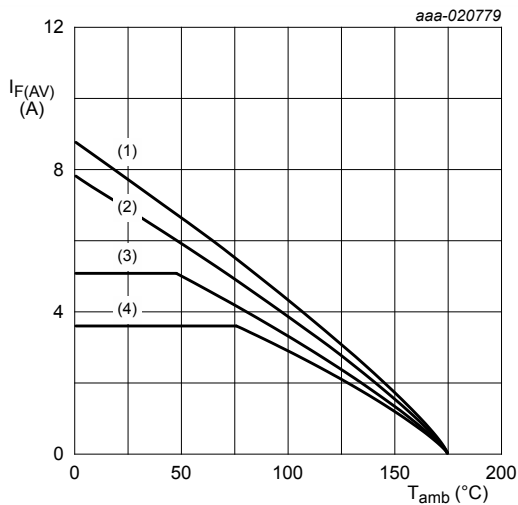
FR4 PCB, standard footprint  
 $T_j = 175\text{ °C}$   
 (1)  $\delta = 1$ ; DC  
 (2)  $\delta = 0.5$ ;  $f = 20\text{ kHz}$   
 (3)  $\delta = 0.2$ ;  $f = 20\text{ kHz}$   
 (4)  $\delta = 0.1$ ;  $f = 20\text{ kHz}$

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



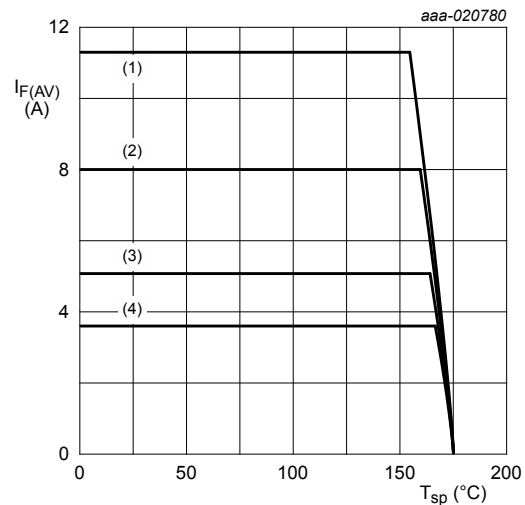
FR4 PCB, mounting pad for cathode  $1\text{ cm}^2$   
 $T_j = 175\text{ °C}$   
 (1)  $\delta = 1$ ; DC  
 (2)  $\delta = 0.5$ ;  $f = 20\text{ kHz}$   
 (3)  $\delta = 0.2$ ;  $f = 20\text{ kHz}$   
 (4)  $\delta = 0.1$ ;  $f = 20\text{ kHz}$

**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

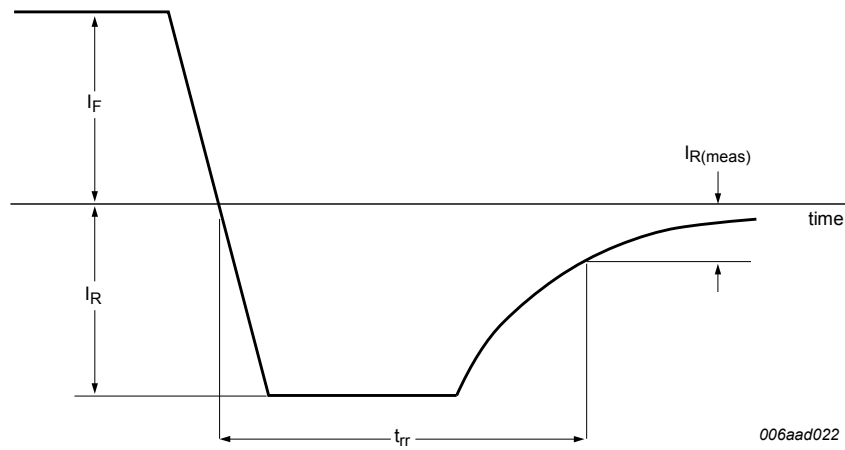


Fig. 14. Reverse recovery definition

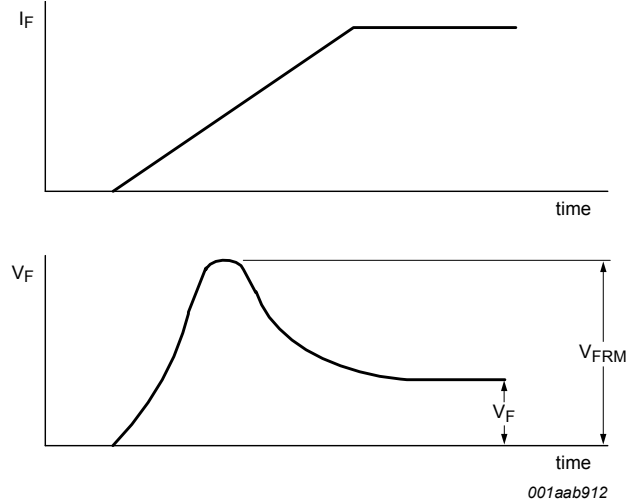


Fig. 15. Forward recovery definition

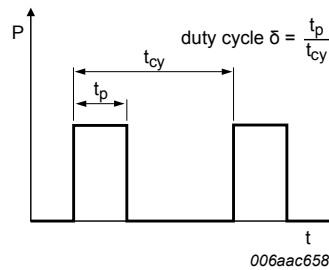


Fig. 16. Duty cycle definition

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

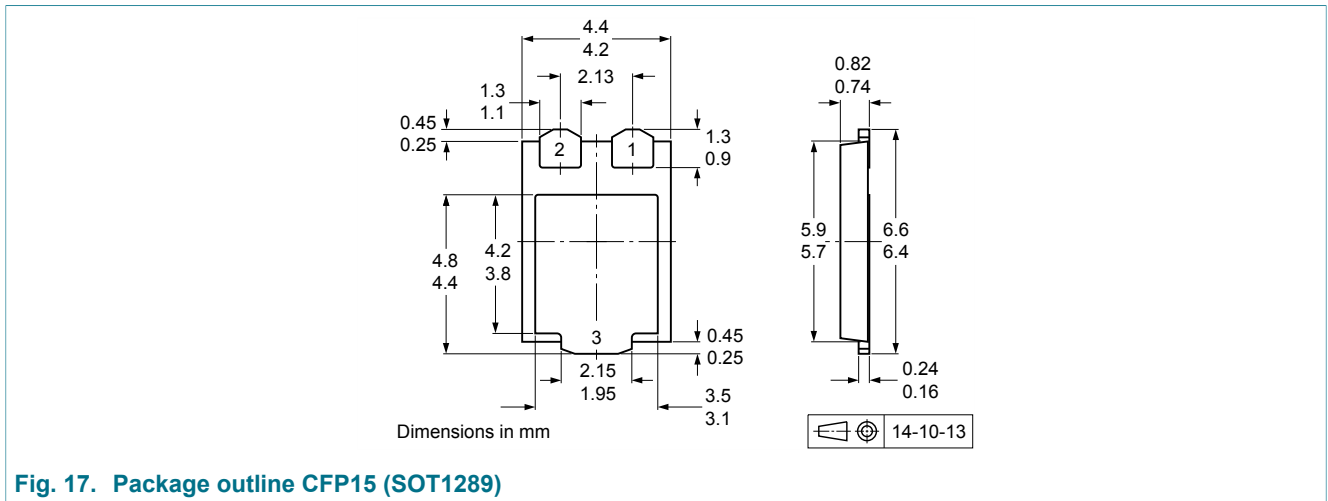


Fig. 17. Package outline CFP15 (SOT1289)

13. Soldering

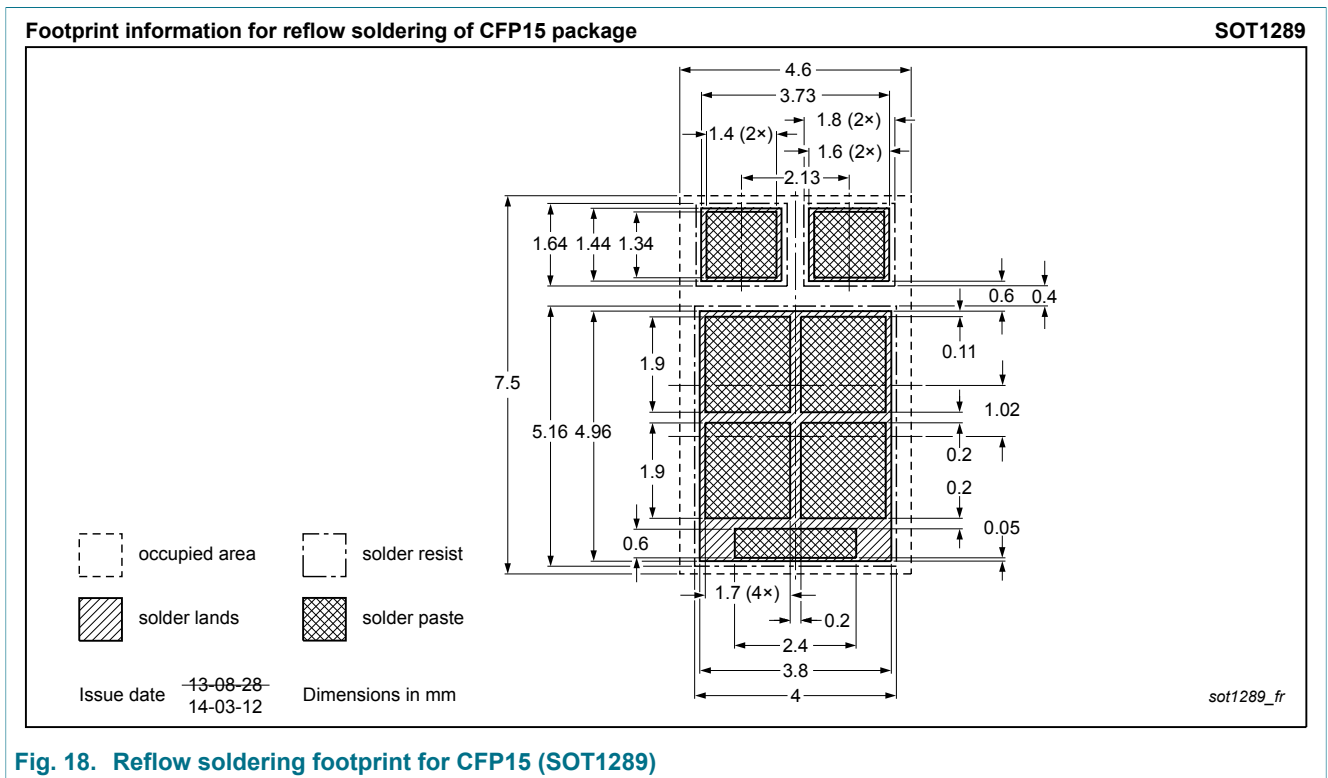


Fig. 18. Reflow soldering footprint for CFP15 (SOT1289)

## 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:	• Updated $I_R$ maximum value at 100 V, 25 °C			
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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