



# PMEG100V100ELPD

100 V, 10 A low leakage current Schottky barrier rectifier

5 April 2018

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:  $I_{F(AV)} \leq 10$  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

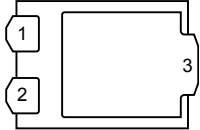
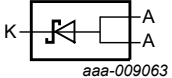
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $f = 20$ kHz; $T_{amb} \leq 150$ °C; square wave	-	-	10	A
$V_R$	reverse voltage	$T_j = 25$ °C	-	-	100	V
$V_F$	forward voltage	$I_F = 10$ A; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_j = 25$ °C	-	770	850	mV
$I_R$	reverse current	$V_R = 100$ V; $t_p \leq 3$ ms; $\delta \leq 0.03$ ; $T_j = 25$ °C	-	0.2	0.8	$\mu$ 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
PMEG100V100ELPD	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
PMEG100V100ELPD	100V L10E

## 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	$\delta = 1; T_{sp} \leq 145\text{ °C}$		-	14	A
$I_{F(AV)}$	average forward current	$\delta = 0.5; f = 20\text{ kHz}; T_{amb} \leq 150\text{ °C};$ square wave		-	10	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8\text{ ms};$ square wave; $T_{j(init)} = 25\text{ °C}$		-	170	A
		$t_p = 8.3\text{ ms};$ single half sine wave; $T_{j(init)} = 25\text{ °C}$		-	210	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

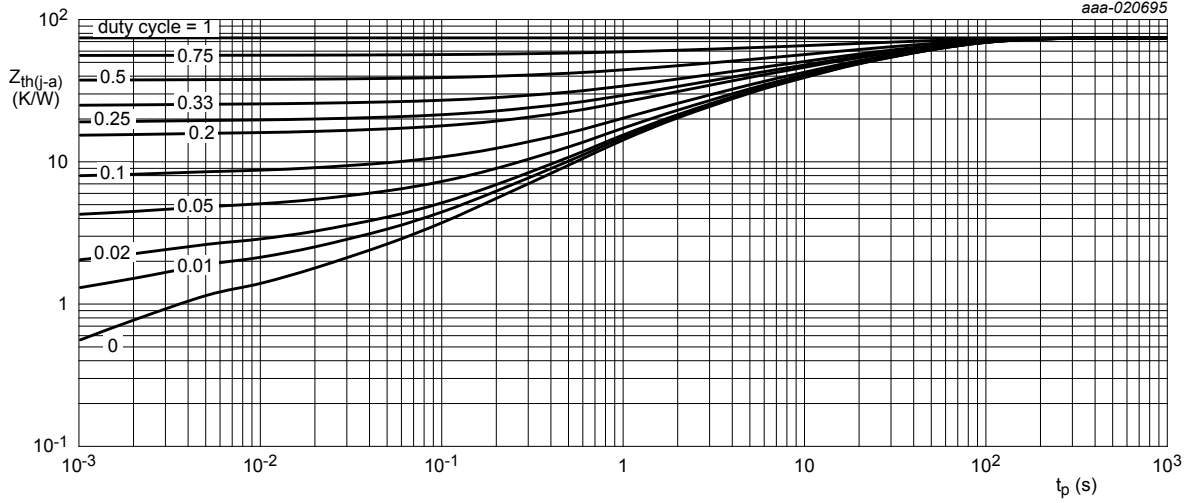
[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses  $P_R$  are a significant part of the total power losses.

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

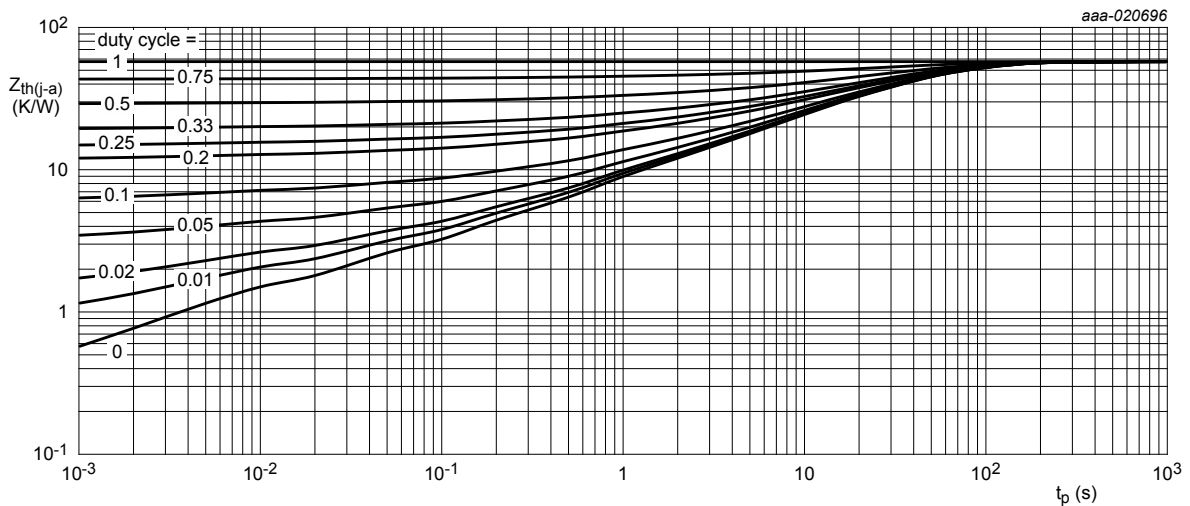
[4] Device mounted on a ceramic PCB,  $Al_2O_3$ , standard footprint.

[5] Soldering point of cathode tab.



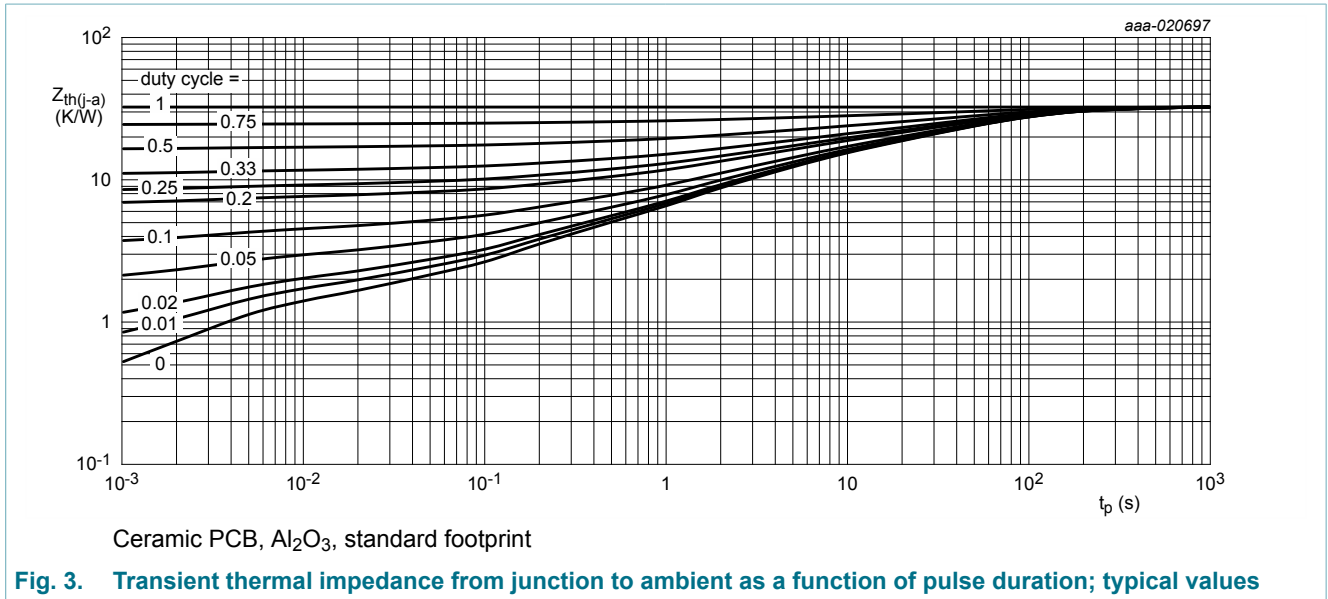
FR4 PCB, standard footprint

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

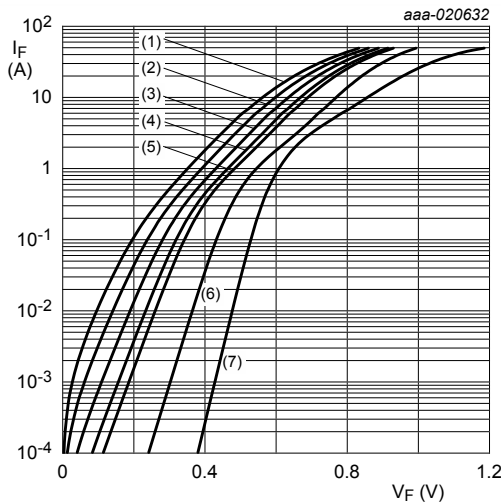


## 10. Characteristics

Table 7. Characteristics

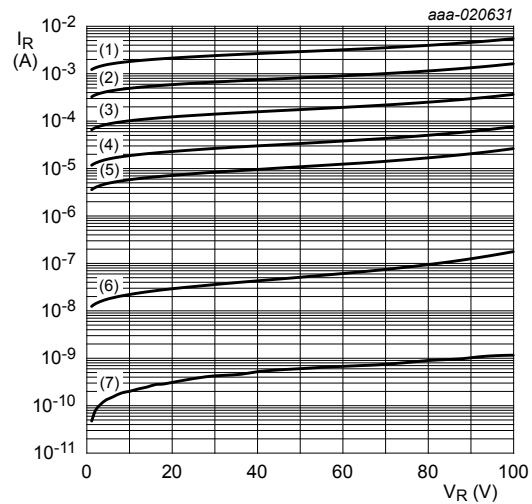
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 1 \text{ mA}; t_p \leq 1.2 \text{ ms}; \delta \leq 0.12;$ pulsed; $T_j = 25 \text{ }^\circ\text{C}$	100	-	-	V
$V_F$	forward voltage	$I_F = 0.1 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02;$ $T_j = 25 \text{ }^\circ\text{C}$	-	440	-	mV
		$I_F = 1 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02;$ $T_j = 25 \text{ }^\circ\text{C}$	-	545	650	mV
		$I_F = 2 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02;$ $T_j = 25 \text{ }^\circ\text{C}$	-	610	710	mV
		$I_F = 4 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02;$ $T_j = 25 \text{ }^\circ\text{C}$	-	685	-	mV
		$I_F = 5 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02;$ $T_j = 25 \text{ }^\circ\text{C}$	-	700	790	mV
		$I_F = 6 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02;$ $T_j = 25 \text{ }^\circ\text{C}$	-	720	-	mV
		$I_F = 8 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02;$ $T_j = 25 \text{ }^\circ\text{C}$	-	745	-	mV
		$I_F = 10 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02;$ $T_j = 25 \text{ }^\circ\text{C}$	-	770	850	mV
		$I_F = 10 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02;$ $T_j = -40 \text{ }^\circ\text{C}$	-	870	960	mV
		$I_F = 5 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02;$ $T_j = 125 \text{ }^\circ\text{C}$	-	570	-	mV
		$I_F = 10 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02;$ $T_j = 125 \text{ }^\circ\text{C}$	-	635	730	mV

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_R$	reverse current	$V_R = 60 \text{ V}; t_p \leq 3 \text{ ms}; \delta \leq 0.03;$ $T_j = 25 \text{ }^\circ\text{C}$	-	0.06	-	$\mu\text{A}$
		$V_R = 80 \text{ V}; t_p \leq 3 \text{ ms}; \delta \leq 0.03;$ $T_j = 25 \text{ }^\circ\text{C}$	-	0.09	-	$\mu\text{A}$
		$V_R = 100 \text{ V}; t_p \leq 3 \text{ ms}; \delta \leq 0.03;$ $T_j = 25 \text{ }^\circ\text{C}$	-	0.2	0.8	$\mu\text{A}$
		$V_R = 100 \text{ V}; t_p \leq 3 \text{ ms}; \delta \leq 0.03;$ $T_j = 125 \text{ }^\circ\text{C}$	-	0.38	2.5	$\text{mA}$
		$V_R = 60 \text{ V}; t_p \leq 3 \text{ ms}; \delta \leq 0.03;$ $T_j = 150 \text{ }^\circ\text{C}$	-	0.92	3.5	$\text{mA}$
$C_d$	diode capacitance	$V_R = 1 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$	-	365	-	$\text{pF}$
		$V_R = 4 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$	-	215	-	$\text{pF}$
		$V_R = 10 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$	-	135	-	$\text{pF}$
$t_{rr}$	reverse recovery time	$I_F = 0.5 \text{ A}; I_R = 0.5 \text{ A}; I_{R(\text{meas})} = 0.1 \text{ A};$ $T_j = 25 \text{ }^\circ\text{C}$	-	14	-	$\text{ns}$
$V_{FRM}$	peak forward recovery voltage	$I_F = 0.5 \text{ A}; dI_F/dt = 20 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}$	-	555	-	$\text{mV}$



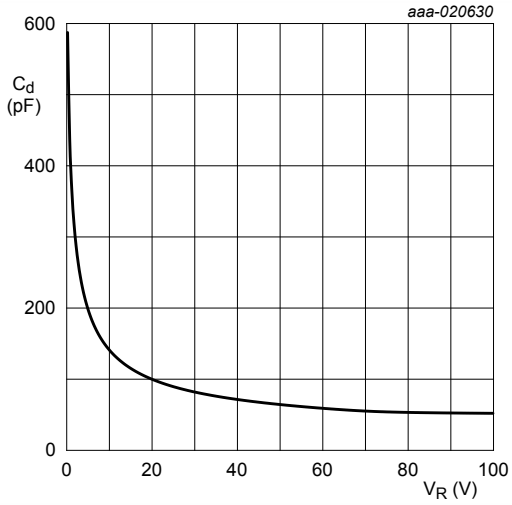
- pulsed condition
- (1)  $T_j = 175 \text{ }^\circ\text{C}$
  - (2)  $T_j = 150 \text{ }^\circ\text{C}$
  - (3)  $T_j = 125 \text{ }^\circ\text{C}$
  - (4)  $T_j = 100 \text{ }^\circ\text{C}$
  - (5)  $T_j = 85 \text{ }^\circ\text{C}$
  - (6)  $T_j = 25 \text{ }^\circ\text{C}$
  - (7)  $T_j = -40 \text{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

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



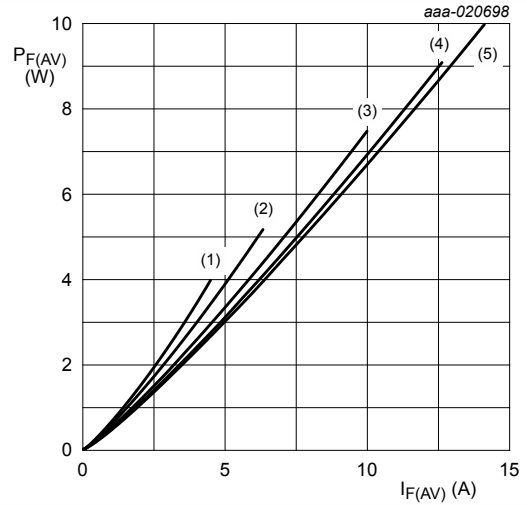
- pulsed condition
- (1)  $T_j = 175 \text{ }^\circ\text{C}$
  - (2)  $T_j = 150 \text{ }^\circ\text{C}$
  - (3)  $T_j = 125 \text{ }^\circ\text{C}$
  - (4)  $T_j = 100 \text{ }^\circ\text{C}$
  - (5)  $T_j = 85 \text{ }^\circ\text{C}$
  - (6)  $T_j = 25 \text{ }^\circ\text{C}$
  - (7)  $T_j = -40 \text{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

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



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

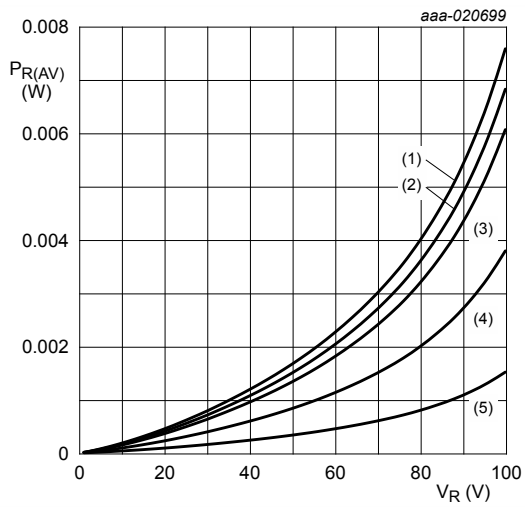
**Fig. 6. Diode capacitance as a function of reverse voltage; typical values**



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

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

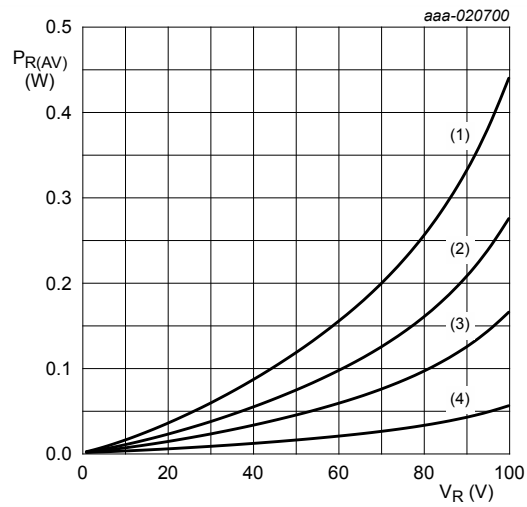
**Fig. 7. Average forward power dissipation as a function of average forward current; typical values**



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

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

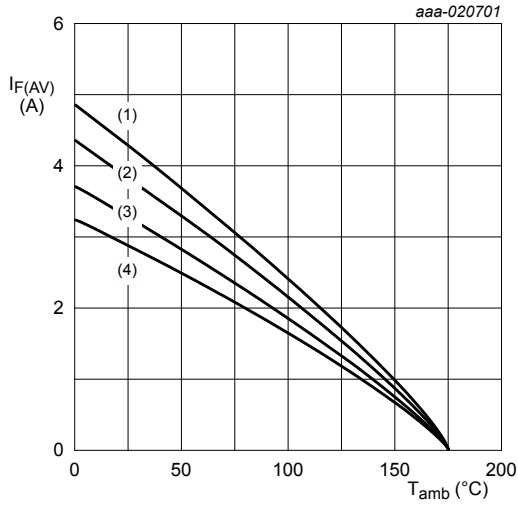
**Fig. 8. Average reverse power dissipation as a function of reverse voltage; typical values**



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

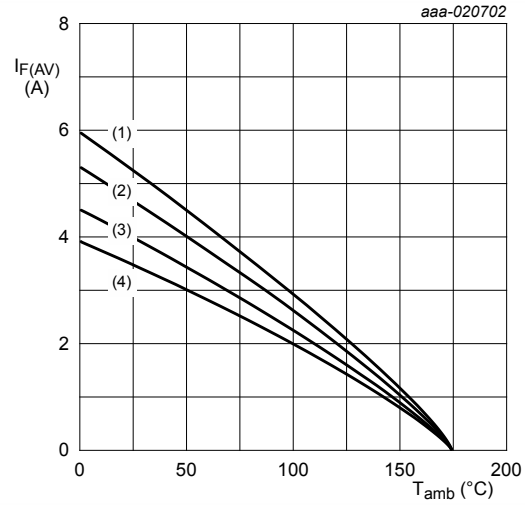
- (1)  $\delta = 1$
- (2)  $\delta = 0.5$
- (3)  $\delta = 0.2$
- (4)  $\delta = 0.1$

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



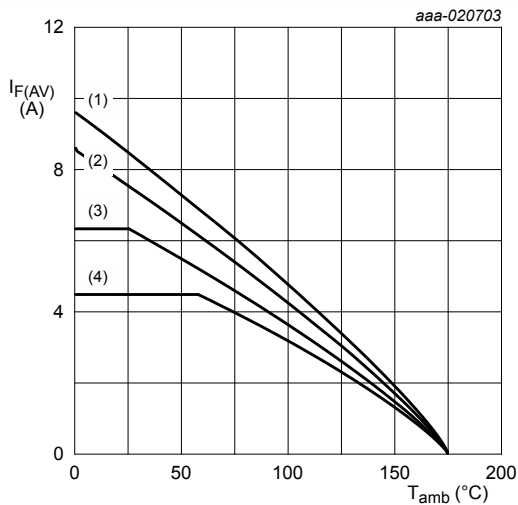
FR4 PCB, standard footprint  
 $T_j = 175\text{ °C}$   
 (1)  $\delta = 1$ ; DC  
 (2)  $\delta = 0.5$ ;  $f = 20\text{ kHz}$   
 (3)  $\delta = 0.2$ ;  $f = 20\text{ kHz}$   
 (4)  $\delta = 0.1$ ;  $f = 20\text{ kHz}$

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



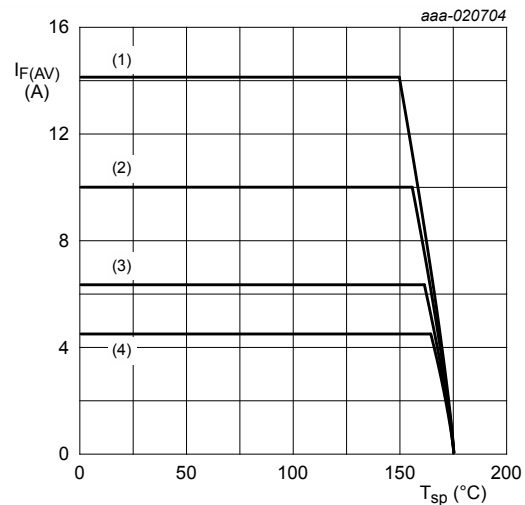
FR4 PCB, mounting pad for cathode  $1\text{ cm}^2$   
 $T_j = 175\text{ °C}$   
 (1)  $\delta = 1$ ; DC  
 (2)  $\delta = 0.5$ ;  $f = 20\text{ kHz}$   
 (3)  $\delta = 0.2$ ;  $f = 20\text{ kHz}$   
 (4)  $\delta = 0.1$ ;  $f = 20\text{ kHz}$

**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

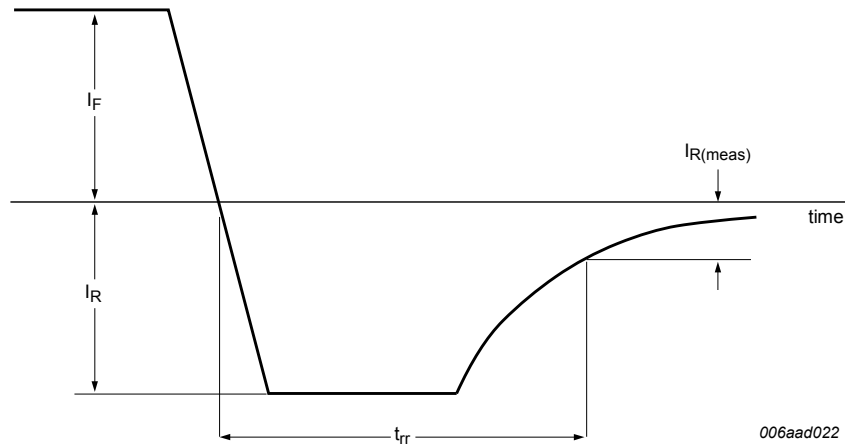


Fig. 14. Reverse recovery definition

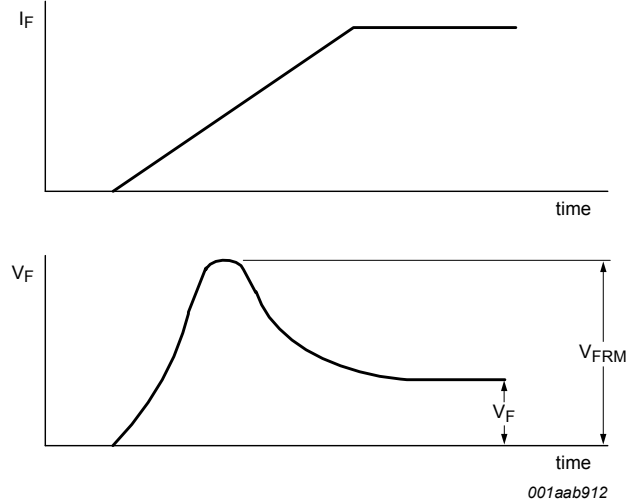


Fig. 15. Forward recovery definition

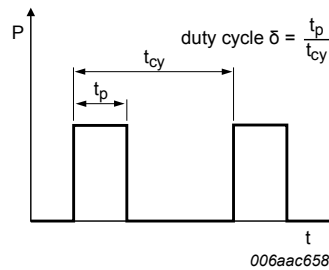


Fig. 16. Duty cycle definition

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**

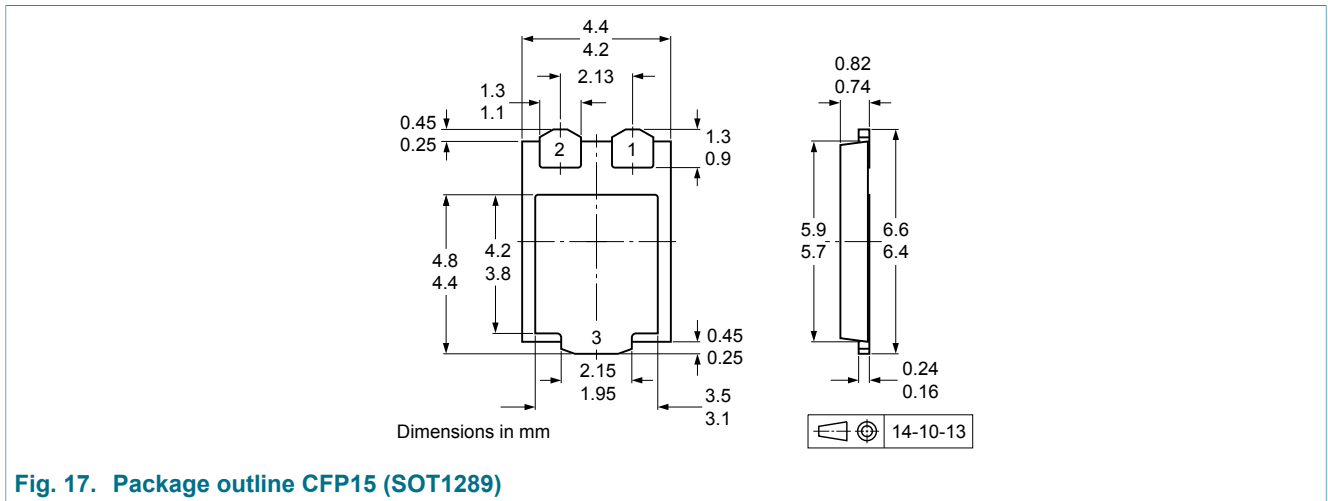


Fig. 17. Package outline CFP15 (SOT1289)

**13. Soldering**

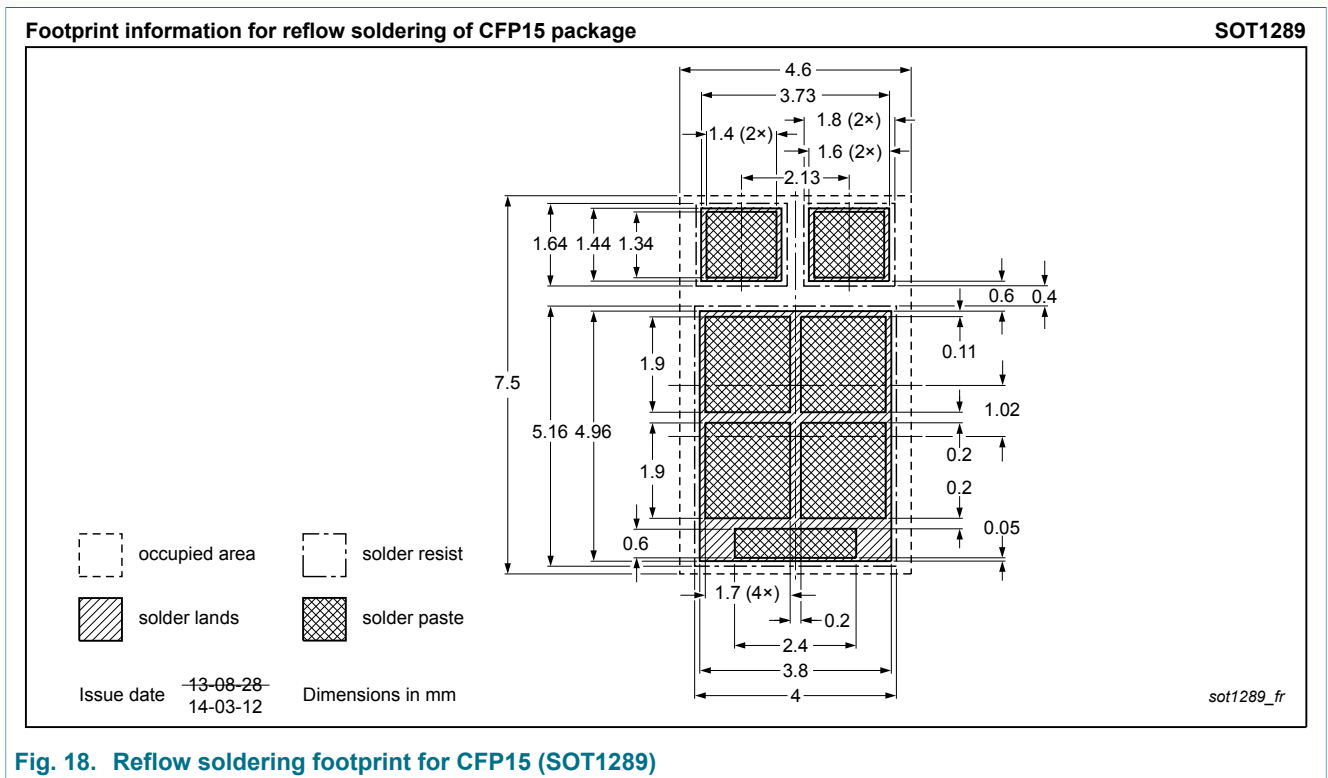


Fig. 18. Reflow soldering footprint for CFP15 (SOT1289)

## 14. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG100V100ELPD v.4	20180405	Product data sheet	-	PMEG100V100ELPD v.3
Modifications:	• $I_{FSM}$ parameter added (sine wave)			
PMEG100V100ELPD v.3	20161004	Product data sheet	-	PMEG100V100ELPD v.2
PMEG100V100ELPD v.2	20160203	Preliminary data sheet	-	PMEG100V100ELPD v.1
PMEG100V100ELPD v.1	20151117			-

## 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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For more information, please visit: <http://www.nexperia.com>  
For sales office addresses, please send an email to: [salesaddresses@nexperia.com](mailto:salesaddresses@nexperia.com)  
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Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.