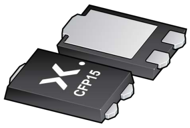


PMEG100V060ELPD

100 V, 6 A low leakage current Schottky barrier rectifier

20 May 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: $I_{F(AV)} \leq 6$ 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

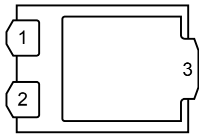
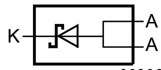
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	δ = 0.5 ; f = 20 kHz; $T_{amb} \leq$ 155 °C; square wave		-	-	6	A
V_R	reverse voltage	T_j = 25 °C		-	-	100	V
V_F	forward voltage	I_F = 6 A; $t_p \leq$ 300 µs; $\delta \leq$ 0.02 ; T_j = 25 °C		-	770	840	mV
I_R	reverse current	V_R = 100 V; $t_p \leq$ 3 ms; $\delta \leq$ 0.03 ; T_j = 25 °C		-	0.11	0.45	µA

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
PMEG100V060ELPD	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
PMEG100V060ELPD	100V L06E

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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 °C		-	100	V
I_F	forward current	$T_{sp} \leq$ 150 °C; δ = 1		-	8.4	A
$I_{F(AV)}$	average forward current	δ = 0.5 ; f = 20 kHz; $T_{amb} \leq$ 155 °C; square wave		-	6	A
I_{FSM}	non-repetitive peak forward current	t_p = 8 ms; $T_{j(init)}$ = 25 °C; square wave		-	130	A
P_{tot}	total power dissipation	$T_{amb} \leq$ 25 °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^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 cm^2.
[4] Device mounted on a ceramic PCB, Al_2O_3, standard footprint.
[5] Soldering point of cathode tab.

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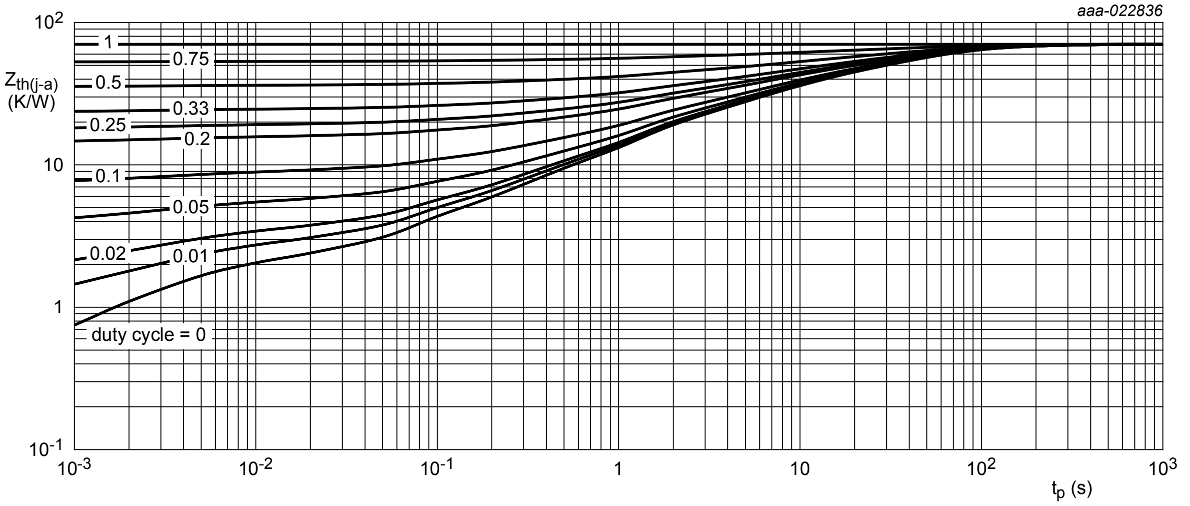
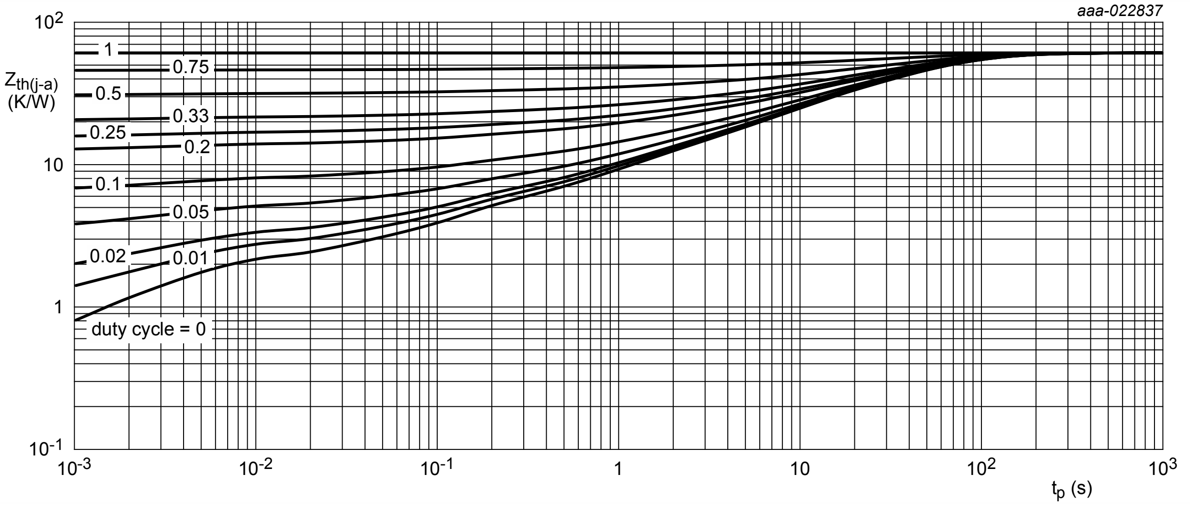


FR4 PCB, standard footprint

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^2

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

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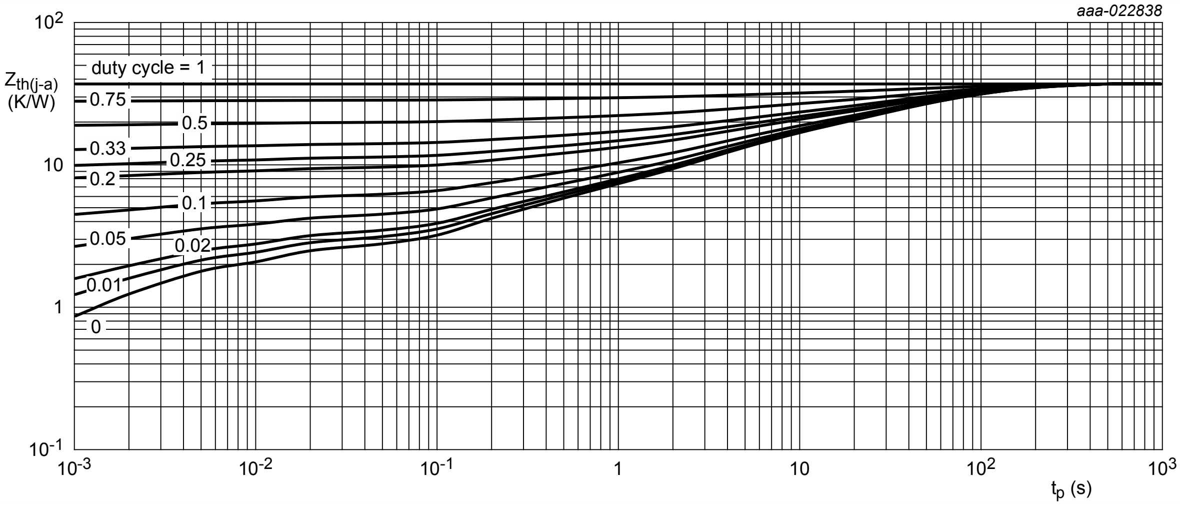

Ceramic PCB, Al_2O_3, standard footprint

Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

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10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	I_R = 1 mA; $t_p \le$ 1.2 ms; $\delta \le$ 0.12 ; T_j = 25 °C; pulsed		100	-	-	V
V_F	forward voltage	I_F = 0.1 A; $t_p \le$ 300 µs; $\delta \le$ 0.02 ; T_j = 25 °C		-	455	-	mV
		I_F = 1 A; $t_p \le$ 300 µs; $\delta \le$ 0.02 ; T_j = 25 °C		-	600	-	mV
		I_F = 2 A; $t_p \le$ 300 µs; $\delta \le$ 0.02 ; T_j = 25 °C		-	670	740	mV
		I_F = 3 A; $t_p \le$ 300 µs; $\delta \le$ 0.02 ; T_j = 25 °C		-	710	770	mV
		I_F = 4 A; $t_p \le$ 300 µs; $\delta \le$ 0.02 ; T_j = 25 °C		-	740	810	mV
		I_F = 6 A; $t_p \le$ 300 µs; $\delta \le$ 0.02 ; T_j = 25 °C		-	770	840	mV
		I_F = 6 A; $t_p \le$ 300 µs; $\delta \le$ 0.02 ; T_j = -40 °C		-	860	970	mV
		I_F = 6 A; $t_p \le$ 300 µs; $\delta \le$ 0.02 ; T_j = 125 °C		-	630	750	mV
I_R	reverse current	V_R = 60 V; $t_p \le$ 3 ms; $\delta \le$ 0.03 ; T_j = 25 °C		-	0.035	-	µA
		V_R = 80 V; $t_p \le$ 3 ms; $\delta \le$ 0.03 ; T_j = 25 °C		-	0.055	-	µA
		V_R = 100 V; $t_p \le$ 3 ms; $\delta \le$ 0.03 ; T_j = 25 °C		-	0.11	0.45	µA
		V_R = 100 V; $t_p \le$ 3 ms; $\delta \le$ 0.03 ; T_j = 125 °C		-	0.22	0.8	mA
		V_R = 60 V; $t_p \le$ 3 ms; $\delta \le$ 0.03 ; T_j = 150 °C		-	0.5	2	mA
C_d	diode capacitance	V_R = 1 V; f = 1 MHz; T_j = 25 °C		-	200	-	pF
		V_R = 4 V; f = 1 MHz; T_j = 25 °C		-	120	-	pF
		V_R = 10 V; f = 1 MHz; T_j = 25 °C		-	80	-	pF
t_{rr}	reverse recovery time	I_F = 0.5 A; I_R = 0.5 A; $I_{R(meas)}$ = 0.1 A; T_j = 25 °C		-	8	-	ns
V_{FR}	forward recovery voltage	I_F = 0.5 A; dI_F/dt = 20 A/µs; T_j = 25 °C		-	565	-	mV

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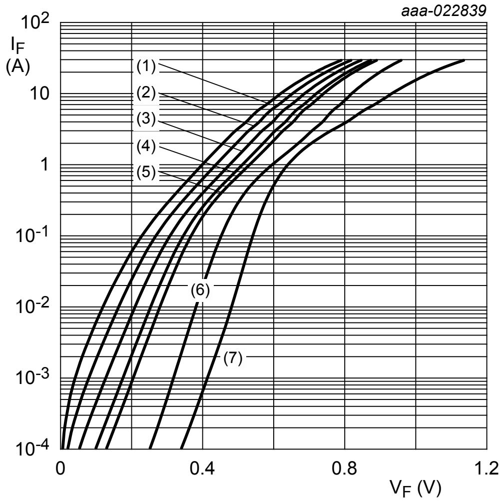
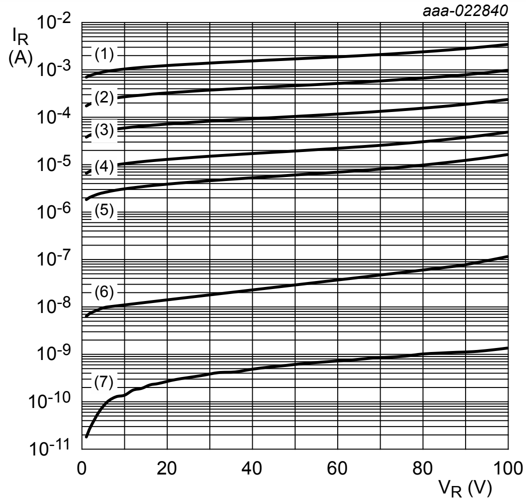


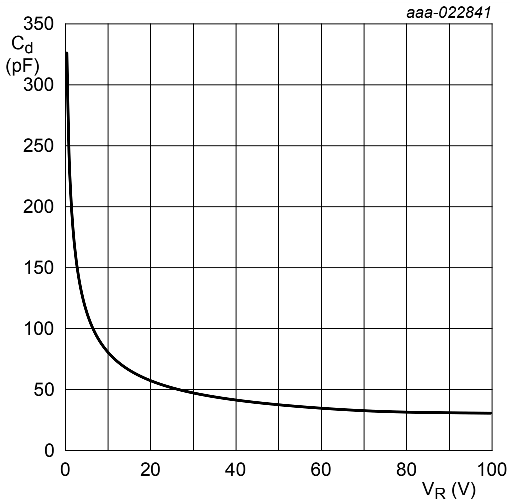
pulsed condition
(1) T_j = 175 °C
(2) T_j = 150 °C
(3) T_j = 125 °C
(4) T_j = 100 °C
(5) T_j = 85°C
(6) T_j = 25 °C
(7) T_j = −40 °C

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



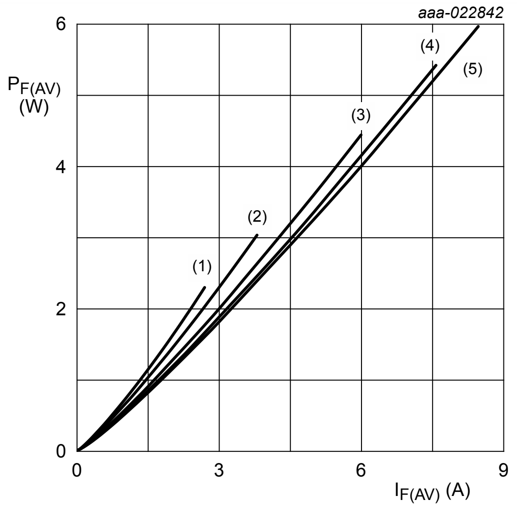
pulsed condition
(1) T_j = 175 °C
(2) T_j = 150 °C
(3) T_j = 125 °C
(4) T_j = 100 °C
(5) T_j = 85 °C
(6) T_j = 25 °C
(7) T_j = −40 °C

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



f = 1 MHz; T_{amb} = 25 °C

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



T_j = 100 °C
(1) δ = 0.1
(2) δ = 0.2
(3) δ = 0.5
(4) δ = 0.8
(5) δ = 1

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

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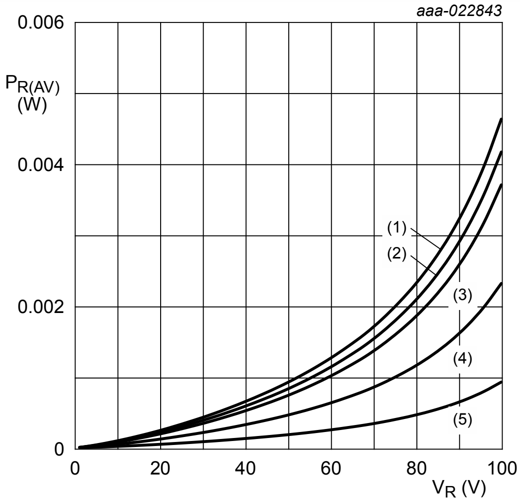
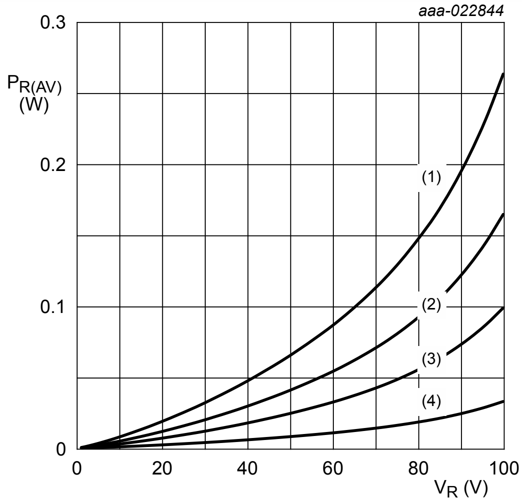


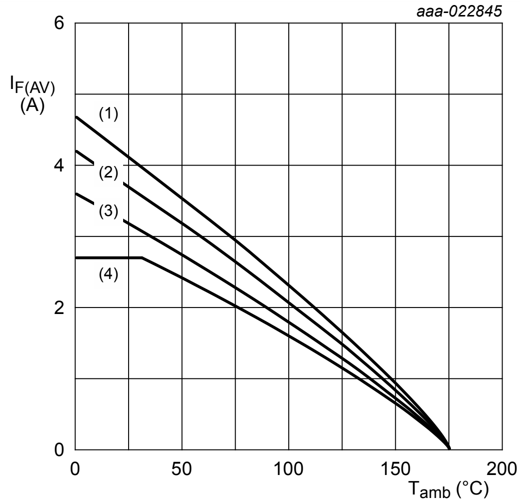
T_j = 100 °C
(1) δ = 1
(2) δ = 0.9
(3) δ = 0.8
(4) δ = 0.5
(5) δ = 0.2

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



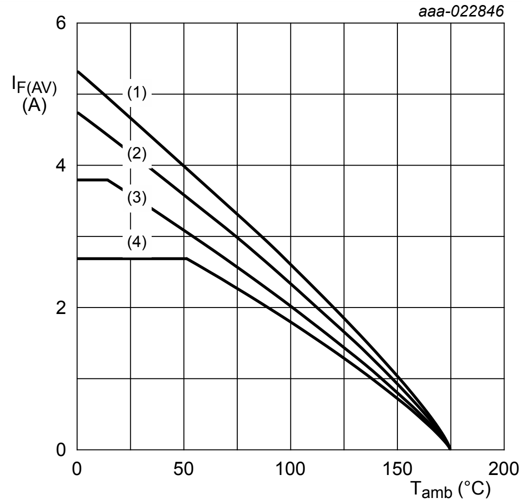
T_j = 175 °C
(1) δ = 1
(2) δ = 0.5
(3) δ = 0.2
(4) δ = 0.1

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



FR4 PCB, standard footprint
T_j = 175 °C
(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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



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

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

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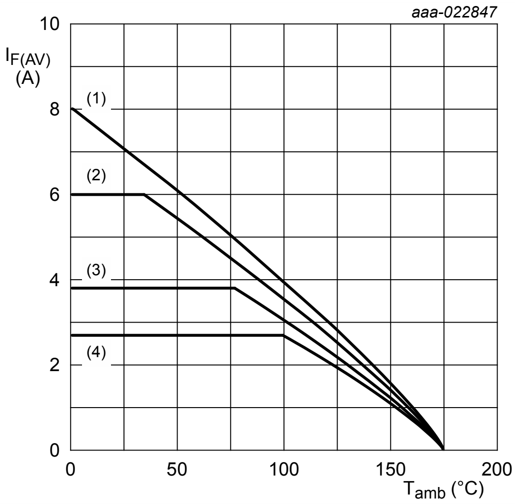
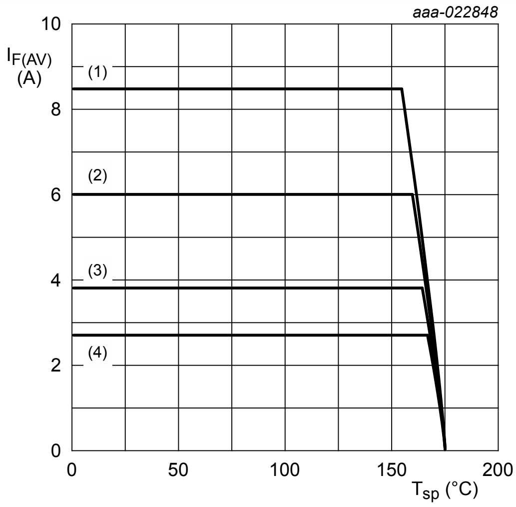


Ceramic PCB, Al_2O_3, standard footprint
T_j = 175 °C
(1) δ = 1 (DC)
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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



T_j = 175 °C
(1) δ = 1 (DC)
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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

11. Test information

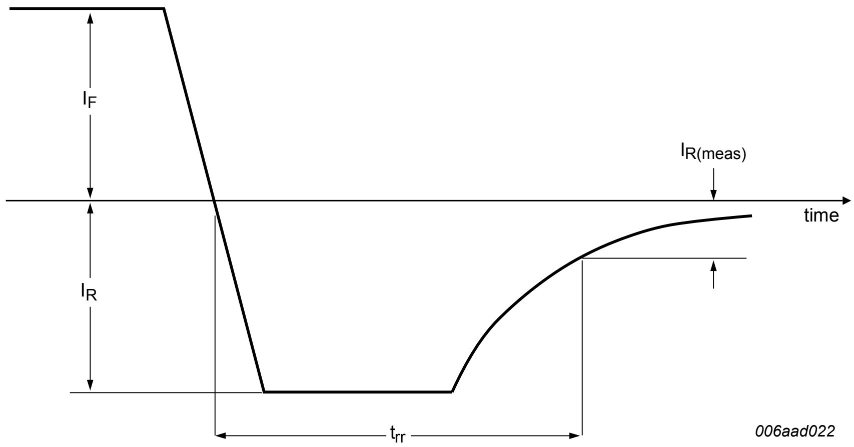


Fig. 14. Reverse recovery definition

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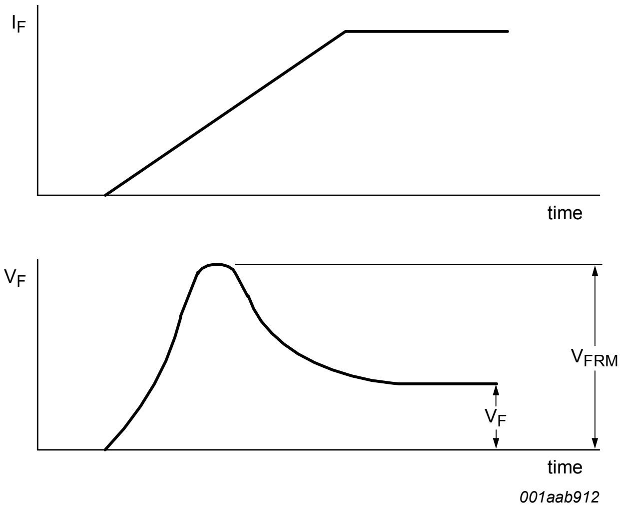

Fig. 15. Forward recovery definition

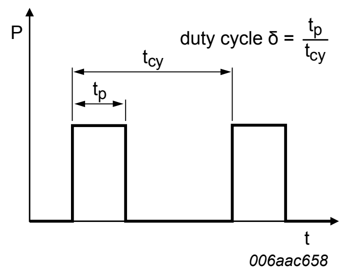

Fig. 16. Duty cycle definition

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.

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12. Package outline

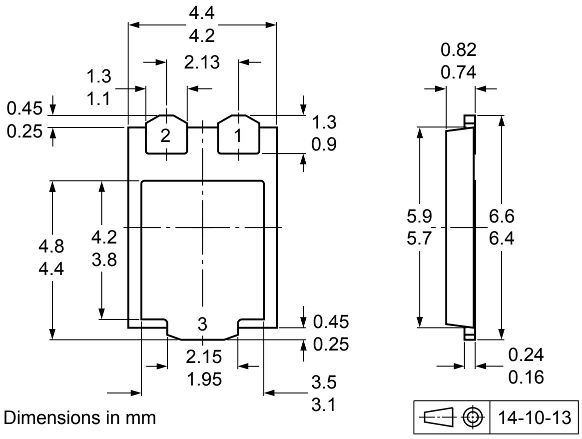

Fig. 17. Package outline CFP15 (SOT1289)

13. Soldering

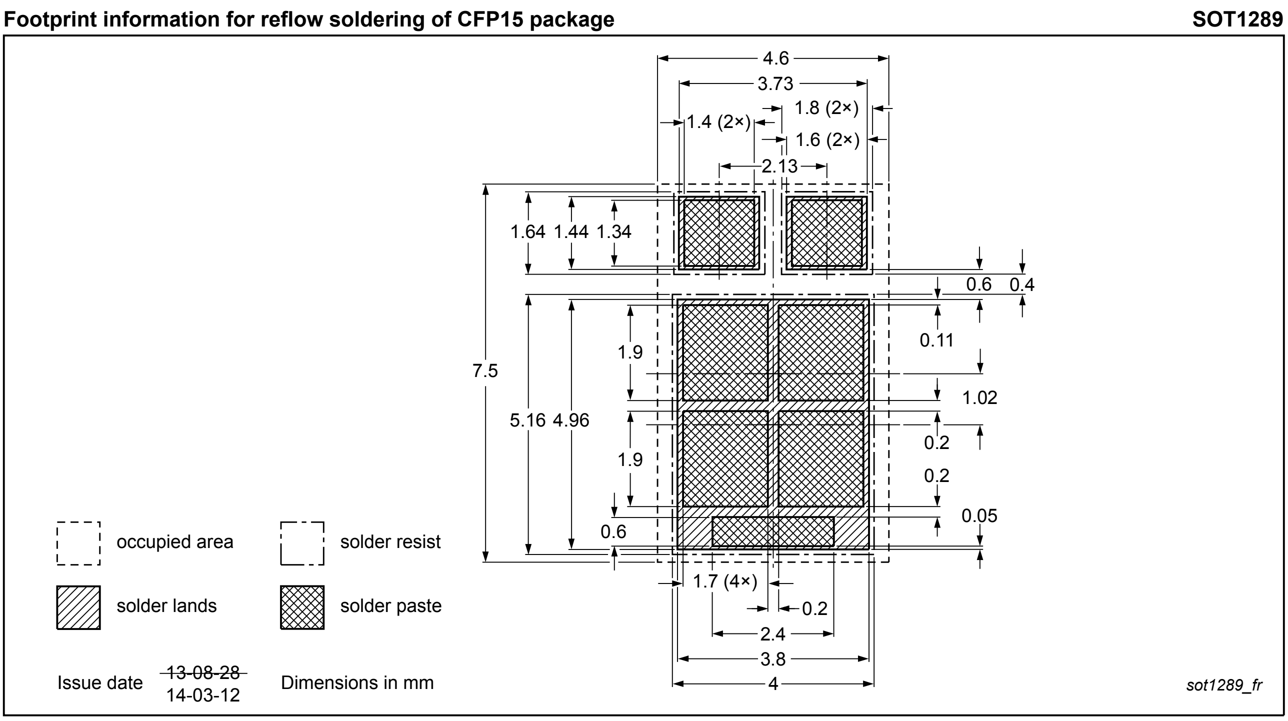

Fig. 18. Reflow soldering footprint for CFP15 (SOT1289)

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14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG100V060ELPD v.1	20160520	Product data sheet	-	-

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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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16. Contents

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Date of release: 20 May 2016