



# PMEG045V100EIPE-Q

45 V, 10 A low VF Schottky barrier rectifier

15 July 2024

Product data sheet

## 1. General description

Planar Low VF Schottky barrier rectifier encapsulated in a CFP15B (SOT1289B) power and flat lead Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Very low forward voltage
- High power capability due to clip-bond technology
- Small and thin SMD plastic package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- High efficiency DC-to-DC conversion
- Low voltage rectification
- Switch mode power supply
- Freewheeling application
- Reverse polarity protection
- OR-ing

## 4. Quick reference data

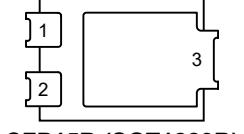
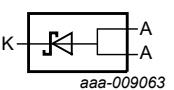
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$ ; $f = 20$ kHz; $T_{sp} \leq 170$ °C		-	-	10	A
$V_R$	reverse voltage	$T_j = 25$ °C		-	-	45	V
$V_F$	forward voltage	$I_F = 10$ A; pulsed; $T_j = 25$ °C	[1]	-	490	540	mV
$I_R$	reverse current	$V_R = 45$ V; pulsed; $T_j = 25$ °C	[1]	-	100	500	µA

[1] Very short pulse, in order to maintain a stable junction temperature.

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode		
2	A	anode		
3	K	cathode	 CFP15B (SOT1289B)	 aaa-009063

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## 6. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
PMEG045V100EIPE-Q	CFP15B	plastic, thermal enhanced ultra thin SMD package; 3 leads; 2.13 mm pitch; 5.8 x 4.3 x 0.95 mm body	<a href="#">SOT1289B</a>

## 7. Marking

**Table 4. Marking codes**

Type number	Marking code
PMEG045V100EIPE-Q	045V M10E

## 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	$\delta = 1$ ; $T_{sp} \leq 168 \text{ }^\circ\text{C}$		-	14	A
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$ ; $f = 20 \text{ kHz}$ ; $T_{sp} \leq 170 \text{ }^\circ\text{C}$		-	10	A
$I_{FSM}$	non-repetitive peak forward current	half sine-wave pulse; $t_p = 8.3 \text{ ms}$ ; $T_{j(init)} = 25 \text{ }^\circ\text{C}$		-	210	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25 \text{ }^\circ\text{C}$	[1]	-	1.66	W
			[2]	-	2.15	W
$T_j$	junction temperature			-	175	$^\circ\text{C}$
$T_{amb}$	ambient temperature			-55	175	$^\circ\text{C}$
$T_{stg}$	storage temperature			-65	175	$^\circ\text{C}$

[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  $\text{cm}^2$ .

## 9. Thermal characteristics

**Table 6. Thermal characteristics**

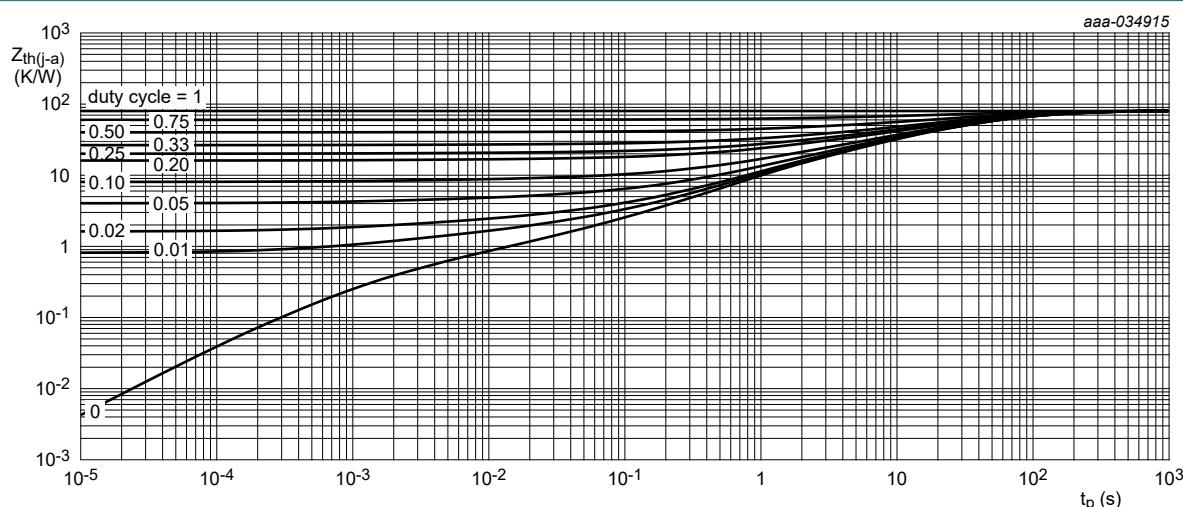
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	90	K/W
			[1] [3]	-	-	70	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	3	K/W

[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.

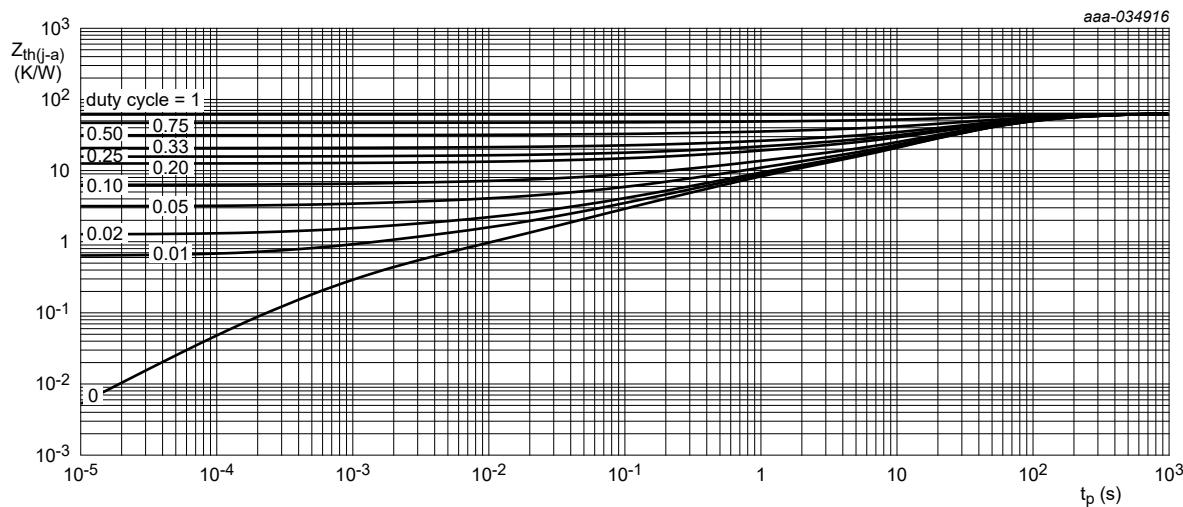
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1 \text{ cm}^2$ .

[4] 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  $1 \text{ cm}^2$

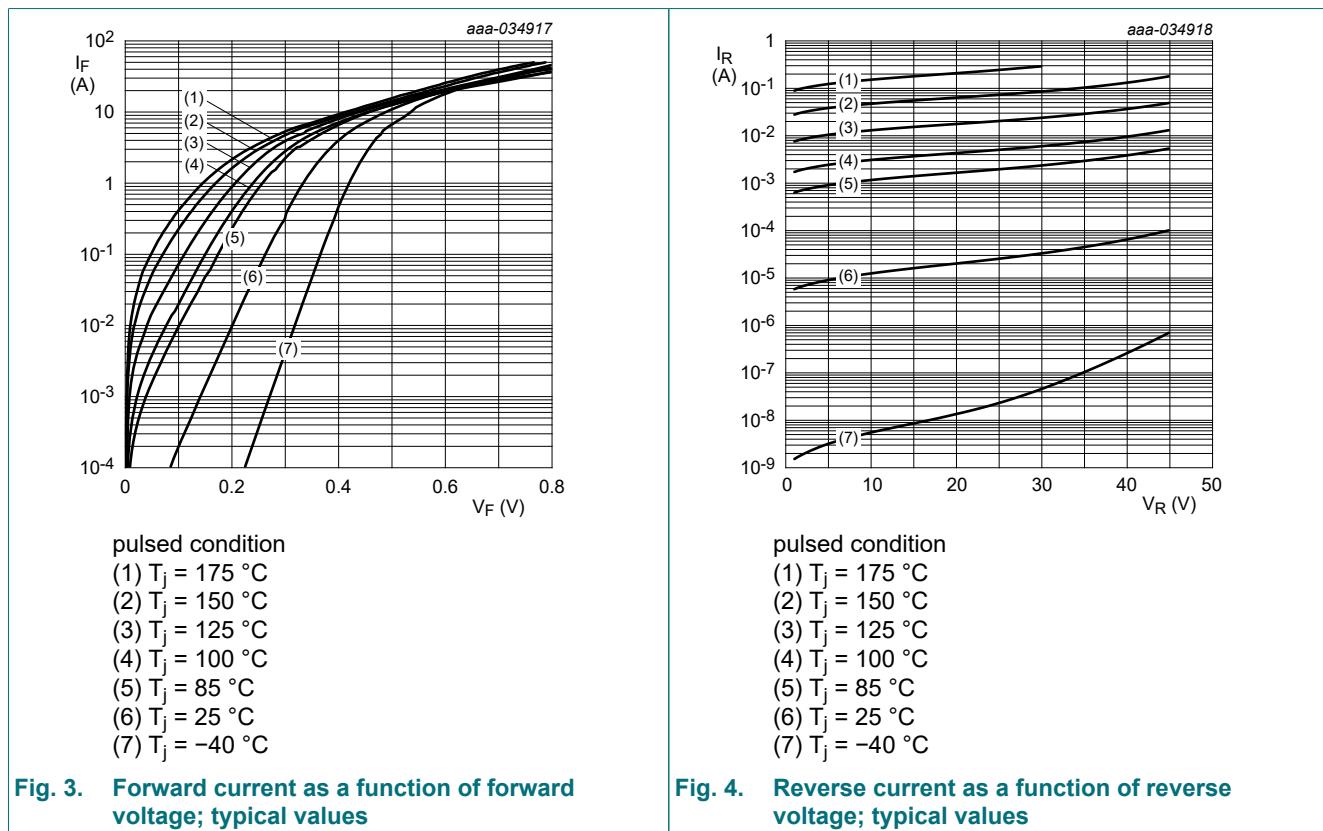
**Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**

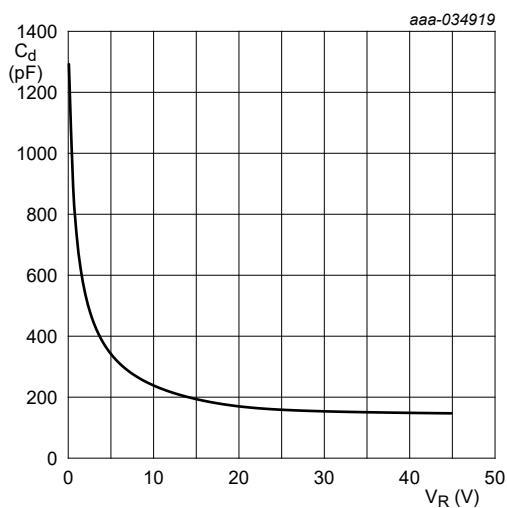
## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 5 \text{ mA}$ ; pulsed; $T_j = 25^\circ\text{C}$	[1]	45	-	-	V
$V_F$	forward voltage	$I_F = 1 \text{ A}$ ; pulsed; $T_j = 25^\circ\text{C}$	[1]	-	330	380	mV
		$I_F = 5 \text{ A}$ ; pulsed; $T_j = 25^\circ\text{C}$	[1]	-	410	470	mV
		$I_F = 10 \text{ A}$ ; pulsed; $T_j = 25^\circ\text{C}$	[1]	-	490	540	mV
		$I_F = 10 \text{ A}$ ; pulsed; $T_j = -40^\circ\text{C}$	[1]	-	530	600	mV
		$I_F = 10 \text{ A}$ ; pulsed; $T_j = 125^\circ\text{C}$	[1]	-	440	500	mV
$I_R$	reverse current	$V_R = 45 \text{ V}$ ; pulsed; $T_j = 25^\circ\text{C}$	[1]	-	100	500	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 1 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_j = 25^\circ\text{C}$		-	700	-	pF
		$V_R = 10 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_j = 25^\circ\text{C}$		-	240	-	pF
$t_{rr}$	reverse recovery time step recovery	$I_F = 0.5 \text{ A}$ ; $I_R = 0.5 \text{ A}$ ; $I_{R(\text{meas})} = 0.1 \text{ A}$ ; $T_j = 25^\circ\text{C}$		-	22	-	ns
	reverse recovery time ramp recovery	$dI_F/dt = 100 \text{ A}/\mu\text{s}$ ; $I_F = 3 \text{ A}$ ; $V_R = 30 \text{ V}$ ; $T_j = 25^\circ\text{C}$		-	15	-	ns
$V_{FRM}$	peak forward recovery voltage	$I_F = 0.5 \text{ A}$ ; $dI_F/dt = 20 \text{ A}/\mu\text{s}$ ; $T_j = 25^\circ\text{C}$		-	310	-	mV

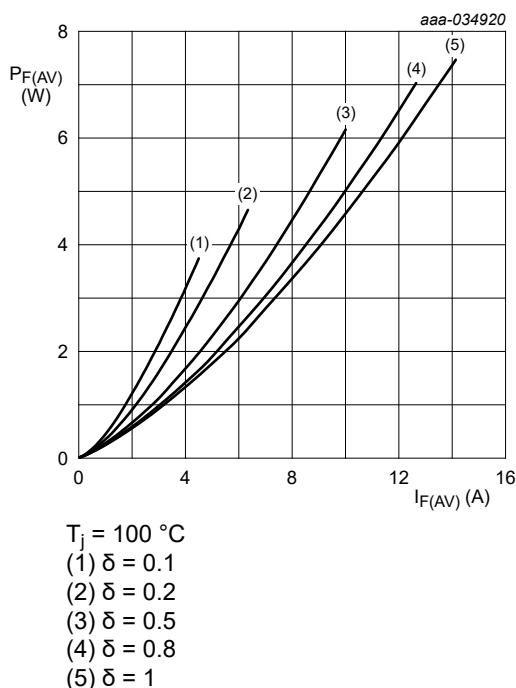
[1] Very short pulse, in order to maintain a stable junction temperature.



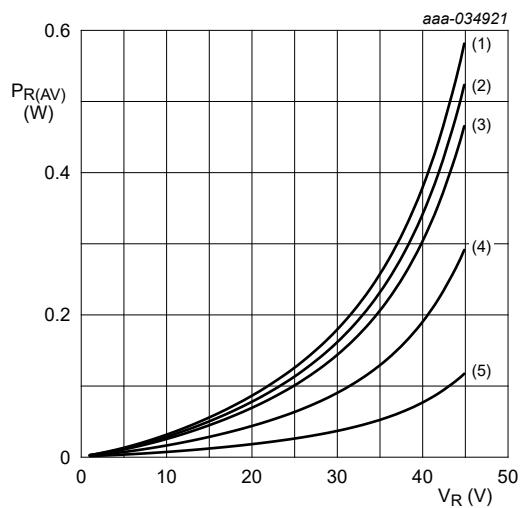


$f = 1$  MHz;  $T_{amb} = 25$  °C

**Fig. 5. Diode capacitance as a function of reverse voltage; typical values**

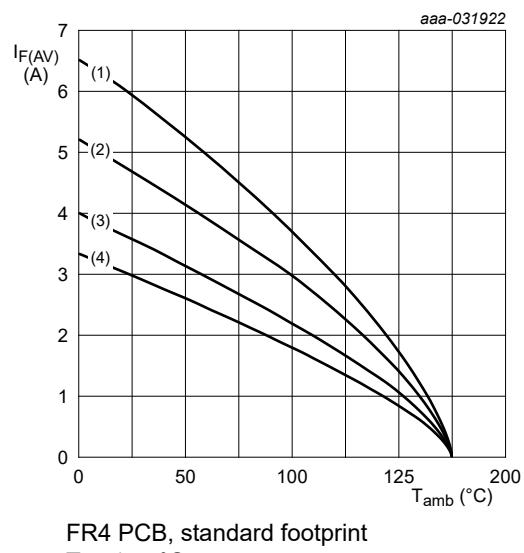


**Fig. 6. Average forward power dissipation as a function of average forward current; typical values**



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

**Fig. 7. Average reverse power dissipation as a function of reverse voltage; typical values**



**Fig. 8. Average forward current as a function of ambient temperature; typical values**

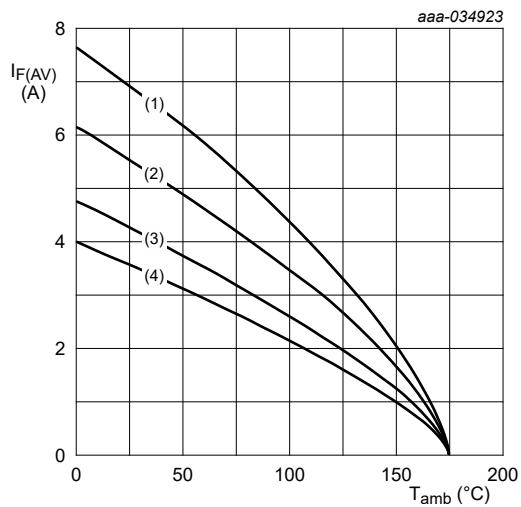


Fig. 9. Average forward current as a function of ambient temperature; typical values

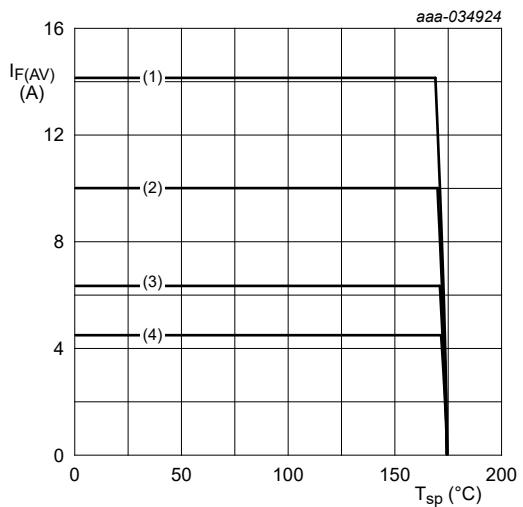


Fig. 10. Average forward current as a function of solder point temperature; typical values

## 11. Test information

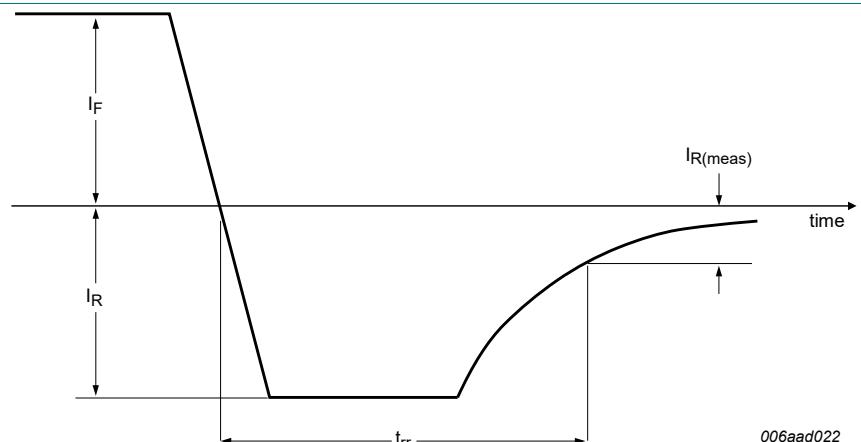


Fig. 11. Reverse recovery definition; step recovery

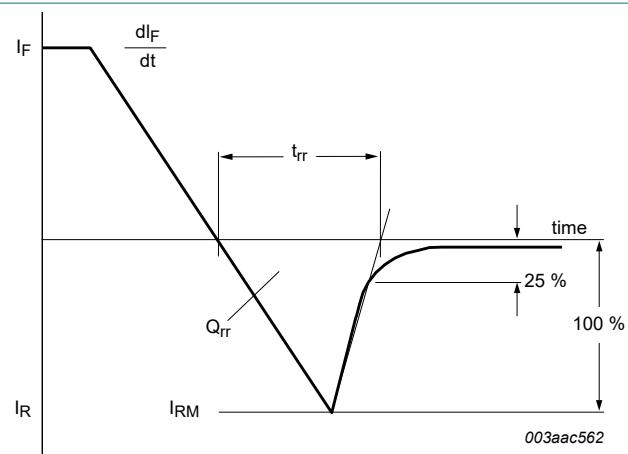


Fig. 12. Reverse recovery definition; ramp recovery

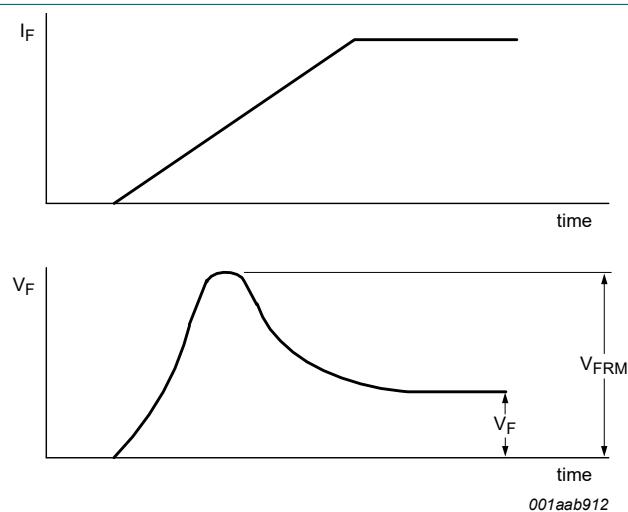


Fig. 13. Forward recovery definition

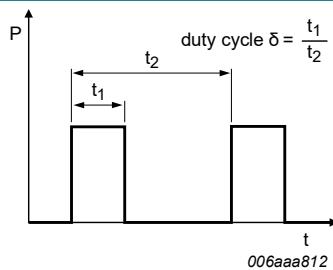


Fig. 14. Duty cycle definition

The current ratings for the typical waveforms are calculated according to the equations:

$$I_{F(AV)} = I_M \times \delta \text{ with } I_M \text{ defined as peak current}$$

$$I_{RMS} = I_{F(AV)} \text{ at DC, and } I_{RMS} = I_M \times \sqrt{\delta}$$

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

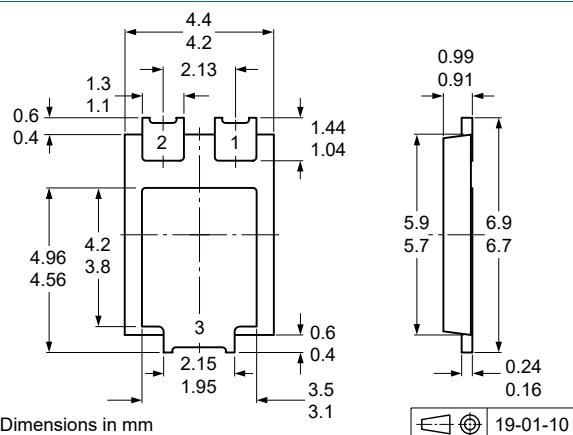


Fig. 15. Package outline CFP15B (SOT1289B)

## 13. Soldering

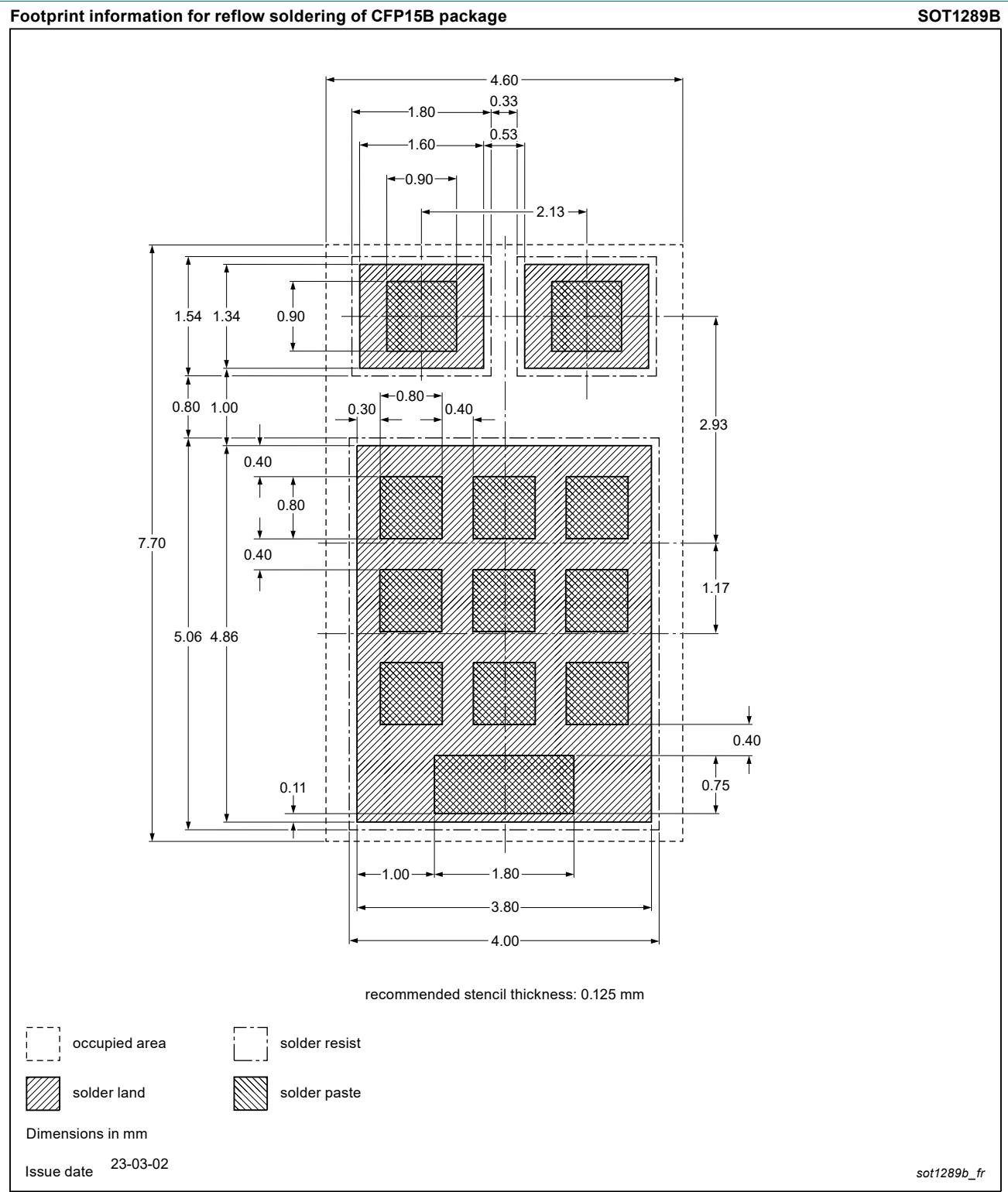


Fig. 16. Reflow soldering footprint for CFP15B (SOT1289B)

## 14. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG045V100EIPE-Q v.2	20240715	Product data sheet	-	PMEG045V100EIPE-Q v.1
Modifications:	<ul style="list-style-type: none"><li>Reflow soldering footprint: Stencil design for solder paste printing changed.</li></ul>			
PMEG045V100EIPE-Q v.1	20220720	Product 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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