



PMEG045T100EPE

45 V, 10 A low VF Trench Schottky barrier rectifier

15 July 2024

Product data sheet

1. General description

Trench Schottky barrier rectifier encapsulated in a CFP15B (SOT1289B) 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: $V_R \leq 45$ V
- Extremely low forward voltage
- High power capability due to clip-bonding technology and heat sink
- Small and thin SMD power plastic package, typical height 0.95 mm

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Freewheeling application
- 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; $T_{sp} \leq 142$ °C	-	-	10	A
V_R	reverse voltage	$T_j = 25$ °C	-	-	45	V
V_F	forward voltage	$I_F = 10$ A; $T_j = 25$ °C; pulsed	[1]	480	545	mV
I_R	reverse current	$V_R = 45$ V; $T_j = 25$ °C; pulsed	[1]	22	80	μ A

[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	 CFP15B (SOT1289B)	 aaa-009063
2	A	anode		
3	K	cathode		

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6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG045T100EPE	CFP15B	plastic, thermal enhanced ultra thin SMD package; 3 leads; 2.13 mm pitch; 5.8 x 4.3 x 0.95 mm body	SOT1289B

7. Marking

Table 4. Marking codes

Type number	Marking code
PMEG045T100EPE	045T 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 °C		-	45	V
I _F	forward current	δ = 1; T _{sp} ≤ 137 °C		-	14	A
I _{F(AV)}	average forward current	δ = 0.5; f = 20 kHz; T _{sp} ≤ 142 °C		-	10	A
I _{FSM}	non-repetitive peak forward current	t _p = 8 ms; square wave; T _{j(init)} = 25 °C		-	130	A
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	1.66	W
			[2]	-	2.15	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 cm².

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 cm².
- [4] Soldering point of cathode tab.

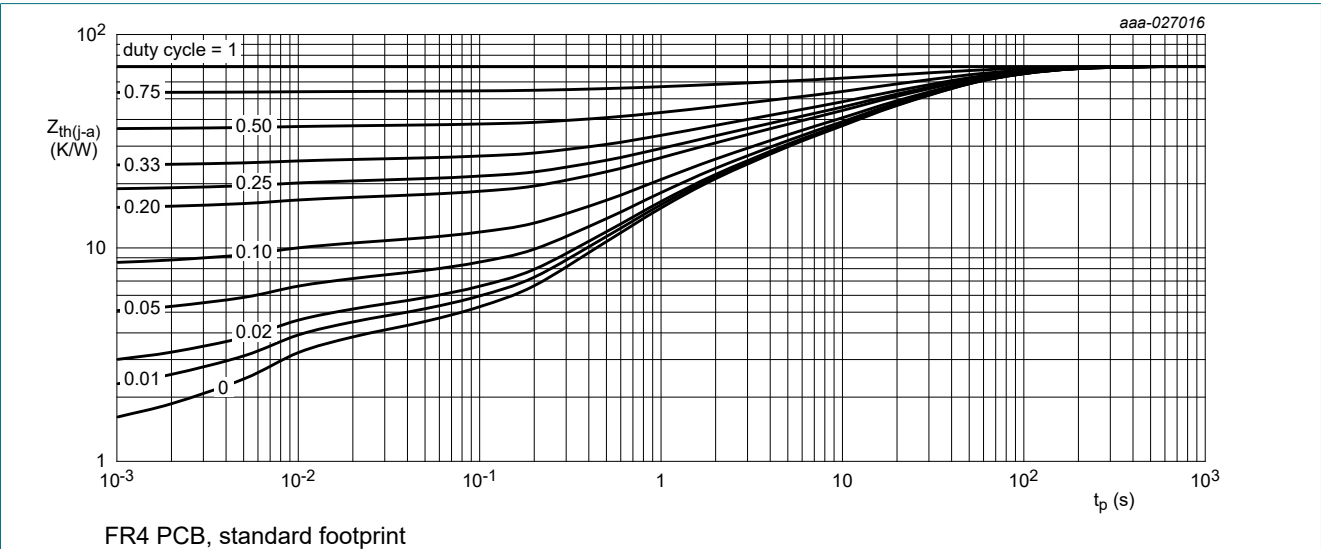


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

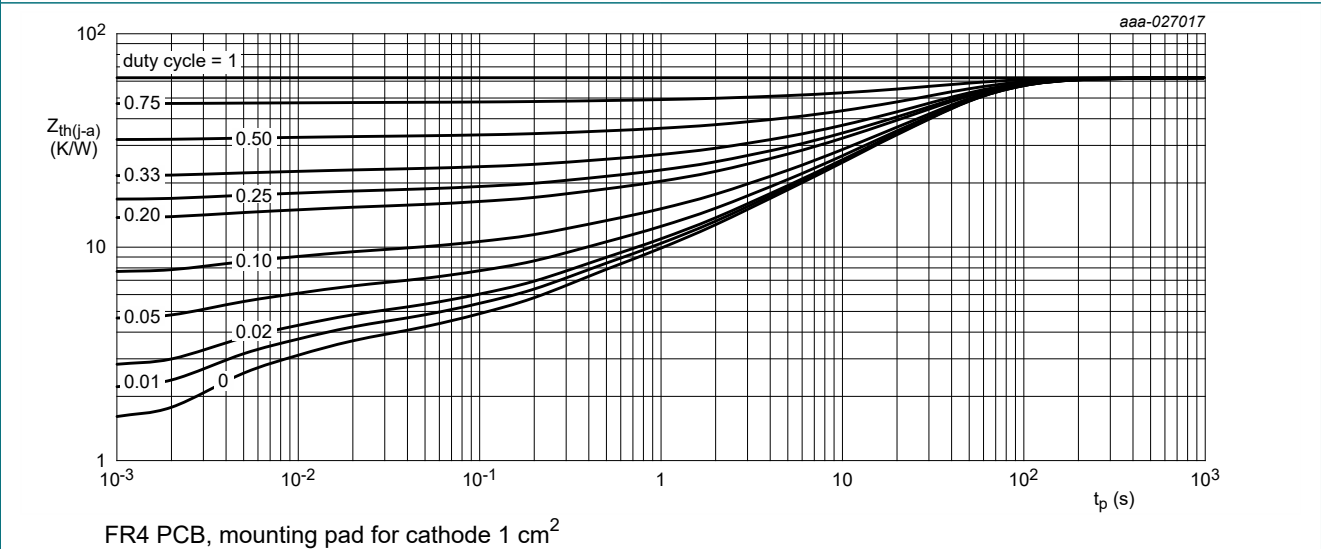


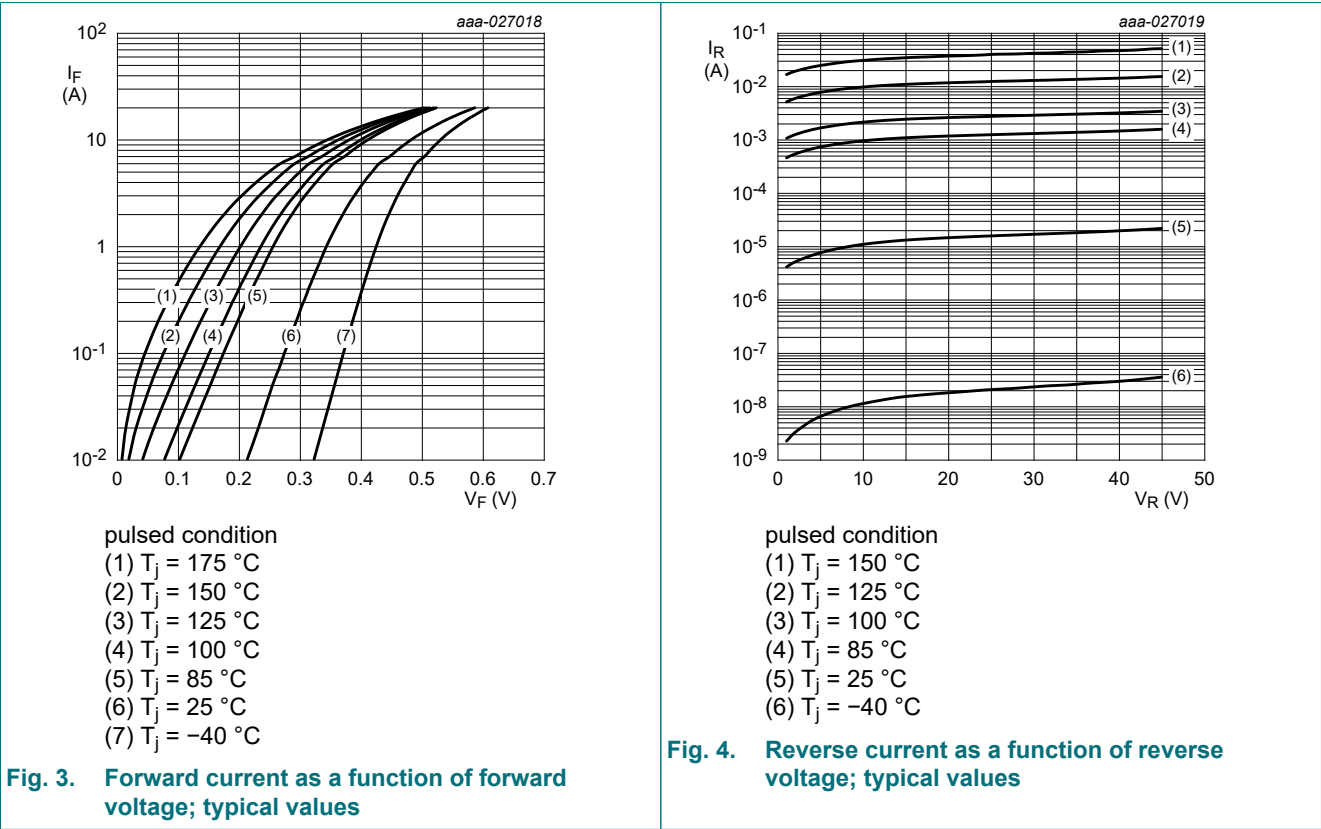
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

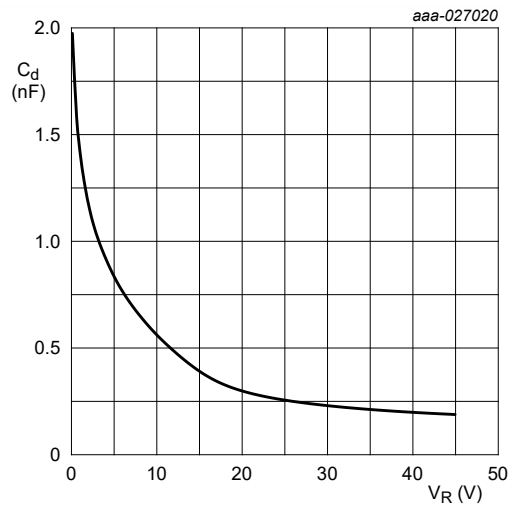
10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 1\text{ mA}$; pulsed; $T_j = 25\text{ }^{\circ}\text{C}$	[1]	45	-	-	V
V_F	forward voltage	$I_F = 0.1\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$; pulsed	[1]	-	275	-	mV
		$I_F = 1\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$; pulsed	[1]	-	340	385	mV
		$I_F = 5\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$; pulsed	[1]	-	415	475	mV
		$I_F = 10\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$; pulsed	[1]	-	480	545	mV
		$I_F = 10\text{ A}$; $T_j = -40\text{ }^{\circ}\text{C}$; pulsed	[1]	-	530	-	mV
		$I_F = 10\text{ A}$; $T_j = 125\text{ }^{\circ}\text{C}$; pulsed	[1]	-	380	-	mV
I_R	reverse current	$V_R = 10\text{ V}$; $T_j = 25\text{ }^{\circ}\text{C}$; pulsed	[1]	-	11	41	μA
		$V_R = 30\text{ V}$; $T_j = 25\text{ }^{\circ}\text{C}$; pulsed	[1]	-	17	-	μA
		$V_R = 45\text{ V}$; $T_j = 25\text{ }^{\circ}\text{C}$; pulsed	[1]	-	22	80	μA
		$V_R = 45\text{ V}$; $T_j = 125\text{ }^{\circ}\text{C}$; pulsed	[1]	-	15	-	mA
C_d	diode capacitance	$V_R = 1\text{ V}$; $f = 1\text{ MHz}$; $T_j = 25\text{ }^{\circ}\text{C}$		-	1.4	-	nF
		$V_R = 10\text{ V}$; $f = 1\text{ MHz}$; $T_j = 25\text{ }^{\circ}\text{C}$		-	0.6	-	nF
t_{rr}	reverse recovery time step recovery	$I_F = 0.5\text{ A}$; $I_R = 0.5\text{ A}$; $I_{R(\text{meas})} = 0.1\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$		-	40	-	ns
	reverse recovery time ramp recovery	$dI_F/dt = 200\text{ A}/\mu\text{s}$; $I_F = 6\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$		-	20	-	ns

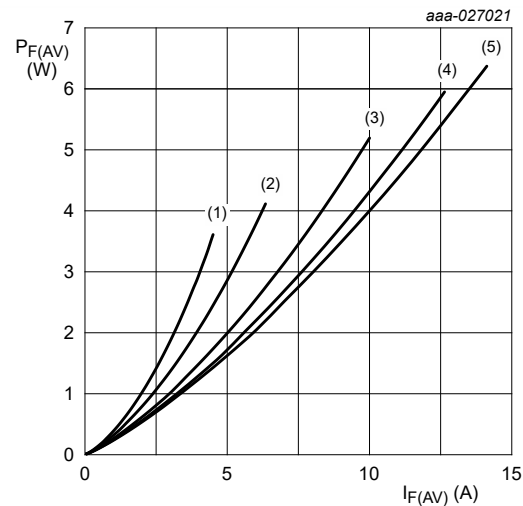
[1] Very short pulse, in order to maintain a stable junction temperature.





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

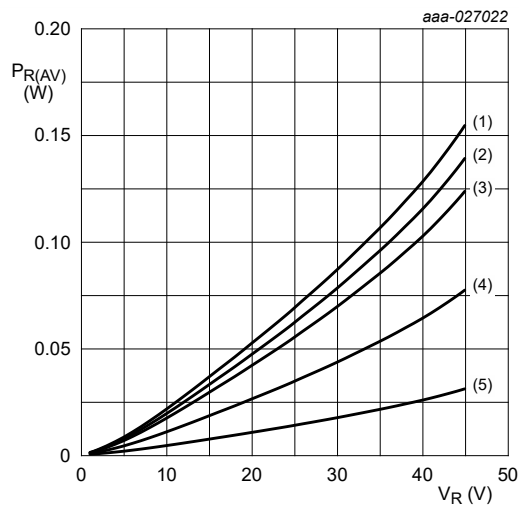
Fig. 5. Diode capacitance as a function of reverse voltage; typical values



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

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

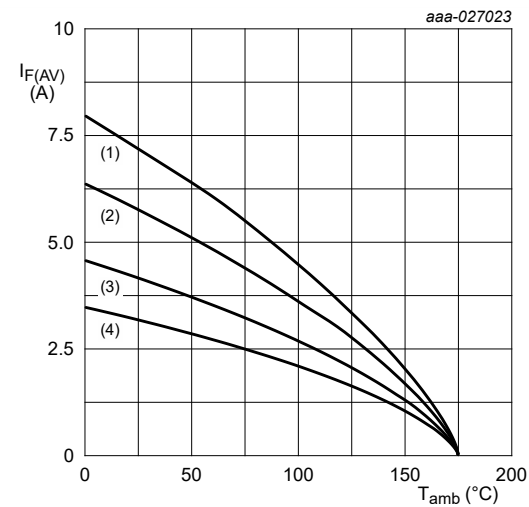
Fig. 6. Average forward power dissipation as a function of average forward current; typical values



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

- (1) $\delta = 1$; DC
- (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

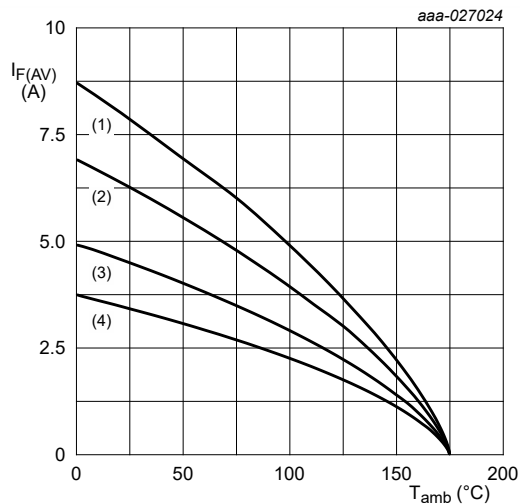


FR4 PCB, standard footprint

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

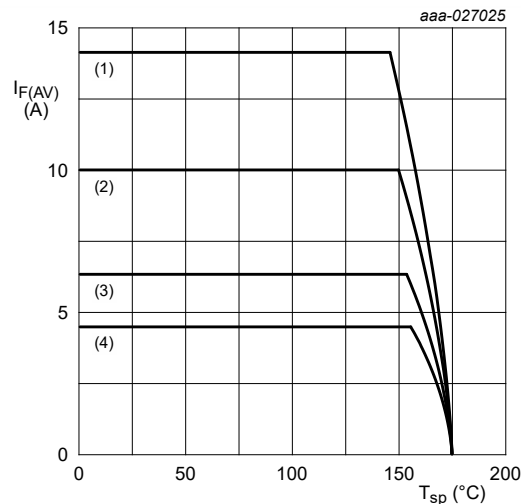
- (1) $\delta = 1$; DC
- (2) $\delta = 0.5$; $f = 20 \text{ kHz}$
- (3) $\delta = 0.2$; $f = 20 \text{ kHz}$
- (4) $\delta = 0.1$; $f = 20 \text{ kHz}$

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



FR4 PCB, mounting pad for cathode 1 cm²
 $T_j = 175$ °C
(1) $\delta = 1$; DC
(2) $\delta = 0.5$; $f = 20$ kHz
(3) $\delta = 0.2$; $f = 20$ kHz
(4) $\delta = 0.1$; $f = 20$ kHz

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



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

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

11. Test information

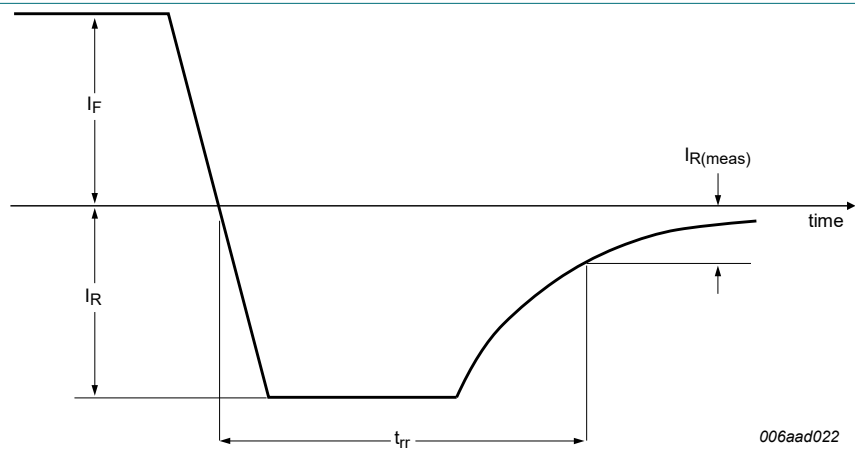


Fig. 11. Reverse recovery definition; step recovery

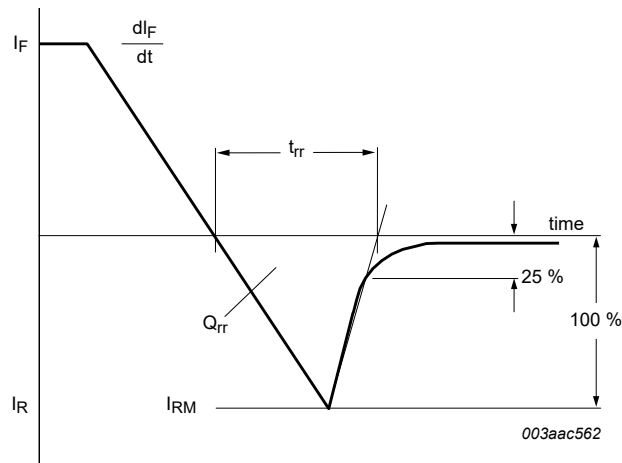


Fig. 12. Reverse recovery definition; ramp recovery

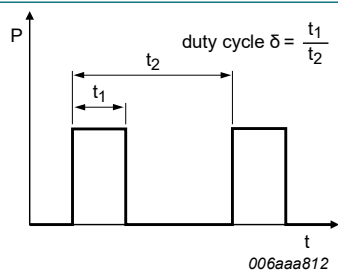


Fig. 13. Duty cycle definition

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,
 $I_{RMS} = I_M \times \sqrt{\delta}$ with I_{RMS} defined as RMS current.

12. Package outline

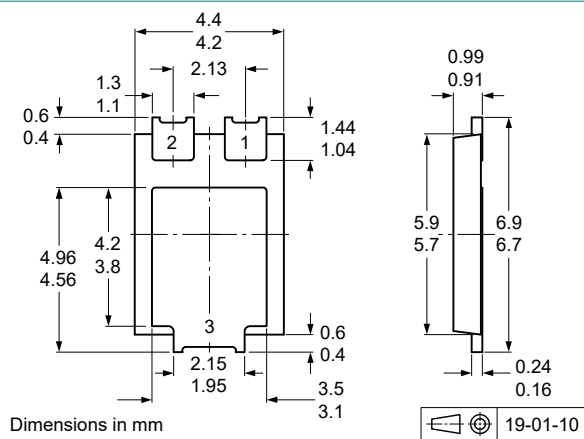
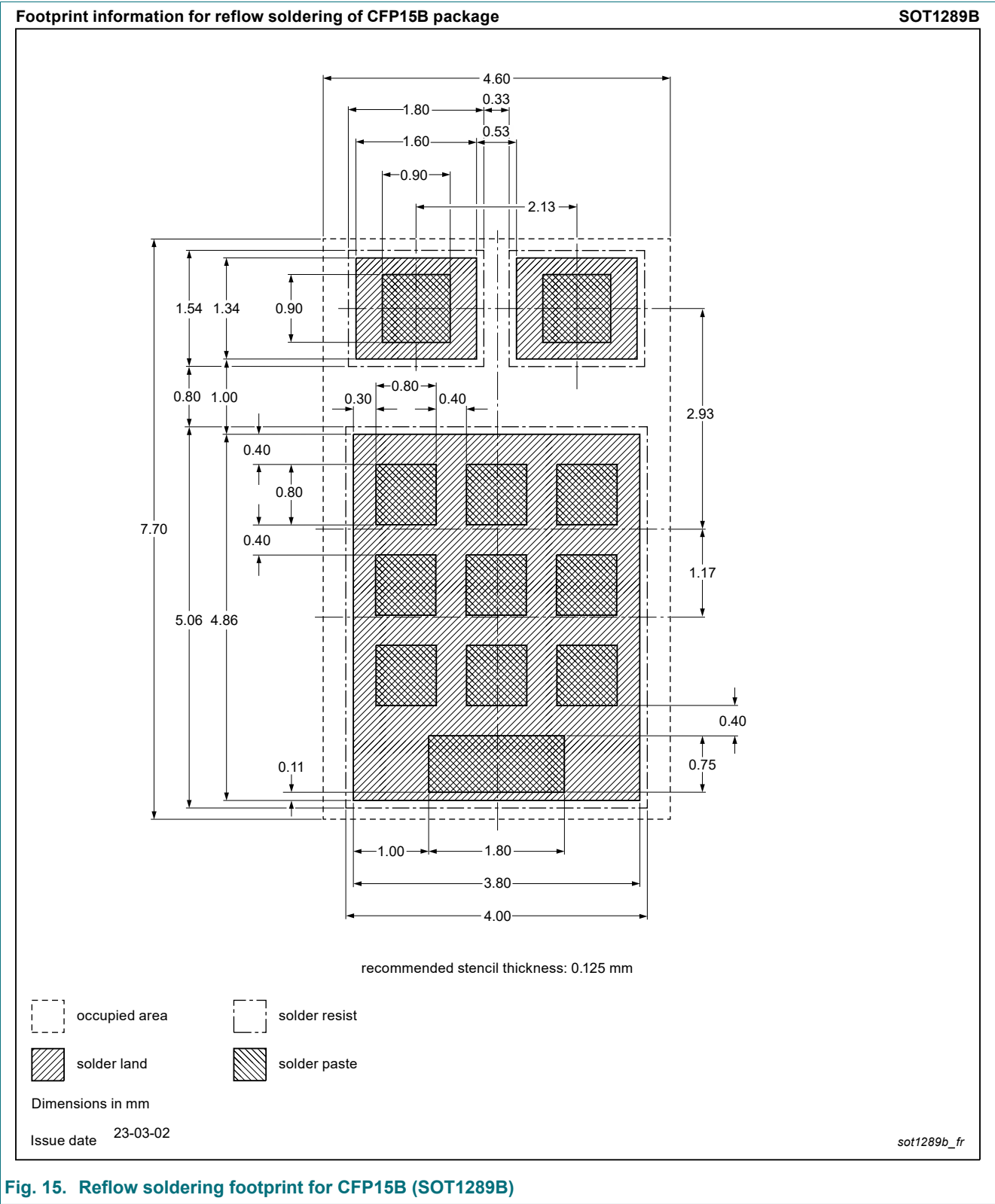


Fig. 14. Package outline CFP15B (SOT1289B)

13. Soldering



14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG045T100EPE v.4	20240715	Product data sheet	-	PMEG045T100EPE v.3
Modifications:	• Reflow soldering footprint: Stencil design for solder paste printing changed.			
PMEG045T100EPE v.3	20230401	Product data sheet	-	PMEG045T100EPE v.2
PMEG045T100EPE v.2	20200624	Product data sheet	-	PMEG045T100EPE v.1
PMEG045T100EPE v.1	20200203	Objective 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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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