



PMEG060T040CLPE-Q

60 V, 2 x 2 A dual common cathode low leakage current
Trench Schottky barrier rectifier

15 July 2024

Product data sheet

1. General description

Trench dual Schottky barrier rectifier in common cathode configuration encapsulated in a CFP15B (SOT1289B) power and flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Reverse voltage: $V_R \leq 60$ V
- Forward current: $I_F \leq 2$ A (per diode)
- Low forward voltage
- Low leakage current due to Trench Schottky technology
- Power and flat lead SMD plastic package
- Package height typical 0.95 mm
- High power capability due to clip-bond technology
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Reverse polarity protection
- Low power consumption applications
- Freewheeling applications

4. Quick reference data

Table 1. Quick reference data

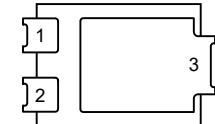
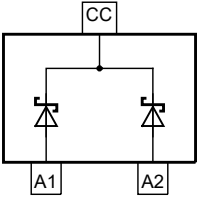
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode (unless otherwise specified)							
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $f = 20$ kHz; square wave; $T_{sp} \leq 170$ °C		-	-	2	A
V_R	reverse voltage	$T_j = 25$ °C		-	-	60	V
V_F	forward voltage	$I_F = 2$ A; $T_j = 25$ °C	[1]	-	555	620	mV
I_R	reverse current	$V_R = 10$ V; $T_j = 25$ °C	[1]	-	0.08	0.6	µA
		$V_R = 60$ V; $T_j = 25$ °C	[1]	-	0.18	1.2	µA

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

60 V, 2 x 2 A dual common cathode low leakage current Trench Schottky barrier rectifier

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode (diode 1)	 CFP15B (SOT1289B)	 006aab034
2	A2	anode (diode 2)		
3	CC	common cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG060T040CLPE-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	SOT1289B

7. Marking

Table 4. Marking codes

Type number	Marking code
PMEG060T040CLPE-Q	060T L04C

8. Limiting values

Table 5. Limiting values
In accordance with the Absolute Maximum Rating System (IEC60134)

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode (unless otherwise specified)						
V _R	reverse voltage	T _j = 25 °C		-	60	V
I _F	forward current	δ = 1; T _{sp} ≤ 165 °C		-	2.83	A
I _{F(AV)}	average forward current	δ = 0.5; f = 20 kHz; square wave; T _{sp} ≤ 170 °C		-	2	A
I _{FSM}	non-repetitive peak forward current	t _p = 8.3 ms; half sine wave; T _{j(init)} = 25 °C		-	60	A
		t _p = 8.3 ms; half sine wave; per device; T _{j(init)} = 25 °C		-	110	A
Per device, one diode loaded						
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 Printed-Circuit Board (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
Per device, one diode loaded							
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]	-	-	7	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.

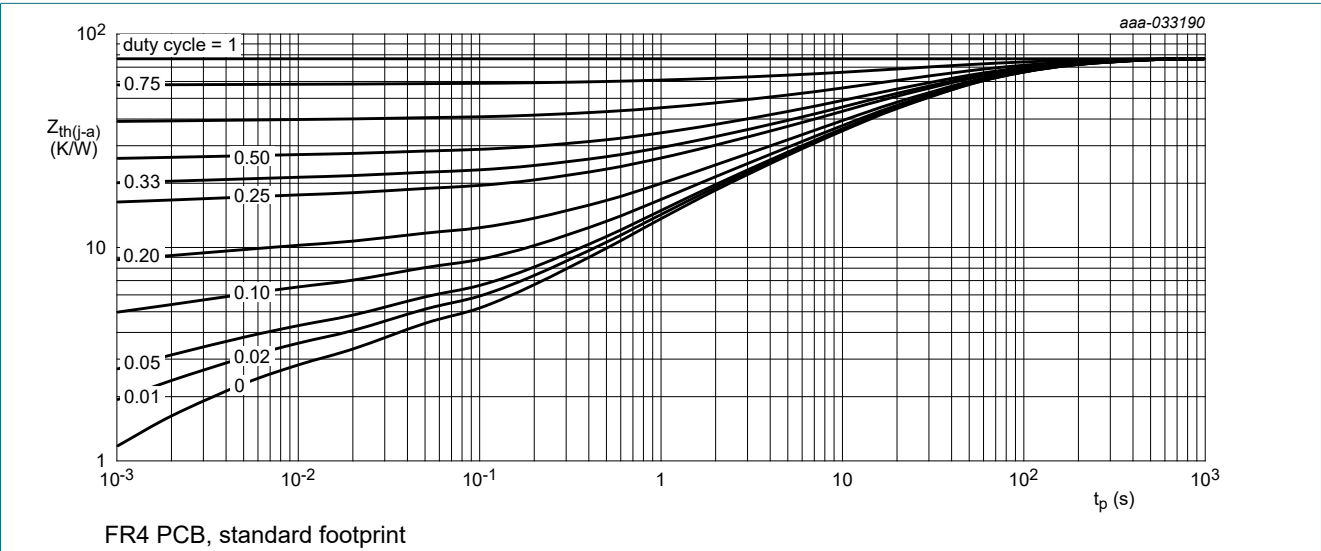


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

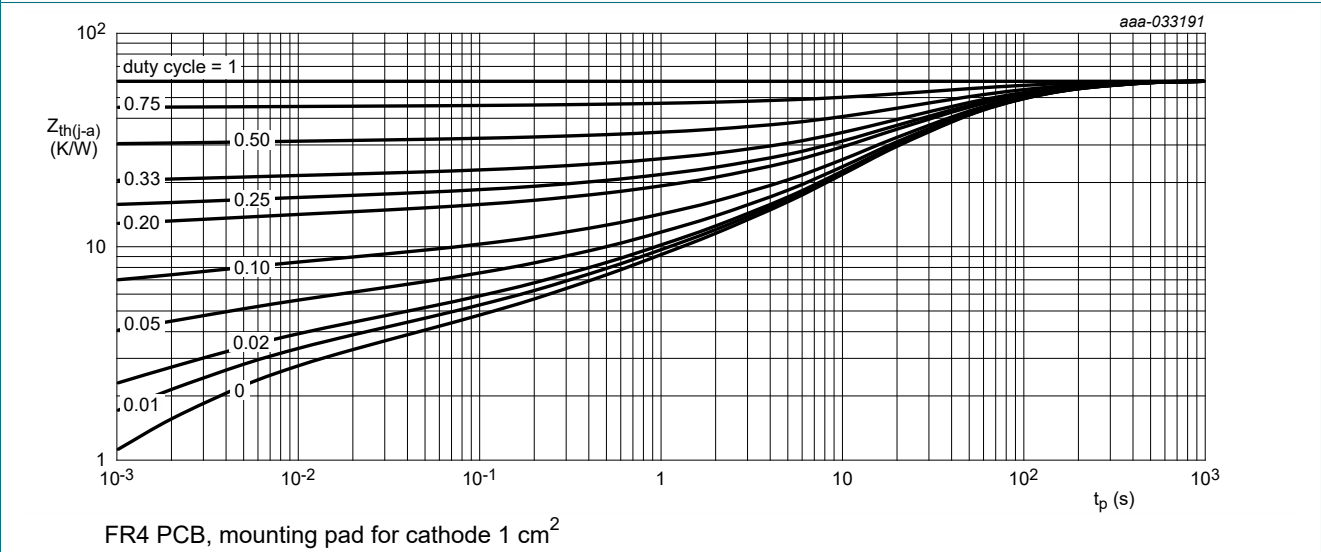


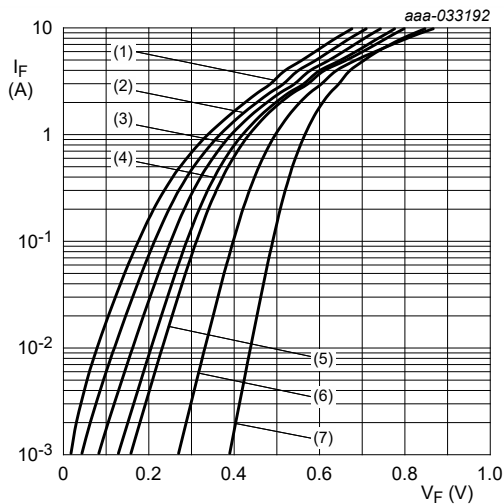
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

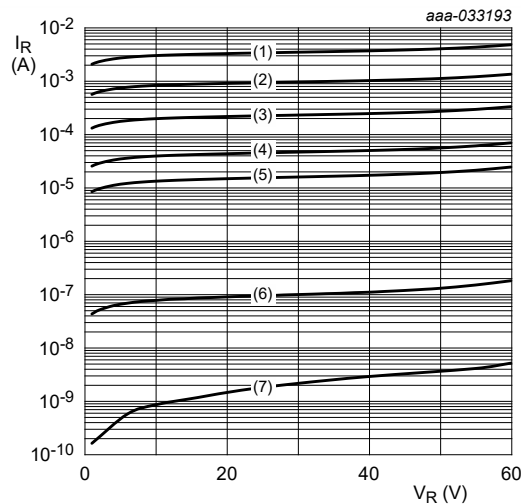
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode (unless otherwise specified)							
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 1\text{ mA}$; $T_j = 25\text{ °C}$	[1]	60	-	-	V
V_F	forward voltage	$I_F = 0.1\text{ A}$; $T_j = 25\text{ °C}$	[1]	-	400	460	mV
		$I_F = 0.5\text{ A}$; $T_j = 25\text{ °C}$	[1]	-	460	520	mV
		$I_F = 1\text{ A}$; $T_j = 25\text{ °C}$	[1]	-	500	560	mV
		$I_F = 2\text{ A}$; $T_j = 25\text{ °C}$	[1]	-	555	620	mV
		$I_F = 2\text{ A}$; $T_j = -40\text{ °C}$	[1]	-	610	680	mV
		$I_F = 2\text{ A}$; $T_j = 125\text{ °C}$	[1]	-	480	570	mV
I_R	reverse current	$V_R = 10\text{ V}$; $T_j = 25\text{ °C}$	[1]	-	0.08	0.6	μA
		$V_R = 40\text{ V}$; $T_j = 25\text{ °C}$	[1]	-	0.12	0.8	μA
		$V_R = 60\text{ V}$; $T_j = 25\text{ °C}$	[1]	-	0.18	1.2	μA
		$V_R = 60\text{ V}$; $T_j = 125\text{ °C}$	[1]	-	0.3	2	mA
C_d	diode capacitance	$V_R = 1\text{ V}$; $f = 1\text{ MHz}$; $T_j = 25\text{ °C}$		-	350	-	pF
		$V_R = 10\text{ V}$; $f = 1\text{ MHz}$; $T_j = 25\text{ °C}$		-	120	-	pF
t_{rr}	reverse recovery time step recovery	$I_F = 0.5\text{ A}$; $I_R = 0.5\text{ A}$; $I_{R(meas)} = 0.1\text{ A}$; $T_j = 25\text{ °C}$		-	12	-	ns
	reverse recovery time ramp recovery	$dI_F/dt = 200\text{ A/μs}$; $I_F = 6\text{ A}$; $V_R = 26\text{ V}$; $T_j = 25\text{ °C}$		-	10	-	ns
V_{FRM}	peak forward recovery voltage	$I_F = 0.5\text{ A}$; $dI_F/dt = 20\text{ A/μs}$; $T_j = 25\text{ °C}$		-	500	-	mV

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



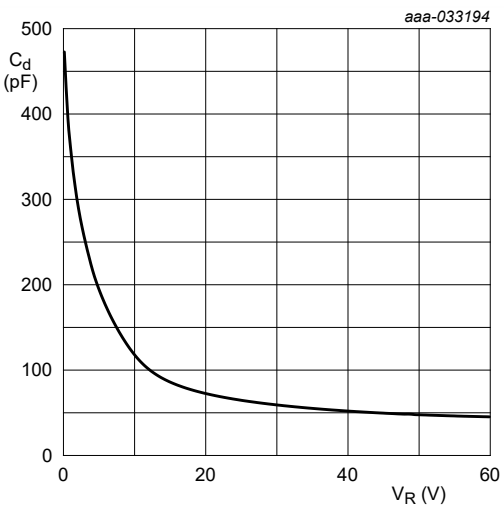
pulsed condition
(1) $T_j = 175\text{ °C}$
(2) $T_j = 150\text{ °C}$
(3) $T_j = 125\text{ °C}$
(4) $T_j = 100\text{ °C}$
(5) $T_j = 85\text{ °C}$
(6) $T_j = 25\text{ °C}$
(7) $T_j = -40\text{ °C}$

Fig. 3. Forward current as a function of forward voltage; typical values



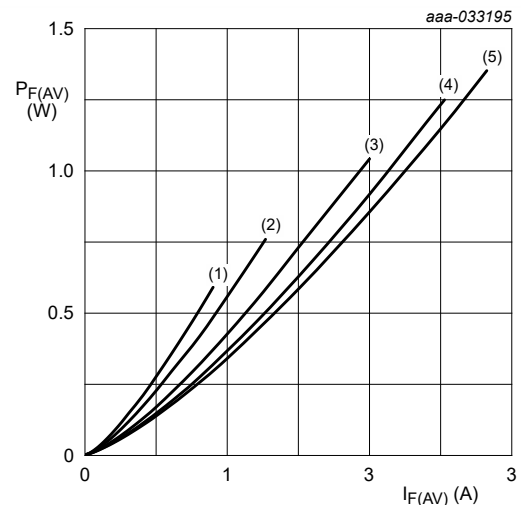
pulsed condition
(1) $T_j = 175\text{ °C}$
(2) $T_j = 150\text{ °C}$
(3) $T_j = 125\text{ °C}$
(4) $T_j = 100\text{ °C}$
(5) $T_j = 85\text{ °C}$
(6) $T_j = 25\text{ °C}$
(7) $T_j = -40\text{ °C}$

Fig. 4. Reverse current as a function of reverse voltage; typical values



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

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



$T_j = 100\text{ °C}$
(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

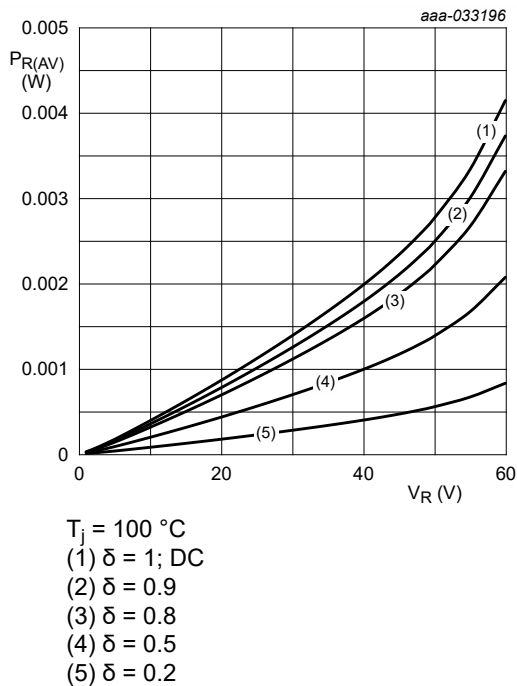


Fig. 7. Average reverse power dissipation as a function of reverse voltage; typical values

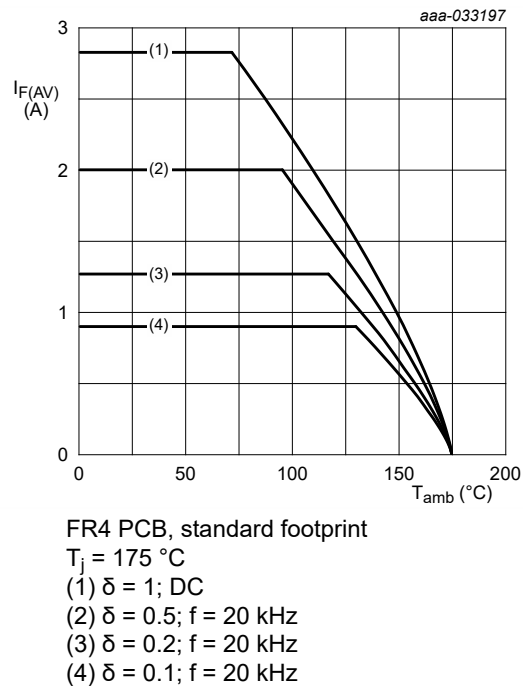


Fig. 8. Average forward current as a function of ambient temperature; typical values

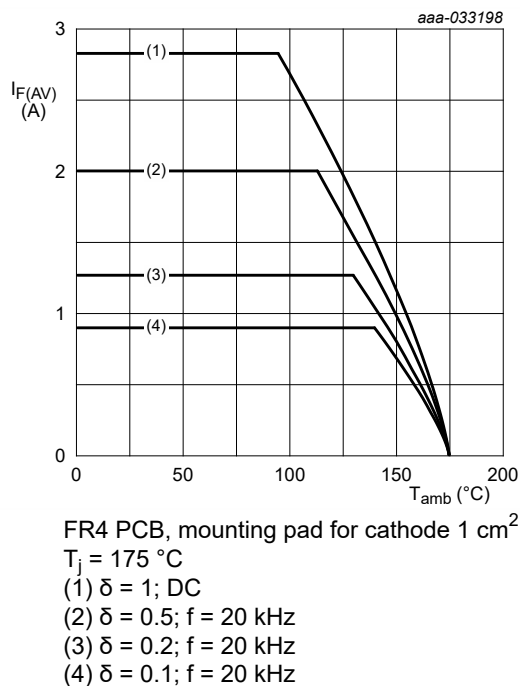


Fig. 9. Average forward current as a function of ambient temperature; typical values

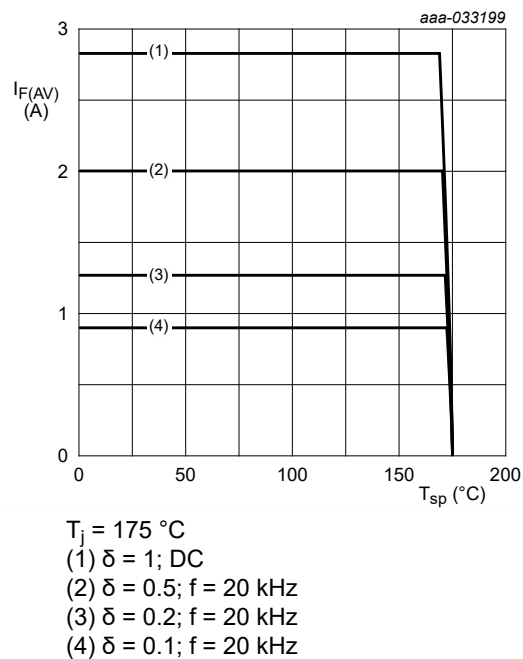


Fig. 10. Average forward current as a function of solder point temperature; typical values

60 V, 2 x 2 A dual common cathode low leakage current Trench Schottky barrier rectifier

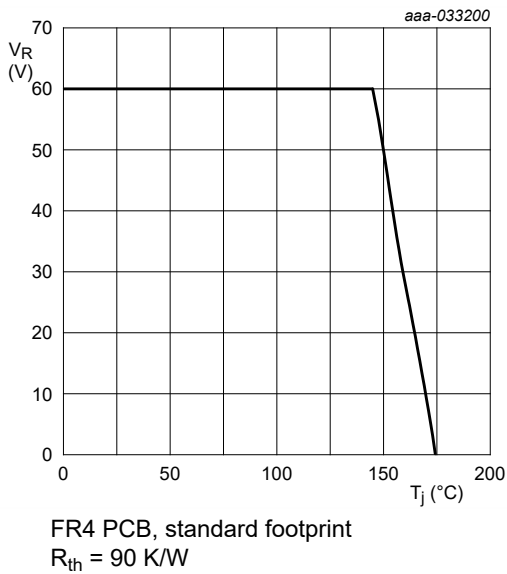


Fig. 11. Derated maximum reverse voltage as a function of junction temperature; typical values

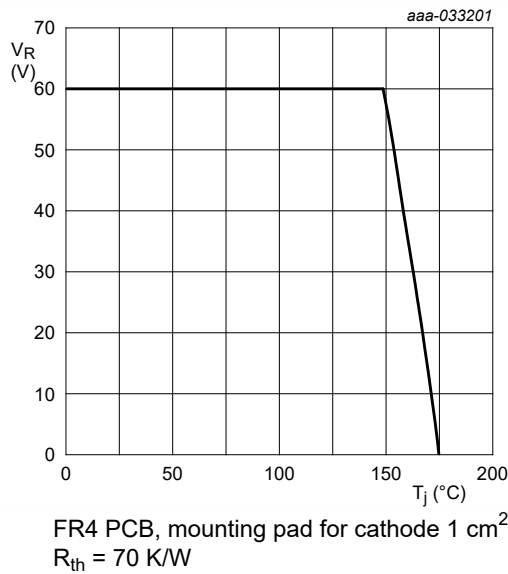


Fig. 12. Derated maximum reverse voltage as a function of junction temperature; typical values

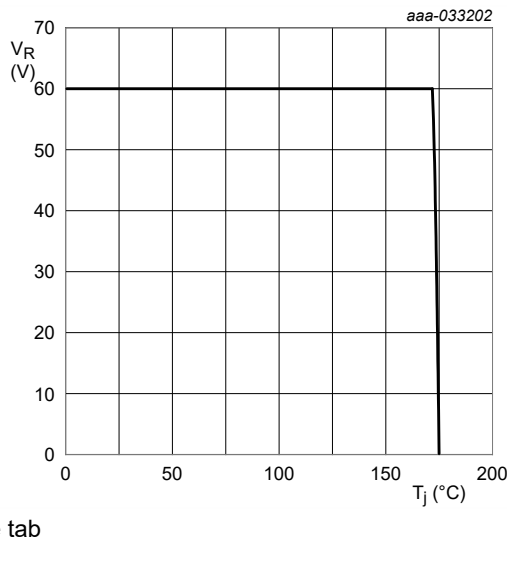
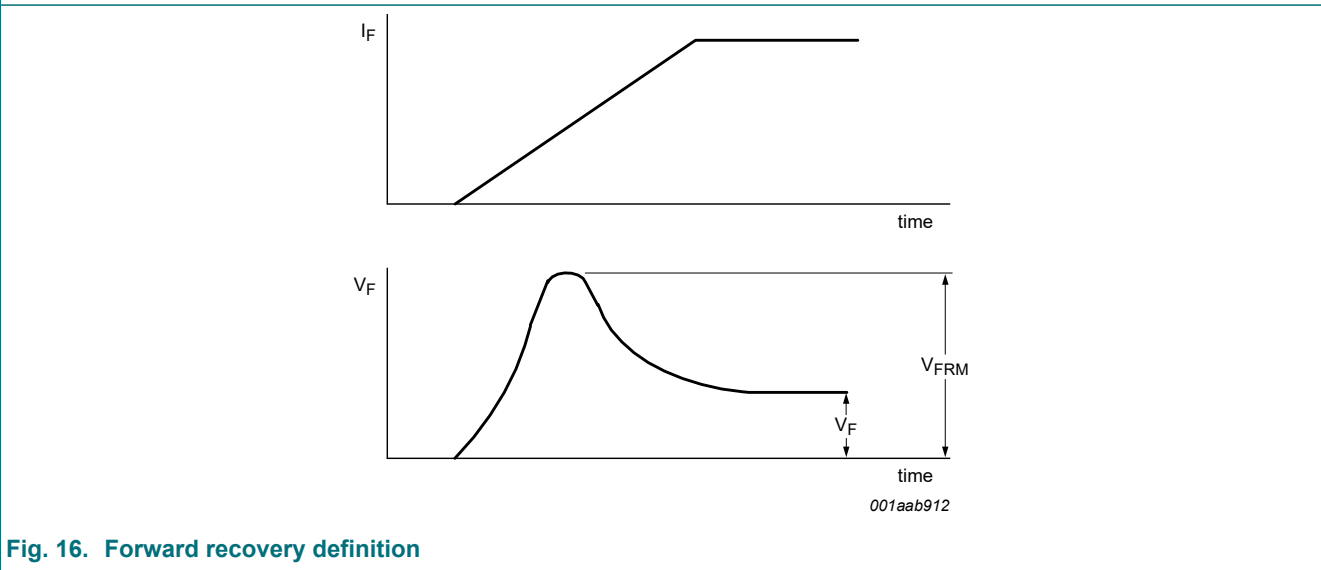
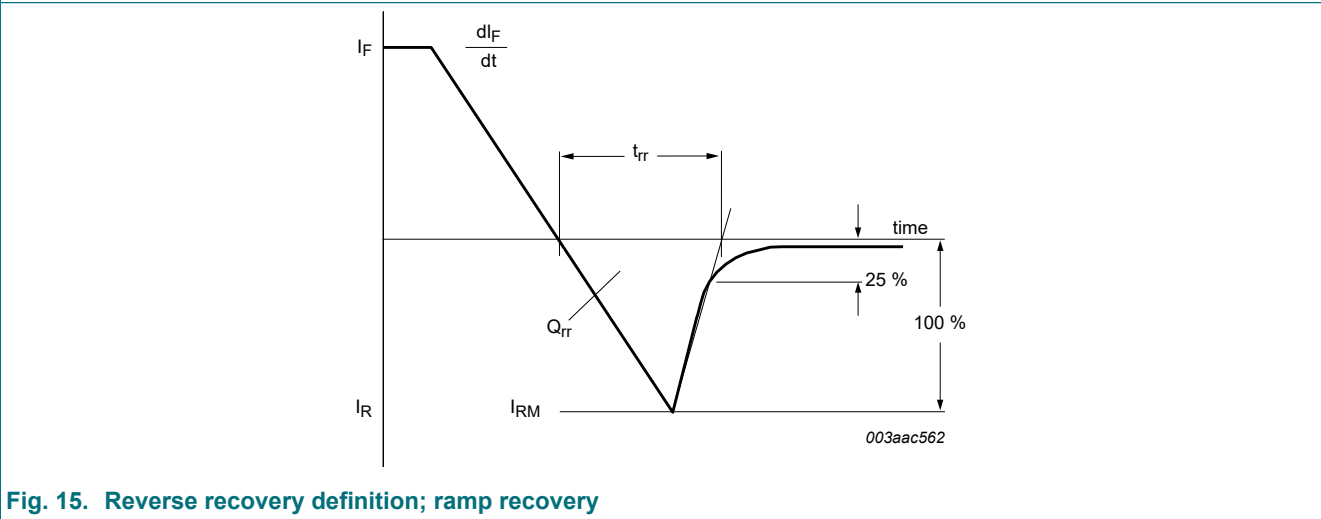
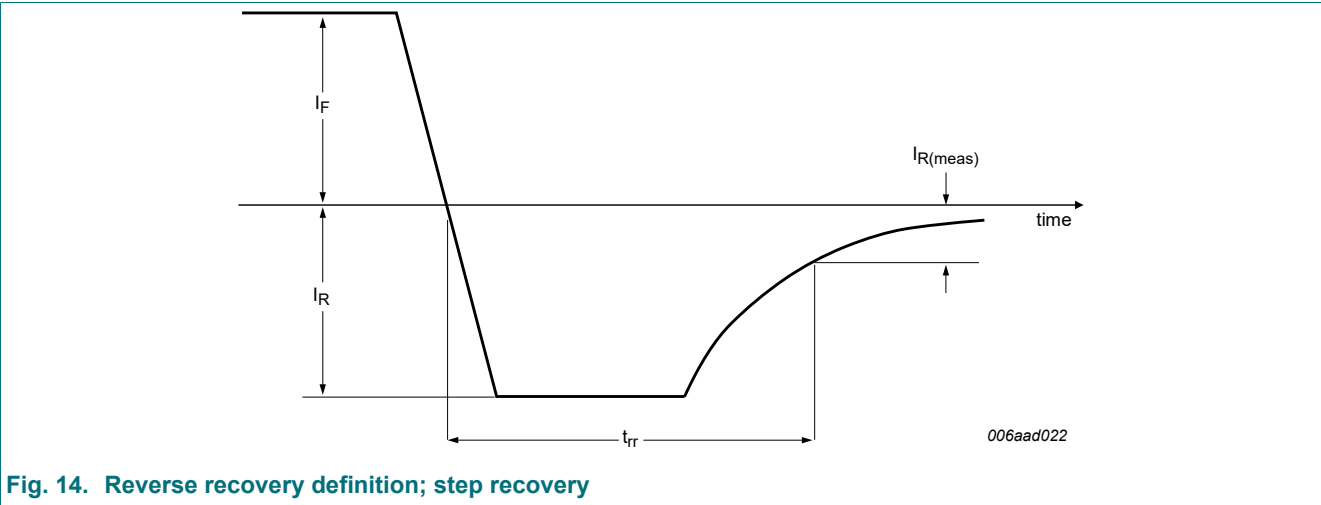


Fig. 13. Derated maximum reverse voltage as a function of junction temperature; typical values

11. Test information



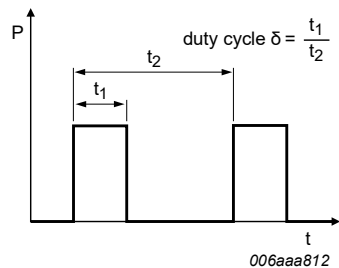


Fig. 17. Duty cycle definition

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

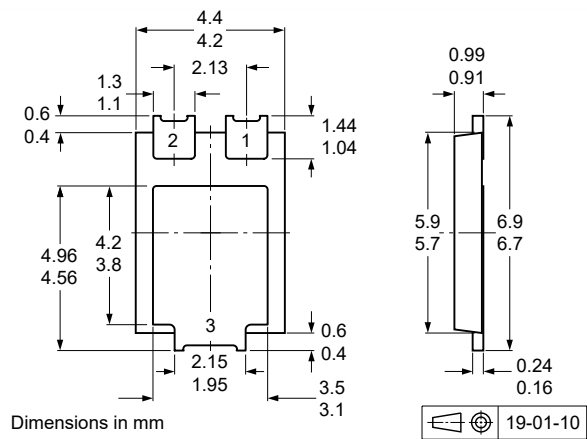
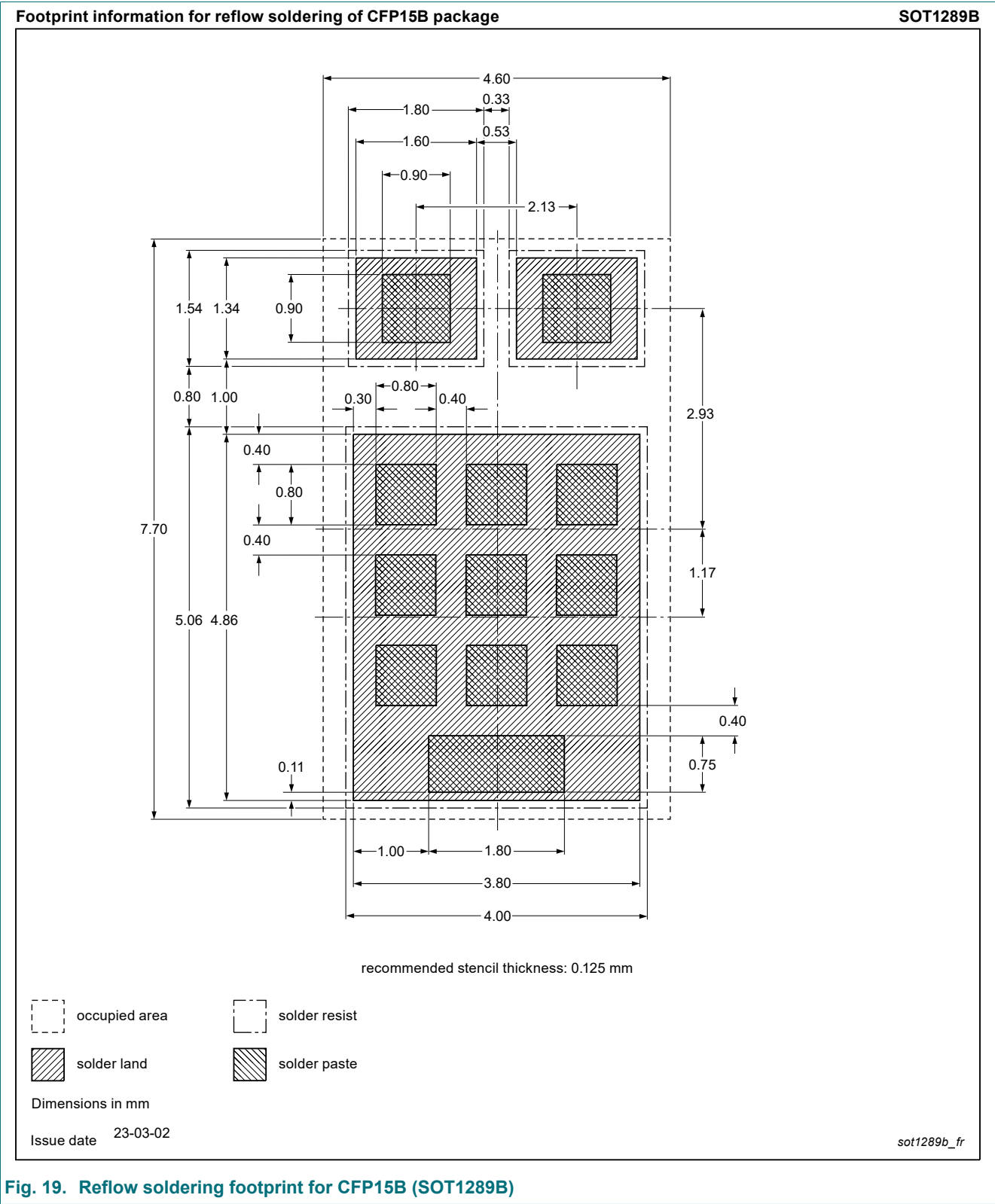


Fig. 18. Package outline CFP15B (SOT1289B)

13. Soldering



14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG060T040CLPE-Q v.4	20240715	Product data sheet	-	PMEG060T040CLPE-Q v.3
Modifications:	• Reflow soldering footprint: Stencil design for solder paste printing changed.			
PMEG060T040CLPE-Q v.3	20220623	Product data sheet	-	PMEG060T040CLPE-Q v.2
PMEG060T040CLPE-Q v.2	20210507	Product data sheet	-	PMEG060T040CLPE-Q v.1
PMEG060T040CLPE-Q v.1	20210329	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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Contents

1. General description..... 1

2. Features and benefits..... 1

3. Applications..... 1

4. Quick reference data..... 1

5. Pinning information.....2

6. Ordering information.....2

7. Marking.....2

8. Limiting values..... 3

9. Thermal characteristics..... 4

10. Characteristics..... 5

11. Test information..... 9

12. Package outline..... 10

13. Soldering..... 11

14. Revision history.....12

15. Legal information.....13

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