



# MJPE2873

50 V, 2 A NPN high power bipolar transistor

22 April 2025

Product data sheet

## 1. General description

NPN high power bipolar transistor in a power SOT1289B (CFP15B) flat lead Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- High thermal power dissipation capability
- High energy efficiency due to less heat generation
- Electrically similar to popular MJD2873 series
- Low collector emitter saturation voltage

## 3. Applications

- Power management
- Load switch
- Linear mode voltage regulator
- Constant current drive backlighting application
- Motor drive
- Relay replacement

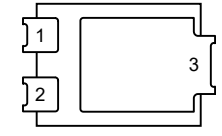
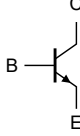
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base	-	-	50	V
$I_C$	collector current		-	-	2	A
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1$ ms	-	-	3	A
$h_{FE}$	DC current gain	$V_{CE} = 2$ V; $I_C = 0.5$ A; pulsed; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_{amb} = 25$ °C	120	-	360	
		$V_{CE} = 2$ V; $I_C = 2$ A; pulsed; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_{amb} = 25$ °C	40	-	-	

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E	emitter	 <p>CFP15B (SOT1289B)</p>	 <p>sym123</p>
2	B	base		
3	C	collector		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">MJPE2873</a>	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
MJPE2873	MJPE2873

## 8. Limiting values

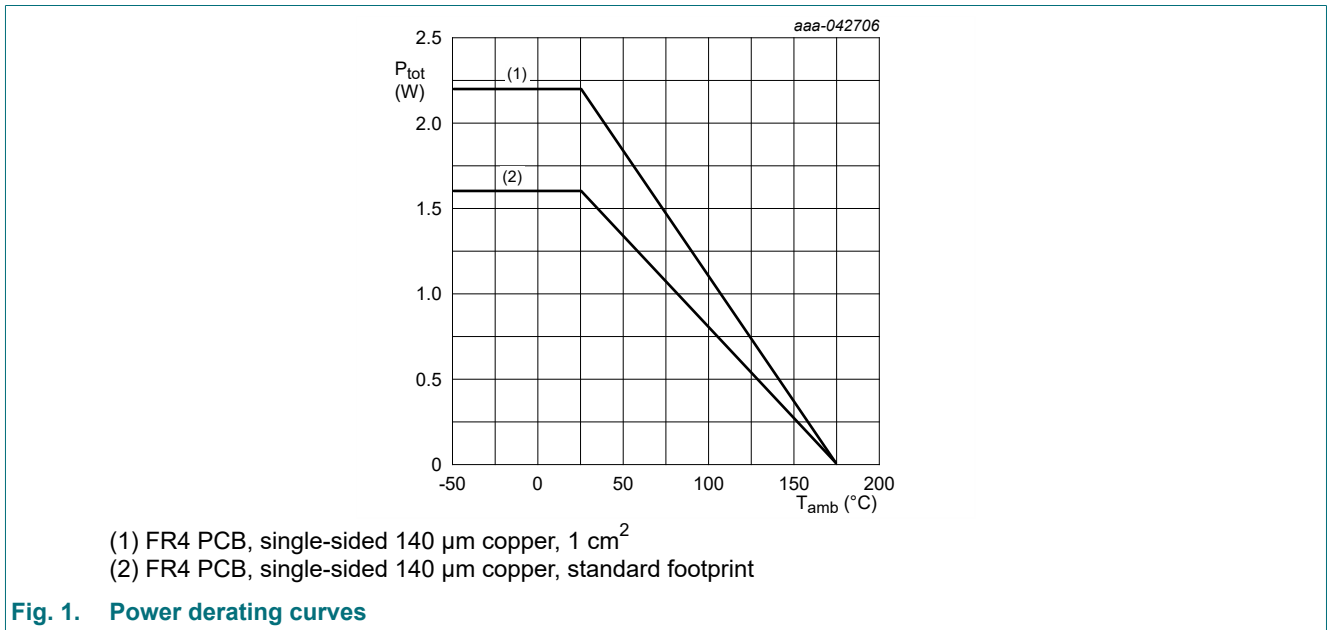
**Table 5. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base	-	50	V
$V_{EBO}$	emitter-base voltage	open collector	-	6	V
$I_C$	collector current		-	2	A
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1$ ms	-	3	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	[1]	1.6	W
		$T_{amb} \leq 25$ °C	[2]	2.2	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), 140  $\mu$ m single-sided copper, standard footprint.

[2] Device mounted on an FR4 Printed-Circuit Board (PCB), 140  $\mu$ m single-sided copper, mounting pad for collector 1 cm<sup>2</sup>.



## 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]	-	-	94	K/W
			[2]	-	-	69	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	4.5	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), 140  $\mu\text{m}$  single-sided copper, standard footprint.

[2] Device mounted on an FR4 Printed-Circuit Board (PCB), 140  $\mu\text{m}$  single-sided copper, mounting pad for collector 1  $\text{cm}^2$ .

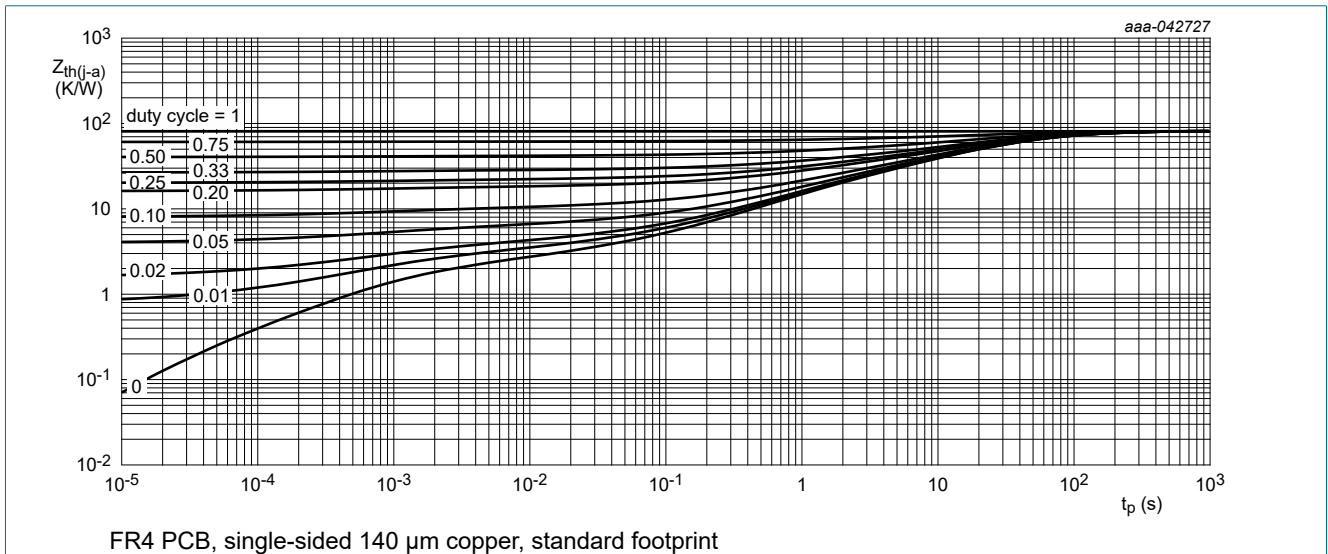


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

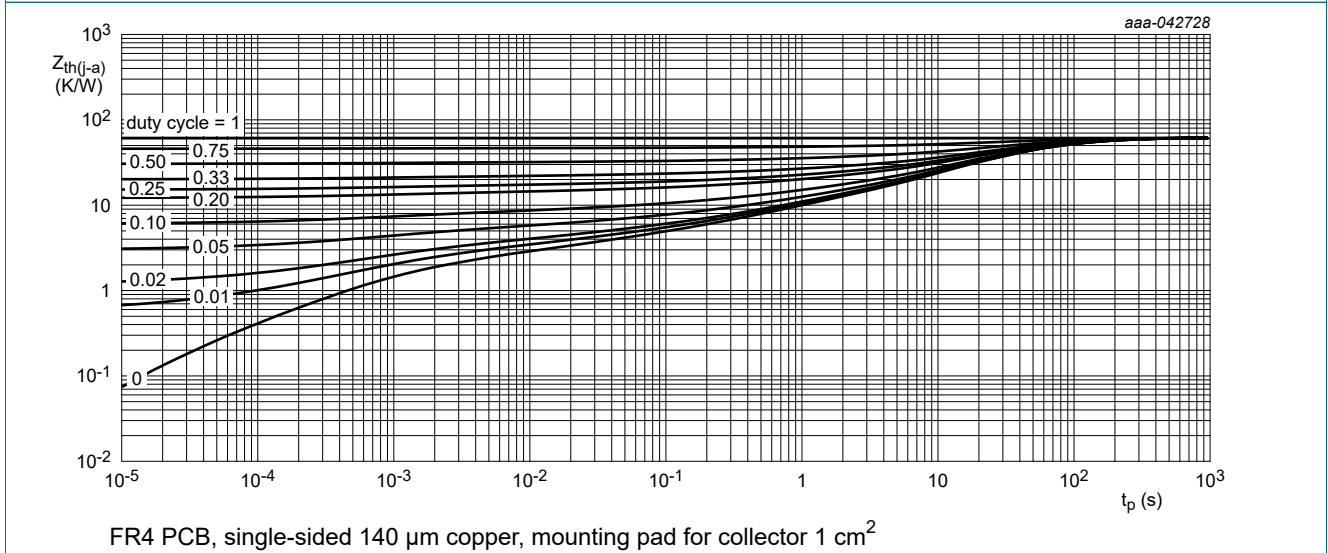
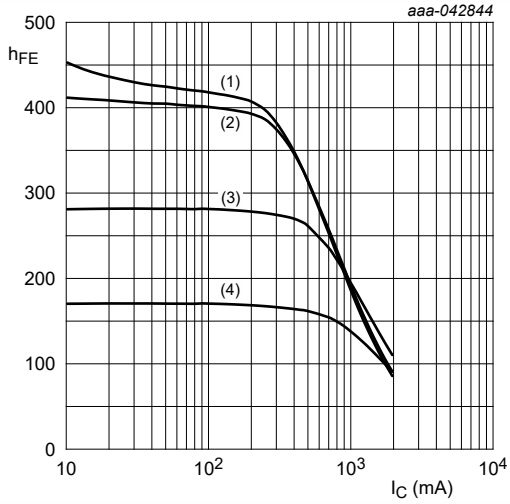


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

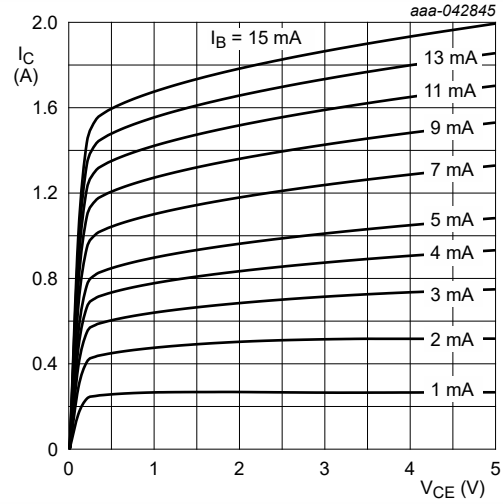
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = 2 \text{ mA}; I_B = 0 \text{ A}; T_{amb} = 25 \text{ }^\circ\text{C}$	50	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_C = 0 \text{ A}; I_E = 100 \text{ } \mu\text{A}; T_{amb} = 25 \text{ }^\circ\text{C}$	6	-	-	V
$I_{CES}$	collector-emitter cut-off current	$V_{CE} = 50 \text{ V}; V_{BE} = 0 \text{ V}; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	100	nA
		$V_{CE} = 50 \text{ V}; V_{BE} = 0 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5 \text{ V}; I_C = 0 \text{ A}; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 2 \text{ V}; I_C = 0.5 \text{ A}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^\circ\text{C}$	120	-	360	
		$V_{CE} = 1.6 \text{ V}; I_C = 0.75 \text{ A}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^\circ\text{C}$	80	-	360	
		$V_{CE} = 2 \text{ V}; I_C = 2 \text{ A}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^\circ\text{C}$	40	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 1 \text{ A}; I_B = 50 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	0.3	V
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 1 \text{ A}; I_B = 50 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02$	-	-	1.2	V
$V_{BE}$	base-emitter voltage	$V_{CE} = 2 \text{ V}; I_C = 1 \text{ A}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	1.2	V
		$V_{CE} = 1.6 \text{ V}; I_C = 0.75 \text{ mA}; \text{pulsed}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	0.95	mV
$h_{fe}$	small-signal current gain	$V_{CE} = 10 \text{ V}; I_C = 500 \text{ mA}; f = 1 \text{ kHz}; T_{amb} = 25 \text{ }^\circ\text{C}$	20	-	-	
$C_c$	collector capacitance	$V_{CB} = 10 \text{ V}; I_E = 0 \text{ A}; i_e = 0 \text{ A}; f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^\circ\text{C}$	-	20	80	pF
$f_T$	transition frequency	$V_{CE} = 10 \text{ V}; I_C = 100 \text{ mA}; f = 100 \text{ MHz}; T_{amb} = 25 \text{ }^\circ\text{C}$	65	130	-	MHz



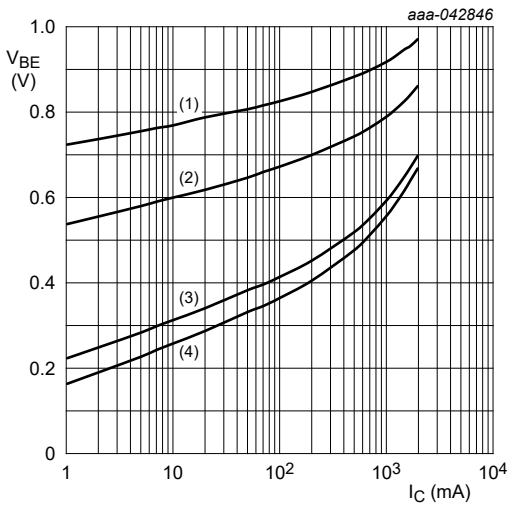
$V_{CE} = 2\text{ V}$   
 (1)  $T_{amb} = 175\text{ °C}$   
 (2)  $T_{amb} = 150\text{ °C}$   
 (3)  $T_{amb} = 25\text{ °C}$   
 (4)  $T_{amb} = -55\text{ °C}$

Fig. 4. DC current gain as a function of collector current; typical values



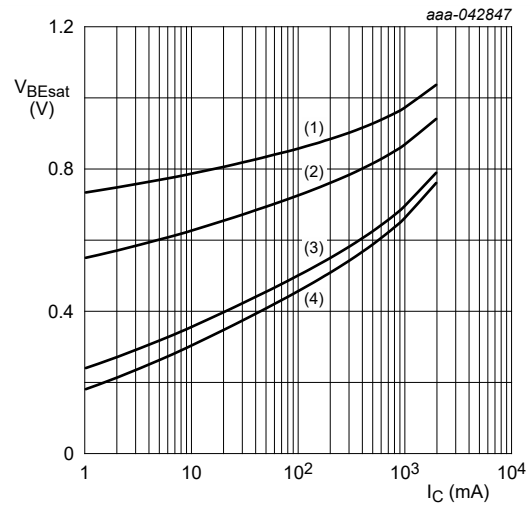
$T_{amb} = 25\text{ °C}$

Fig. 5. Collector current as a function of collector-emitter voltage; typical values



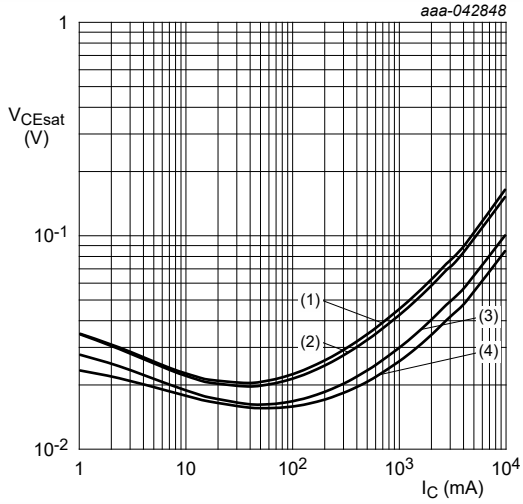
$V_{CE} = 2\text{ V}$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$   
 (4)  $T_{amb} = 175\text{ °C}$

Fig. 6. Base-emitter voltage as a function of collector current; typical values



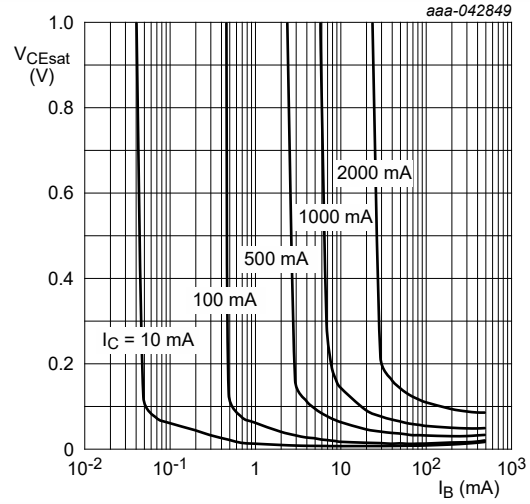
$I_C/I_B = 20$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$   
 (4)  $T_{amb} = 175\text{ °C}$

Fig. 7. Base-emitter saturation voltage as a function of collector current; typical values



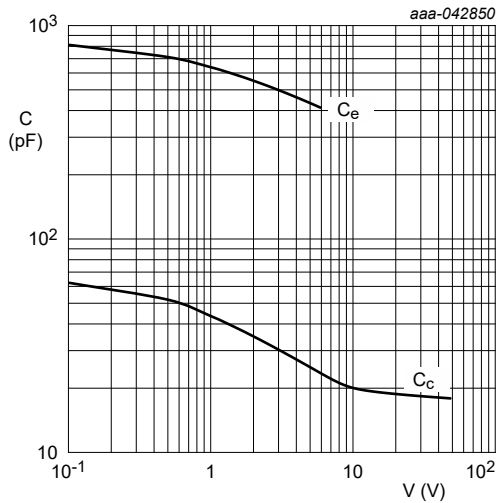
$I_C/I_B = 20$   
 (1)  $T_{amb} = 175^\circ\text{C}$   
 (2)  $T_{amb} = 150^\circ\text{C}$   
 (3)  $T_{amb} = 25^\circ\text{C}$   
 (4)  $T_{amb} = -55^\circ\text{C}$

**Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values**



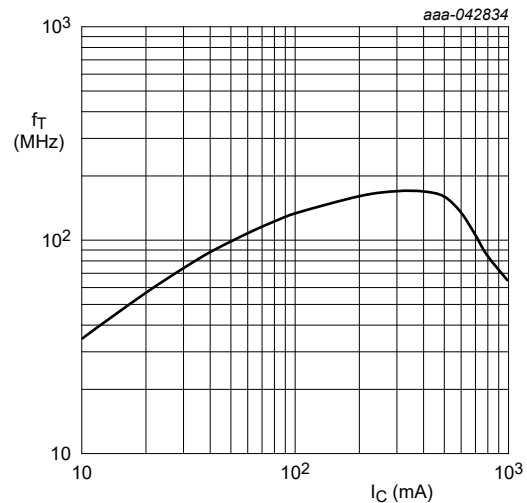
$T_{amb} = 25^\circ\text{C}$

**Fig. 9. Collector-emitter saturation region as a function of base current; typical values**



$T_{amb} = 25^\circ\text{C}$

**Fig. 10. Input/output capacitance as a function of input/output voltage**



$V_{CE} = 10\text{ V}$   
 $T_{amb} = 25^\circ\text{C}$

**Fig. 11. Transition frequency as a function of collector current; typical values**

## 11. Package outline

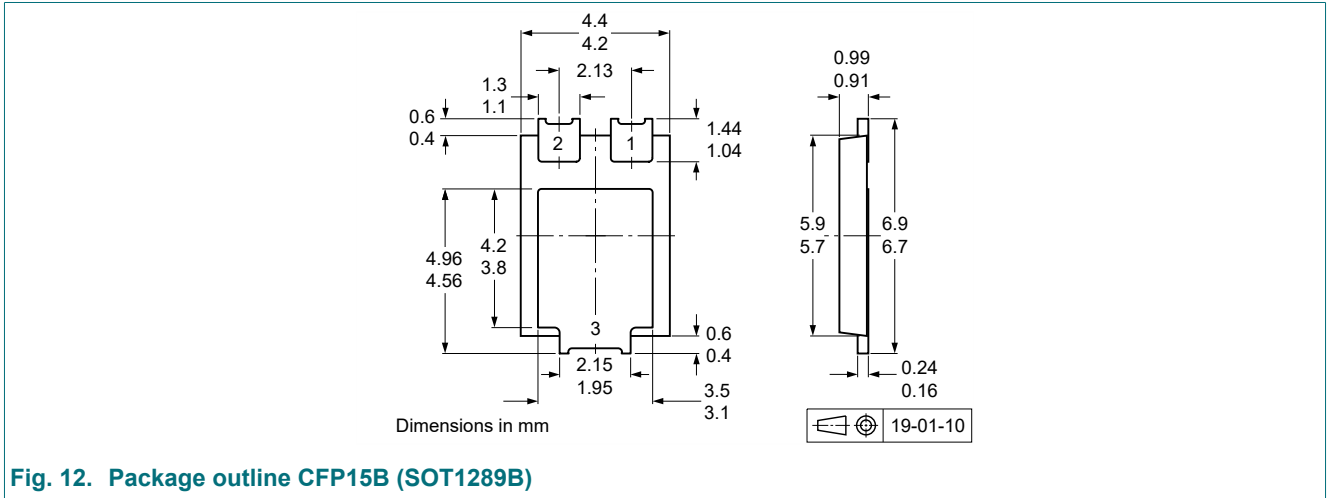


Fig. 12. Package outline CFP15B (SOT1289B)

## 12. Soldering

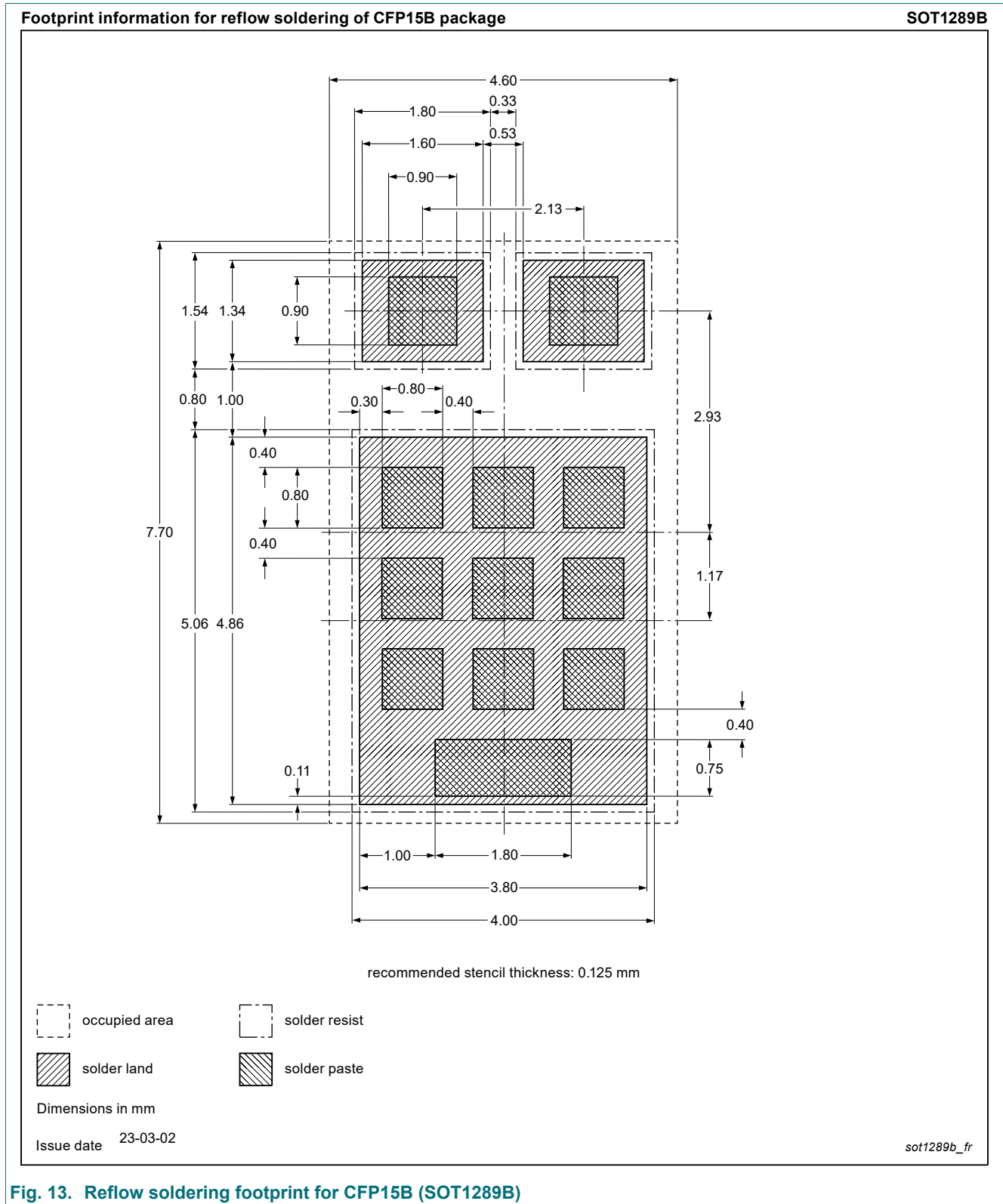


Fig. 13. Reflow soldering footprint for CFP15B (SOT1289B)

### 13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
MJPE2873 v.1	20250422	Product data sheet	-	-

## 14. Legal information

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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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