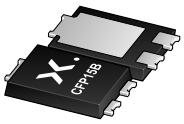


MJPE2873-Q

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
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

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

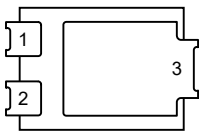
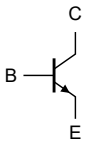
4. Quick reference data

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 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		120	-	360	
		V_{CE} = 2 V; I_C = 2 A; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		40	-	-	

5. Pinning information

Table 2. Pinning information

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

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
MJPE2873-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
MJPE2873-Q	MJPE2873

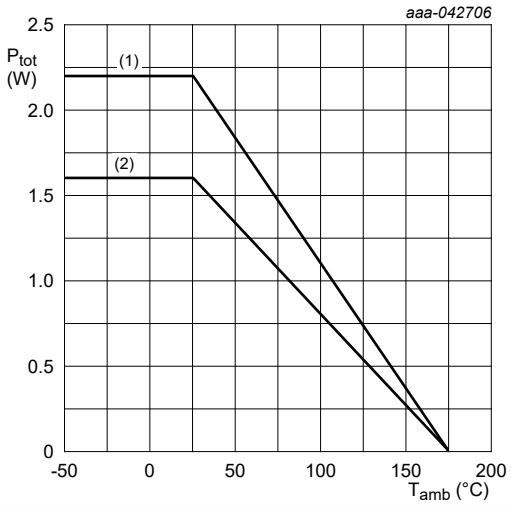
8. Limiting values

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 µm single-sided copper, standard footprint.
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), 140 µm single-sided copper, mounting pad for collector 1 cm^2.



(1) FR4 PCB, single-sided 140 µm copper, 1 cm^2
(2) FR4 PCB, single-sided 140 µm copper, standard footprint

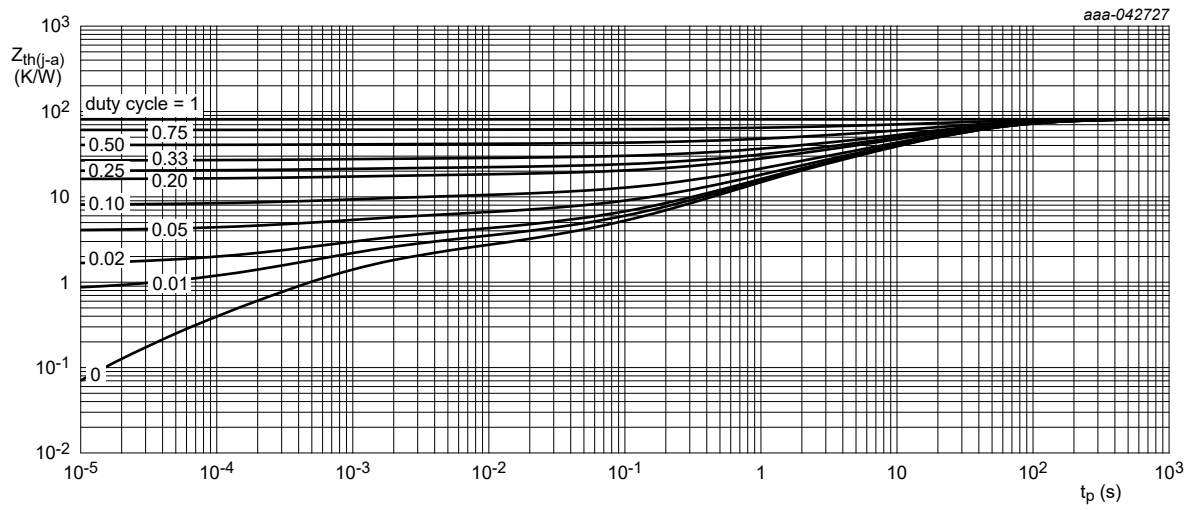
Fig. 1. Power derating curves

9. Thermal characteristics

Table 6. Thermal characteristics

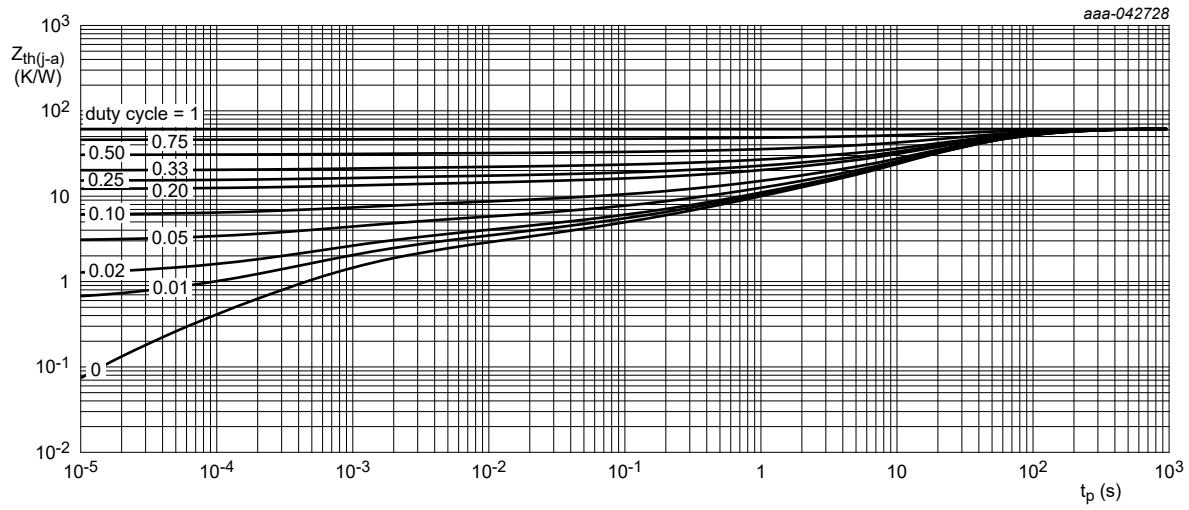
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	94	K/W
			[2]	-	-	69	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	4.5	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), 140 µm single-sided copper, standard footprint.
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), 140 µm single-sided copper, mounting pad for collector 1cm ^{2}.



FR4 PCB, single-sided 140 µm copper, standard footprint

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



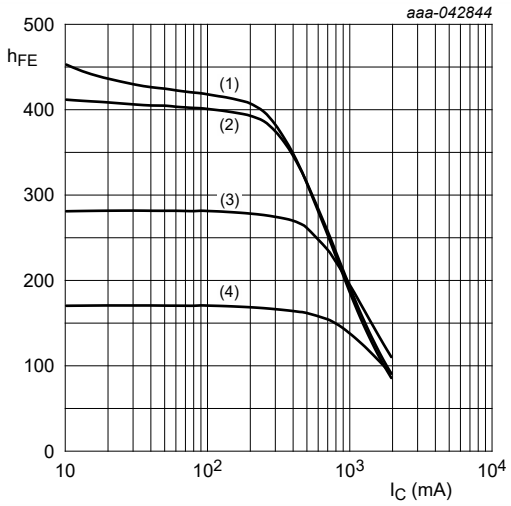
FR4 PCB, single-sided 140 µm copper, mounting pad for collector 1 cm^2

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

10. Characteristics

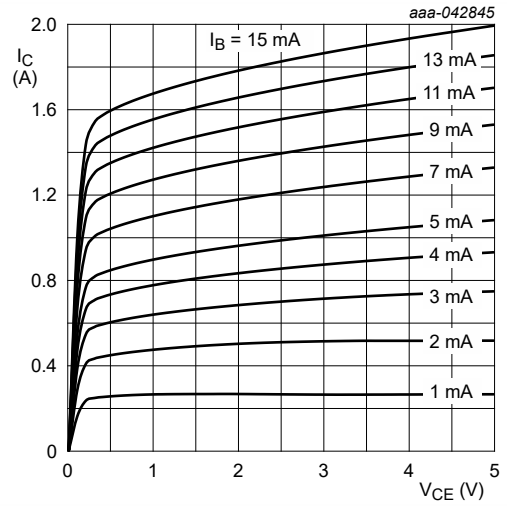
Table 7. Characteristics

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



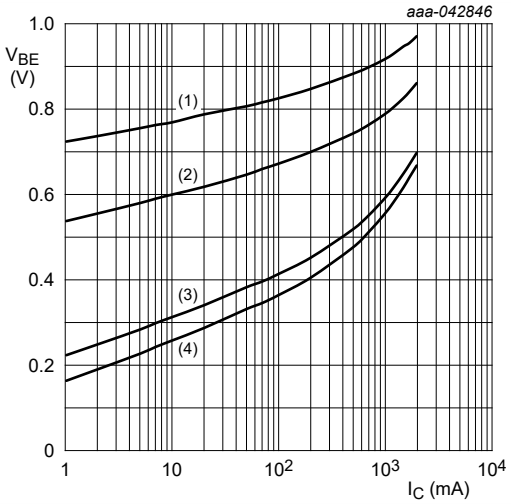
V_{CE} = 2 V
(1) T_{amb} = 175 °C
(2) T_{amb} = 150 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = −55 °C

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



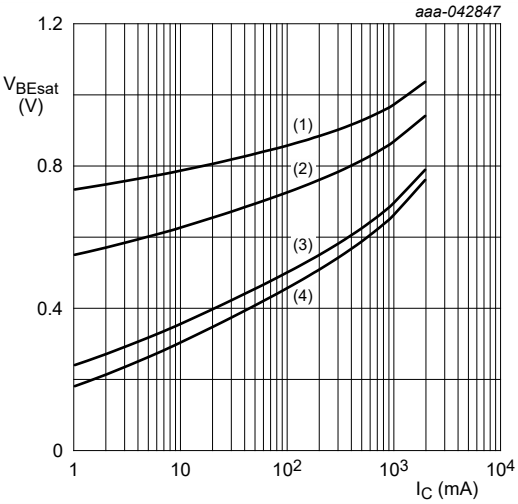
T_{amb} = 25 °C

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



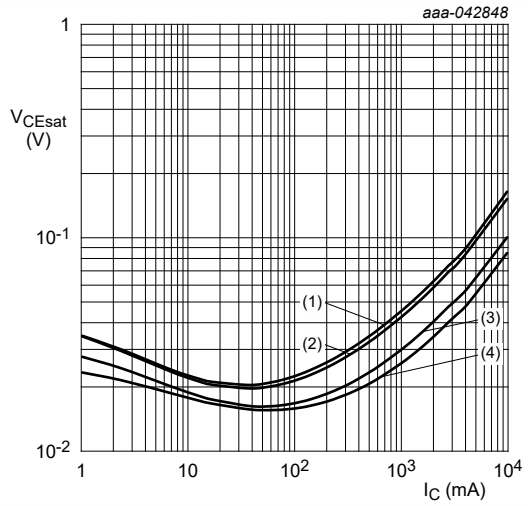
V_{CE} = 2 V
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C
(4) T_{amb} = 175 °C

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



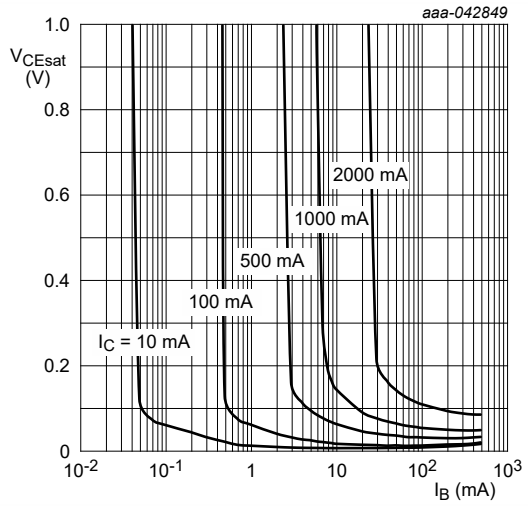
I_C/I_B = 20
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C
(3) T_{amb} = 175 °C

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



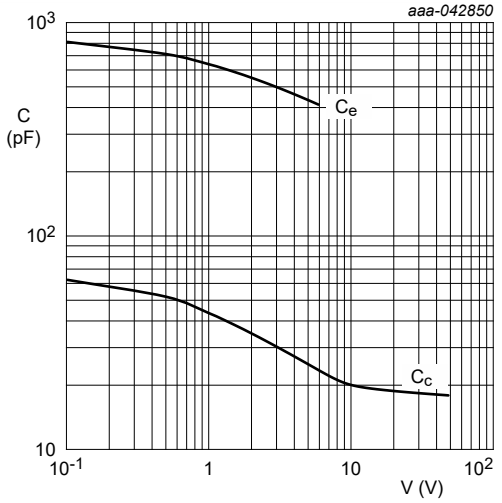
I_C/I_B = 20
(1) T_{amb} = 175 °C
(2) T_{amb} = 150 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = −55 °C

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



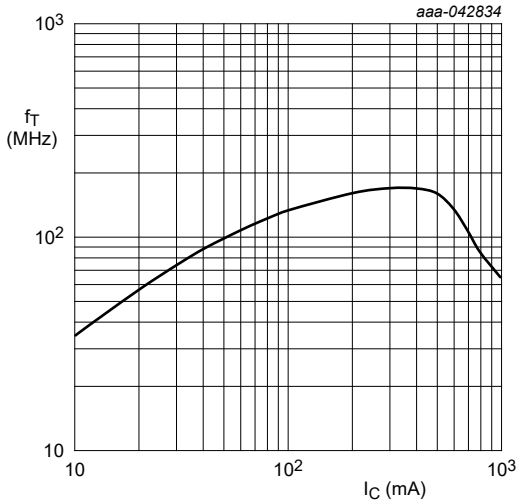
T_{amb} = 25 °C

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



T_{amb} = 25 °C

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



V_{CE} = 10 V
T_{amb} = 25 °C

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

11. Test information

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

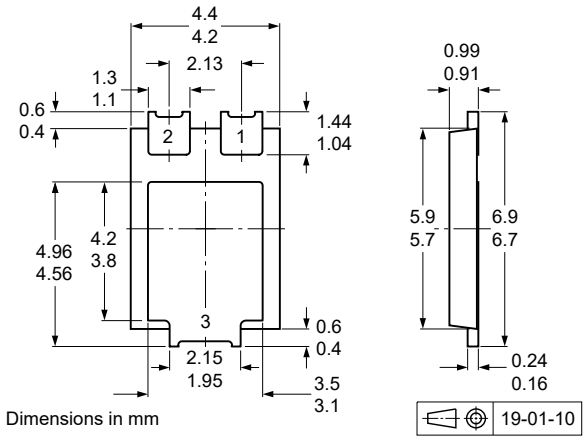


Fig. 12. Package outline CFP15B (SOT1289B)

13. Soldering

Footprint information for reflow soldering of CFP15B package **SOT1289B**

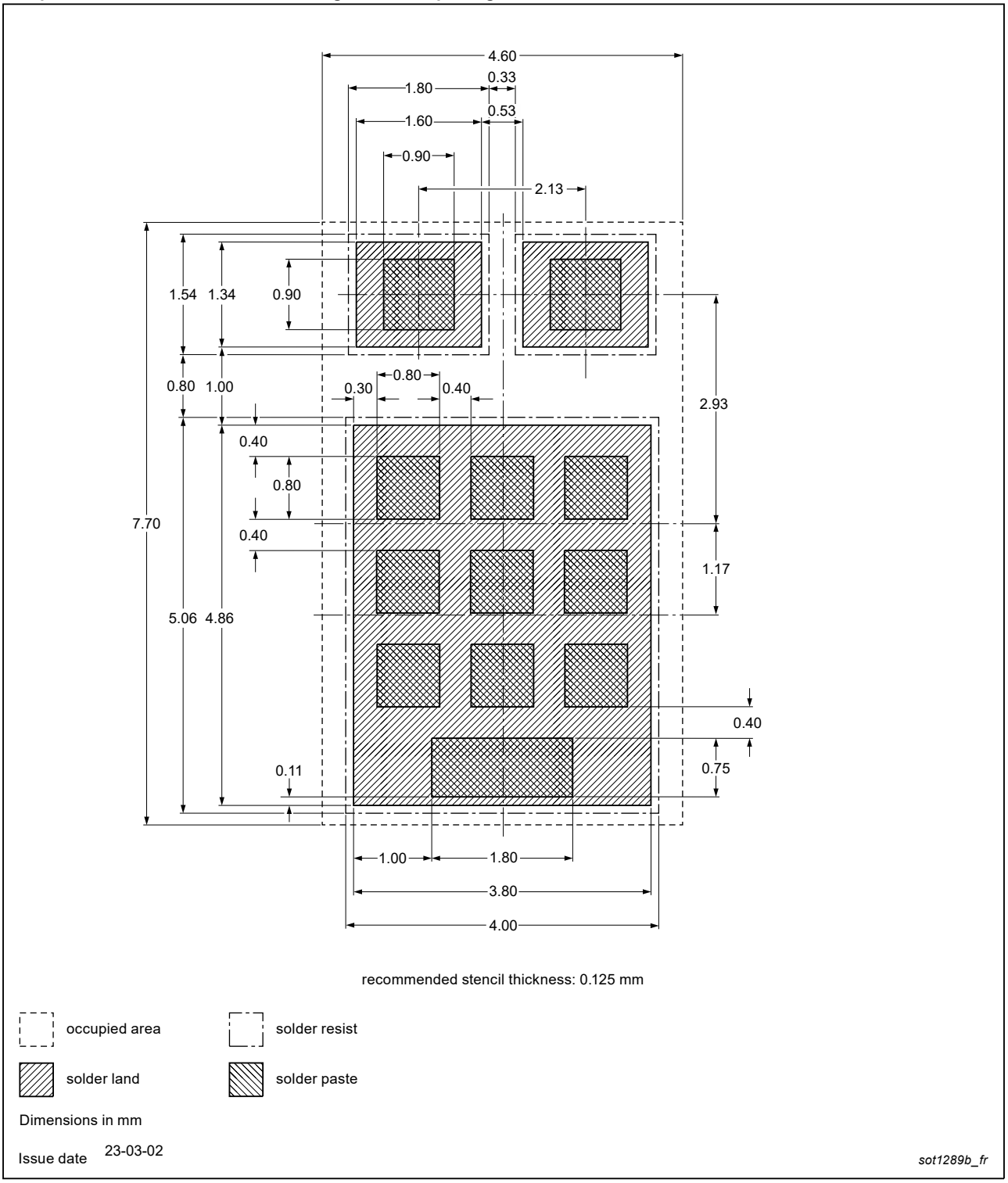


Fig. 13. Reflow soldering footprint for CFP15B (SOT1289B)

14. Revision history

Table 8. Revision history

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