



# MJD42C

100 V, 6 A PNP high power bipolar transistor

10 May 2021

Product data sheet

## 1. General description

PNP high power bipolar transistor in a power DPAK, TO-252 (SOT428C) Surface-Mounted Device (SMD) plastic package.

NPN complement: MJD41C

## 2. Features and benefits

- High thermal power dissipation capability
- High energy efficiency due to less heat generation
- Electrically similar to popular MJD42 series
- Low collector emitter saturation voltage
- Fast switching speeds

## 3. Applications

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

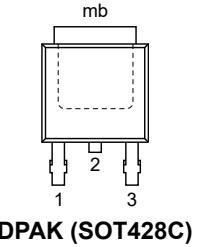
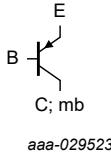
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base	-	-	-100	V
$I_C$	collector current		-	-	-6	A
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1 \text{ ms}$	-	-	-10	A
$h_{FE}$	DC current gain	$V_{CE} = -4 \text{ V}$ ; $I_C = -0.3 \text{ A}$ ; pulsed; $t_p \leq 200 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25^\circ\text{C}$	30	-	-	
		$V_{CE} = -4 \text{ V}$ ; $I_C = -3 \text{ A}$ ; pulsed; $t_p \leq 200 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25^\circ\text{C}$	15	-	-	

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base		
2	C	collector		
3	E	emitter		
mb	C	mounting base; connected to collector		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
MJD42C	DPAK	Plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)	SOT428C

## 7. Marking

Table 4. Marking codes

Type number	Marking code
MJD42C	MJD42C

## 8. Limiting values

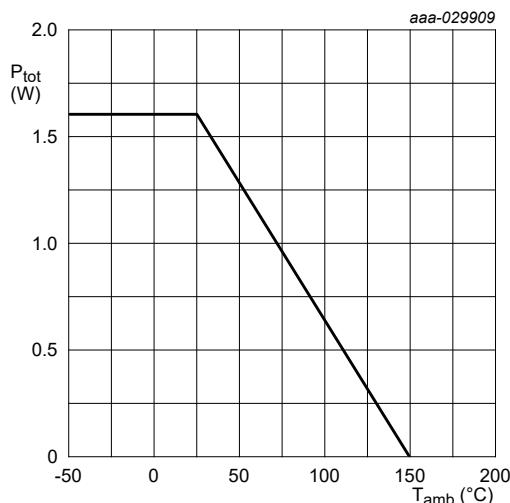
Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base		-	-100	V
$V_{EBO}$	emitter-base voltage	open collector		-	-6	V
$I_C$	collector current			-	-6	A
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1 \text{ ms}$		-	-10	A
$P_{tot}$	total power dissipation	$T_{mb} \leq 25 \text{ }^\circ\text{C}$	[1]	-	15	W
		$T_{amb} \leq 25 \text{ }^\circ\text{C}$	[2]	-	1.6	W
$T_j$	junction temperature			-	150	$^\circ\text{C}$
$T_{amb}$	ambient temperature			-55	150	$^\circ\text{C}$
$T_{stg}$	storage temperature			-65	150	$^\circ\text{C}$

[1] Total power dissipation junction to mounting base.

[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided 70  $\mu\text{m}$  copper, tin-plated mounting pad for collector 1  $\text{cm}^2$ .



FR4 PCB, single-sided 70  $\mu\text{m}$  copper, tin-plated, mounting pad for collector 1  $\text{cm}^2$ .

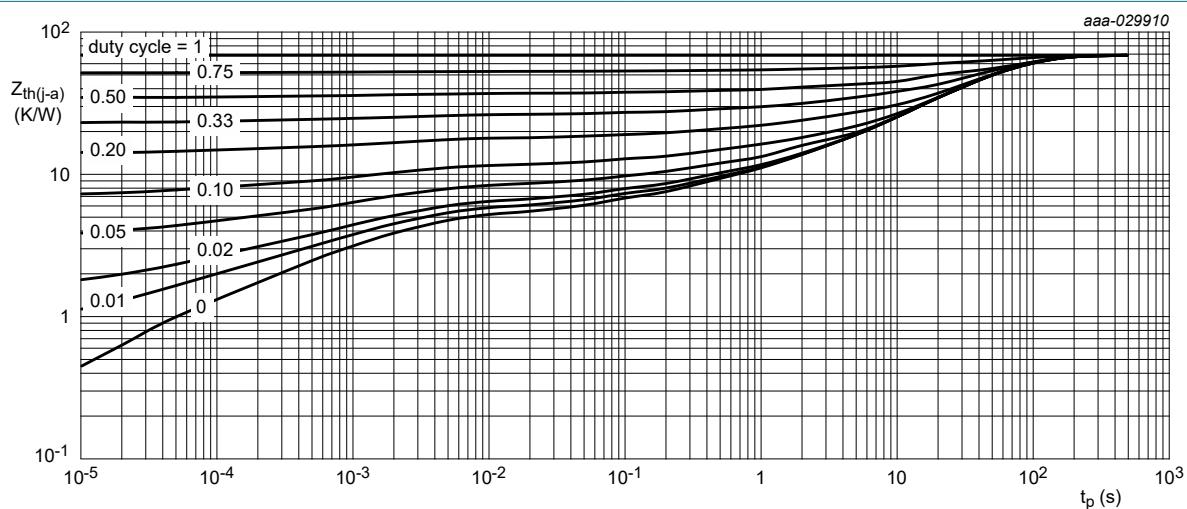
Fig. 1. Power derating curves SOT428C

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{\text{th(j-a)}}$	thermal resistance from junction to ambient	in free air	[1]	-	-	79	K/W
$R_{\text{th(j-mb)}}$	thermal resistance from junction to mounting base			-	-	9	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided 70  $\mu\text{m}$  copper, tin-plated mounting pad for collector 1  $\text{cm}^2$ .



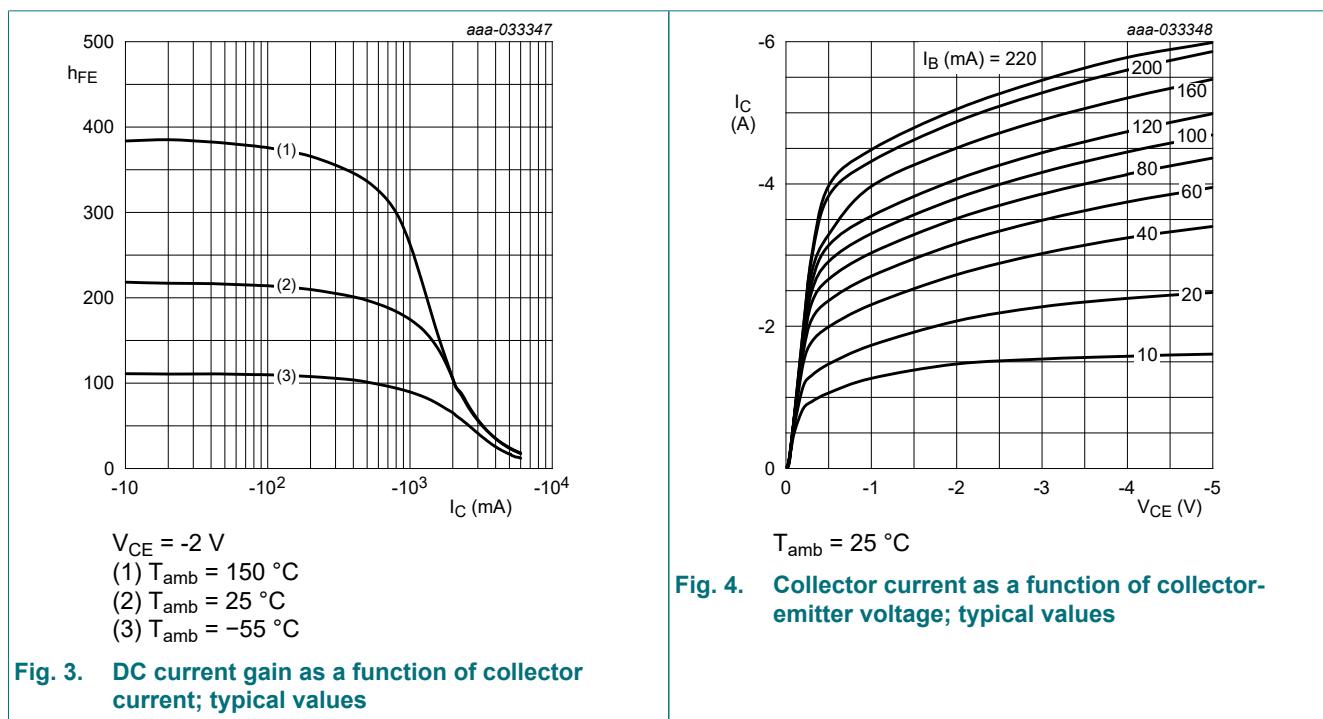
FR4 PCB, single-sided 70  $\mu\text{m}$  copper, tin-plated, mounting pad for collector 1  $\text{cm}^2$ .

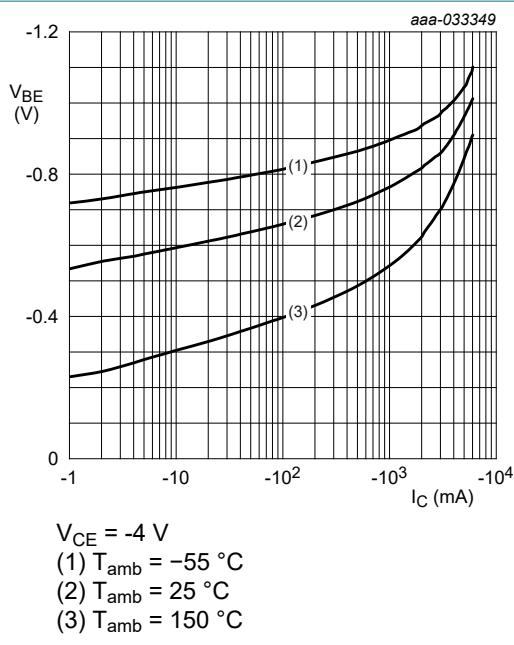
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

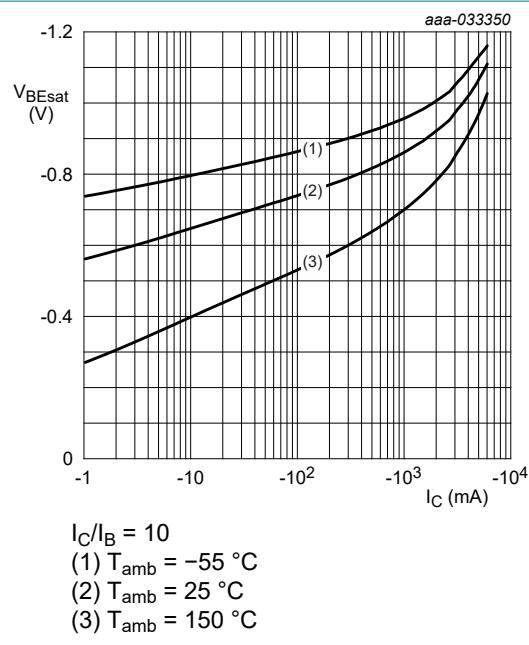
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$I_{CES}$	collector-emitter cut-off current	$V_{CE} = -80 \text{ V}$ ; $V_{BE} = 0 \text{ V}$ ; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	-1	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = -5 \text{ V}$ ; $I_C = 0 \text{ A}$ ; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	-1	$\mu\text{A}$
$h_{FE}$	DC current gain	$V_{CE} = -4 \text{ V}$ ; $I_C = -0.3 \text{ A}$ ; pulsed; $t_p \leq 200 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25 \text{ }^{\circ}\text{C}$	30	-	-	-	
		$V_{CE} = -4 \text{ V}$ ; $I_C = -3 \text{ A}$ ; pulsed; $t_p \leq 200 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25 \text{ }^{\circ}\text{C}$	15	-	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -6 \text{ A}$ ; $I_B = -600 \text{ mA}$ ; pulsed; $t_p \leq 200 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	-1.5	V
$V_{BE}$	base-emitter voltage	$V_{CE} = -4 \text{ V}$ ; $I_C = -6 \text{ A}$ ; pulsed; $t_p \leq 200 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		-	-	-2	V
$h_{fe}$	small-signal current gain	$V_{CE} = -10 \text{ V}$ ; $I_C = -500 \text{ mA}$ ; $f = 1 \text{ kHz}$ ; pulsed; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25 \text{ }^{\circ}\text{C}$	20	-	-	-	
$f_T$	transition frequency	$V_{CE} = -10 \text{ V}$ ; $I_C = -500 \text{ mA}$ ; $f = 100 \text{ MHz}$ ; $T_{amb} = 25 \text{ }^{\circ}\text{C}$		3	-	-	MHz

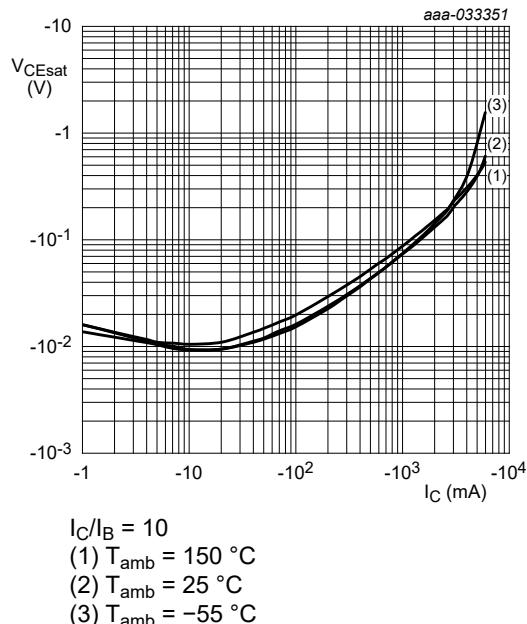




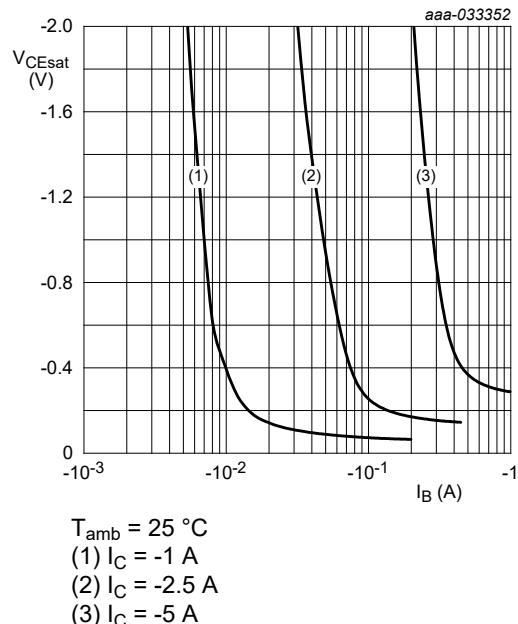
**Fig. 5. Base-emitter voltage as a function of collector current; typical values**



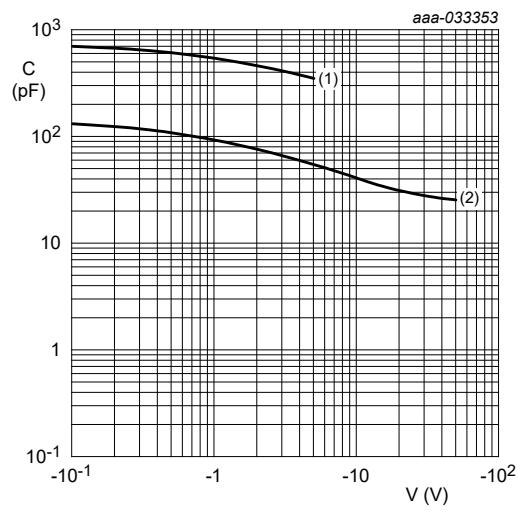
**Fig. 6. Base-emitter saturation voltage as a function of collector current; typical values**



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



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



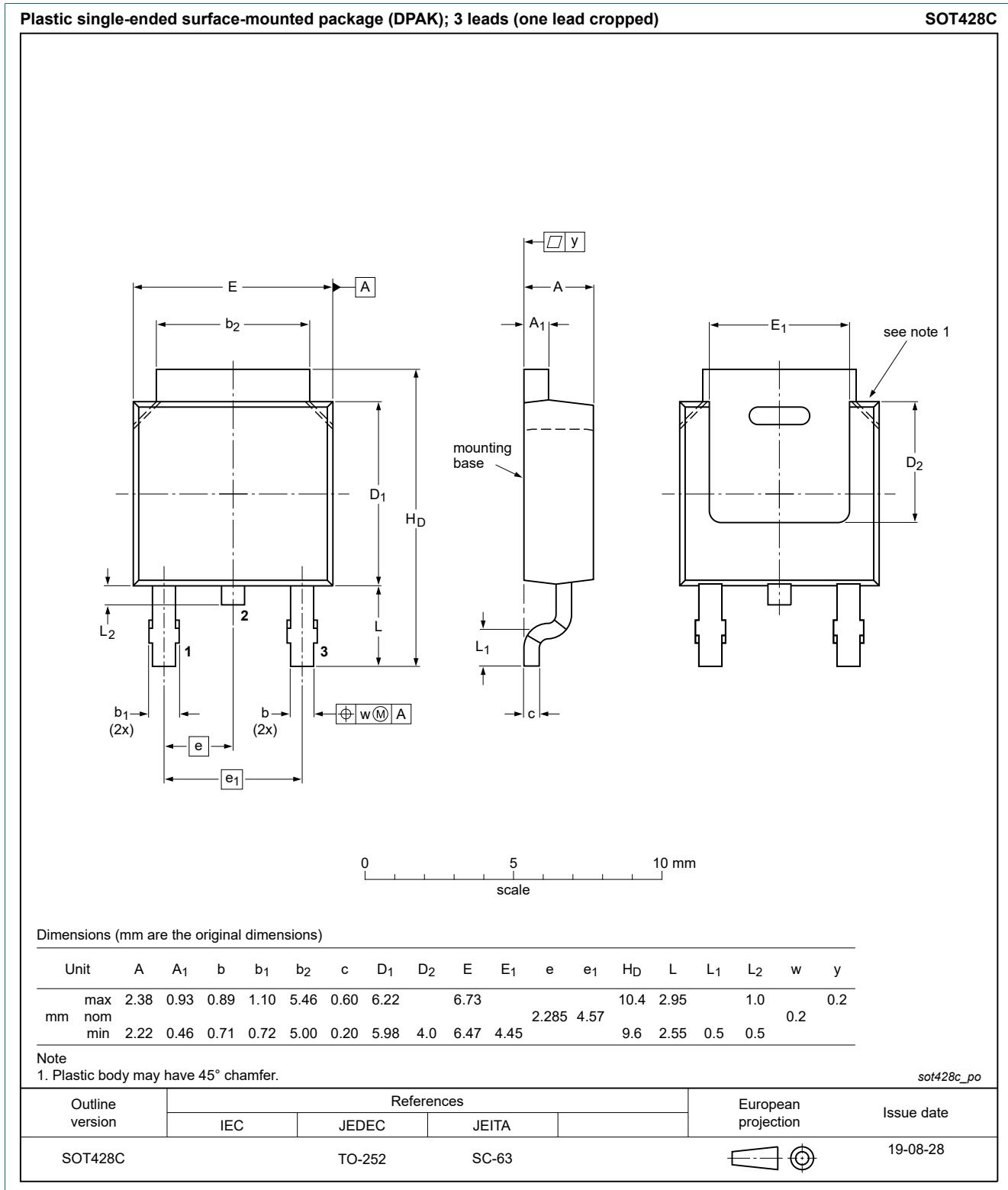
$T_{amb} = 25^\circ C$

(1)  $C_e$

(2)  $C_c$

Fig. 9. Input/output capacitance as a function of input/output voltage

## 11. Package outline



## 12. Soldering

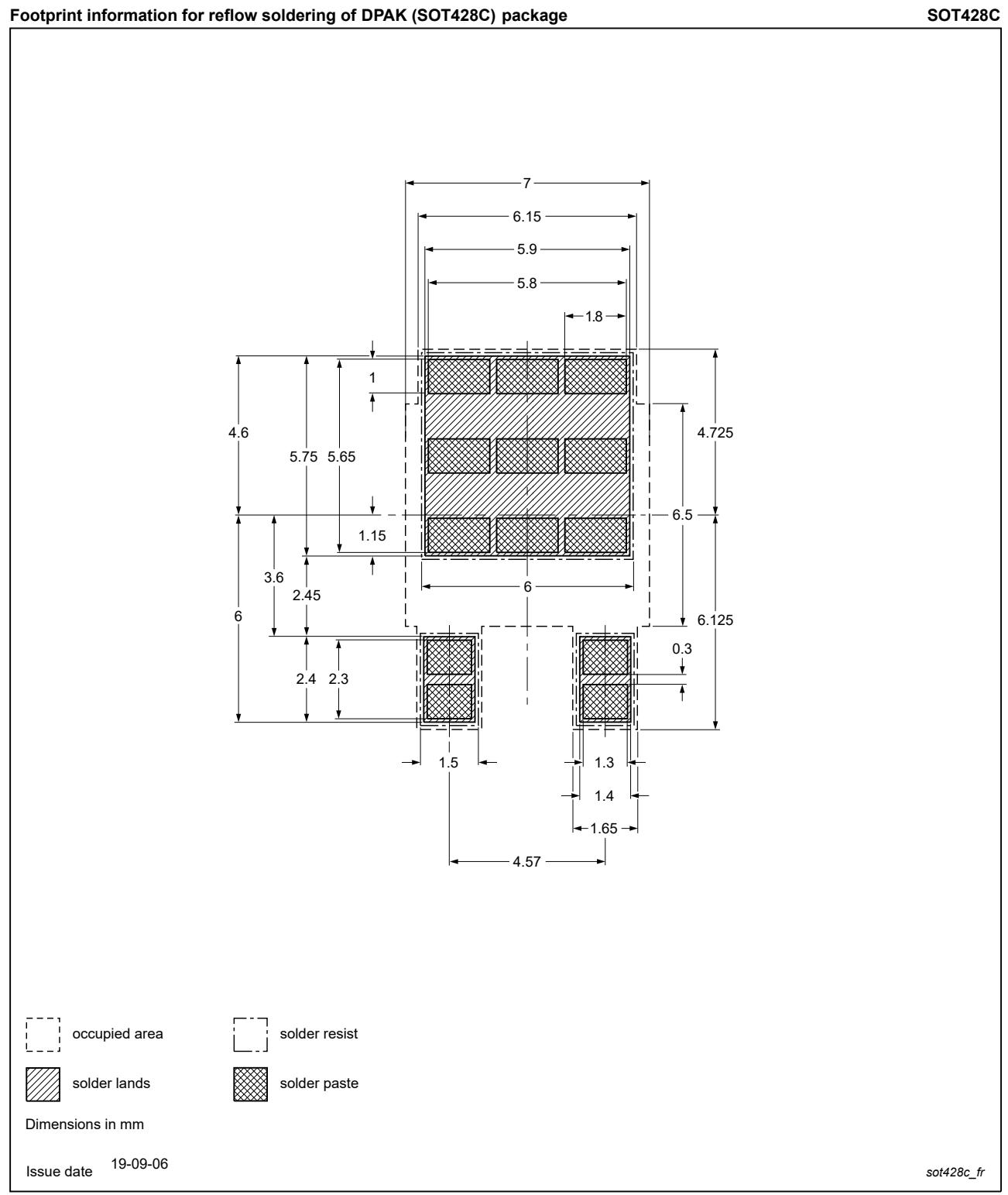


Fig. 11. Reflow soldering footprint for DPAK (SOT428C)

## 13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
MJD42C v.1	20210510	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.
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Product [short] data sheet	Production	This document contains the product specification.

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