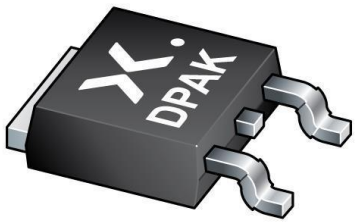
MJD42C-QJ Datasheet



DiGi Electronics Part Number	MJD42C-QJ-DG
Manufacturer	Nexperia USA Inc.
Manufacturer Product Number	MJD42C-QJ
Description	TRANS PNP 100V 6A DPAK
Detailed Description	Bipolar (BJT) Transistor PNP 100 V 6 A 3MHz 1.6 W Surface Mount DPAK

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
MJD42C-QJ	Nexperia USA Inc.
Series:	Product Status:
-	Active
Transistor Type:	Current - Collector (Ic) (Max):
PNP	6 A
Voltage - Collector Emitter Breakdown (Max):	Vce Saturation (Max) @ Ib, Ic:
100 V	1.5V @ 600mA, 6A
Current - Collector Cutoff (Max):	DC Current Gain (hFE) (Min) @ Ic, Vce:
1µA	30 @ 300mA, 4V
Power - Max:	Frequency - Transition:
1.6 W	3MHz
Operating Temperature:	Grade:
150°C (TJ)	Automotive
Qualification:	Mounting Type:
AEC-Q100	Surface Mount
Package / Case:	Supplier Device Package:
TO-252-3, DPAK (2 Leads + Tab), SC-63	DPAK
Base Product Number:	
MJD42	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	3 (168 Hours)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.29.0095	

MJD42C-Q

100 V, 6 A PNP high power bipolar transistor

8 June 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-Q

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
- 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

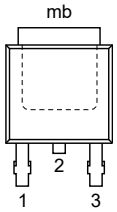
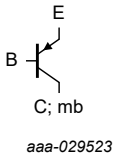
4. Quick reference data

Table 1. Quick reference data

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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 DPAK (SOT428C)	
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-Q	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-Q	MJD42CA

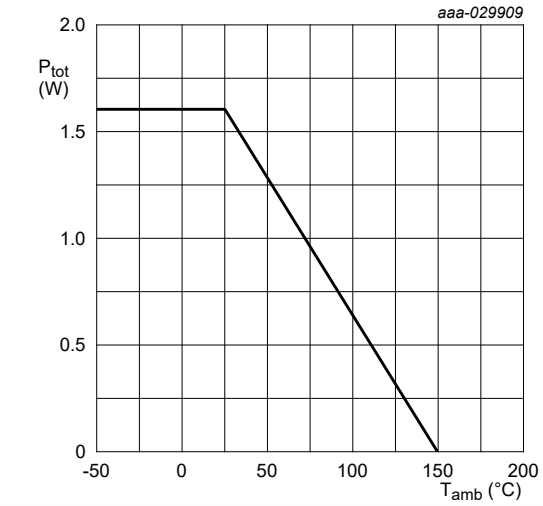
8. Limiting values

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 ms		-	-10	A
P_{tot}	total power dissipation	$T_{mb} \leq 25$ °C	[1]	-	15	W
		$T_{amb} \leq 25$ °C	[2]	-	1.6	W
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] Total power dissipation junction to mounting base.
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided 70 µm copper, tin-plated mounting pad for collector 1 cm^2.



FR4 PCB, single-sided 70 µm copper, tin-plated, mounting pad for collector 1 cm^2.

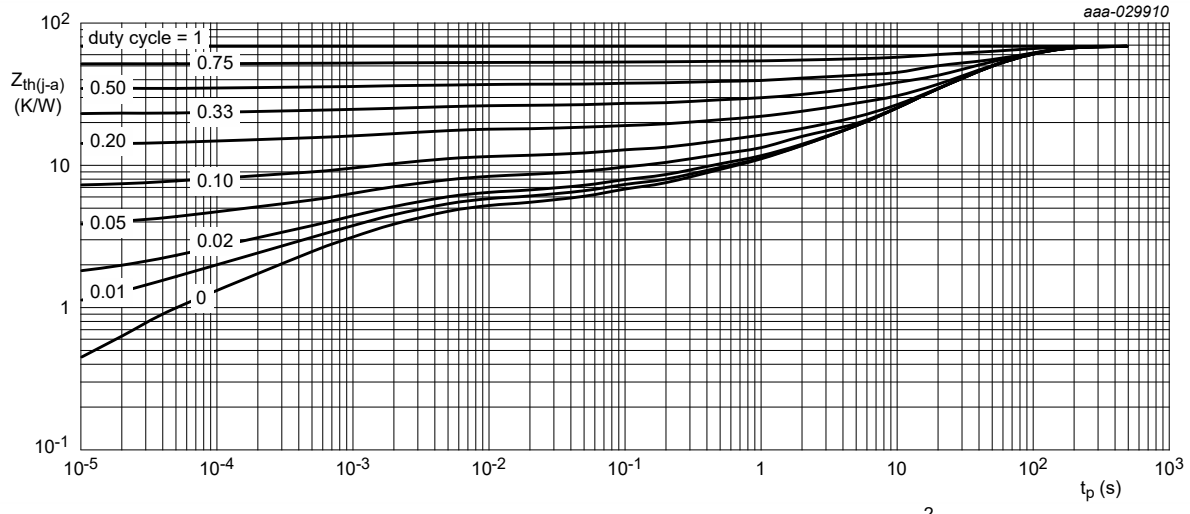
Fig. 1. Power derating curves SOT428C

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]	-	-	79	K/W
$R_{th(j-mb)}$	thermal resistance from junction to mounting base			-	-	9	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided 70 µm copper, tin-plated mounting pad for collector 1 cm^2.



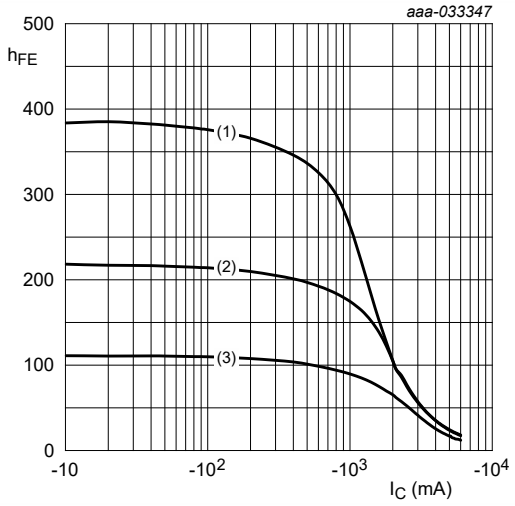
FR4 PCB, single-sided 70 µm copper, tin-plated, mounting pad for collector 1 cm^2.

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

10. Characteristics

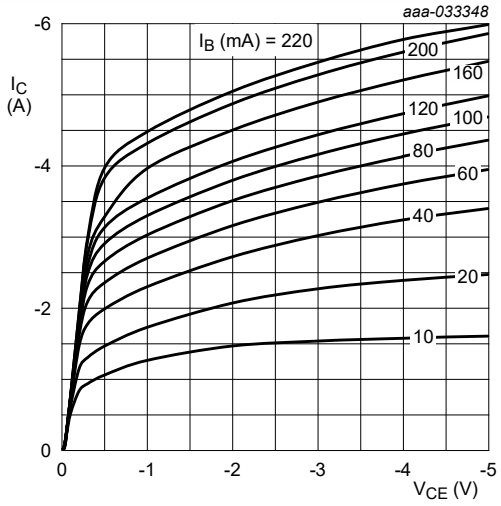
Table 7. Characteristics

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



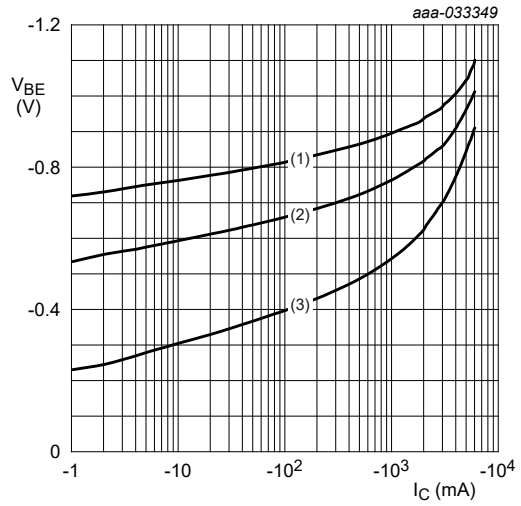
V_{CE} = -2 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

Fig. 3. DC current gain as a function of collector current; typical values



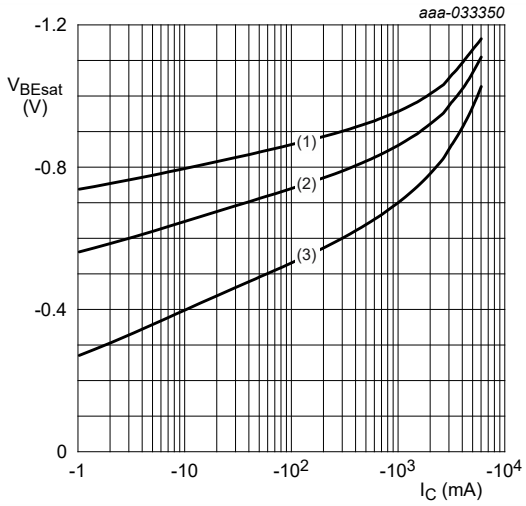
T_{amb} = 25 °C

Fig. 4. Collector current as a function of collector-emitter voltage; typical values



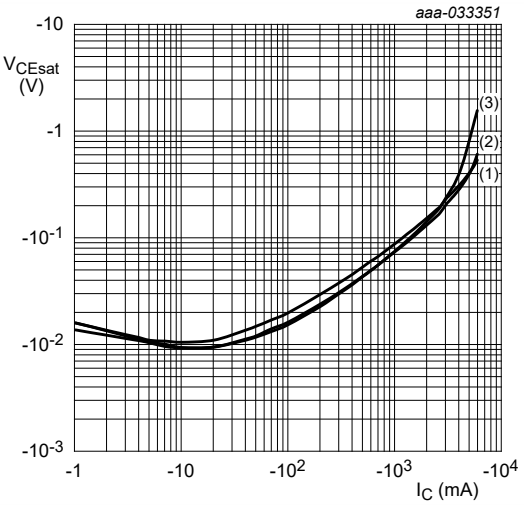
V_{CE} = -4 V
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

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



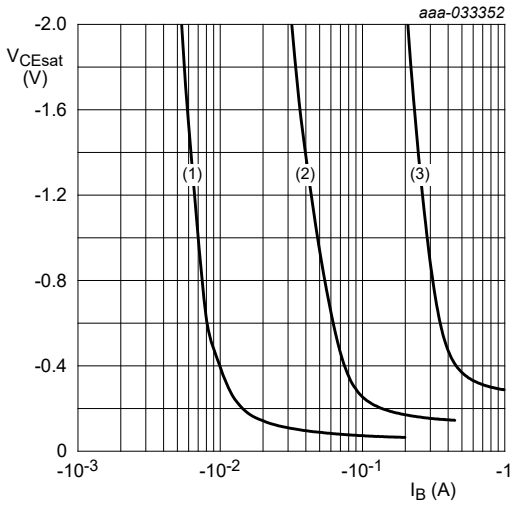
I_C/I_B = 10
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

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



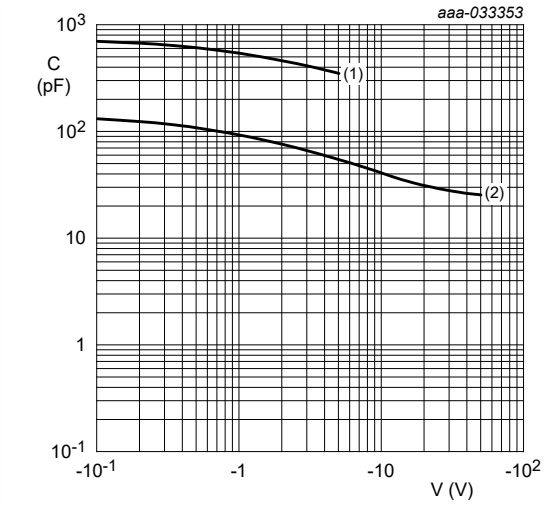
I_C/I_B = 10
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

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



T_{amb} = 25 °C
(1) I_C = -1 A
(2) I_C = -2.5 A
(3) I_C = -5 A

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



T_{amb} = 25 °C
(1) C_e
(2) C_c

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

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

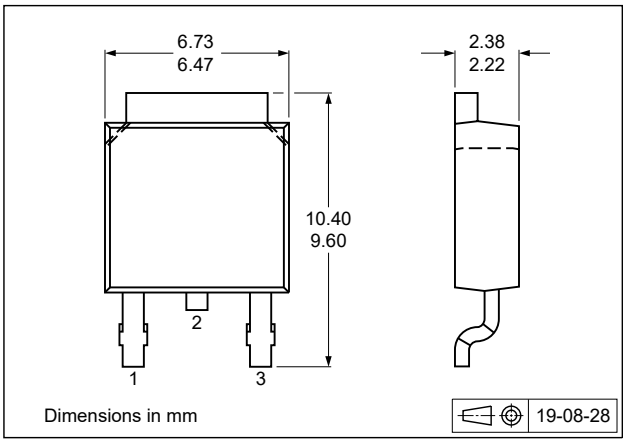


Fig. 10. Package outline DPAK (SOT428C)

13. Soldering

Footprint information for reflow soldering of DPAK (SOT428C) package **SOT428C**

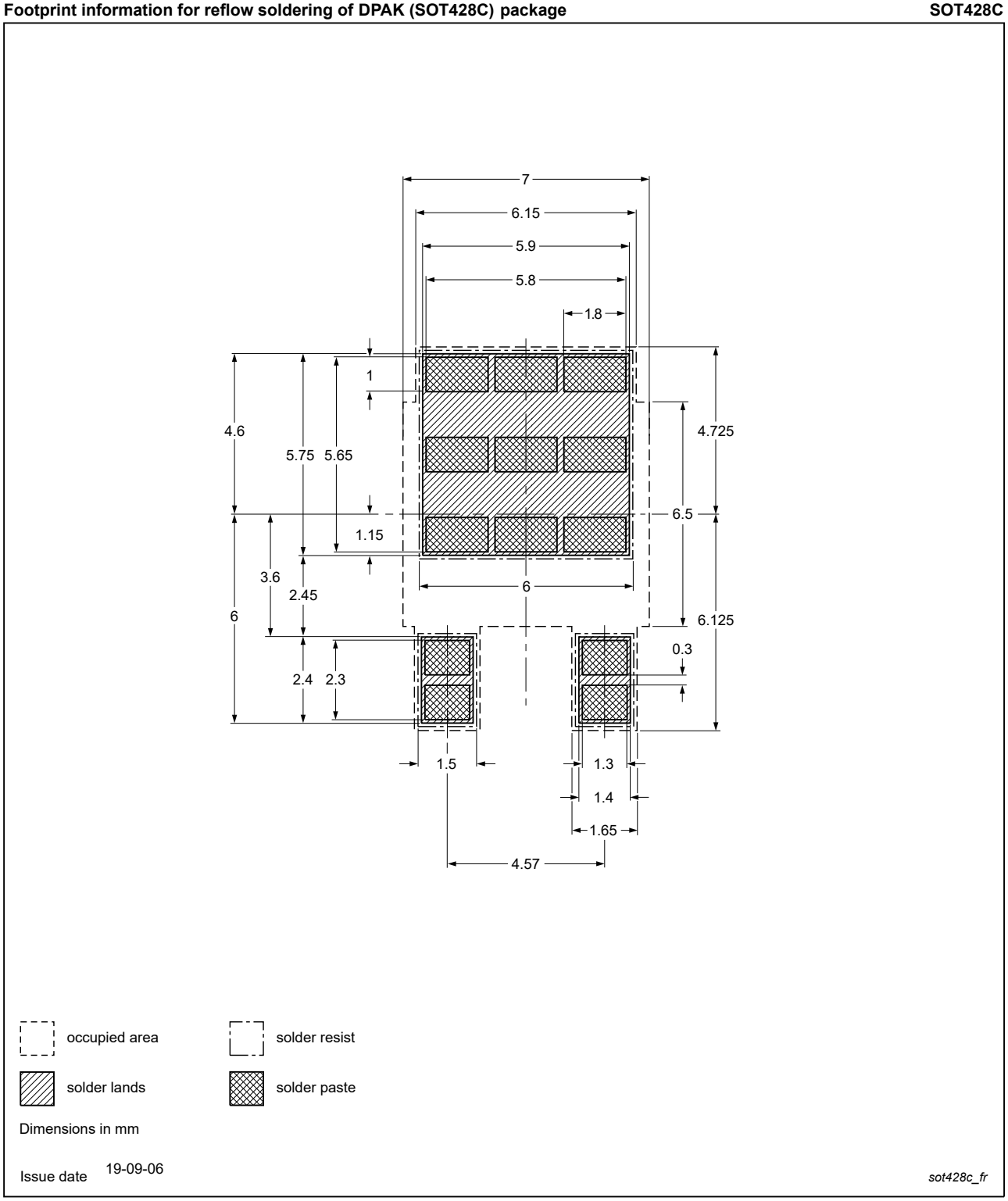


Fig. 11. Reflow soldering footprint for DPAK (SOT428C)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
MJD42C-Q v.2	20210608	Product data sheet	-	MJD42C-Q v.1
Modifications:	• Product status changed			
MJD42C-Q v.1	20210416	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.

[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".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at https://www.nexperia.com.

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Date of release: 8 June 2021

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