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Electronic Components Sourcing Information

Product Reference Information

Part Number:	PMCB60XNEZ
Manufacturer:	Nexperia USA Inc.
Package:	Please confirm with sales
Availability:	Please confirm with sales

Product Page:

<https://antrexco.com/product/details/nexperia-usa-inc/pmcb60xnez.html>

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Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.



PMCB60XNE

30 V, N-channel Trench MOSFET

21 February 2022

Product data sheet

1. General description

N-channel enhancement mode Field-Effect Transistor (FET) in a leadless ultra small DSN1006-3 (SOT8026) Surface-Mounted Device (SMD) package using Trench MOSFET technology.

2. Features and benefits

- Low threshold voltage
- Very fast switching
- Ultra small package: $1.0 \times 0.6 \times 0.2$ mm
- Trench MOSFET technology
- ElectroStatic Discharge (ESD) protection > 2 kV HBM (class H2)

3. Applications

- Battery switch
- High-speed line driver
- Low-side load switch
- Switching circuits

4. Quick reference data

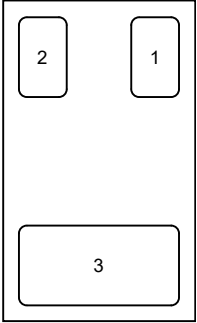
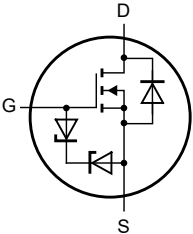
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$T_j = 25\text{ °C}$		-	-	30	V
V_{GS}	gate-source voltage			-12	-	12	V
I_D	drain current	$V_{GS} = 4.5\text{ V}; T_{amb} = 25\text{ °C}; t \leq 5\text{ s}$	[1]	-	-	4.3	A
Static characteristics							
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = 4.5\text{ V}; I_D = 3.5\text{ A}; T_j = 25\text{ °C}$		-	40	55	mΩ

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and mounting pad for drain 6 cm^2 .

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	G	gate	 Transparent top view DSN1006 (SOT8026)	 017aaa255
2	S	source		
3	D	drain		

6. Ordering information

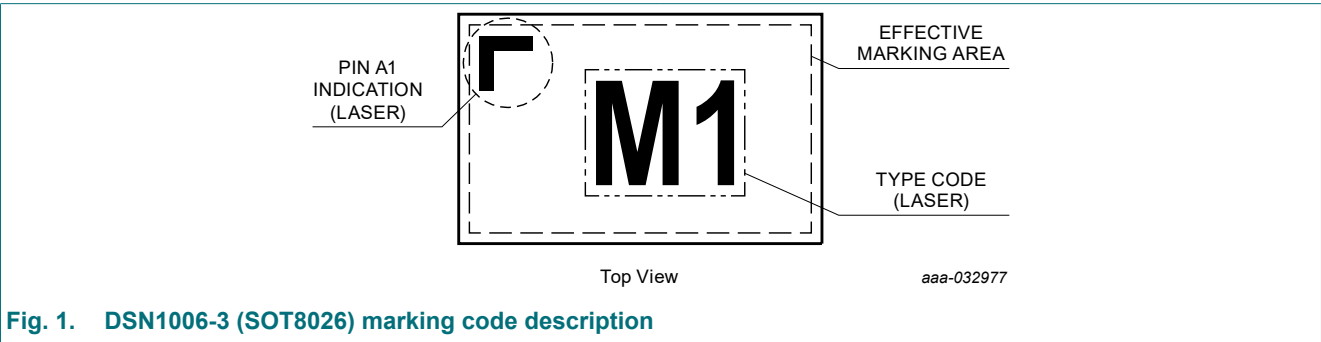
Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMCB60XNE	DSN1006	chip-scale package; 3 terminals; body 1.0 x 0.6 x 0.2 mm	SOT8026

7. Marking

Table 4. Marking codes

Type number	Marking code
PMCB60XNE	M2



8. Limiting values

Table 5. Limiting values

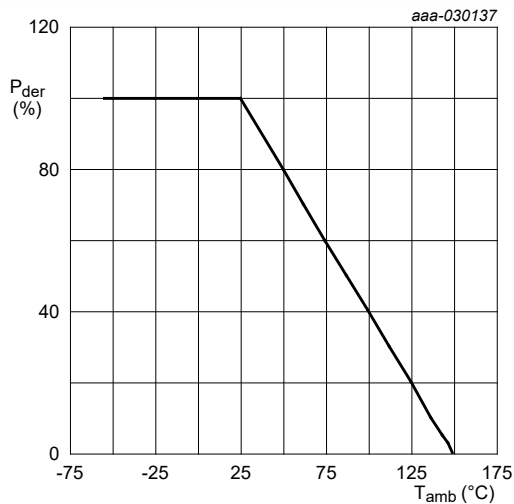
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V _{DS}	drain-source voltage	T _j = 25 °C		-	30	V
V _{GS}	gate-source voltage			-12	12	V
I _D	drain current	V _{GS} = 4.5 V; T _{amb} = 25 °C; t ≤ 5 s	[1]	-	4.3	A
		V _{GS} = 4.5 V; T _{amb} = 25 °C	[1]	-	3.5	A
		V _{GS} = 4.5 V; T _{amb} = 100 °C	[1]	-	2.2	A
I _{DM}	peak drain current	T _{amb} = 25 °C; single pulse; t _p ≤ 10 μs		-	14	A
P _{tot}	total power dissipation	T _{amb} = 25 °C	[2]	-	480	mW
			[3]	-	900	mW
			[1]	-	1	W
		T _{sp} = 25 °C		-	7	W
T _j	junction temperature			-55	150	°C
T _{amb}	ambient temperature			-55	150	°C
T _{stg}	storage temperature			-65	150	°C
Source-drain diode						
I _S	source current	T _{amb} = 25 °C	[1]	-	1	A

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and mounting pad for drain 6 cm².

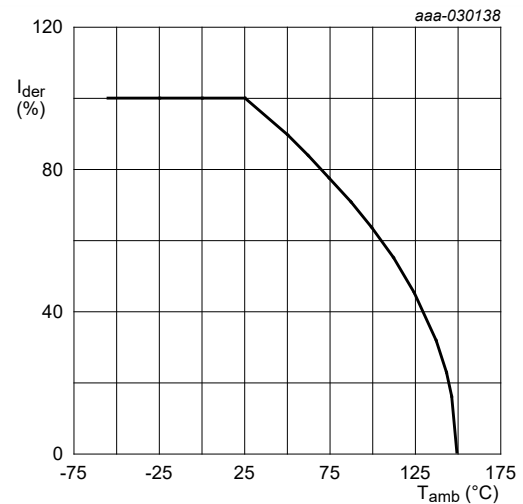
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, 4 layer copper, tin-plated and standard footprint.



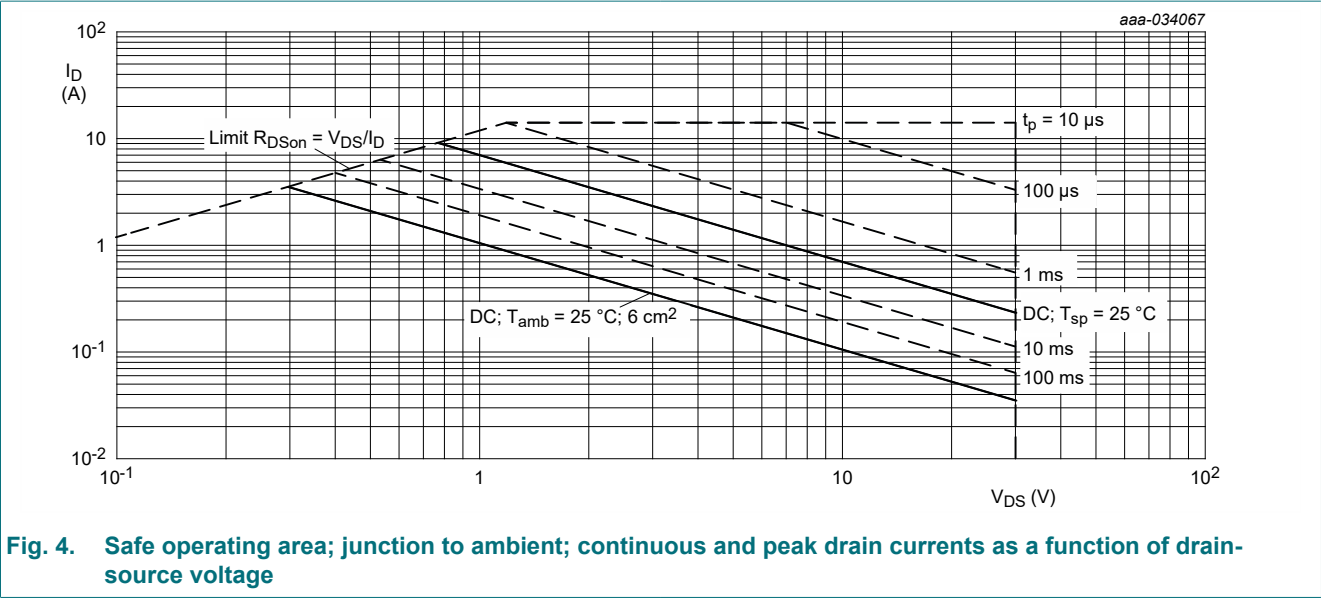
$$P_{der} = \frac{P_{tot}}{P_{tot}(25^{\circ}\text{C})} \times 100\%$$

Fig. 2. Normalized total power dissipation as a function of ambient temperature



$$I_{der} = \frac{I_D}{I_D(25^{\circ}\text{C})} \times 100\%$$

Fig. 3. Normalized continuous drain current as a function of ambient temperature

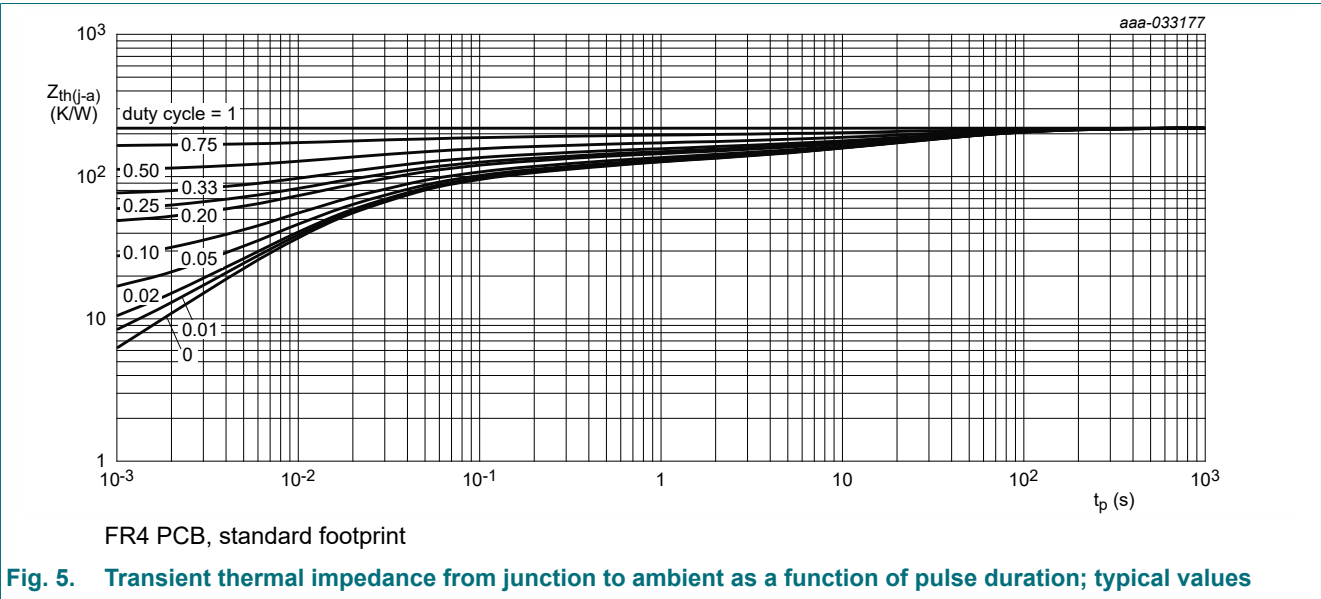


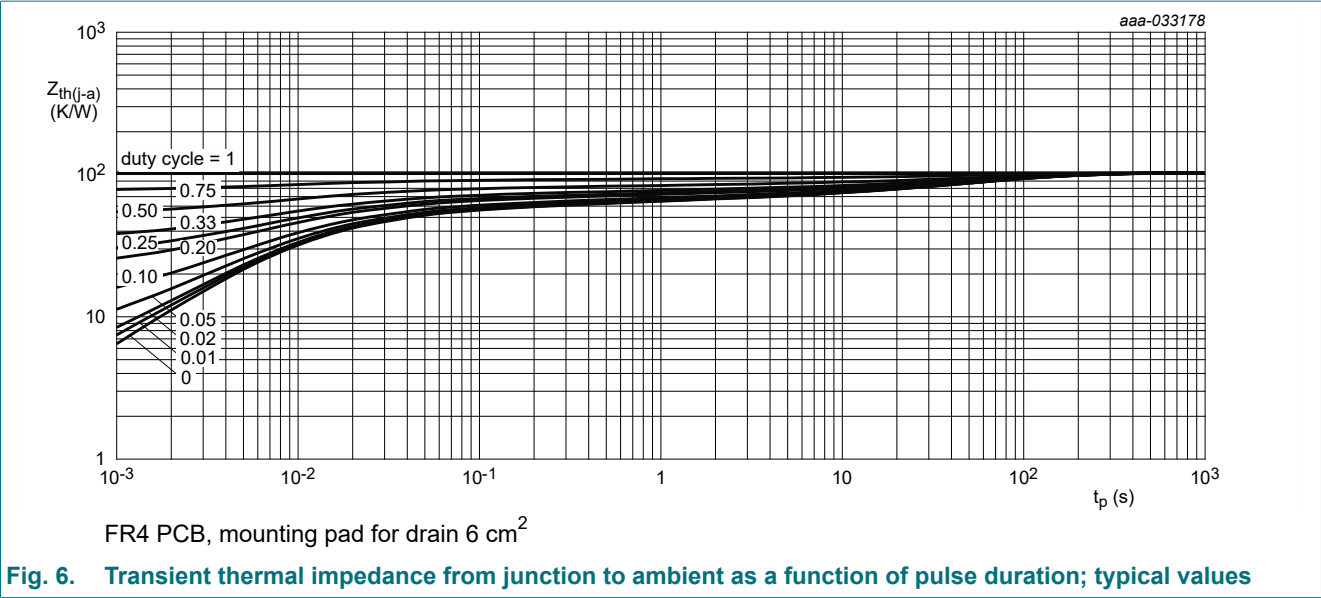
9. Thermal characteristics

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]	-	220	258	K/W
			[2]	-	123	142	K/W
			[3]	-	102	120	K/W
		in free air; t ≤ 5 s	[3]	-	70	80	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point			-	13	18	K/W

- [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, 4 layer copper, tin-plated and standard footprint.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for drain 6 cm².





10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V _{(BR)DSS}	drain-source breakdown voltage	I _D = 250 μA; V _{GS} = 0 V; T _j = 25 °C		30	-	-	V
V _{GSth}	gate-source threshold voltage	I _D = 250 μA; V _{DS} =V _{GS} ; T _j = 25 °C		0.5	0.8	1.1	V
I _{DSS}	drain leakage current	V _{DS} = 30 V; V _{GS} = 0 V; T _j = 25 °C		-	-	1	μA
I _{GSS}	gate leakage current	V _{GS} = 12 V; V _{DS} = 0 V; T _j = 25 °C		-	-	10	μA
		V _{GS} = -12 V; V _{DS} = 0 V; T _j = 25 °C		-	-	-10	μA
R _{DSon}	drain-source on-state resistance	V _{GS} = 4.5 V; I _D = 3.5 A; T _j = 25 °C		-	40	55	mΩ
		V _{GS} = 4.5 V; I _D = 3.5 A; T _j = 150 °C		-	66	91	mΩ
		V _{GS} = 2.5 V; I _D = 2 A; T _j = 25 °C		-	48	75	mΩ
		V _{GS} = 1.8 V; I _D = 0.5 A; T _j = 25 °C		-	70	155	mΩ
g _{fs}	forward transconductance	V _{DS} = 10 V; I _D = 4 A; T _j = 25 °C		-	6.7	-	S
Dynamic characteristics							
Q _{G(tot)}	total gate charge	V _{DS} = 15 V; I _D = 4 A; V _{GS} = 4.5 V; T _j = 25 °C		-	5	7.5	nC
Q _{GS}	gate-source charge			-	0.8	-	nC
Q _{GD}	gate-drain charge			-	1.4	-	nC
C _{iss}	input capacitance	V _{DS} = 15 V; f = 1 MHz; V _{GS} = 0 V; T _j = 25 °C		-	420	-	pF
C _{oss}	output capacitance			-	36	-	pF
C _{rss}	reverse transfer capacitance			-	26	-	pF
t _{d(on)}	turn-on delay time	V _{DS} = 15 V; I _D = 4 A; V _{GS} = 4.5 V; R _{G(ext)} = 6 Ω; T _j = 25 °C		-	20	-	ns
t _r	rise time			-	40	-	ns
t _{d(off)}	turn-off delay time			-	107	-	ns
t _f	fall time			-	74	-	ns
Source-drain diode							
V _{SD}	source-drain voltage	I _S = 1 A; V _{GS} = 0 V; T _j = 25 °C		-	0.7	1.2	V

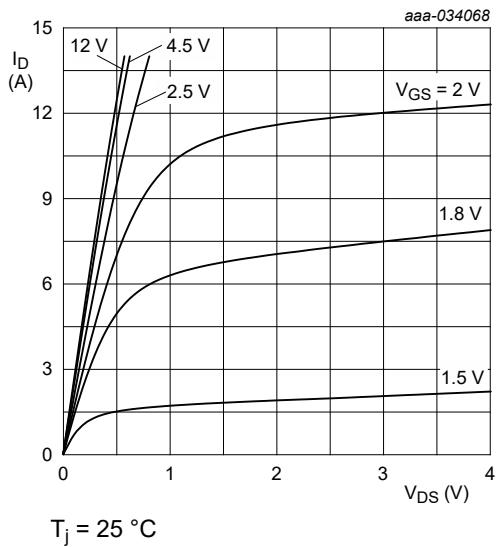


Fig. 7. Output characteristics: drain current as a function of drain-source voltage; typical values

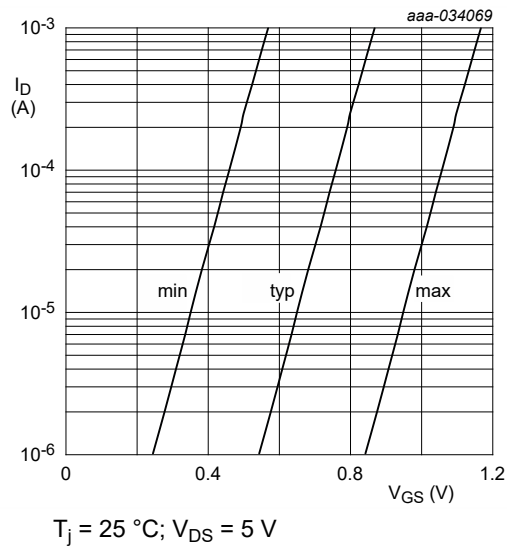


Fig. 8. Subthreshold drain current as a function of gate-source voltage

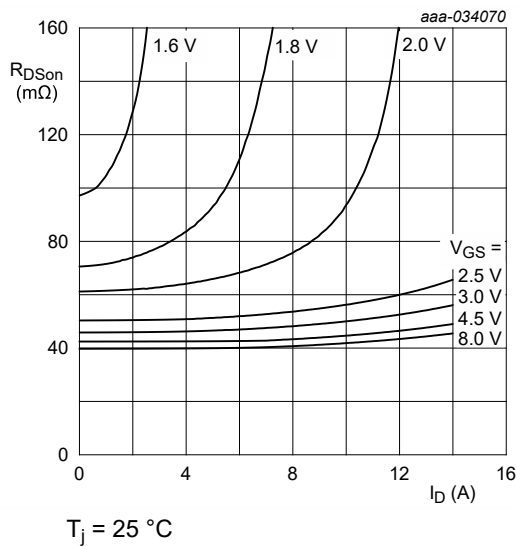


Fig. 9. Drain-source on-state resistance as a function of drain current; typical values

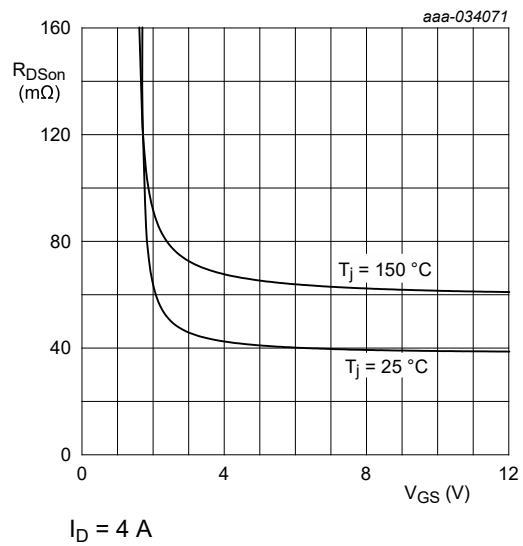


Fig. 10. Drain-source on-state resistance as a function of gate-source voltage; typical values

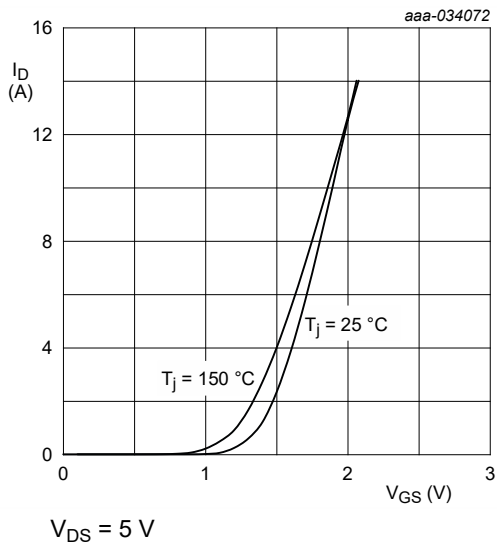


Fig. 11. Transfer characteristics: drain current as a function of gate-source voltage; typical values

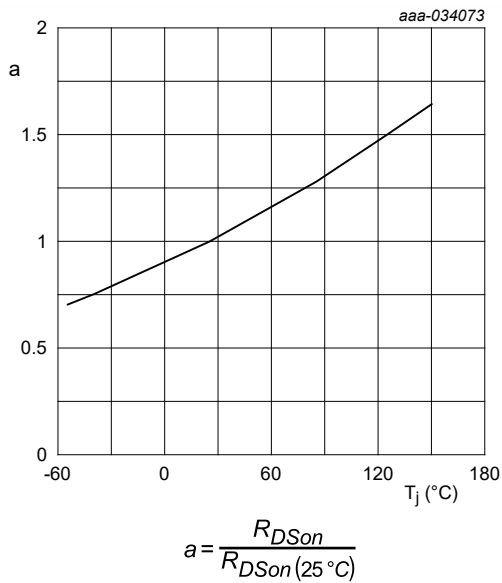


Fig. 12. Normalized drain-source on-state resistance as a function of junction temperature; typical values

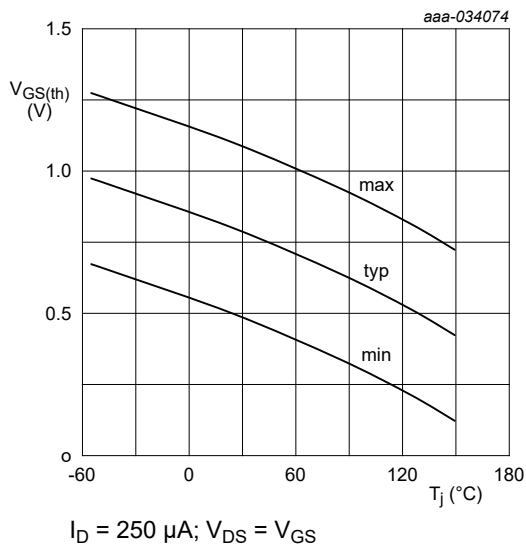


Fig. 13. Gate-source threshold voltage as a function of junction temperature

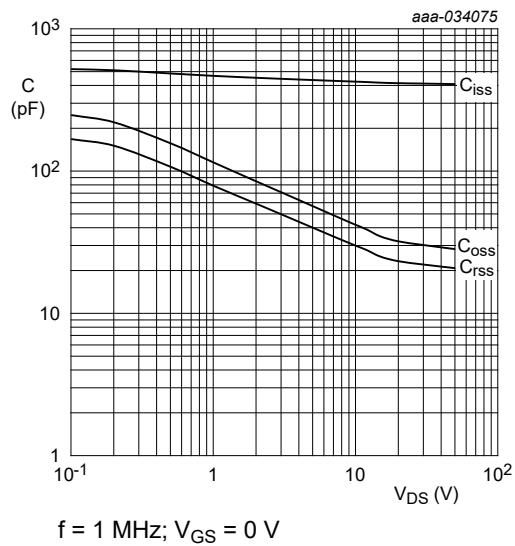


Fig. 14. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

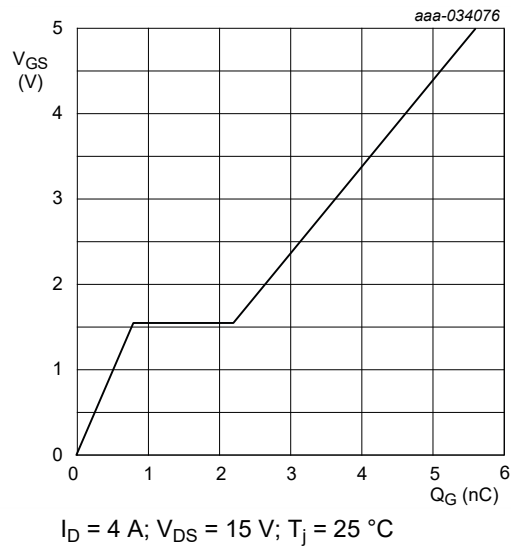


Fig. 15. Gate-source voltage as a function of gate charge; typical values

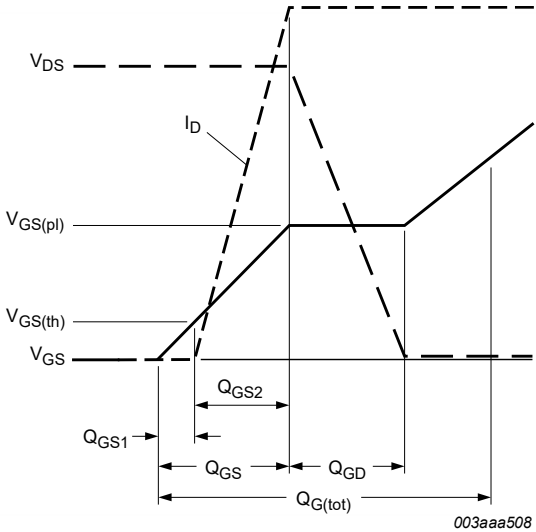


Fig. 16. Gate charge waveform definitions

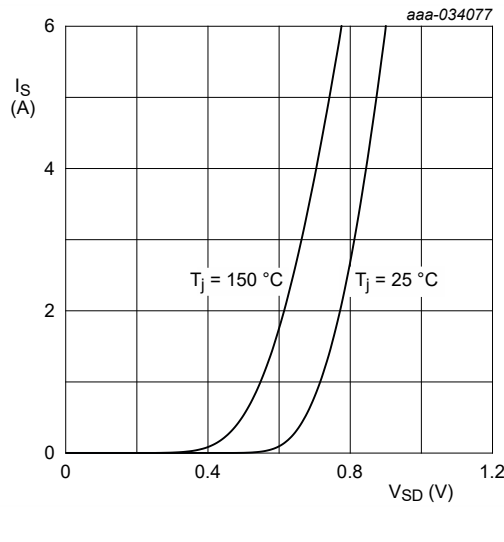


Fig. 17. Source current as a function of source-drain voltage; typical values

11. Test information

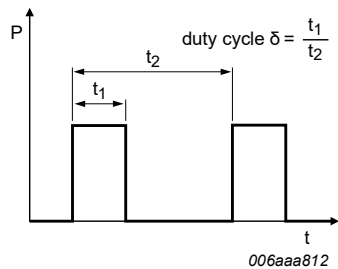


Fig. 18. Duty cycle definition

12. Package outline

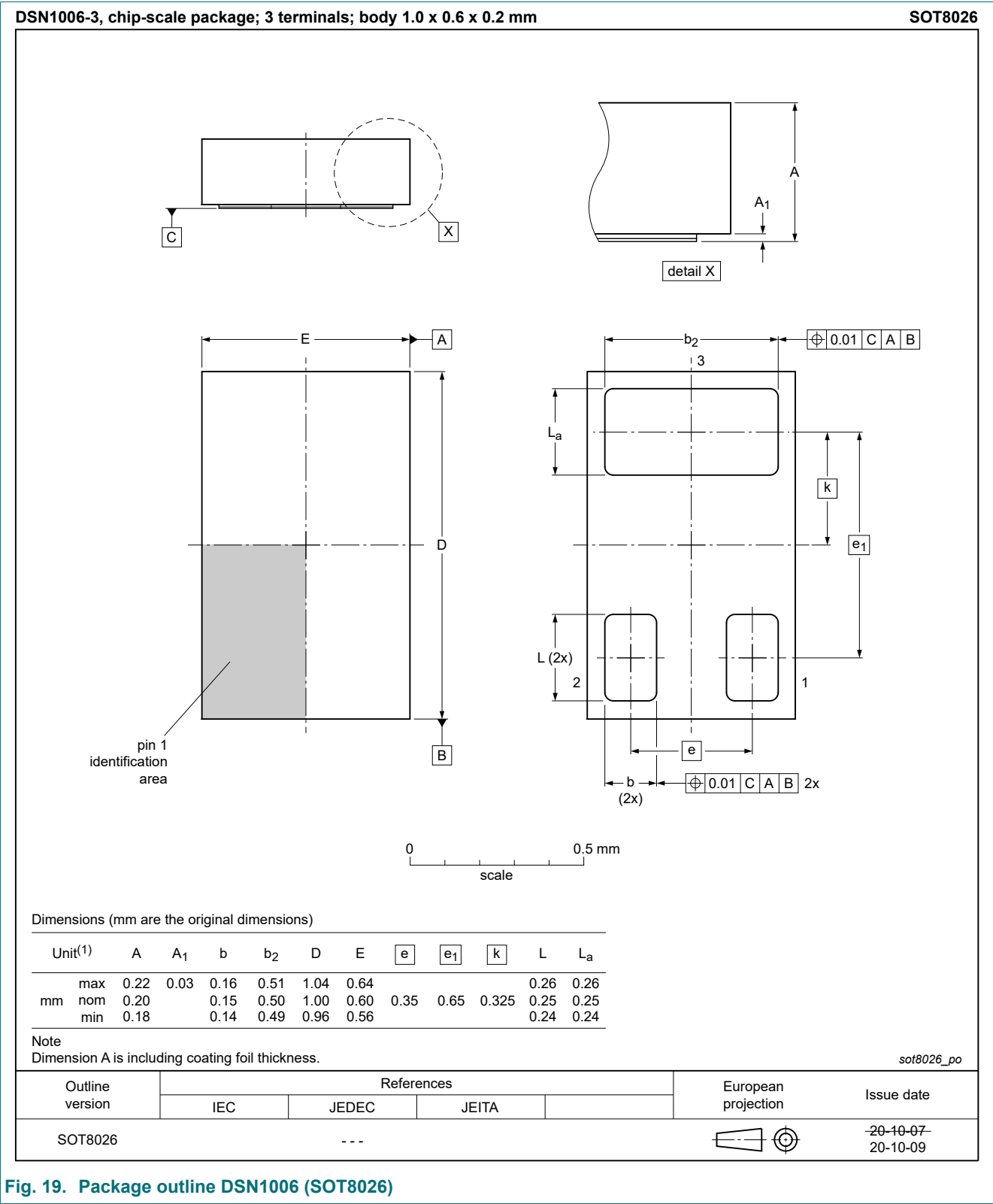


Fig. 19. Package outline DSN1006 (SOT8026)

13. Soldering

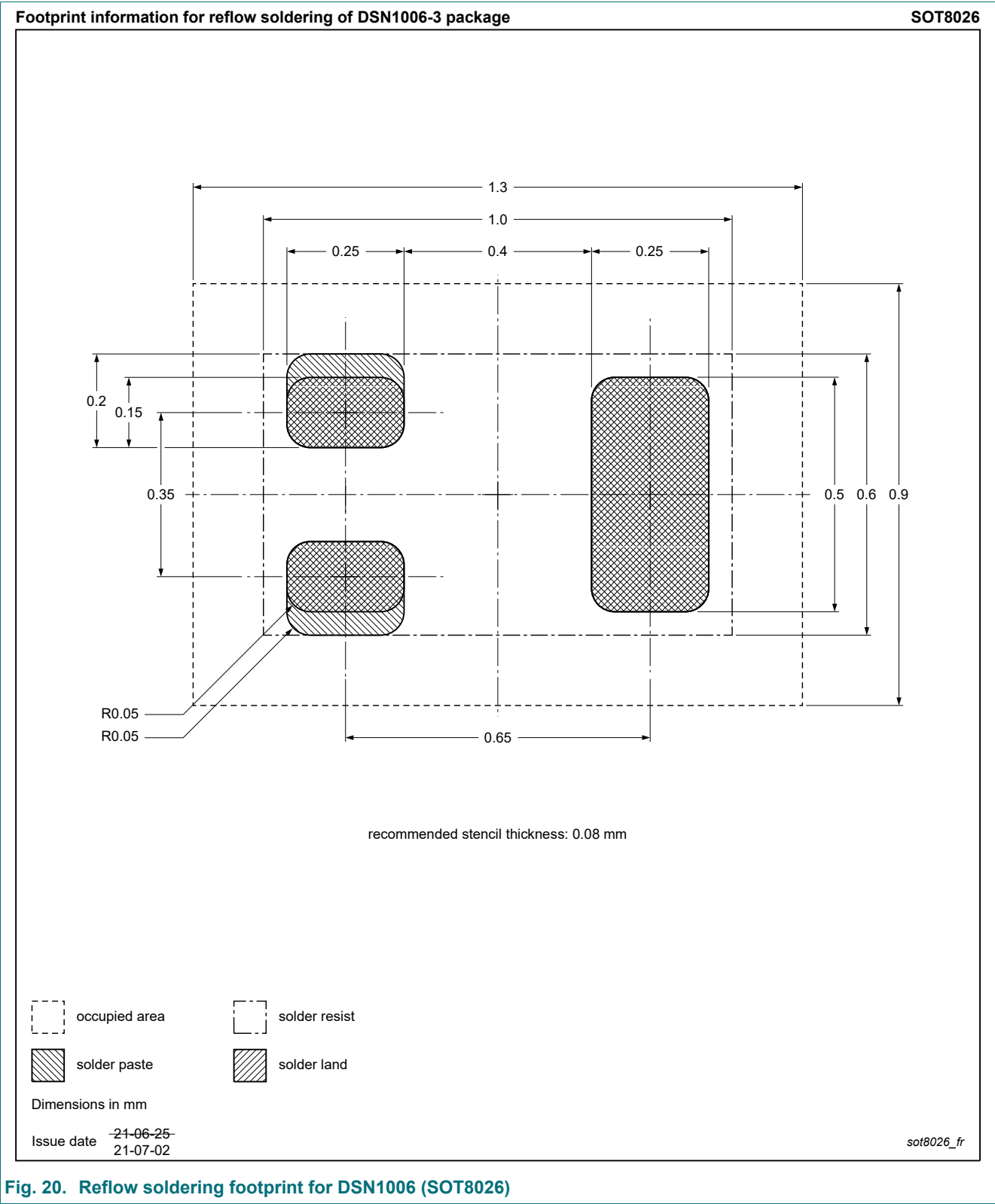


Fig. 20. Reflow soldering footprint for DSN1006 (SOT8026)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMCB60XNE v.1	20220221	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.....	6
11. Test information.....	9
12. Package outline.....	10
13. Soldering.....	11
14. Revision history.....	12
15. Legal information.....	13

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