



PMZB600UNEL

20 V, N-channel Trench MOSFET

5 December 2016

Product data sheet

1. General description

N-channel enhancement mode Field-Effect Transistor (FET) in a leadless ultra small DFN1006B-3 (SOT883B) Surface-Mounted Device (SMD) plastic package using Trench MOSFET technology.

2. Features and benefits

- Low leakage current
- Leadless ultra small SMD plastic package: $1.0 \times 0.6 \times 0.37$ mm
- ElectroStatic Discharge (ESD) protection > 1 kV HBM
- Drain-source on-state resistance $R_{DSon} = 470$ m Ω

3. Applications

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

4. Quick reference data

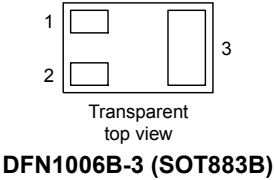
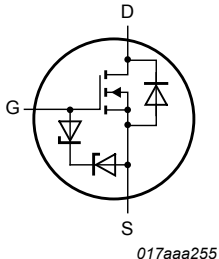
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$T_j = 25$ °C	-	-	20	V
V_{GS}	gate-source voltage		-8	-	8	V
I_D	drain current	$V_{GS} = 4.5$ V; $T_{amb} = 25$ °C	[1]	-	0.6	A
Static characteristics						
R_{DSon}	drain-source on-state resistance	$V_{GS} = 4.5$ V; $I_D = 0.6$ A; $T_j = 25$ °C	-	470	620	m Ω

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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	G	gate		
2	S	source		
3	D	drain		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMZB600UNEL	DFN1006B-3	DFN1006B-3: leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.37 mm	SOT883B

7. Marking

Table 4. Marking codes

Type number	Marking code
PMZB600UNEL	0101 1110

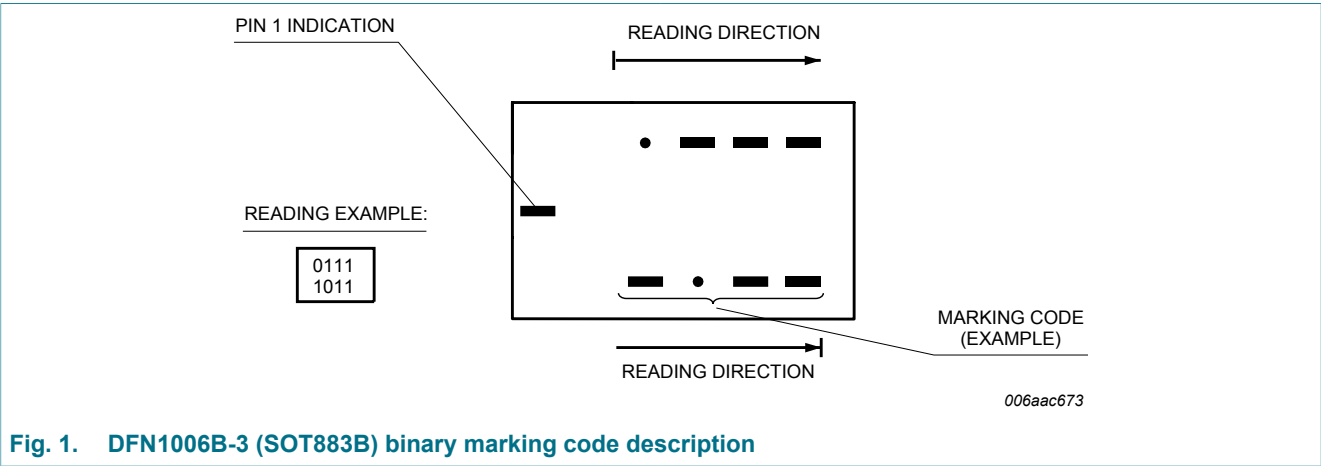


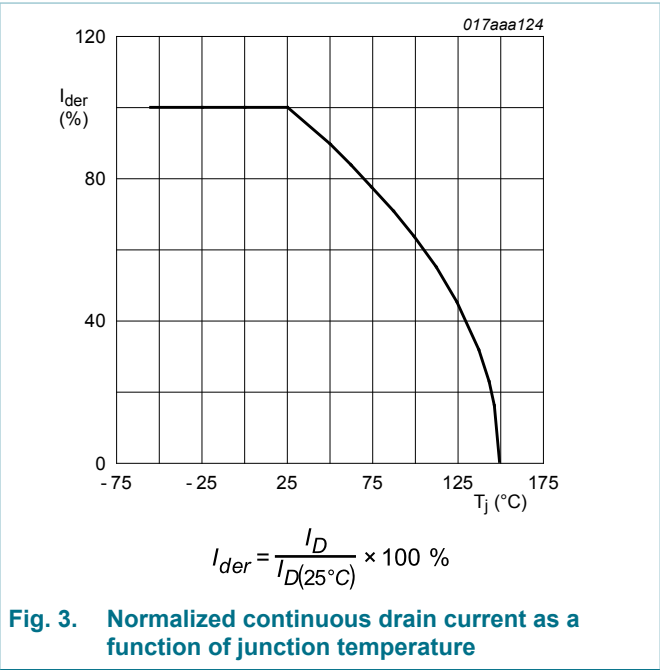
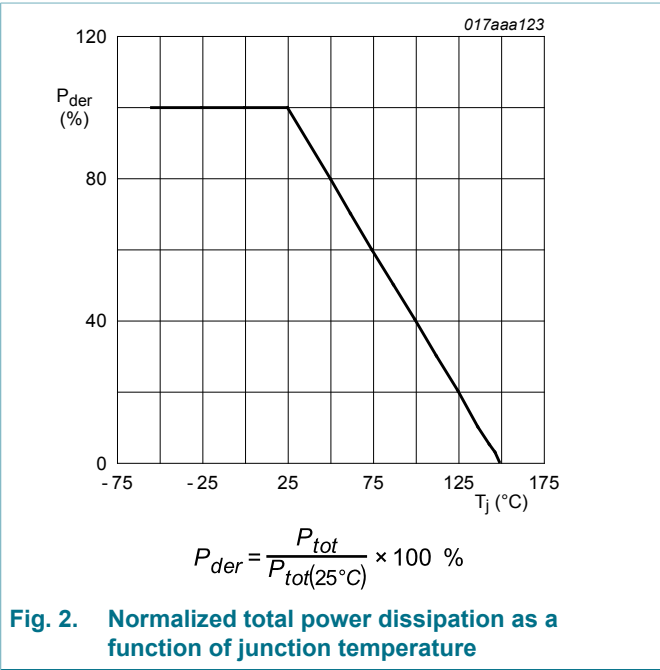
Fig. 1. DFN1006B-3 (SOT883B) binary marking code description

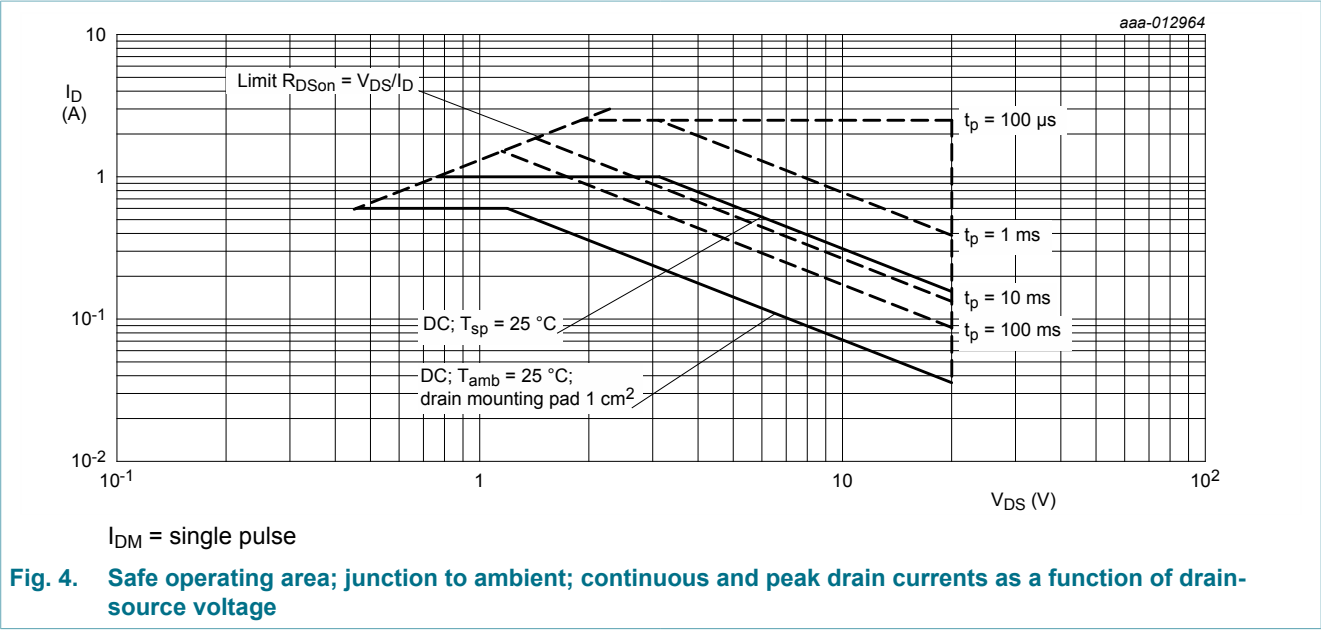
8. Limiting values

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		-	20	V
V _{GS}	gate-source voltage			-8	8	V
I _D	drain current	V _{GS} = 4.5 V; T _{amb} = 25 °C	[1]	-	0.6	A
		V _{GS} = 4.5 V; T _{amb} = 100 °C	[1]	-	0.4	A
I _{DM}	peak drain current	T _{amb} = 25 °C; single pulse; t _p ≤ 10 μs		-	2.5	A
P _{tot}	total power dissipation	T _{amb} = 25 °C	[2]	-	360	mW
			[1]	-	715	mW
		T _{sp} = 25 °C		-	2700	mW
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]	-	0.4	A

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



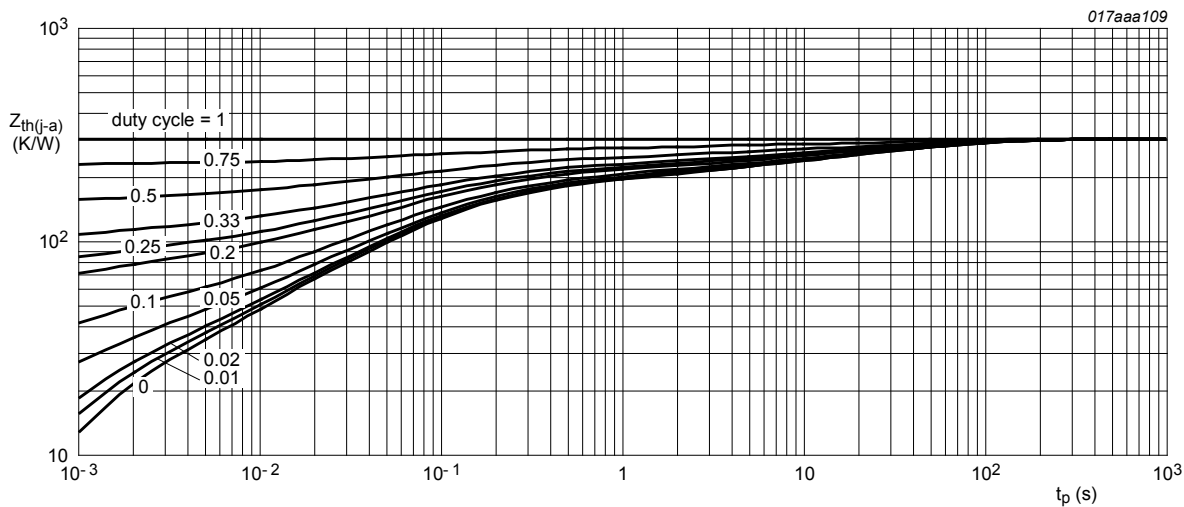


9. Thermal characteristics

Table 6. Thermal characteristics

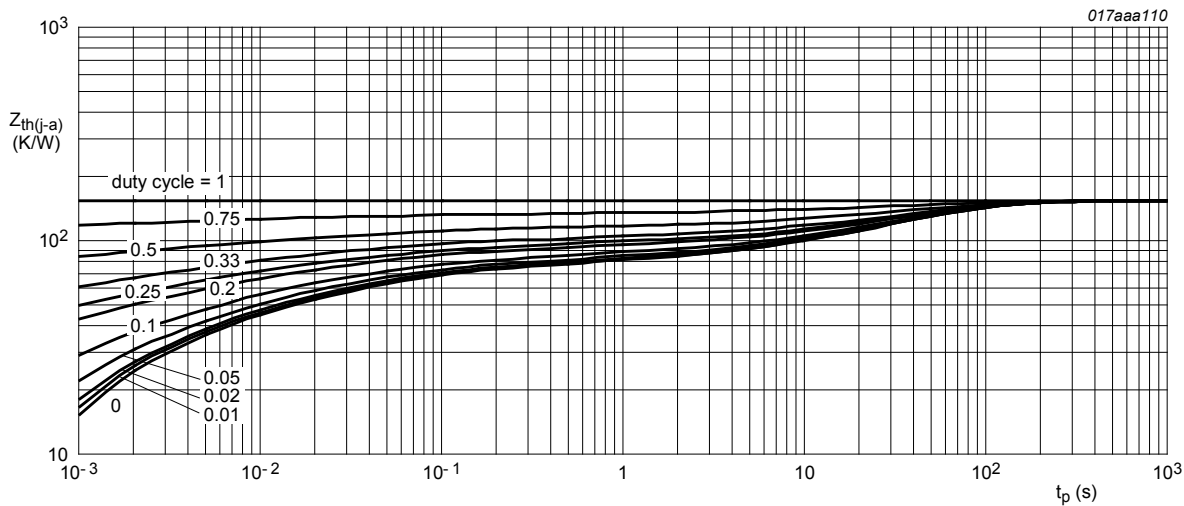
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	305	360	K/W
			[2]	-	150	175	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	40	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for drain 1 cm².



FR4 PCB, standard footprint

Fig. 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, mounting pad for drain 1 cm²

Fig. 6. 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
Static characteristics							
V _{(BR)DSS}	drain-source breakdown voltage	I _D = 250 μA; V _{GS} = 0 V; T _j = 25 °C		20	-	-	V
V _{GSth}	gate-source threshold voltage	I _D = 250 μA; V _{DS} =V _{GS} ; T _j = 25 °C		0.45	0.7	0.95	V
I _{DSS}	drain leakage current	V _{DS} = 20 V; V _{GS} = 0 V; T _j = 25 °C		-	-	1	μA
		V _{DS} = 20 V; V _{GS} = 0 V; T _j = 150 °C		-	-	10	μA
		V _{DS} = 5 V; V _{GS} = 0 V; T _j = 25 °C		-	-	25	nA
I _{GSS}	gate leakage current	V _{GS} = 8 V; V _{DS} = 0 V; T _j = 25 °C		-	-	10	μA
		V _{GS} = -8 V; V _{DS} = 0 V; T _j = 25 °C		-	-	-10	μA
		V _{GS} = 4.5 V; V _{DS} = 0 V; T _j = 25 °C		-	-	1	μA
		V _{GS} = -4.5 V; V _{DS} = 0 V; T _j = 25 °C		-	-	-1	μA
		V _{GS} = 1.8 V; V _{DS} = 0 V; T _j = 25 °C		-	-	50	nA
		V _{GS} = -1.8 V; V _{DS} = 0 V; T _j = 25 °C		-	-	-50	nA
R _{DSon}	drain-source on-state resistance	V _{GS} = 4.5 V; I _D = 0.6 A; T _j = 25 °C		-	470	620	mΩ
		V _{GS} = 4.5 V; I _D = 0.6 A; T _j = 150 °C		-	760	1000	mΩ
		V _{GS} = 2.5 V; I _D = 0.5 A; T _j = 25 °C		-	620	850	mΩ
		V _{GS} = 1.8 V; I _D = 0.1 A; T _j = 25 °C		-	845	1300	mΩ
		V _{GS} = 1.5 V; I _D = 10 mA; T _j = 25 °C		-	1125	3000	mΩ
		V _{GS} = 1.2 V; I _D = 1 mA; T _j = 25 °C		-	2210	-	mΩ
g _{fs}	forward transconductance	V _{DS} = 5 V; I _D = 0.6 A; T _j = 25 °C		-	1	-	S
R _G	gate resistance	f = 1 MHz		-	34	-	Ω
Dynamic characteristics							
Q _{G(tot)}	total gate charge	V _{DS} = 10 V; I _D = 0.6 A; V _{GS} = 4.5 V; T _j = 25 °C		-	0.4	0.7	nC
Q _{GS}	gate-source charge			-	0.1	-	nC
Q _{GD}	gate-drain charge			-	0.1	-	nC
C _{iss}	input capacitance	V _{DS} = 10 V; f = 1 MHz; V _{GS} = 0 V; T _j = 25 °C		-	21.3	-	pF
C _{oss}	output capacitance			-	5.4	-	pF
C _{rss}	reverse transfer capacitance			-	4.2	-	pF
t _{d(on)}	turn-on delay time	V _{DS} = 10 V; I _D = 0.6 A; V _{GS} = 4.5 V; R _{G(ext)} = 6 Ω; T _j = 25 °C		-	5.6	-	ns
t _r	rise time			-	9.2	-	ns
t _{d(off)}	turn-off delay time			-	19	-	ns
t _f	fall time			-	51	-	ns
Source-drain diode							
V _{SD}	source-drain voltage	I _S = 0.36 A; V _{GS} = 0 V; T _j = 25 °C		-	0.8	1.2	V

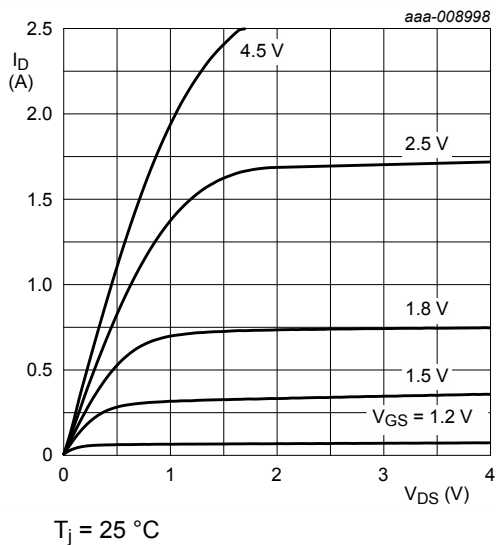


Fig. 7. Output characteristics: drain current as a function of drain-source voltage; typical values

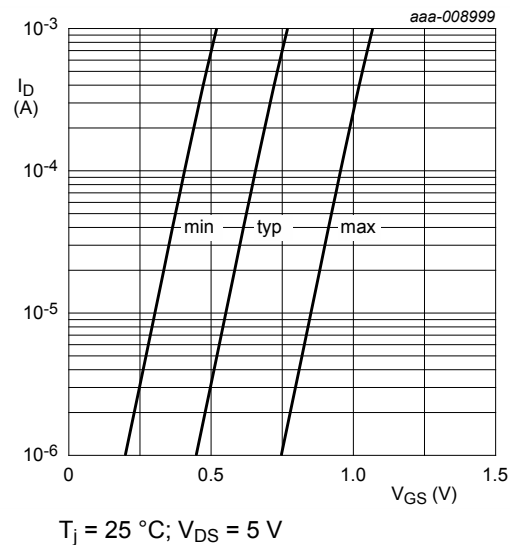


Fig. 8. Sub-threshold drain current as a function of gate-source voltage

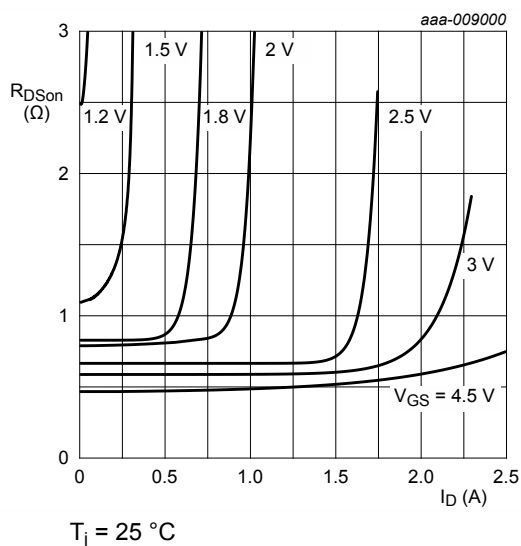


Fig. 9. Drain-source on-state resistance as a function of drain current; typical values

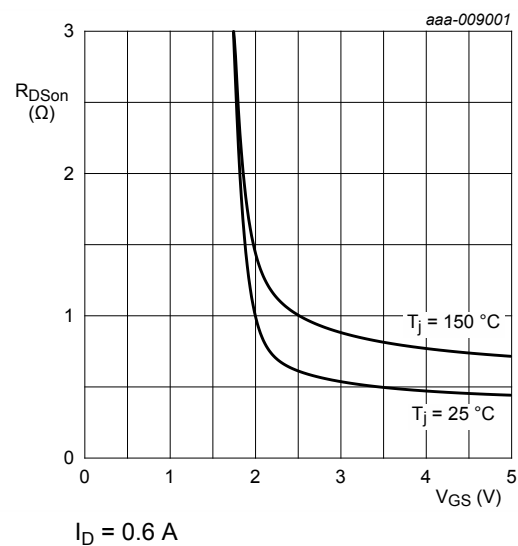


Fig. 10. Drain-source on-state resistance as a function of gate-source voltage; typical values

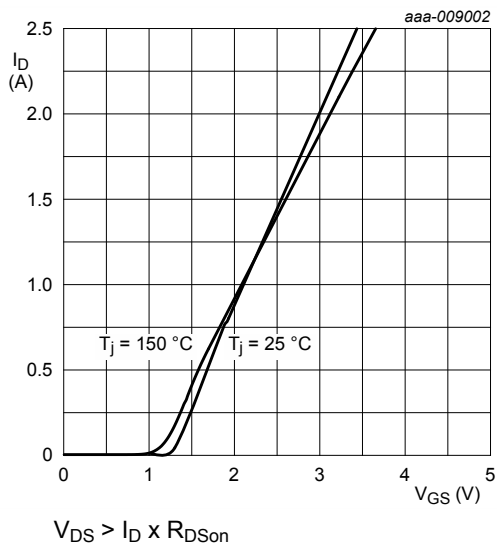


Fig. 11. Transfer characteristics: drain current as a function of gate-source voltage; typical values

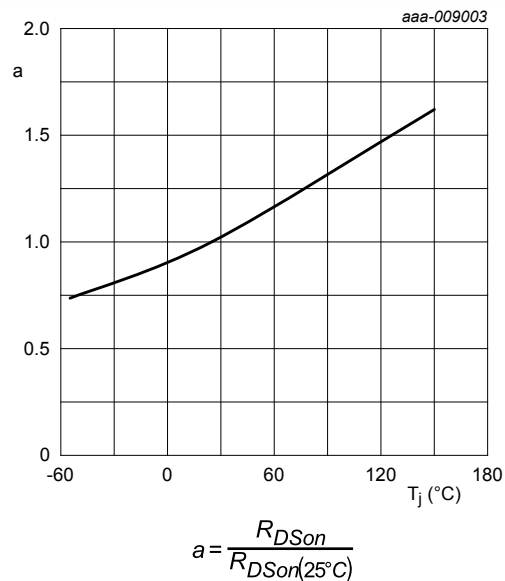


Fig. 12. Normalized drain-source on-state resistance as a function of junction temperature; typical values

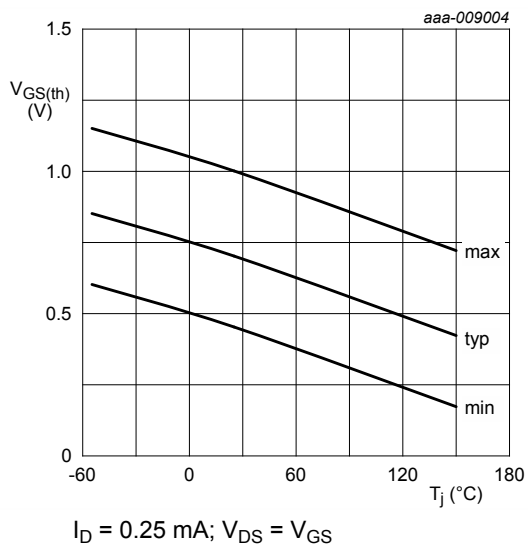


Fig. 13. Gate-source threshold voltage as a function of junction temperature

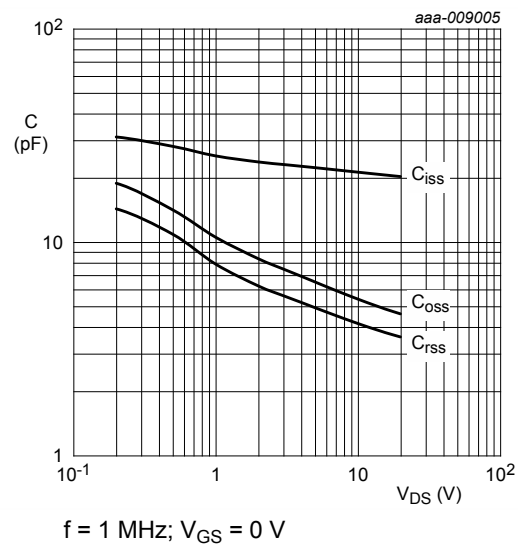


Fig. 14. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

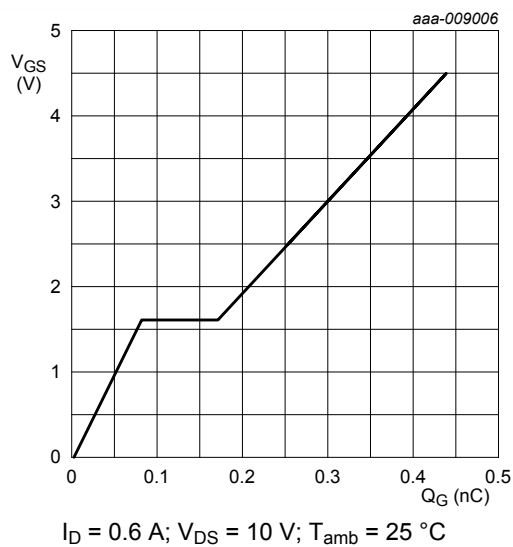


Fig. 15. Gate-source voltage as a function of gate charge; typical values

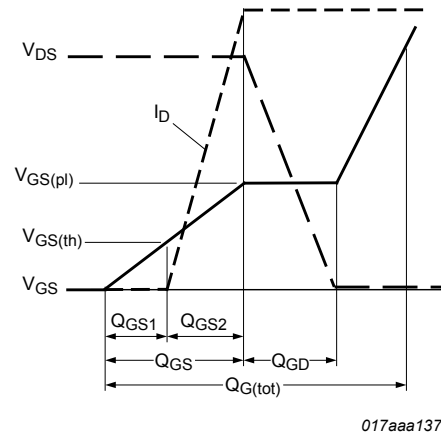


Fig. 16. MOSFET transistor: Gate charge waveform definitions

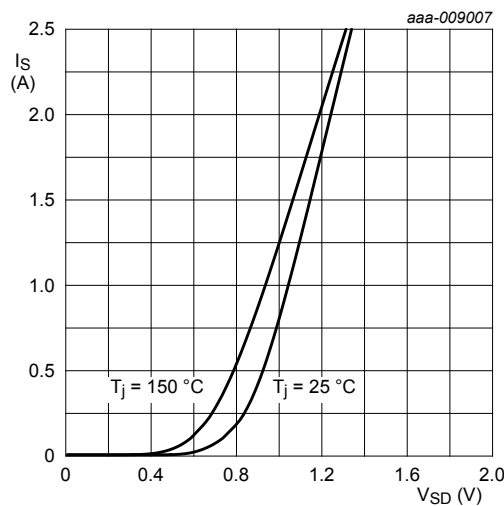


Fig. 17. Source current as a function of source-drain voltage; typical values

11. Package outline

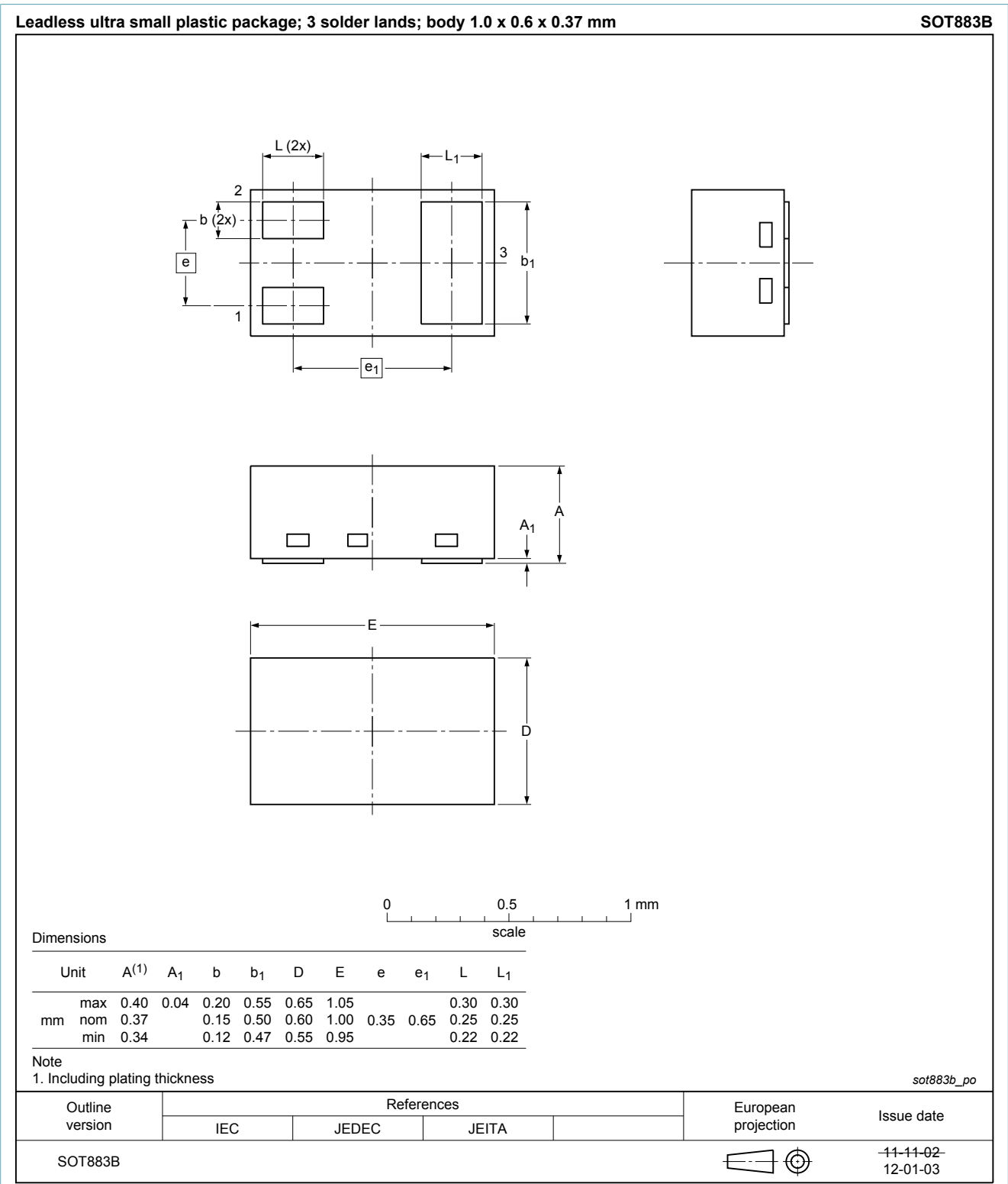


Fig. 18. Package outline DFN1006B-3 (SOT883B)

12. Soldering

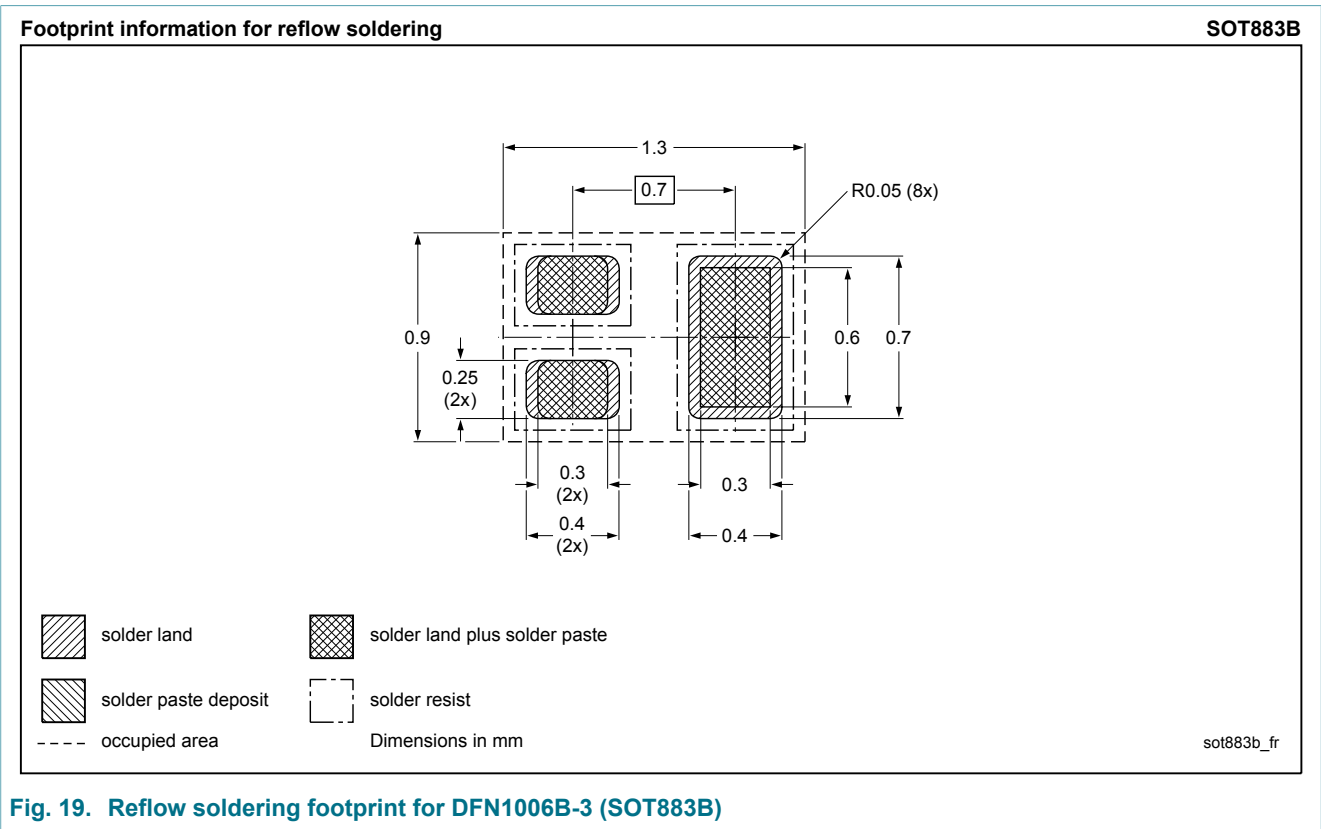


Fig. 19. Reflow soldering footprint for DFN1006B-3 (SOT883B)

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMZB600UNEL v.1	20161205	Product data sheet	-	-

14. 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.

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