



PMDXB600UNEL

20 V, dual N-channel Trench MOSFET

28 June 2016

Product data sheet

1. General description

Dual N-channel enhancement mode Field-Effect Transistor (FET) in a leadless ultra small DFN1010B-6 (SOT1216) Surface-Mounted Device (SMD) plastic package using Trench MOSFET technology.

2. Features and benefits

- Low leakage current
- Leadless ultra small and ultra thin SMD plastic package: $1.1 \times 1.0 \times 0.37$ mm
- Exposed drain pad for excellent thermal conduction
- ElectroStatic Discharge (ESD) protection > 1 kV HBM
- Drain-source on-state resistance $R_{DS(on)} = 470$ 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
Per transistor							
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]	-	-	600	mA
Static characteristics (per transistor)							
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = 4.5$ V; $I_D = 600$ mA; $T_J = 25$ °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.

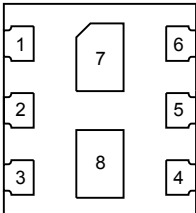
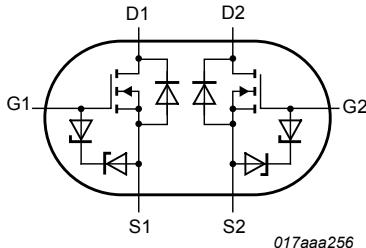


Scan or click this QR code to view the latest information for this product



5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	S1	source TR1	 Transparent top view DFN1010B-6 (SOT1216)	 017aaa256
2	G1	gate TR1		
3	D2	drain TR2		
4	S2	source TR2		
5	G2	gate TR2		
6	D1	drain TR1		
7	D1	drain TR1		
8	D2	drain TR2		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMDXB600UNEL	DFN1010B-6	DFN1010B-6: plastic thermal enhanced ultra thin small outline package; no leads; 6 terminals	SOT1216

7. Marking

Table 4. Marking codes

Type number	Marking code
PMDXB600UNEL	C 001

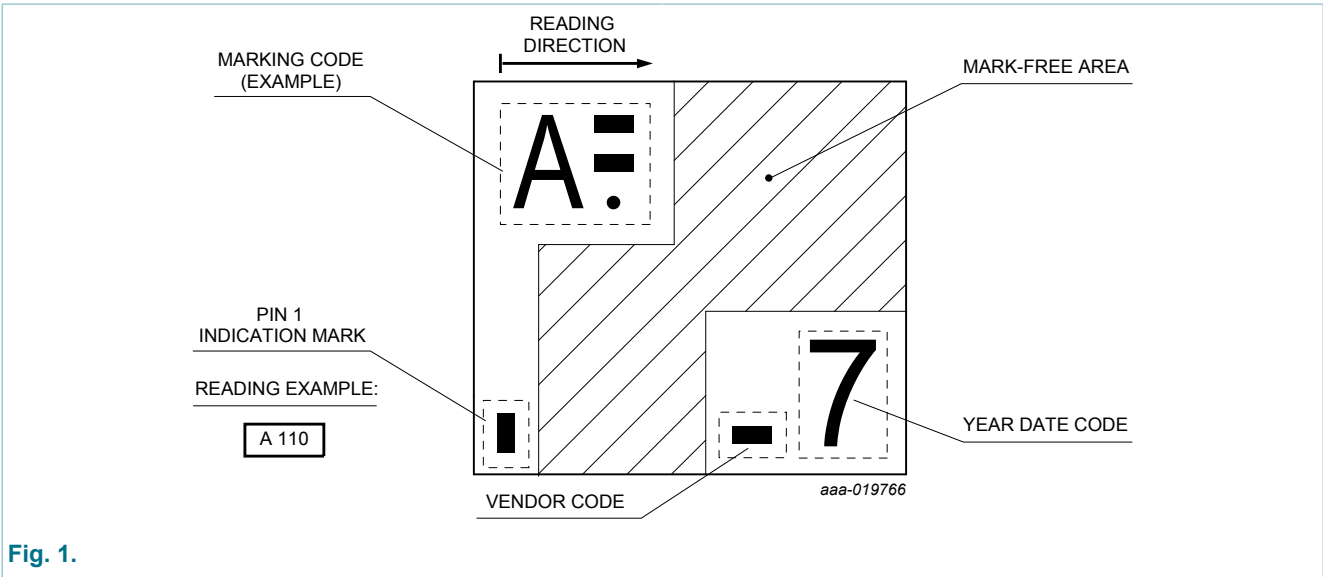


Fig. 1.

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per transistor						
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]	-	600	mA
		V _{GS} = 4.5 V; T _{amb} = 100 °C	[1]	-	400	mA
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]	-	265	mW
			[1]	-	380	mW
		T _{sp} = 25 °C		-	4025	mW
Per device						
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 cm^2 .

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

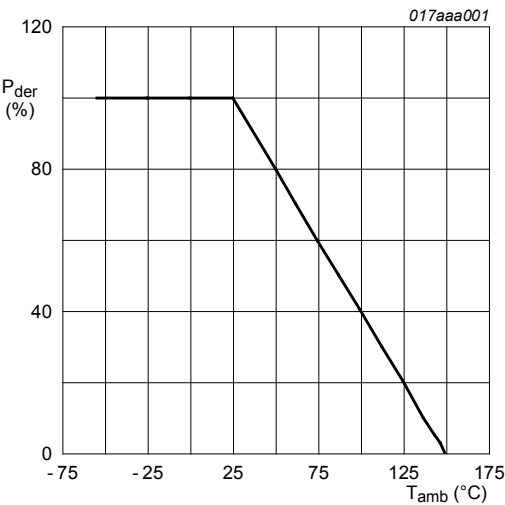


Fig. 2. Normalized total power dissipation as a function of ambient temperature

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

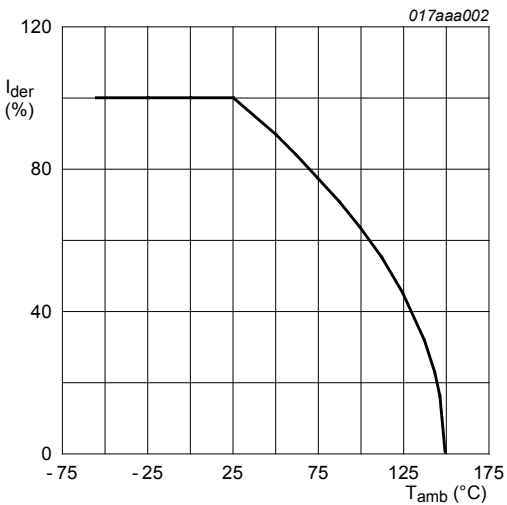


Fig. 3. Normalized continuous drain current as a function of ambient temperature

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

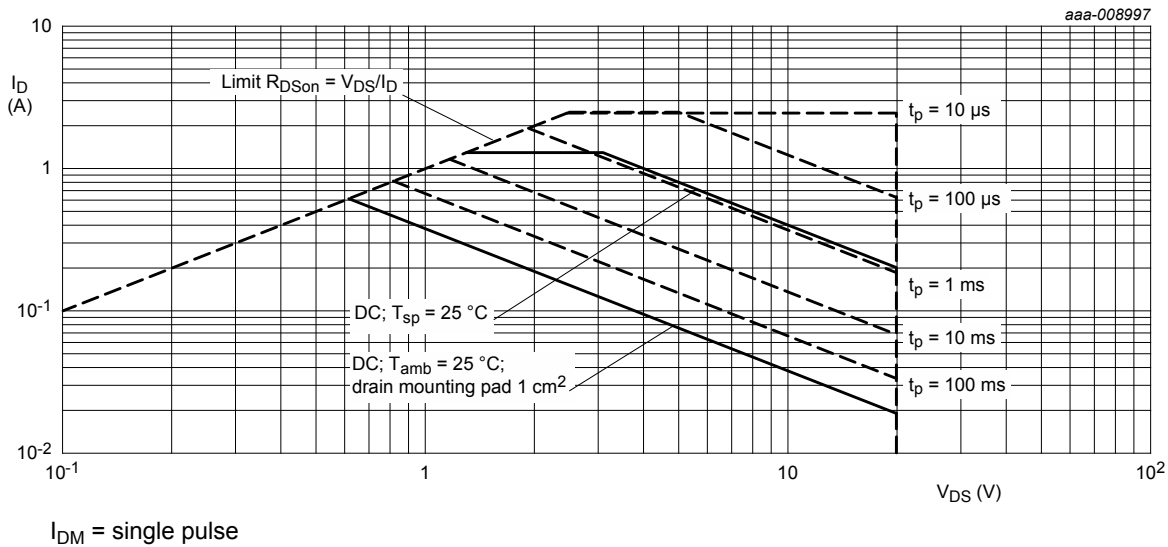


Fig. 4. Safe operating area; junction to ambient; continuous and peak drain currents as a function of drain-source voltage

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	410	475	K/W
			[2]	-	285	330	K/W

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	27	31	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.

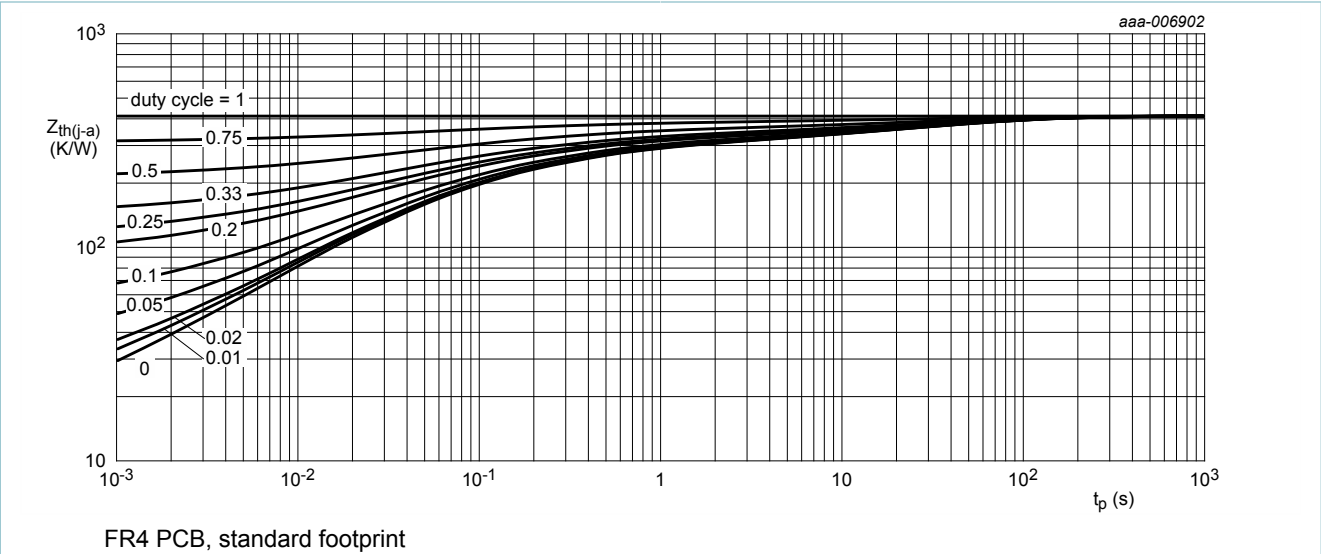


Fig. 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

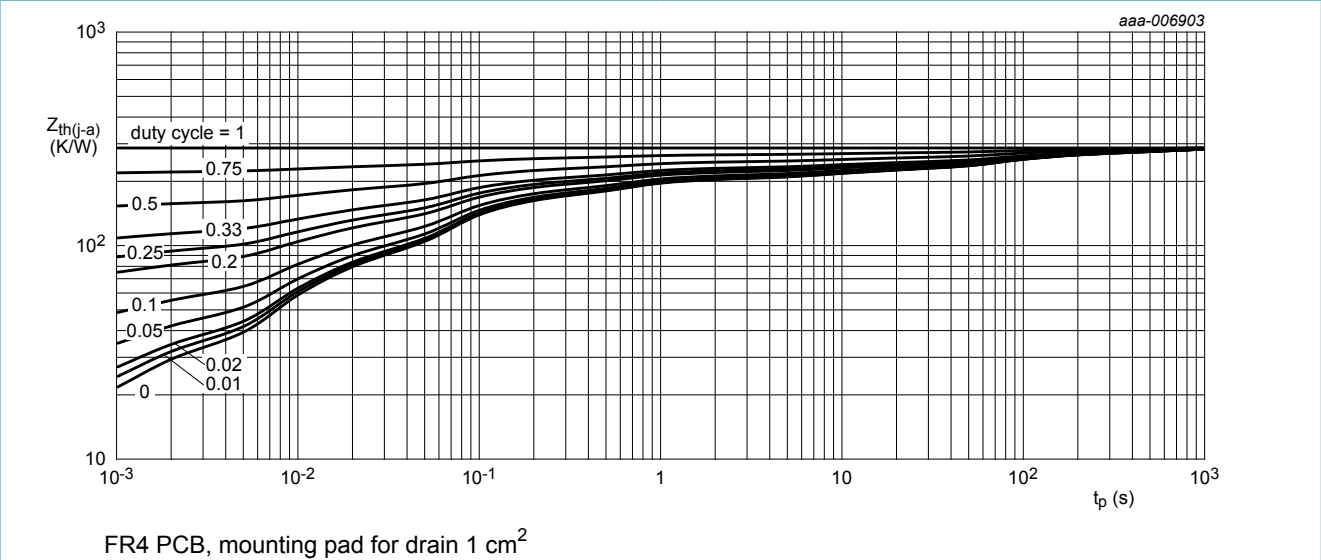


Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics (per transistor)						
$V_{(BR)DSS}$	drain-source breakdown voltage	$I_D = 250\ \mu A$; $V_{GS} = 0\ V$; $T_j = 25\ ^\circ C$	20	-	-	V
V_{GSth}	gate-source threshold voltage	$I_D = 250\ \mu A$; $V_{DS} = V_{GS}$; $T_j = 25\ ^\circ C$	0.45	0.7	0.95	V
I_{DSS}	drain leakage current	$V_{DS} = 20\ V$; $V_{GS} = 0\ V$; $T_j = 25\ ^\circ C$	-	-	1	μA
		$V_{DS} = 5\ V$; $V_{GS} = 0\ V$; $T_j = 25\ ^\circ C$	-	-	25	nA
I_{GSS}	gate leakage current	$V_{GS} = 8\ V$; $V_{DS} = 0\ V$; $T_j = 25\ ^\circ C$	-	-	10	μA
		$V_{GS} = -8\ V$; $V_{DS} = 0\ V$; $T_j = 25\ ^\circ C$	-	-	-10	μA
		$V_{GS} = 4.5\ V$; $V_{DS} = 0\ V$; $T_j = 25\ ^\circ C$	-	-	1	μA
		$V_{GS} = -4.5\ V$; $V_{DS} = 0\ V$; $T_j = 25\ ^\circ C$	-	-	-1	μA
		$V_{GS} = 1.8\ V$; $V_{DS} = 0\ V$; $T_j = 25\ ^\circ C$	-	-	50	nA
		$V_{GS} = -1.8\ V$; $V_{DS} = 0\ V$; $T_j = 25\ ^\circ C$	-	-	-50	nA
R_{DSon}	drain-source on-state resistance	$V_{GS} = 4.5\ V$; $I_D = 600\ mA$; $T_j = 25\ ^\circ C$	-	470	620	m Ω
		$V_{GS} = 4.5\ V$; $I_D = 600\ mA$; $T_j = 150\ ^\circ C$	-	760	1000	m Ω
		$V_{GS} = 2.5\ V$; $I_D = 500\ mA$; $T_j = 25\ ^\circ C$	-	620	850	m Ω
		$V_{GS} = 1.8\ V$; $I_D = 100\ mA$; $T_j = 25\ ^\circ C$	-	845	1300	m Ω
		$V_{GS} = 1.5\ V$; $I_D = 10\ mA$; $T_j = 25\ ^\circ C$	-	1125	3000	m Ω
		$V_{GS} = 1.2\ V$; $I_D = 1\ mA$; $T_j = 25\ ^\circ C$	-	2210	-	m Ω
g_{fs}	forward transconductance	$V_{DS} = 5\ V$; $I_D = 0.6\ A$; $T_j = 25\ ^\circ C$	-	1	-	S
Dynamic characteristics (per transistor)						
$Q_{G(tot)}$	total gate charge	$V_{DS} = 10\ V$; $I_D = 600\ mA$; $V_{GS} = 4.5\ V$; $T_j = 25\ ^\circ C$	-	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	$V_{DS} = 10\ V$; $f = 1\ MHz$; $V_{GS} = 0\ V$; $T_j = 25\ ^\circ C$	-	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	$V_{DS} = 10\ V$; $I_D = 600\ mA$; $V_{GS} = 4.5\ V$; $R_{G(ext)} = 6\ \Omega$; $T_j = 25\ ^\circ C$	-	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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Source-drain diode (per transistor)						
V _{SD}	source-drain voltage	I _S = 0.36 A; V _{GS} = 0 V; T _j = 25 °C	-	0.8	1.2	V

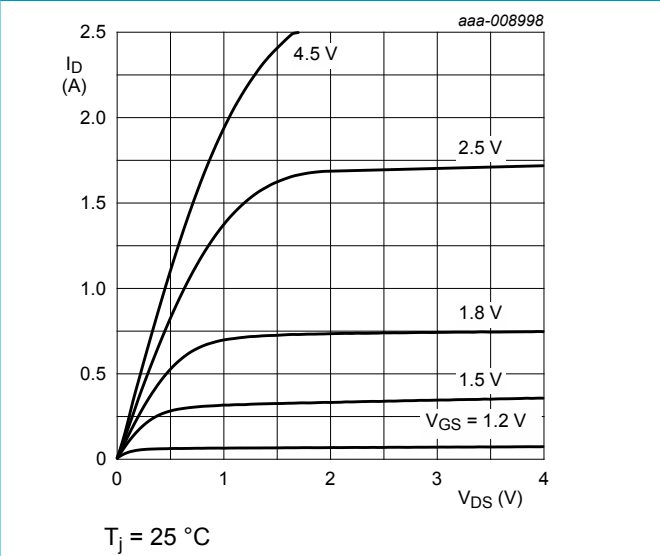


Fig. 7. Output characteristics: drain current as a function of drain-source voltage; typical values

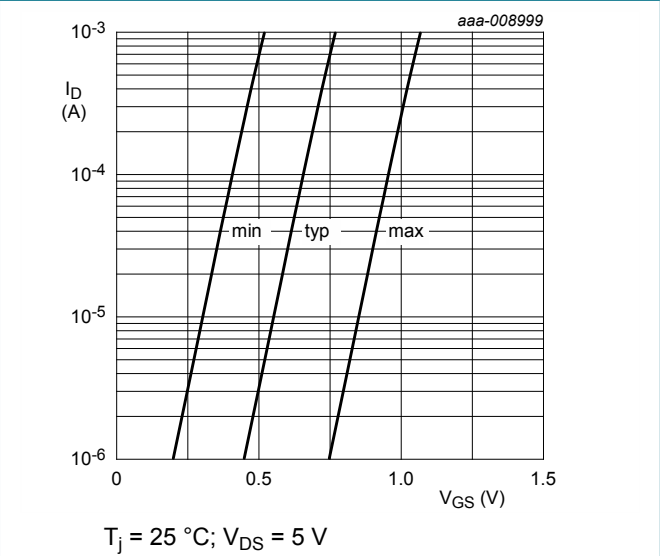


Fig. 8. Sub-threshold drain current as a function of gate-source voltage

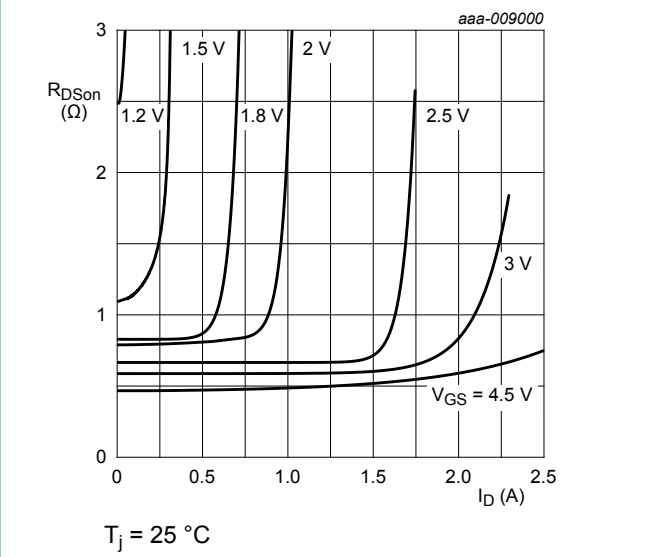


Fig. 9. Drain-source on-state resistance as a function of drain current; typical values

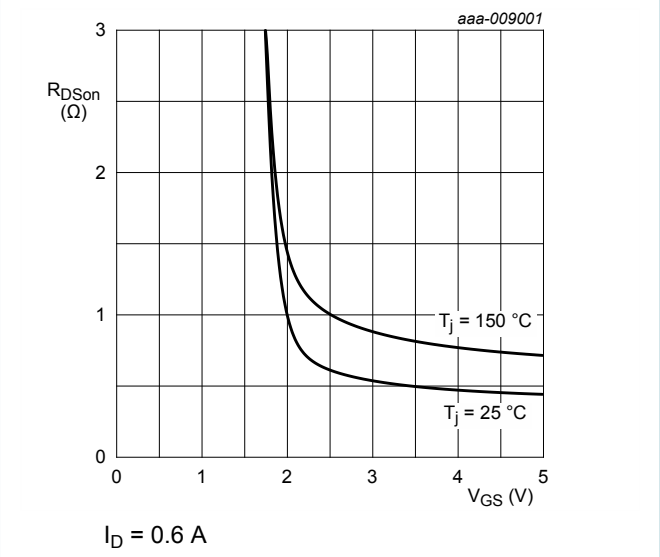


Fig. 10. Drain-source on-state resistance as a function of gate-source voltage; typical values

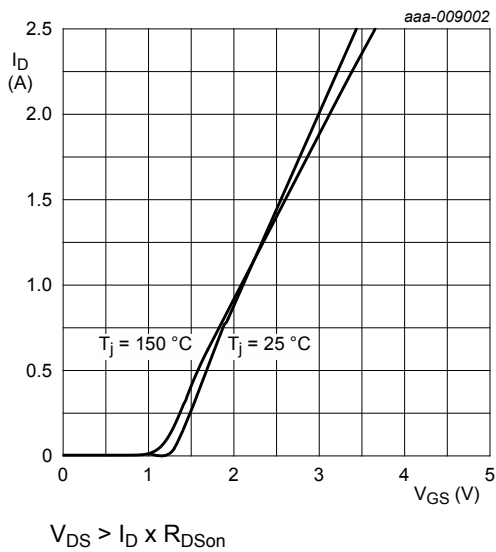


Fig. 11. Transfer characteristics: drain current as a function of gate-source voltage; typical values

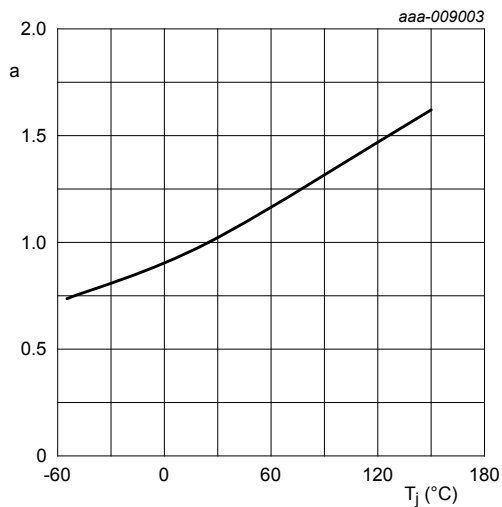


Fig. 12. Normalized drain-source on-state resistance as a function of junction temperature; typical values

$$a = \frac{R_{DSon}}{R_{DSon(25^{\circ}\text{C})}}$$

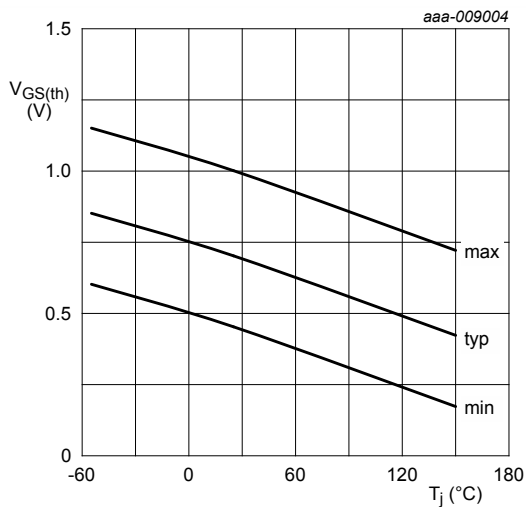


Fig. 13. Gate-source threshold voltage as a function of junction temperature

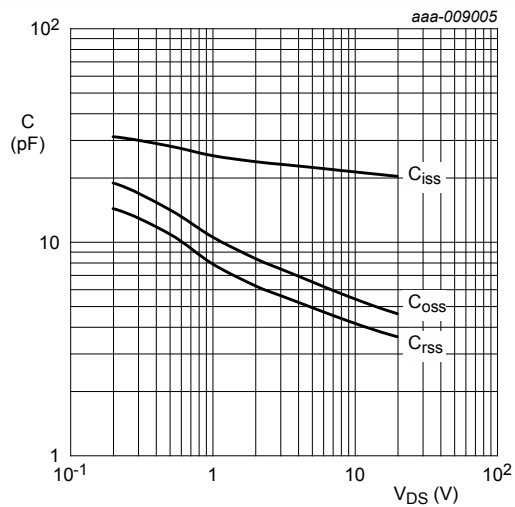


Fig. 14. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

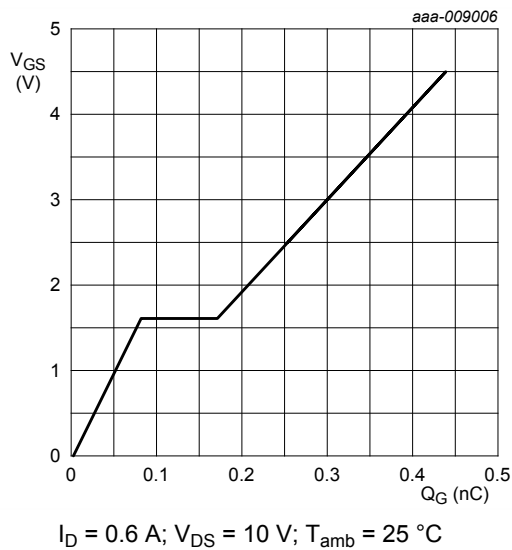


Fig. 15. Gate-source voltage as a function of gate charge; typical values

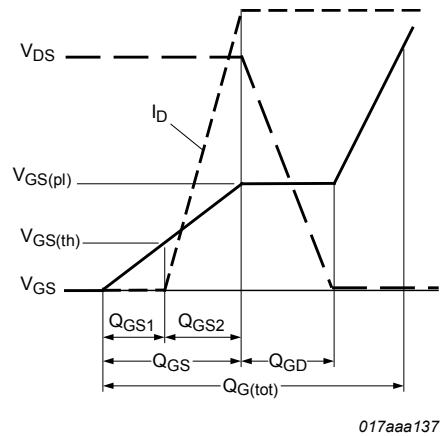


Fig. 16. MOSFET transistor: Gate charge waveform definitions

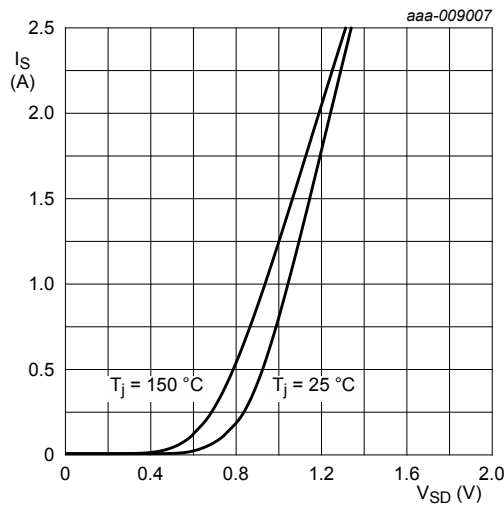


Fig. 17. Source current as a function of source-drain voltage; typical values

11. Test information

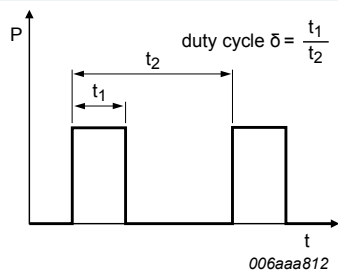
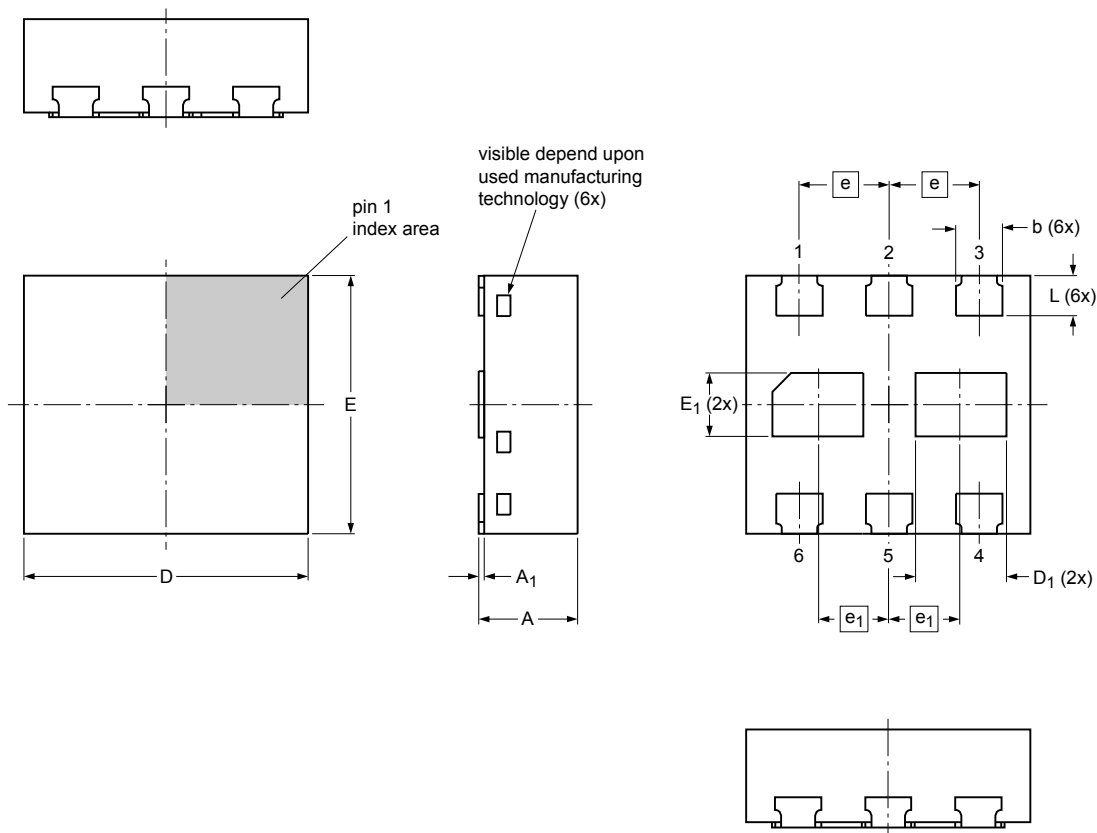


Fig. 18. Duty cycle definition

12. Package outline

DFN1010B-6: plastic thermal enhanced ultra thin small outline package; no leads;
6 terminals; body: 1.1 x 1.0 x 0.37 mm

SOT1216



0 1 mm
scale

Dimensions (mm are the original dimensions)

Unit	A	A ₁	b	D	D ₁	E	E ₁	e	e ₁	L
min	0.34		0.15	1.05	0.32	0.95	0.22			0.125
mm	nom		0.18	1.10	0.35	1.00	0.25	0.35	0.275	0.155
	max	0.40	0.04	0.23	1.15	0.40	1.05	0.30		0.205

Note
1. Dimension A is including plating thickness.

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1216						13-03-05 13-03-06

Fig. 19. Package outline DFN1010B-6 (SOT1216)

13. Soldering

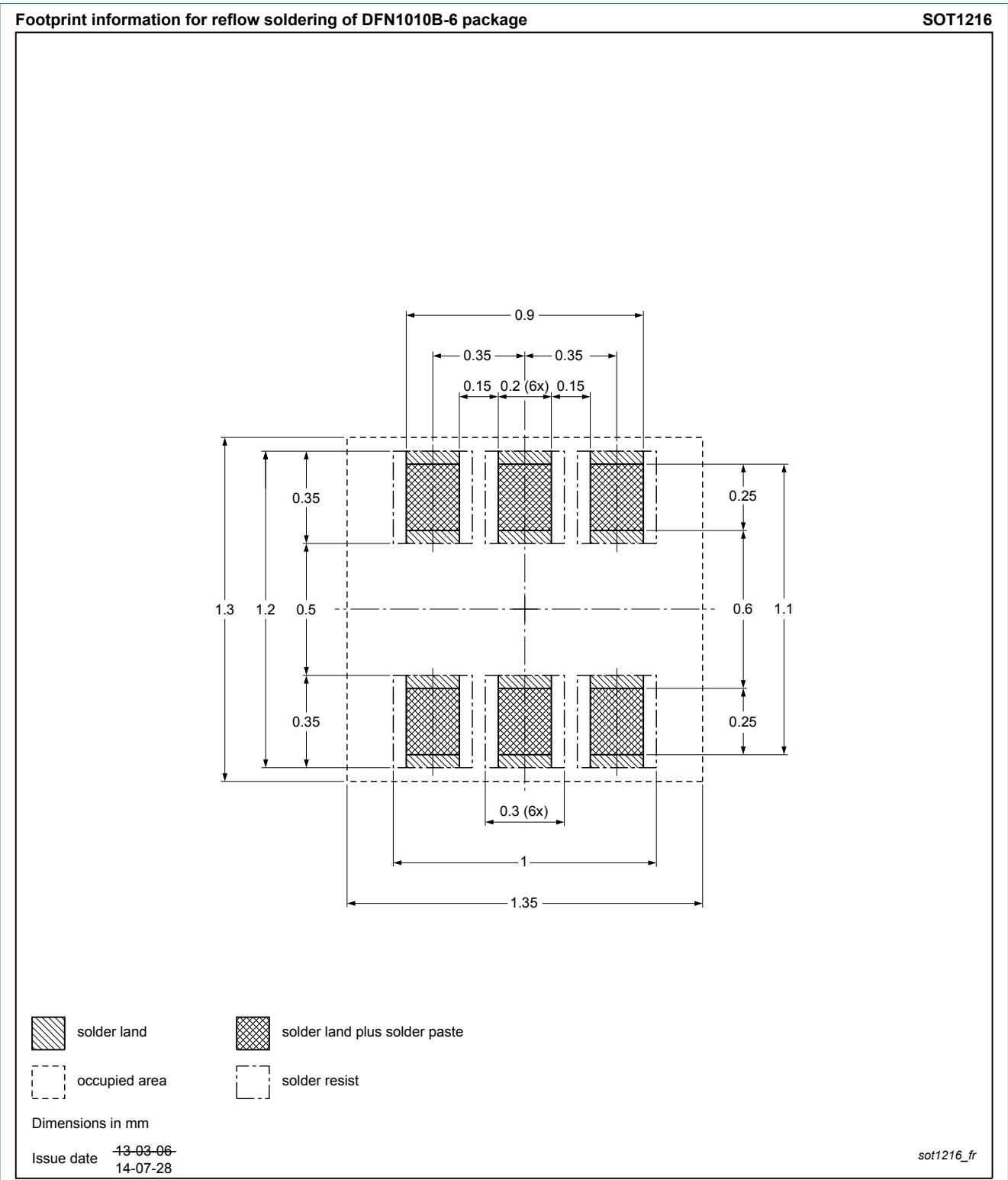


Fig. 20. Reflow soldering footprint for DFN1010B-6 (SOT1216)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMDXB600UNEL v.1	20160628	Product data sheet	-	-

15. Legal information

15.1 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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16. 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 4

9 Thermal characteristics 5

10 Characteristics 7

11 Test information 10

12 Package outline 11

13 Soldering 12

14 Revision history 13

15 Legal information 14

15.1 Data sheet status 14

15.2 Definitions 14

15.3 Disclaimers 14

15.4 Trademarks 15

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