



PMV35EPE

30 V, P-channel Trench MOSFET

6 July 2016

Product data sheet

1. General description

P-channel enhancement mode Field-Effect Transistor (FET) in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package using Trench MOSFET technology.

2. Features and benefits

- Logic level compatible
- Very fast switching
- Trench MOSFET technology
- ElectroStatic Discharge (ESD) protection > 2 kV HBM

3. Applications

- Relay driver
- High-speed line driver
- High-side loadswitch
- Switching circuits

4. Quick reference data

Table 1. Quick reference data

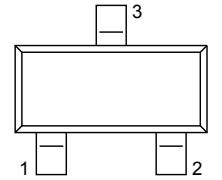
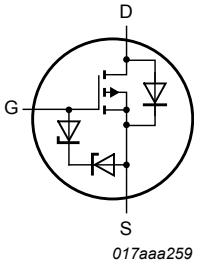
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$T_j = 25 \text{ }^\circ\text{C}$		-	-	-30	V
V_{GS}	gate-source voltage			-20	-	20	V
I_D	drain current	$V_{GS} = -10 \text{ V}; T_{amb} = 25 \text{ }^\circ\text{C}; t \leq 5 \text{ s}$	[1]	-	-	-5.3	A
Static characteristics							
R_{DSon}	drain-source on-state resistance	$V_{GS} = -10 \text{ V}; I_D = -4.2 \text{ A}; T_j = 25 \text{ }^\circ\text{C}$		-	35	45	$\text{m}\Omega$

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

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5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	G	gate		
2	S	source		
3	D	drain	 TO-236AB (SOT23)	 017aaa259

6. Ordering information

Table 3. Ordering information

Type number	Package			Version
	Name	Description		
PMV35EPE	TO-236AB	plastic surface-mounted package; 3 leads		SOT23

7. Marking

Table 4. Marking codes

Type number	Marking code ^[1]
PMV35EPE	EK%

[1] % = placeholder for manufacturing site code

8. Limiting values

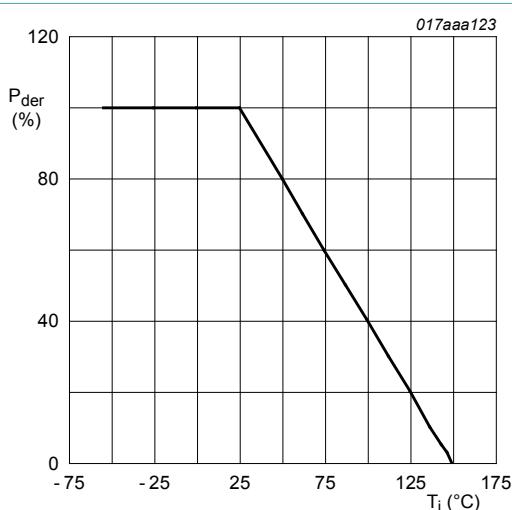
Table 5. Limiting values

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			-20	20	V
I _D	drain current	V _{GS} = -10 V; T _{amb} = 25 °C; t ≤ 5 s	[1]	-	-5.3	A
		V _{GS} = -10 V; T _{amb} = 25 °C	[1]	-	-4.2	A
		V _{GS} = -10 V; T _{amb} = 100 °C	[1]	-	-2.7	A
I _{DM}	peak drain current	T _{amb} = 25 °C; single pulse; t _p ≤ 10 µs		-	-17	A
P _{tot}	total power dissipation	T _{amb} = 25 °C	[2]	-	480	mW
			[1]	-	1.2	W
		T _{sp} = 25 °C		-	6.95	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]	-	-4	A

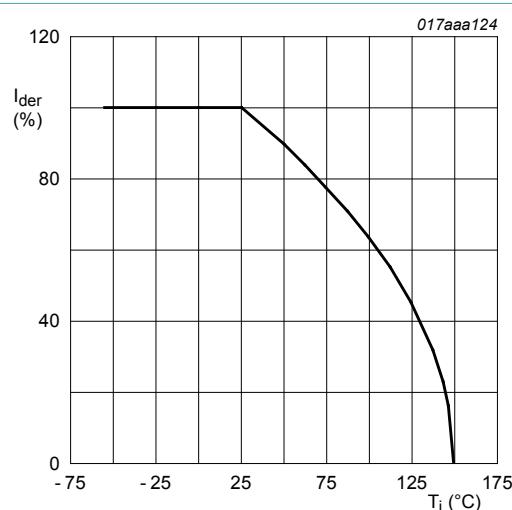
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for drain 6 cm².

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



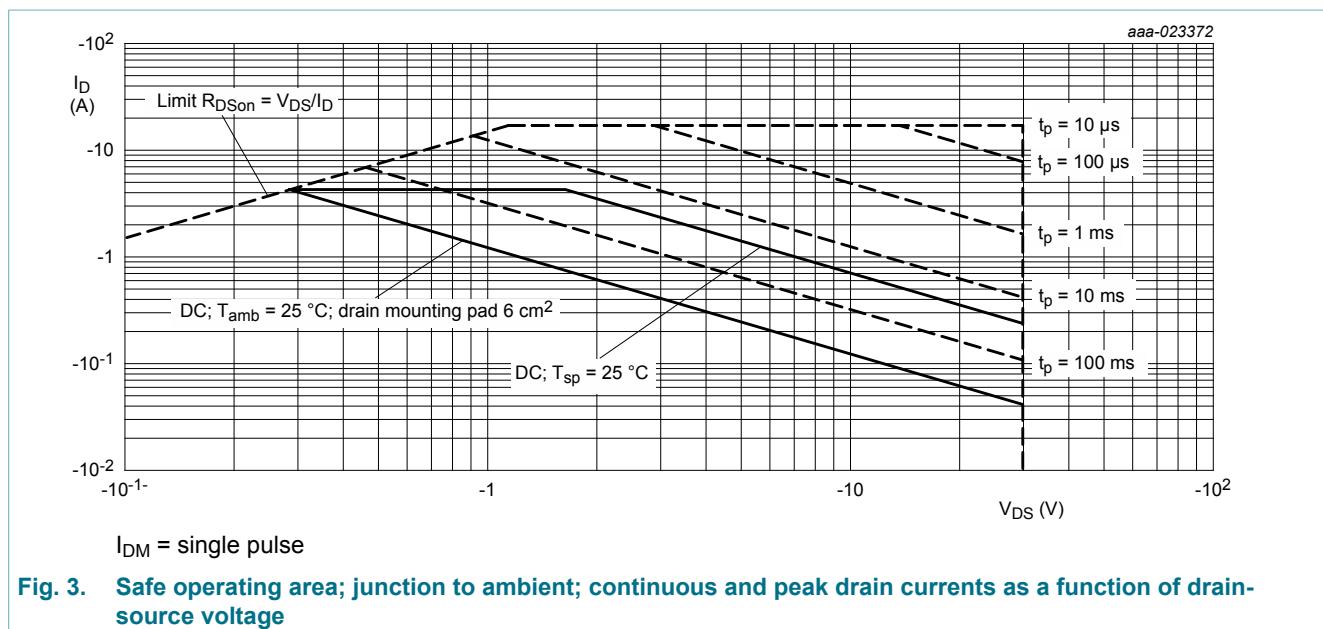
$$P_{der} = \frac{P_{tot}}{P_{tot}(25^{\circ}C)} \times 100 \%$$

Fig. 1. Normalized total power dissipation as a function of junction temperature



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

Fig. 2. Normalized continuous drain current as a function of junction temperature



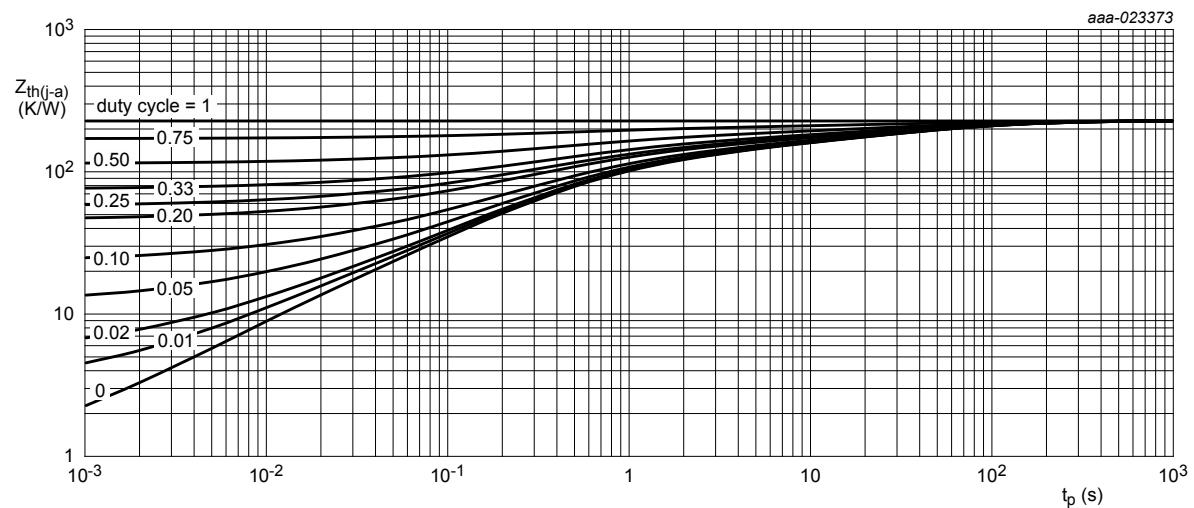
9. Thermal characteristics

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]	-	227	261	K/W
			[2]	-	91	104	K/W
	$t \leq 5 \text{ s}$		[2]	-	57	66	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	13	18	K/W

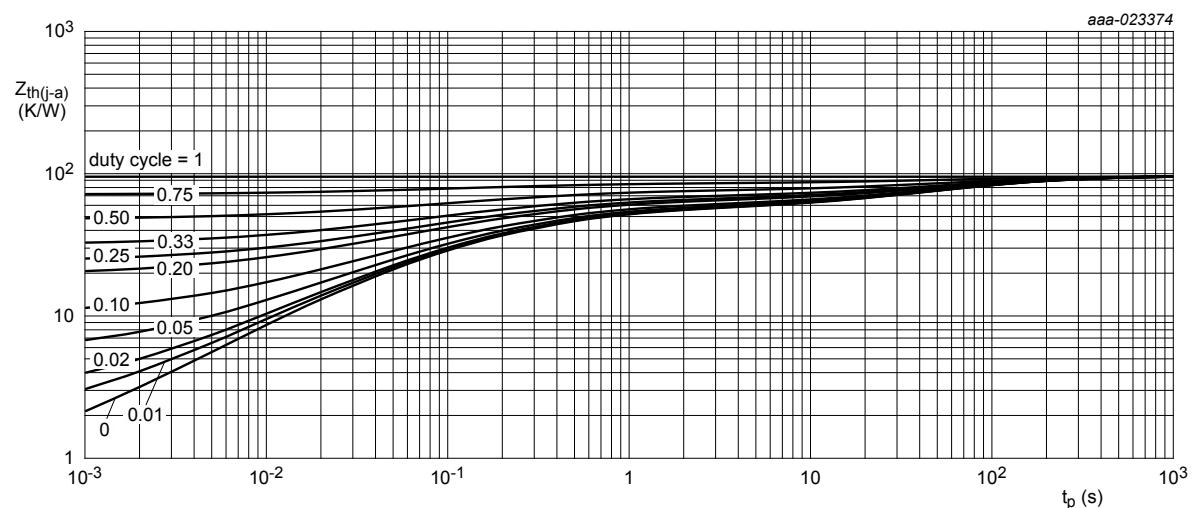
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for drain 6 cm^2 .



FR4 PCB, standard footprint

Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



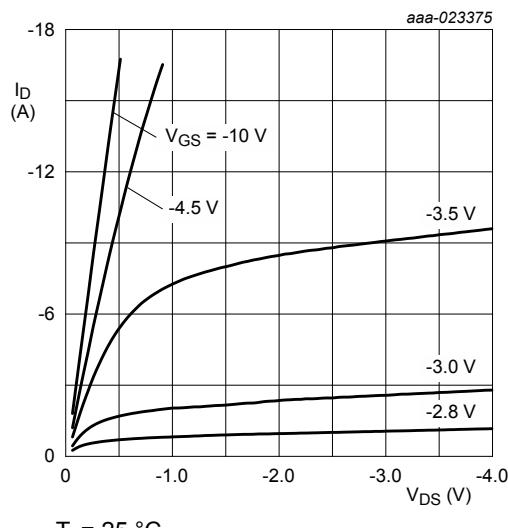
FR4 PCB, mounting pad for drain 6 cm²

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

10. Characteristics

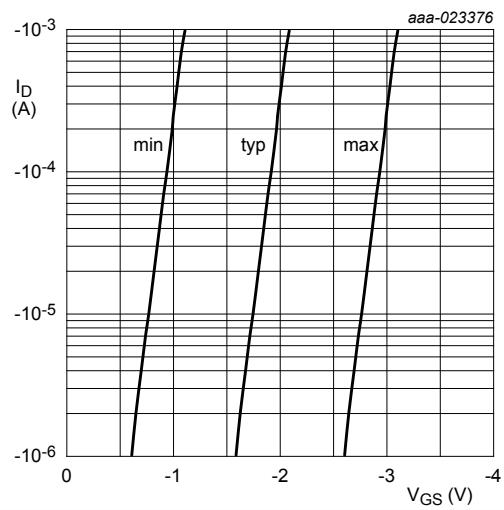
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
$V_{(BR)DSS}$	drain-source breakdown voltage	$I_D = -250 \mu A$; $V_{GS} = 0 V$; $T_j = 25^\circ C$		-30	-	-	V
V_{GSTh}	gate-source threshold voltage	$I_D = -250 \mu A$; $V_{DS} = V_{GS}$; $T_j = 25^\circ C$		-1	-2	-3	V
I_{DSS}	drain leakage current	$V_{DS} = -30 V$; $V_{GS} = 0 V$; $T_j = 25^\circ C$		-	-	-1	μA
I_{GSS}	gate leakage current	$V_{GS} = 20 V$; $V_{DS} = 0 V$; $T_j = 25^\circ C$		-	-	10	μA
		$V_{GS} = -20 V$; $V_{DS} = 0 V$; $T_j = 25^\circ C$		-	-	-10	μA
		$V_{GS} = 10 V$; $V_{DS} = 0 V$; $T_j = 25^\circ C$		-	-	2	μA
		$V_{GS} = -10 V$; $V_{DS} = 0 V$; $T_j = 25^\circ C$		-	-	-2	μA
R_{DSon}	drain-source on-state resistance	$V_{GS} = -10 V$; $I_D = -4.2 A$; $T_j = 25^\circ C$		-	35	45	$m\Omega$
		$V_{GS} = -10 V$; $I_D = -4.2 A$; $T_j = 150^\circ C$		-	51	67	$m\Omega$
		$V_{GS} = -4.5 V$; $I_D = -3.3 A$; $T_j = 25^\circ C$		-	49	72	$m\Omega$
g_{fs}	forward transconductance	$V_{DS} = -10 V$; $I_D = -4.2 A$; $T_j = 25^\circ C$		-	13.5	-	S
R_G	gate resistance	$f = 1 MHz$		-	13	-	Ω
Dynamic characteristics							
$Q_{G(tot)}$	total gate charge	$V_{DS} = -15 V$; $I_D = -4.2 A$; $V_{GS} = -10 V$; $T_j = 25^\circ C$		-	12.8	19.2	nC
Q_{GS}	gate-source charge			-	2.2	-	nC
Q_{GD}	gate-drain charge			-	2.2	-	nC
C_{iss}	input capacitance	$V_{DS} = -15 V$; $f = 1 MHz$; $V_{GS} = 0 V$; $T_j = 25^\circ C$		-	793	-	pF
C_{oss}	output capacitance			-	134	-	pF
C_{rss}	reverse transfer capacitance			-	84	-	pF
$t_{d(on)}$	turn-on delay time	$V_{DS} = -15 V$; $I_D = -4.2 A$; $V_{GS} = -10 V$; $R_{G(ext)} = 6 \Omega$; $T_j = 25^\circ C$		-	6	-	ns
t_r	rise time			-	19	-	ns
$t_{d(off)}$	turn-off delay time			-	36	-	ns
t_f	fall time			-	19	-	ns
Source-drain diode							
V_{SD}	source-drain voltage	$I_S = -4 A$; $V_{GS} = 0 V$; $T_j = 25^\circ C$		-	-0.8	-1.2	V



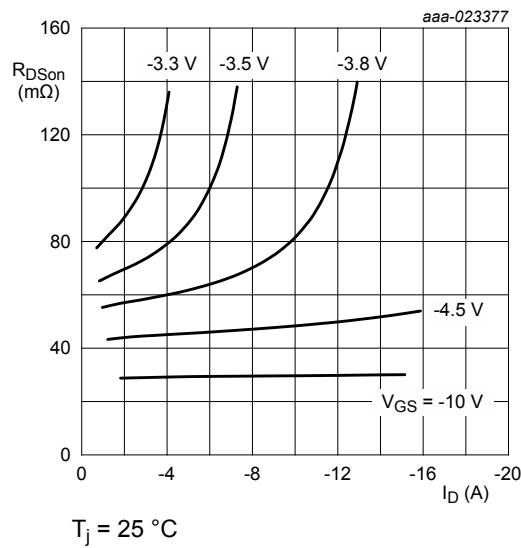
$T_j = 25^\circ\text{C}$

Fig. 6. Output characteristics: drain current as a function of drain-source voltage; typical values



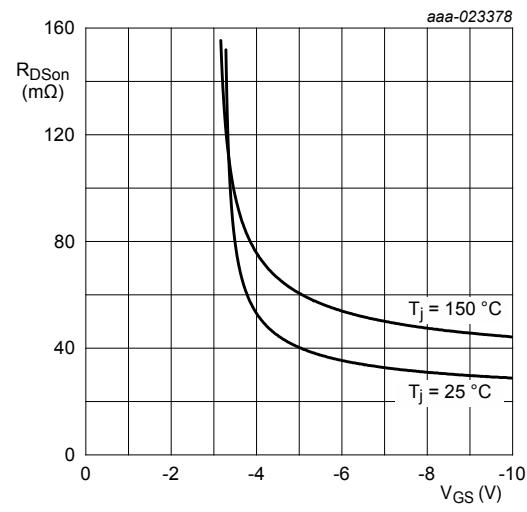
$V_{DS} = -5\text{ V}$
 $T_j = 25^\circ\text{C}$

Fig. 7. Sub-threshold drain current as a function of gate-source voltage



$T_j = 25^\circ\text{C}$

Fig. 8. Drain-source on-state resistance as a function of drain current; typical values



$I_D = -4\text{ A}$

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

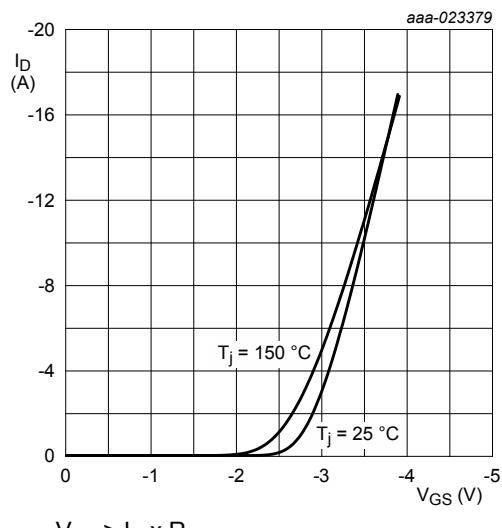


Fig. 10. Transfer characteristics: drain current as a function of gate-source voltage; typical values

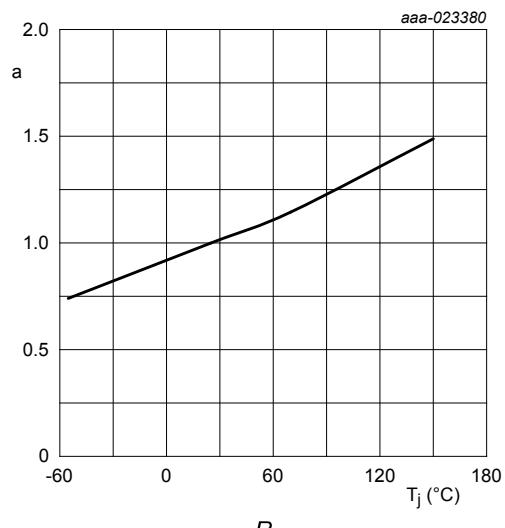


Fig. 11. Normalized drain-source on-state resistance as a function of junction temperature; typical values

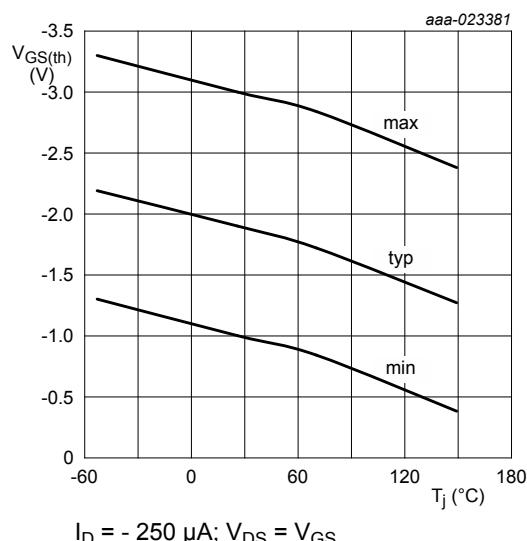


Fig. 12. Gate-source threshold voltage as a function of junction temperature

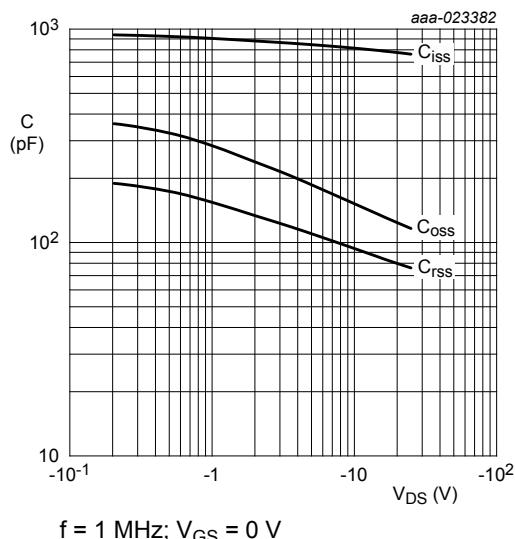
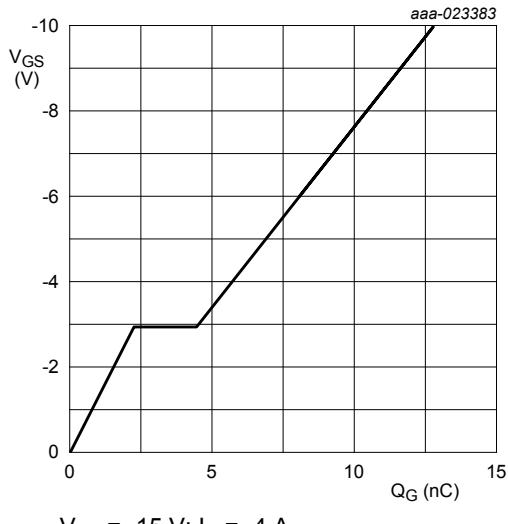


Fig. 13. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values



$V_{DS} = -15$ V; $I_D = -4$ A

Fig. 14. Gate-source voltage as a function of gate charge; typical values

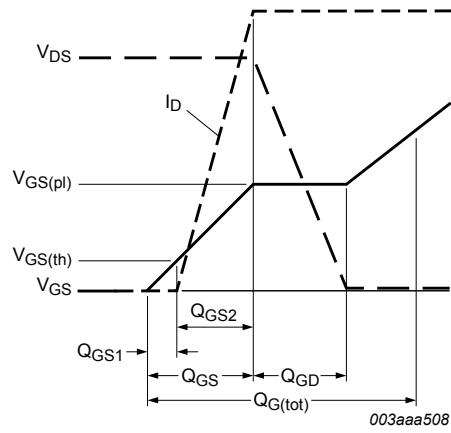
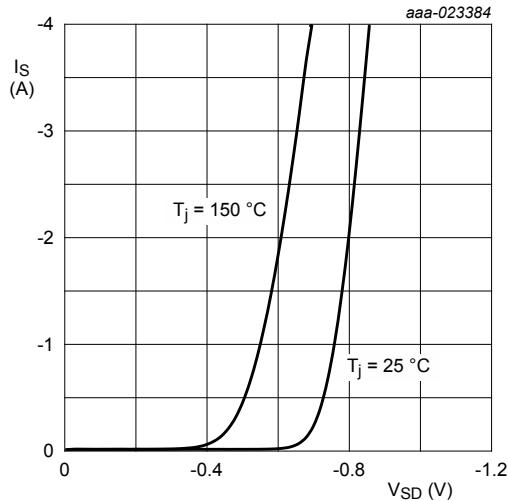


Fig. 15. Gate charge waveform definitions



$V_{GS} = 0$ V

Fig. 16. Source current as a function of source-drain voltage; typical values

11. Test information

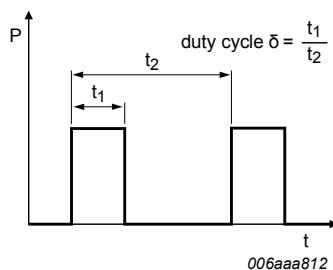
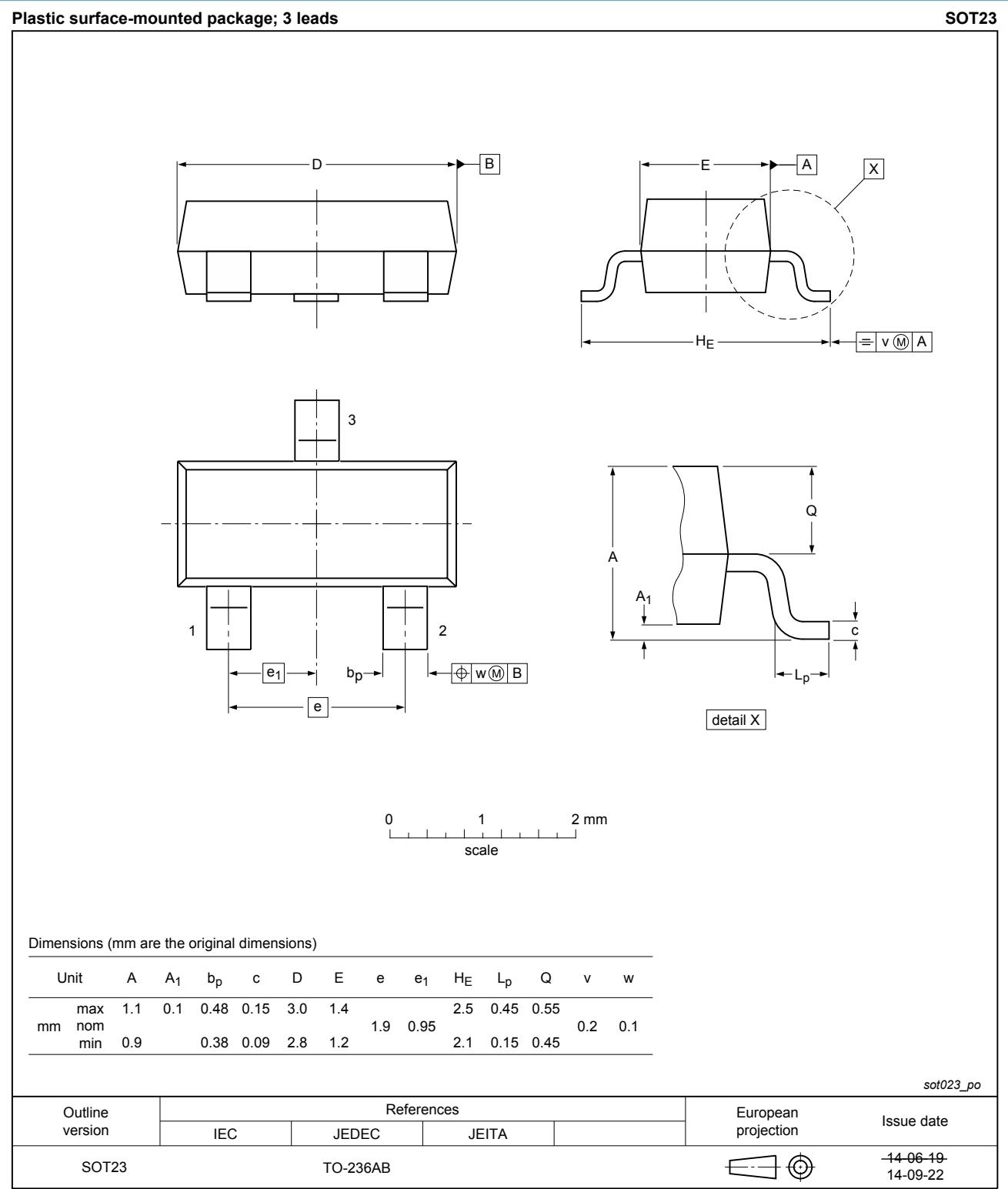


Fig. 17. Duty cycle definition

12. Package outline



13. Soldering

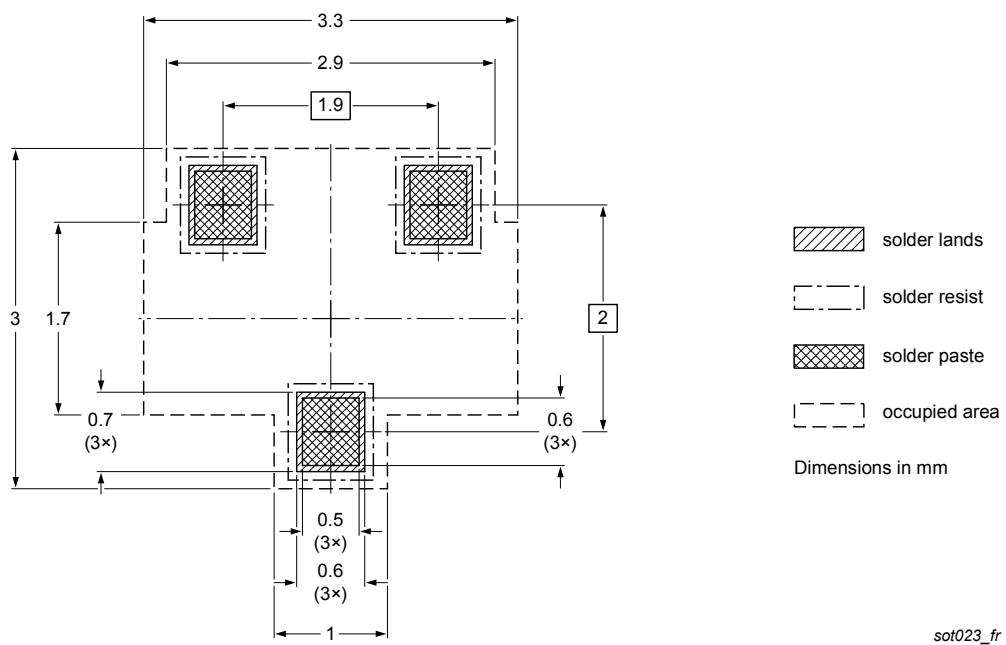


Fig. 19. Reflow soldering footprint for TO-236AB (SOT23)

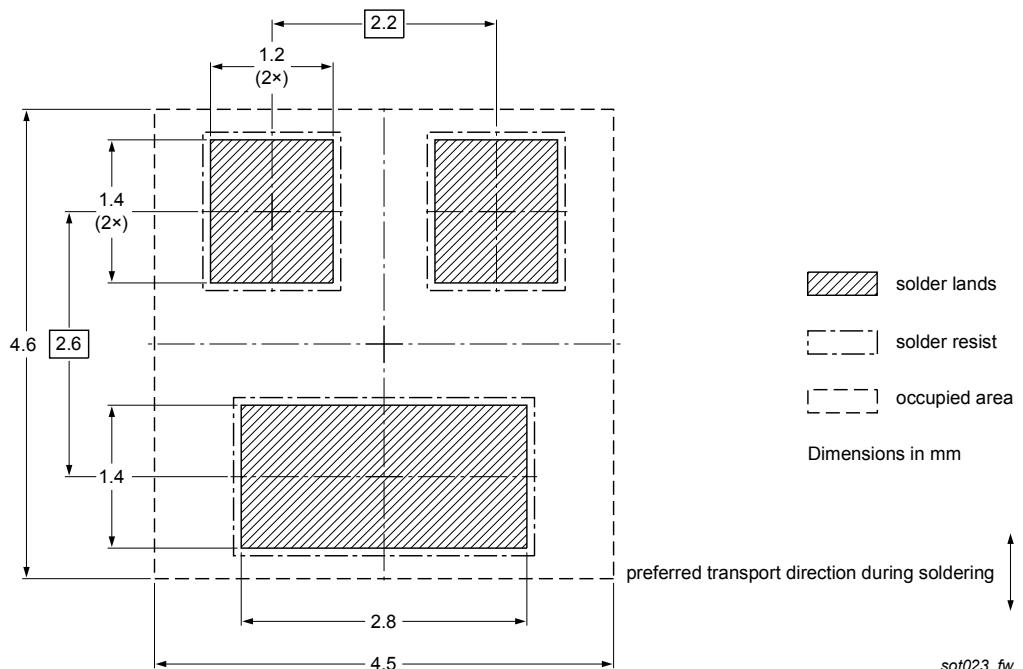


Fig. 20. Wave soldering footprint for TO-236AB (SOT23)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMV35EPE v.1	20160706	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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