

PMV50UPE

20 V, single P-channel Trench MOSFET

20 July 2012

Product data sheet

1. Product profile

1.1 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.

1.2 Features and benefits

- 3 kV ESD protected
- Trench MOSFET technology
- Low threshold voltage

1.3 Applications

- Relay driver
- High-side loadswitch
- Switching circuits

1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$T_J = 25\text{ °C}$	-	-	-20	V
V_{GS}	gate-source voltage		-8	-	8	V
I_D	drain current	$V_{GS} = -4.5\text{ V}; T_{amb} = 25\text{ °C}; t \leq 5\text{ s}$	[1]	-	-3.7	A
Static characteristics						
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = -4.5\text{ V}; I_D = -3.2\text{ A}; T_J = 25\text{ °C}$	-	50	66	mΩ

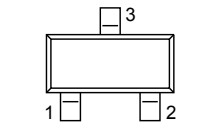
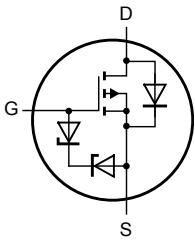
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for drain 6 cm².

PMV50UPE

20 V, single P-channel Trench MOSFET

2. Pinning information

Table 2. Pinning information

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

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMV50UPE	TO-236AB	plastic surface-mounted package; 3 leads	SOT23

4. Marking

Table 4. Marking codes

Type number	Marking code
PMV50UPE	%CZ

[1] % = placeholder for manufacturing site code

5. 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	$T_j = 25\text{ °C}$	-	-20	V	
V_{GS}	gate-source voltage		-8	8	V	
I_D	drain current	$V_{GS} = -4.5\text{ V}; T_{amb} = 25\text{ °C}; t \leq 5\text{ s}$	[1]	-	-3.7	A
		$V_{GS} = -4.5\text{ V}; T_{amb} = 25\text{ °C}$	[1]	-	-3.2	A
		$V_{GS} = -4.5\text{ V}; T_{amb} = 100\text{ °C}$	[1]	-	-2	A
I_{DM}	peak drain current	$T_{amb} = 25\text{ °C};$ single pulse; $t_p \leq 10\text{ }\mu\text{s}$	-	-12.8	A	
P_{tot}	total power dissipation	$T_{amb} = 25\text{ °C}$	[2]	-	500	mW

PMV50UPE

20 V, single P-channel Trench MOSFET

Symbol	Parameter	Conditions		Min	Max	Unit
			[1]	-	955	mW
		$T_{sp} = 25\text{ °C}$		-	3570	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	$T_{amb} = 25\text{ °C}$	[1]	-	-1	A
ESD maximum rating						
V_{ESD}	electrostatic discharge voltage	HBM	[3]	-	3000	V

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

6. 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]	-	218	250	K/W
			[2]	-	114	130	K/W
			[3]	-	80	92	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	30	35	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 .
 [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for drain 6 cm^2 , $t \leq 5\text{ s}$.

7. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
$V_{(BR)DSS}$	drain-source breakdown voltage	$I_D = -250\text{ }\mu\text{A}$; $V_{GS} = 0\text{ V}$; $T_j = 25\text{ °C}$		-20	-	-	V
V_{GSth}	gate-source threshold voltage	$I_D = -250\text{ }\mu\text{A}$; $V_{DS} = V_{GS}$; $T_j = 25\text{ °C}$		-0.47	-0.6	-0.9	V
I_{DSS}	drain leakage current	$V_{DS} = -20\text{ V}$; $V_{GS} = 0\text{ V}$; $T_j = 25\text{ °C}$		-	-	-1	μA
		$V_{DS} = -20\text{ V}$; $V_{GS} = 0\text{ V}$; $T_j = 150\text{ °C}$		-	-	-10	μA

PMV50UPE

20 V, single P-channel Trench MOSFET

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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
R _{DSon}	drain-source on-state resistance	V _{GS} = -4.5 V; I _D = -3.2 A; T _j = 25 °C	-	50	66	mΩ
		V _{GS} = -4.5 V; I _D = -3.2 A; T _j = 150 °C	-	73	96	mΩ
		V _{GS} = -2.5 V; I _D = -2.1 A; T _j = 25 °C	-	57	81	mΩ
		V _{GS} = -1.8 V; I _D = -2.1 A; T _j = 25 °C	-	70	110	mΩ
g _{fs}	forward transconductance	V _{DS} = -5 V; I _D = -3.2 A; T _j = 25 °C	-	18	-	S
Dynamic characteristics						
Q _{G(tot)}	total gate charge	V _{DS} = -10 V; I _D = -3.2 A; V _{GS} = -4.5 V; T _j = 25 °C	-	10.5	15.7	nC
Q _{GS}	gate-source charge		-	2.2	-	nC
Q _{GD}	gate-drain charge		-	2.7	-	nC
C _{iss}	input capacitance	V _{DS} = -10 V; f = 1 MHz; V _{GS} = 0 V; T _j = 25 °C	-	24	-	pF
C _{oss}	output capacitance		-	106	-	pF
C _{rss}	reverse transfer capacitance		-	14.6	-	pF
t _{d(on)}	turn-on delay time		V _{DS} = -10 V; I _D = -3.2 A; V _{GS} = -4.5 V; R _{G(ext)} = 6 Ω; T _j = 25 °C	-	400	-
t _r	rise time	-		700	-	ns
t _{d(off)}	turn-off delay time	-		2180	-	ns
t _f	fall time	-		8800	-	ns
Source-drain diode						
V _{SD}	source-drain voltage	I _S = -1 A; V _{GS} = 0 V; T _j = 25 °C	-	-0.8	-1.2	V