

PMV90EN

30 V, single N-channel Trench MOSFET

Rev. 1 — 13 February 2012

Product data sheet

1. Product profile

1.1 General description

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

1.2 Features and benefits

- Logic-level compatible
- Trench MOSFET technology
- Very fast switching

1.3 Applications

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

1.4 Quick reference data

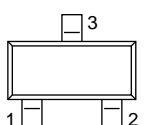
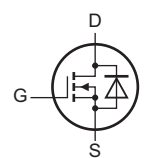
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DS}	drain-source voltage	$T_{amb} = 25\text{ °C}$	-	-	30	V
V_{GS}	gate-source voltage		-20	-	20	V
I_D	drain current	$V_{GS} = 10\text{ V}; T_{amb} = 25\text{ °C}; t \leq 5\text{ s}$	[1]	-	2.1	A
Static characteristics						
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = 10\text{ V}; I_D = 1.9\text{ A}; T_j = 25\text{ °C}$	-	70	84	mΩ

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

2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	G	gate	 <p>SOT23 (TO-236AB)</p>	 <p>017aaa253</p>
2	S	source		
3	D	drain		

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3. Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
PMV90EN	TO-236AB	plastic surface-mounted package; 3 leads	SOT23

4. Marking

Table 4. Marking codes

Type number	Marking code ^[1]
PMV90EN	EC%

[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	$T_{amb} = 25\text{ °C}$	-	30	V	
V_{GS}	gate-source voltage		-20	20	V	
I_D	drain current	$V_{GS} = 10\text{ V}; T_{amb} = 25\text{ °C}; t \leq 5\text{ s}$	[1]	-	2.1	A
		$V_{GS} = 10\text{ V}; T_{amb} = 25\text{ °C}$	[1]	-	1.9	A
		$V_{GS} = 10\text{ V}; T_{amb} = 100\text{ °C}$	[1]	-	1.2	A
I_{DM}	peak drain current	$T_{amb} = 25\text{ °C};$ single pulse; $t_p \leq 10\text{ }\mu\text{s}$	-	7.6	A	
P_{tot}	total power dissipation	$T_{amb} = 25\text{ °C}$	[2]	-	310	mW
			[1]	-	455	mW
		$T_{sp} = 25\text{ °C}$		-	2085	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]	-	0.5	A
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[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 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

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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]	-	350	400	K/W
			[2]	-	240	275	K/W
		in free air; $t \leq 5$ s	[2]	-	186	215	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		-	50	60	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 cm².

7. 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; $T_j = 25$ °C	30	-	-	V
V_{GSth}	gate-source threshold voltage	$I_D = 250 \mu A$; $V_{DS} = V_{GS}$; $T_j = 25$ °C	1	1.5	2.5	V
I_{DSS}	drain leakage current	$V_{DS} = 30$ V; $V_{GS} = 0$ V; $T_{amb} = 25$ °C	-	-	1	μA
		$V_{DS} = 30$ V; $V_{GS} = 0$ V; $T_{amb} = 150$ °C	-	-	10	μA
I_{GSS}	gate leakage current	$V_{GS} = 20$ V; $V_{DS} = 0$ V; $T_j = 25$ °C	-	-	100	nA
		$V_{GS} = -20$ V; $V_{DS} = 0$ V; $T_j = 25$ °C	-	-	100	nA
R_{DSon}	drain-source on-state resistance	$V_{GS} = 10$ V; $I_D = 1.9$ A; $T_j = 25$ °C	-	70	84	m Ω
		$V_{GS} = 10$ V; $I_D = 1.9$ A; $T_j = 150$ °C	-	109	130	m Ω
		$V_{GS} = 4.5$ V; $I_D = 1.6$ A; $T_j = 25$ °C	-	90	115	m Ω
g_{fs}	forward transconductance	$V_{DS} = 10$ V; $I_D = 1.9$ A; $T_j = 25$ °C	-	5.7	-	S
Dynamic characteristics						
$Q_{G(tot)}$	total gate charge	$V_{DS} = 15$ V; $I_D = 1.9$ A; $V_{GS} = 10$ V; $T_j = 25$ °C	-	2.6	4	nC
Q_{GS}	gate-source charge		-	0.42	-	nC
Q_{GD}	gate-drain charge		-	0.34	-	nC
C_{iss}	input capacitance	$V_{DS} = 15$ V; $f = 1$ MHz; $V_{GS} = 0$ V; $T_j = 25$ °C	-	132	-	pF
C_{oss}	output capacitance		-	31	-	pF
C_{rss}	reverse transfer capacitance		-	13	-	pF
$t_{d(on)}$	turn-on delay time	$V_{DS} = 15$ V; $I_D = 1.9$ A; $V_{GS} = 10$ V; $R_{G(ext)} = 6 \Omega$; $T_j = 25$ °C	-	3	-	ns
t_r	rise time		-	8	-	ns
$t_{d(off)}$	turn-off delay time		-	15	-	ns
t_f	fall time		-	5	-	ns
Source-drain diode						
V_{SD}	source-drain voltage	$I_S = 0.5$ A; $V_{GS} = 0$ V; $T_j = 25$ °C	-	0.7	1.2	V