

PMV185XN

30 V, single N-channel Trench MOSFET

3 August 2012

Product data sheet

1. Product profile

1.1 General description

N-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

- Low R_{DSon}
- Very fast switching
- Trench MOSFET technology

1.3 Applications

- Relay driver
- High-speed line driver
- Low-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 | $T_{amb} = 25\text{ °C}$ | - | - | 30 | V |
| V_{GS} | gate-source voltage | | -12 | - | 12 | V |
| I_D | drain current | $V_{GS} = 4.5\text{ V}; T_{amb} = 25\text{ °C}; t \leq 5\text{ s}$ | [1] | - | 1.2 | A |
| Static characteristics | | | | | | |
| R_{DSon} | drain-source on-state resistance | $V_{GS} = 4.5\text{ V}; I_D = 1.1\text{ A}; T_J = 25\text{ °C}$ | - | 185 | 250 | mΩ |

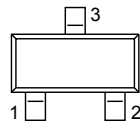
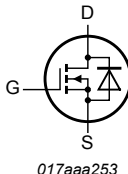
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for drain 6 cm^2 .

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2. Pinning information

Table 2. Pinning information

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

3. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|----------|--|---------|
| | Name | Description | Version |
| PMV185XN | TO-236AB | plastic surface-mounted package; 3 leads | SOT23 |

4. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PMV185XN | EH% |

[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 | | | -12 | 12 | V |
| I_D | drain current | $V_{GS} = 4.5\text{ V}; T_{amb} = 25\text{ °C}; t \leq 5\text{ s}$ | [1] | - | 1.2 | A |
| | | $V_{GS} = 4.5\text{ V}; T_{amb} = 25\text{ °C}$ | [1] | - | 1.1 | A |
| | | $V_{GS} = 4.5\text{ V}; T_{amb} = 100\text{ °C}$ | [1] | - | 0.7 | A |
| I_{DM} | peak drain current | $T_{amb} = 25\text{ °C}; \text{single pulse}; t_p \leq 10\text{ }\mu\text{s}$ | | - | 4.4 | A |
| P_{tot} | total power dissipation | $T_{amb} = 25\text{ °C}$ | [2] | - | 325 | mW |
| | | | [1] | - | 455 | mW |
| | | $T_{sp} = 25\text{ °C}$ | | - | 1275 | mW |

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| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---------------------------|----------------------|--------------------------|-----|-----|-----|------|
| 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] | - | 0.7 | A |

- [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.

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] | - | 333 | 385 | K/W |
| | | | [2] | - | 240 | 275 | K/W |
| | | in free air; $t \leq 5\text{ s}$ | [2] | - | 203 | 235 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | | - | 85 | 100 | 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 .

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| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|----------------------------------|---|-----|------|-----|------|
| I _{GSS} | gate leakage current | V _{GS} = 12 V; V _{DS} = 0 V; T _j = 25 °C | - | - | 100 | nA |
| | | V _{GS} = -12 V; V _{DS} = 0 V; T _j = 25 °C | - | - | 100 | nA |
| R _{DS(on)} | drain-source on-state resistance | V _{GS} = 4.5 V; I _D = 1.1 A; T _j = 25 °C | - | 185 | 250 | mΩ |
| | | V _{GS} = 4.5 V; I _D = 1.1 A; T _j = 150 °C | - | 300 | 400 | mΩ |
| | | V _{GS} = 2.5 V; I _D = 0.25 A; T _j = 25 °C | - | 255 | 365 | mΩ |
| g _{fs} | forward transconductance | V _{DS} = 10 V; I _D = 1.1 A; T _j = 25 °C | - | 2.9 | - | S |
| Dynamic characteristics | | | | | | |
| Q _{G(tot)} | total gate charge | V _{DS} = 15 V; I _D = 1.1 A; V _{GS} = 4.5 V; T _j = 25 °C | - | 0.87 | 1.3 | nC |
| Q _{GS} | gate-source charge | | - | 0.17 | - | nC |
| Q _{GD} | gate-drain charge | | - | 0.24 | - | nC |
| C _{iss} | input capacitance | V _{DS} = 15 V; f = 1 MHz; V _{GS} = 0 V; T _j = 25 °C | - | 76 | - | pF |
| C _{oss} | output capacitance | | - | 30 | - | pF |
| C _{rss} | reverse transfer capacitance | | - | 22 | - | pF |
| t _{d(on)} | turn-on delay time | V _{DS} = 15 V; I _D = 1.1 A; V _{GS} = 4.5 V; R _{G(ext)} = 6 Ω; T _j = 25 °C | - | 7 | - | ns |
| t _r | rise time | | - | 11 | - | ns |
| t _{d(off)} | turn-off delay time | | - | 16 | - | ns |
| t _f | fall time | | - | 7 | - | ns |
| Source-drain diode | | | | | | |
| V _{SD} | source-drain voltage | I _S = 0.7 A; V _{GS} = 0 V; T _j = 25 °C | - | 0.8 | 1.2 | V |