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Kind regards,

Team Nexperia



PMV37EN2

30 V, N-channel Trench MOSFET

10 January 2017

Product data sheet

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.

2. Features and benefits

- Logic level compatible
- Very fast switching
- Trench MOSFET technology
- Enhanced power dissipation capability of 1115 mW

3. Applications

- Relay driver
- High-speed line driver
- Low-side load switch
- Switching circuits

4. Quick reference data

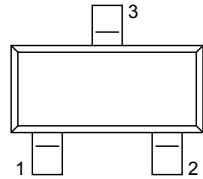
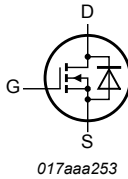
Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------------------------|----------------------------------|---|-----|-----|-----|------------|
| V_{DS} | drain-source voltage | $T_j = 25\text{ °C}$ | - | - | 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] | - | 5.6 | A |
| Static characteristics | | | | | | |
| R_{DSon} | drain-source on-state resistance | $V_{GS} = 10\text{ V}; I_D = 4.5\text{ A}; T_j = 25\text{ °C}$ | - | 31 | 36 | m Ω |

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

5. 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 | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|----------|--|---------|
| | Name | Description | Version |
| PMV37EN2 | TO-236AB | plastic surface-mounted package; 3 leads | SOT23 |

7. Marking

Table 4. Marking codes

| Type number | Marking code ^[1] |
|-------------|-----------------------------|
| PMV37EN2 | %K7 |

[1] % = placeholder for manufacturing site code

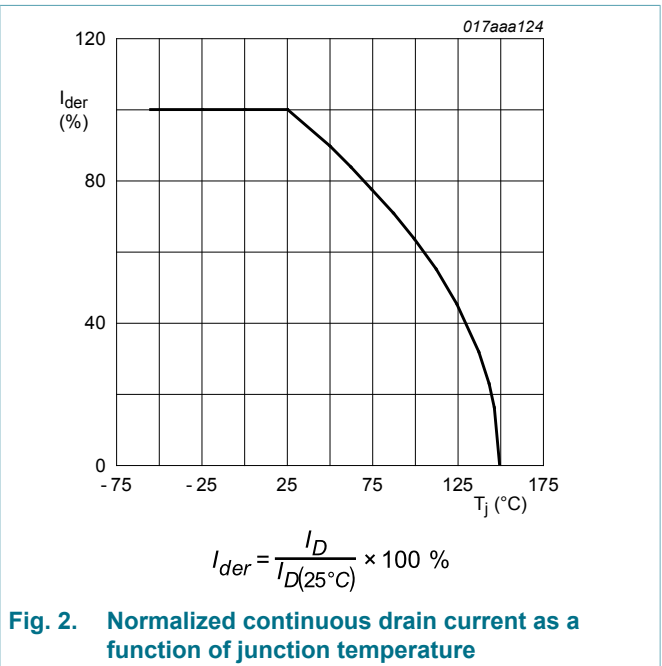
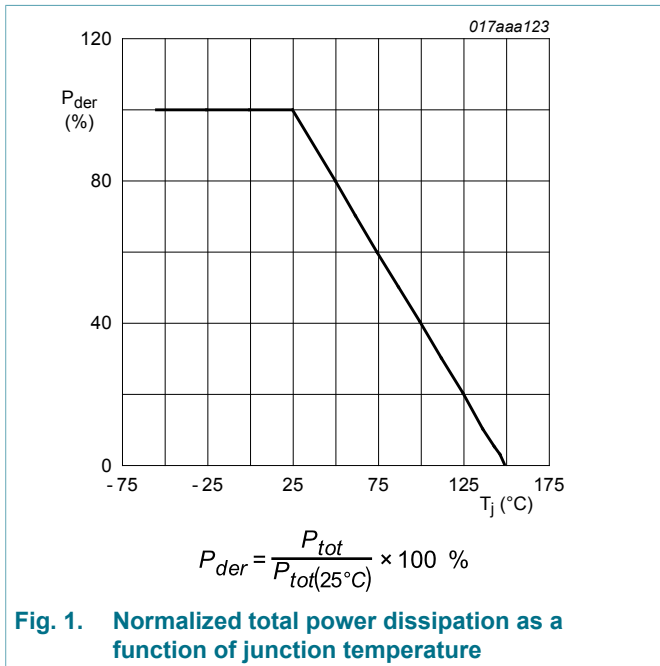
8. Limiting values

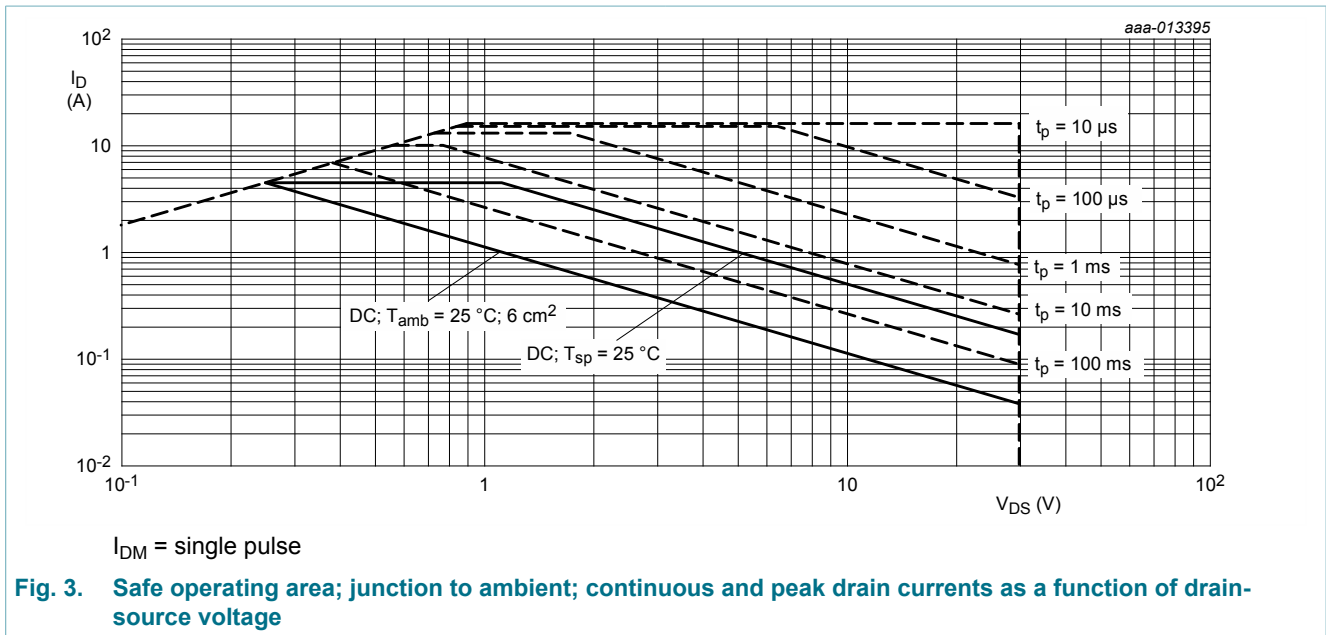
Table 5. Limiting values

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] | - | 5.6 | A |
| | | V _{GS} = 10 V; T _{amb} = 25 °C | [1] | - | 4.5 | A |
| | | V _{GS} = 10 V; T _{amb} = 100 °C | [1] | - | 2.8 | A |
| I _{DM} | peak drain current | T _{amb} = 25 °C; single pulse; t _p ≤ 10 μs | | - | 16 | A |
| P _{tot} | total power dissipation | T _{amb} = 25 °C | [2] | - | 510 | mW |
| | | | [1] | - | 1115 | mW |
| | | T _{sp} = 25 °C | | - | 5000 | 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 °C | [1] | - | 1 | 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 Printed Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.





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] | - | 209 | 246 | K/W |
| | | | [2] | - | 95 | 112 | K/W |
| | | in free air; $t \leq 5$ s | [2] | - | 63 | 72 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | | - | 20 | 25 | K/W |

[1] Device mounted on an FR4 Printed-Circuit Board (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 .

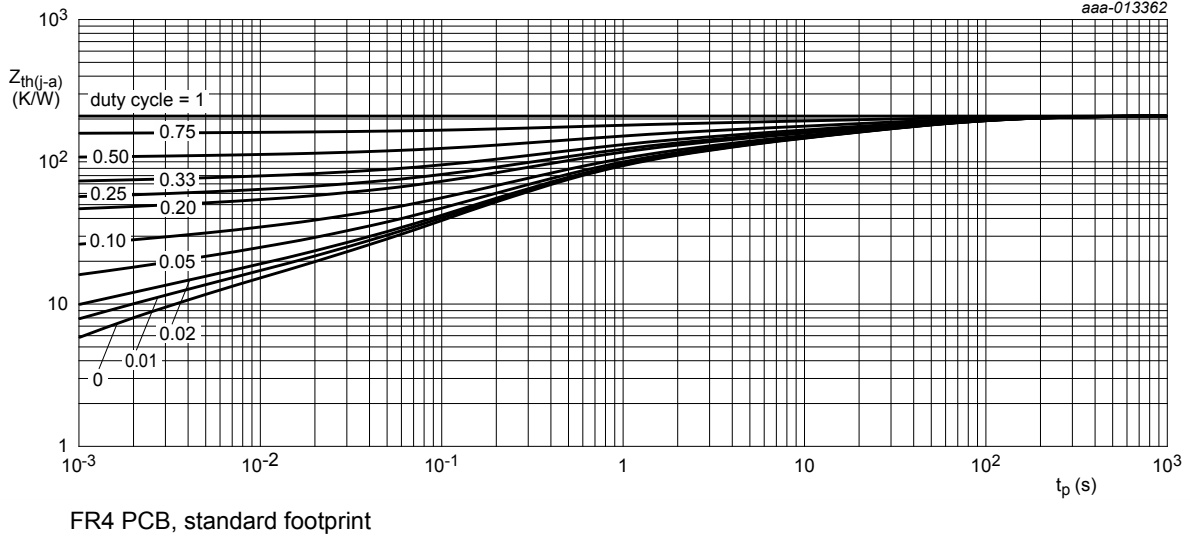


Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

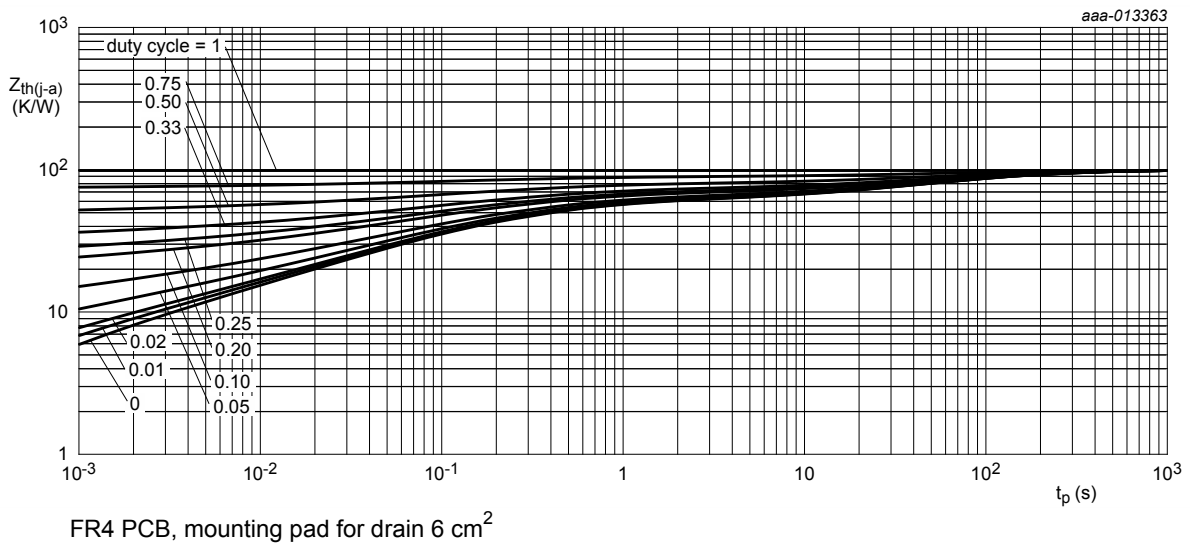


Fig. 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|----------------------------------|---|-----|------|------|------------|
| Static characteristics | | | | | | |
| $V_{(BR)DSS}$ | drain-source breakdown voltage | $I_D = 250 \mu A; V_{GS} = 0 V; T_j = 25 \text{ }^\circ C$ | 30 | - | - | V |
| V_{GSth} | gate-source threshold voltage | $I_D = 250 \mu A; V_{DS} = V_{GS}; T_j = 25 \text{ }^\circ C$ | 1 | 1.5 | 2 | V |
| I_{DSS} | drain leakage current | $V_{DS} = 30 V; V_{GS} = 0 V; T_j = 25 \text{ }^\circ C$ | - | - | 1 | μA |
| I_{GSS} | gate leakage current | $V_{GS} = 20 V; V_{DS} = 0 V; T_j = 25 \text{ }^\circ C$ | - | - | 100 | nA |
| | | $V_{GS} = -20 V; V_{DS} = 0 V; T_j = 25 \text{ }^\circ C$ | - | - | -100 | nA |
| R_{DSon} | drain-source on-state resistance | $V_{GS} = 10 V; I_D = 4.5 A; T_j = 25 \text{ }^\circ C$ | - | 31 | 36 | m Ω |
| | | $V_{GS} = 10 V; I_D = 4.5 A; T_j = 150 \text{ }^\circ C$ | - | 48 | 56 | m Ω |
| | | $V_{GS} = 4.5 V; I_D = 3.9 A; T_j = 25 \text{ }^\circ C$ | - | 37 | 47 | m Ω |
| g_{fs} | forward transconductance | $V_{DS} = 10 V; I_D = 2 A; T_j = 25 \text{ }^\circ C$ | - | 13 | - | S |
| R_G | gate resistance | $T_j = 25 \text{ }^\circ C; f = 1 \text{ MHz}$ | - | 2.3 | - | Ω |
| Dynamic characteristics | | | | | | |
| $Q_{G(tot)}$ | total gate charge | $V_{DS} = 15 V; I_D = 3.2 A; V_{GS} = 10 V; T_j = 25 \text{ }^\circ C$ | - | 3.6 | 6.3 | nC |
| Q_{GS} | gate-source charge | | - | 0.5 | - | nC |
| Q_{GD} | gate-drain charge | | - | 0.4 | - | nC |
| C_{iss} | input capacitance | $V_{DS} = 15 V; f = 1 \text{ MHz}; V_{GS} = 0 V; T_j = 25 \text{ }^\circ C$ | - | 209 | - | pF |
| C_{oss} | output capacitance | | - | 50 | - | pF |
| C_{rSS} | reverse transfer capacitance | | - | 17 | - | pF |
| $t_{d(on)}$ | turn-on delay time | $V_{DS} = 15 V; I_D = 3.2 A; V_{GS} = 10 V; R_{G(ext)} = 6 \Omega; T_j = 25 \text{ }^\circ C$ | - | 3 | - | ns |
| t_r | rise time | | - | 12 | - | ns |
| $t_{d(off)}$ | turn-off delay time | | - | 11 | - | ns |
| t_f | fall time | | - | 2 | - | ns |
| Source-drain diode | | | | | | |
| V_{SD} | source-drain voltage | $I_S = 1 A; V_{GS} = 0 V; T_j = 25 \text{ }^\circ C$ | - | 0.75 | 1.2 | V |

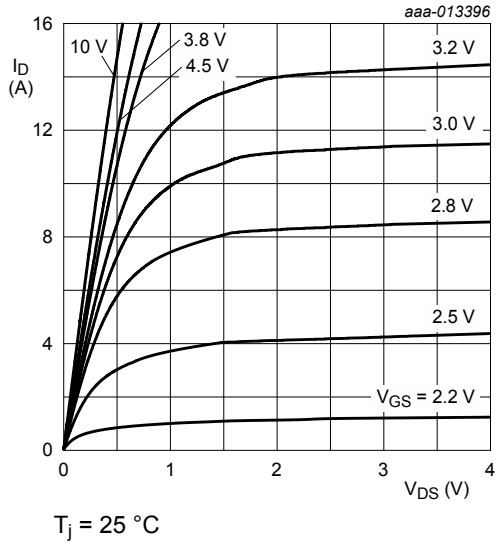


Fig. 6. Output characteristics: drain current as a function of drain-source voltage; typical values

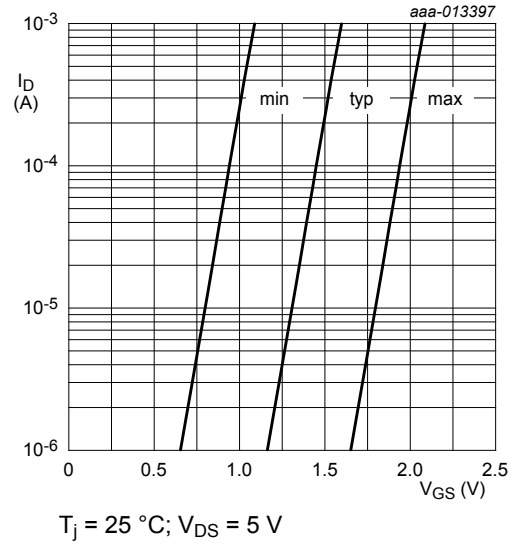


Fig. 7. Sub-threshold drain current as a function of gate-source voltage

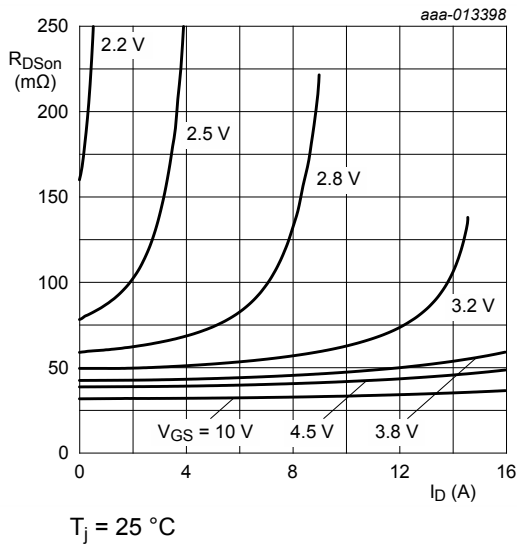


Fig. 8. Drain-source on-state resistance as a function of drain current; typical values

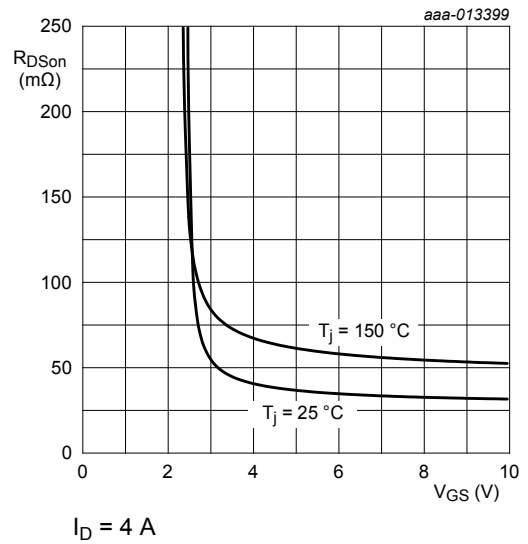


Fig. 9. Drain-source on-state resistance as a function of gate-source voltage; typical values

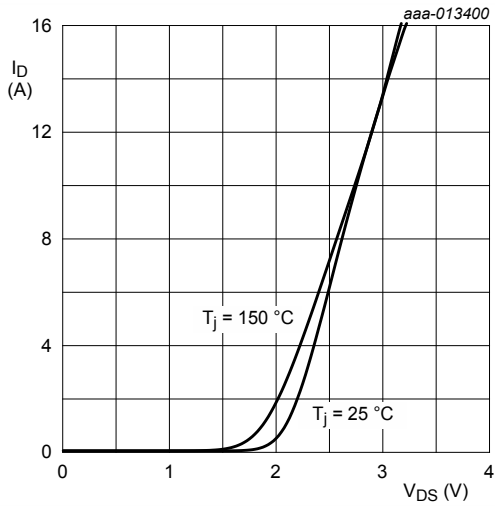


Fig. 10. Transfer characteristics: drain current as a function of gate-source voltage; typical values

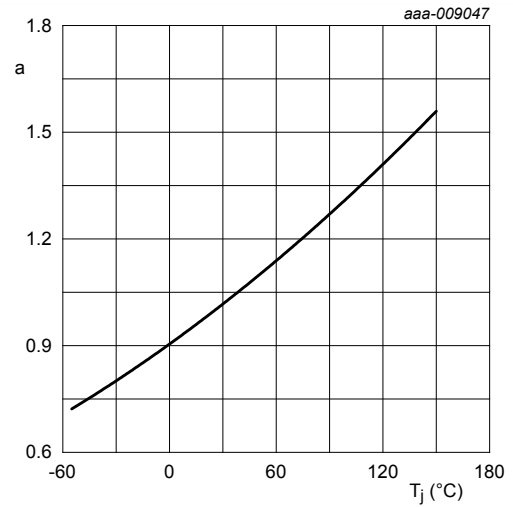


Fig. 11. Normalized drain-source on-state resistance as a function of junction temperature; typical values

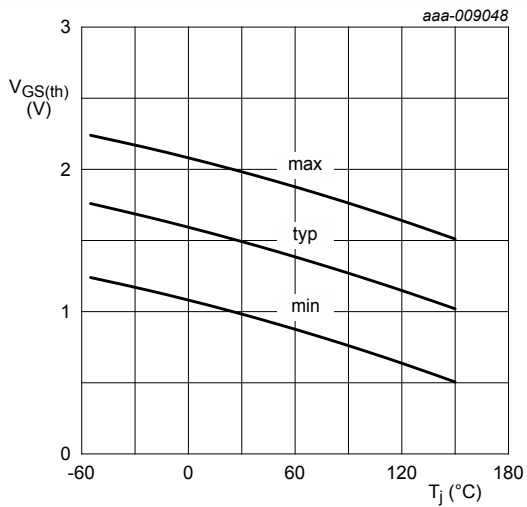


Fig. 12. Gate-source threshold voltage as a function of junction temperature

$I_D = 0.25 \text{ mA}; V_{DS} = V_{GS}$

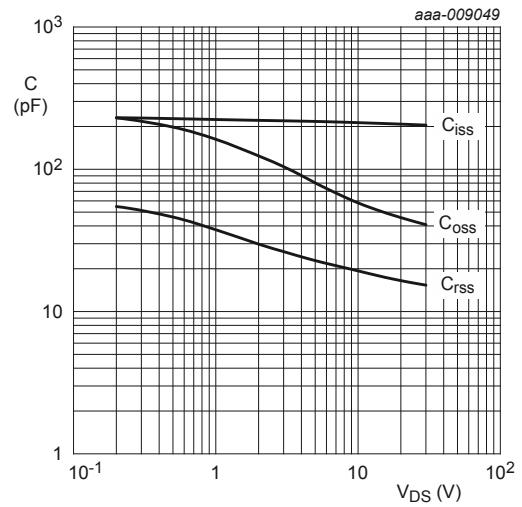
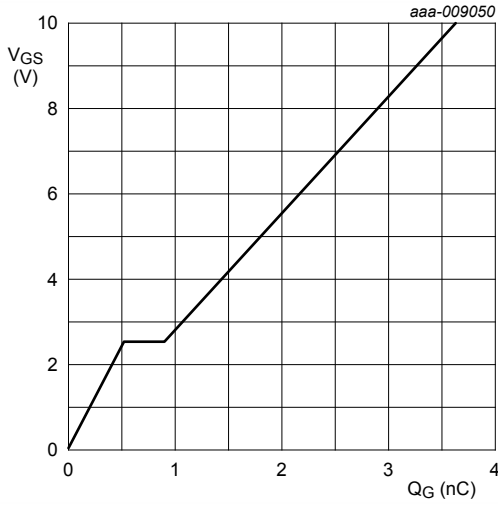


Fig. 13. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

$f = 1 \text{ MHz}; V_{GS} = 0 \text{ V}$



$I_D = 3.2 \text{ A}; V_{DS} = 15 \text{ V}; T_{amb} = 25 \text{ }^\circ\text{C}$

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

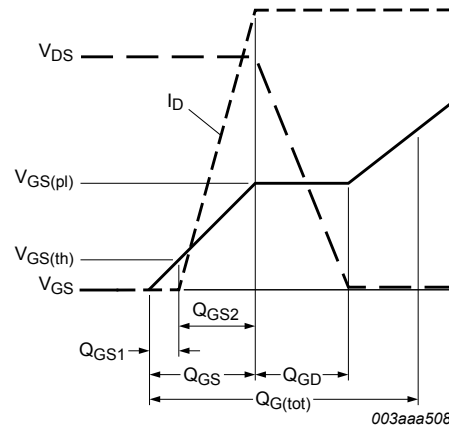
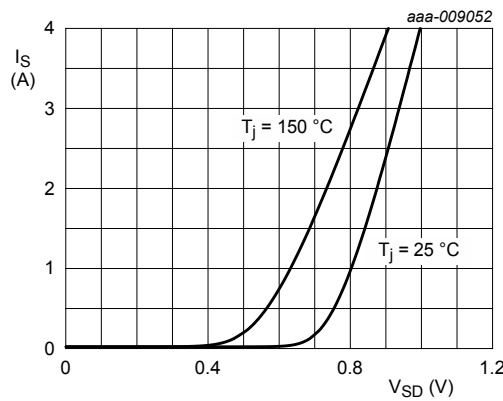


Fig. 15. MOSFET transistor: Gate charge waveform definitions



$V_{GS} = 0 \text{ V}$

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

11. Test information

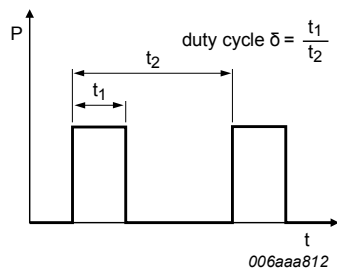
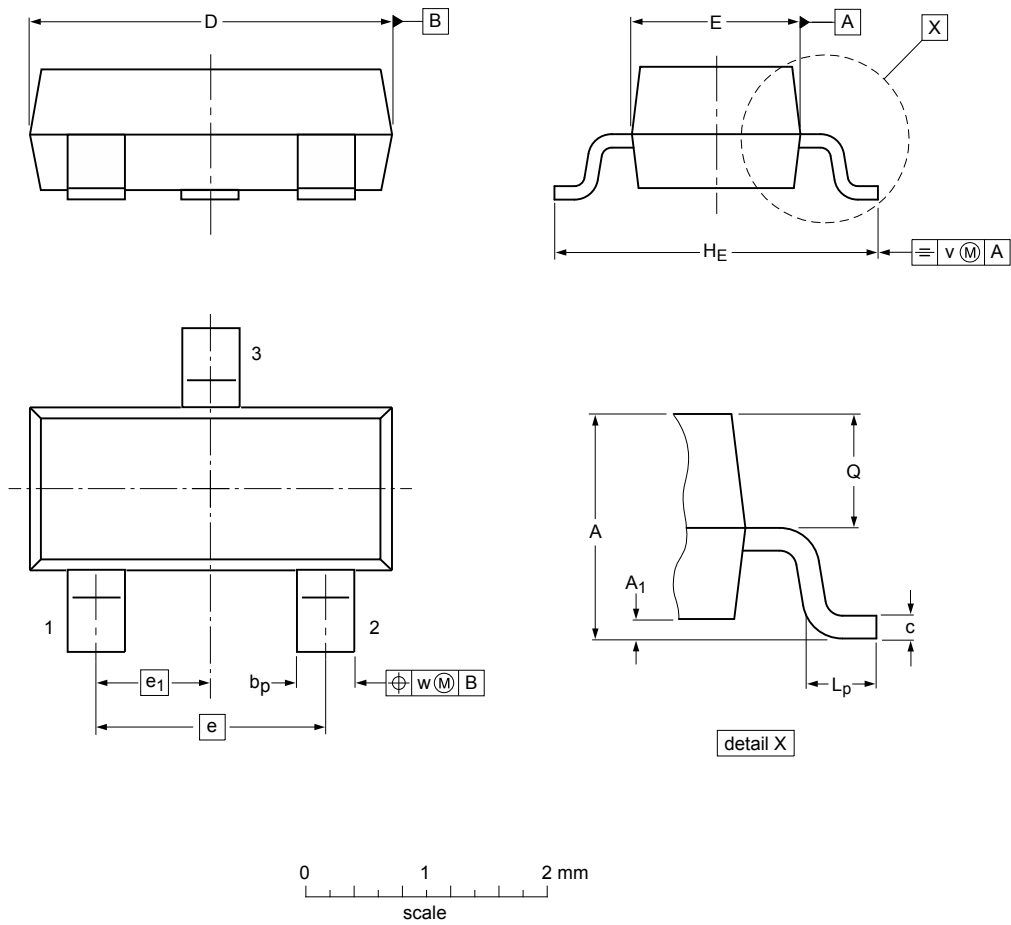


Fig. 17. Duty cycle definition

12. Package outline

Plastic surface-mounted package; 3 leads

SOT23



Dimensions (mm are the original dimensions)

| Unit | A | A ₁ | b _p | c | D | E | e | e ₁ | H _E | L _p | Q | v | w |
|------|-----|----------------|----------------|------|-----|-----|-----|----------------|----------------|----------------|------|-----|-----|
| max | 1.1 | 0.1 | 0.48 | 0.15 | 3.0 | 1.4 | | | 2.5 | 0.45 | 0.55 | | |
| nom | | | | | | | 1.9 | 0.95 | | | | 0.2 | 0.1 |
| min | 0.9 | | 0.38 | 0.09 | 2.8 | 1.2 | | | 2.1 | 0.15 | 0.45 | | |

sot023_po

| Outline version | References | | | European projection | Issue date |
|-----------------|------------|----------|-------|---------------------|----------------------|
| | IEC | JEDEC | JEITA | | |
| SOT23 | | TO-236AB | | | 14-06-19 14-09-22 |

Fig. 18. Package outline TO-236AB (SOT23)

13. Soldering

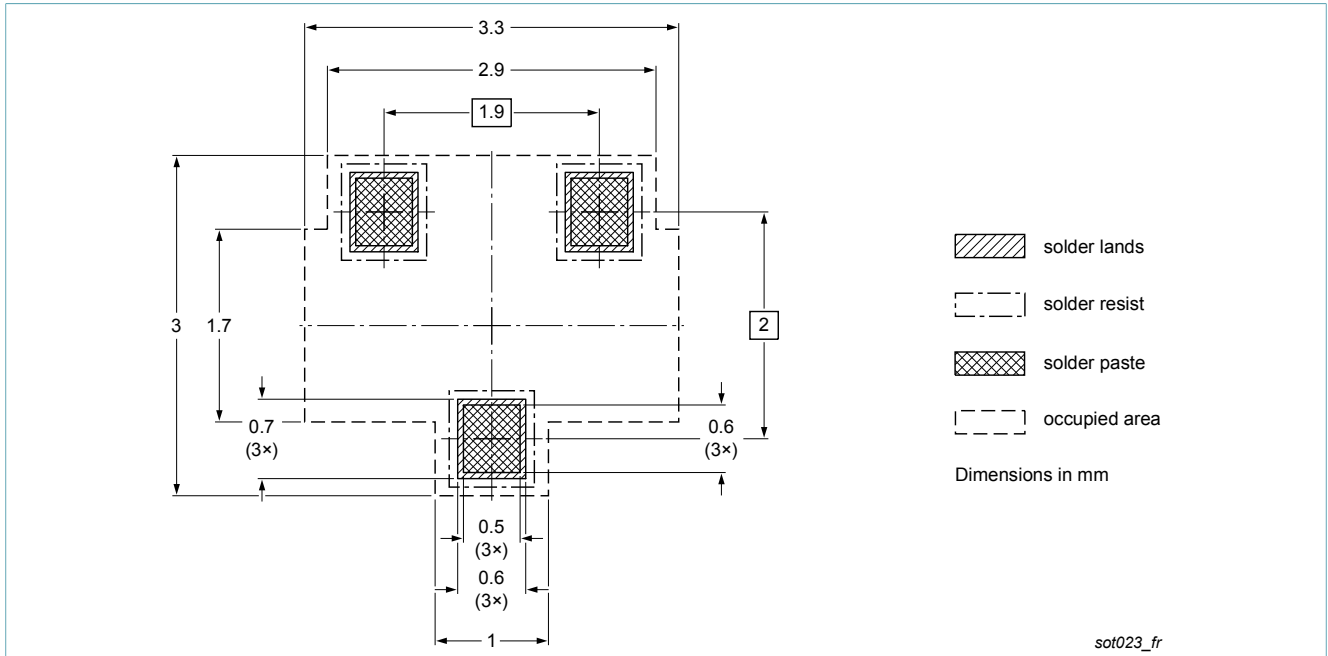


Fig. 19. Reflow soldering footprint for TO-236AB (SOT23)

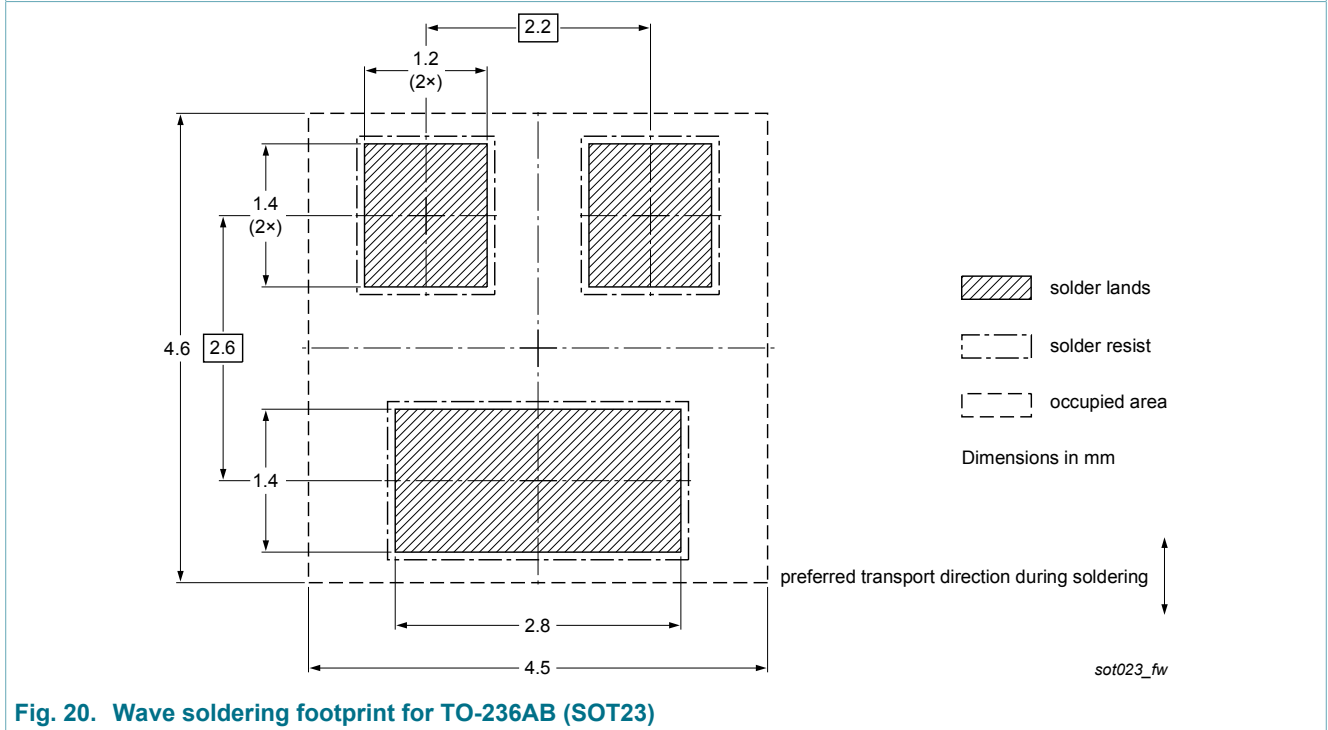


Fig. 20. Wave soldering footprint for TO-236AB (SOT23)

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--|--------------------|---------------|--------------|
| PMV37EN2 v.2 | 20170110 | Product data sheet | - | PMV37EN2 v.1 |
| Modifications: | <ul style="list-style-type: none">Section 10. Characteristics: values for forward transconductance and gate resistance changed | | | |
| PMV37EN2 v.1 | 20140603 | 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. |

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