

### Description

The PMV37ENEA uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

### General Features

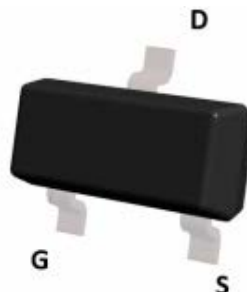
$V_{DS} = 60V$   $I_D = 3A$

$R_{DS(ON)} < 100m\Omega$  @  $V_{GS}=10V$

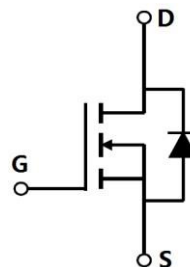
### Application

- Battery protection
- Load switch
- Uninterruptible power supply

### Dimensions SOT-23



### Pin Configuration



### Package Marking and Ordering Information

| Device    | Device Marking | Device Package | Reel Size | Tape width | Quantity   |
|-----------|----------------|----------------|-----------|------------|------------|
| PMV37ENEA | 6003           | SOT-23         | -         | -          | 3000 units |

### Absolute Maximum Ratings (TC=25°C unless otherwise noted)

| Symbol               | Parameter                                             | Rating     | Units |
|----------------------|-------------------------------------------------------|------------|-------|
| $V_{DS}$             | Drain-Source Voltage                                  | 60         | V     |
| $V_{GS}$             | Gate-Source Voltage                                   | $\pm 20$   | V     |
| $I_D@T_A=25^\circ C$ | Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup> | 3.0        | A     |
| $I_D@T_A=70^\circ C$ | Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup> | 1.8        | A     |
| $I_{DM}$             | Pulsed Drain Current <sup>2</sup>                     | 9.2        | A     |
| $P_D@T_A=25^\circ C$ | Total Power Dissipation <sup>3</sup>                  | 1          | W     |
| $T_{STG}$            | Storage Temperature Range                             | -55 to 150 | °C    |
| $T_J$                | Operating Junction Temperature Range                  | -55 to 150 | °C    |
| $R_{\theta JA}$      | Thermal Resistance Junction-Ambient <sup>1</sup>      | 125        | °C/W  |
| $R_{\theta JC}$      | Thermal Resistance Junction-Case <sup>1</sup>         | 80         | °C/W  |

## Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)

| Symbol                              | Parameter                                      | Conditions                                                                           | Min. | Typ.  | Max. | Unit  |
|-------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------|------|-------|------|-------|
| BV <sub>DSS</sub>                   | Drain-Source Breakdown Voltage                 | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA                                           | 60   | ---   | ---  | V     |
| ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | BV <sub>DSS</sub> Temperature Coefficient      | Reference to 25°C, I <sub>D</sub> =1mA                                               | ---  | 0.054 | ---  | V/°C  |
| R <sub>DS(ON)</sub>                 | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =2A                                             | ---  | 80    | 100  | mΩ    |
|                                     |                                                | V <sub>GS</sub> =4.5V, I <sub>D</sub> =1A                                            | ---  | 85    | 110  |       |
| V <sub>GS(th)</sub>                 | Gate Threshold Voltage                         |                                                                                      | 1.2  | ---   | 2.5  | V     |
| ΔV <sub>GS(th)</sub>                | V <sub>GS(th)</sub> Temperature Coefficient    | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA                             | ---  | -4.96 | ---  | mV/°C |
| I <sub>DSS</sub>                    | Drain-Source Leakage Current                   | V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                      | ---  | ---   | 1    | uA    |
|                                     |                                                | V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C                      | ---  | ---   | 5    |       |
| I <sub>GSS</sub>                    | Gate-Source Leakage Current                    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                           | ---  | ---   | ±100 | nA    |
| g <sub>fs</sub>                     | Forward Transconductance                       | V <sub>DS</sub> =5V, I <sub>D</sub> =2A                                              | ---  | 13    | ---  | S     |
| Q <sub>g</sub>                      | Total Gate Charge (4.5V)                       | V <sub>DS</sub> =48V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =2A                      | ---  | 5     | 7.0  | nC    |
| Q <sub>gs</sub>                     | Gate-Source Charge                             |                                                                                      | ---  | 1.68  | 2.4  |       |
| Q <sub>gd</sub>                     | Gate-Drain Charge                              |                                                                                      | ---  | 1.9   | 2.7  |       |
| T <sub>d(on)</sub>                  | Turn-On Delay Time                             | V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω, I <sub>D</sub> =2A | ---  | 1.6   | 3.2  | ns    |
| T <sub>r</sub>                      | Rise Time                                      |                                                                                      | ---  | 7.2   | 13   |       |
| T <sub>d(off)</sub>                 | Turn-Off Delay Time                            |                                                                                      | ---  | 25    | 50   |       |
| T <sub>f</sub>                      | Fall Time                                      |                                                                                      | ---  | 14.4  | 28.8 |       |
| C <sub>iss</sub>                    | Input Capacitance                              | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz                                    | ---  | 511   | 715  | pF    |
| C <sub>oss</sub>                    | Output Capacitance                             |                                                                                      | ---  | 38    | 53   |       |
| C <sub>rss</sub>                    | Reverse Transfer Capacitance                   |                                                                                      | ---  | 25    | 35   |       |
| I <sub>S</sub>                      | Continuous Source Current <sup>1,4</sup>       | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current                                    | ---  | ---   | 2.3  | A     |
| I <sub>SM</sub>                     | Pulsed Source Current <sup>2,4</sup>           |                                                                                      | ---  | ---   | 9.2  | A     |
| V <sub>SD</sub>                     | Diode Forward Voltage <sup>2</sup>             | V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C                        | ---  | ---   | 1.2  | V     |
| t <sub>rr</sub>                     | Reverse Recovery Time                          | I <sub>F</sub> =2A, di/dt=100A/μs, T <sub>J</sub> =25°C                              | ---  | 9.7   | ---  | nS    |
| Q <sub>rr</sub>                     | Reverse Recovery Charge                        |                                                                                      | ---  | 5.8   | ---  | nC    |

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The power dissipation is limited by 150°C junction temperature.
- 4.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.

## Typical Characteristics

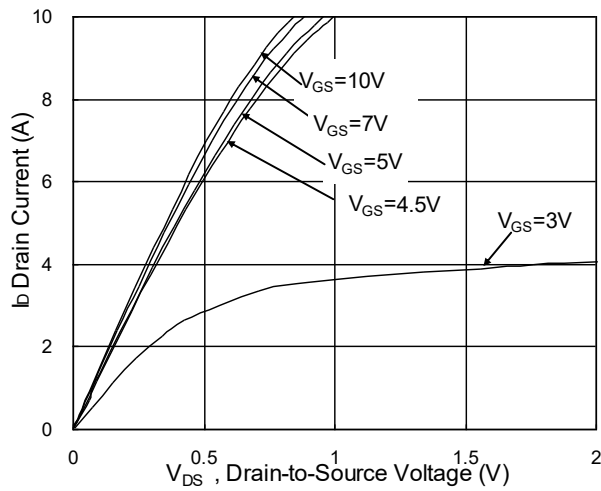


Fig.1 Typical Output Characteristics

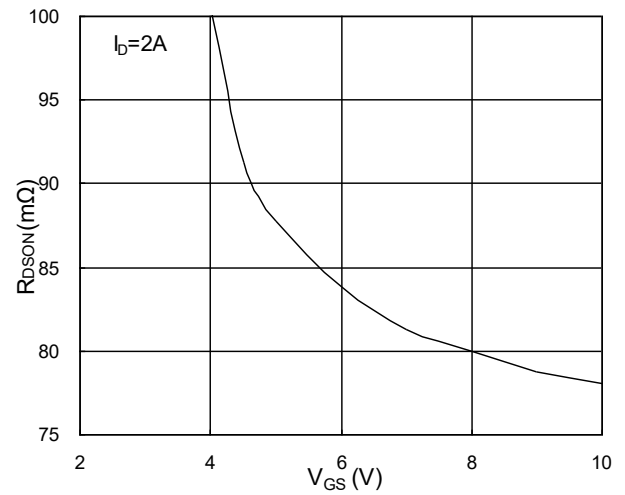


Fig.2 On-Resistance v.s Gate-Source

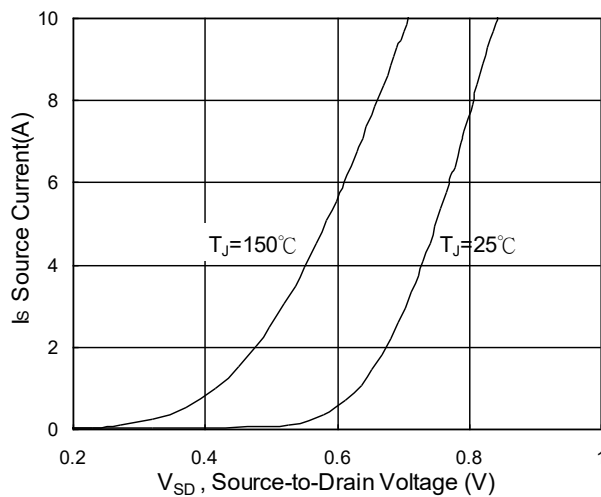


Fig.3 Forward Characteristics of Reverse

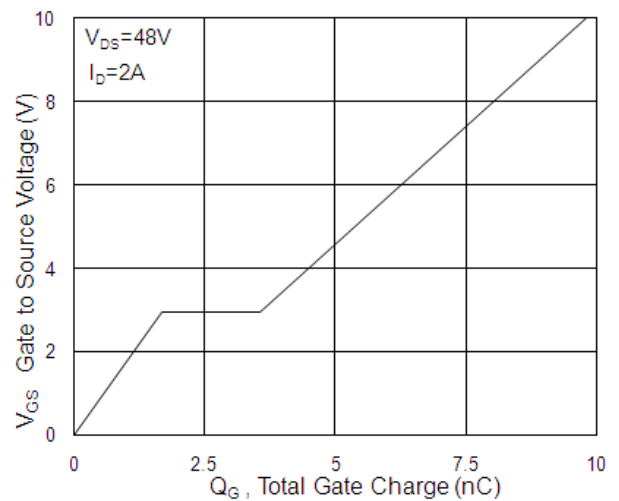


Fig.4 Gate-Charge Characteristics

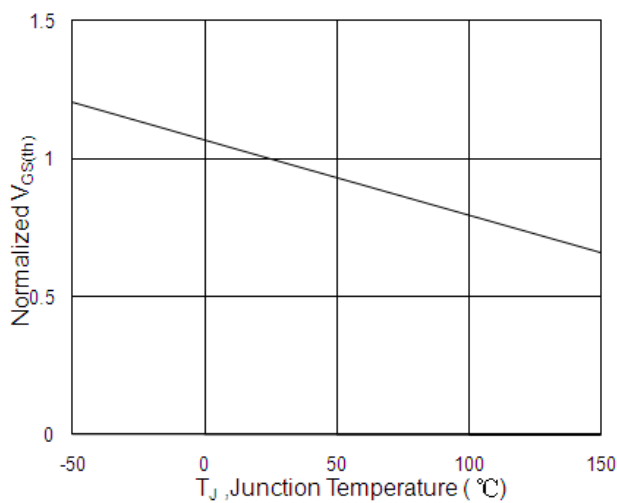


Fig.5 Normalized  $V_{GS(th)}$  v.s  $T_J$

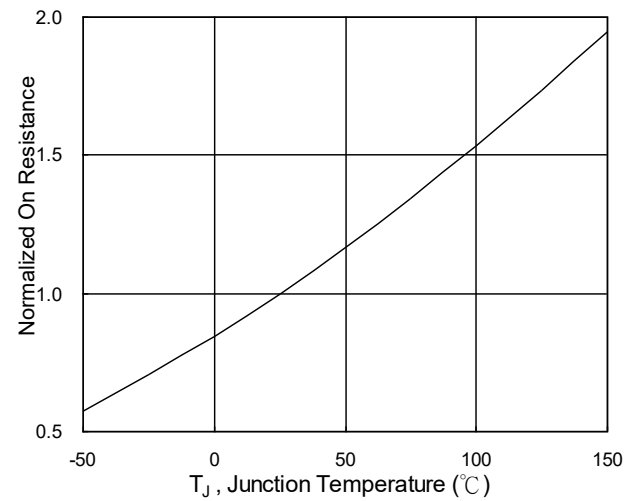
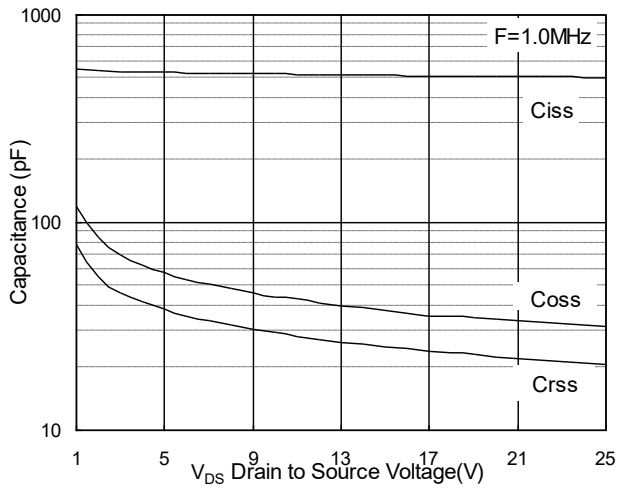
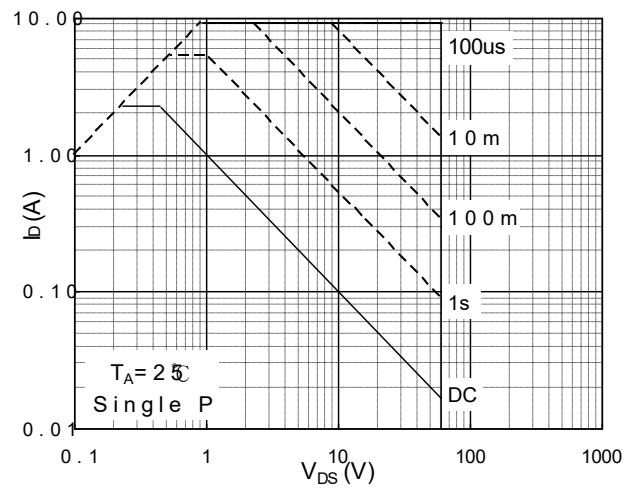


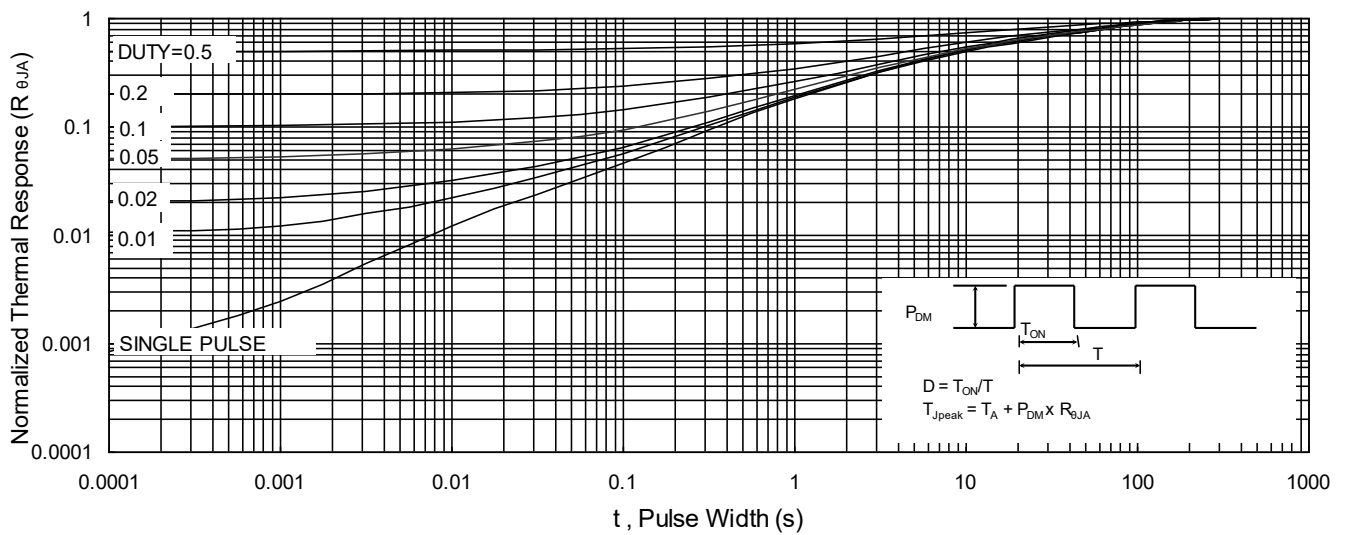
Fig.6 Normalized  $R_{DS(on)}$  v.s  $T_J$



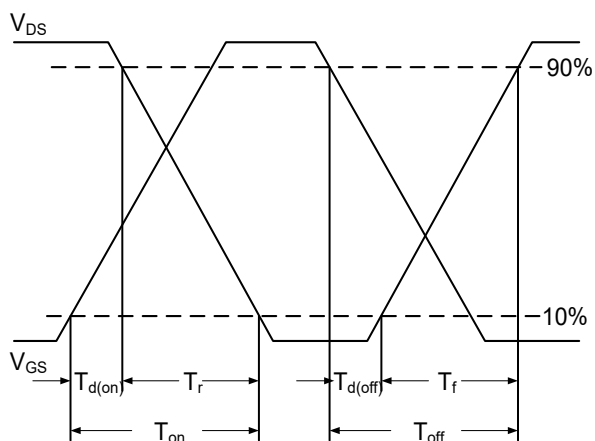
**Fig.7 Capacitance**



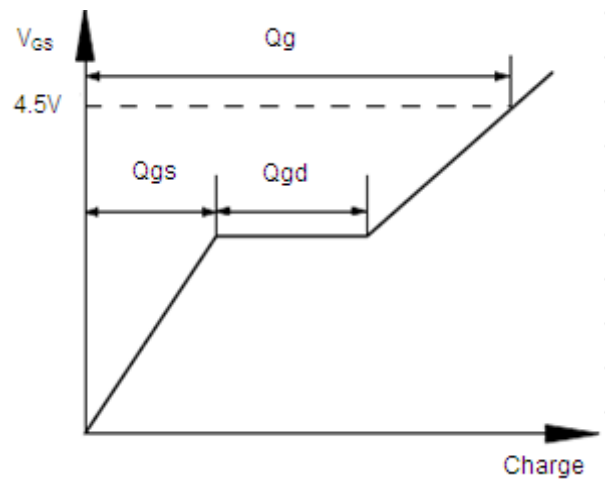
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**

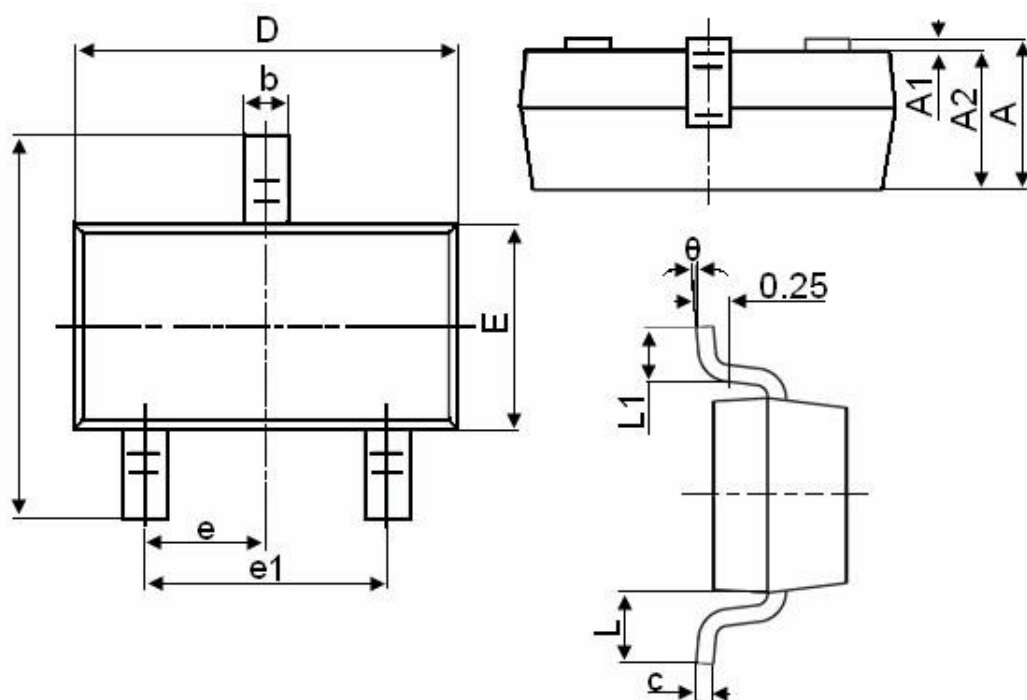


**Fig.10 Switching Time Waveform**



**Fig.11 Gate Charge Waveform**

## Package Mechanical Data-SOT-23



| Symbol | Dimensions in Millimeters |       |
|--------|---------------------------|-------|
|        | MIN.                      | MAX.  |
| A      | 0.900                     | 1.150 |
| A1     | 0.000                     | 0.100 |
| A2     | 0.900                     | 1.050 |
| b      | 0.300                     | 0.500 |
| c      | 0.080                     | 0.150 |
| D      | 2.800                     | 3.000 |
| E      | 1.200                     | 1.400 |
| E1     | 2.250                     | 2.550 |
| e      | 0.950TYP                  |       |
| e1     | 1.800                     | 2.000 |
| L      | 0.550REF                  |       |
| L1     | 0.300                     | 0.500 |
| θ      | 0°                        | 8°    |