



Description

The HPMV280ENEA 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.



SOT-23

General Features

$V_{DS} = 100V$ $I_D = 3A$

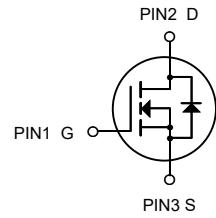
$R_{DS(ON)} < 248m\Omega$ @ $V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|-------------|--------|---------|----------|
| HPMV280ENEA | SOT-23 | MA4 | 3000 |

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

| Symbol | Parameter | Rating | Units |
|------------------------|--|------------|-------|
| V_{DS} | Drain-Source Voltage | 100 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D @ T_A=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 3 | A |
| $I_D @ T_A=70^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 1 | A |
| I_{DM} | Pulsed Drain Current ² | 5 | A |
| $P_D @ T_A=25^\circ C$ | Total Power Dissipation ³ | 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 ¹ | 125 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | 80 | °C/W |



Electrical Characteristics (T_J=25 °C, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|--|---|------|-------|------|-------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 100 | --- | --- | V |
| ΔBV _{DSS} /ΔT _J | BVDSS Temperature Coefficient | Reference to 25°C, I _D =1mA | --- | 0.067 | --- | V/°C |
| R _{DSON} | Static Drain-Source On-Resistance ² | V _{GS} =10V, I _D =1A | --- | 210 | 248 | mΩ |
| | | V _{GS} =4.5V, I _D =0.5A | --- | 244 | 290 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.0 | 1.5 | 2.5 | V |
| ΔV _{GS(th)} | V _{GS(th)} Temperature Coefficient | | --- | -4.2 | --- | mV/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =80V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =80V, V _{GS} =0V, T _J =25°C | --- | --- | 5 | uA |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |
| g _{fs} | Forward Transconductance | V _{DS} =5V, I _D =1A | --- | 2.4 | --- | S |
| R _g | Gate Resistance | V _{DS} =0V, V _{GS} =0V, f=1MHz | --- | 2.8 | 5.6 | |
| Q _g | Total Gate Charge (10V) | | --- | 9.7 | 13.6 | nC |
| Q _{gs} | Gate-Source Charge | V _{DS} =80V, V _{GS} =10V, I _D =1A | --- | 1.6 | 2.2 | |
| Q _{gd} | Gate-Drain Charge | | --- | 1.7 | 2.4 | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =50V, V _{GS} =10V, R _G =3.3, I _D =1A | --- | 1.6 | 3.2 | ns |
| T _r | Rise Time | | --- | 19 | 34 | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 13.6 | 27 | |
| T _f | Fall Time | | --- | 19 | 38 | |
| C _{iss} | Input Capacitance | V _{DS} =15V, V _{GS} =0V, f=1MHz | --- | 508 | 711 | pF |
| C _{oss} | Output Capacitance | | --- | 29 | 41 | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 16.4 | 23 | |
| I _S | Continuous Source Current ^{1,4} | V _G =V _D =0V, Force Current | --- | --- | 1.2 | A |
| I _{SM} | Pulsed Source Current ^{2,4} | | --- | --- | 5 | A |
| V _{SD} | Diode Forward Voltage ² | V _{GS} =0V, I _S =1A, T _J =25°C | --- | --- | 1.2 | V |
| t _{rr} | Reverse Recovery Time | I _F =1A, dI/dt=100A/μs, T _J =25°C | --- | 14 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | | --- | 9.3 | --- | nC |

Note :

- 1.The data tested by surface mounted on a 1 inch²FR-4 board with 2OZ 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_D and I_{DM} , in real applications , should be limited by total power dissipation.



Typical Characteristics

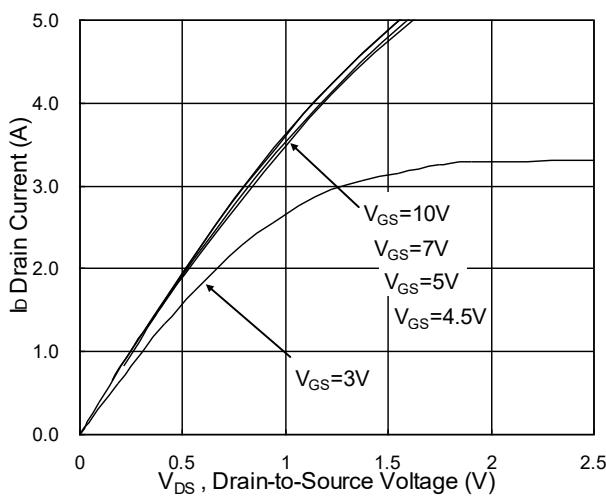


Fig.1 Typical Output Characteristics

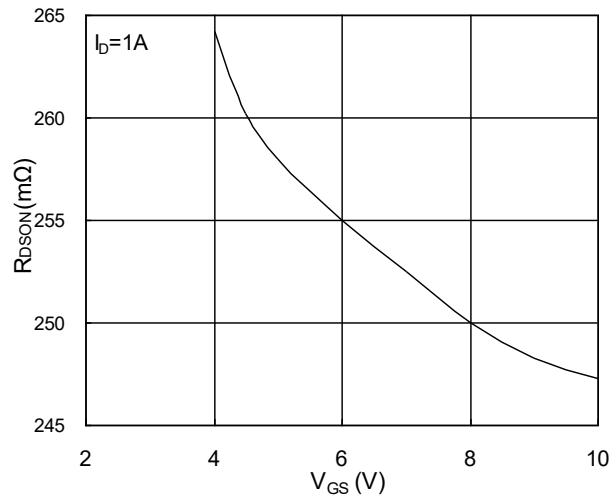


Fig.2 On-Resistance vs. Gate-Source

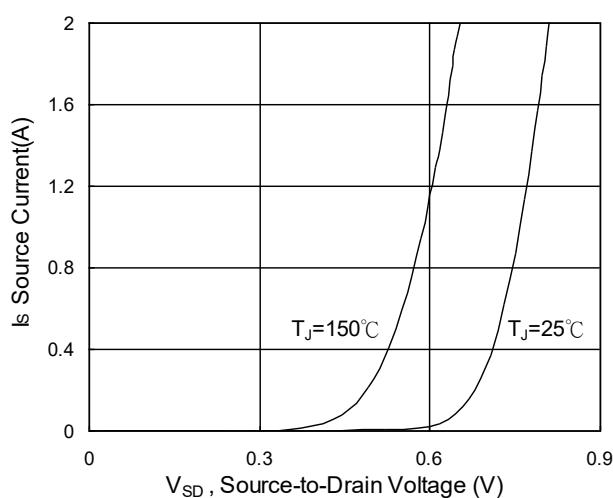


Fig.3 Forward Characteristics of Reverse

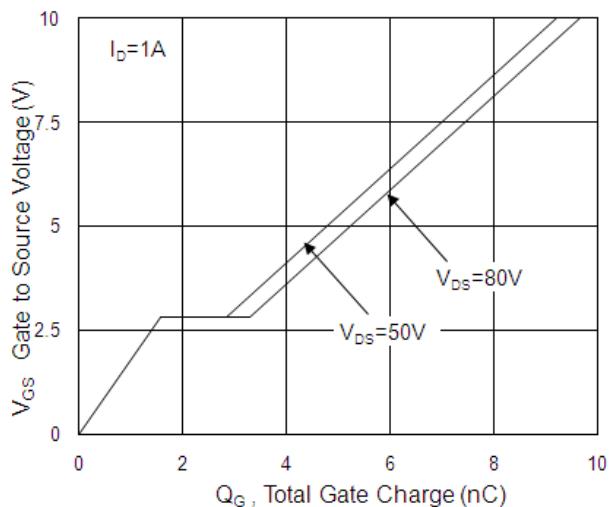


Fig.4 Gate-Charge Characteristics

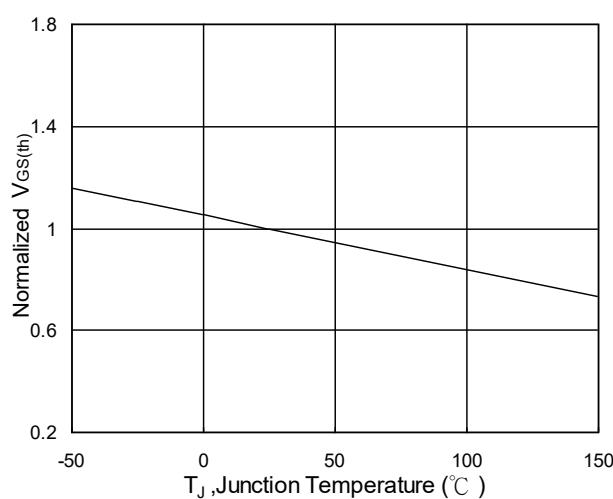


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

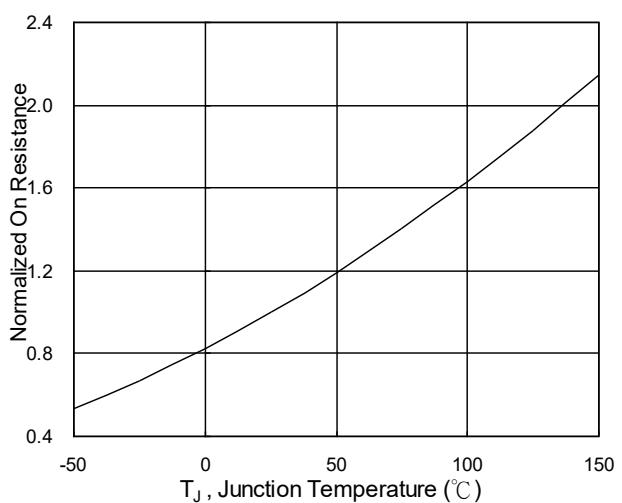


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

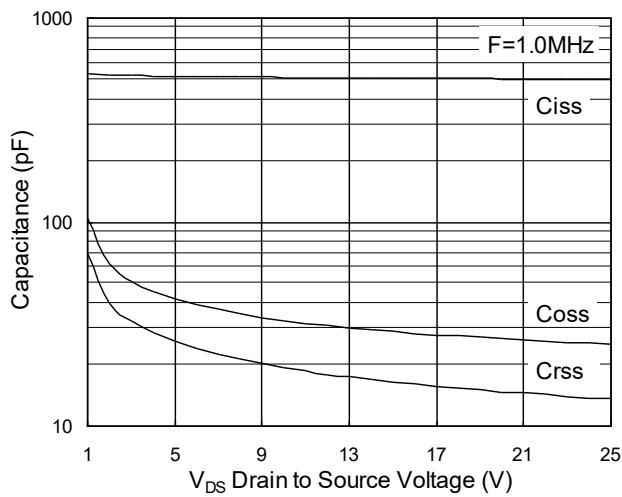


Fig.7 Capacitance

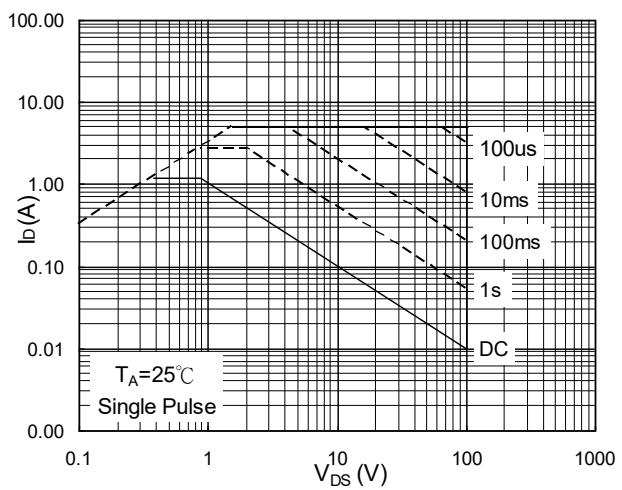


Fig.8 Safe Operating Area

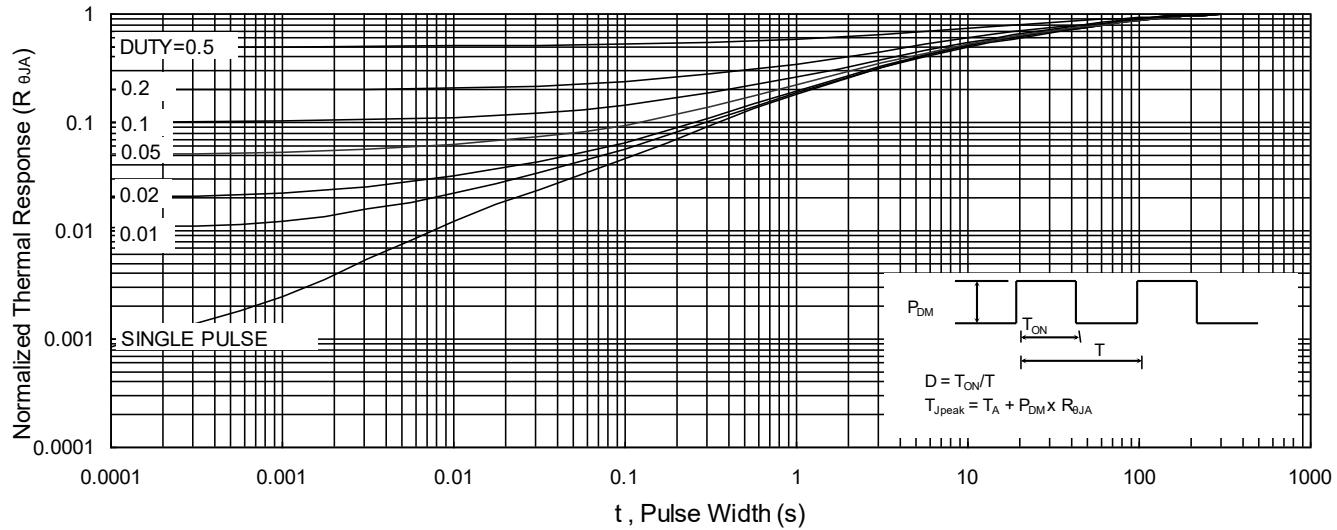


Fig.9 Normalized Maximum Transient Thermal Impedance

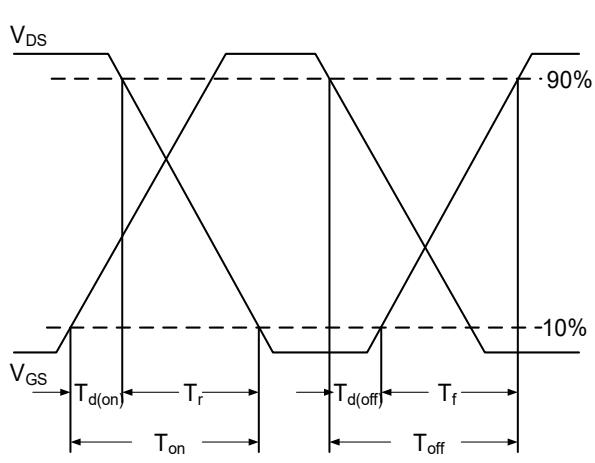


Fig.10 Switching Time Waveform

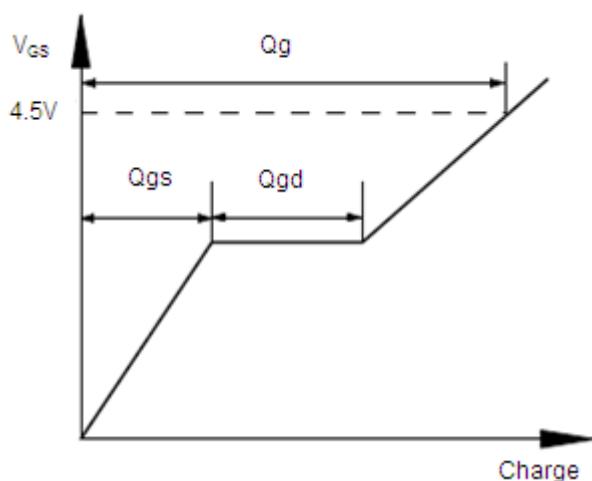
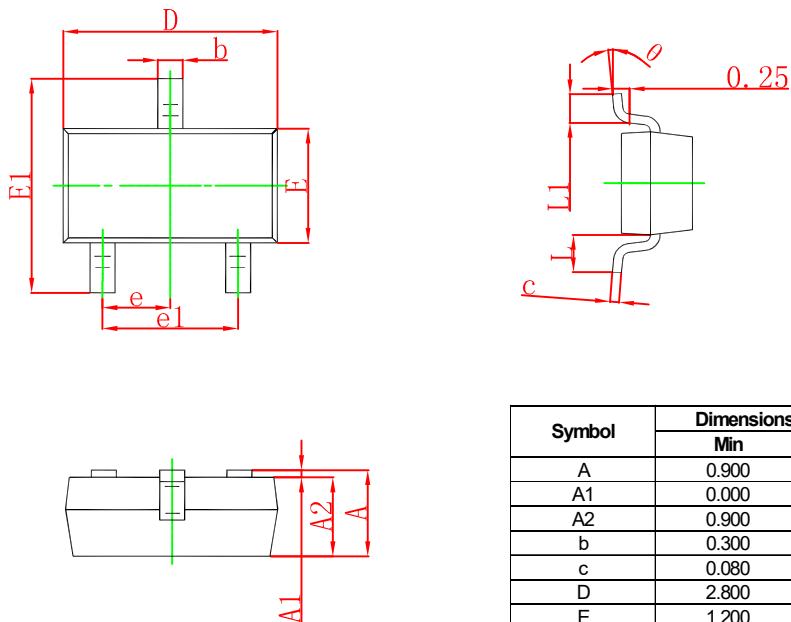


Fig.11 Gate Charge Waveform

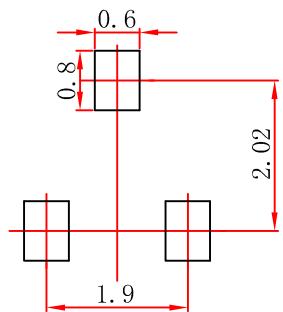


SOT-23 Package Outline Dimensions



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP | | 0.037 TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF | | 0.022 REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |

SOT-23 Suggested Pad Layout



Note:
1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.05 mm.
3. The pad layout is for reference purposes only.



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