

- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

**Product Summary**

| BVDSS | RDSON | ID   |
|-------|-------|------|
| -30V  | 11mΩ  | -23A |

**PRPAK3.3X3.3 Pin Configuration**

**Description**

AGM30P10AP is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

**Package Marking and Ordering Information**

| Device Marking | Device     | Device Package | Reel Size | Tape width | Quantity |
|----------------|------------|----------------|-----------|------------|----------|
| AGM30P10AP     | AGM30P10AP | DFN3.3*3.3     | --mm      | --mm       | 5000     |

**Table 1. Absolute Maximum Ratings (TA=25°C)**

| Symbol                            | Parameter   | Value      | Unit |
|-----------------------------------|---|------------|------|
| V <sub>DS</sub>                   | Drain-Source Voltage (V <sub>GS</sub> =0V)              | -30        | V    |
| V <sub>GS</sub>                   | Gate-Source Voltage (V <sub>DS</sub> =0V)               | ±20        | V    |
| I <sub>D</sub>                    | Drain Current-Continuous(T <sub>c</sub> =25°C) (Note 1) | -23        | A    |
|                                   | Drain Current-Continuous(T <sub>c</sub> =100°C)         | -19        | A    |
| I <sub>DM (pulse)</sub>           | Drain Current-Continuous@ Current-Pulsed (Note 2)       | -62        | A    |
| P <sub>D</sub>                    | Maximum Power Dissipation(T <sub>c</sub> =25°C)         | 37         | W    |
|                                   | Maximum Power Dissipation(T <sub>c</sub> =100°C)        | 27         | W    |
| E <sub>AS</sub>                   | Avalanche energy (Note 3)                               | 75         | mJ   |
| T <sub>J</sub> , T <sub>STG</sub> | Operating Junction and Storage Temperature Range        | -55 To 150 | °C   |

**Table 2. Thermal Characteristic**

| Symbol           | Parameter   | Typ | Max | Unit |
|------------------|---|-----|-----|------|
| R <sub>θJA</sub> | Thermal Resistance Junction-ambient (Steady State) <sup>1</sup> | --- | 70  | °C/W |
| R <sub>θJC</sub> | Thermal Resistance Junction-Case <sup>1</sup>                   | --- | 3.4 | °C/W |

**Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)**

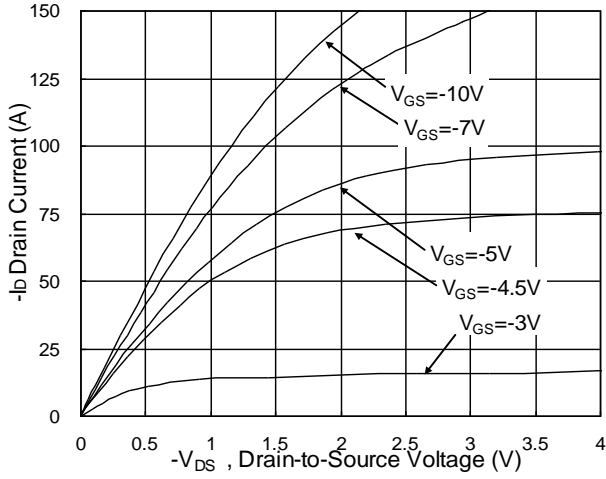
| Symbol                                    | Parameter                        | Conditions  | Min | Typ  | Max  | Unit |
|---|----------------------------------|---|-----|------|------|------|
| <b>On/Off States</b>                      |                                  |   |     |      |      |      |
| BV <sub>DSS</sub>                         | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA  | -30 |      |      | V    |
| I <sub>DSS</sub>                          | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V  |     |      | -1   | μA   |
| I <sub>GSS</sub>                          | Gate-Body Leakage Current        | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V  |     |      | ±100 | nA   |
| V <sub>GS(th)</sub>                       | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                      | 1.2 | 1.3  | 2.1  | V    |
| g <sub>FS</sub>                           | Forward Transconductance         | V <sub>DS</sub> =-5V, I <sub>D</sub> =-20A  |     | 30   |      | S    |
| R <sub>DS(ON)</sub>                       | Drain-Source On-State Resistance | V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A   |     | 11   | 13.9 | mΩ   |
|   |                                  | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-15A  |     |      |      | mΩ   |
| <b>Dynamic Characteristics</b>            |                                  |   |     |      |      |      |
| C <sub>iss</sub>                          | Input Capacitance                | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V,<br>F=1MHZ   |     | 1380 |      | pF   |
| C <sub>oss</sub>                          | Output Capacitance               |   |     | 310  |      | pF   |
| C <sub>rss</sub>                          | Reverse Transfer Capacitance     |   |     | 237  |      | pF   |
| R <sub>g</sub>                            | Gate resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1.0MHz  |     | 9    |      | Ω    |
| <b>Switching Times</b>                    |                                  |   |     |      |      |      |
| t <sub>d(on)</sub>                        | Turn-on Delay Time               | V <sub>GS</sub> =-10V, V <sub>DD</sub> =-15V,<br>I <sub>D</sub> =-15A, R <sub>GEN</sub> =3.3Ω |     | 8    |      | nS   |
| t <sub>r</sub>                            | Turn-on Rise Time                |   |     | 73   |      | nS   |
| t <sub>d(off)</sub>                       | Turn-Off Delay Time              |   |     | 61.8 |      | nS   |
| t <sub>f</sub>                            | Turn-Off Fall Time               |   |     | 24.4 |      | nS   |
| Q <sub>g</sub>                            | Total Gate Charge                | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-25V, I <sub>D</sub> =-12A                            |     | 22   |      | nC   |
| Q <sub>gs</sub>                           | Gate-Source Charge               |   |     | 8.7  |      | nC   |
| Q <sub>gd</sub>                           | Gate-Drain Charge                |   |     | 7.2  |      | nC   |
| <b>Source-Drain Diode Characteristics</b> |                                  |   |     |      |      |      |
| I <sub>s</sub>                            | Continuous Source Current        | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current   |     |      | -23  | A    |
| V <sub>SD</sub>                           | Forward on Voltage               | V <sub>GS</sub> =0V, I <sub>s</sub> =-1A  |     |      | 1.0  | V    |
| t <sub>rr</sub>                           | Reverse Recovery Time            | I <sub>F</sub> =-15A, dI/dt=100A/μs,<br>·T <sub>J</sub> =25°C                                 |     |      | 19   | ns   |
| Q <sub>rr</sub>                           | Reverse Recovery Charge          |   |     |      |      | 9    |

Notes 1.The maximum current rating is package limited.

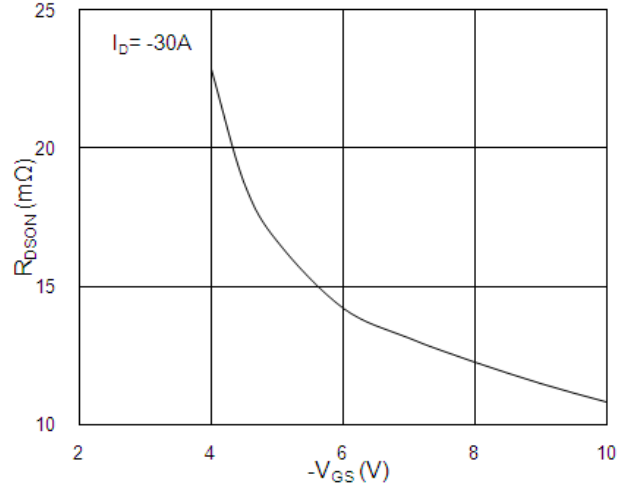
Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3.EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=15V, V<sub>G</sub>=10V, R<sub>G</sub>=25Ω

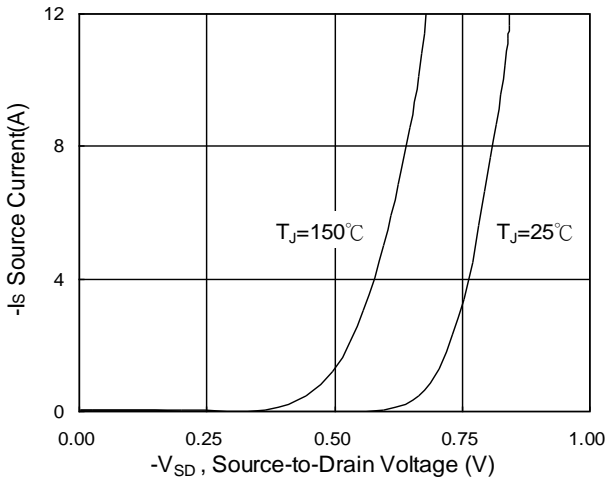
**Typical Characteristics**



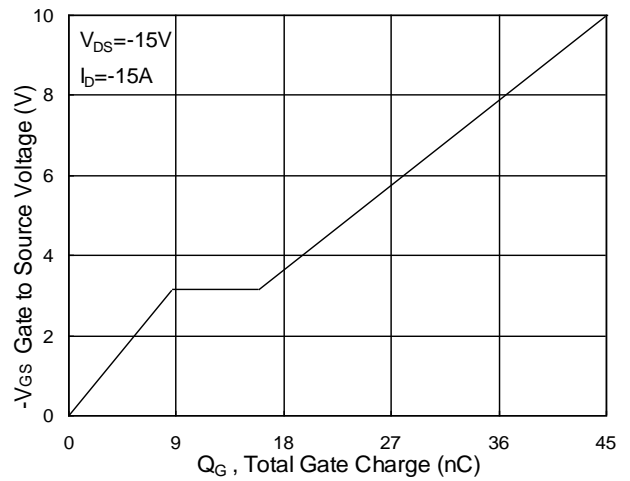
**Fig.1 Typical Output Characteristics**



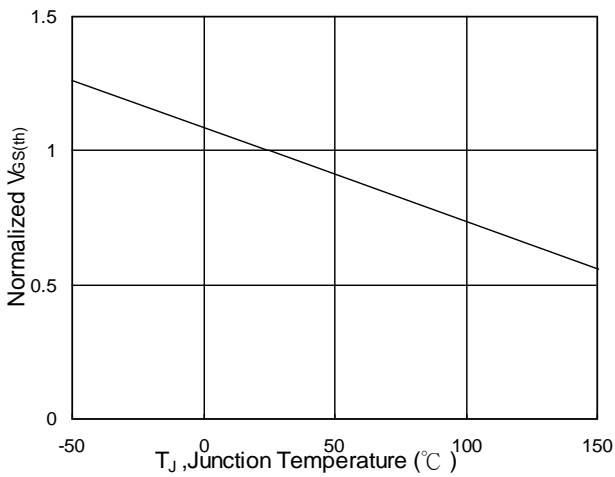
**Fig.2 On-Resistance vs. G-S Voltage**



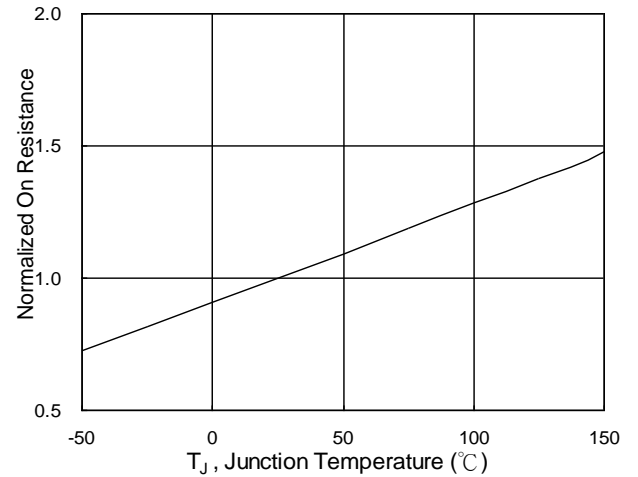
**Fig.3 Forward Characteristics of Reverse**



**Fig.4 Gate-Charge Characteristics**



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



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

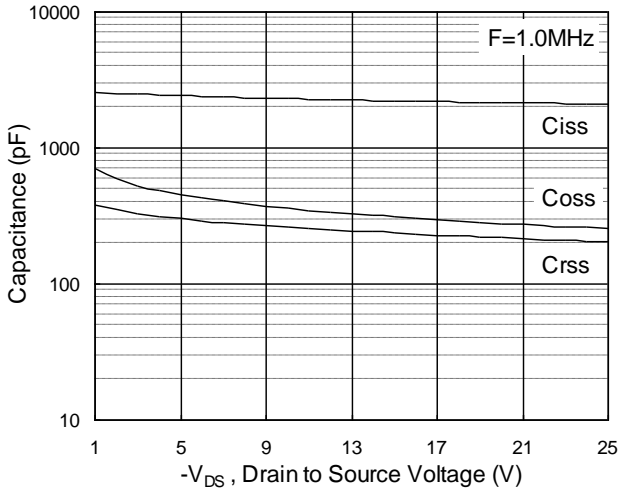


Fig.7 Capacitance

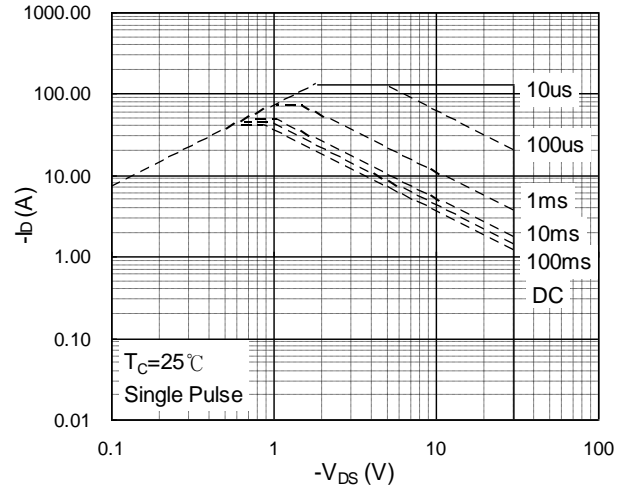


Fig.8 Safe Operating Area

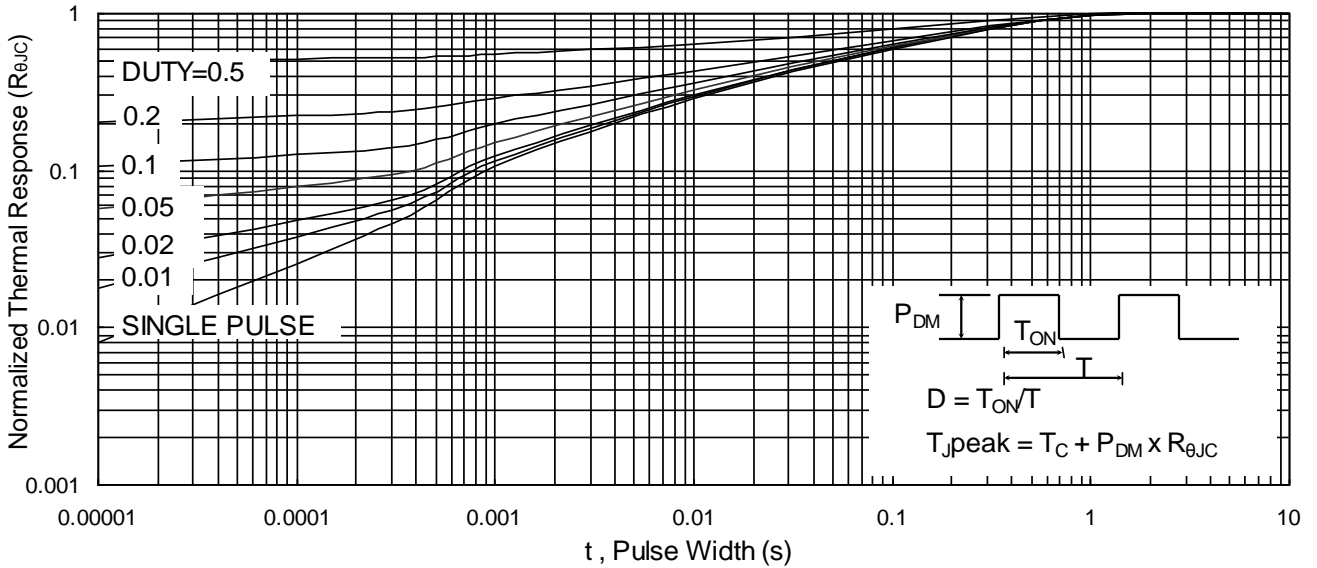


Fig.9 Normalized Maximum Transient Thermal Impedance

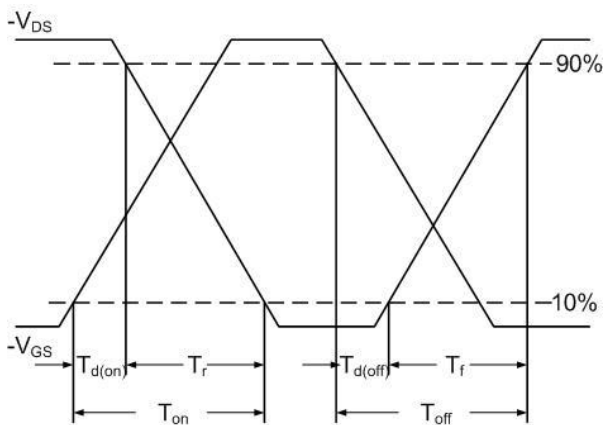


Fig.10 Switching Time Waveform

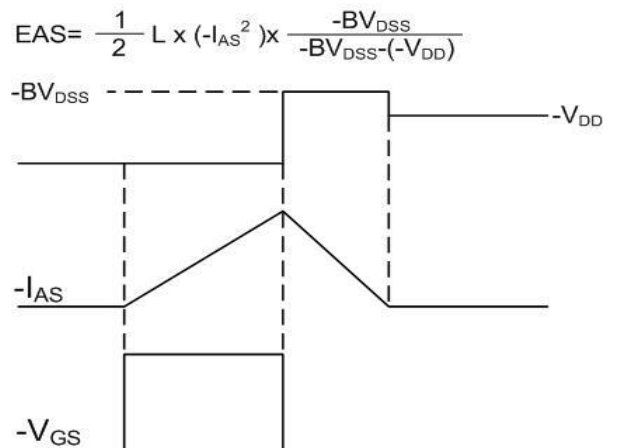
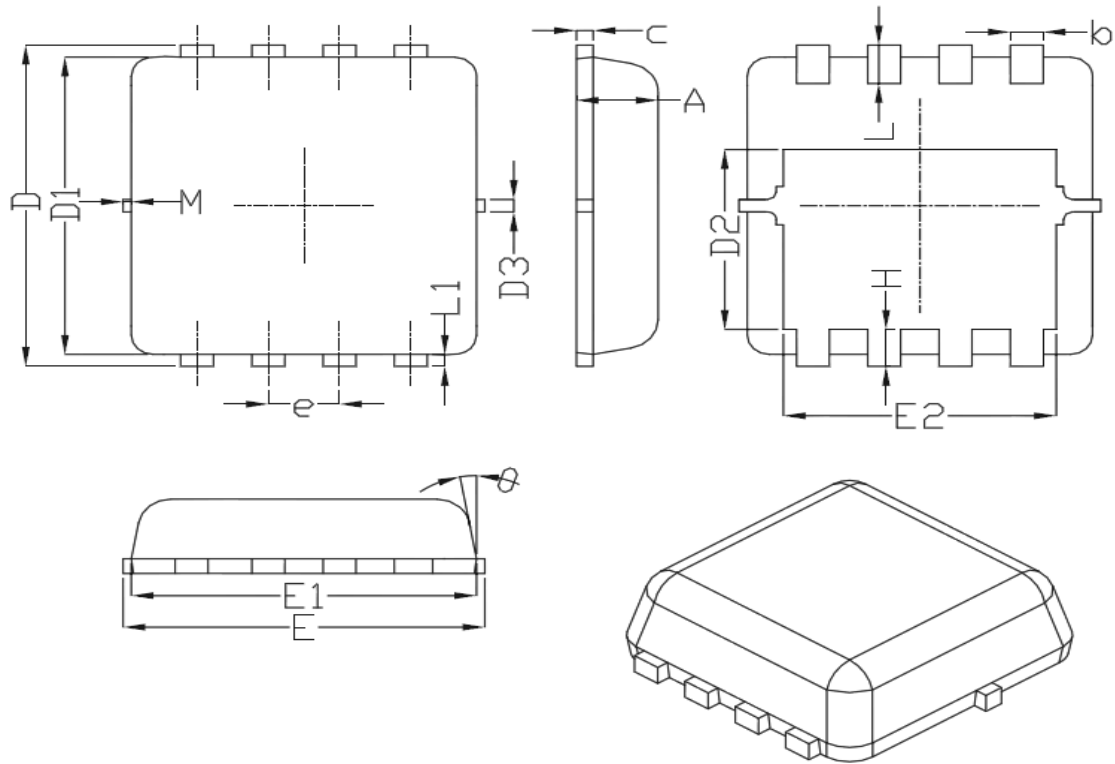


Fig.11 Unclamped Inductive Switching Waveform

**PDFN3333 Package Outline Data**

**DIMENSIONS ( unit : mm )**

| Symbol         | Min     | Typ  | Max  | Symbol    | Min  | Typ  | Max  |
|----------------|---------|------|------|-----------|------|------|------|
| <b>A</b>       | 0.70    | 0.75 | 0.80 | <b>b</b>  | 0.25 | 0.30 | 0.35 |
| <b>C</b>       | 0.10    | 0.15 | 0.25 | <b>D</b>  | 3.25 | 3.35 | 3.45 |
| <b>D1</b>      | 3.00    | 3.10 | 3.20 | <b>D2</b> | 1.78 | 1.88 | 1.98 |
| <b>D3</b>      | --      | 0.13 | --   | <b>E</b>  | 3.20 | 3.30 | 3.40 |
| <b>E1</b>      | 3.00    | 3.15 | 3.20 | <b>E2</b> | 2.39 | 2.49 | 2.59 |
| <b>e</b>       | 0.65BSC |      |      | <b>H</b>  | 0.30 | 0.39 | 0.50 |
| <b>L</b>       | 0.30    | 0.40 | 0.50 | <b>L1</b> | --   | 0.13 | --   |
| <b>θ</b>       | --      | 10°  | 12°  | <b>M</b>  | *    | *    | 0.15 |
| *Not specified |         |      |      |           |      |      |      |

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