

General Description

The AGM40P55AP combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$

This device is ideal for load switch and battery protection applications.

Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance
- 100% Avalanche tested
- 100% DVDS tested

Application

- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|------------|----------------|-----------|------------|----------|
| AGM40P55AP | AGM40P55AP | PDFN3.3*3.3 | 330mm | 12mm | 5000 |

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

| Symbol | Parameter | Value | Unit |
|-------------|--|------------|------|
| VDS | Drain-Source Voltage (VGS=0V) | -40 | V |
| VGS | Gate-Source Voltage (VDS=0V) | ±20 | V |
| ID | Drain Current-Continuous(Tc=25°C) (Note 1) | -50 | A |
| | Drain Current-Continuous(Tc=100°C) | -31 | A |
| IDM (pluse) | Drain Current-Pulsed (Note 2) | -200 | A |
| PD | Maximum Power Dissipation(Tc=25°C) | 55 | w |
| | Maximum Power Dissipation(Tc=100°C) | 22 | w |
| EAS | Avalanche energy (Note 3) | 196 | mJ |
| TJ,TSTG | Operating Junction and Storage Temperature Range | -55 To 150 | °C |

Table 2. Thermal Characteristic

| Symbol | Parameter | Typ | Max | Unit |
|--------|---|-----|------|------|
| RθJA | Thermal Resistance Junction-ambient (Steady State) ¹ | --- | 61 | °C/W |
| RθJC | Thermal Resistance Junction-Case ¹ | --- | 2.27 | °C/W |

Product Summary

| BVDSS | RDSON | ID |
|-------|-------|------|
| -40V | 8.9mΩ | -50A |

PDFN3.3*3.3 Pin Configuration

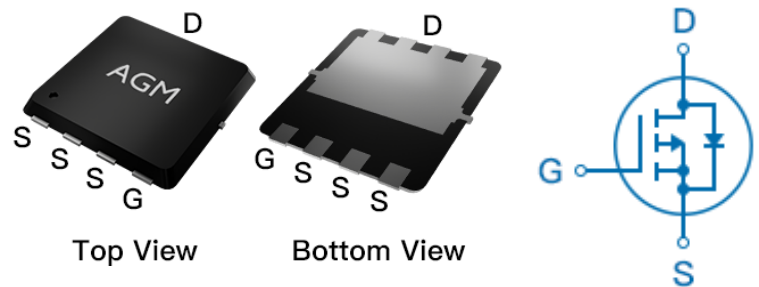


Table 3. Electrical Characteristics (T_J=25°C unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|----------------------------------|---------------------------------------|------|------|------|------|
| On/Off States | | | | | | |
| BVDSS | Drain-Source Breakdown Voltage | VGS=0V ID=-250μA | -40 | -- | -- | V |
| IDSS | Zero Gate Voltage Drain Current | VDS=-40V,VGS=0V | -- | -- | -1 | μA |
| IGSS | Gate-Body Leakage Current | VGS=±20V,VDS=0V | -- | -- | ±100 | nA |
| VGS(th) | Gate Threshold Voltage | VDS=VGS,ID=-250μA | -1.2 | -1.6 | -2.2 | V |
| gFS | Forward Transconductance | VDS=-5V,ID=-10A | -- | 22 | -- | S |
| RDS(on) | Drain-Source On-State Resistance | VGS=-10V, ID=-15A | -- | 8.9 | 13 | mΩ |
| | | VGS=-4.5V, ID=-10A | -- | 14.2 | 20 | mΩ |
| Dynamic Characteristics | | | | | | |
| Ciss | Input Capacitance | VDS=-20V,VGS=0V, F=1MHZ | -- | 2837 | -- | pF |
| Coss | Output Capacitance | | -- | 230 | -- | pF |
| Crss | Reverse Transfer Capacitance | | -- | 203 | -- | pF |
| Rg | Gate resistance | VGS=0V, VDS=0V,f=1.0MHz | -- | 4.5 | -- | Ω |
| Switching Times | | | | | | |
| td(on) | Turn-on Delay Time | VGS=-10V,VDS=-15V, ID=-16A,RGEN=3Ω | -- | 38 | -- | nS |
| tr | Turn-on Rise Time | | -- | 31 | -- | nS |
| td(off) | Turn-Off Delay Time | | -- | 90 | -- | nS |
| tf | Turn-Off Fall Time | | -- | 9.2 | -- | nS |
| Qg | Total Gate Charge | VGS=-10V, VDS=-20V, ID=-16A | -- | 28 | -- | nC |
| Qgs | Gate-Source Charge | | -- | 8 | -- | nC |
| Qgd | Gate-Drain Charge | | -- | 8.5 | -- | nC |
| Source-Drain Diode Characteristics | | | | | | |
| ISD | Source-Drain Current(Body Diode) | | -- | -- | -50 | A |
| VSD | Forward on Voltage | VGS=0V,IS=-15A | -- | -- | -1.2 | V |
| trr | Reverse Recovery Time | Isd=-15A , | -- | -- | -- | ns |
| Qrr | Reverse Recovery Charge | dI/dt=100A/μs , T _J =25°C | -- | -- | -- | nc |

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_J=25°C,VDD=-20V,Vgs=-10V,ID=-28A,L=0.5mH,RG=25ohm

Typical Characteristics

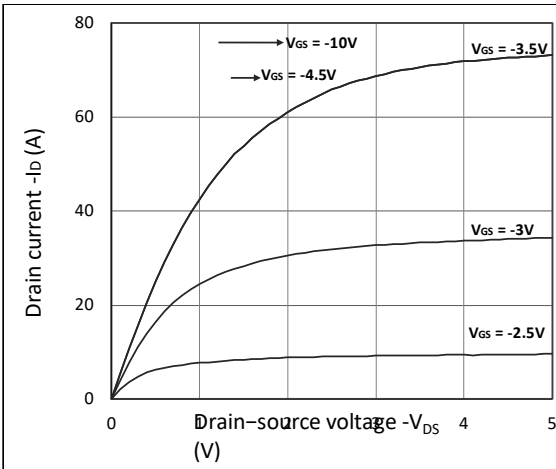


Figure 1. Output Characteristics

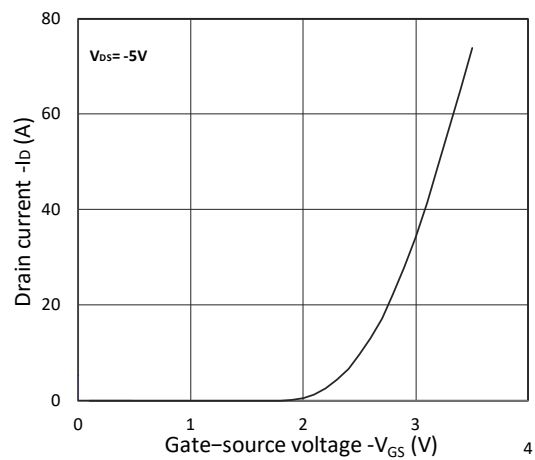


Figure 2. Transfer Characteristics

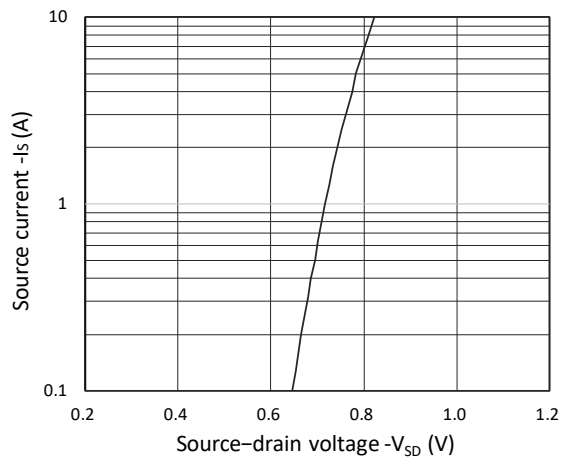
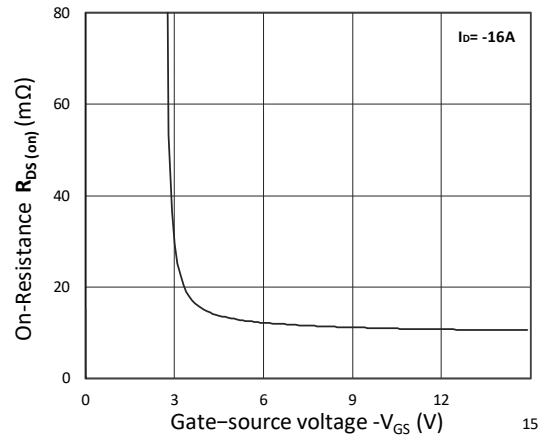
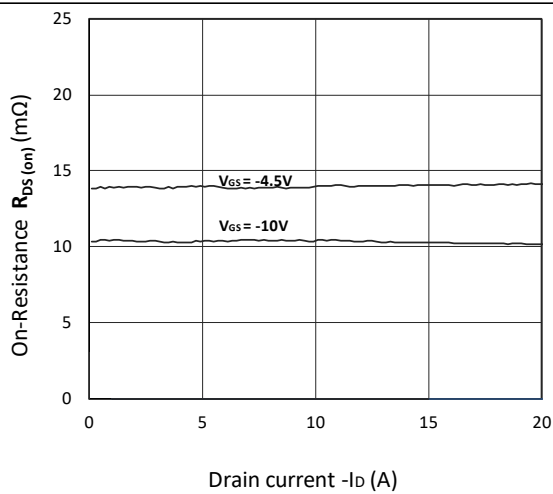
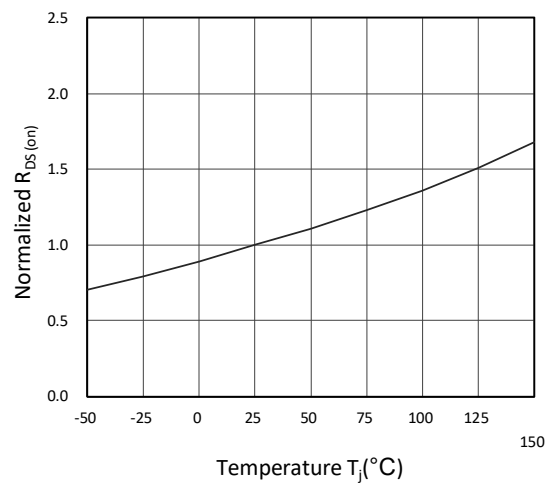


Figure 3. Forward Characteristics of Reverse


 Figure 4. $R_{DS(ON)}$ vs. V_{GS}

 Figure 5. $R_{DS(ON)}$ vs. I_D

 Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

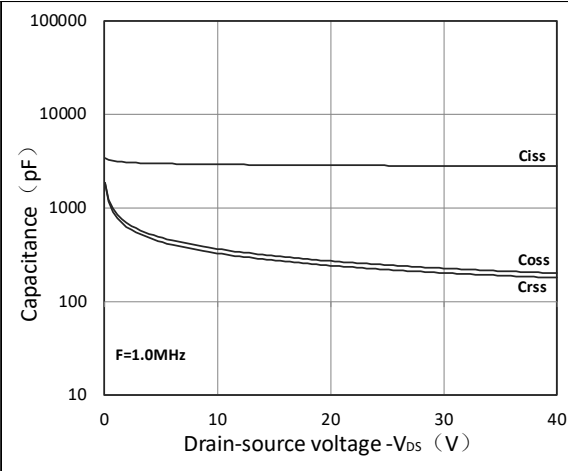


Figure 7. Capacitance Characteristics

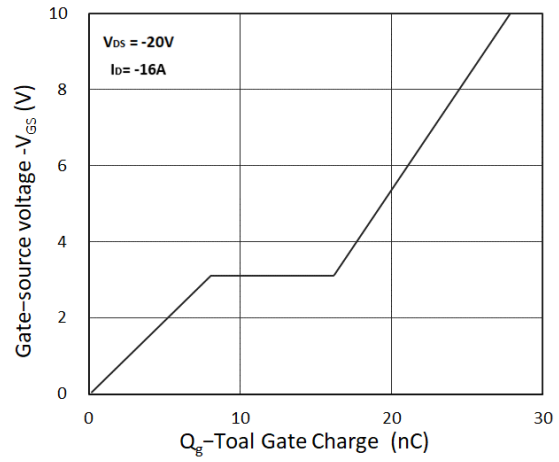


Figure 8. Gate Charge Characteristics

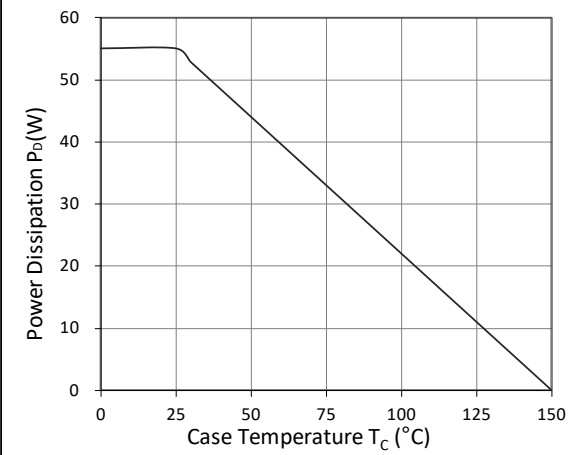


Figure 9. Power Dissipation

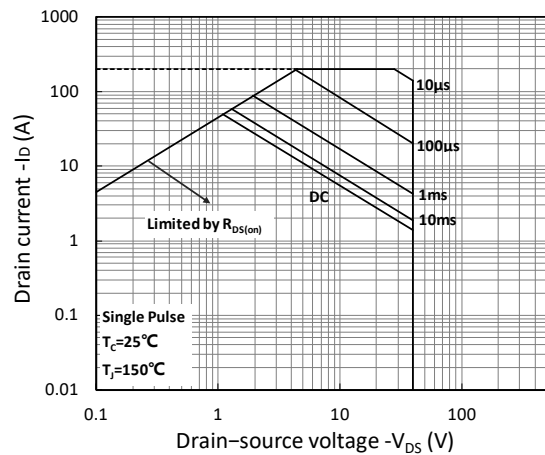


Figure 10. Safe Operating Area

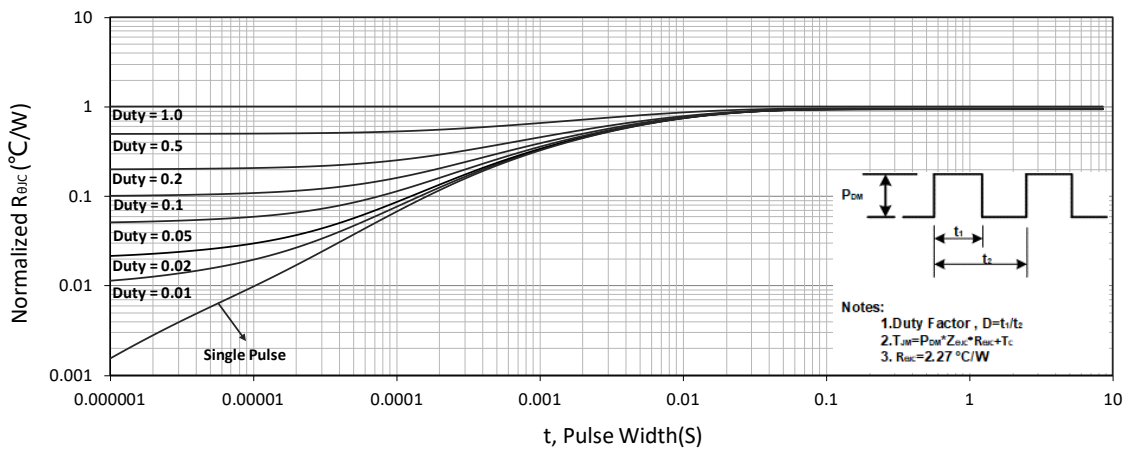
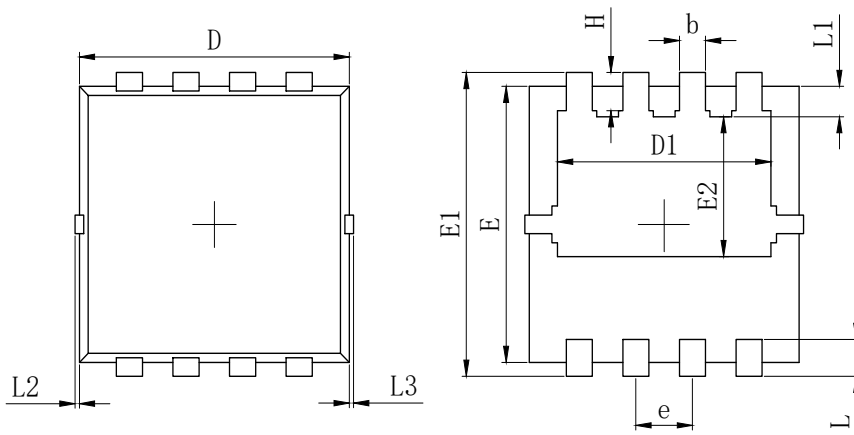
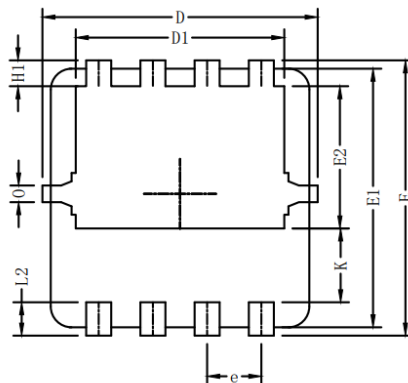
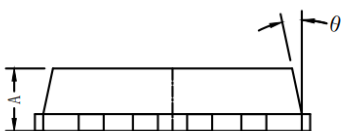
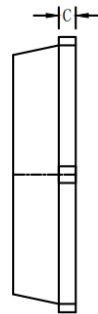
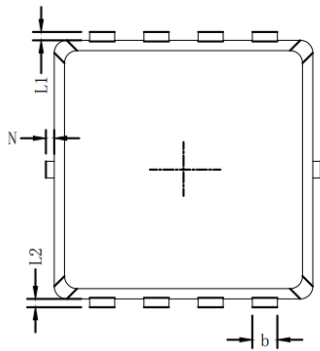
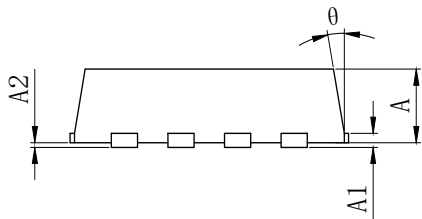


Figure 11. Normalized Maximum Transient Thermal Impedance

•Dimensions (PDFN3.3×3.3)


| SYMBOL | MILLIMETER | | |
|--------|------------|-------|-------|
| | MIN | Typ. | MAX |
| A | 0.700 | 0.800 | 0.900 |
| A1 | 0.152 REF. | | |
| A2 | 0°0.05 | | |
| D | 3.000 | 3.100 | 3.200 |
| D1 | 2.300 | 2.450 | 2.600 |
| E | 2.900 | 3.000 | 3.100 |
| E1 | 3.150 | 3.300 | 3.450 |
| E2 | 1.320 | 1.520 | 1.720 |
| b | 0.200 | 0.300 | 0.400 |
| e | 0.550 | 0.650 | 0.750 |
| L | 0.300 | 0.400 | 0.500 |
| L1 | 0.180 | 0.330 | 0.480 |
| L2 | 0°0.100 | | |
| L3 | 0°0.100 | | |
| H | 0.315 | 0.415 | 0.515 |
| θ | 8° | 10° | 12° |



| Symbols | Millimeters | | |
|---------|-------------|------|------|
| | MIN. | NOM. | MAX. |
| A | 0.65 | 0.75 | 0.85 |
| b | 0.25 | 0.30 | 0.35 |
| C | 0.15 | 0.20 | 0.25 |
| D | 3.00 | 3.10 | 3.20 |
| D1 | 2.40 | 2.50 | 2.60 |
| E | 3.20 | 3.30 | 3.40 |
| E1 | 3.00 | 3.10 | 3.20 |
| E2 | 1.60 | 1.70 | 1.80 |
| e | 0.65 BSC. | | |
| H1 | 0.21 | 0.31 | 0.41 |
| H2 | 0.30 | 0.40 | 0.50 |
| K | 0.78 | 0.88 | 0.98 |
| L1/L2 | 0.10 REF. | | |
| θ | 11° | 12° | 13° |
| N | 0 | - | 0.15 |
| 0 | 0.2 REF. | | |


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