

## General Description

The AGMH20P15D 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

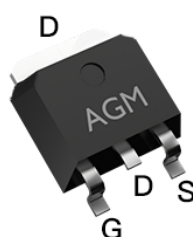
## Application

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

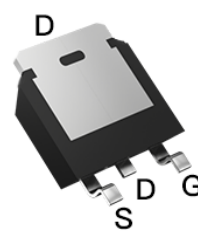
## Product Summary

| BVDSS | RDSON | ID   |
|-------|-------|------|
| -150V | 150mΩ | -20A |

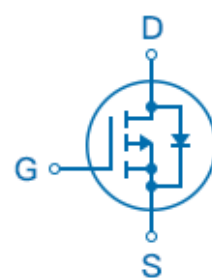
## TO-252 Pin Configuration



Top View



Bottom View



## Package Marking and Ordering Information

| Device Marking | Device     | Device Package | Reel Size | Tape width | Quantity |
|----------------|------------|----------------|-----------|------------|----------|
| AGMH20P15D     | AGMH20P15D | TO-252         | 330mm     | 16mm       | 2500     |

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

| Symbol      | Parameter  | Value      | Unit |
|-------------|--|------------|------|
| VDS         | Drain-Source Voltage (VGS=0V)                    | -150       | V    |
| VGS         | Gate-Source Voltage (VDS=0V)                     | ±20        | V    |
| ID          | Drain Current-Continuous(Tc=25°C) (Note 1)       | -20        | A    |
|             | Drain Current-Continuous(Tc=100°C)               | -12        | A    |
| IDM (pluse) | Drain Current-Pulsed (Note 2)                    | -80        | A    |
| PD          | Maximum Power Dissipation(Tc=25°C)               | 156        | w    |
|             | Maximum Power Dissipation(Tc=100°C)              | 62.5       | w    |
| EAS         | Avalanche energy (Note 3)                        | 81         | 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) <sup>1</sup> | --- | 50  | °C/W |
| RθJC   | Thermal Resistance Junction-Case <sup>1</sup>                   | --- | 0.8 | °C/W |

**Table 3. Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

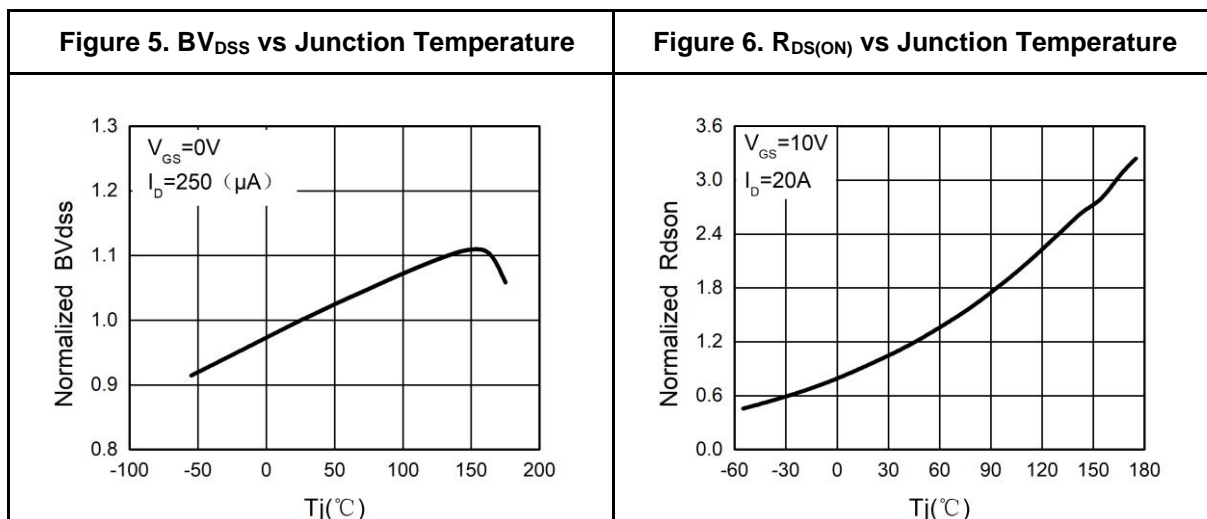
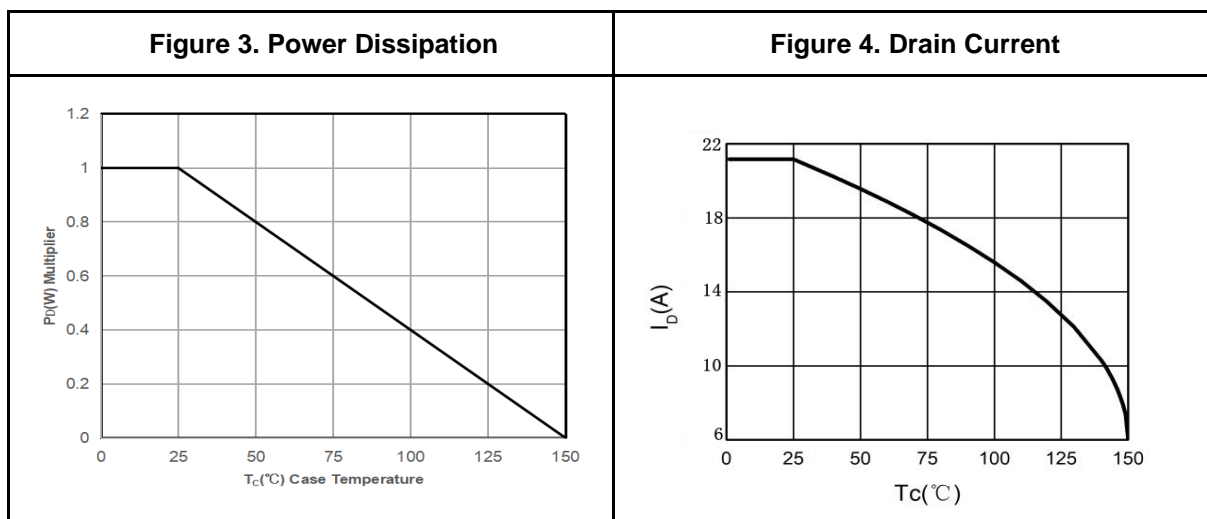
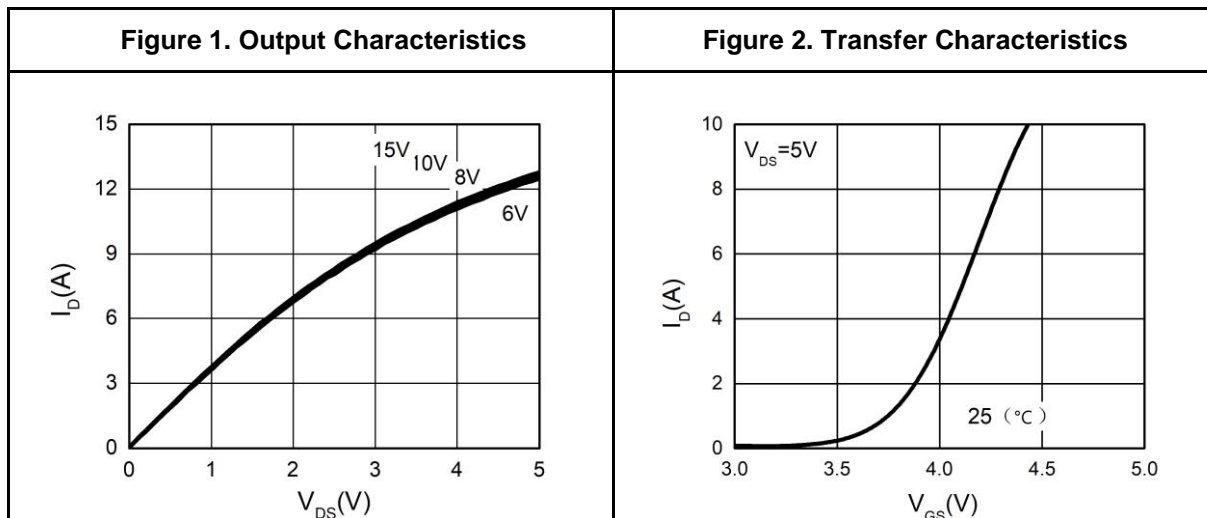
| Symbol                             | Parameter                        | Conditions                      | Min  | Typ  | Max  | Unit |
|------------------------------------|----------------------------------|---------------------------------|------|------|------|------|
| On/Off States                      |                                  |                                 |      |      |      |      |
| BVDSS                              | Drain-Source Breakdown Voltage   | VGS=0V ID=-250μA                | -150 | --   | --   | V    |
| IDSS                               | Zero Gate Voltage Drain Current  | VDS=-150V,VGS=0V                | --   | --   | -1   | μA   |
| IGSS                               | Gate-Body Leakage Current        | VGS=±20V,VDS=0V                 | --   | --   | ±100 | nA   |
| VGS(th)                            | Gate Threshold Voltage           | VDS=VGS,ID=-250μA               | -2.0 | -2.6 | -4.0 | V    |
| gFS                                | Forward Transconductance         | VDS=-5V,ID=-3A                  | --   | 15   | --   | S    |
| RDS(on)                            | Drain-Source On-State Resistance | VGS=-10V, ID=-5A                | --   | 150  | 170  | mΩ   |
| Dynamic Characteristics            |                                  |                                 |      |      |      |      |
| Ciss                               | Input Capacitance                | VDS=-50V,VGS=0V,<br>F=1MHZ      | --   | 4228 | --   | pF   |
| Coss                               | Output Capacitance               |                                 | --   | 1216 | --   | pF   |
| Crss                               | Reverse Transfer Capacitance     |                                 | --   | 1028 | --   | pF   |
| Rg                                 | Gate resistance                  | VGS=0V,<br>VDS=0V,f=1.0MHz      | --   | 10.5 | --   | Ω    |
| Switching Times                    |                                  |                                 |      |      |      |      |
| td(on)                             | Turn-on Delay Time               | VGS=-10V,VDS=-50V,<br>RGEN=9.1Ω | --   | 60   | --   | nS   |
| tr                                 | Turn-on Rise Time                |                                 | --   | 68   | --   | nS   |
| td(off)                            | Turn-Off Delay Time              |                                 | --   | 482  | --   | nS   |
| tf                                 | Turn-Off Fall Time               |                                 | --   | 262  | --   | nS   |
| Qg                                 | Total Gate Charge                | VGS=-10V,<br>VDS=-50V, ID=-5A   | --   | 78   | --   | nC   |
| Qgs                                | Gate-Source Charge               |                                 | --   | 16   | --   | nC   |
| Qgd                                | Gate-Drain Charge                |                                 | --   | 19   | --   | nC   |
| Source-Drain Diode Characteristics |                                  |                                 |      |      |      |      |
| ISD                                | Source-Drain Current(Body Diode) |                                 | --   | --   | -20  | A    |
| VSD                                | Forward on Voltage               | VGS=0V,IS=-5A                   | --   | --   | -1.2 | V    |
| trr                                | Reverse Recovery Time            | Isd=-5A , dI/dt=100A/μs ,       | --   | 68   | --   | ns   |
| Qrr                                | Reverse Recovery Charge          | TJ=25℃                          | --   | 65   | --   | nc   |

Notes 1.The maximum current rating is package limited.

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

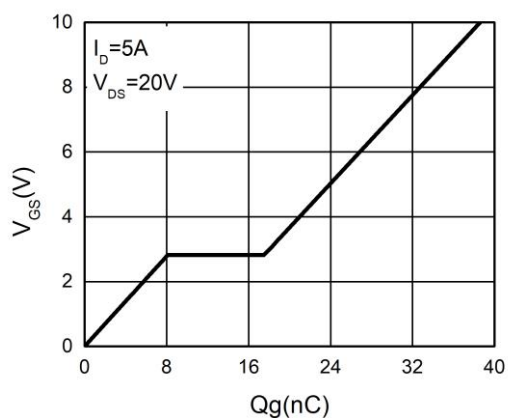
Notes 3.EAS condition: T<sub>J</sub>=25°C , V<sub>DD</sub>=-50V, V<sub>gs</sub>=-10V , ID=18A, L=0.5mH, R<sub>G</sub>=25ohm

## Typical Electrical And Thermal Characteristics (Curves)

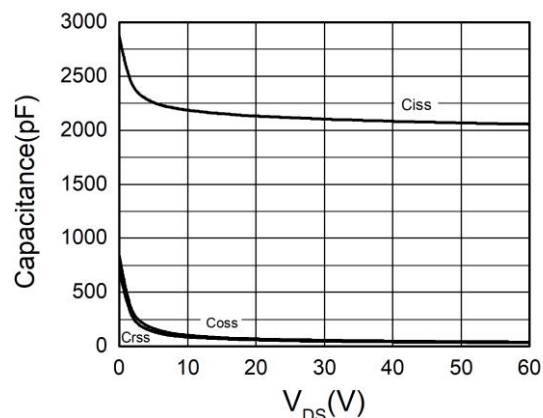


## Typical Electrical And Thermal Characteristics (Curves)

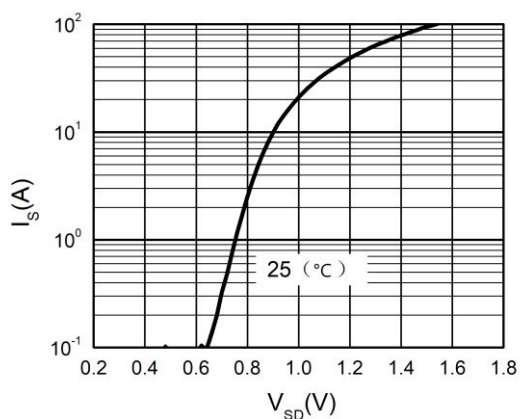
**Figure 7. Gate Charge Waveforms**



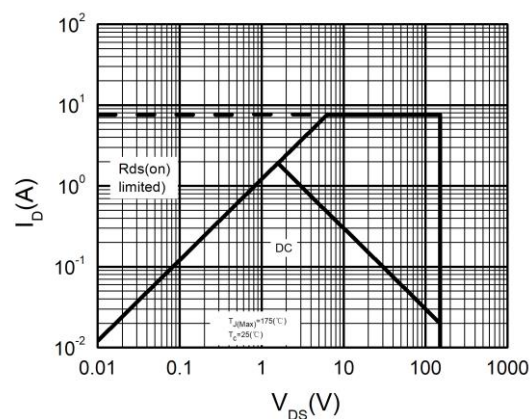
**Figure 8. Capacitance**



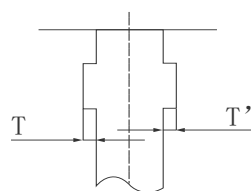
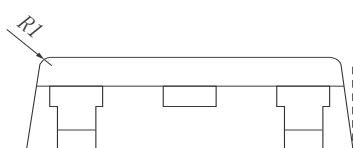
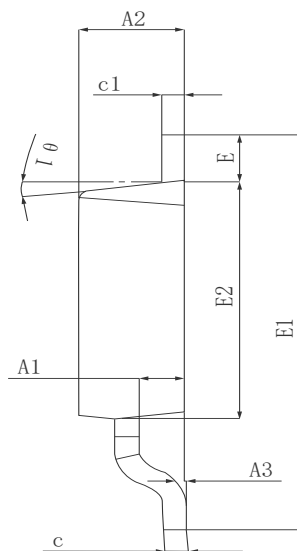
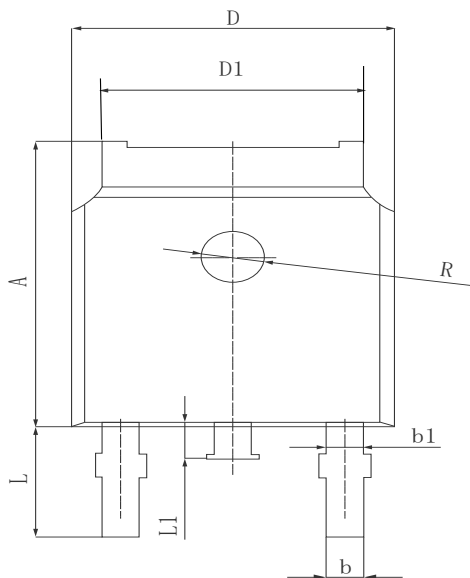
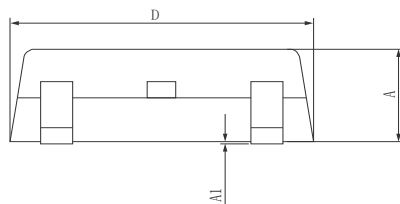
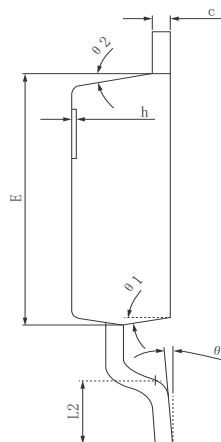
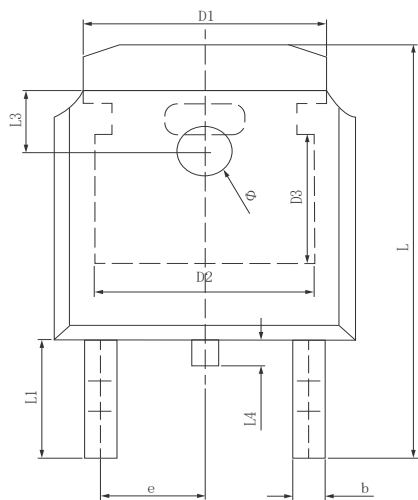
**Figure 9. Body-Diode Characteristics**



**Figure 10. Maximum Safe Operating Area**



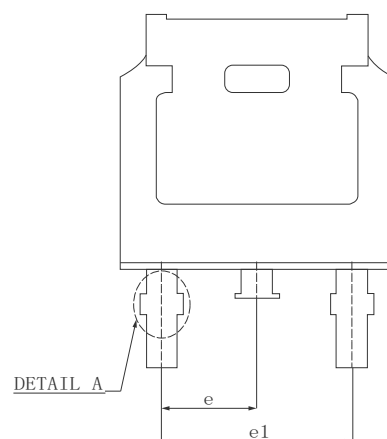
# Dimensions (TO-252)



$0 \leq T, T' \leq 0.12$   
 DETALL A

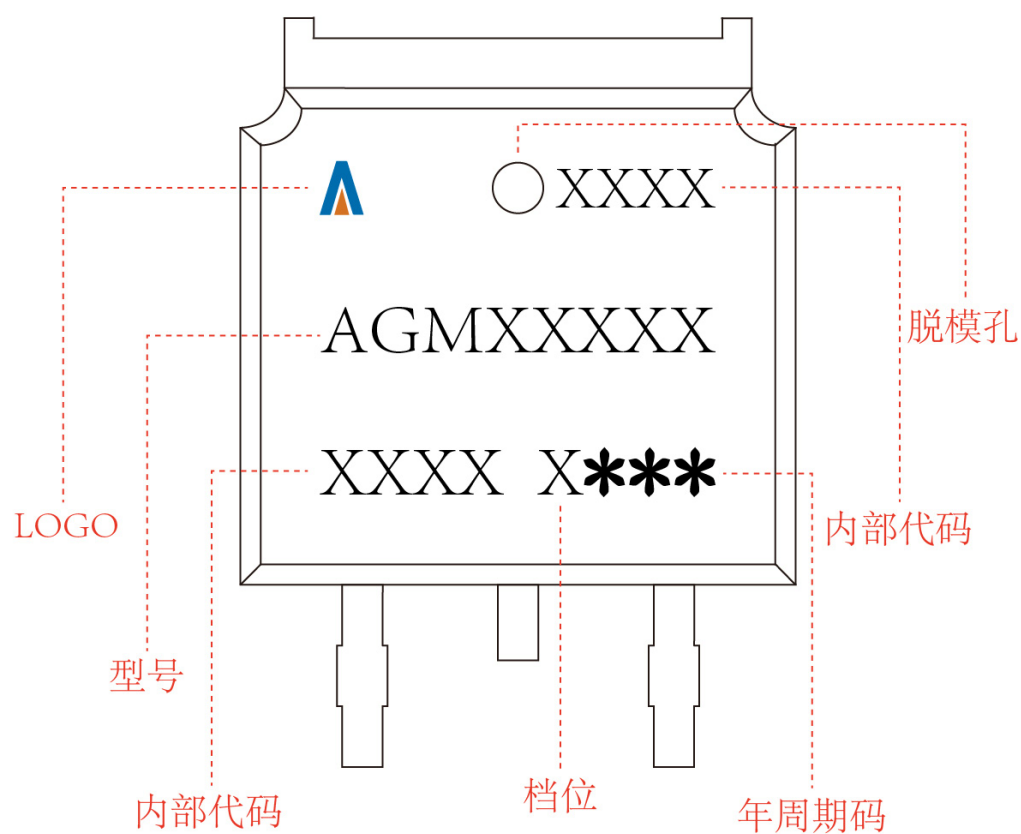
| SYMBOL  | MILLIMETER |        |        |
|---------|------------|--------|--------|
|         | MIN        | Typ.   | MAX    |
| A       | 2.200      | 2.300  | 2.400  |
| A1      | 0.000      |        | 0.127  |
| b       | 0.640      | 0.690  | 0.740  |
| c (电镀后) | 0.460      | 0.520  | 0.580  |
| D       | 6.500      | 6.600  | 6.700  |
| D1      | 5.334 REF  |        |        |
| D2      | 4.826 REF  |        |        |
| D3      | 3.166 REF  |        |        |
| E       | 6.000      | 6.100  | 6.200  |
| e       | 2.286 TYP  |        |        |
| h       | 0.000      | 0.100  | 0.200  |
| L       | 9.900      | 10.100 | 10.300 |
| L1      | 2.888 REF  |        |        |
| L2      | 1.400      | 1.550  | 1.700  |
| L3      | 1.600 REF  |        |        |
| L4      | 0.600      | 0.800  | 1.000  |
| Φ       | 1.100      | 1.200  | 1.300  |
| θ       | 0°         |        | 8°     |
| θ 1     | 9° TYP     |        |        |
| θ 2     | 9° TYP     |        |        |

| SYMBOL | MILLIMETER |       |        |
|--------|------------|-------|--------|
|        | MIN        | NOM   | MAX    |
| A      | 7.050      | 7.100 | 7.150  |
| A1     | 0.960      | 1.010 | 1.060  |
| A2     | 2.250      | 2.300 | 2.350  |
| A3     | 0.000      | 0.300 | 0.100  |
| b      | 0.760REF.  |       |        |
| b1     | 1.000REF.  |       |        |
| c      | 0.508REF.  |       |        |
| c1     | 0.508REF.  |       |        |
| D      | 6.550      | 6.600 | 6.650  |
| D1     | 5.220      | 5.320 | 5.420  |
| E      | 0.950      | 1.000 | 1.050  |
| E1     | 9.700      | 9.900 | 10.100 |
| E2     | 6.050      | 6.100 | 6.150  |
| e      | 2.286BSC   |       |        |
| e1     | 4.572REF.  |       |        |
| L      | 2.650      | 2.800 | 2.950  |
| L1     | 0.700      | 0.800 | 0.900  |
| θ 1    | 7° REF.    |       |        |
| R      | 1.300REF.  |       |        |
| R1     | 0.250REF.  |       |        |



TO-252

Marking Instructions:




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