

## • General Description

The AGM318D 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

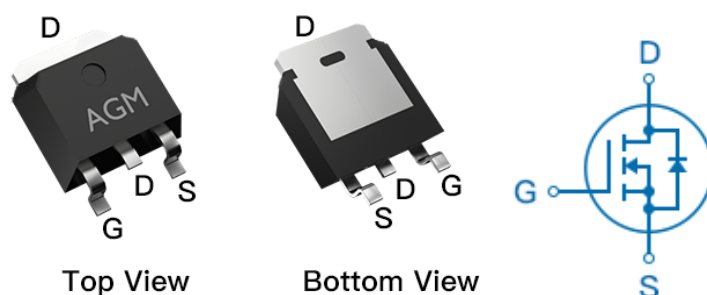
## • Application

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

## Product Summary

| BVDSS | RDSON | ID  |
|-------|-------|-----|
| 30V   | 18mΩ  | 20A |

## TO-252 Pin Configuration



## Package Marking and Ordering Information

| Device Marking | Device  | Device Package | Reel Size | Tape width | Quantity |
|----------------|---------|----------------|-----------|------------|----------|
| AAGM318D       | AGM318D | TO-252         | 330mm     | 16mm       | 2500     |

**Table 1. Absolute Maximum Ratings ( $T_A=25^{\circ}\text{C}$ )**

| Symbol         | Parameter                                                     | Rating     | Units              |
|----------------|---------------------------------------------------------------|------------|--------------------|
| $V_{DS}$       | Drain-Source Voltage ( $V_{GS}=0V$ )                          | 30         | V                  |
| $V_{GS}$       | Gate-Source Voltage ( $V_{DS}=0V$ )                           | $\pm 20$   | V                  |
| $I_D$          | Drain Current-Continuous( $T_c=25^{\circ}\text{C}$ ) (Note 1) | 20         | A                  |
|                | Drain Current-Continuous( $T_c=100^{\circ}\text{C}$ )         | 12         | A                  |
| IDM (pluse)    | Drain Current-Pulsed (Note 2)                                 | 80         | A                  |
| $P_D$          | Total Power Dissipation( $T_c=25^{\circ}\text{C}$ )           | 37         | W                  |
|                | Total Power Dissipation( $T_c=100^{\circ}\text{C}$ )          | 15         | W                  |
| EAS            | Avalanche energy (Note 3)                                     | 22         | mJ                 |
| $T_J, T_{STG}$ | Operating Junction and Storage Temperature Range              | -55 To 150 | $^{\circ}\text{C}$ |

**Table 2. Thermal Characteristic**

| Symbol          | Parameter                                                       | Typ | Max | Unit                 |
|-----------------|-----------------------------------------------------------------|-----|-----|----------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient (Steady State) <sup>1</sup> | --- | 50  | $^{\circ}\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case <sup>1</sup>                   | --- | 3.4 | $^{\circ}\text{C/W}$ |

**Table 3. N- Channel 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                              | 30  | --   | --   | V    |
| IDSS                               | Zero Gate Voltage Drain Current  | VDS=30V,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                                | --  | 5.2  | --   | S    |
| RDS(on)                            | Drain-Source On-State Resistance | VGS=10V, ID=15A                              | --  | 18   | 27   | mΩ   |
|                                    |                                  | VGS=4.5V, ID=10A                             | --  | 28   | 38   | mΩ   |
| Dynamic Characteristics            |                                  |                                              |     |      |      |      |
| Ciss                               | Input Capacitance                | VDS=15V,VGS=0V,<br>F=1MHZ                    | --  | 333  | --   | pF   |
| Coss                               | Output Capacitance               |                                              | --  | 94   | --   | pF   |
| Crss                               | Reverse Transfer Capacitance     |                                              | --  | 75   | --   | pF   |
| Rg                                 | Gate resistance                  | VGS=0V,<br>VDS=0V,f=1.0MHz                   | --  | --   | --   | Ω    |
| Switching Times                    |                                  |                                              |     |      |      |      |
| td(on)                             | Turn-on Delay Time               | VGS=10V,VDS=15V,<br>RL=15Ω,RGEN=6Ω,<br>ID=5A | --  | 7.4  | --   | nS   |
| tr                                 | Turn-on Rise Time                |                                              | --  | 2.4  | --   | nS   |
| td(off)                            | Turn-Off Delay Time              |                                              | --  | 18.4 | --   | nS   |
| tf                                 | Turn-Off Fall Time               |                                              | --  | 4.0  | --   | nS   |
| Qg                                 | Total Gate Charge                | VGS=10V, VDS=10V,<br>ID=5A                   | --  | 8.6  | --   | nC   |
| Qgs                                | Gate-Source Charge               |                                              | --  | 2.1  | --   | nC   |
| Qgd                                | Gate-Drain Charge                |                                              | --  | 1.1  | --   | nC   |
| Source-Drain Diode Characteristics |                                  |                                              |     |      |      |      |
| ISD                                | Source-Drain Current(Body Diode) |                                              | --  | --   | 20   | A    |
| VSD                                | Forward on Voltage               | VGS=0V,IS=15A                                | --  | --   | 1.2  | V    |
| trr                                | Reverse Recovery Time            | IF=15A , dI/dt=100A/μs ,<br>TJ=25℃           | --  | --   | --   | ns   |
| Qrr                                | Reverse Recovery Charge          |                                              | --  | --   | --   | 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: TJ=25°C,VDD=15V,Vgs=10V,ID=21A,L=0.1mH,RG=25ohm

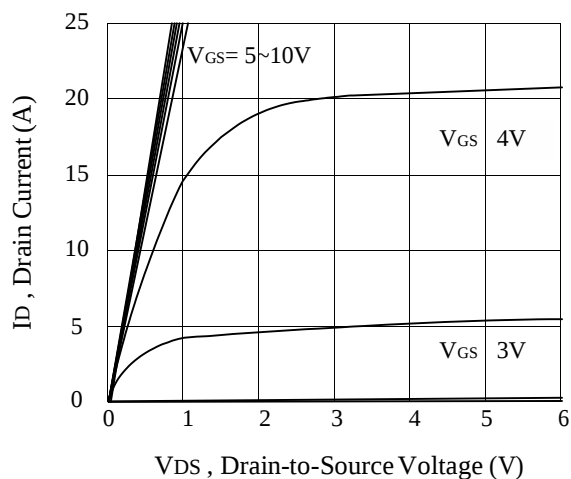


Figure 1. Output Characteristics

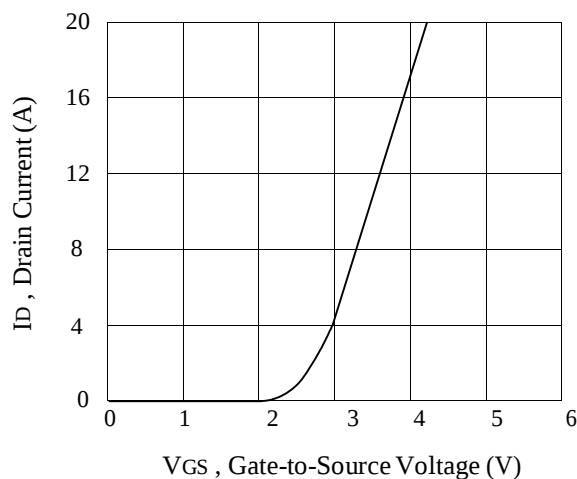


Figure 2. Transfer Characteristics

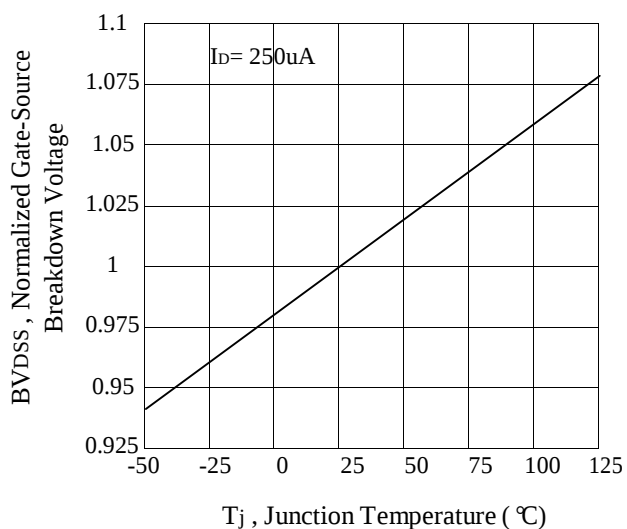


Figure 3. Breakdown Voltage Variation with Temperature

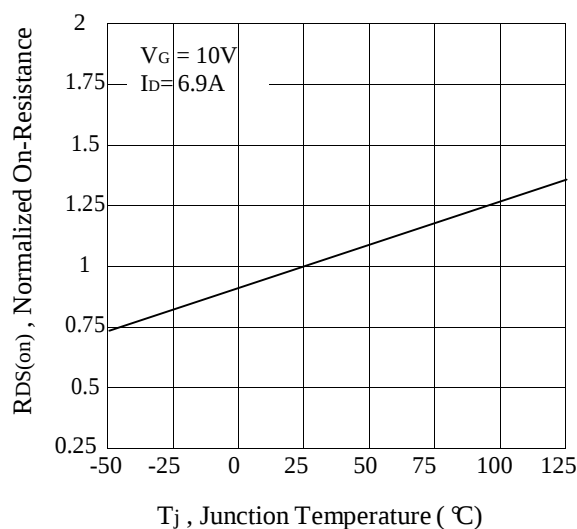


Figure 4. On-Resistance Variation with Temperature

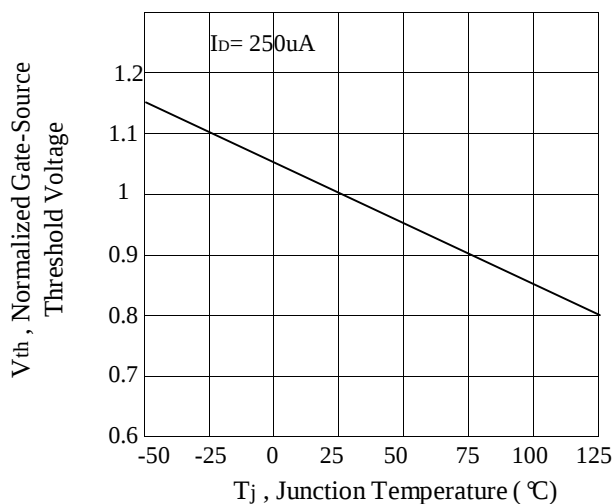


Figure 5. Gate Threshold Variation with Temperature

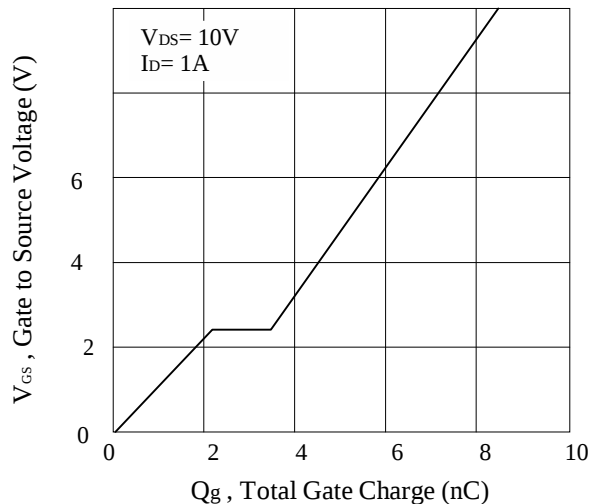
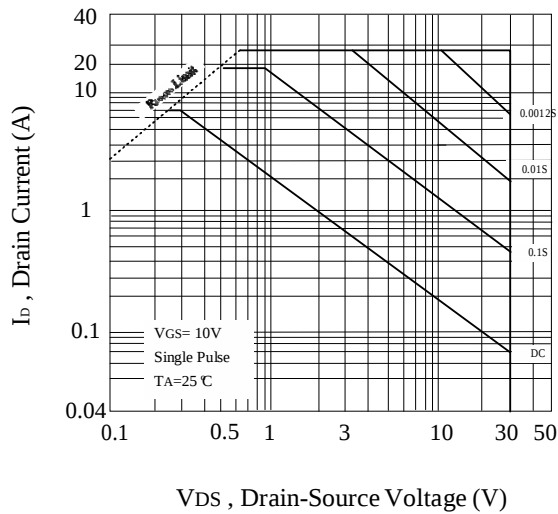
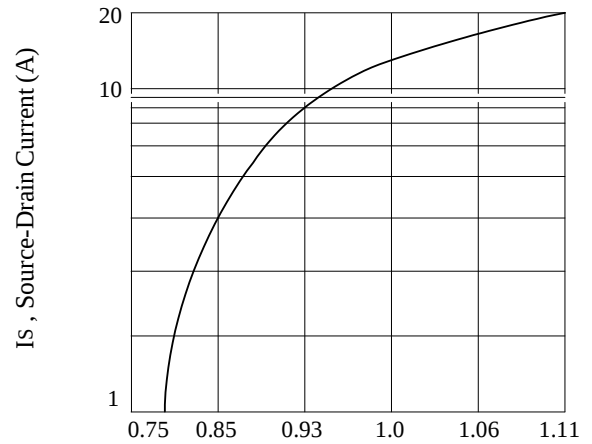


Figure 6. Gate Charge



V<sub>DS</sub> , Drain-Source Voltage (V)  
Figure 7. Maximum Safe Operating Area



V<sub>SD</sub> , Body Diode Forward Voltage (V)  
Figure 8. Body Diode Forward Voltage Variation with Source Current

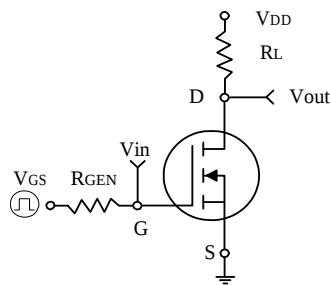


Figure 9. Switching Test Circuit and Switching Waveforms

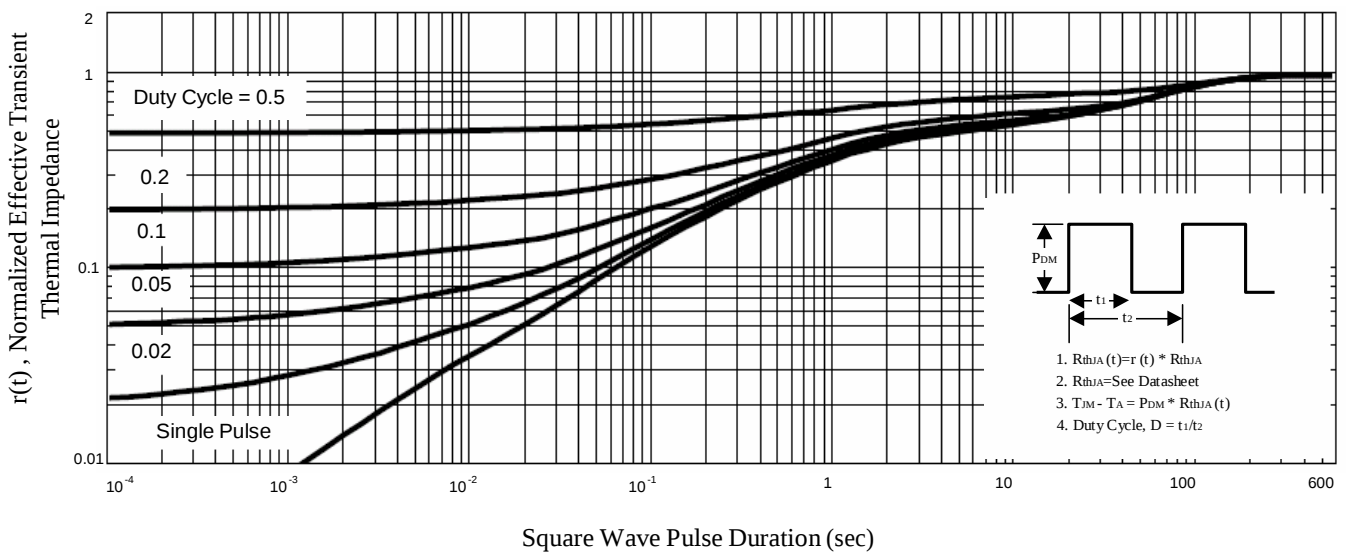
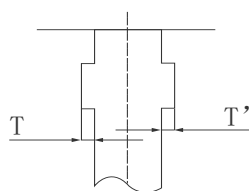
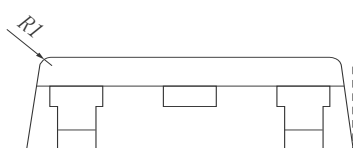
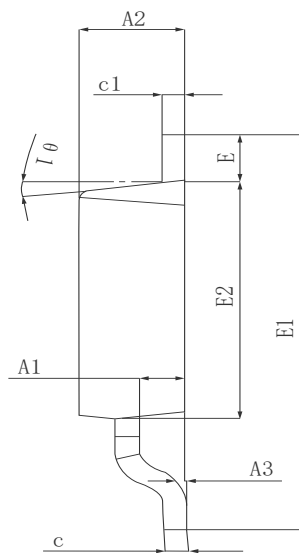
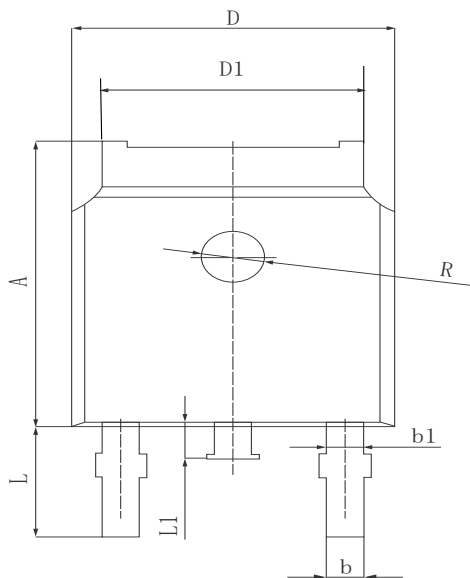
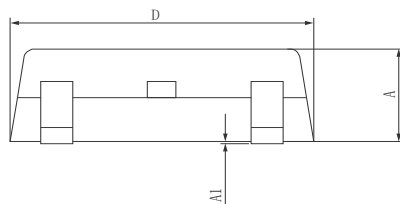
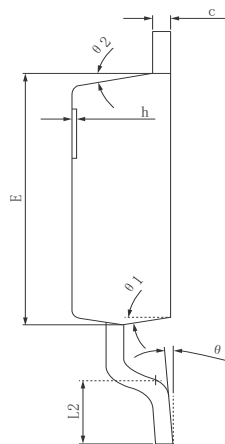
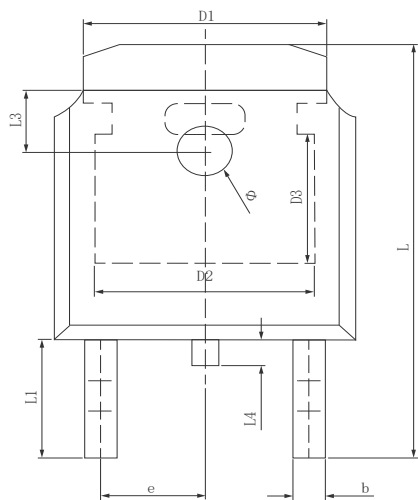


Figure 10. Normalized Thermal Transient Impedance Curve

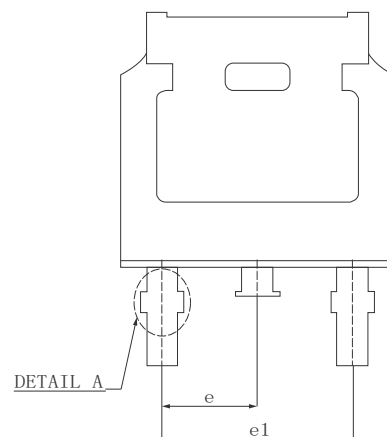
# ●Dimensions (TO-252)



0 ≤ T, T' ≤ 0.12  
DETAIL A

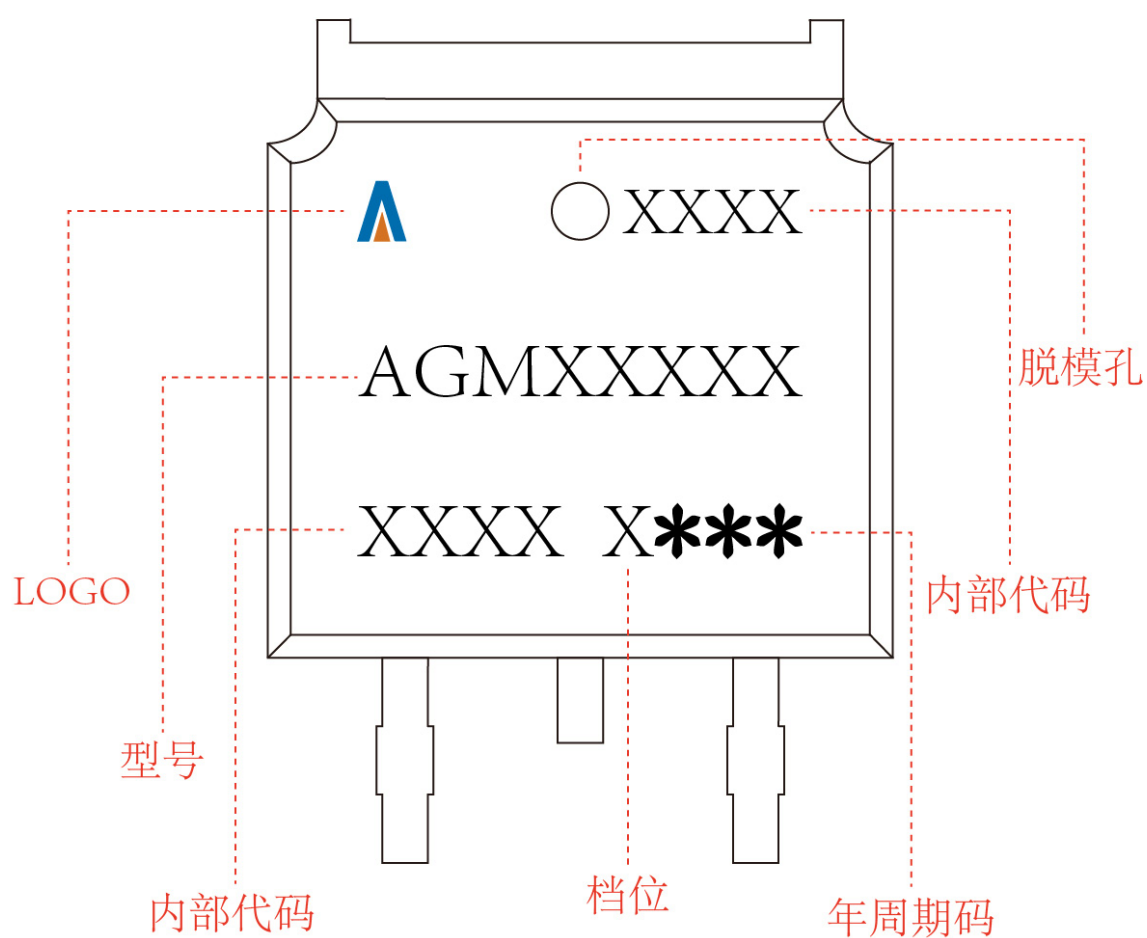
| SYMBOL  | MILLIMETER |        |        |
|---------|------------|--------|--------|
|         | MIN        | Typ.   | MAX    |
| A       | 2.200      | 2.300  | 2.400  |
| A1      | 0.000      |        | 0.127  |
| b       | 0.640      | 0.690  | 0.740  |
| c (电镀后) | 0.460      | 0.520  | 0.580  |
| 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      | 0.050 | 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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