

### ● General Description

The AGMH603H 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

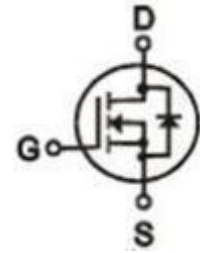
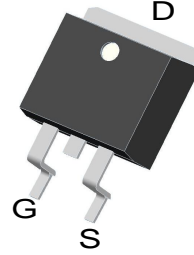
### ● Application

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

### Product Summary

| BVDSS | RDSON | ID   |
|-------|-------|------|
| 60V   | 2.5mΩ | 180A |

### TO-263 Pin Configuration



### Package Marking and Ordering Information

| Device Marking | Device   | Device Package | Reel Size | Tape width | Quantity |
|----------------|----------|----------------|-----------|------------|----------|
| AGMH603H       | AGMH603H | TO-263         | 330mm     | 25mm       | 800      |

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

| Symbol      | Parameter  | Value      | Unit |
|-------------|--|------------|------|
| VDS         | Drain-Source Voltage (VGS=0V)                            | 60         | V    |
| VGS         | Gate-Source Voltage (VDS=0V)                             | ±20        | V    |
| ID          | Drain Current-Continuous(Tc=25°C) <b>(Note 1)</b>        | 180        | A    |
|             | Drain Current-Continuous(Tc=100°C)                       | 130        | A    |
| IDM (pluse) | Drain Current-Continuous@ Current-Pulsed <b>(Note 2)</b> | 720        | A    |
| PD          | Maximum Power Dissipation(Tc=25°C)                       | 222        | w    |
|             | Maximum Power Dissipation(Tc=100°C)                      | 112        | w    |
| EAS         | Avalanche energy <b>(Note 3)</b>                         | 1046       | mJ   |
| TJ,TSTG     | Operating Junction and Storage Temperature Range         | -55 To 175 | °C   |

**Table 2. Thermal Characteristic**

| Symbol | Parameter   | Typ | Max  | Unit |
|--------|---|-----|------|------|
| RθJA   | Thermal Resistance Junction-ambient (Steady State) <sup>1</sup> | --- | 52   | °C/W |
| RθJC   | Thermal Resistance Junction-Case <sup>1</sup>                   | --- | 0.67 | °C/W |

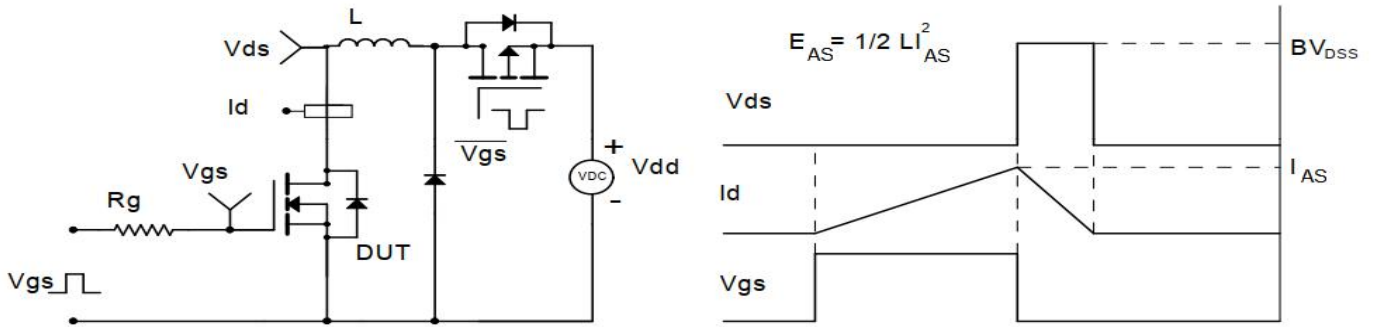
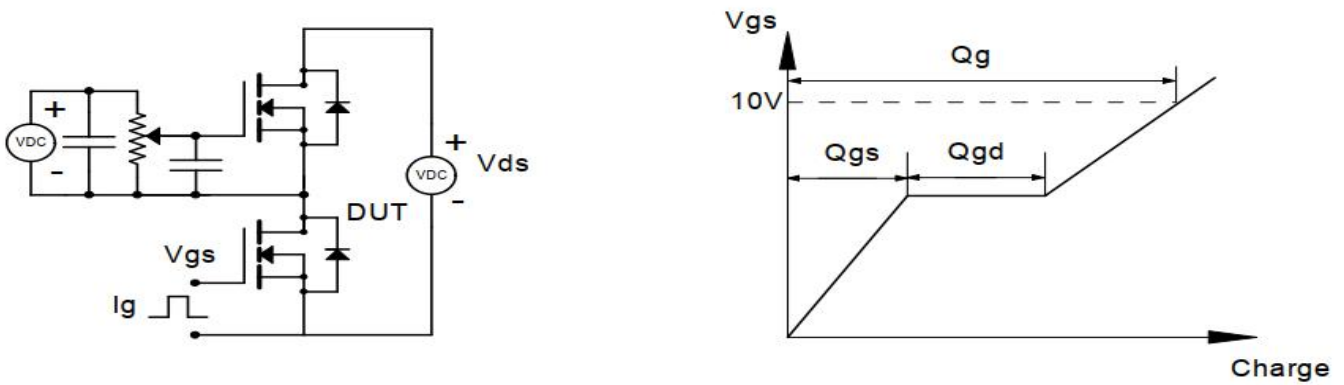
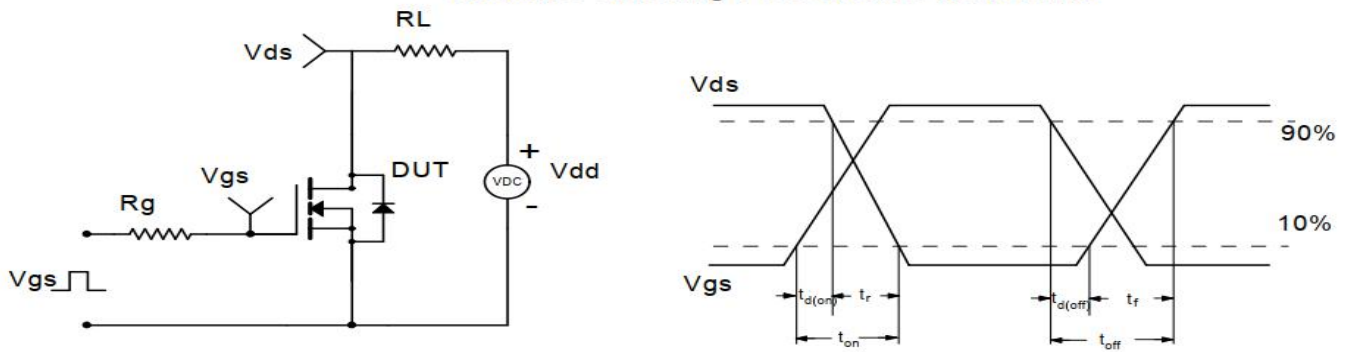
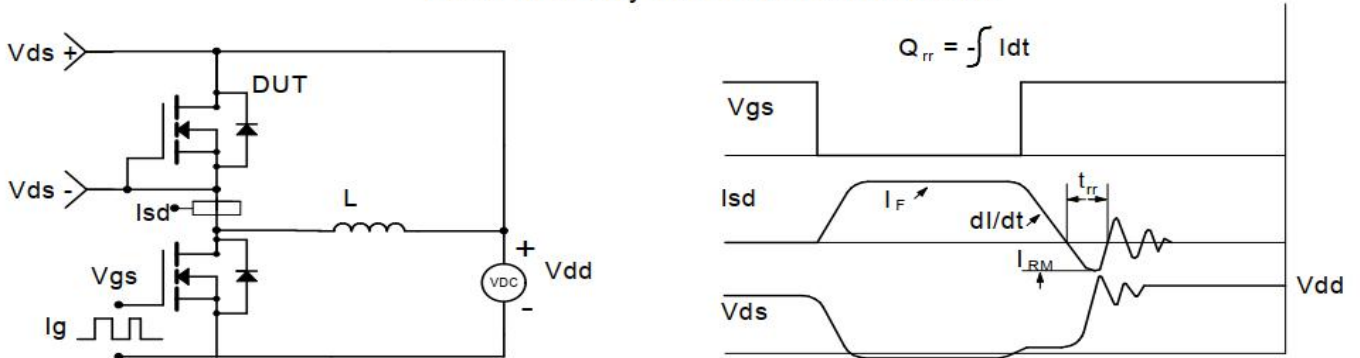
**Table 3. Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

| Symbol                                    | Parameter                        | Conditions                          | Min | Typ  | Max  | Unit |
|---|----------------------------------|-------------------------------------|-----|------|------|------|
| <b>On/Off States</b>                      |                                  |                                     |     |      |      |      |
| BVDSS                                     | Drain-Source Breakdown Voltage   | VGS=0V ID=250μA                     | 60  | 66   | --   | V    |
| IDSS                                      | Zero Gate Voltage Drain Current  | VDS=60V,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 | 2.8  | 3.0  | V    |
| gFS                                       | Forward Transconductance         | VDS=5V,ID=20A                       | 60  | --   | --   | S    |
| RDS(on)                                   | Drain-Source On-State Resistance | VGS=10V, ID=20A                     | --  | 2.5  | 3.5  | mΩ   |
| <b>Dynamic Characteristics</b>            |                                  |                                     |     |      |      |      |
| Ciss                                      | Input Capacitance                | VDS=30V,VGS=0V,<br>F=1MHZ           | --  | 5846 | --   | pF   |
| Coss                                      | Output Capacitance               |                                     | --  | 947  | --   | pF   |
| Crss                                      | Reverse Transfer Capacitance     |                                     | --  | 29.5 | --   | pF   |
| Rg  | Gate resistance                  | VGS=0V,<br>VDS=0V,f=1.0MHz          | --  | --   | 5    | Ω    |
| <b>Switching Times</b>                    |                                  |                                     |     |      |      |      |
| td(on)                                    | Turn-on Delay Time               | VGS=10V,VDS=30V,<br>RL=1Ω,RGEN=3Ω   | --  | 7.1  | --   | nS   |
| tr  | Turn-on Rise Time                |                                     | --  | 12.3 | --   | nS   |
| td(off)                                   | Turn-Off Delay Time              |                                     | --  | 24.6 | --   | nS   |
| tf  | Turn-Off Fall Time               |                                     | --  | 5.2  | --   | nS   |
| Qg  | Total Gate Charge                | VGS=10V, VDS=30V,<br>ID=20A         | --  | 93   | --   | nC   |
| Qgs                                       | Gate-Source Charge               |                                     | --  | 24   | --   | nC   |
| Qgd                                       | Gate-Drain Charge                |                                     | --  | 11.5 | --   | nC   |
| <b>Source-Drain Diode Characteristics</b> |                                  |                                     |     |      |      |      |
| ISD                                       | Source-Drain Current(Body Diode) |                                     | --  | --   | 180  | A    |
| VSD                                       | Forward on Voltage               | VGS=0V,IS=20A                       | --  | --   | 1.2  | V    |
| trr                                       | Reverse Recovery Time            | IF=20A , dI/dt=100A/μs ,<br>TJ=25°C | --  | 58   | --   | ns   |
| Qrr                                       | Reverse Recovery Charge          |                                     | --  | 83   | --   | 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

**Test circuit&Waveform**
**Unclamped Inductive Switching (UIS) Test Circuit & Waveforms**

**Gate Charge Test Circuit & Waveform**

**Resistive Switching Test Circuit & Waveforms**

**Diode Recovery Test Circuit & Waveforms**


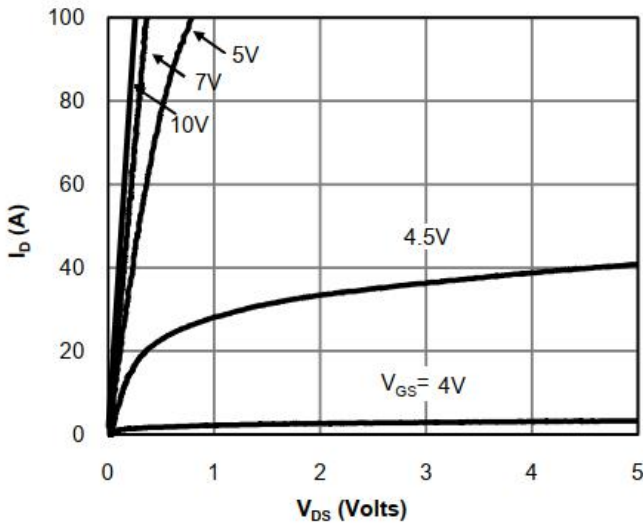
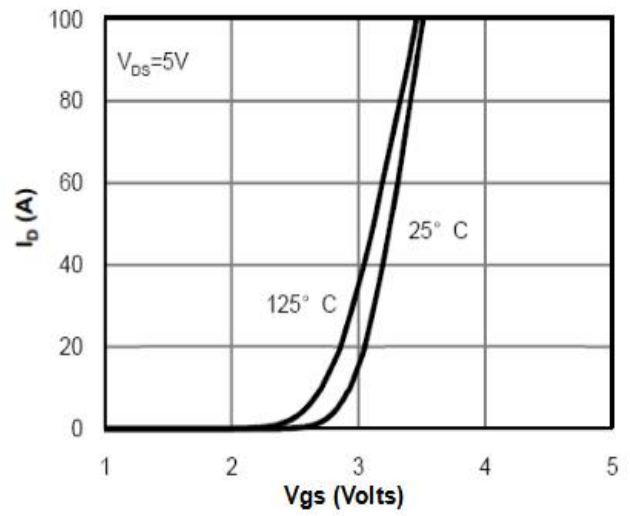
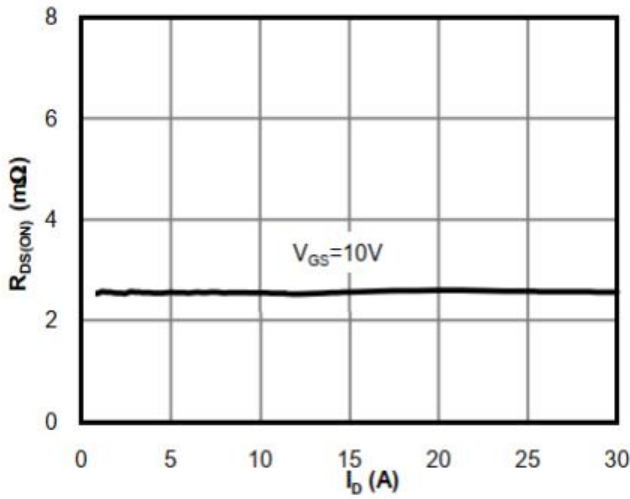
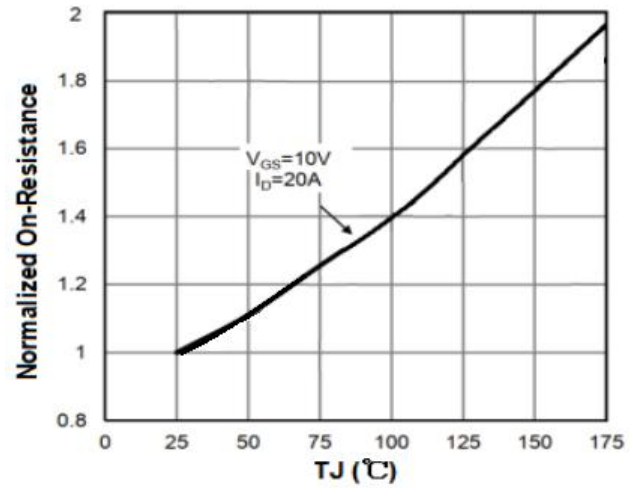
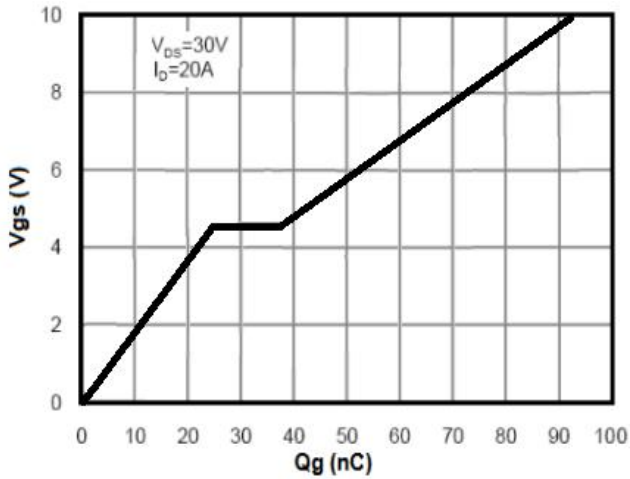
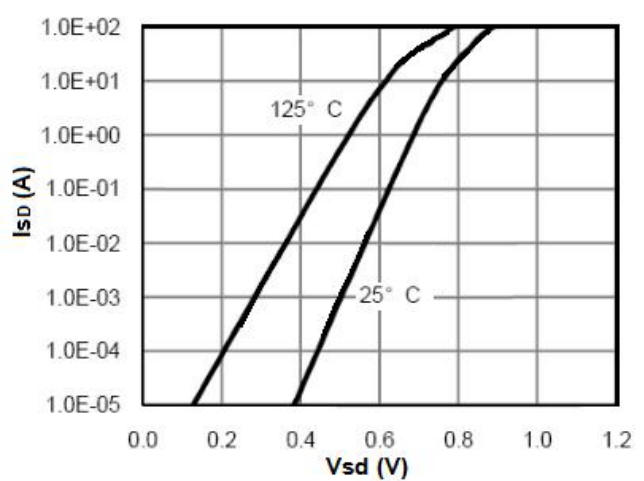
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**
**Figure 1 Output Characteristics**

**Figure 2 Transfer Characteristics**

**Figure 3 Rds(on)- Drain Current**

**Figure 4 Rds(on)-Junction Temperature**

**Figure 5 Gate Charge**

**Figure 6 Source- Drain Diode Forward**


Figure 7 Capacitance vs Vds

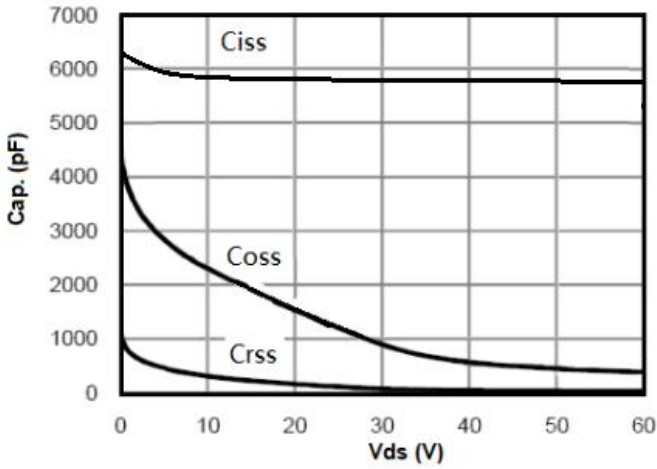


Figure 8 Power De-rating

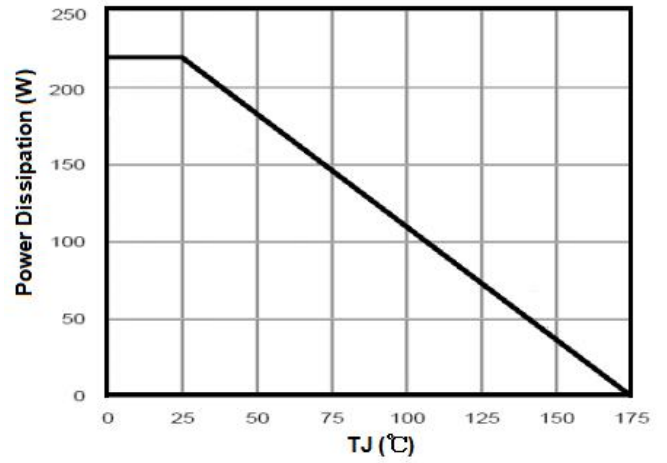


Figure 9 Current De-rating

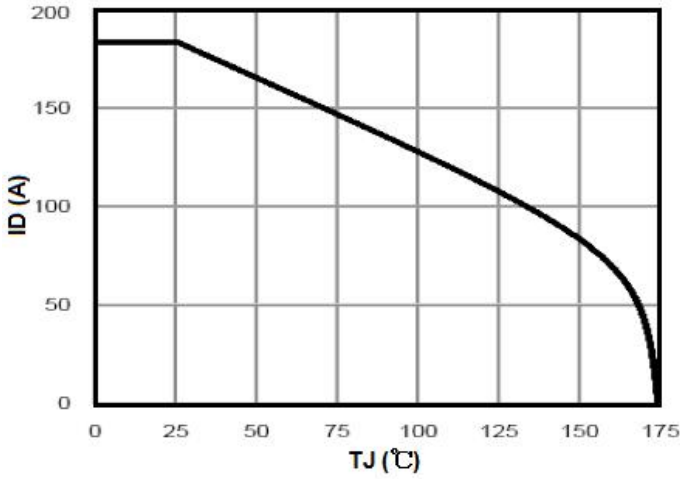


Figure 8 Safe Operation Area

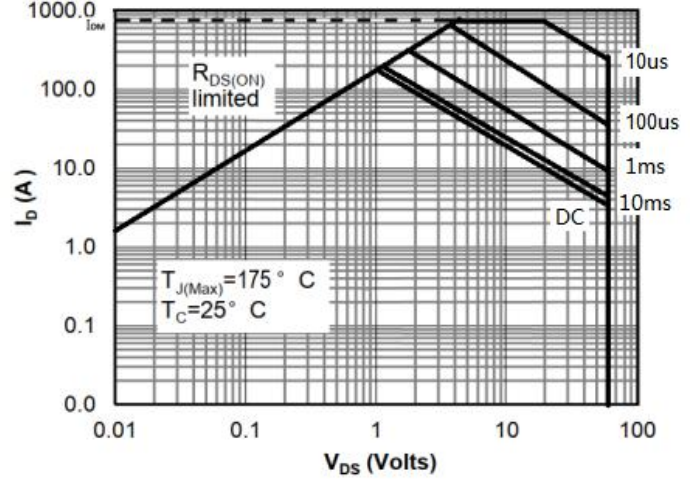
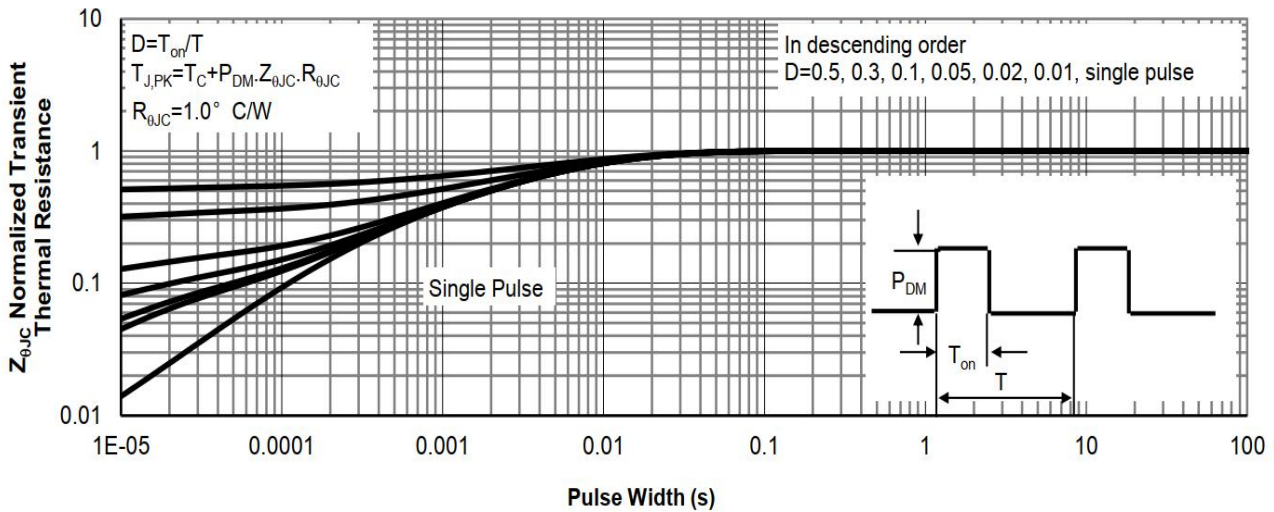
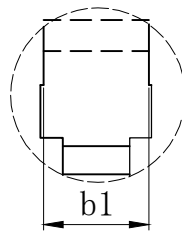
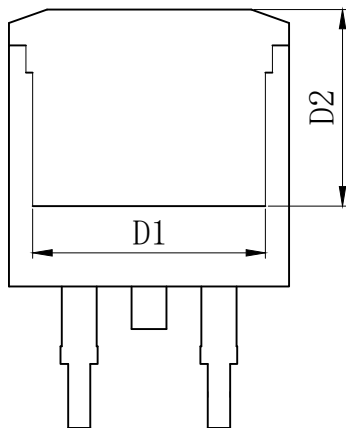
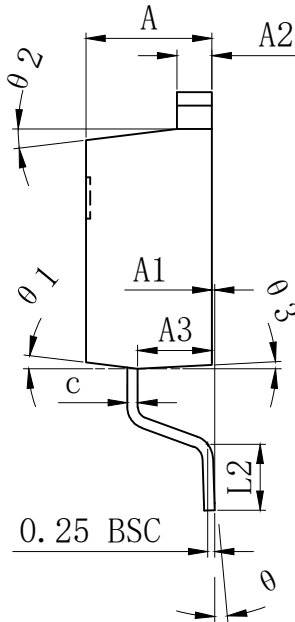
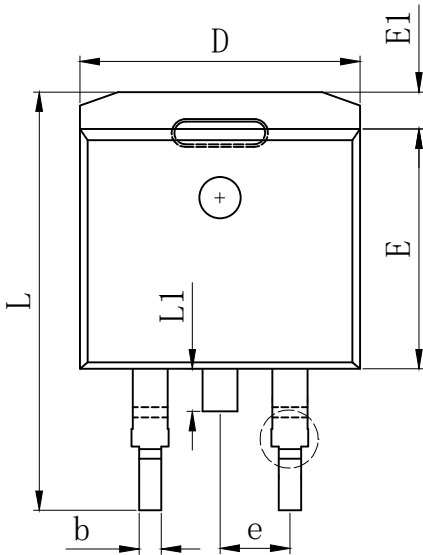


Figure 11 Normalized Maximum Transient Thermal Impedance



# TO-263 PACKAGE INFORMATION



| SYMBOL     | MILLIMETER |        |        |
|------------|------------|--------|--------|
|            | MIN        | Typ.   | MAX    |
| A          | 4.370      | 4.570  | 4.770  |
| A1         | 0.000      |        | 0.250  |
| A2         | 1.220      | 1.270  | 1.420  |
| A3         | 2.490      | 2.690  | 2.890  |
| b          | 0.700      | 0.810  | 0.960  |
| b1         | 1.170      | 1.270  | 1.470  |
| c          | 0.300      | 0.380  | 0.530  |
| D          | 9.860      | 10.160 | 10.360 |
| D1         | 8.400 REF  |        |        |
| D2         | 7.073 REF  |        |        |
| E          | 8.500      | 8.700  | 8.900  |
| E1         | 1.070      | 1.270  | 1.470  |
| e          | 2.540 TYP  |        |        |
| L          | 14.700     | 15.100 | 15.500 |
| L1         | 1.400      | 1.550  | 1.700  |
| L2         | 2.000      | 2.300  | 2.600  |
| $\theta$   | 0°         |        | 9°     |
| $\theta 1$ | 7° TYP     |        |        |
| $\theta 2$ | 7° TYP     |        |        |
| $\theta 3$ | 3° TYP     |        |        |


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