

## General Description

The AGMH022P10C 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

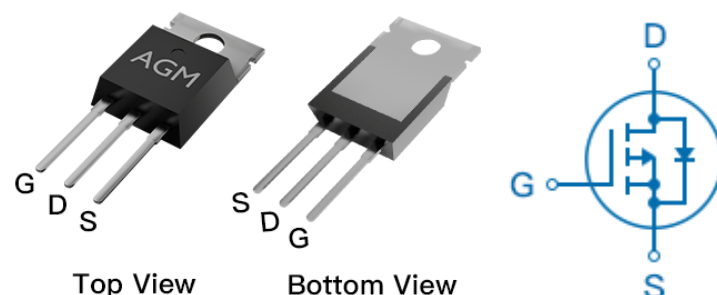
## Application

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

## Product Summary

| BVDSS | RDSON | ID   |
|-------|-------|------|
| -100V | 15mΩ  | -65A |

## TO-220 Pin Configuration



## Package Marking and Ordering Information

| Device Marking | Device      | Device Package | Reel Size | Tape width | Quantity |
|----------------|-------------|----------------|-----------|------------|----------|
| AGMH022P10C    | AGMH022P10C | TO-220         | ----      | ----       | 1000     |

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

| Symbol      | Parameter                                        | Value      | Unit |
|-------------|--------------------------------------------------|------------|------|
| VDS         | Drain-Source Voltage (VGS=0V)                    | -100       | V    |
| VGS         | Gate-Source Voltage (VDS=0V)                     | ±20        | V    |
| ID          | Drain Current-Continuous(Tc=25°C) (Note 1)       | -65        | A    |
|             | Drain Current-Continuous(Tc=100°C)               | -41        | A    |
| IDM (pluse) | Drain Current-Pulsed (Note 2)                    | -260       | A    |
| PD          | Maximum Power Dissipation(Tc=25°C)               | 250        | w    |
|             | Maximum Power Dissipation(Tc=100°C)              | 100        | w    |
| EAS         | Avalanche energy (Note 3)                        | 625        | 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> | --- | 62  | °C/W |
| RθJC   | Thermal Resistance Junction-Case <sup>1</sup>                   | --- | 0.5 | °C/W |

**Table 2. P-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                                | -100 | --   | --   | V    |
| IDSS                               | Zero Gate Voltage Drain Current  | VDS=-100V,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   | -3   | -4   | V    |
| gFS                                | Forward Transconductance         | VDS=-5V,ID=-5A                                  | --   | 18   | --   | S    |
| RDS(on)                            | Drain-Source On-State Resistance | VGS=-10V, ID=-10A                               | --   | 15   | 24   | mΩ   |
| Dynamic Characteristics            |                                  |                                                 |      |      |      |      |
| Ciss                               | Input Capacitance                | VDS=-40V,VGS=0V,<br>F=1MHZ                      | --   | 4276 | --   | pF   |
| Coss                               | Output Capacitance               |                                                 | --   | 336  | --   | pF   |
| Crss                               | Reverse Transfer Capacitance     |                                                 | --   | 25   | --   | pF   |
| Rg                                 | Gate resistance                  | VGS=0V,<br>VDS=0V,f=1.0MHz                      | --   | 2.9  | --   | Ω    |
| Switching Times                    |                                  |                                                 |      |      |      |      |
| td(on)                             | Turn-on Delay Time               | ID =-20A<br>VDS = -50V<br>VGS = -10V<br>RG = 5Ω | --   | 15   | --   | nS   |
| tr                                 | Turn-on Rise Time                |                                                 | --   | 18   | --   | nS   |
| td(off)                            | Turn-Off Delay Time              |                                                 | --   | 50   | --   | nS   |
| tf                                 | Turn-Off Fall Time               |                                                 | --   | 19   | --   | nS   |
| Qg                                 | Total Gate Charge                | VGS=-10V,<br>VDS=-50V, ID=-20A                  | --   | 52.1 | --   | nC   |
| Qgs                                | Gate-Source Charge               |                                                 | --   | 16.7 | --   | nC   |
| Qgd                                | Gate-Drain Charge                |                                                 | --   | 7.1  | --   | nC   |
| Source-Drain Diode Characteristics |                                  |                                                 |      |      |      |      |
| ISD                                | Source-Drain Current(Body Diode) |                                                 | --   | --   | -65  | A    |
| VSD                                | Forward on Voltage               | VGS=0V,IS=-10A                                  | --   | --   | -1.2 | V    |
| trr                                | Reverse Recovery Time            | IS=-10A, VDD=-50V<br>dI/dt=100A/μs              | --   | 55   | --   | ns   |
| Qrr                                | Reverse Recovery Charge          |                                                 | --   | 102  | --   | nc   |

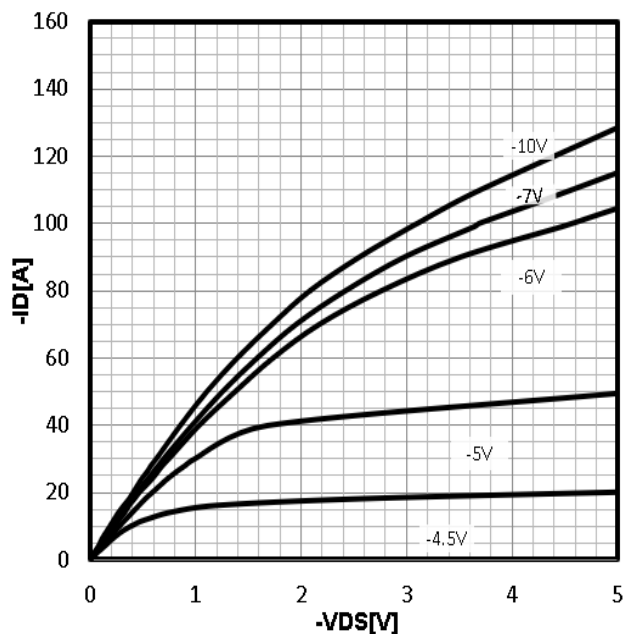
Notes 1.The maximum current rating is package limited.

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

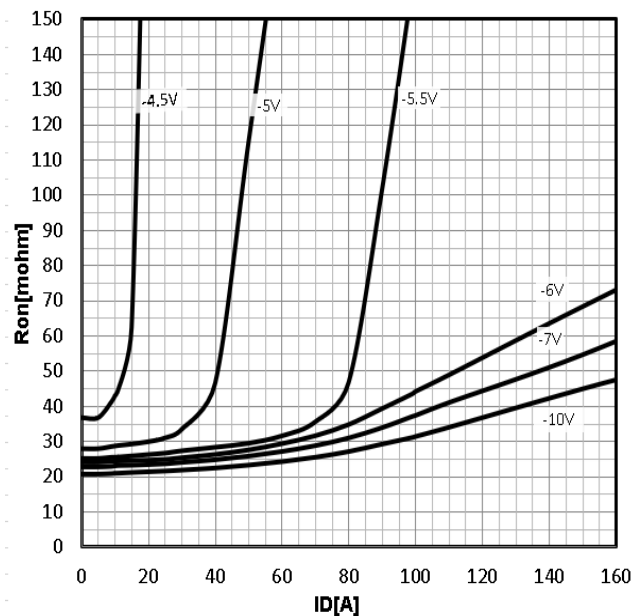
3.EAS condition: T<sub>J</sub>=25°C , V<sub>DD</sub>=-50V, V<sub>gs</sub>=-10V , I<sub>D</sub>=-50A, L=0.5mH, R<sub>G</sub>=25ohm

## Characteristics Curve:

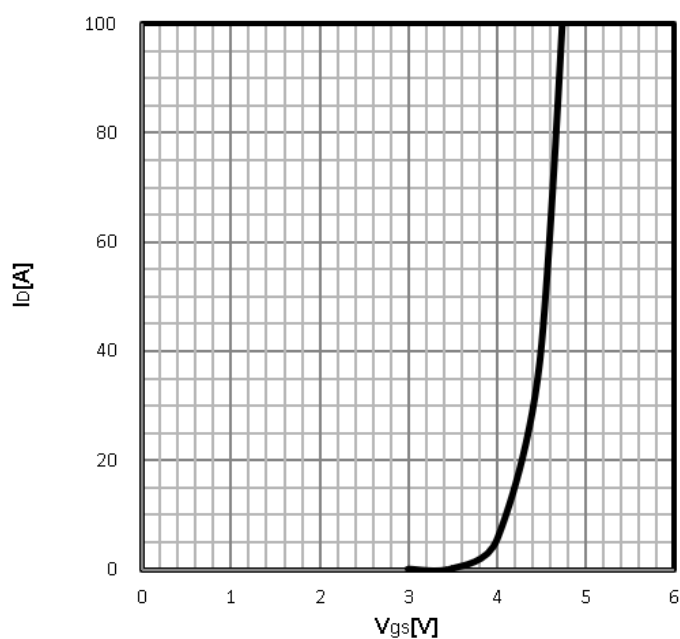
**Typ. output characteristics**  
 $-I_D = f(-V_{DS})$



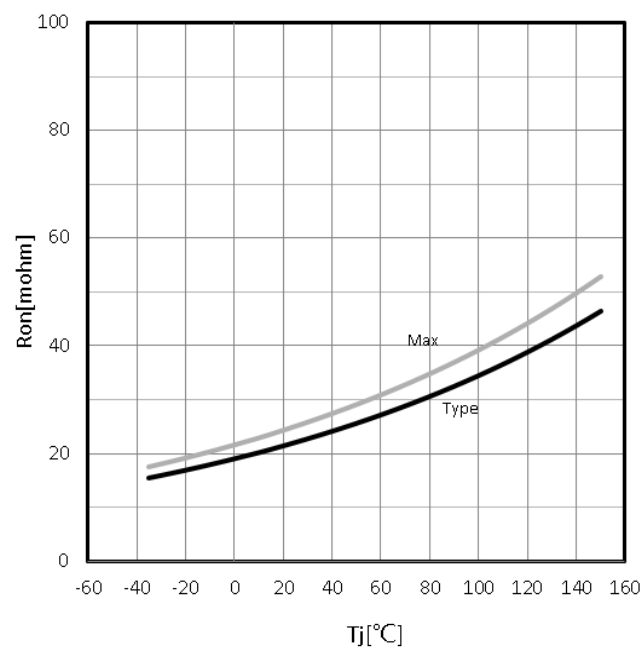
**Typ. drain-source on resistance**  
 $R_{DS(on)} = f(-I_D)$



**Typ. transfer characteristics**  
 $-I_D = f(-V_{GS})$

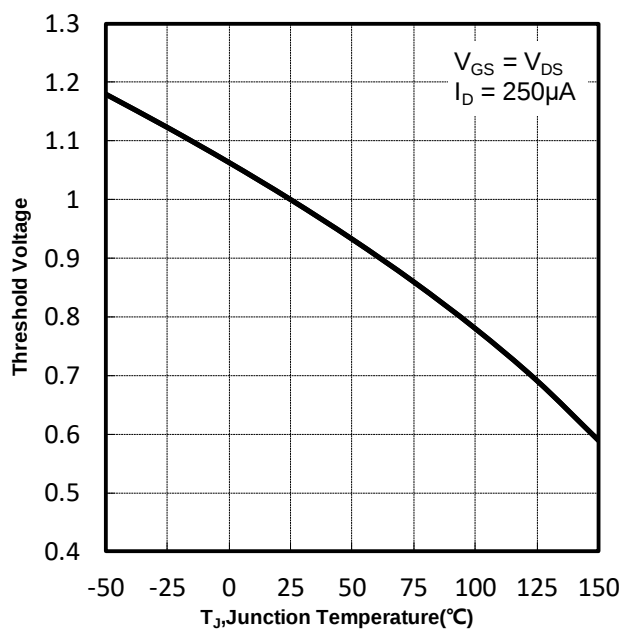


**Drain-source on-state resistance**  
 $R_{DS(on)} = f(T_j); I_D = -10A; V_{GS} = -10V$



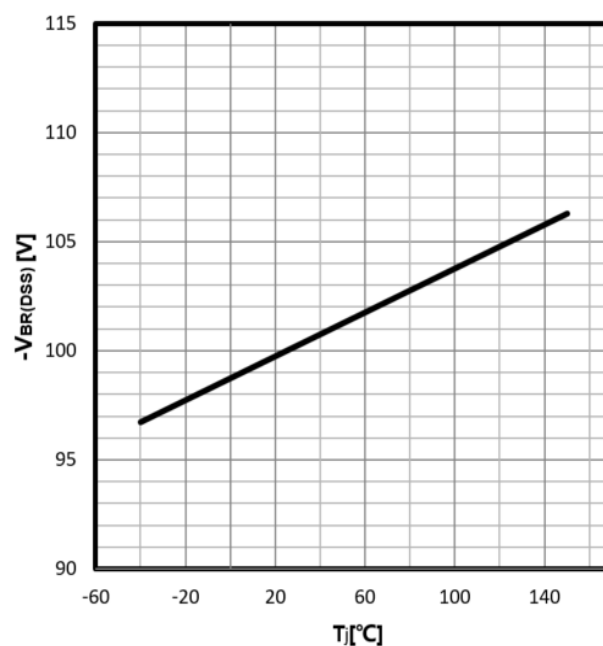
### Gate Threshold Voltage

$$-V_{TH}=f(T_j); I_D=-250\mu A$$



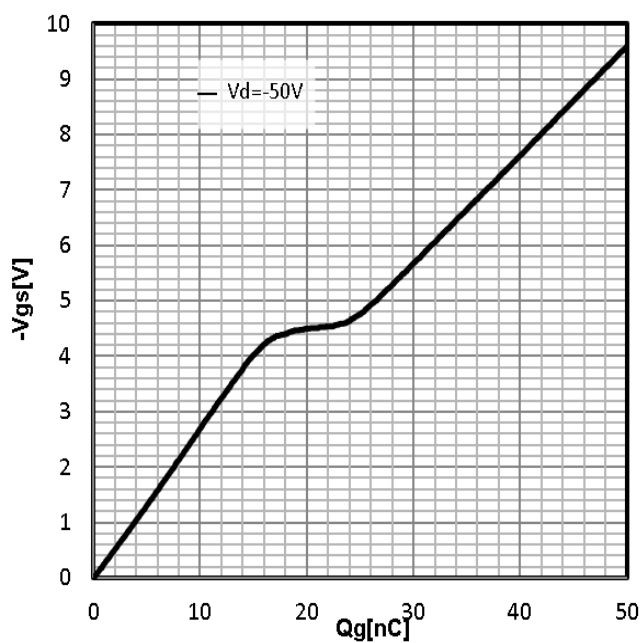
### Drain-source breakdown voltage

$$-V_{BR(DSS)}=f(T_j); I_D=-250\mu A$$



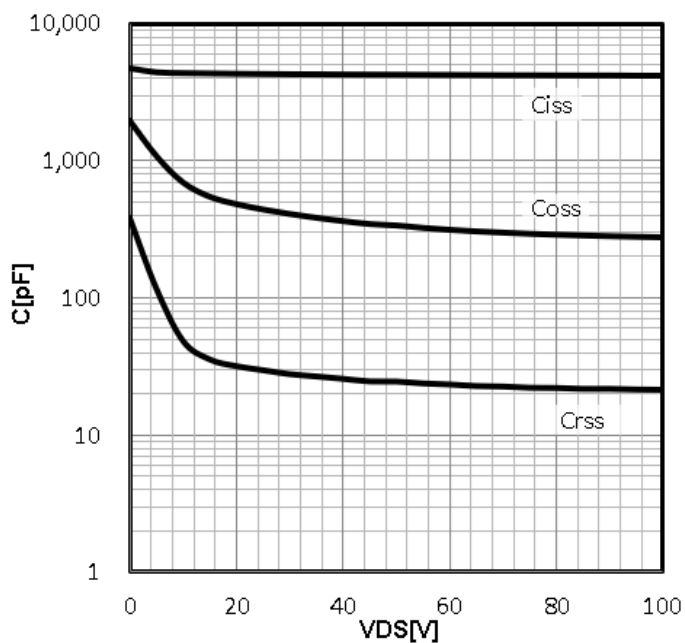
### Typ. gate charge

$$-V_{GS}=f(Q_g); I_D=-20A$$



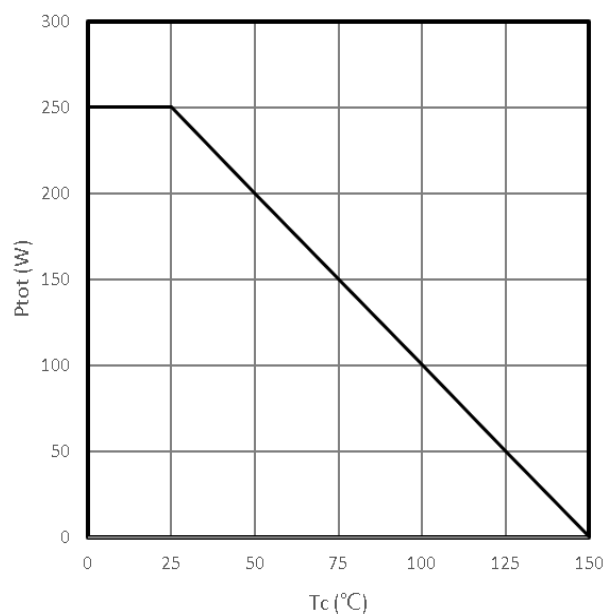
### Typ. capacitances

$$C=f(-V_{DS}); V_{GS}=0V; f=1MHz$$



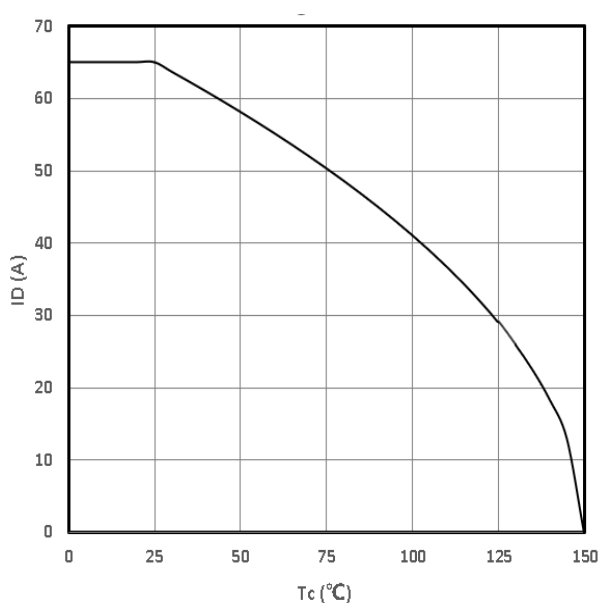
### Power Dissipation

$$P_{\text{tot}} = f(T_C)$$



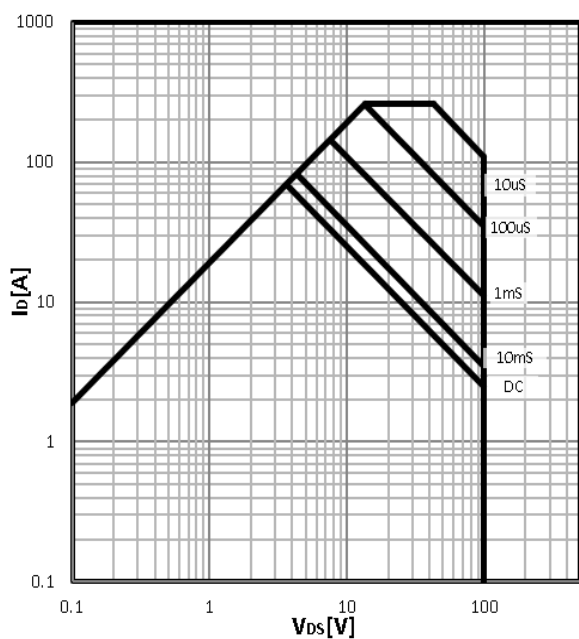
### Maximum Drain Current

$$-I_D = f(T_C)$$



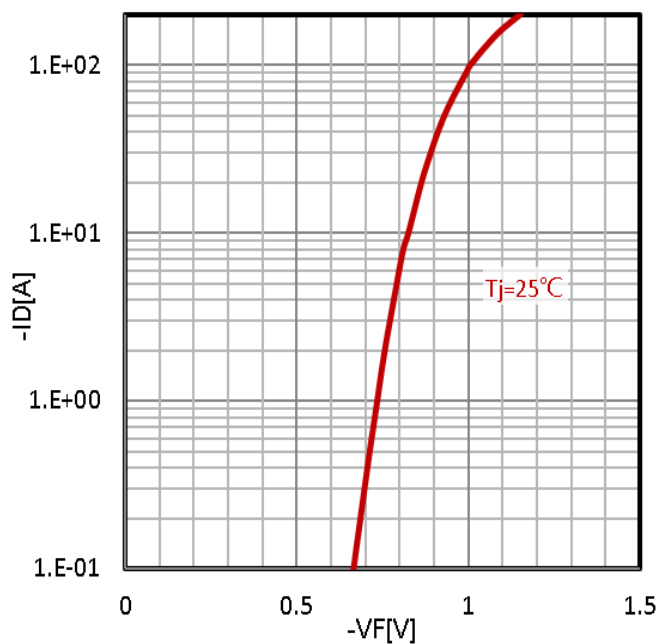
### Safe operating area

$$-I_D = f(-V_{DS})$$



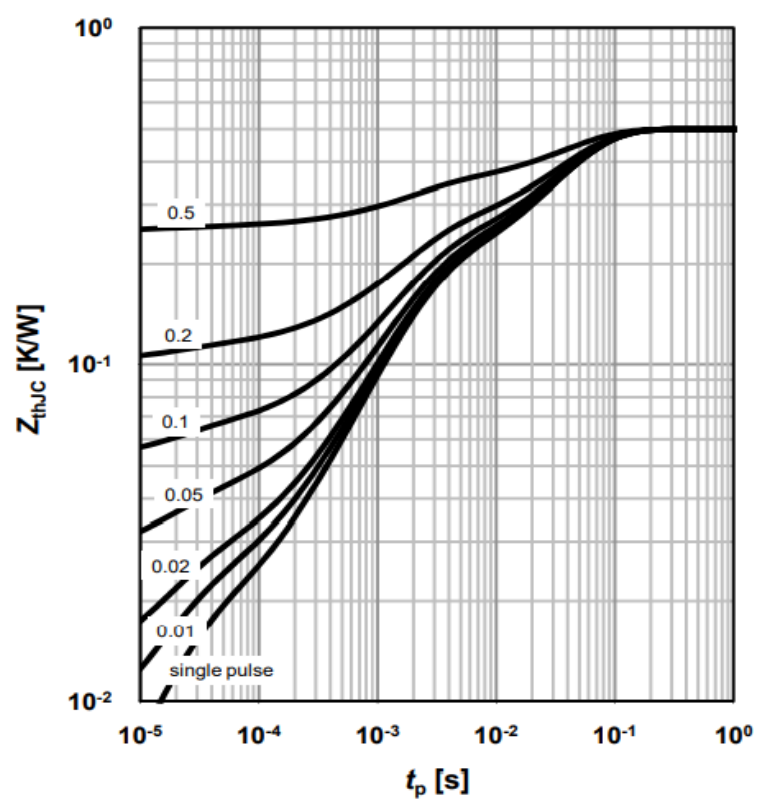
### Body Diode Forward Voltage Variation

$$-I_F = f(-V_{DS})$$

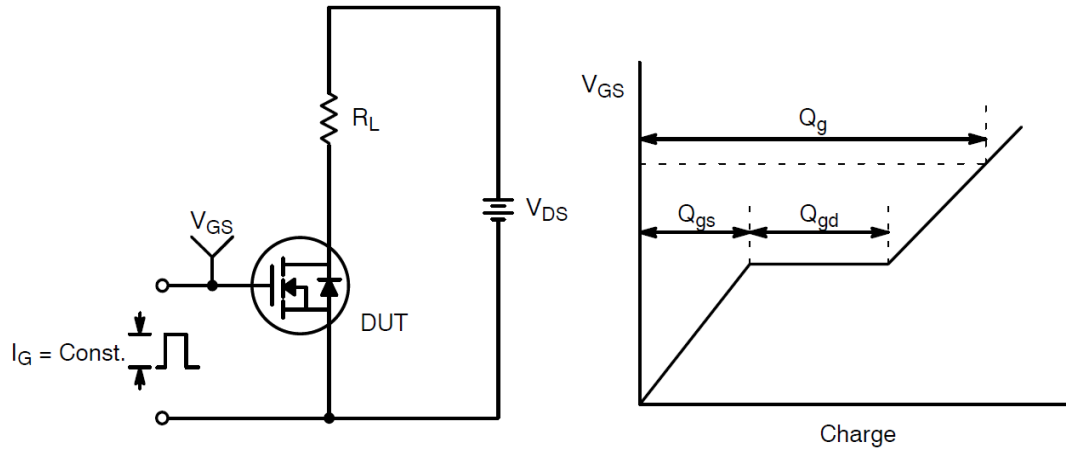


# Max. transient thermal impedance

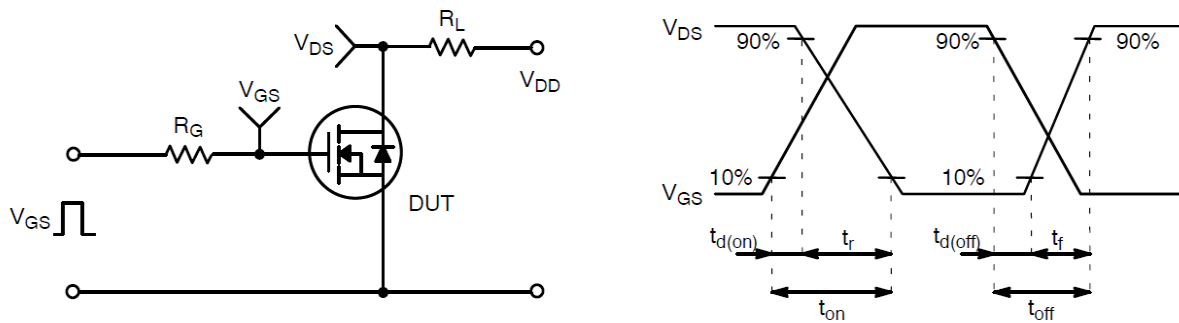
$$Z_{thJC}=f(t_p)$$



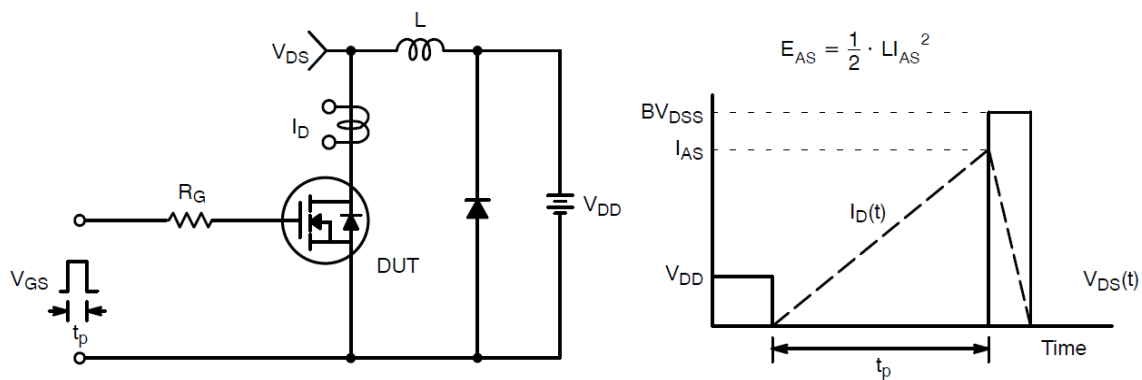
## Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

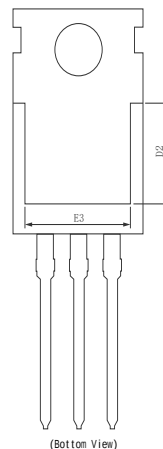
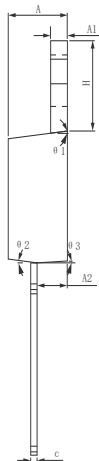
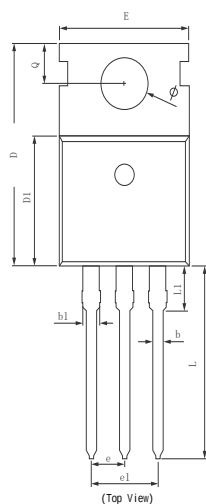


Resistive Switching Test Circuit & Waveforms

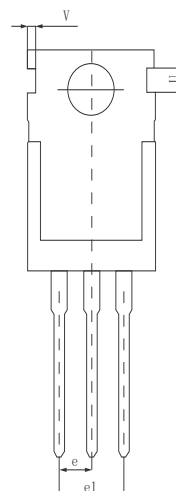
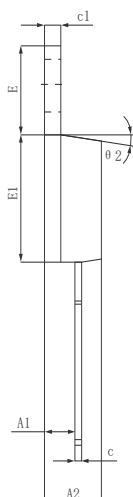
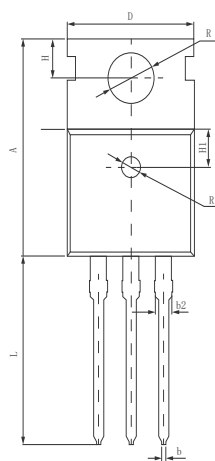
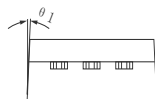


Unclamped Inductive Switching Test Circuit & Waveforms

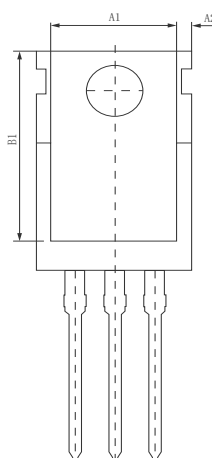
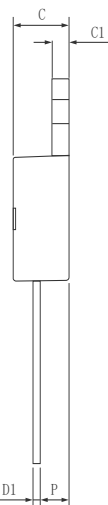
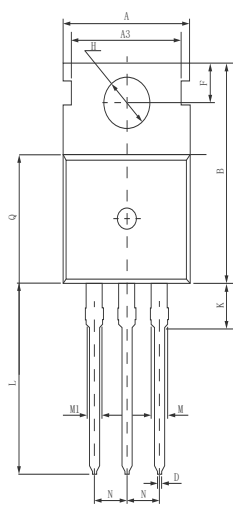
# Dimensions (TO-220)



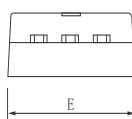
| SYMBOL | MILLIMETER |           |        |
|--------|------------|-----------|--------|
|        | MIN        | Typ.      | MAX    |
| A      | 4.370      | 4.570     | 4.700  |
| A1     | 1.250      | 1.300     | 1.400  |
| A2     | 2.150      | 2.350     | 2.550  |
| b      | 0.700      | 0.800     | 0.950  |
| b1     | 1.170      | 1.270     | 1.470  |
| c      | 0.450      | 0.500     | 0.600  |
| D      | 15.100     | 15.600    | 16.100 |
| D1     | 8.800      | 9.100     | 9.400  |
| D2     | 5.500      | 6.300 REF |        |
| E      | 9.700      | 10.000    | 10.300 |
| E3     | 7.000      | 7.600 REF |        |
| e      | 2.540 BSC  |           |        |
| e1     | 5.080 BSC  |           |        |
| L      | 13.200     | 13.500    | 13.800 |
| L1     |            | 3.100     | 3.400  |
| H      | 6.250      | 6.500     | 1.352  |
| Φ      | 3.400      | 3.600     | 3.800  |
| Q      | 2.600      | 2.800     | 3.000  |
| θ 1    | 7° TYP     |           |        |
| θ 2    | 7° TYP     |           |        |
| θ 3    | 3° TYP     |           |        |



| SYMBOL | MILLIMETER |        |        |
|--------|------------|--------|--------|
|        | MIN        | Typ.   | MAX    |
| A      | 15.400     | 15.600 | 15.800 |
| A1     | 2.350      | 2.400  | 2.500  |
| A2     | 4.400      | 4.500  | 4.700  |
| b      | 0.700      | 0.800  | 0.900  |
| b2     | 1.180      | 1.310  | 1.440  |
| c      | 0.480      | 0.500  | 0.560  |
| c1     | 1.290      | 1.300  | 1.320  |
| D      | 9.800      | 10.000 | 10.200 |
| E      | 6.400      | 6.500  | 6.600  |
| E1     | 9.000      | 9.100  | 9.200  |
| e      | 2.420      | 2.540  | 2.660  |
| e1     | 4.840      | 5.080  | 5.320  |
| H      | 2.730      | 2.800  | 2.870  |
| H1     | 2.400      | 2.500  | 2.600  |
| L      | 13.020     | 13.370 | 13.720 |
| R      | 3.500      | 3.600  | 3.730  |
| R1     | 1.400      | 1.500  | 1.600  |
| U      | 1.650      | 1.750  | 1.850  |
| V      | 0.580      | 0.680  | 0.780  |
| θ 1    | 2°         | 2.5°   | 3°     |
| θ 2    | 6.5°       | 7°     | 7.5°   |



| Symbol | Dimensions (mm) |
|--------|-----------------|
| A      | 10.0±0.3        |
| A1     | 8.0±0.2         |
| A2     | 0.94±0.1        |
| A3     | 8.7±0.1         |
| B      | 15.6±0.4        |
| B1     | 13.2±0.2        |
| C      | 4.5±0.2         |
| C1     | 1.3±0.2         |
| D      | 0.8±0.2         |
| D1     | 0.5±0.1         |
| E      | 10.0±0.3        |
| F      | 2.8±0.1         |
| H      | 3.6±0.1         |
| K      | 3.1±0.2         |
| L      | 1.3±0.4         |
| M      | 1.38±0.1        |
| M1     | 1.28±0.1        |
| N      | 2.54 (typ)      |
| P      | 2.4±0.3         |
| Q      | 9.15±0.25       |



### Marking Instructions:

Diagram illustrating the layout of a label with various fields and their corresponding labels:

- 脱模孔** (Demolding Hole): Indicated by a dashed line pointing to a small circle at the top center.
- AGMXXXXX**: A line of text below the demolding hole.
- XXXX**: A line of text to the right of the logo.
- XXXX X\*\*\***: A line of text below the previous one.
- 内部代码** (Internal Code): Indicated by a dashed line pointing to the bottom right area.
- LOGO**: Indicated by a dashed line pointing to the blue and orange logo.
- 型号** (Model): Indicated by a dashed line pointing to the bottom left area.
- 内部代码** (Internal Code): Indicated by a dashed line pointing to the bottom left area.
- 档位** (Gear/Position): Indicated by a dashed line pointing to the bottom center area.
- 年周期码** (Year Cycle Code): Indicated by a dashed line pointing to the bottom right area.

The diagram shows a rectangular label with the following content and callouts:

- AGMXXXXXX**: Callout: 型号 (Model)
- Logo**: Callout: LOGO
- XXXX**: Callout: 内部代码 (Internal Code)
- XXXX X\*\*\***: Callout: 内部代码 (Internal Code)
- XXXX**: Callout: 年周期码 (Annual Cycle Code)
- XXXX**: Callout: 档位 (Gear)
- 脱模孔**: Callout: 脱模孔 (Demolding Hole)

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