## General Description

The AGM012N10LL 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

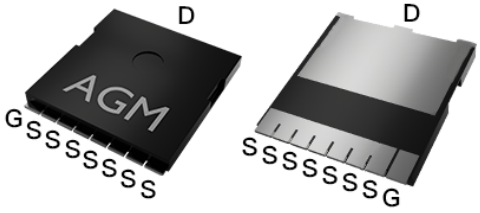
## Application

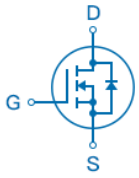
- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

## Product Summary

| BVDSS | RDSON | ID |
|---|---|---|
| 100V | 1.03mΩ | 385A |

**TOLL Pin Configuration**




| Pin | Description |
|---|---|
| 1 | Gate(G) |
| 2,3,4,5,6,7,8 | Source(S) |
| 9 | Drain(D) |

## Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|---|---|---|---|---|---|
| AGM012N10LL | AGM012N10LL | TOLL | 330mm | 25mm | 2000 |

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

| 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℃) **(Note 1)** | 385 | A |
| | Drain Current-Continuous(Tc=100℃) | 272 | A |
| IDM (pluse) | Drain Current-Pulsed **(Note 2)** | 1540 | A |
| PD | Maximum Power Dissipation(Tc=25℃) | 441 | w |
| | Maximum Power Dissipation(Tc=100℃) | 220 | w |
| EAS | Avalanche energy **(Note 3)** | 1225 | mJ |
| TJ,TSTG | Operating Junction and Storage Temperature Range | -55 To 175 | ℃ |

**Table 2. Thermal Characteristic**

| Symbol | Parameter | Typ | Max | Unit |
|---|---|---|---|---|
| RθJA | Thermal Resistance Junction-ambient (Steady State)[1] | --- | 60 | ℃/W |
| RθJC | Thermal Resistance Junction-Case[1] | --- | 0.34 | ℃/W |

**Table 3. Electrical Characteristics (TJ=25℃unless otherwise noted)**

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **On/Off States** | | | | | | |
| $BV_{DSS}$ | 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 | 2.0 | 3.3 | 4.0 | V |
| gFS | Forward Transconductance | VDS=5V,ID=15A | -- | 56 | -- | S |
| RDS(on) | Drain-Source On-State Resistance | VGS=10V, ID=20A | -- | 1.03 | 1.35 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| Ciss | Input Capacitance | VDS=50V,VGS=0V, F=1MHZ | -- | 12598 | -- | pF |
| Coss | Output Capacitance | | -- | 3117 | -- | pF |
| Crss | Reverse Transfer Capacitance | | -- | 76 | -- | pF |
| Rg | Gate resistance | VGS=0V, VDS=0V,f=1.0MHz | -- | 0.59 | -- | Ω |
| **Switching Times** | | | | | | |
| td(on) | Turn-on Delay Time | VGS=10V,VDS=50V, ID=100A,RGEN=5Ω | -- | 35 | -- | nS |
| tr | Turn-on Rise Time | | -- | 90 | -- | nS |
| td(off) | Turn-Off Delay Time | | -- | 95 | -- | nS |
| tf | Turn-Off Fall Time | | -- | 105 | -- | nS |
| Qg | Total Gate Charge | VGS=10V, VDS=50V, ID=100A | -- | 172 | -- | nC |
| Qgs | Gate-Source Charge | | -- | 58 | -- | nC |
| Qgd | Gate-Drain Charge | | -- | 39 | -- | nC |
| **Source-Drain Diode Characteristics** | | | | | | |
| ISD | Source-Drain Current(Body Diode) | | -- | -- | 385 | A |
| VSD | Forward on Voltage | VGS=0V,IS=15A | -- | -- | 1.2 | V |
| trr | Reverse Recovery Time | IF=15A , dI/dt=100A/μs , TJ=25℃ | -- | 95 | -- | ns |
| Qrr | Reverse Recovery Charge | | -- | 200 | -- | nc |

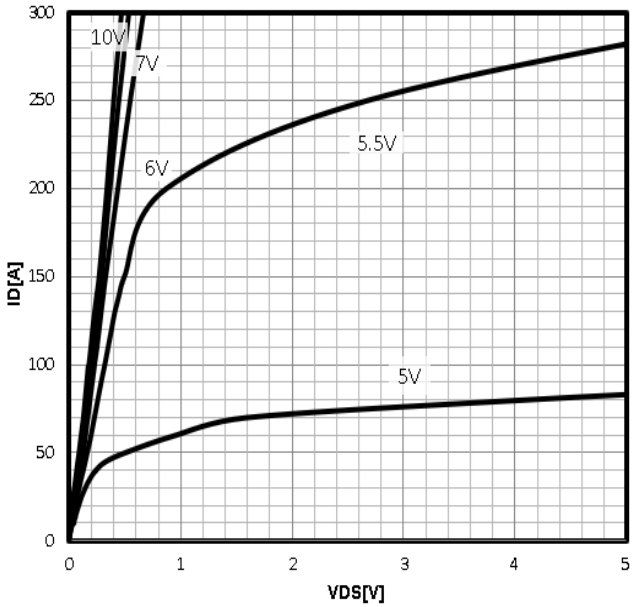
Notes 1.The maximum current rating is package limited.

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

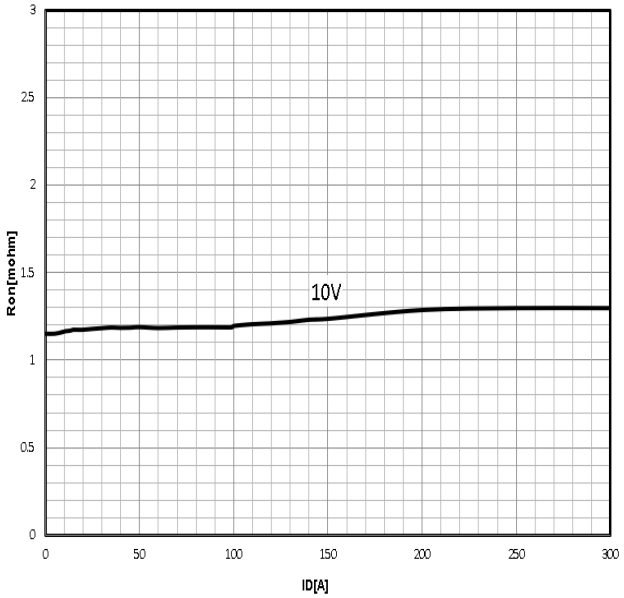
Notes 3.EAS condition: TJ=25℃,VDD=50V,Vgs=10V，ID=70A,L=0.5mH,RG=25ohm

## Characteristics Curve:

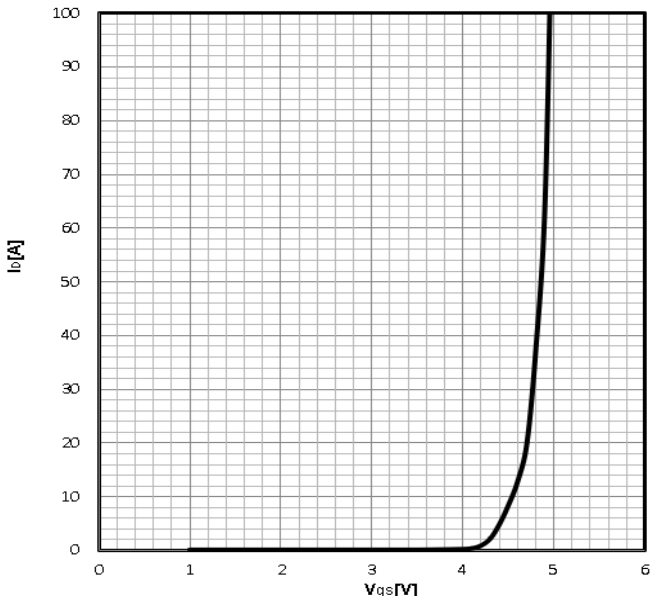
### Typ. output characteristics
$I_D=f(V_{DS})$



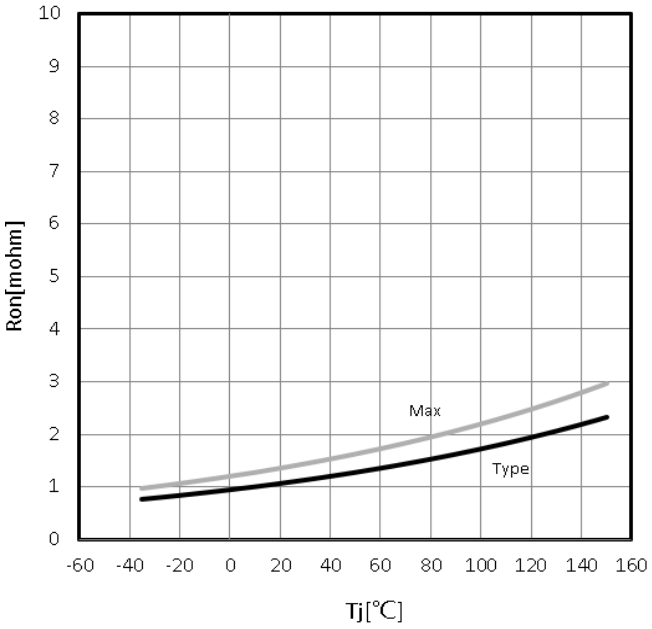

### Typ. drain-source on resistance
$R_{DS(on)}=f(I_D)$




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

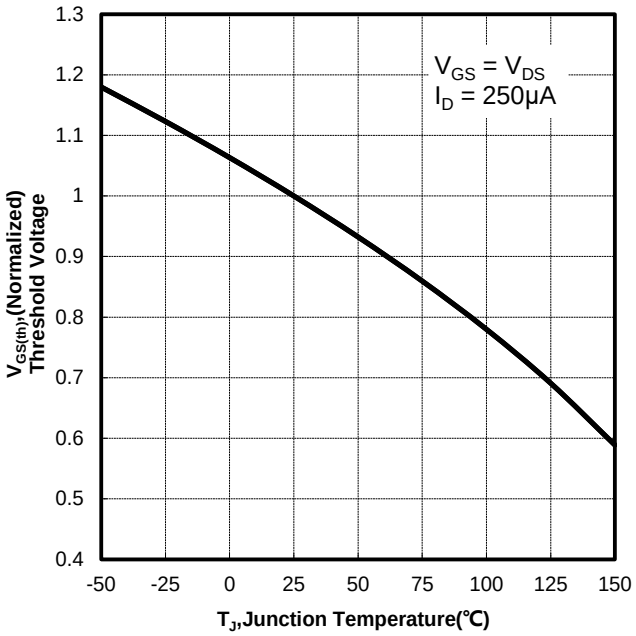



### Drain-source on-state resistance
$R_{DS(on)}= f(T_j)$; $I_D=100A$; $V_{GS}=10V$



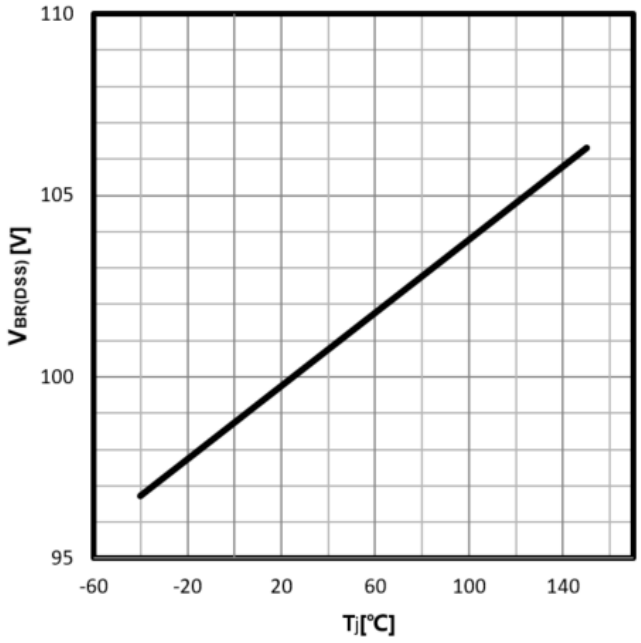
**Gate Threshold Voltage**

$V_{TH}=f(T_j)$; $I_D=250uA$



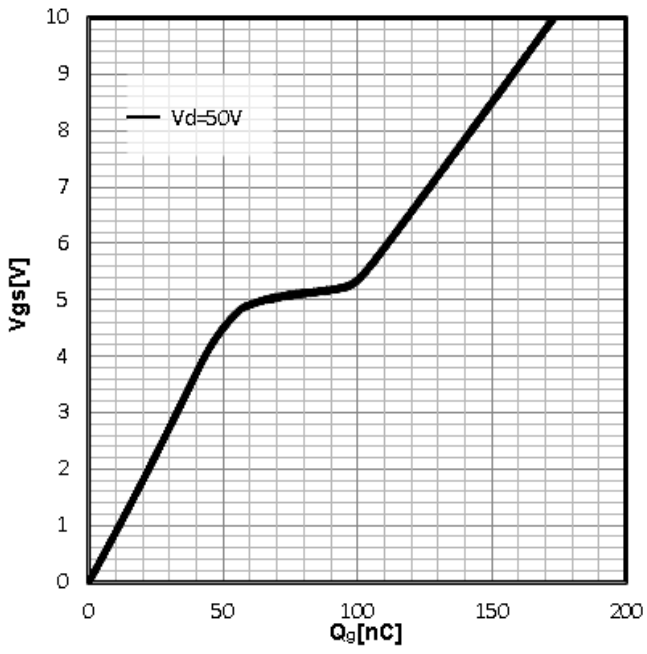

**Drain-source breakdown voltage**

$V_{BR(DSS)}=f(T_j)$; $I_D=250uA$



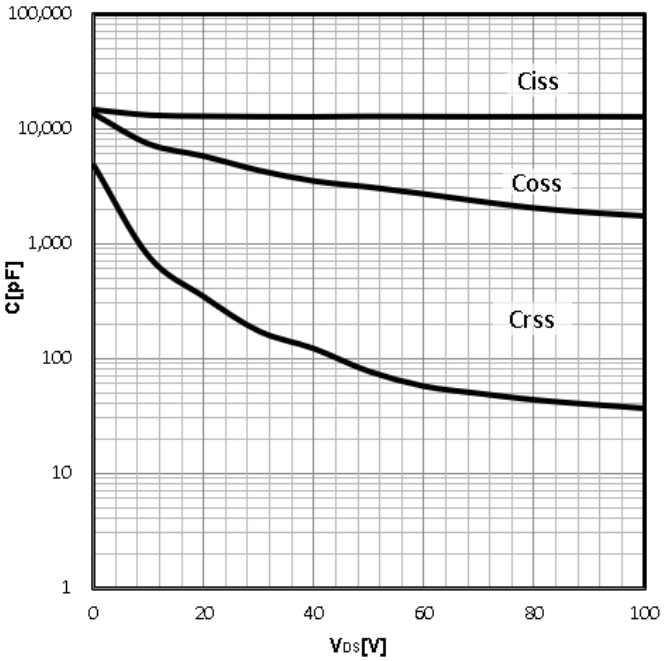

**Typ. gate charge**

$V_{GS}=f(Q_g)$ ; $I_D=100A$



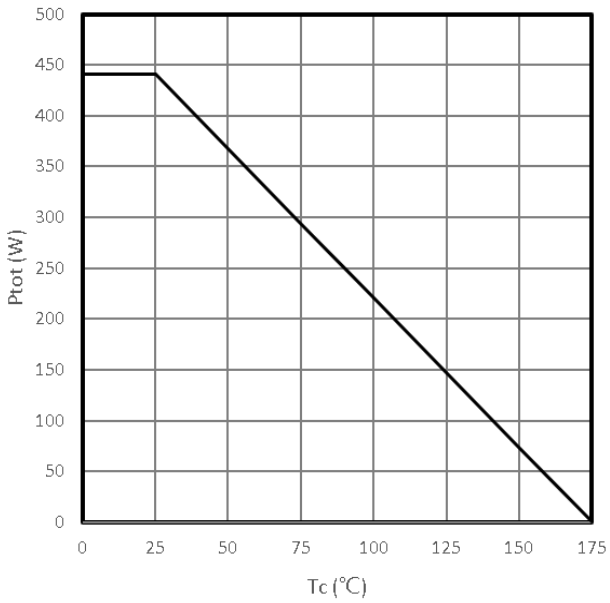

**Typ. capacitances**

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



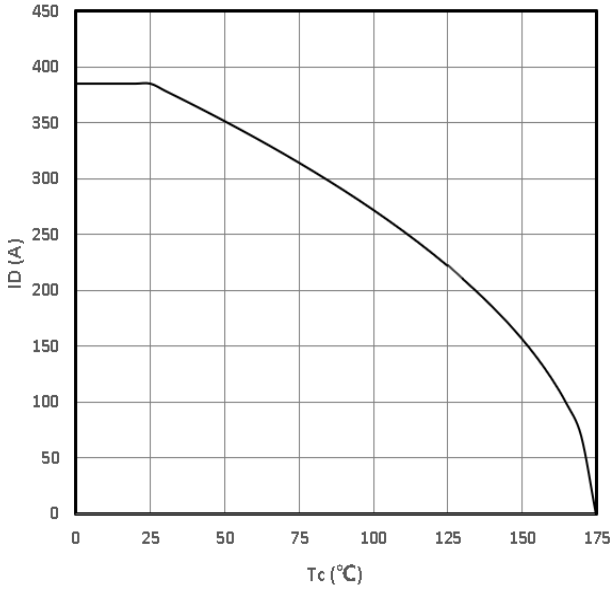
**Power Dissipation**

$P_{tot}=f(T_C)$



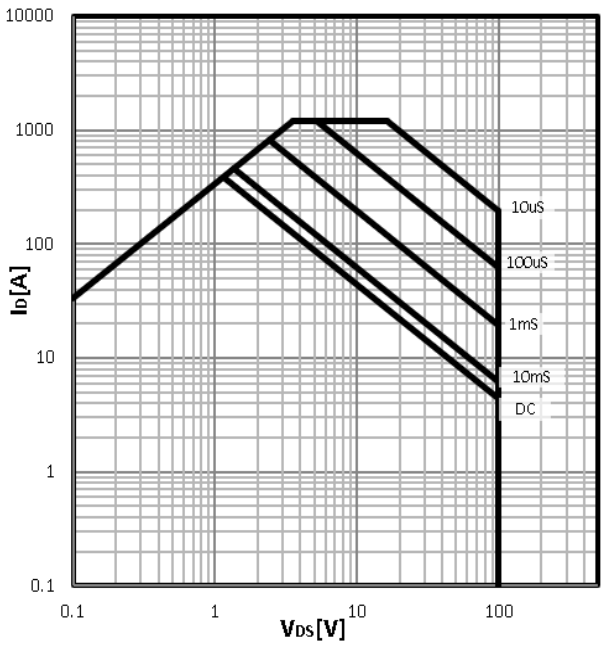

**Maximum Drain Current**

$I_D=f(T_C)$



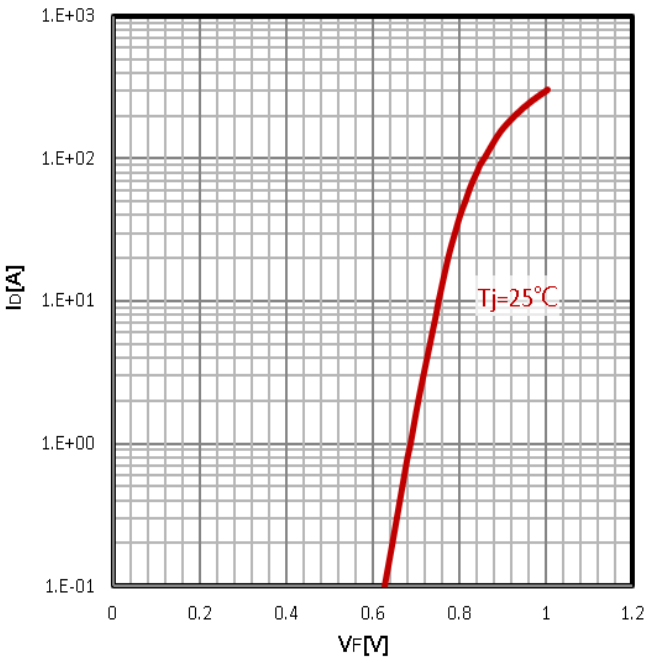

**Safe operating area**

$I_D=f(V_{DS})$



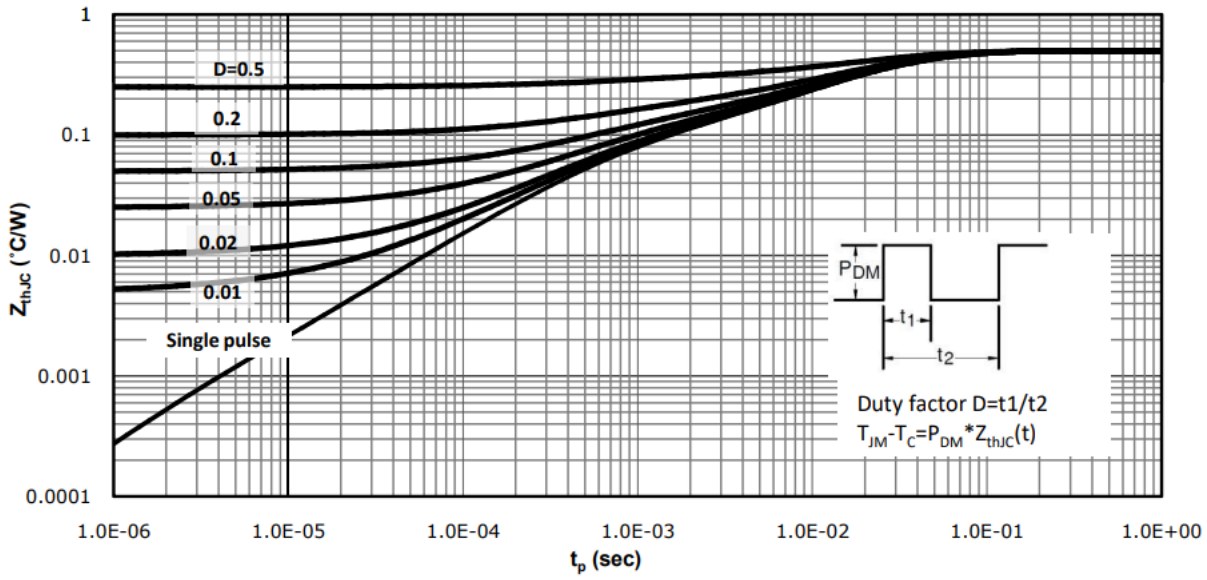

**Body Diode Forward Voltage Variation**

$I_F=f(V_{SD})$

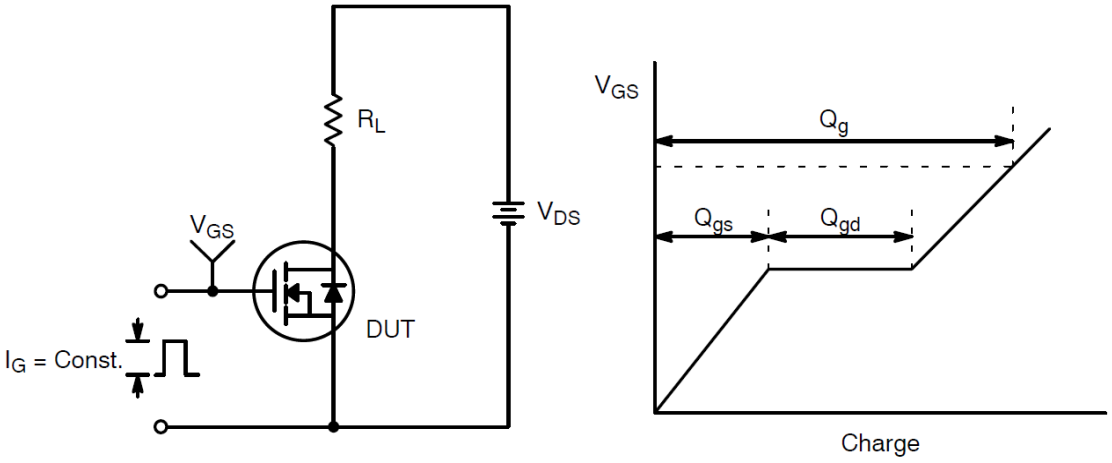


**Max. transient thermal impedance**

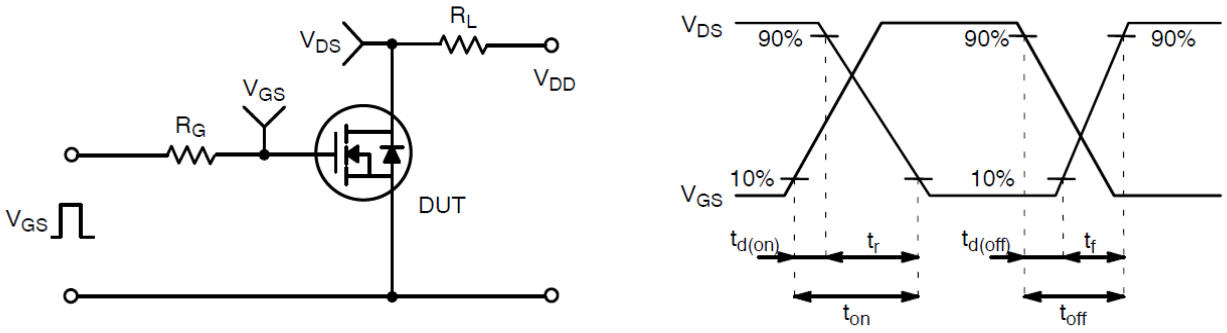
$Z_{thJC}=f(t_p)$



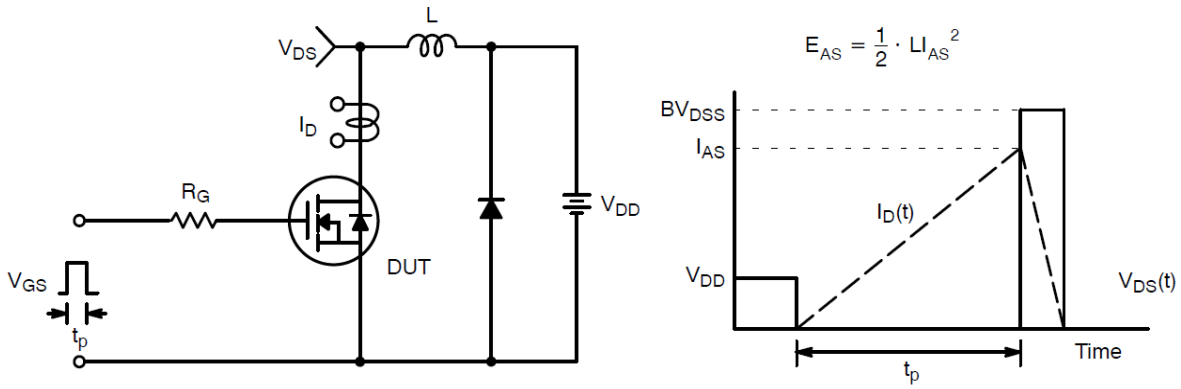
## Test Circuit and Waveform:




**Gate Charge Test Circuit & Waveform**

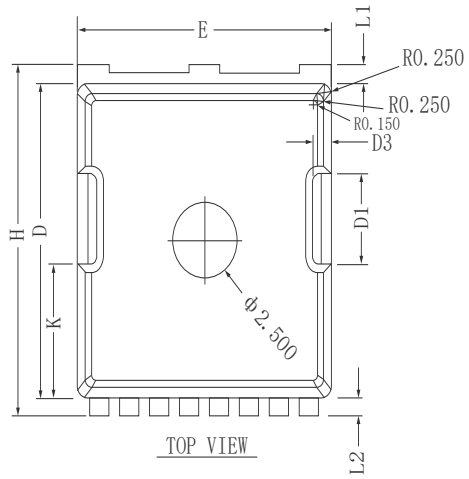


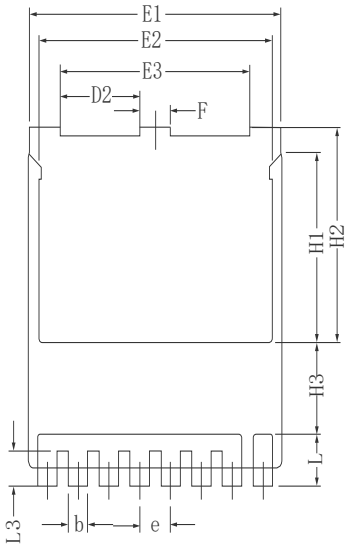

**Resistive Switching Test Circuit & Waveforms**

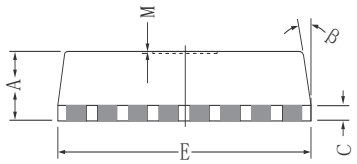



**Unclamped Inductive Switching Test Circuit & Waveforms**

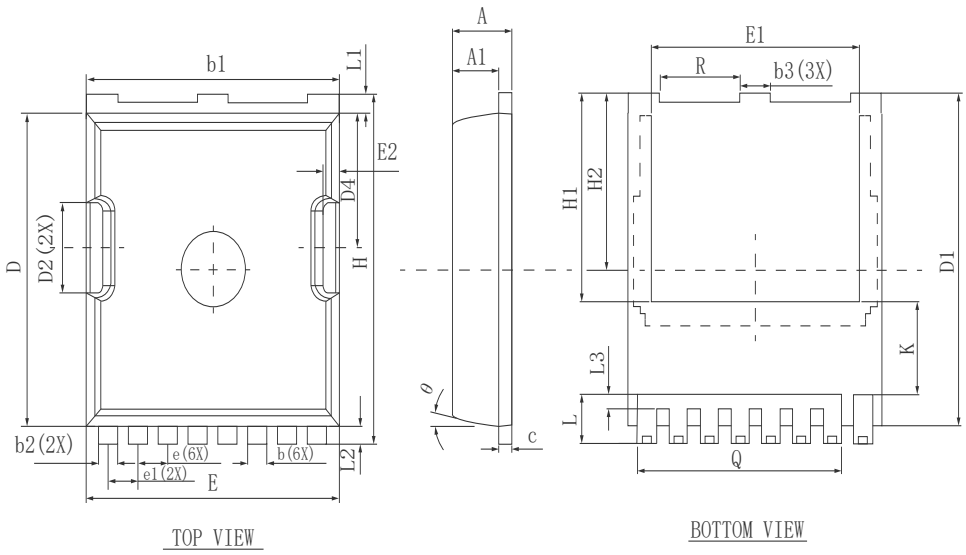
## ●Dimensions（TOLL）

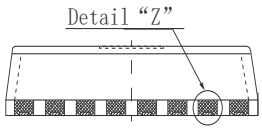


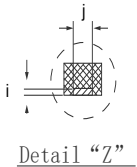




| Symbols | Millimeters | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 2.20 | 2.30 | 2.40 |
| b | 0.65 | 0.75 | 0.85 |
| C | 0.508 REF | | |
| D | 10.25 | 10.40 | 10.55 |
| D1 | 2.85 | 3.00 | 3.15 |
| D2 | 2.95 | 3.10 | 3.25 |
| D3 | 0.75 REF | | |
| E | 9.75 | 9.90 | 10.05 |
| E1 | 9.65 | 9.80 | 9.95 |
| E2 | 8.95 | 9.10 | 9.25 |
| E3 | 7.25 | 7.40 | 7.55 |
| e | 1.20 BSC | | |
| F | 1.05 | 1.20 | 1.35 |
| H | 11.55 | 11.70 | 11.85 |
| H1 | 6.03 | 6.18 | 6.33 |
| H2 | 6.85 | 7.00 | 7.15 |
| H3 | 3.00 BSC | | |
| L | 1.55 | 1.70 | 1.85 |
| L1 | 0.55 | 0.70 | 0.85 |
| L2 | 0.45 | 0.60 | 0.75 |
| L3 | 1.00 | 1.15 | 1.30 |
| M | 0.08 REF | | |
| β | 8° | 10° | 12° |
| K | 4.25 | 4.40 | 4.55 |



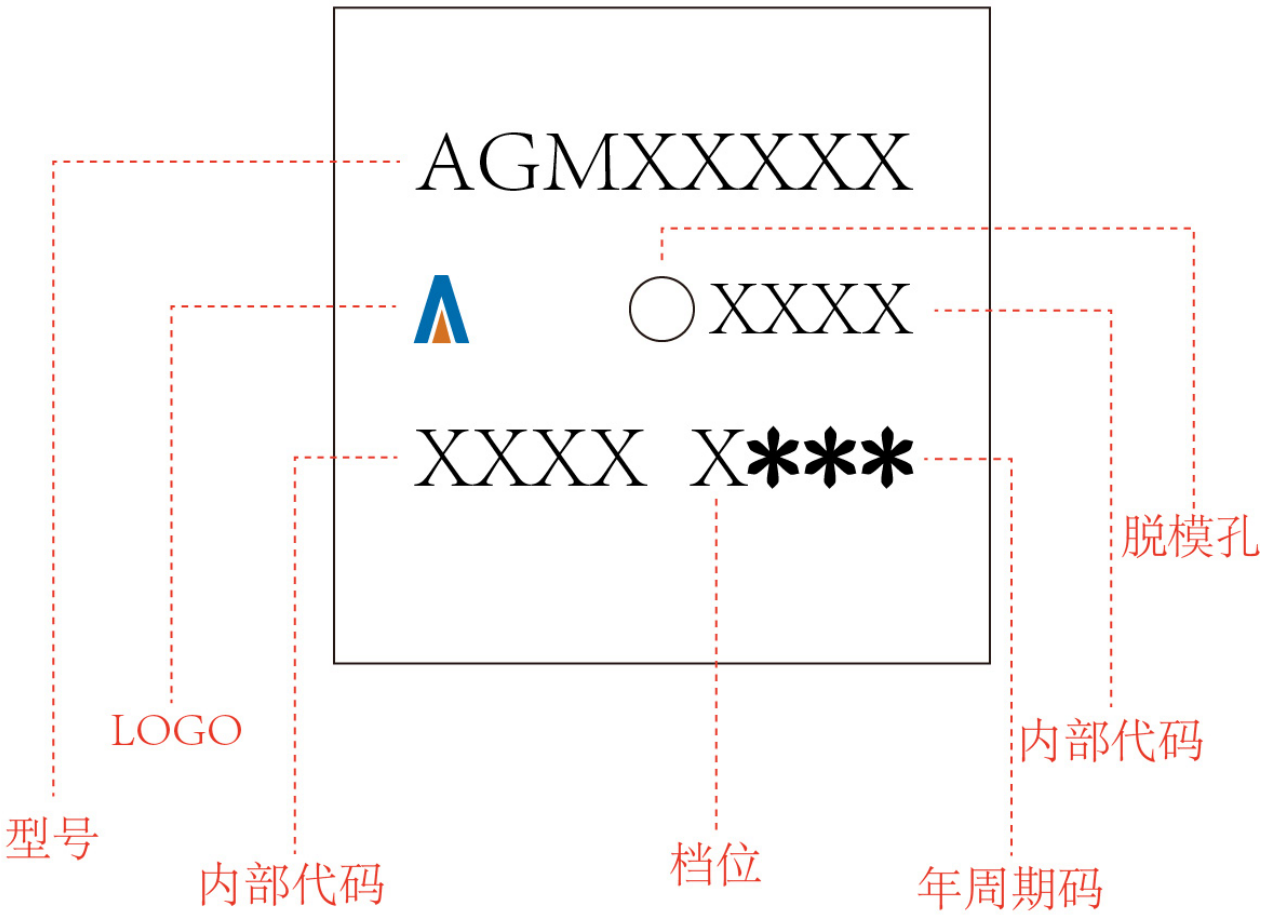




| SYMBOL | MILLIMETER | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 2.200 | 2.300 | 2.400 |
| A1 | 1.700 | 1.800 | 1.900 |
| b | 0.600 | 0.700 | 0.800 |
| b1 | 9.700 | 9.800 | 9.900 |
| b2 | 0.650 | 0.750 | 0.850 |
| b3 | 1.100 | 1.200 | 1.300 |
| c | 0.400 | 0.500 | 0.600 |
| D | 10.300 | 10.400 | 10.500 |
| D1 | 11.000 | 11.100 | 11.200 |
| D2 | 3.200 | 3.300 | 3.400 |
| D4 | 4.470 | 4.570 | 4.670 |
| E | 9.800 | 9.900 | 10.000 |
| E1 | 8.000 | 8.100 | 8.200 |
| E2 | 0.500 | 0.600 | 0.700 |
| e | 1.200 BSC | | |
| e1 | 1.225 BSC | | |
| H | 11.600 | 11.700 | 11.800 |
| H1 | 6.950 BSC | | |
| H2 | 5.900 BSC | | |
| i | 0.100 REF. | | |
| j | 0.350 REF. | | |
| K | 3.100 REF. | | |
| L | 1.550 | 1.650 | 1.750 |
| L1 | 0.600 | 0.700 | 0.800 |
| L2 | 0.500 | 0.600 | 0.700 |
| L3 | 0.400 | 0.500 | 0.600 |
| Q | 7.950 REF. | | |
| R | 3.000 | 3.100 | 3.200 |
| θ | 10° REF. | | |

TOLL

Marking Instructions:



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This document is the third version issued on April 10th, 2024. This document replaces all previously provided information.