## General Description

The AGMH12N10C 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

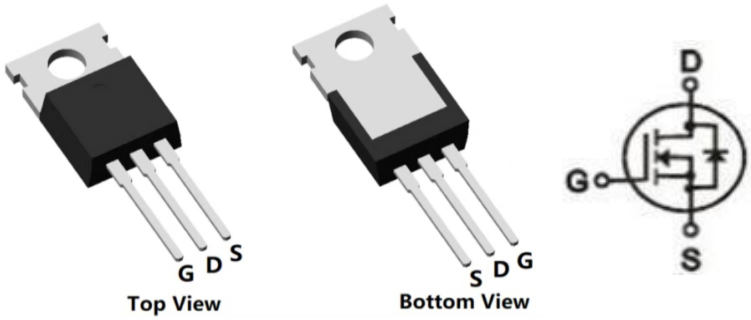
## Application

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

## Product Summary

| BVDSS | RDSON | ID |
|---|---|---|
| 100V | 9.6mΩ | 55A |

**TO-220 Pin Configuration**




## Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|---|---|---|---|---|---|
| AGMH12N10C | AGMH12N10C | TO-220 | ---- | ---- | 1000 |

**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)** | 55 | A |
| | Drain Current-Continuous(Tc=100℃) | 35 | A |
| IDM (pluse) | Drain Current-Continuous@ Current-Pulsed **(Note 2)** | 220 | A |
| PD | Maximum Power Dissipation(Tc=25℃) | 96 | w |
| | Maximum Power Dissipation(Tc=100℃) | 38 | w |
| EAS | Avalanche energy **(Note 3)** | 150 | mJ |
| TJ,TSTG | Operating Junction and Storage Temperature Range | -55 To 150 | ℃ |

**Table 2. Thermal Characteristic**

| Symbol | Parameter | Typ | Max | Unit |
|---|---|---|---|---|
| RθJA | Thermal Resistance Junction-ambient (Steady State)[1] | --- | 94 | ℃/W |
| RθJC | Thermal Resistance Junction-Case[1] | --- | 1.3 | ℃/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 | -- | -- | 1.0 | μA |
| IGSS | Gate-Body Leakage Current | VGS=±20V,VDS=0V | -- | -- | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | VDS=VGS,ID=250μA | 2.5 | 3.0 | 4.0 | V |
| gFS | Forward Transconductance | VDS=5V,ID=15A | -- | 19 | -- | S |
| RDS(on) | Drain-Source On-State Resistance | VGS=10V, ID=20A | -- | 9.6 | 14 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| Ciss | Input Capacitance | VDS=50V,VGS=0V, F=1MHZ | -- | 1200 | -- | pF |
| Coss | Output Capacitance | | -- | 460 | -- | pF |
| Crss | Reverse Transfer Capacitance | | -- | 9.0 | -- | pF |
| Rg | Gate resistance | VGS=0V, VDS=0V,f=1.0MHz | -- | 11.5 | -- | Ω |
| **Switching Times** | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | VGS=10V,VDS=50V, ID=10A,RGEN=5Ω | -- | 16 | -- | nS |
| tr | Turn-on Rise Time | | -- | 18 | -- | nS |
| $t_{d(off)}$ | Turn-Off Delay Time | | -- | 32 | -- | nS |
| tf | Turn-Off Fall Time | | -- | 10 | -- | nS |
| Qg | Total Gate Charge | VGS=10V, VDS=50V, ID=10A | -- | 21.8 | -- | nC |
| Qgs | Gate-Source Charge | | -- | 3.7 | -- | nC |
| Qgd | Gate-Drain Charge | | -- | 5.0 | -- | nC |
| **Source-Drain Diode Characteristics** | | | | | | |
| ISD | Source-Drain Current(Body Diode) | | -- | -- | 55 | A |
| VSD | Forward on Voltage | VGS=0V,IS=20A | -- | -- | 1.2 | V |
| trr | Reverse Recovery Time | Is=20A , VDD=50V,dI/dt=100A/μs | -- | 43 | -- | ns |
| Qrr | Reverse Recovery Charge | | -- | 90 | -- | nc |

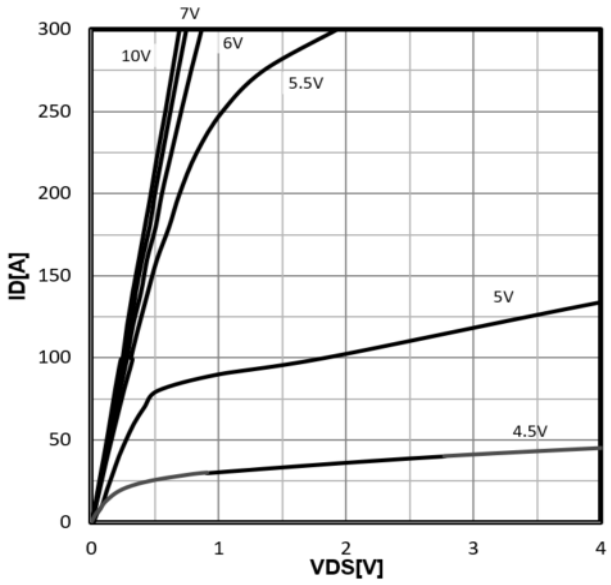
Notes 1.The maximum current rating is package limited.

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

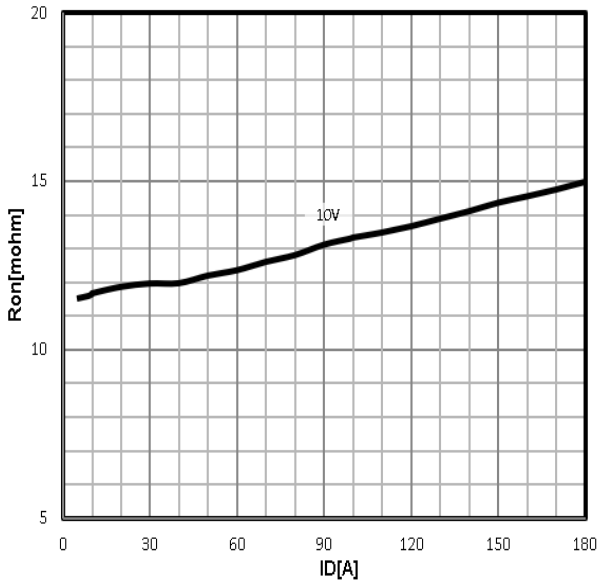
Notes 3.EAS condition: TJ=25℃

## Characteristics Curve:

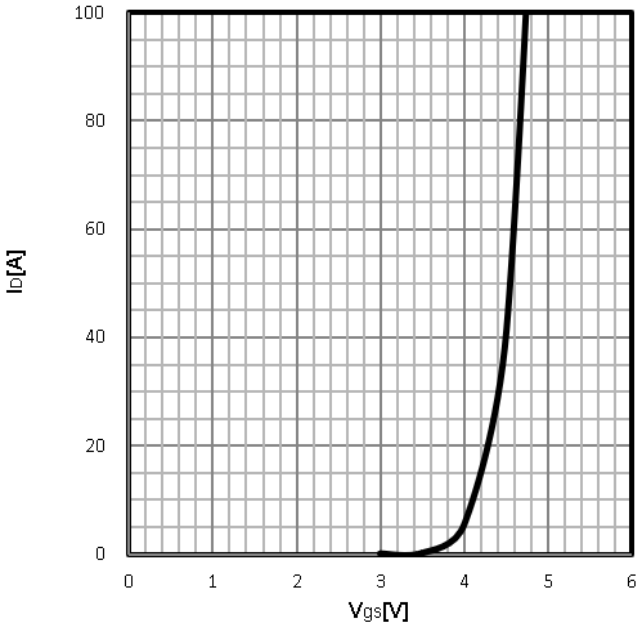
**Typ. output characteristics**
$I_D=f(V_{DS})$



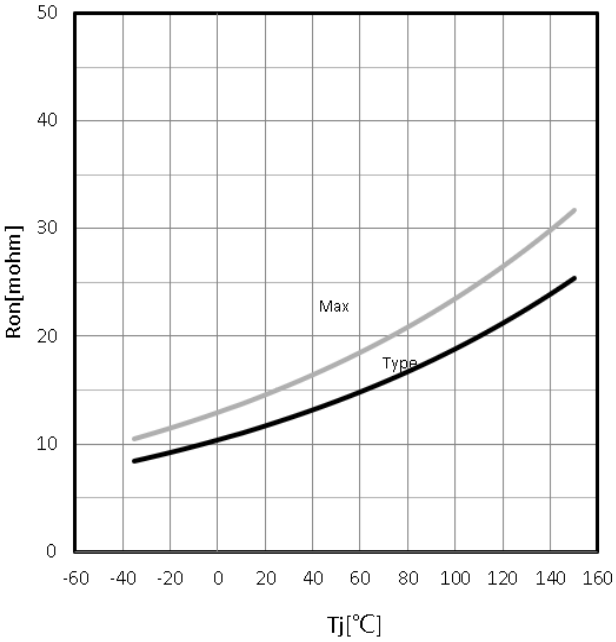

**Typ. drain-source on resistance**
$R_{DS(on)}=f(I_D)$



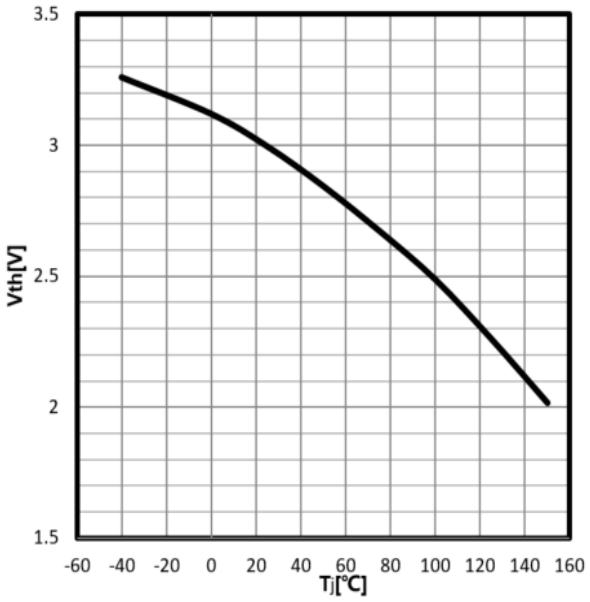

**Typ. transfer characteristics**
$I_D=f(V_{GS})$



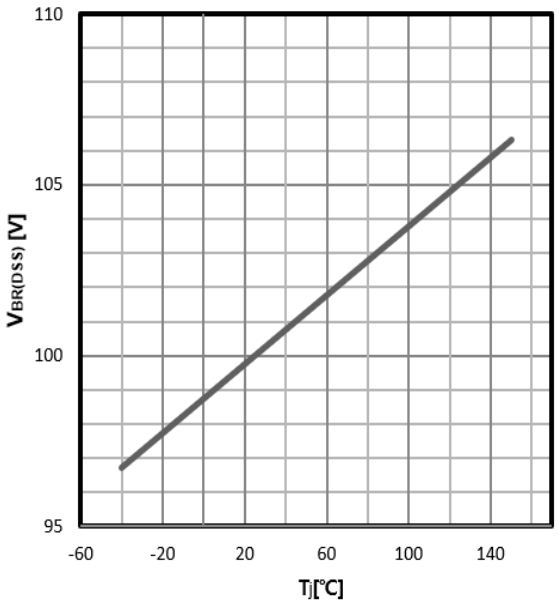

**Drain-source on-state resistance**
$R_{DS(on)}=f(T_j);I_D=20A;\ V_{GS}=10V$



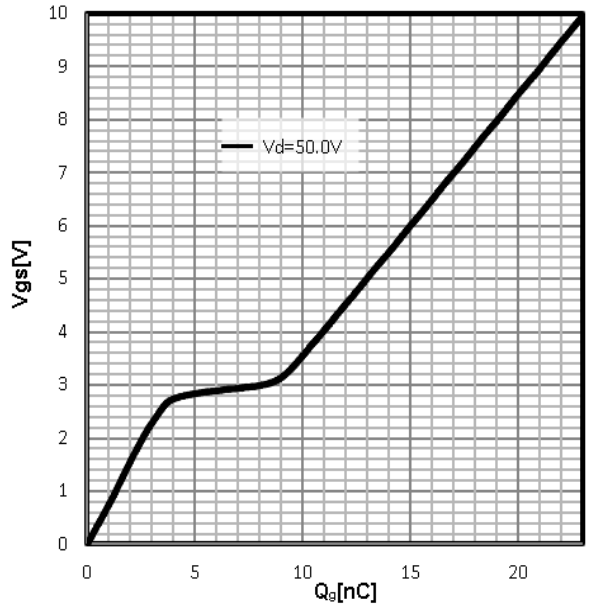
**Gate Threshold Voltage**
$V_{TH}=f(T_j)$; $I_D=250uA$



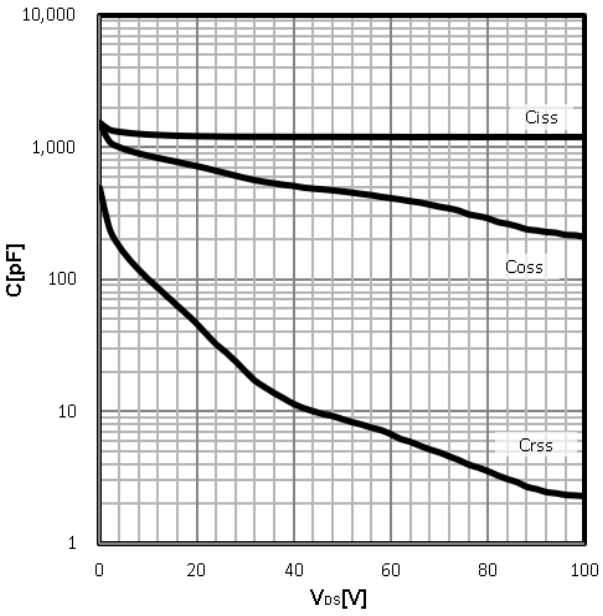

**Drain-source breakdown voltage**
$V_{BR(DSS)}=f(T_j)$; $I_D=250uA$




**Typ. gate charge**
$V_{GS}=f(Q_g)$ ; $I_D=10A$

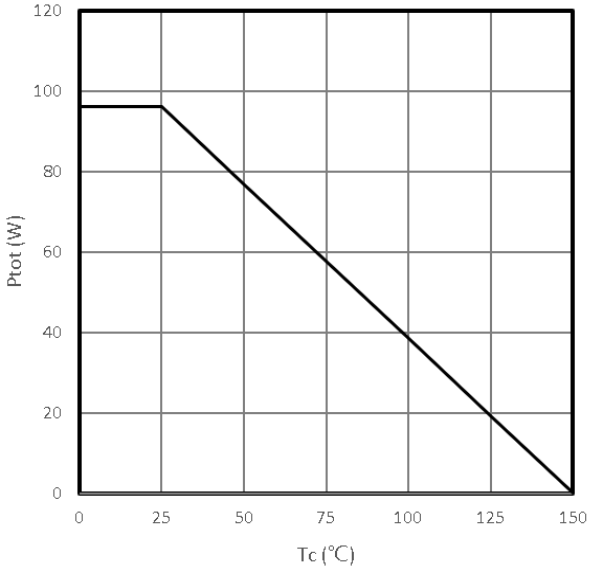



**Typ. capacitances**
$C=f(V_{DS})$; $V_{GS}=0V$; $f=1MHz$



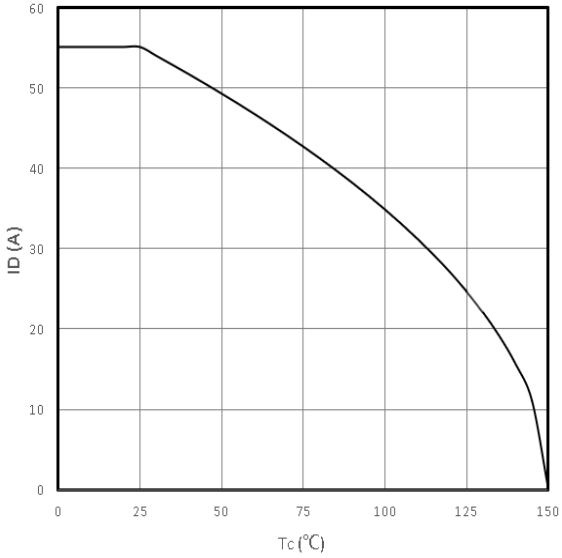
**Power Dissipation**

$P_{tot}=f(T_C)$



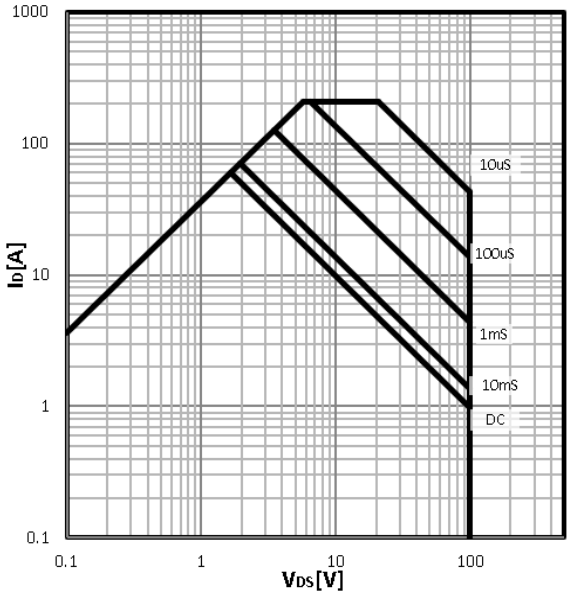

**Maximum Drain Current**

$I_D=f(T_C)$



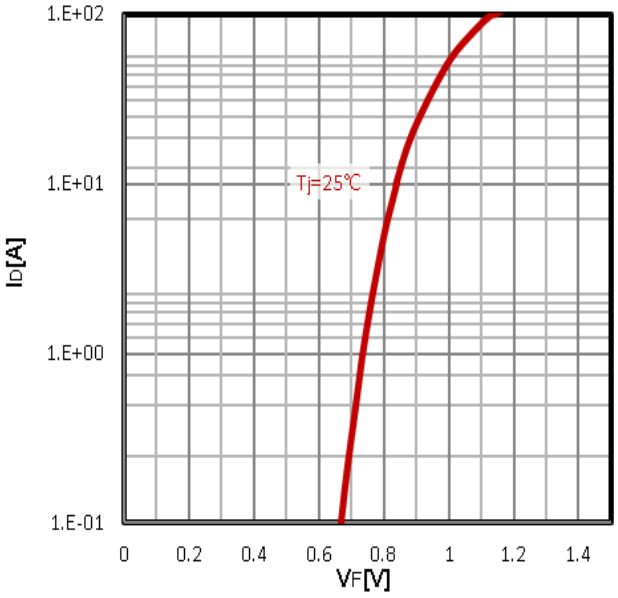

**Safe operating area**

$I_D=f(V_{DS})$



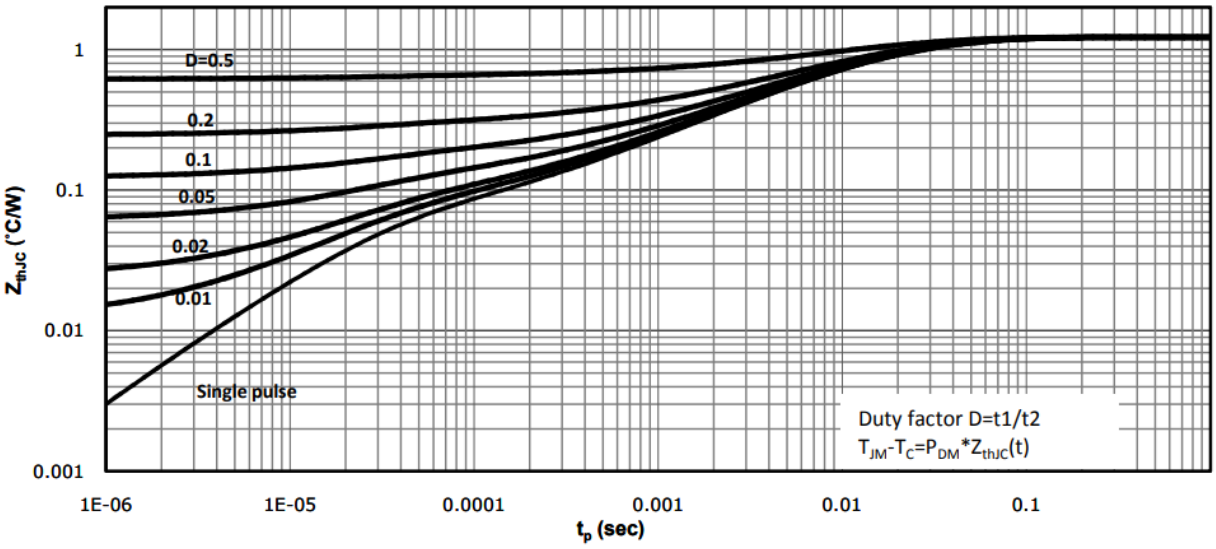

**Body Diode Forward Voltage Variation**

$I_F=f(V_{GS})$

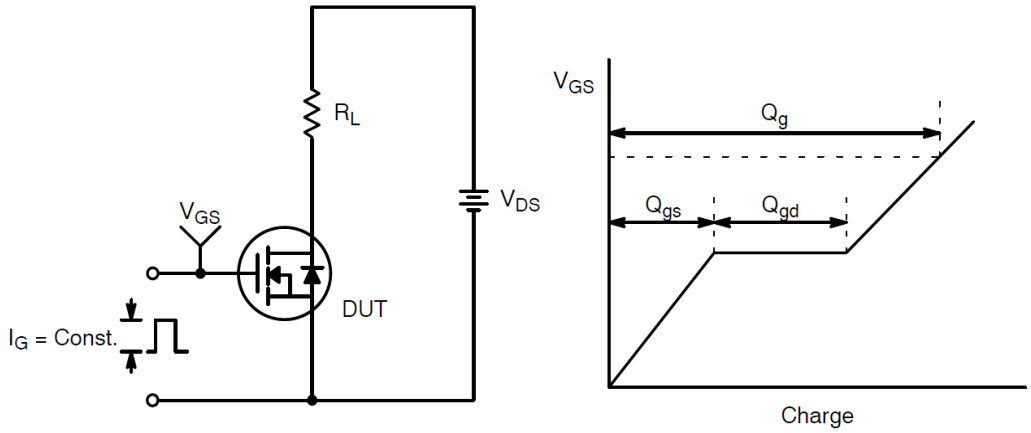


**Max. transient thermal impedance**

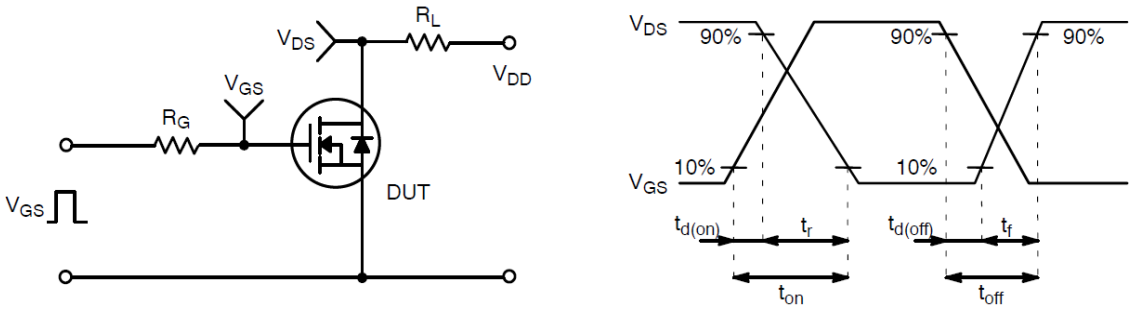
$Z_{thJC}=f(t_p)$



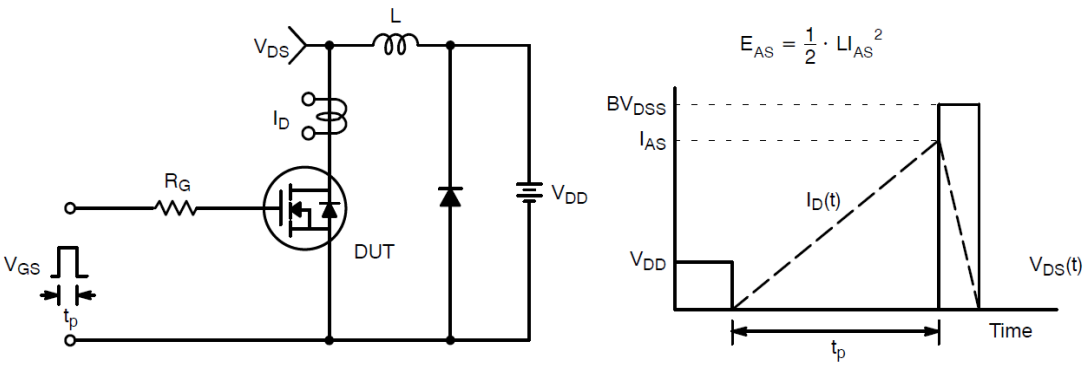
## Test Circuit and Waveform:




**Gate Charge Test Circuit & Waveform**

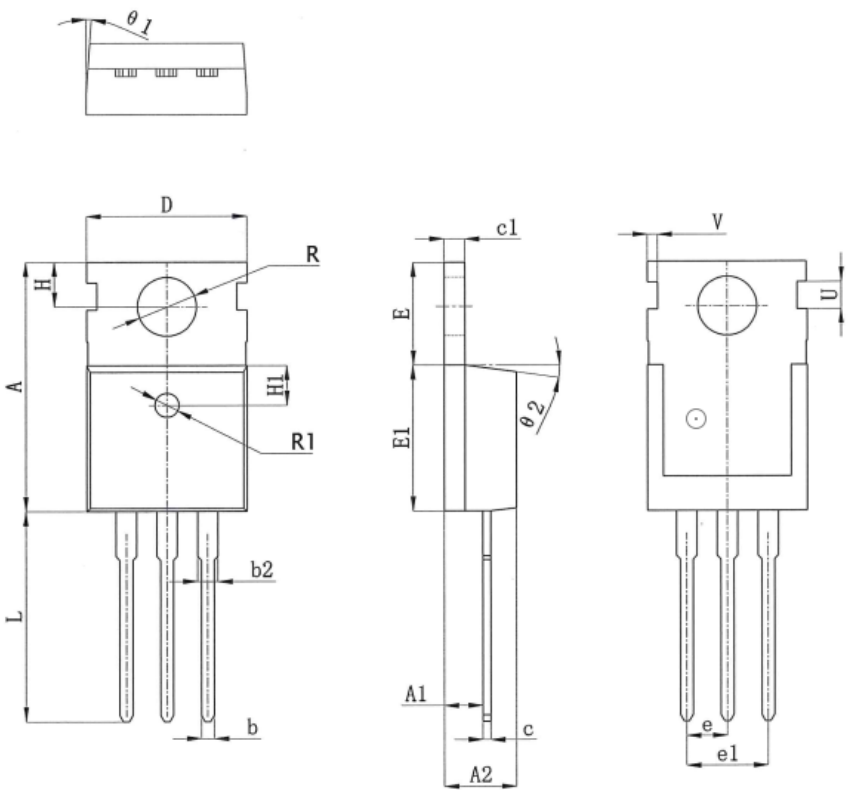



**Resistive Switching Test Circuit & Waveforms**

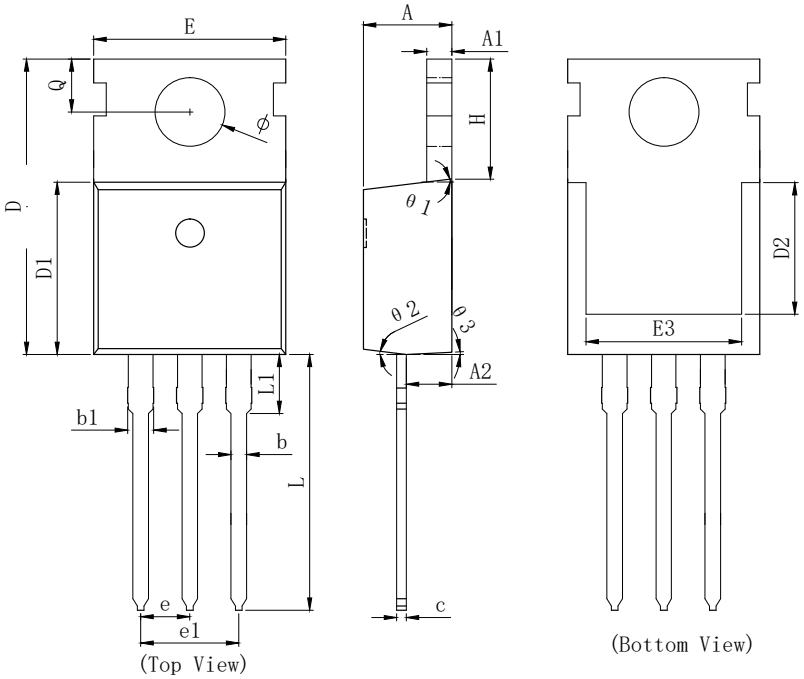



**Unclamped Inductive Switching Test Circuit & Waveforms**

# TO-220 PACKAGE INFORMATION




| SYMBOL | MILLIMETER | | |
|---|---|---|---|
| | MIN | NOM | 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 |
| θ1 | 2° | 2.5° | 3° |
| θ2 | 6.5° | 7° | 7.5° |




| 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 | 6.750 |
| Φ | 3.400 | 3.600 | 3.800 |
| Q | 2.600 | 2.800 | 3.000 |
| θ1 | 7° TYP | | |
| θ2 | 7° TYP | | |
| θ3 | 3° TYP | | |

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This document is the second version issued on June 10th, 2023. This document replaces all previously provided information.