

● General Description

The AGM609F 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

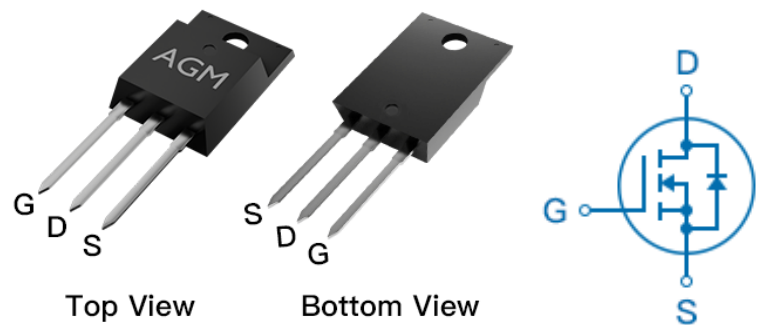
● Application

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

Product Summary

| BVDSS | RDSON | ID |
|-------|-------|-----|
| 60V | 6.3mΩ | 80A |

TO-220F Pin Configuration



Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|---------|----------------|-----------|------------|----------|
| AGM609F | AGM609F | TO-220F | ---- | --- | 1000 |

Table 1. Absolute Maximum Ratings (TC=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) (Note 1) | 80 | A |
| | Drain Current-Continuous(Tc=100°C) | 48 | A |
| IDM (pluse) | Drain Current-Pulsed (Note 2) | 320 | A |
| PD | Maximum Power Dissipation(Tc=25°C) | 62.5 | w |
| | Maximum Power Dissipation(Tc=100°C) | 25 | w |
| EAS | Avalanche energy (Note 3) | 110 | 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) ¹ | --- | 60 | °C/W |
| RθJC | Thermal Resistance Junction-Case ¹ | --- | 2.0 | °C/W |

Table 3. Electrical Characteristics (T_J=25°C unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|----------------------------------|-------------------------------------|-----|------|------|------|
| On/Off States | | | | | | |
| BVDSS | Drain-Source Breakdown Voltage | VGS=0V ID=250μA | 60 | -- | -- | 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 | 1.2 | 1.7 | 2.2 | V |
| gFS | Forward Transconductance | VDS=5V,ID=15A | -- | 23 | -- | S |
| RDS(on) | Drain-Source On-State Resistance | VGS=10V, ID=20A | -- | 6.3 | 8.5 | mΩ |
| | | VGS=4.5V, ID=15A | -- | 8.0 | 12.5 | mΩ |
| Dynamic Characteristics | | | | | | |
| Ciss | Input Capacitance | VDS=30V,VGS=0V, F=100MHZ | -- | 1481 | -- | pF |
| Coss | Output Capacitance | | -- | 442 | -- | pF |
| Crss | Reverse Transfer Capacitance | | -- | 18 | -- | pF |
| Rg | Gate resistance | VGS=0V, VDS=0V,f=1.0MHz | -- | 1.2 | -- | Ω |
| Switching Times | | | | | | |
| td(on) | Turn-on Delay Time | VGS=10V,VDS=30V, RL=1.5Ω,RGEN=3Ω | -- | 7.5 | -- | nS |
| tr | Turn-on Rise Time | | -- | 5.5 | -- | nS |
| td(off) | Turn-Off Delay Time | | -- | 29.3 | -- | nS |
| tf | Turn-Off Fall Time | | -- | 5.9 | -- | nS |
| Qg | Total Gate Charge | VGS=10V, VDS=30V, ID=30A | -- | 52.1 | -- | nC |
| Qgs | Gate-Source Charge | | -- | 7.0 | -- | nC |
| Qgd | Gate-Drain Charge | | -- | 15.3 | -- | nC |
| Source-Drain Diode Characteristics | | | | | | |
| ISD | Source-Drain Current(Body Diode) | | -- | -- | 80 | A |
| VSD | Forward on Voltage | VGS=0V,IS=20A | -- | -- | 1.2 | V |
| trr | Reverse Recovery Time | IS=20A , dI/dt=100A/μs , TJ=25°C | -- | 26 | -- | ns |
| Qrr | Reverse Recovery Charge | | -- | 38 | -- | 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_J=25°C,VDD=30V,Vgs=10V,ID=21A, L=0.5mH,RG=25ohm

Fig.1 Gate-Charge Characteristics

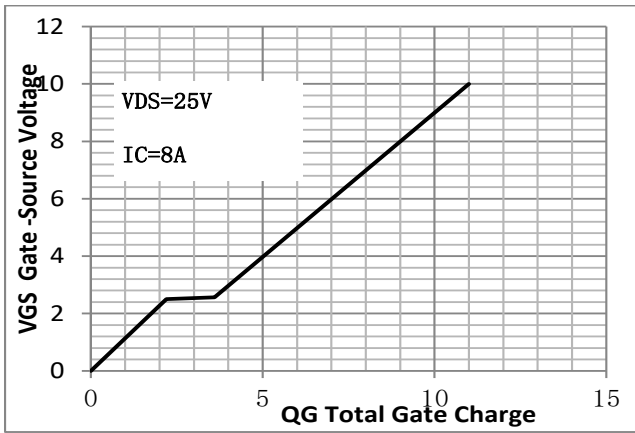


Fig.2 Capacitance Characteristics

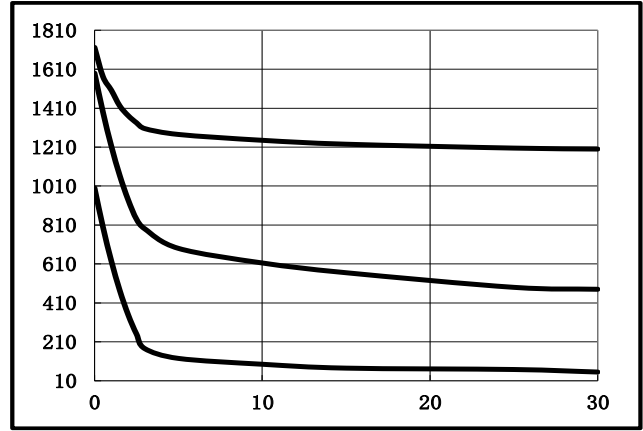


Fig.3 Power Dissipation

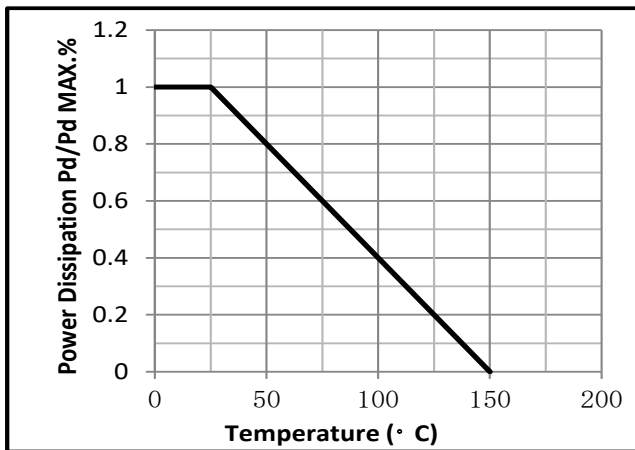


Fig.4 Typical output Characteristics

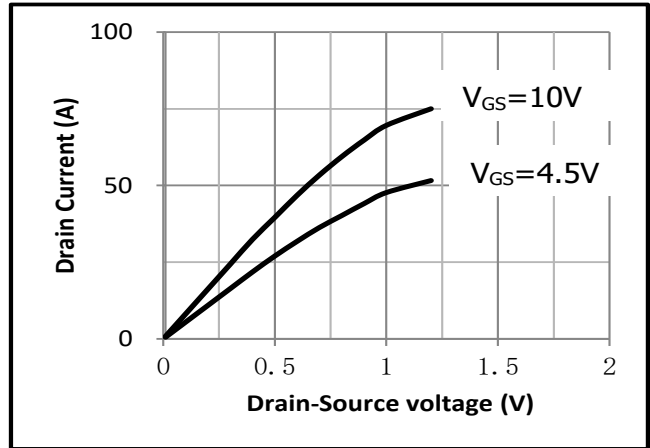


Fig.5 Threshold Voltage V.S Junction Temperature

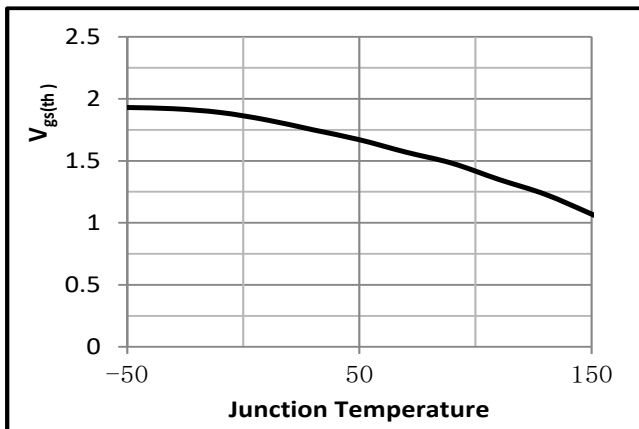


Fig.6 Resistance V.S Drain Current

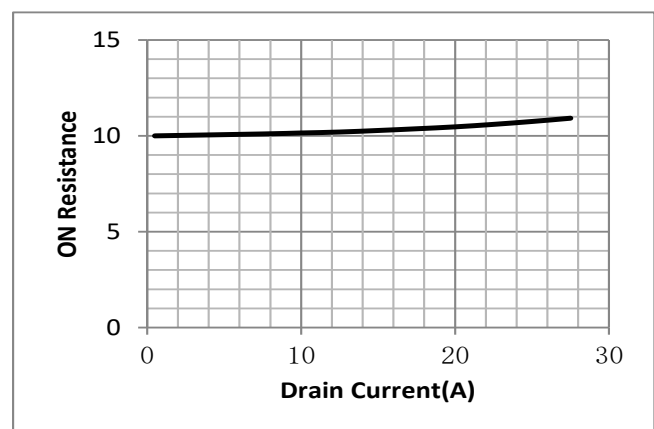


Fig.7 On-Resistance VS Gate Source Voltage

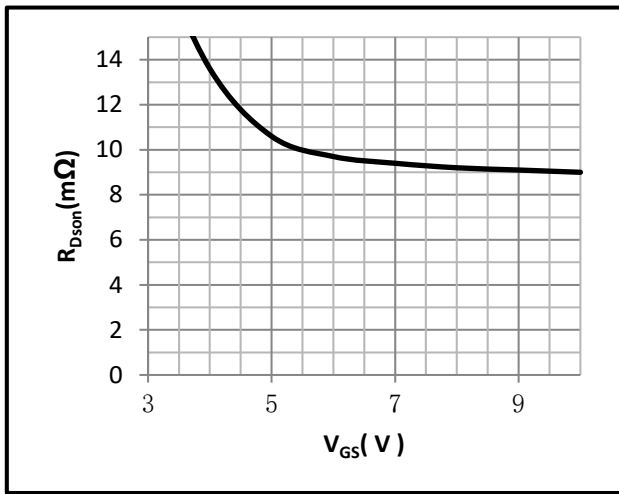


Fig.8 On-Resistance V.S Junction Temperature

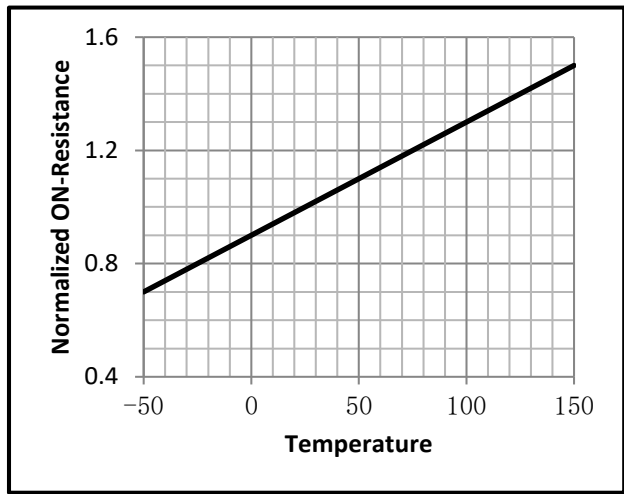


Fig.9 Switching Time Measurement Circuit

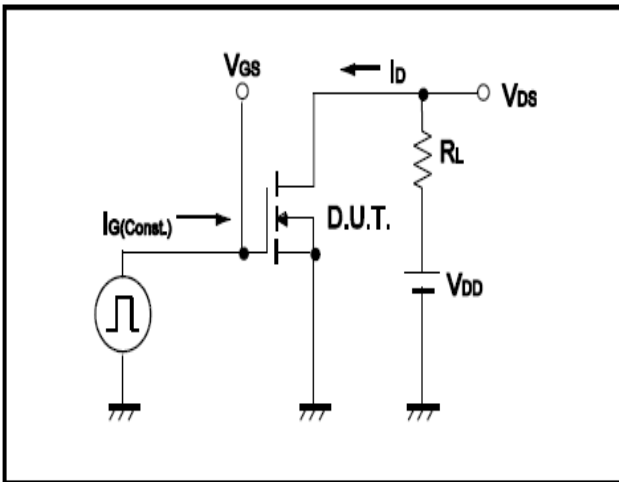


Fig.10 Gate Charge Waveform

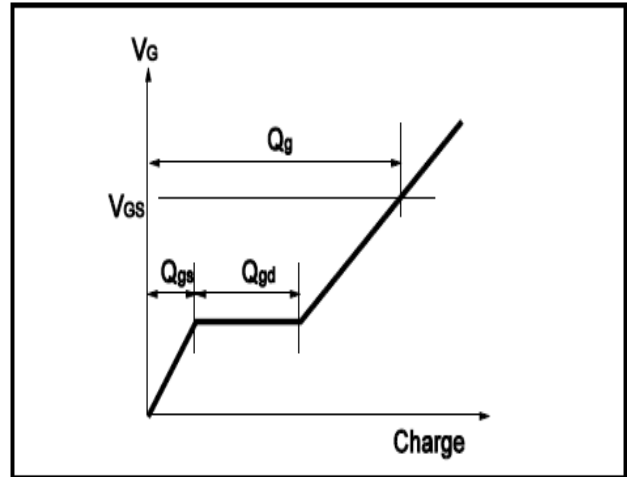


Fig.11 Switching Time Measurement Circuit

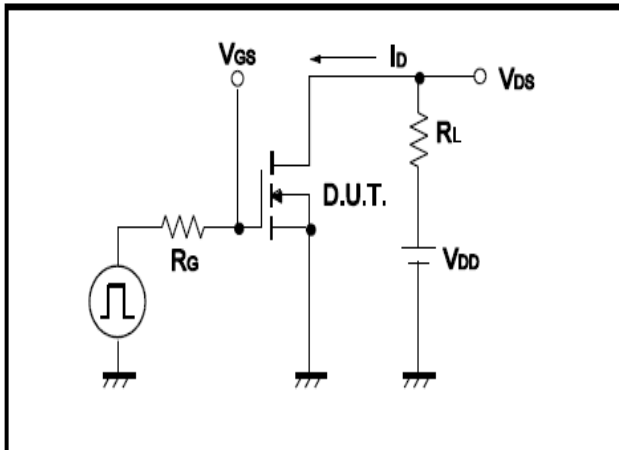
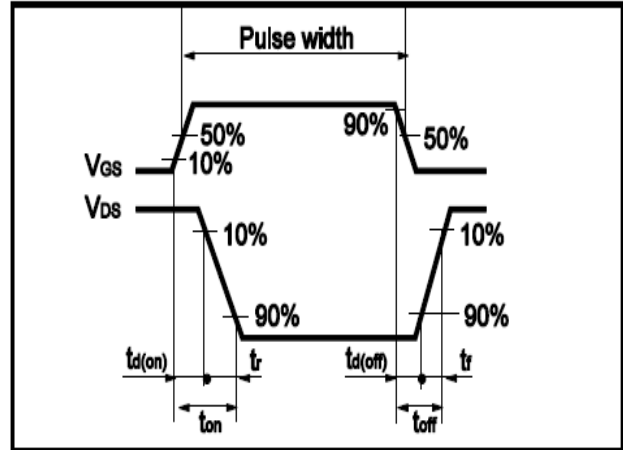


Fig.12 Gate Charge Waveform



Test Circuit

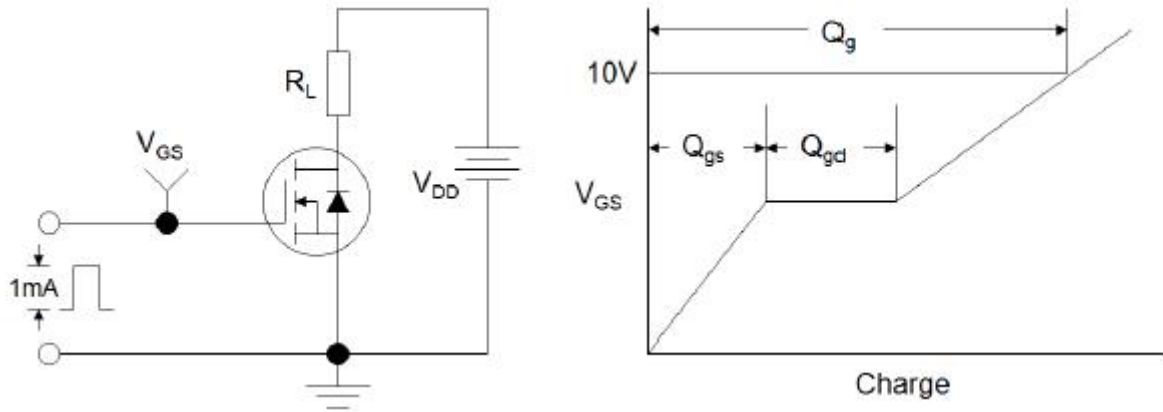


Figure1:Gate Charge Test Circuit & Waveform

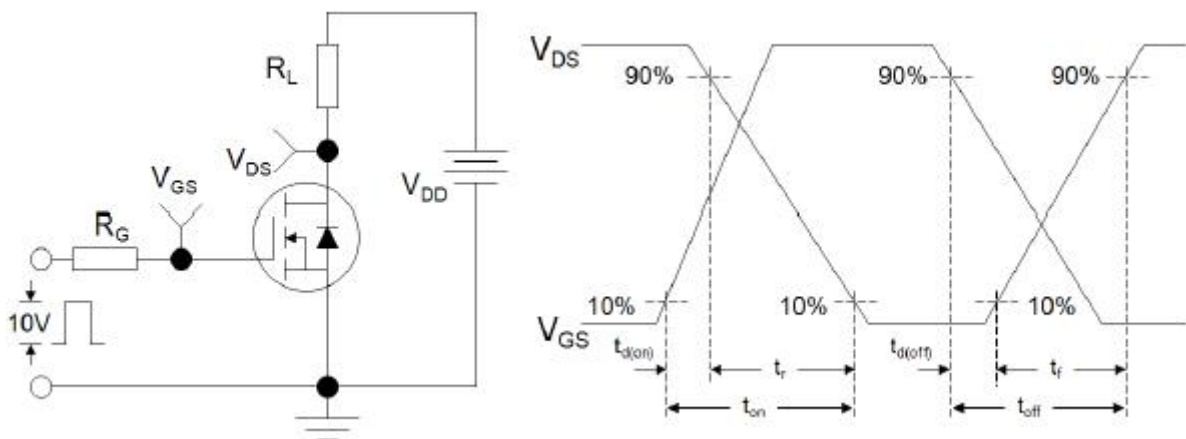


Figure 2: Resistive Switching Test Circuit & Waveforms

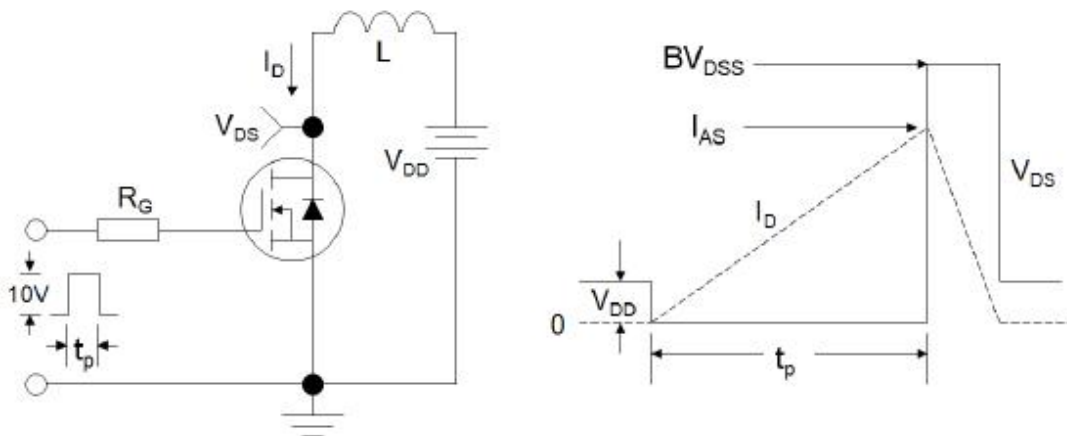
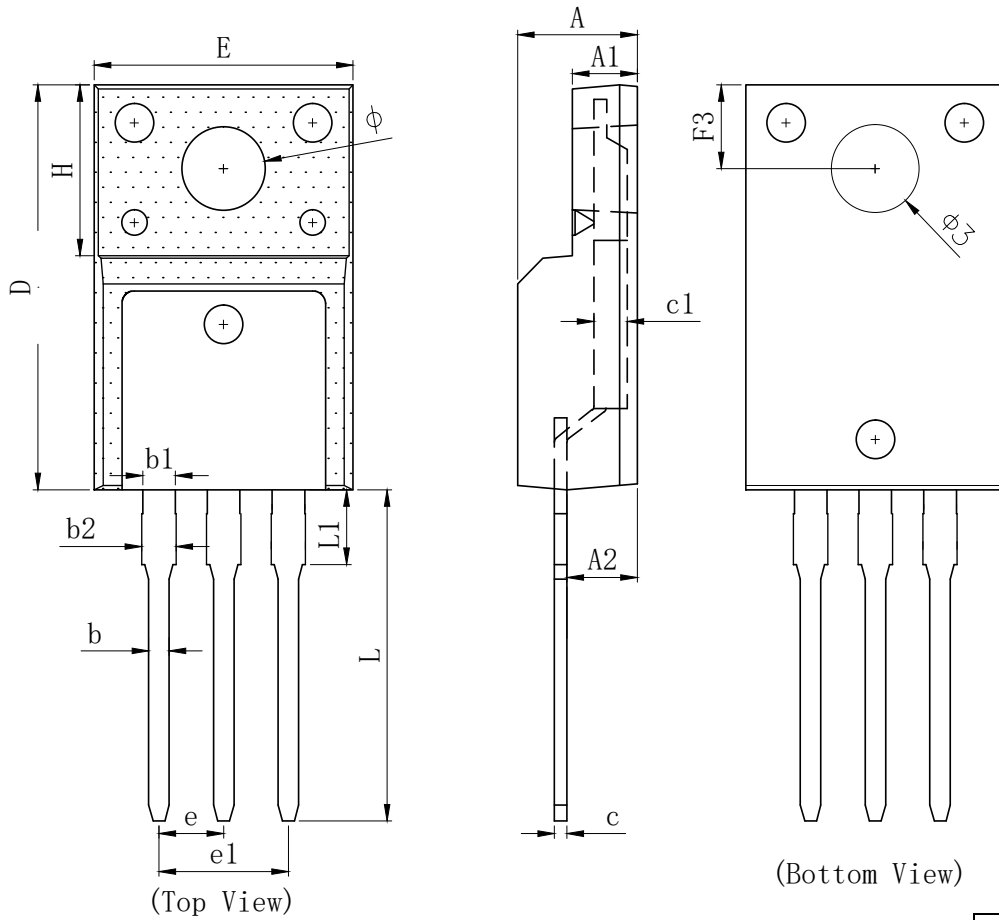
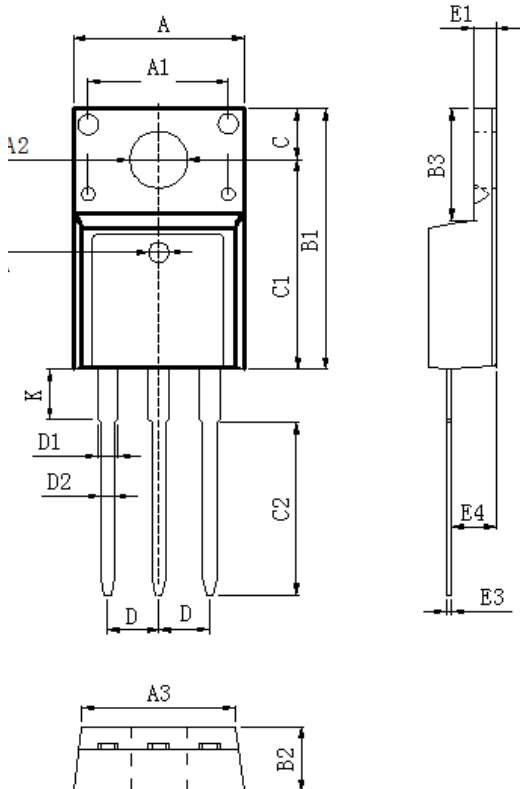


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

TO-220F Package Mechanical Data



| SYMBOL | MILLIMETER | | |
|--------|------------|--------|--------|
| | MIN | Typ. | MAX |
| A | 4.500 | 4.700 | 4.900 |
| A1 | 2.340 | 2.540 | 2.740 |
| A2 | 2.560 | 2.760 | 2.960 |
| b | 0.700 | 0.800 | 0.950 |
| b1 | 1.180 | 1.280 | 1.430 |
| b2 | 1.250 | 1.350 | 1.550 |
| c | 0.400 | 0.500 | 0.650 |
| c1 | 1.200 | 1.300 | 1.350 |
| D | 15.570 | 15.870 | 16.170 |
| H | 6.700 REF | | |
| E | 9.960 | 10.160 | 10.360 |
| e | 2.540 BSC | | |
| e1 | 5.080 BSC | | |
| L | 12.680 | 12.980 | 13.280 |
| L1 | 2.780 | 2.930 | 3.080 |
| F3 | 3.150 | 3.300 | 3.450 |
| φ | 3.030 | 3.180 | 3.450 |
| φ3 | 3.150 | 3.450 | 3.650 |



| DIM | MILLIMETERS |
|-----|-----------------|
| A | 10.16 ± 0.3 |
| A1 | 7.00 ± 0.1 |
| A2 | 3.3 ± 0.2 |
| A3 | 9.5 ± 0.2 |
| B1 | 15.87 ± 0.3 |
| B2 | 4.7 ± 0.2 |
| B3 | 6.68 ± 0.4 |
| C | 3.3 ± 0.2 |
| C1 | 12.57 ± 0.3 |
| C2 | 10.02 ± 0.5 |
| D | 2.54 ± 0.05 |
| D1 | 1.28 ± 0.2 |
| D2 | 0.8 ± 0.1 |
| K | 3.1 ± 0.3 |
| E1 | 2.54 ± 0.1 |
| E3 | 0.5 ± 0.1 |
| E4 | 2.76 ± 0.2 |
| DIA | ⊙1.5 (deep 0.2) |

Unit : mm


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