

## General Description

The AGM65R380F 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 test
- 100% DVDS tested

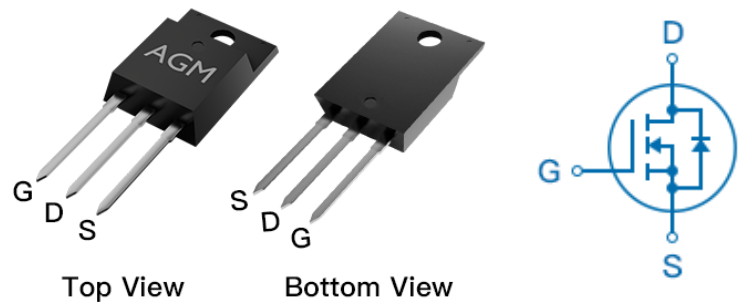
## Application

- Electronic Ballast
- Electronic Transformer
- Switch Mode Power Supply

## Product Summary

| BVDSS | RDSON | ID  |
|-------|-------|-----|
| 650V  | 0.34Ω | 14A |

## TO-220F Pin Configuration



## Package Marking and Ordering Information

| Device Marking | Device     | Device Package | Reel Size | Tape width | Quantity |
|----------------|------------|----------------|-----------|------------|----------|
| AGM65R380F     | AGM65R380F | TO-220F        | ---       | ---        | 1000     |

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

| Symbol      | Parameter                                        | Value      | Unit |
|-------------|--------------------------------------------------|------------|------|
| VDS         | Drain-Source Voltage (VGS=0V)                    | 650        | V    |
| VGS         | Gate-Source Voltage (VDS=0V)                     | ±20        | V    |
| ID          | Drain Current-Continuous(Tc=25°C) (Note 1)       | 14         | A    |
|             | Drain Current-Continuous(Tc=100°C)               | 9.0        | A    |
| IDM (pluse) | Drain Current-Pulsed (Note 2)                    | 56         | A    |
| PD          | Maximum Power Dissipation(Tc=25°C)               | 50         | w    |
|             | Maximum Power Dissipation(Tc=100°C)              | 20         | w    |
| EAS         | Avalanche energy (Note 3)                        | 20         | 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> | --- | 50  | °C/W |
| RθJC   | Thermal Resistance Junction-Case <sup>1</sup>                   | --- | 2.5 | °C/W |

**Table 3. 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                        | 650 | --   | --   | V    |
| IDSS                               | Zero Gate Voltage Drain Current  | VDS=650V,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 | 3.7  | 5.0  | V    |
| RDS(on)                            | Drain-Source On-State Resistance | VGS=10V, ID=5A                         | --  | 0.34 | 0.43 | Ω    |
| Dynamic Characteristics            |                                  |                                        |     |      |      |      |
| Ciss                               | Input Capacitance                | VDS=40V,<br>VGS=0V,<br>F=1MHZ          | --  | 703  | --   | pF   |
| Coss                               | Output Capacitance               |                                        | --  | 194  | --   | pF   |
| Crss                               | Reverse Transfer Capacitance     |                                        | --  | 4.5  | --   | pF   |
| Rg                                 | Gate resistance                  | VGS=0V,<br>VDS=0V,f=1.0MHz             | --  | 2.8  | --   | Ω    |
| Switching Times                    |                                  |                                        |     |      |      |      |
| td(on)                             | Turn-on Delay Time               | VDD=325V, VGS=10V,<br>ID=5A, RGEN=4.7Ω | --  | 13   | --   | nS   |
| tr                                 | Turn-on Rise Time                |                                        | --  | 6.0  | --   | nS   |
| td(off)                            | Turn-Off Delay Time              |                                        | --  | 52   | --   | nS   |
| tf                                 | Turn-Off Fall Time               |                                        | --  | 37   | --   | nS   |
| Qg                                 | Total Gate Charge                | VGS=10V,<br>VDS=520V, ID=5A            | --  | 24.5 | --   | nC   |
| Qgs                                | Gate-Source Charge               |                                        | --  | 3.8  | --   | nC   |
| Qgd                                | Gate-Drain Charge                |                                        | --  | 12.4 | --   | nC   |
| Source-Drain Diode Characteristics |                                  |                                        |     |      |      |      |
| ISD                                | Source-Drain Current(Body Diode) |                                        | --  | --   | 14   | A    |
| VSD                                | Forward on Voltage               | VGS=0V,ISD=10A                         | --  | 0.86 | 1.6  | V    |
| trr                                | Reverse Recovery Time            | VDD=50V,IF=5A ,                        | --  | 395  | --   | ns   |
| Qrr                                | Reverse Recovery Charge          | VGS=0V,dI/dt=100A/μs                   | --  | 4.8  | --   | 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

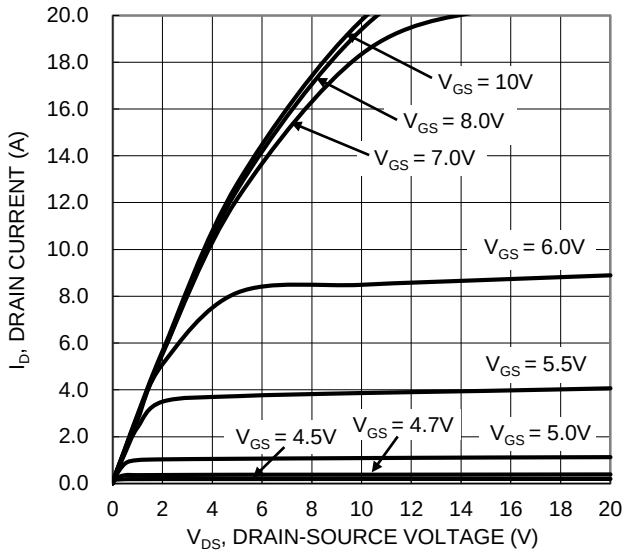


Figure 1. Typical Output Characteristic

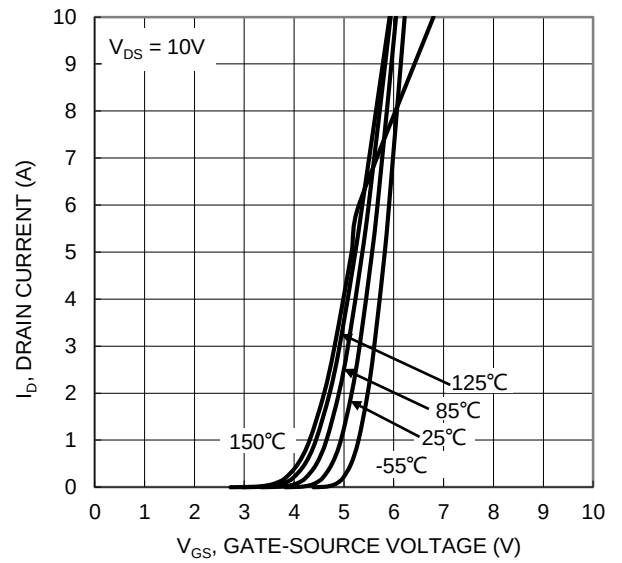


Figure 2. Typical Transfer Characteristic

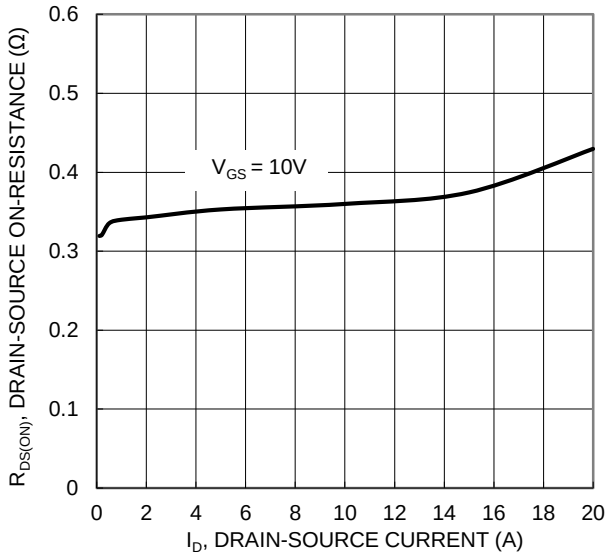


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

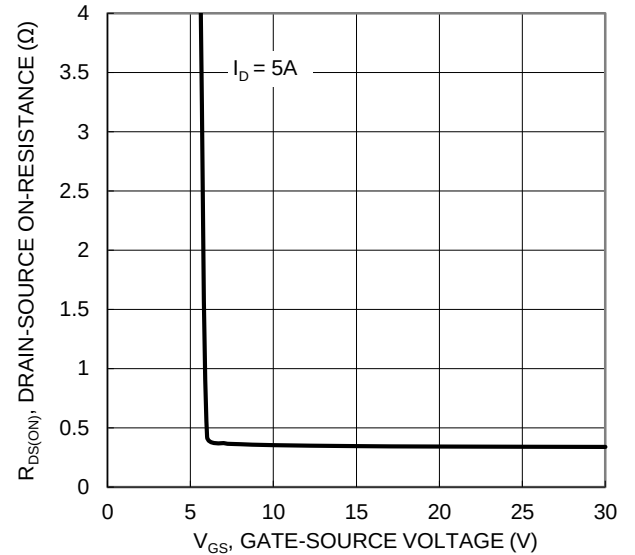


Figure 4. Typical Transfer Characteristic

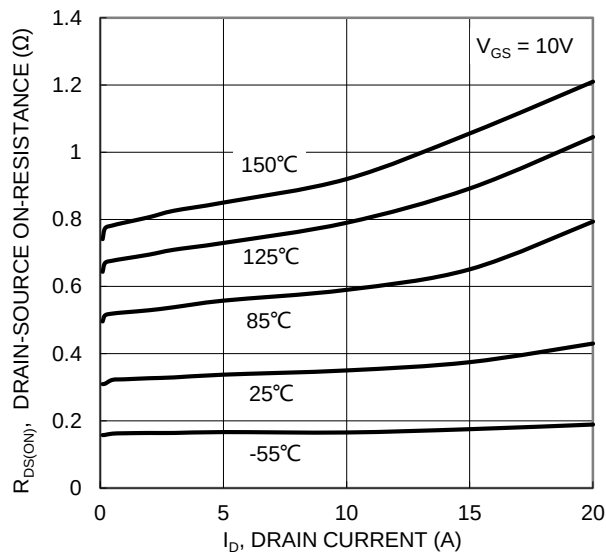


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

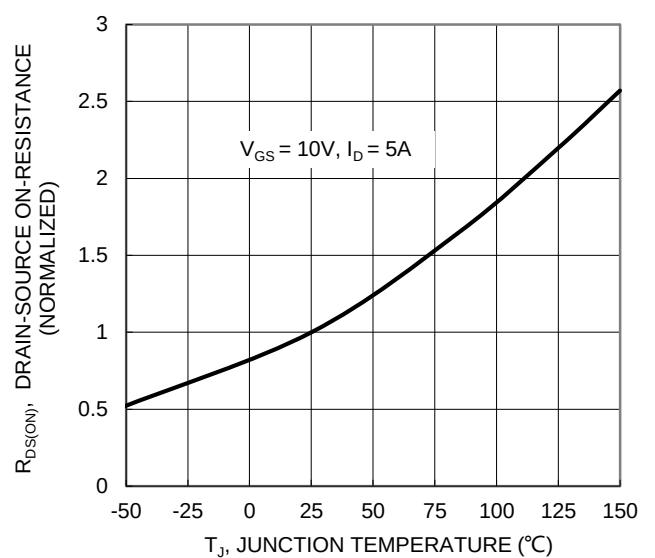


Figure 6. On-Resistance Variation with Junction Temperature

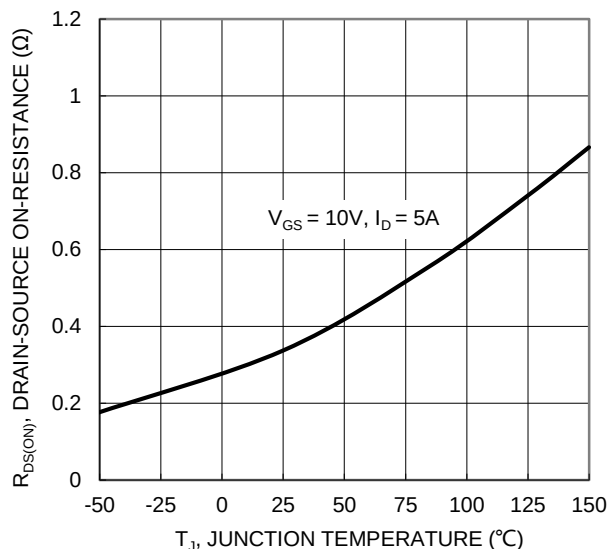


Figure 7. On-Resistance Variation with Junction Temperature

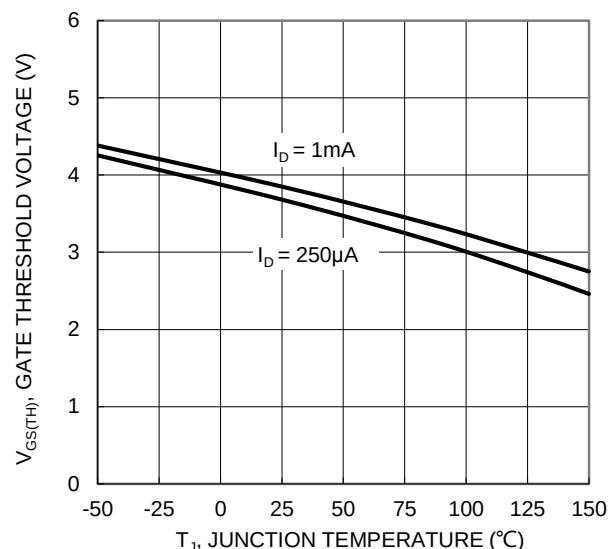


Figure 8. Gate Threshold Variation vs. Junction Temperature

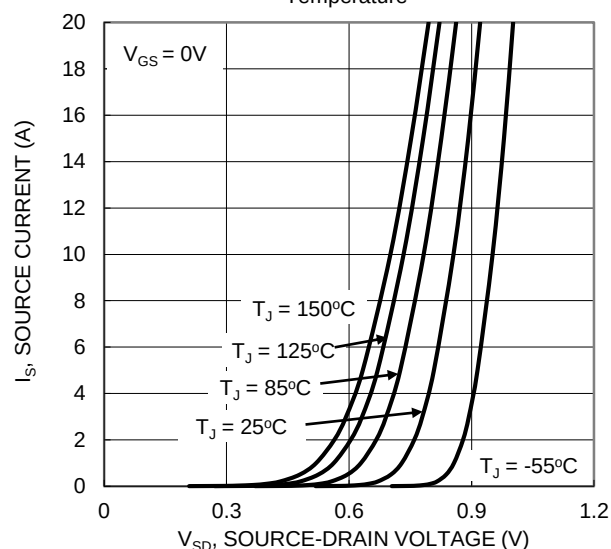


Figure 9. Diode Forward Voltage vs. Current

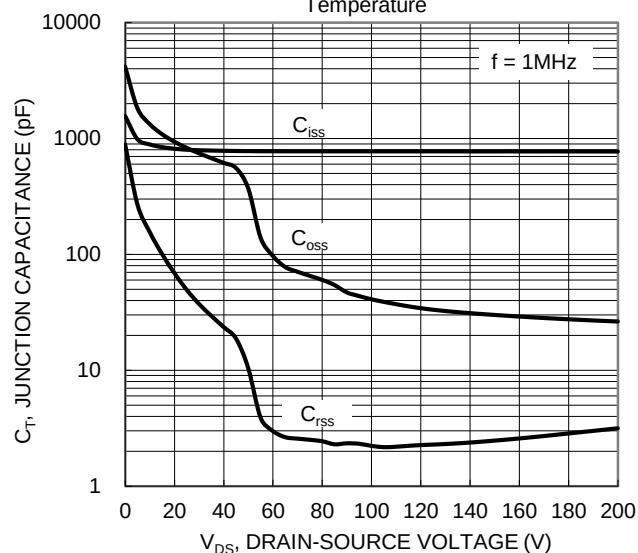


Figure 10. Typical Junction Capacitance

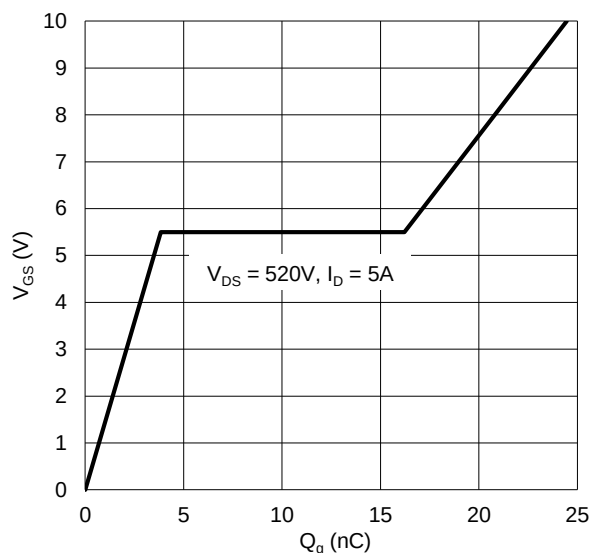


Figure 11. Gate Charge

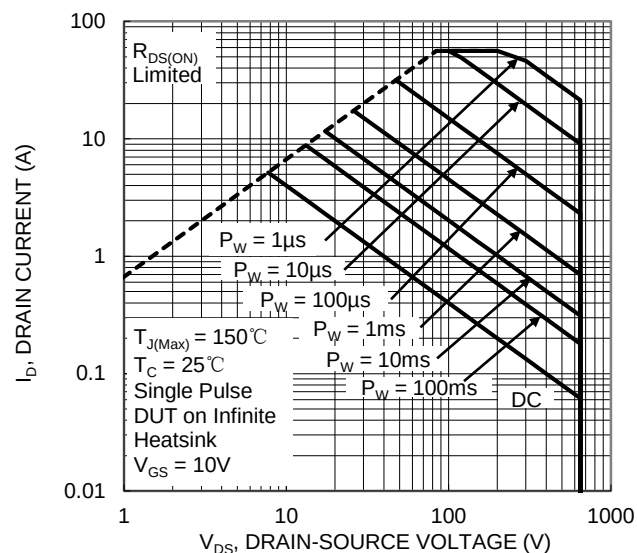


Figure 12. SOA, Safe Operation Area

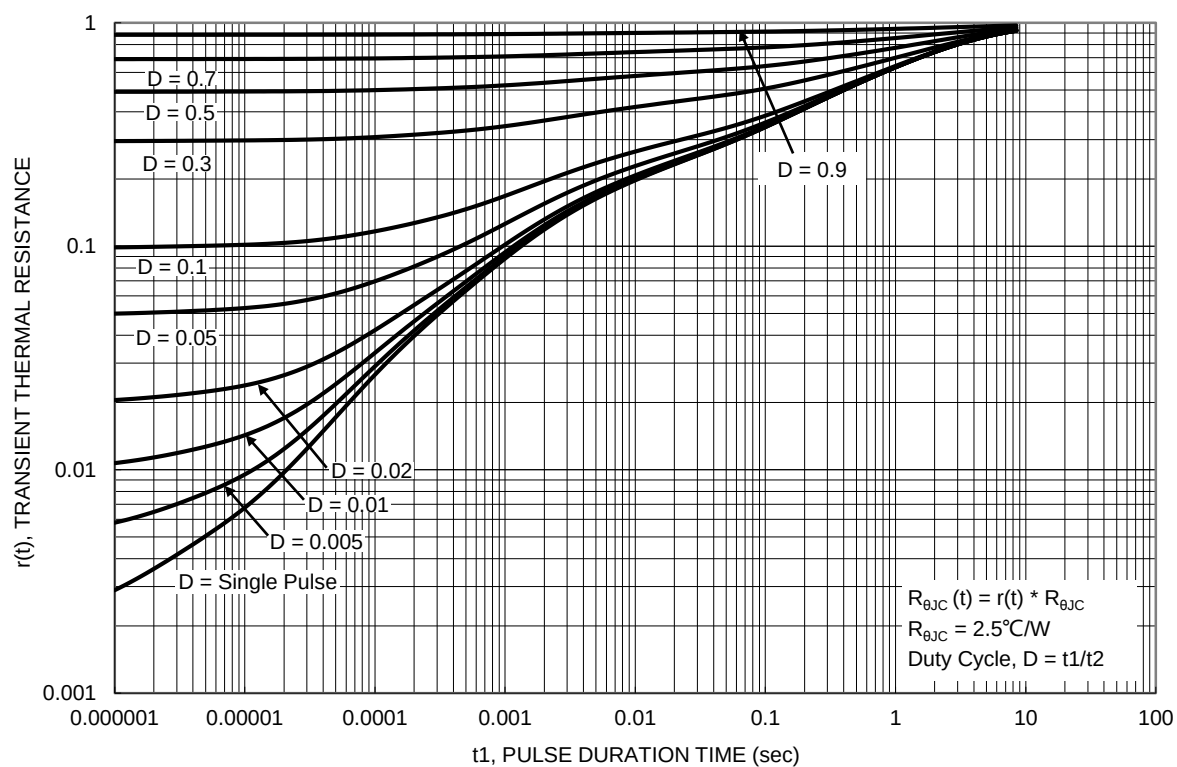
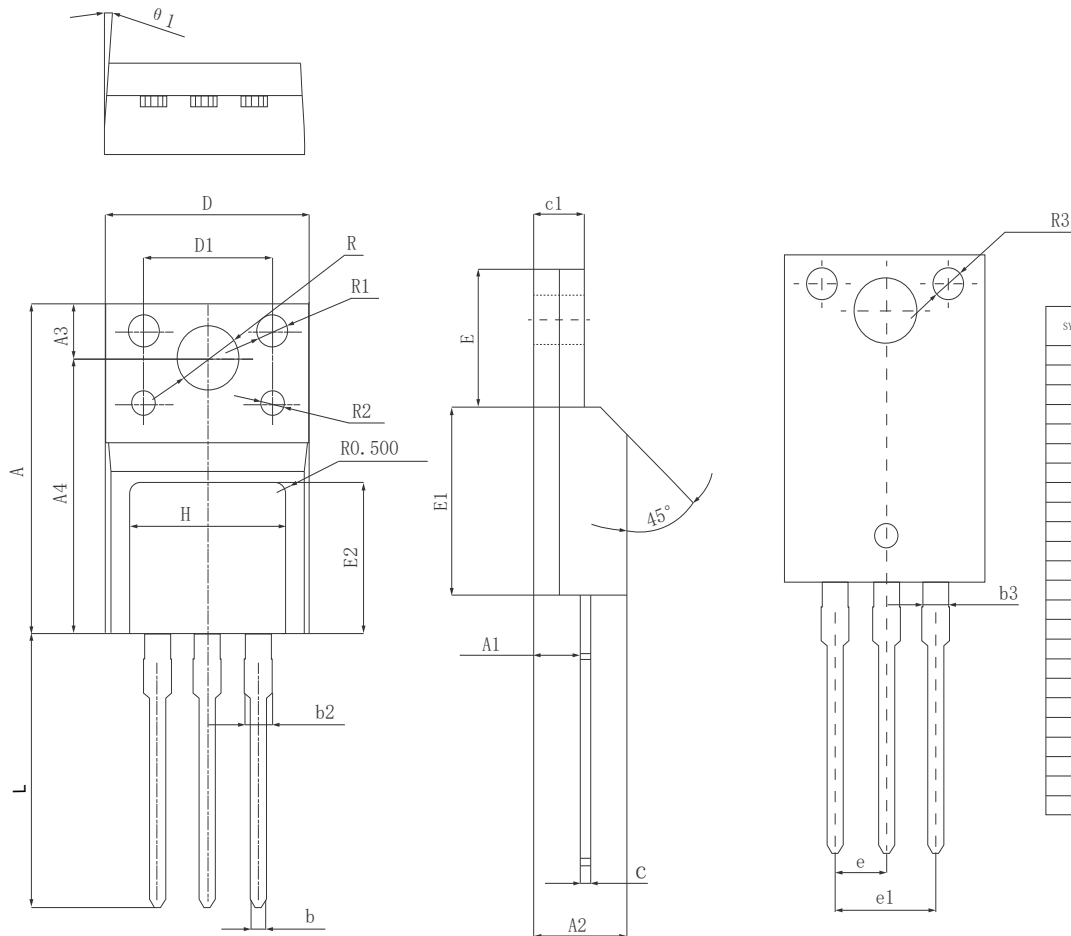
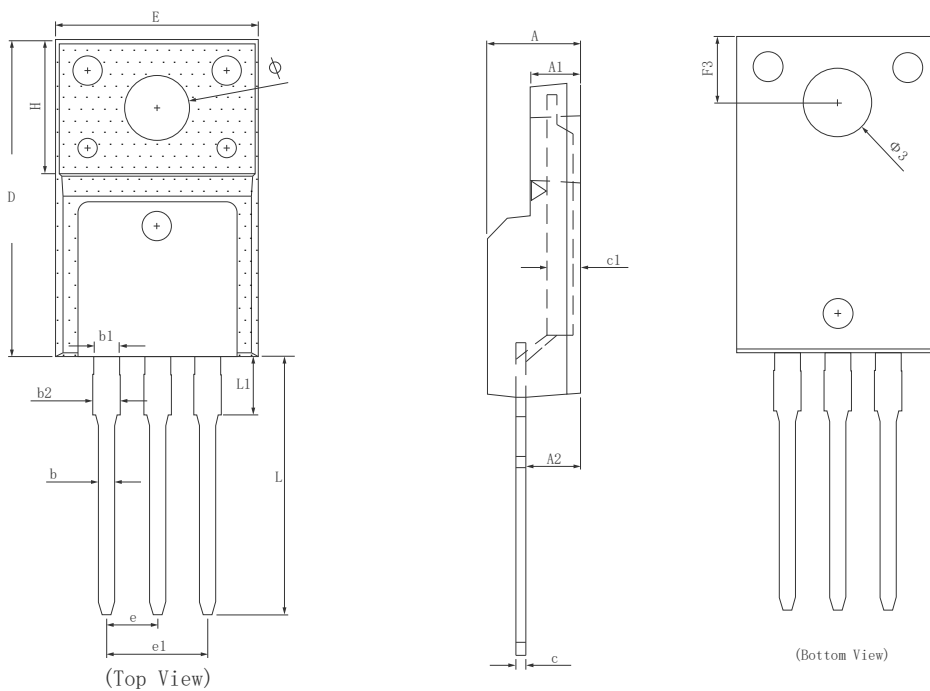


Figure 13. Transient Thermal Resistance

# Dimensions (TO-220F)



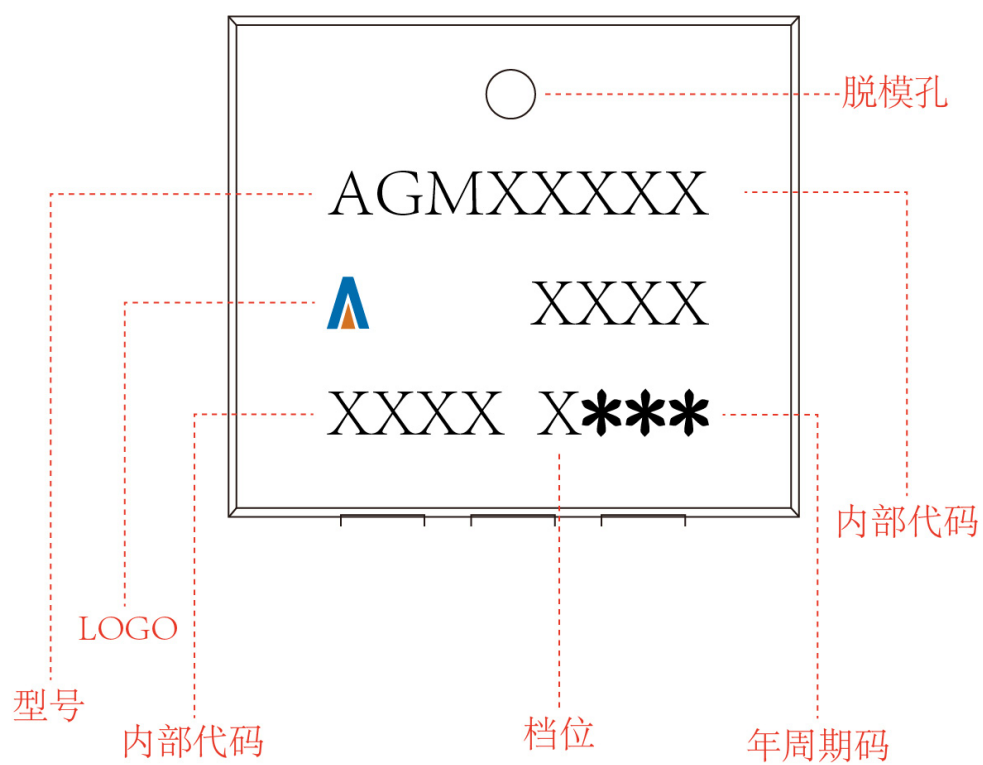
| SYMBOL | MILLIMETER |        |        |
|--------|------------|--------|--------|
|        | MIN        | NOM    | MAX    |
| A      | 15.670     | 15.870 | 16.070 |
| A1     | 2.150      | 2.350  | 2.550  |
| A2     | 4.500      | 4.700  | 4.900  |
| A3     | 3.100      | 3.300  | 3.500  |
| A4     | 12.270     | 12.570 | 12.870 |
| b      | 0.770      | 0.800  | 0.830  |
| b2     | 1.200      | 1.300  | 1.400  |
| b3     | 1.200BSC   |        |        |
| c      | 0.400      | 0.500  | 0.600  |
| c1     | 2.440      | 2.540  | 2.640  |
| D      | 9.860      | 10.160 | 10.460 |
| D1     | 6.900      | 7.000  | 7.100  |
| E      | 6.480      | 6.680  | 6.880  |
| E1     | 8.990      | 9.190  | 9.390  |
| E2     | 7.100      | 7.300  | 7.500  |
| e      | 2.540BSC   |        |        |
| e1     | 5.080BSC   |        |        |
| L      | 13.140     | 13.340 | 13.540 |
| R      | 3.100      | 3.300  | 3.500  |
| R1     | 1.500REF.  |        |        |
| R2     | 1.200REF.  |        |        |
| R3     | 1.500REF.  |        |        |
| H      | 7.600      | 7.800  | 8.000  |
| θ 1    | 4°         | 4.5°   | 5°     |



| 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  |

(注：全尺寸测量时c1不测)

### Marking Instructions:



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