

## General Description

The AGM3400E 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

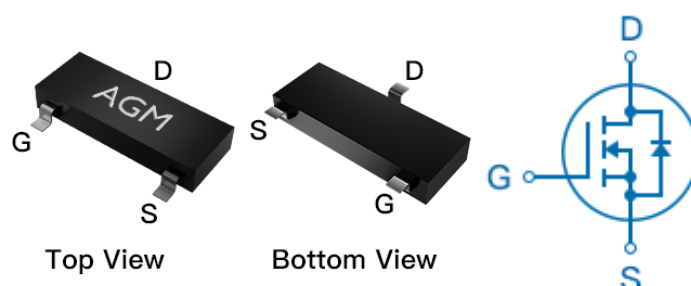
## Application

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

## Product Summary

| BVDSS | RDSON | ID   |
|-------|-------|------|
| 30V   | 20mΩ  | 5.8A |

## SOT23-3 Pin Configuration



## Package Marking and Ordering Information

| Device Marking | Device   | Device Package | Reel Size | Tape width | Quantity |
|----------------|----------|----------------|-----------|------------|----------|
| 3400           | AGM3400E | SOT23-3        | 178mm     | 8mm        | 3000     |

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

| Symbol      | Parameter                                         | Value      | Unit |
|-------------|---------------------------------------------------|------------|------|
| VDS         | Drain-Source Voltage (VGS=0V)                     | 30         | V    |
| VGS         | Gate-Source Voltage (VDS=0V)                      | ±12        | V    |
| ID          | Drain Current-Continuous(TA=25°C) <b>(Note 1)</b> | 5.6        | A    |
|             | Drain Current-Continuous(TA=70°C)                 | 4.5        | A    |
| IDM (pluse) | Drain Current-Pulsed <b>(Note 2)</b>              | 23         | A    |
| PD          | Maximum Power Dissipation(TA=25°C)                | 1.2        | w    |
|             | Maximum Power Dissipation(TA=70°C)                | 0.8        | w    |
| EAS         | Avalanche energy <b>(Note 3)</b>                  | 18         | 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> | --- | 104 | °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                     | 30  | --   | --   | V    |
| IDSS                               | Zero Gate Voltage Drain Current  | VDS=30V,VGS=0V                      | --  | --   | 1    | μA   |
| IGSS                               | Gate-Body Leakage Current        | VGS=±12V,VDS=0V                     | --  | --   | ±100 | nA   |
| VGS(th)                            | Gate Threshold Voltage           | VDS=VGS,ID=250μA                    | 0.5 | 0.9  | 1.3  | V    |
| gfs                                | Forward Transconductance         | VDS=5V,ID=3A                        | --  | 2    | --   | S    |
| RDS(on)                            | Drain-Source On-State Resistance | VGS=10V, ID=4A                      | --  | 20   | 25   | mΩ   |
|                                    |                                  | VGS=4.5V, ID=3A                     | --  | 22   | 31   | mΩ   |
|                                    |                                  | VGS=2.5V, ID=2A                     | --  | 27   | 45   | mΩ   |
| Dynamic Characteristics            |                                  |                                     |     |      |      |      |
| Ciss                               | Input Capacitance                | VDS=15V,VGS=0V,<br>F=1MHZ           | --  | 780  | --   | pF   |
| Coss                               | Output Capacitance               |                                     | --  | 229  | --   | pF   |
| Crss                               | Reverse Transfer Capacitance     |                                     | --  | 167  | --   | pF   |
| Rg                                 | Gate resistance                  | VGS=0V,<br>VDS=0V,f=1.0MHz          | --  | 8.1  | --   | Ω    |
| Switching Times                    |                                  |                                     |     |      |      |      |
| td(on)                             | Turn-on Delay Time               | VGS=10V,VDS=15V,<br>RGEN=3Ω,ID=5.6A | --  | 4.4  | --   | nS   |
| tr                                 | Turn-on Rise Time                |                                     | --  | 28   | --   | nS   |
| td(off)                            | Turn-Off Delay Time              |                                     | --  | 16   | --   | nS   |
| tf                                 | Turn-Off Fall Time               |                                     | --  | 26   | --   | nS   |
| Qg                                 | Total Gate Charge                | VGS=10V, VDS=15V,<br>ID=5.6A        | --  | 17   | --   | nC   |
| Qgs                                | Gate-Source Charge               |                                     | --  | 2.1  | --   | nC   |
| Qgd                                | Gate-Drain Charge                |                                     | --  | 2.0  | --   | nC   |
| Source-Drain Diode Characteristics |                                  |                                     |     |      |      |      |
| ISD                                | Source-Drain Current(Body Diode) |                                     | --  | --   | 5.8  | A    |
| VSD                                | Forward on Voltage               | VGS=0V,IS=4A                        | --  | --   | 1.2  | V    |
| trr                                | Reverse Recovery Time            | IF=4A , dI/dt=100A/μs ,             | --  | 1.1  | --   | ns   |
| Qrr                                | Reverse Recovery Charge          | TJ=25℃                              | --  | 13.1 | --   | 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, V<sub>DD</sub>=15V, V<sub>gs</sub>=10V, I<sub>D</sub>=19A, L=0.1mH, R<sub>G</sub>=25ohm

## ■ Typical Performance Characteristics

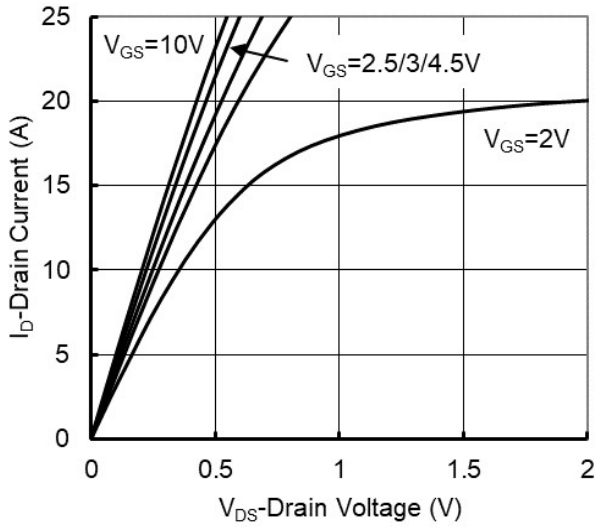


Figure1. Output Characteristics

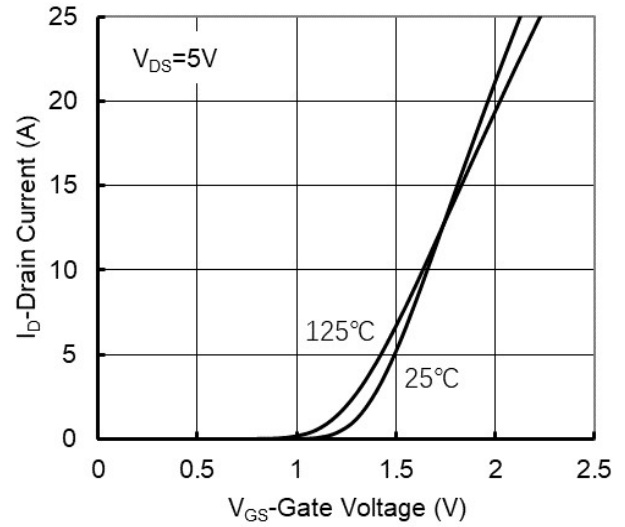


Figure2. Transfer Characteristics

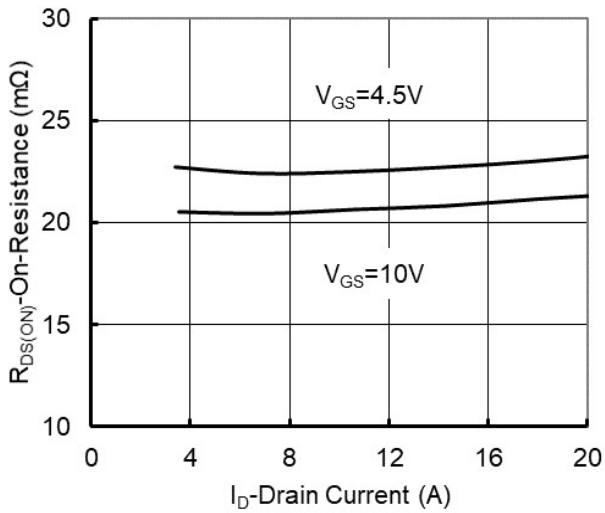


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

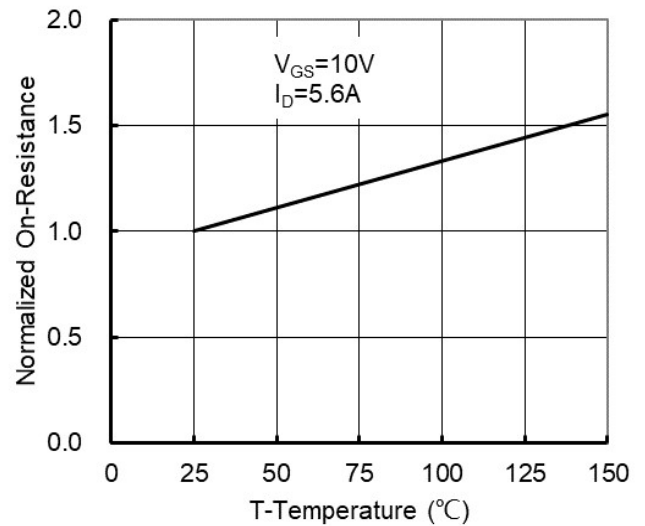


Figure 4: On-Resistance vs. Junction Temperature

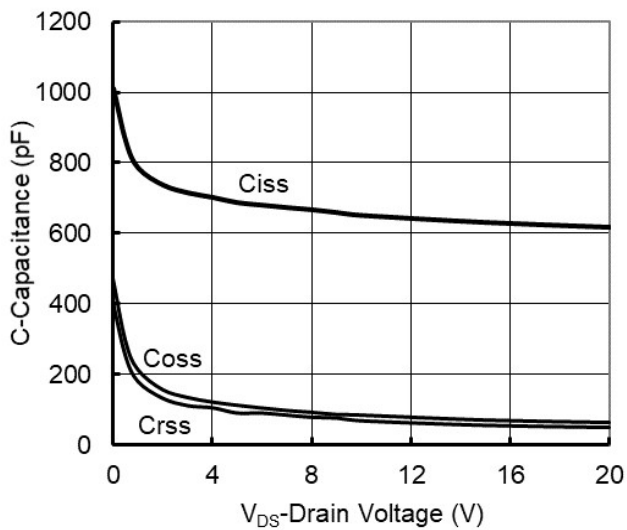


Figure5. Capacitance Characteristics

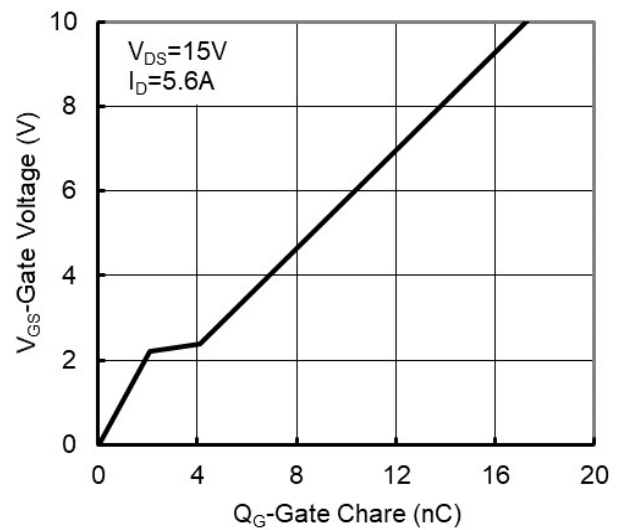


Figure6. Gate Charge

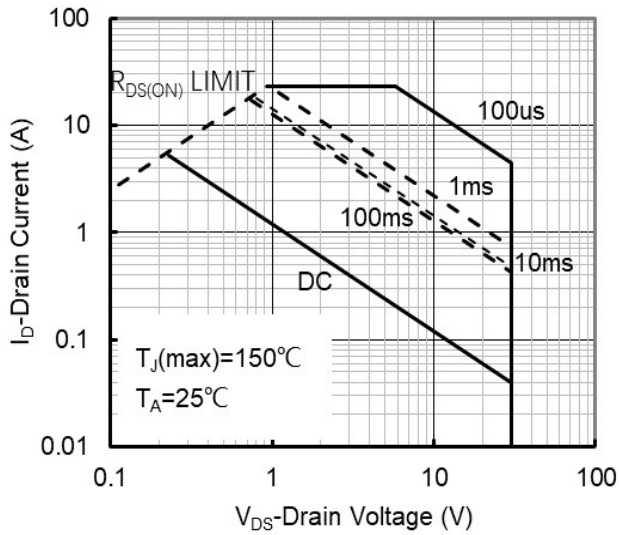


Figure7. Safe Operation Area

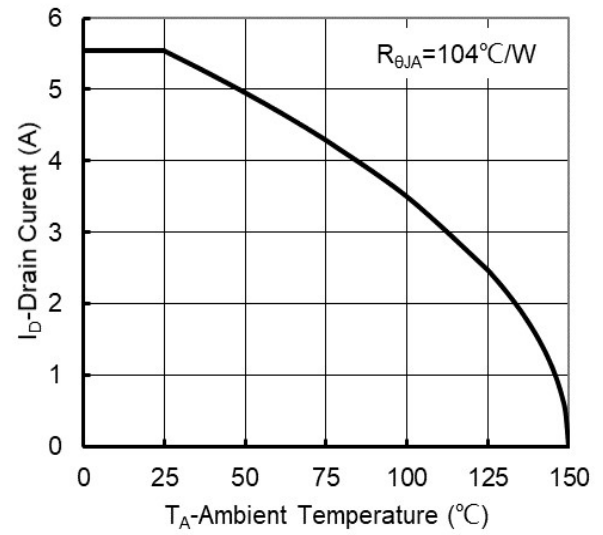


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

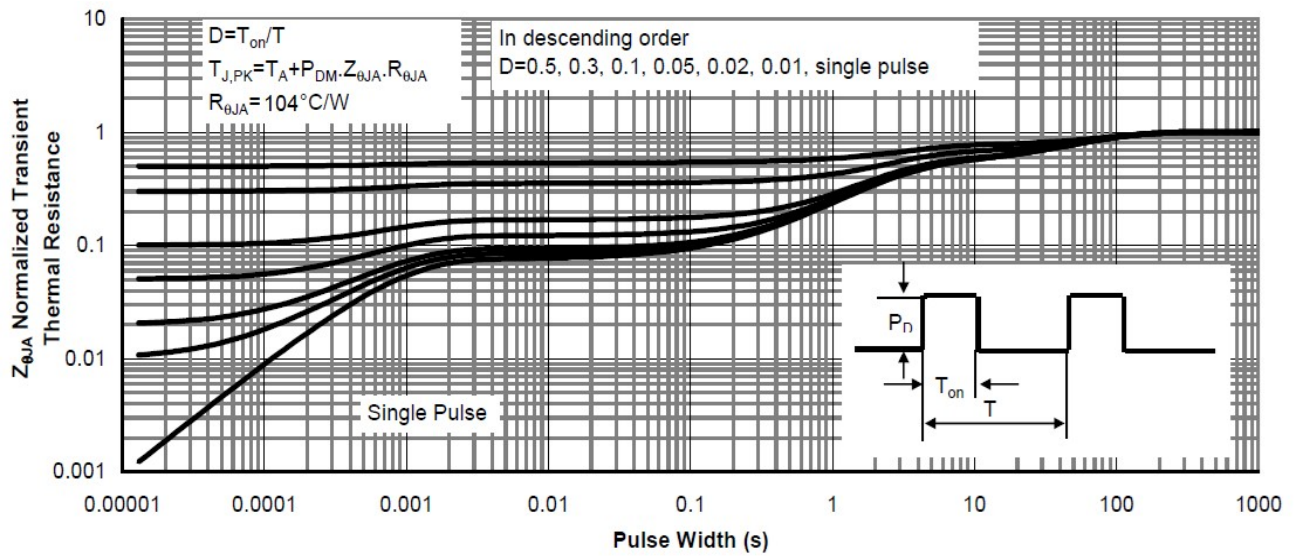
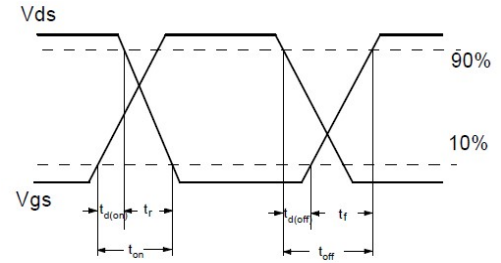
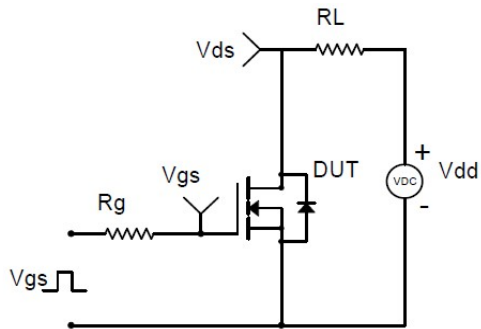
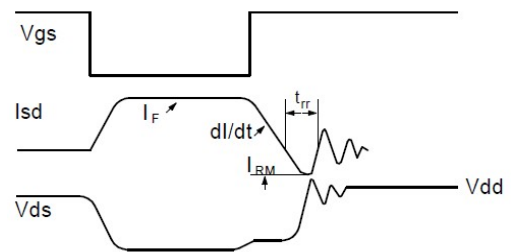
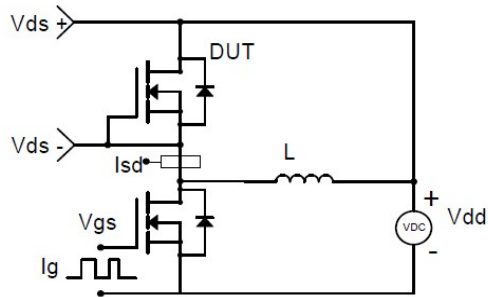
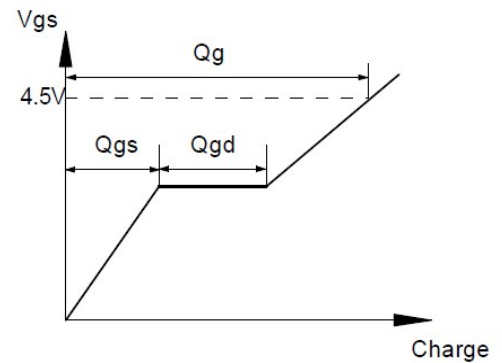
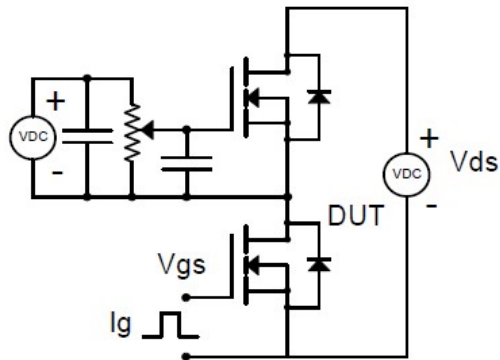
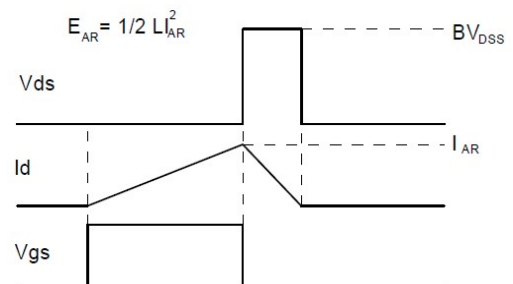
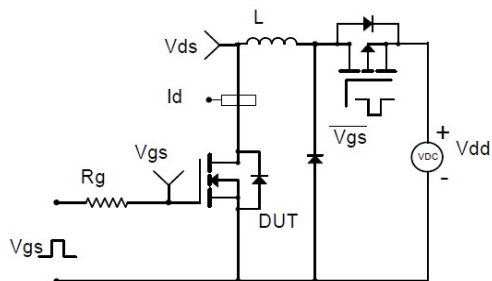
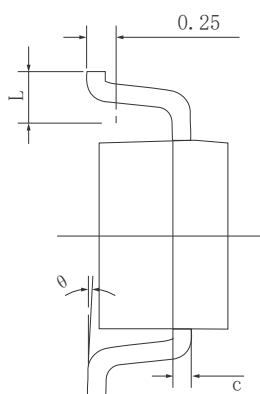
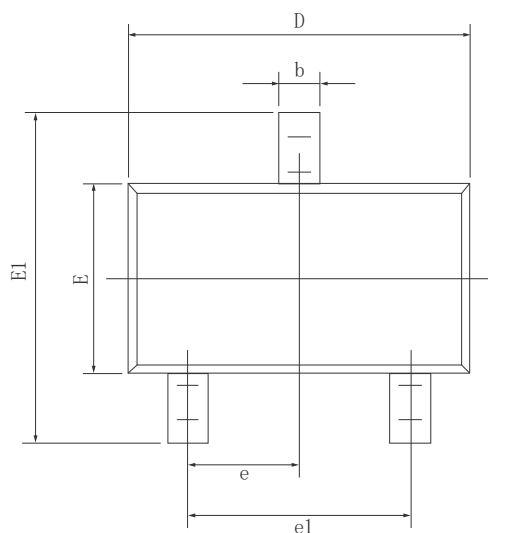


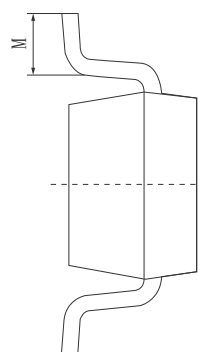
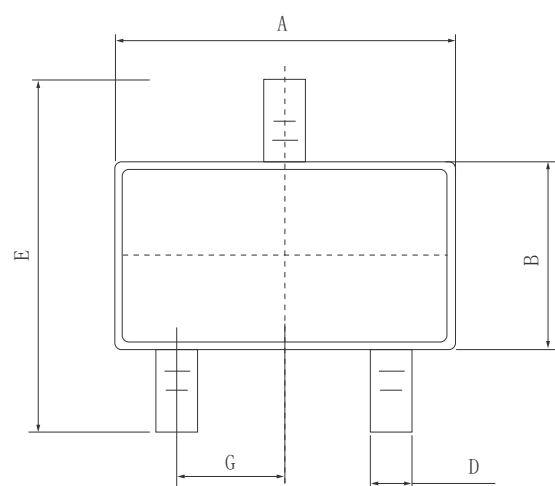
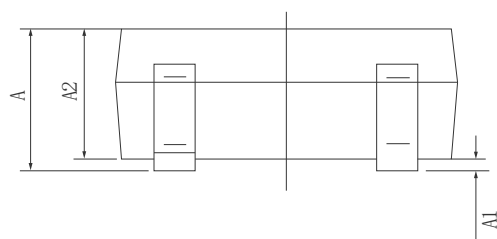
Figure9. Normalized Maximum Transient Thermal Impedance


**Resistive Switching Test Circuit & Waveforms**

**Diode Recovery Test Circuit & Waveforms**

**Gate Charge Test Circuit & Waveform**

**Unclamped Inductive Switching (UIS) Test Circuit & Waveforms**

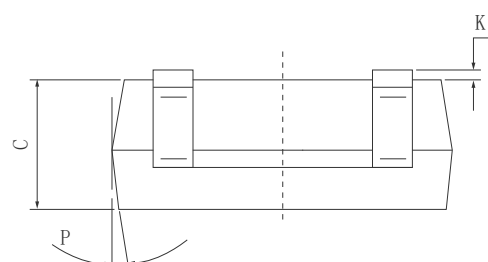
# Dimensions (SOT23-3)



| SYMBOL   | MILLIMETER |      |      |
|----------|------------|------|------|
|          | MIN        | NOM  | MAX  |
| A        | —          | —    | 1.25 |
| A1       | 0.03       | —    | 0.10 |
| A2       | 1.05       | 1.10 | 1.15 |
| b        | 0.30       | 0.35 | 0.40 |
| c        | 0.13       | —    | 0.17 |
| D        | 2.87       | 2.92 | 2.97 |
| E        | 1.55       | 1.60 | 1.65 |
| E1       | 2.70       | 2.85 | 3.00 |
| e        | 0.95 BSC.  |      |      |
| e1       | 1.80       | —    | 2.00 |
| L        | 0.35       | 0.45 | 0.55 |
| $\theta$ | 0°         | —    | 8°   |

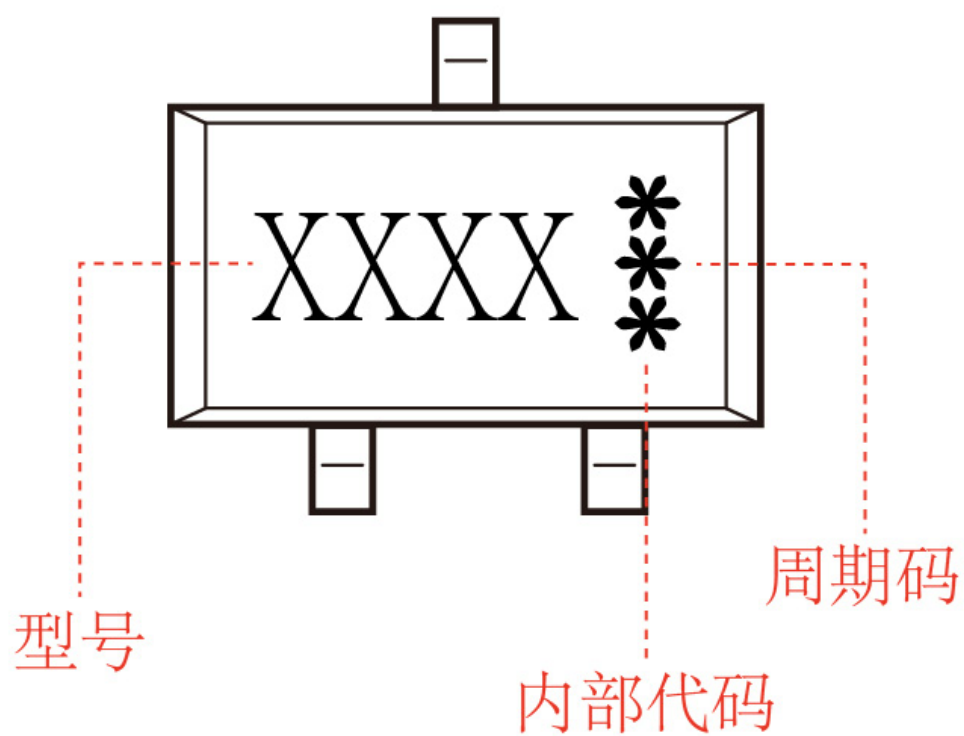


| DIM | MILLIMETERS |
|-----|-------------|
| A   | 2.82~3.02   |
| B   | 1.60±0.10   |
| C   | 1.10±0.05   |
| D   | 0.40±0.10   |
| E   | 2.65~2.95   |
| G   | 0.95typ     |
| K   | 0.00~0.10   |
| M   | 0.20MIN     |
| P   | 9±2°        |



SOT23-3

Marking Instructions:



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