

### General Description

The ZM300N06T 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

### Application

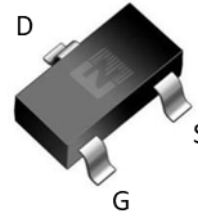
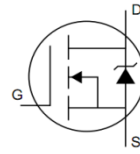
- MB/VGA Vcore
- SMPS 2<sup>nd</sup> Synchronous Rectifier
- POL application
- BLDC Motor driver

### Product Summary

$$V_{DS} = 60V$$

$$R_{DS(ON)} = 30m\Omega$$

$$I_D = 5A$$



SOT23-3



### Ordering Information:

|                           |           |
|---------------------------|-----------|
| Part NO.                  | ZM300N06T |
| Marking                   | 300N06    |
| Packing Information       | REEL TAPE |
| Basic ordering unit (pcs) | 3000      |

### Absolute Maximum Ratings ( $T_C = 25^\circ C$ )

| Parameter                            | Symbol                 | Rating     | Unit       |
|--------------------------------------|------------------------|------------|------------|
| Drain-Source Voltage                 | $V_{DS}$               | 60         | V          |
| Gate-Source Voltage                  | $V_{GS}$               | $\pm 20$   | V          |
| Continuous Drain Current             | $I_{D@TC=25^\circ C}$  | 5.0        | A          |
|                                      | $I_{D@TC=75^\circ C}$  | 3.8        | A          |
|                                      | $I_{D@TC=100^\circ C}$ | 3.1        | A          |
| Pulsed Drain Current <sup>①</sup>    | $I_{DM}$               | 15         | A          |
| Total Power Dissipation <sup>②</sup> | $P_D@T_C=25^\circ C$   | 1.4        | W          |
| Total Power Dissipation              | $P_D@T_A=25^\circ C$   | 0.7        | W          |
| Operating Junction Temperature       | $T_J$                  | -55 to 150 | $^\circ C$ |
| Storage Temperature                  | $T_{STG}$              | -55 to 150 | $^\circ C$ |

**•Thermal resistance**

| Parameter                                        | Symbol     | Min. | Typ. | Max. | Unit  |
|--------------------------------------------------|------------|------|------|------|-------|
| Thermal resistance, junction - case <sup>②</sup> | $R_{thJC}$ | -    | -    | 80   | ° C/W |
| Thermal resistance, junction - ambient           | $R_{thJA}$ | -    | -    | 180  | ° C/W |
| Soldering temperature, wavesoldering for 10s     | $T_{sold}$ | -    | -    | 265  | ° C   |

**•Electronic Characteristics**

| Parameter                         | Symbol       | Condition                     | Min. | Typ | Max.      | Unit       |
|-----------------------------------|--------------|-------------------------------|------|-----|-----------|------------|
| Drain-Source Breakdown Voltage    | $BV_{DSS}$   | $V_{GS}=0V, I_D=-250\mu A$    | 60   |     |           | V          |
| Gate Threshold Voltage            | $V_{GS(TH)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$ | 1.2  |     | 2.5       | V          |
| Drain-Source Leakage Current      | $I_{DSS}$    | $V_{DS}=60V, V_{GS}=0V$       |      |     | 1.0       | $\mu A$    |
| Gate- Source Leakage Current      | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$   |      |     | $\pm 100$ | nA         |
| Static Drain-source On Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=5A$          |      | 30  | 39        | m $\Omega$ |
|                                   |              | $V_{GS}=4.5V, I_D=3A$         |      | 36  | 47        | m $\Omega$ |
| Forward Transconductance          | $g_{FS}$     | $V_{DS}=10V, I_D=5A$          |      | 10  |           | s          |
| Source-drain voltage              | $V_{SD}$     | $I_S=5A$                      |      |     | 1.28      | V          |

**•Electronic Characteristics**

| Parameter                    | Symbol    | Condition                             | Min. | Typ  | Max. | Unit |
|------------------------------|-----------|---------------------------------------|------|------|------|------|
| Input capacitance            | $C_{iss}$ | $V_{GS}=0V, V_{DS}=25V$<br>$f = 1MHz$ | -    | 1430 | -    | pF   |
| Output capacitance           | $C_{oss}$ |                                       | -    | 160  | -    |      |
| Reverse transfer capacitance | $C_{rss}$ |                                       | -    | 115  | -    |      |

**•Gate Charge characteristics( $T_a = 25^\circ C$ )**

| Parameter            | Symbol   | Condition                                | Min. | Typ | Max. | Unit |
|----------------------|----------|------------------------------------------|------|-----|------|------|
| Total gate charge    | $Q_g$    | $V_{DD}=25V$<br>$I_D=5A$<br>$V_{GS}=10V$ | -    | 25  | -    | nC   |
| Gate - Source charge | $Q_{gs}$ |                                          | -    | 4   | -    |      |
| Gate - Drain charge  | $Q_{gd}$ |                                          | -    | 9   | -    |      |

Note: ① Pulse Test : Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$  ;

② Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;

Fig.1 Power Dissipation Derating Curve

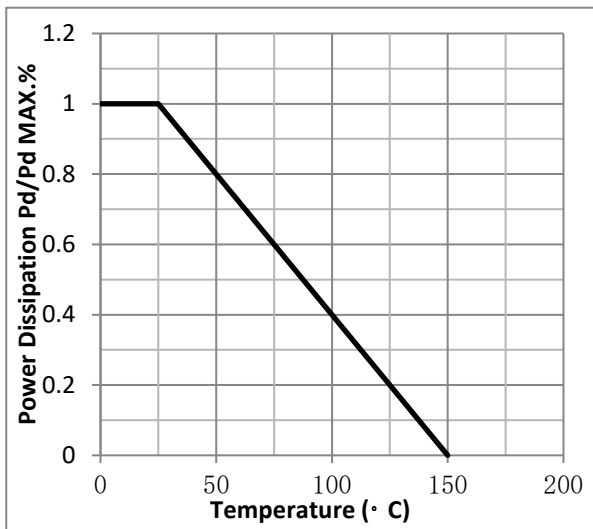


Fig.2 Typical output Characteristics

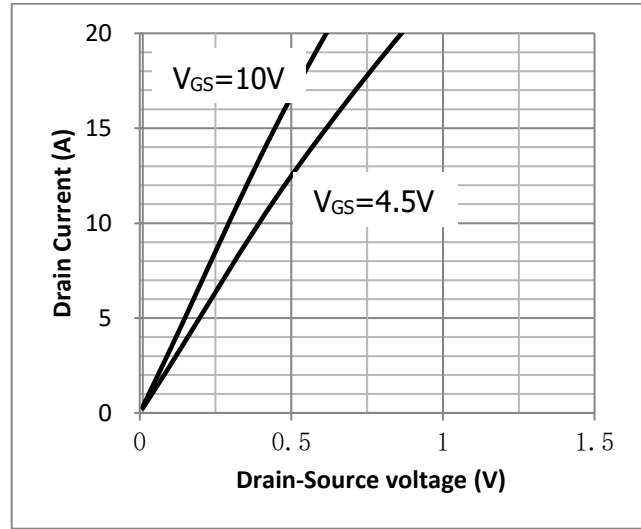


Fig.3 Threshold Voltage V.S Junction Temperature

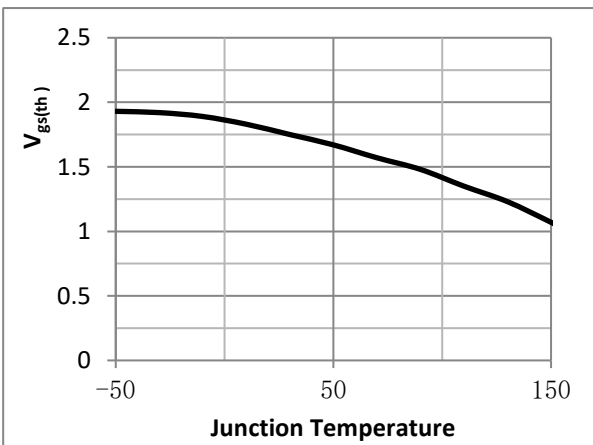


Fig.4 Resistance V.S Drain Current

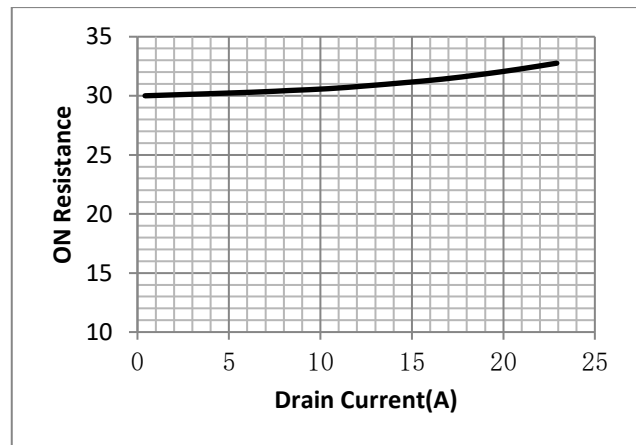


Fig.5 On-Resistance VS Gate Source Voltage

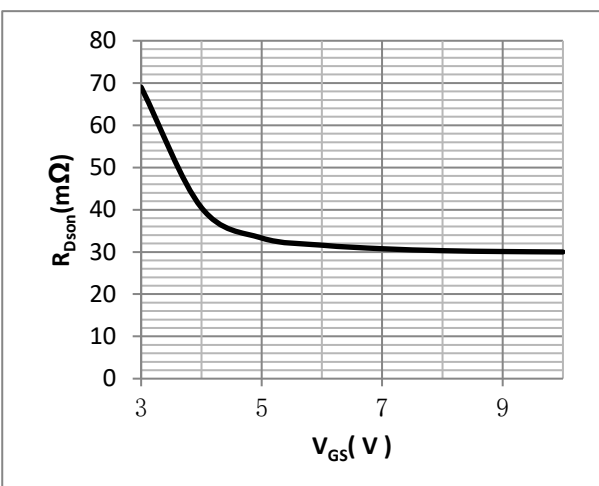


Fig.6 On-Resistance V.S Junction Temperature

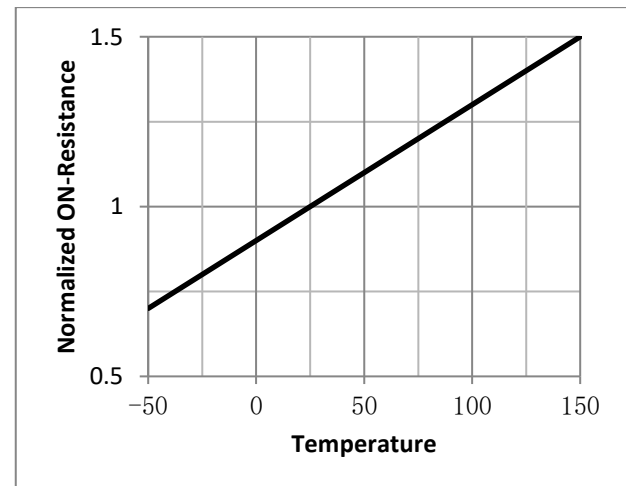


Fig.7 Switching Time Measurement Circuit

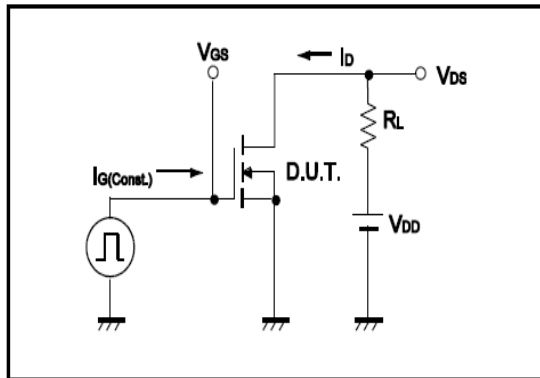


Fig.8 Gate Charge Waveform

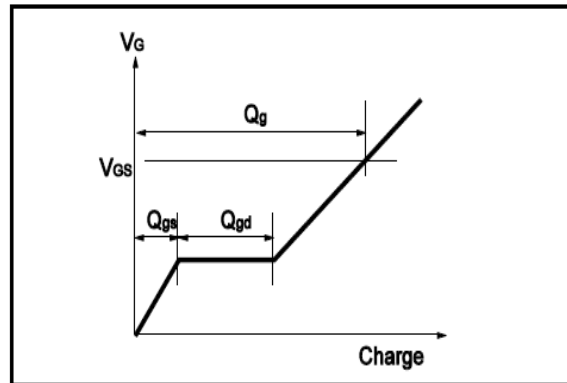


Fig.9 Switching Time Measurement Circuit

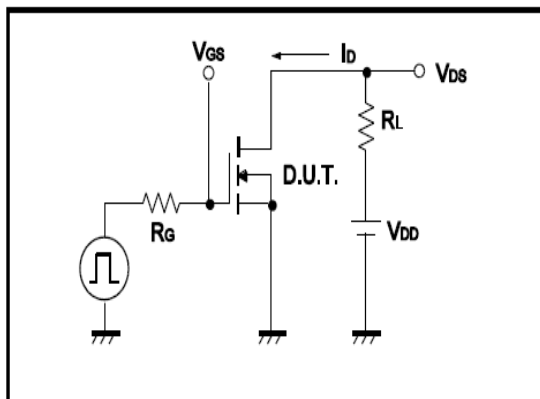


Fig.10 Gate Charge Waveform

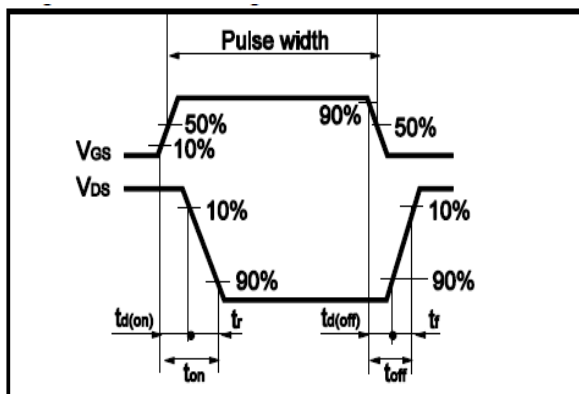


Fig.11 Avalanche Measurement Circuit

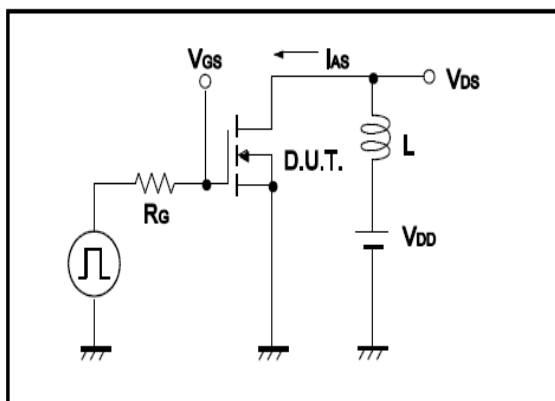
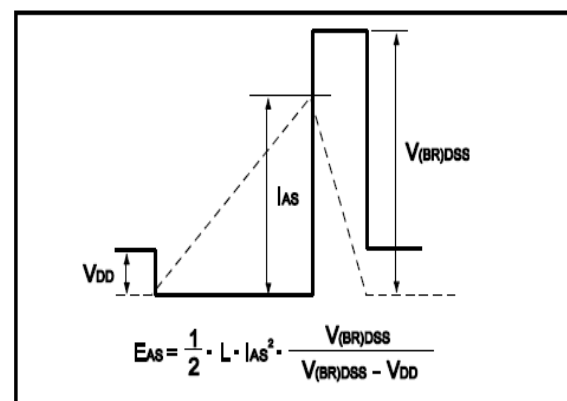
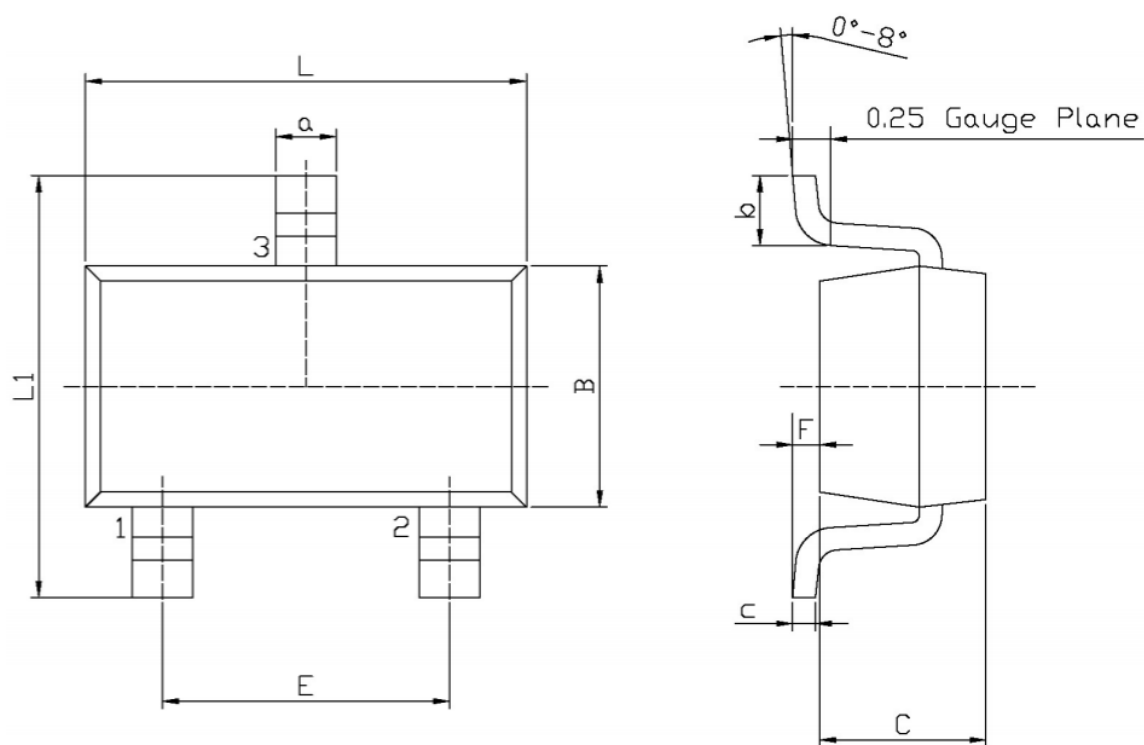


Fig.12 Avalanche Waveform



•Dimensions(SOT23-3)

Unit: mm



Unit: mm

| Symbol | Dimensions In Millimeters |      | Symbol | Dimensions In Millimeters |      |
|--------|---------------------------|------|--------|---------------------------|------|
|        | Min                       | Max  |        | Min                       | Max  |
| L      | 2.82                      | 3.02 | a      | 0.35                      | 0.50 |
| B      | 1.50                      | 1.70 | C      | 0.10                      | 0.20 |
| C      | 0.90                      | 1.30 | b      | 0.35                      | 0.55 |
| L1     | 2.60                      | 3.00 | F      | 0                         | 0.15 |
| E      | 1.80                      | 2.00 |        |                           |      |