

• General Description

The ZM500N06T 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

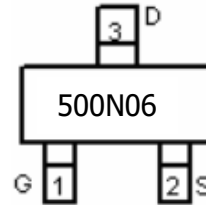
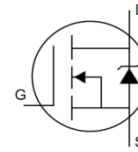
- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

• Ordering Information:

| | |
|---------------------------|-----------|
| Part NO. | ZM500N06T |
| Marking | 500N06 |
| Packing Information | REEL TAPE |
| Basic ordering unit (pcs) | 3000 |

• Absolute Maximum Ratings ($T_c = 25^\circ\text{C}$)

| Parameter | Symbol | Rating | Unit |
|---|------------------------------|------------|------------------|
| Drain-Source Voltage | V_{DS} | 60 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current | $I_{D@TC=25^\circ\text{C}}$ | 4.0 | A |
| | $I_{D@TC=75^\circ\text{C}}$ | 3.0 | A |
| | $I_{D@TC=100^\circ\text{C}}$ | 2.5 | A |
| Pulsed Drain Current ^① | I_{DM} | 12 | A |
| Total Power Dissipation ^② | P_D | 1.4 | W |
| Total Power Dissipation($T_A=25^\circ\text{C}$) | $P_{D@TA=25^\circ\text{C}}$ | 0.7 | W |
| Operating Junction Temperature | T_J | -55 to 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | -55 to 150 | $^\circ\text{C}$ |

• Product Summary
 $V_{DS} = 60\text{V}$
 $R_{DS(ON)} = 50\text{m}\Omega$
 $I_D = 4\text{A}$


SOT23-3



•Thermal resistance

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|--|-------------------|------|------|------|-------|
| Thermal resistance, junction - case ^② | 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 =-250uA | 60 | | | V |
| Gate Threshold Voltage | V _{GS(TH)} | V _{GS} =V _{DS} , I _D =250uA | 1.2 | | 2.5 | V |
| Drain-Source Leakage Current | I _{DSS} | V _{DS} =60V, V _{GS} =0V | | | 1.0 | uA |
| Gate- Source Leakage Current | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | | | ±100 | nA |
| Static Drain-source On Resistance | R _{DS(ON)} | V _{GS} =10V, I _D =5A | | 50 | 65 | mΩ |
| | | V _{GS} =4.5V, I _D =3A | | 70 | 90 | mΩ |
| 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} | f = 1MHz | - | 700 | - | pF |
| Output capacitance | C _{oss} | | - | 110 | - | |
| Reverse transfer capacitance | C _{rss} | | - | 115 | - | |

•Gate Charge characteristics(T_a = 25°C)

| Parameter | Symbol | Condition | Min. | Typ | Max. | Unit |
|----------------------|-----------------|-----------------------|------|-----|------|------|
| Total gate charge | Q _g | V _{DD} =25V | - | 12 | - | nC |
| Gate - Source charge | Q _{gs} | I _D = 8A | - | 5 | - | |
| Gate - Drain charge | Q _{gd} | V _{GS} = 10V | - | 4 | - | |

Note: ① Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 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

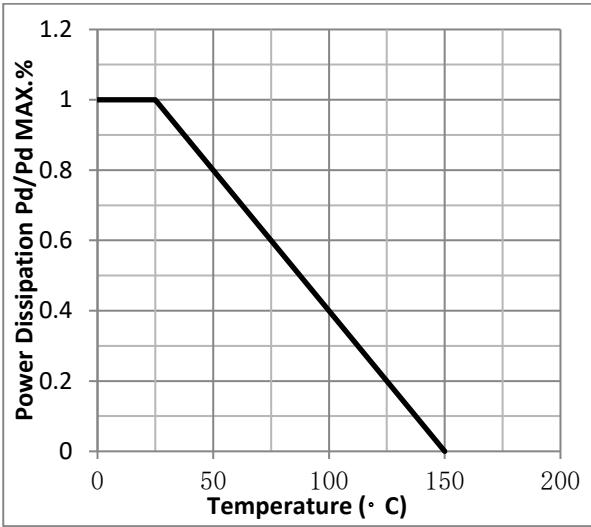


Fig.2 Typical output Characteristics

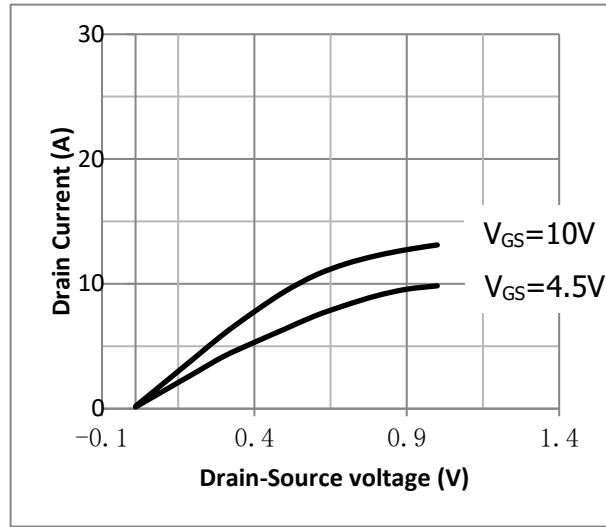


Fig.3 Threshold Voltage V.S Junction Temperature

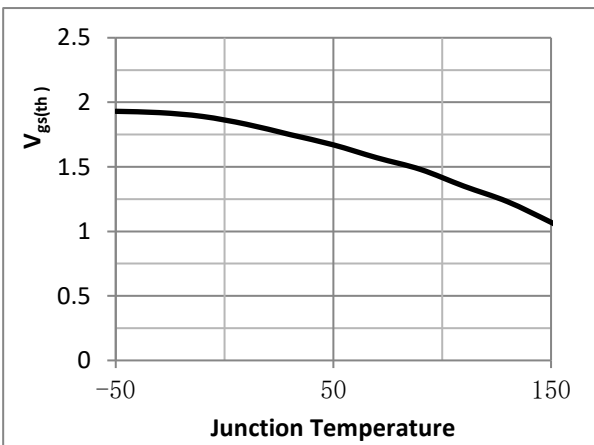


Fig.4 Resistance V.S Drain Current

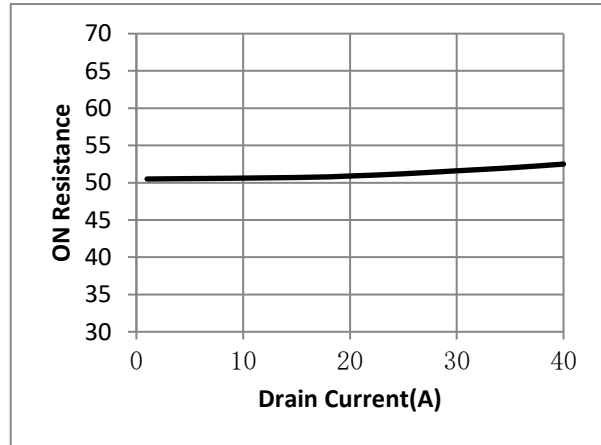


Fig.5 On-Resistance VS Gate Source Voltage

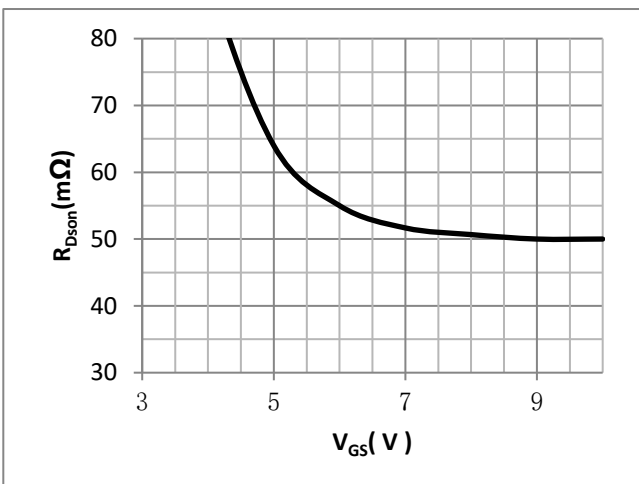


Fig.6 On-Resistance V.S Junction Temperature

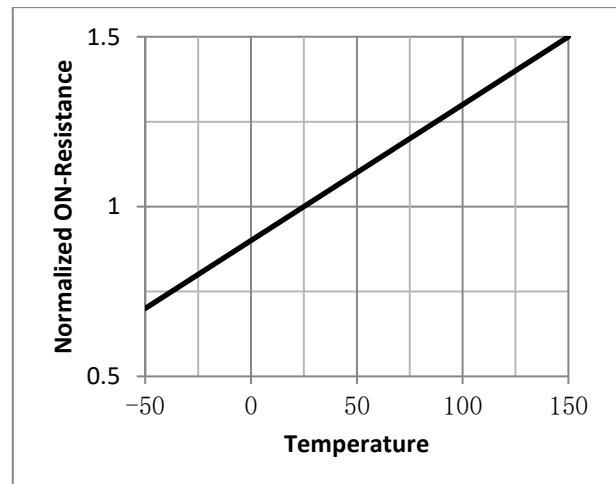


Fig.7 Switching Time Measurement Circuit

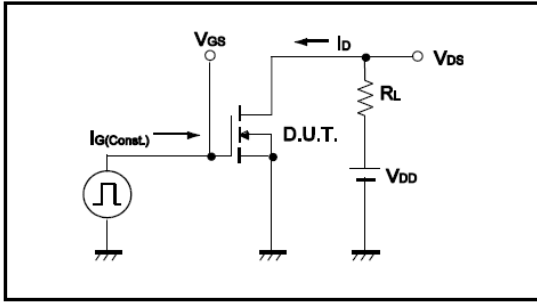


Fig.8 Gate Charge Waveform

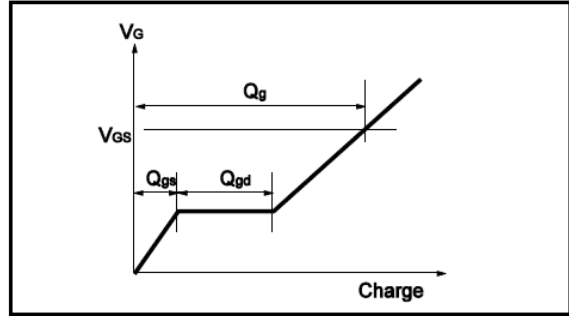


Fig.9 Switching Time Measurement Circuit

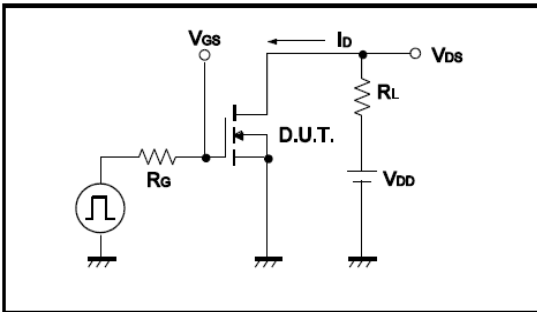


Fig.10 Gate Charge Waveform

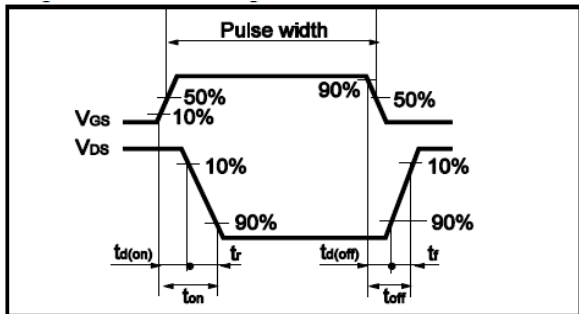


Fig.11 Avalanche Measurement Circuit

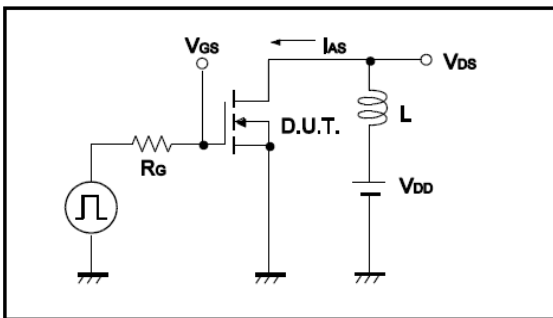
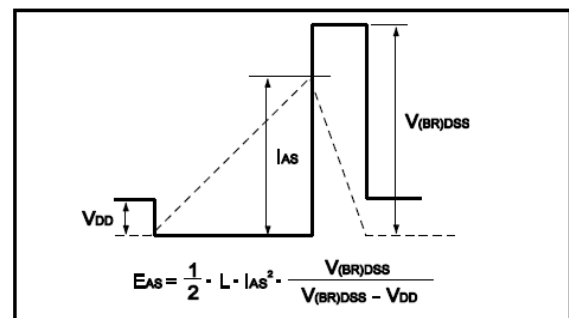
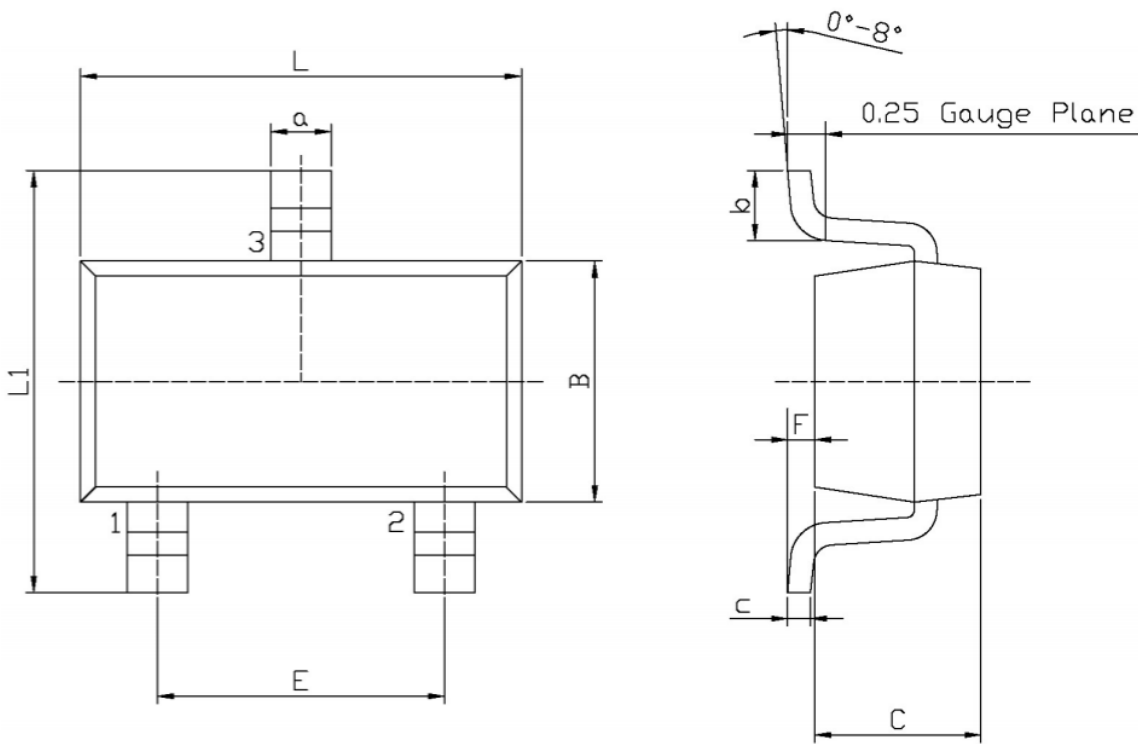


Fig.12 Avalanche Waveform



•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 | | | |