

### General Description

The ZM200N06M combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ .

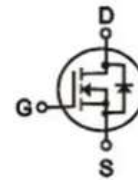
### Features

- 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

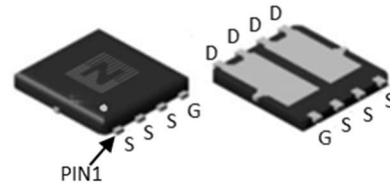
### Product Summary



$$V_{DS} = 60V$$

$$R_{DS(ON)} = 20m\Omega$$

$$I_D = 33A$$



DFN3 x 3



### Ordering Information:

|                           |           |
|---------------------------|-----------|
| Part NO.                  | ZM200N06M |
| Marking                   | ZM200N06  |
| Packing Information       | REEL TAPE |
| Basic ordering unit (pcs) | 5000      |

### 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                   | $I_{D@TC=25^\circ C}$  | 33         | A          |
|                                            | $I_{D@TC=75^\circ C}$  | 25         | A          |
|                                            | $I_{D@TC=100^\circ C}$ | 21         | A          |
| Pulsed Drain Current <sup>①</sup>          | $I_{DM}$               | 99         | A          |
| Total Power Dissipation( $TC=25^\circ C$ ) | $P_D@TC=25^\circ C$    | 17         | W          |
| Total Power Dissipation( $TA=25^\circ C$ ) | $P_D@TA=25^\circ C$    | 0.9        | W          |
| Operating Junction Temperature             | $T_J$                  | -55 to 150 | $^\circ C$ |
| Storage Temperature                        | $T_{STG}$              | -55 to 150 | $^\circ C$ |
| Single Pulse Avalanche Energy              | $E_{AS}$               | 65         | mJ         |

**•Thermal resistance**

| Parameter                                     | Symbol     | Min. | Typ. | Max. | Unit          |
|-----------------------------------------------|------------|------|------|------|---------------|
| Thermal resistance, junction - case           | $R_{thJC}$ | -    | -    | 7.3  | $^{\circ}C/W$ |
| Thermal resistance, junction - ambient        | $R_{thJA}$ | -    | -    | 138  | $^{\circ}C/W$ |
| Soldering temperature, wave soldering for 10s | $T_{sold}$ | -    | -    | 265  | $^{\circ}C$   |

**•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 | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=20A$         |      | 20  | 26        | $m\Omega$ |
|                                   |              | $V_{GS}=4.5V, I_D=16A$        |      | 24  | 31        | $m\Omega$ |
| Forward Transconductance          | $g_{FS}$     | $V_{DS}=25V, I_D=5A$          |      | 14  |           | S         |
| Source-drain voltage              | VSD          | $I_S=20A$                     |      |     | 1.28      | V         |

**•Electronic Characteristics**

| Parameter                    | Symbol    | Condition                             | Min. | Typ  | Max. | Unit |
|------------------------------|-----------|---------------------------------------|------|------|------|------|
| Input capacitance            | $C_{iss}$ | $V_{GS}=0V, V_{DS}=25V$<br>$f = 1MHz$ | -    | 1650 | -    | pF   |
| Output capacitance           | $C_{oss}$ |                                       | -    | 340  | -    |      |
| Reverse transfer capacitance | $C_{rss}$ |                                       | -    | 160  | -    |      |

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

| Parameter            | Symbol   | Condition                                      | Min. | Typ | Max. | Unit |
|----------------------|----------|------------------------------------------------|------|-----|------|------|
| Total gate charge    | $Q_g$    | $V_{DD} = 30V$<br>$I_D = 3A$<br>$V_{GS} = 10V$ | -    | 19  | -    | nC   |
| Gate - Source charge | $Q_{gs}$ |                                                | -    | 9   | -    |      |
| Gate - Drain charge  | $Q_{gd}$ |                                                | -    | 11  | -    |      |

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

Fig.1 Power Dissipation

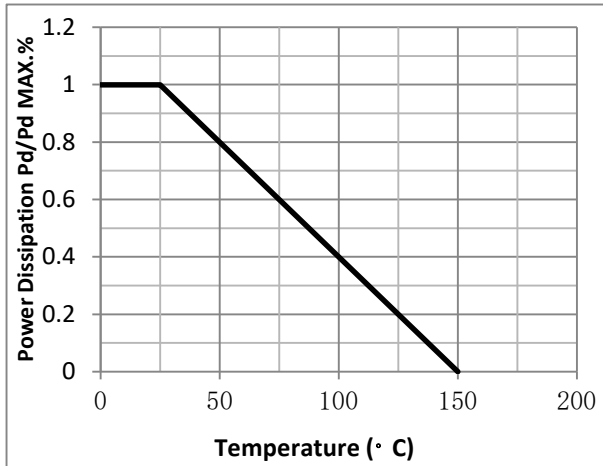


Fig.2 Typical output Characteristics

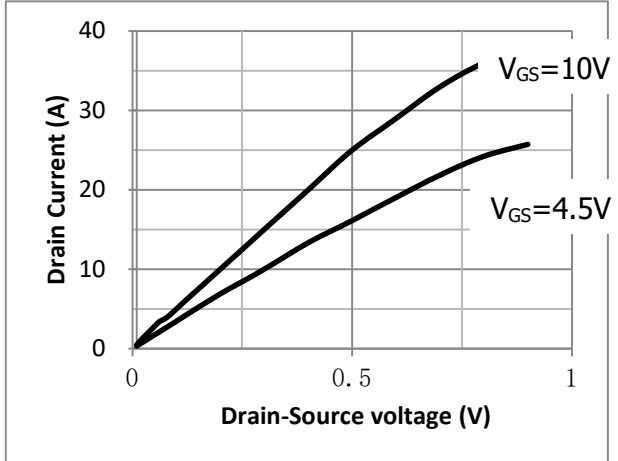


Fig.3 Threshold Voltage V.S Junction Temperature

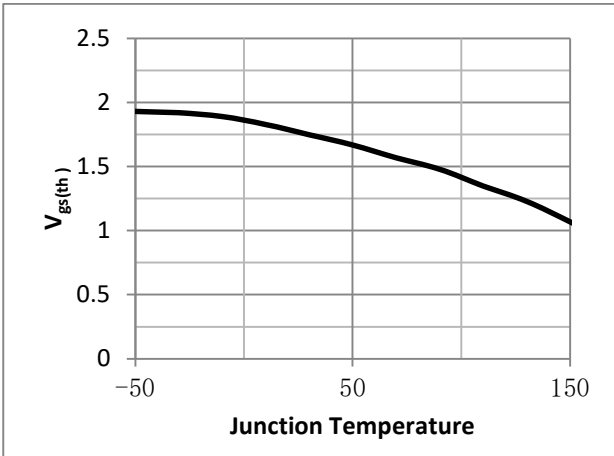


Fig.4 Resistance V.S Drain Current

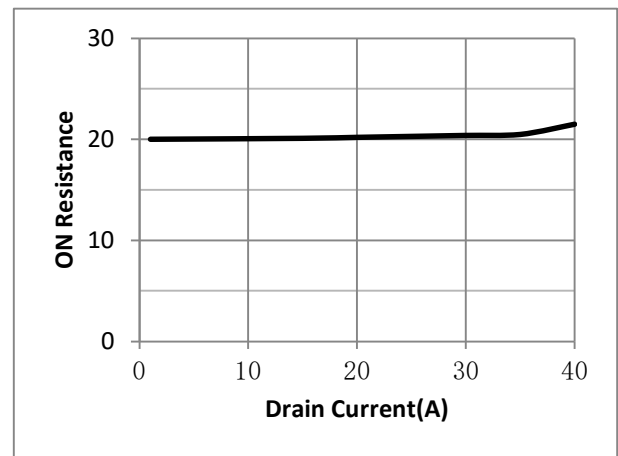


Fig.5 On-Resistance VS Gate Source Voltage

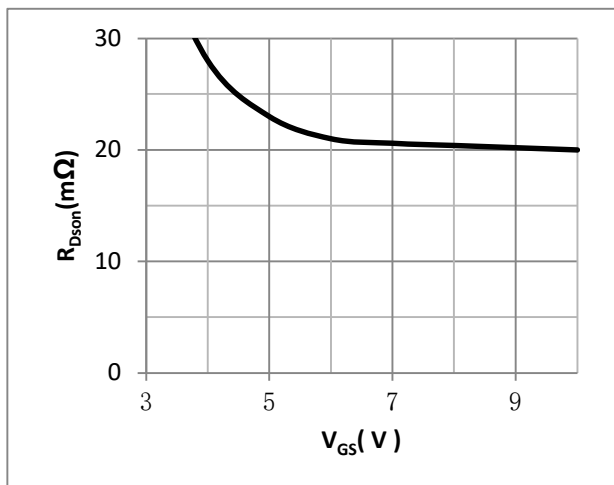


Fig.6 On-Resistance V.S Junction Temperature

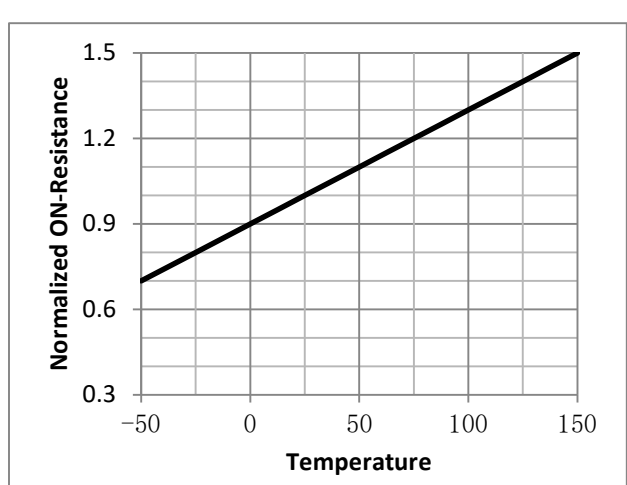


Fig.7 Switching Time Measurement Circuit

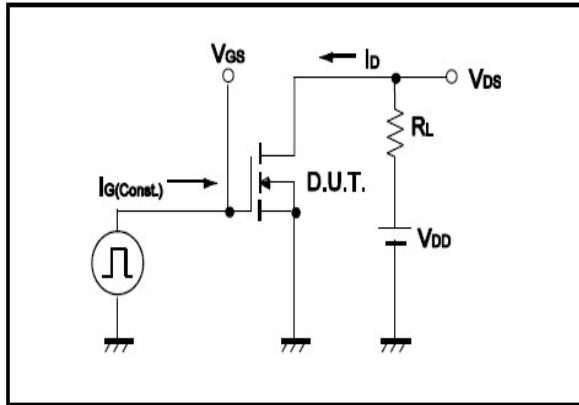


Fig.8 Gate Charge Waveform

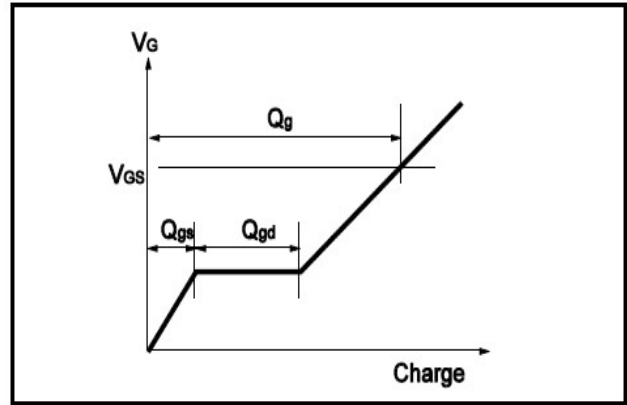


Fig.9 Switching Time Measurement Circuit

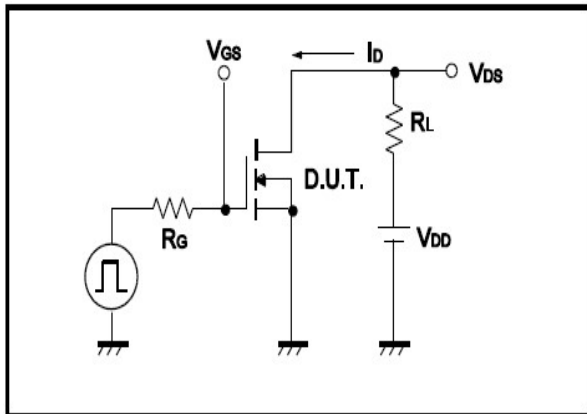


Fig.10 Gate Charge Waveform

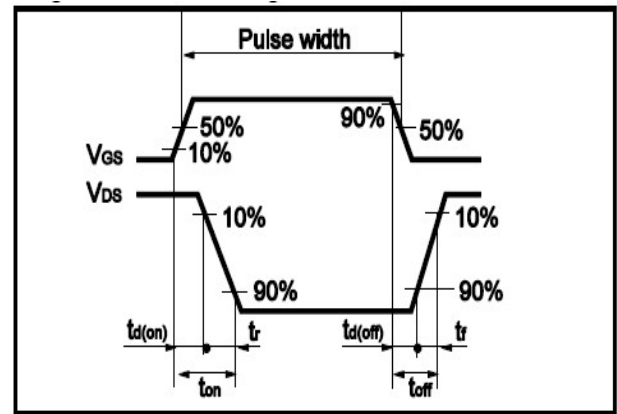


Fig.11 Avalanche Measurement Circuit

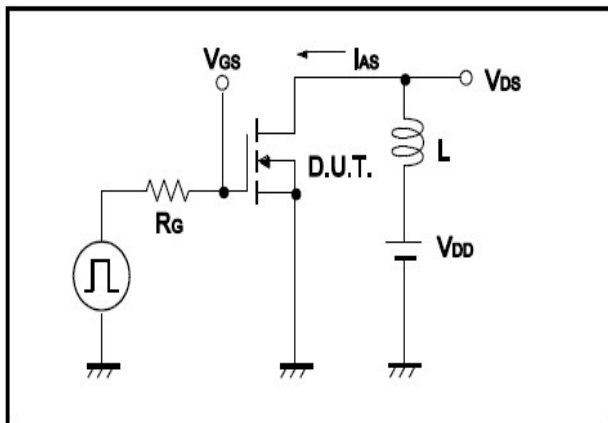
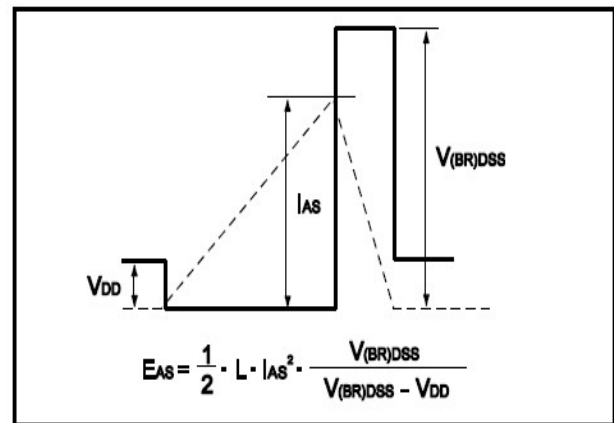


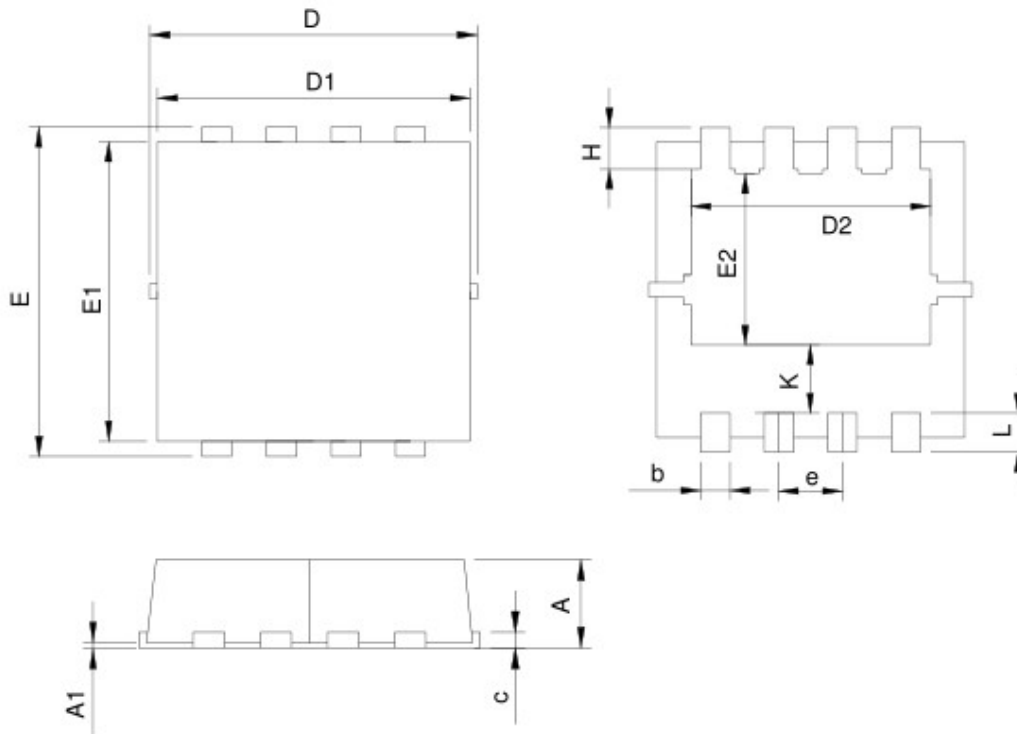
Fig.12 Avalanche Waveform





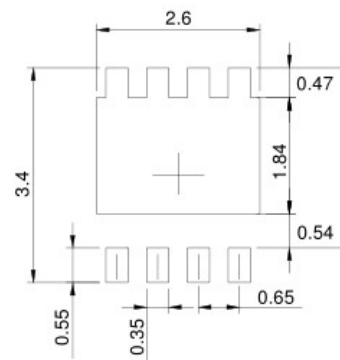
## •Dimensions(DFN3×3)

Unit: mm



| SYMBOL | DFN3.3x3.3-8 |      |           |       |
|--------|--------------|------|-----------|-------|
|        | MILLIMETERS  |      | INCHES    |       |
|        | MIN.         | MAX. | MIN.      | MAX.  |
| A      | 0.70         | 1.00 | 0.028     | 0.039 |
| A1     | 0.00         | 0.05 | 0.000     | 0.002 |
| b      | 0.25         | 0.35 | 0.010     | 0.014 |
| c      | 0.14         | 0.20 | 0.006     | 0.008 |
| D      | 3.10         | 3.50 | 0.122     | 0.138 |
| D1     | 3.05         | 3.25 | 0.120     | 0.128 |
| D2     | 2.35         | 2.55 | 0.093     | 0.100 |
| E      | 3.10         | 3.50 | 0.122     | 0.138 |
| E1     | 2.90         | 3.10 | 0.114     | 0.122 |
| E2     | 1.64         | 1.84 | 0.065     | 0.072 |
| e      | 0.65 BSC     |      | 0.026 BSC |       |
| H      | 0.32         | 0.52 | 0.013     | 0.020 |
| K      | 0.59         | 0.79 | 0.023     | 0.031 |
| L      | 0.25         | 0.55 | 0.010     | 0.022 |

## RECOMMENDED LAND PATTERN



UNIT: mm