

**• General Description**

The ZM200N04T 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**

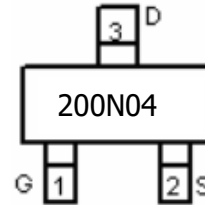
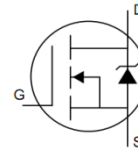
- MB/VGA Vcore
- SMPS 2<sup>nd</sup> Synchronous Rectifier
- POL application
- BLDC Motor driver

**• Product Summary**

$V_{DS} = 40V$

$R_{DS(ON)} = 22m\Omega$

$I_D = 5.2A$



SOT23-3


**• Ordering Information:**

|                           |           |
|---------------------------|-----------|
| Part NO.                  | ZM200N04T |
| Marking                   | 200N04    |
| Packing Information       | REEL TAPE |
| Basic ordering unit (pcs) | 3000      |

**• Absolute Maximum Ratings ( $T_c = 25^\circ C$ )**

| Parameter                      | Symbol                 | Rating     | Unit       |
|--------------------------------|------------------------|------------|------------|
| Drain-Source Voltage           | $V_{DS}$               | 40         | 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          |
|                                | $I_D @ TC=100^\circ C$ | 3.2        | A          |
| Pulsed Drain Current ①         | $I_{DM}$               | 15         | A          |
| Total Power Dissipation ②      | $P_D @ TC=25^\circ C$  | 1.5        | W          |
| Total Power Dissipation        | $P_D @ TA=25^\circ C$  | 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 <sub>thJC</sub> | -    | -    | 80   | ° C/W |
| Thermal resistance, junction - ambient           | R <sub>thJA</sub> | -    | -    | 180  | ° C/W |
| Soldering temperature, wavesoldering for 10s     | T <sub>sold</sub> | -    | -    | 265  | ° C   |

**•Electronic Characteristics**

| Parameter                         | Symbol              | Condition  | Min. | Typ | Max. | Unit |
|-----------------------------------|---------------------|--|------|-----|------|------|
| Drain-Source Breakdown Voltage    | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA               | 40   |     |      | V    |
| Gate Threshold Voltage            | V <sub>GS(TH)</sub> | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA | 1.3  | 1.7 | 2.5  | V    |
| Drain-Source Leakage Current      | I <sub>DSS</sub>    | V <sub>DS</sub> =40V, V <sub>GS</sub> =0V                |      |     | 1.0  | uA   |
| Gate- Source Leakage Current      | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V               |      |     | ±100 | nA   |
| Static Drain-source On Resistance | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =5.2A               |      | 22  | 28   | mΩ   |
|                                   |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A                |      | 27  | 35   | mΩ   |
| Forward Transconductance          | g <sub>FS</sub>     | V <sub>DS</sub> =10V, I <sub>D</sub> =2A                 |      | 3   |      | s    |
| Source-drain voltage              | V <sub>SD</sub>     | I <sub>s</sub> =5.2A                                     |      |     | 1.28 | V    |

**•Electronic Characteristics**

| Parameter                    | Symbol           | Condition | Min. | Typ | Max. | Unit |
|------------------------------|------------------|-----------|------|-----|------|------|
| Input capacitance            | C <sub>iss</sub> | f = 1MHz  | -    | 920 | -    | pF   |
| Output capacitance           | C <sub>oss</sub> |           | -    | 73  | -    |      |
| Reverse transfer capacitance | C <sub>rss</sub> |           | -    | 52  | -    |      |

**•Gate Charge characteristics(T<sub>a</sub> = 25°C)**

| Parameter            | Symbol          | Condition             | Min. | Typ  | Max. | Unit |
|----------------------|-----------------|-----------------------|------|------|------|------|
| Total gate charge    | Q <sub>g</sub>  | V <sub>DD</sub> =15V  | -    | 14.3 | -    | nC   |
| Gate - Source charge | Q <sub>gs</sub> | I <sub>D</sub> = 8A   | -    | 2.5  | -    |      |
| Gate - Drain charge  | Q <sub>gd</sub> | V <sub>GS</sub> = 10V | -    | 2.8  | -    |      |

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 Gate-Charge Characteristics

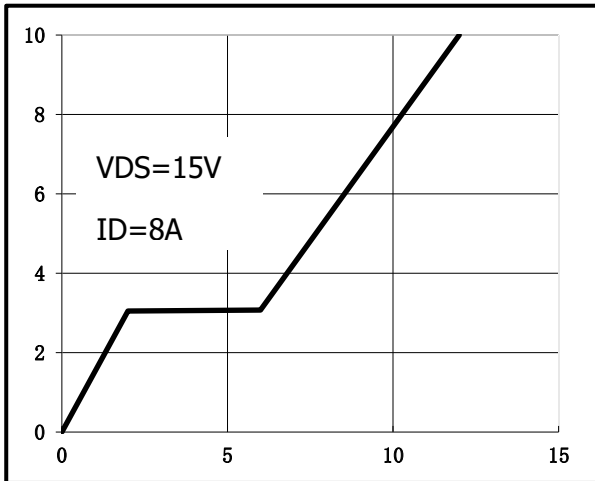


Fig.2 Capacitance Characteristics

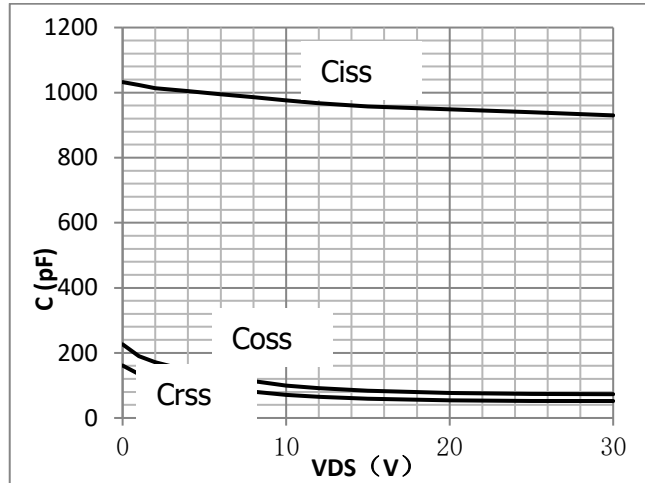


Fig.3 Power Dissipation Derating Curve

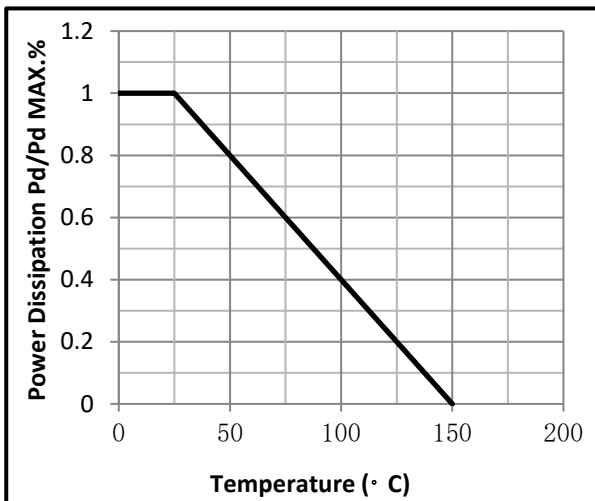


Fig.4 Typical output Characteristics

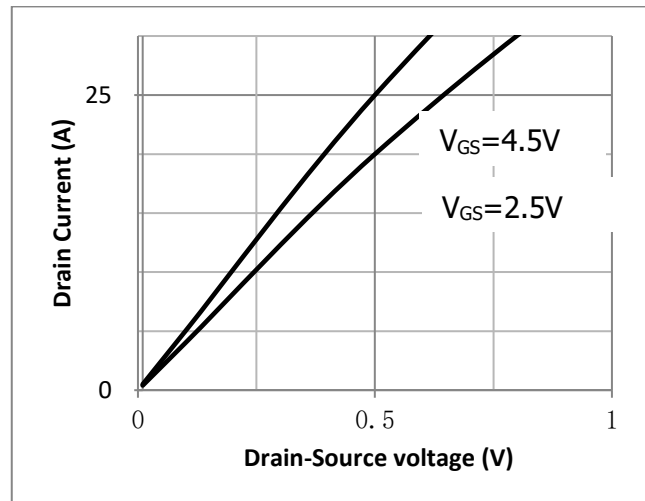


Fig.5 Threshold Voltage V.S Junction Temperature

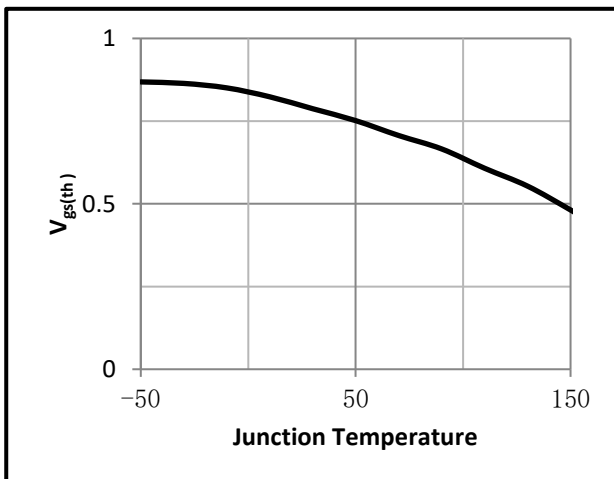


Fig.6 Resistance V.S Drain Current

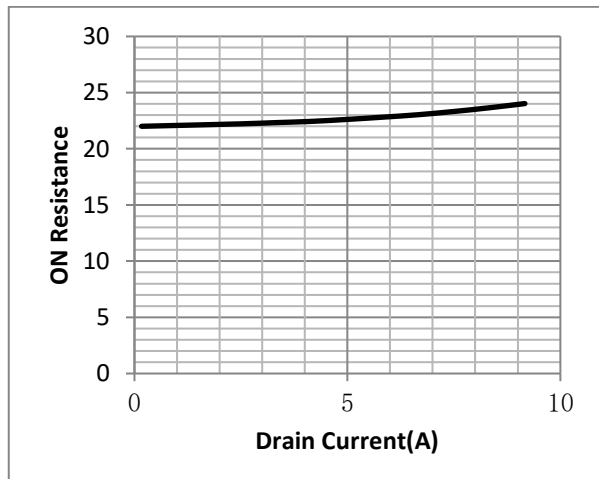


Fig.7 On-Resistance VS Gate Source Voltage

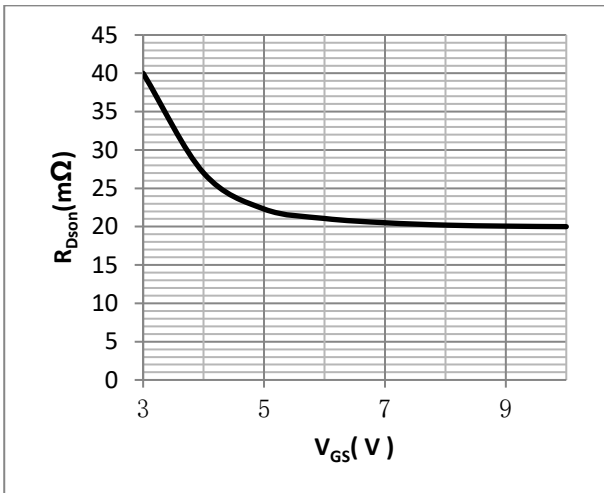


Fig.8 On-Resistance V.S Junction Temperature

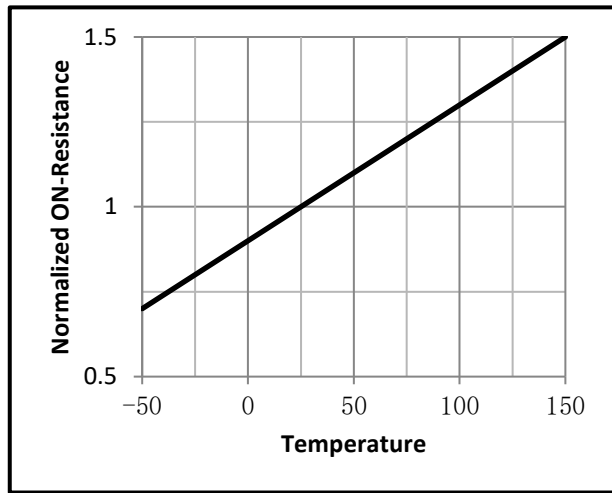


Fig.9 Switching Time Measurement Circuit

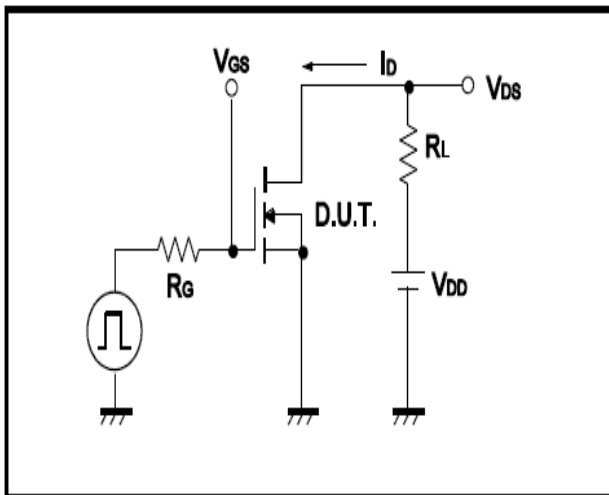


Fig.10 Gate Charge Waveform

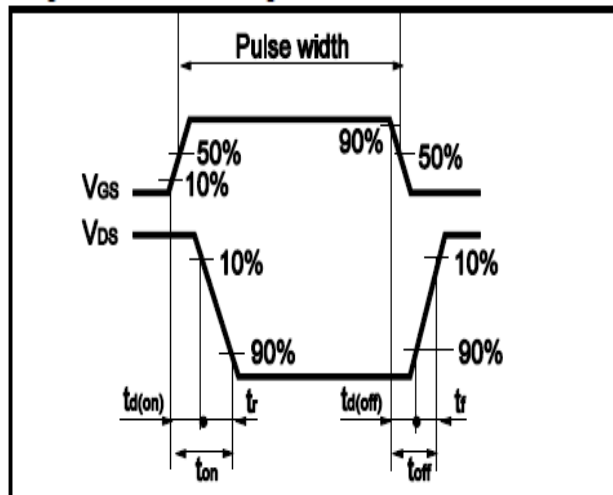


Fig.11 Avalanche Measurement Circuit

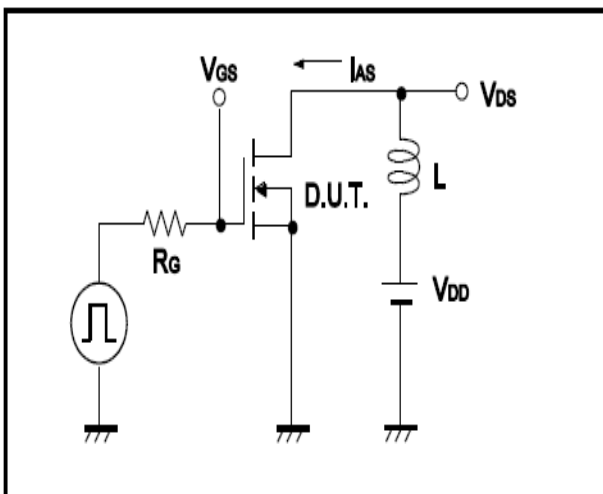
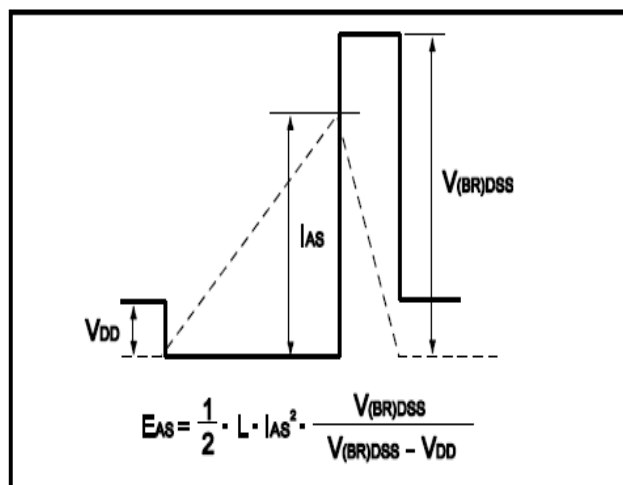


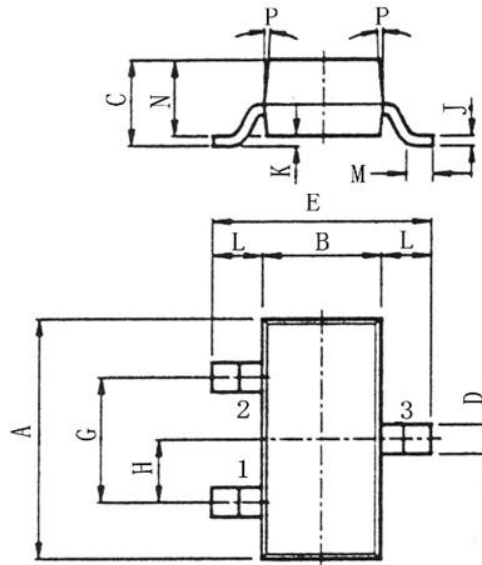
Fig.12 Avalanche Waveform





•Dimensions(SOT23-3)

Unit: mm



| SYMBOL | min  | nom  | max  |
|--------|------|------|------|
| A      | 2.70 | 2.9  | 3.10 |
| B      | 1.15 | 1.3  | 1.50 |
| C      |      |      | 1.30 |
| D      | 0.35 | 0.4  | 0.55 |
| E      | 2.20 | 2.4  | 2.70 |
| G      | 1.70 | 1.9  | 2.10 |
| H      | 0.85 | 0.95 | 1.05 |
| J      | 0.05 | 0.10 | 0.20 |
| K      | 0.00 |      | 0.10 |
| L      | 0.45 | 0.55 | 0.65 |
| M      | 0.20 |      |      |
| N      | 0.90 | 1.00 | 1.20 |
| P      |      | 7°   |      |