

### • General Description

It 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

- SMPS 2<sup>nd</sup> Synchronous Rectifier
- BLDC Motor driver

### • Product Summary


 $V_{DS} = 100V$ 
 $R_{DS(ON)} = 10m\Omega$ 
 $I_D = 62A$ 


TO-251

### • Ordering Information:

|                           |            |
|---------------------------|------------|
| Part NO.                  | ZMS100N10I |
| Marking                   | ZMS100N10  |
| Packing Information       | Tube       |
| Basic ordering unit (pcs) | 3600       |

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

| Parameter                                 | Symbol                 | Rating     | Unit       |
|---|------------------------|------------|------------|
| Drain-Source Voltage                      | $V_{DS}$               | 100        | V          |
| Gate-Source Voltage                       | $V_{GS}$               | $\pm 20$   | V          |
| Continuous Drain Current <sup>②</sup>     | $I_D @ TC=25^\circ C$  | 62         | A          |
|   | $I_D @ TC=75^\circ C$  | 47         | A          |
|   | $I_D @ TC=100^\circ C$ | 39         | A          |
| Pulsed Drain Current <sup>①</sup>         | $I_{DM}$               | 186        | A          |
| Total Power Dissipation <sup>②</sup>      | $P_D @ TC=25^\circ C$  | 60         | W          |
| Total Power Dissipation                   | $P_D @ TA=25^\circ C$  | 2.0        | W          |
| Operating Junction Temperature            | $T_J$                  | -55 to 150 | $^\circ C$ |
| Storage Temperature                       | $T_{STG}$              | -55 to 150 | $^\circ C$ |
| Single Pulse Avalanche Energy @ $L=0.1mH$ | $E_{AS}$               | 100        | mJ         |

**•Thermal resistance**

| Parameter  | Symbol            | Min. | Typ. | Max. | Unit  |
|--|-------------------|------|------|------|-------|
| Thermal resistance, junction - case <sup>②</sup> | R <sub>thJC</sub> | -    | -    | 2.2  | ° C/W |
| Thermal resistance, junction - ambient           | R <sub>thJA</sub> | -    | -    | 64   | ° 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               | 100  |     |      | V    |
| Gate Threshold Voltage            | V <sub>GS(TH)</sub> | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA | 1.4  |     | 2.5  | V    |
| Drain-Source Leakage Current      | I <sub>DSS</sub>    | V <sub>DS</sub> =100V, 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> =20A                |      | 10  | 13   | mΩ   |
|                                   | R <sub>DS(ON)</sub> | V <sub>GS</sub> =4.5V, I <sub>D</sub> =16A               |      | 12  | 15   | mΩ   |
| Forward Transconductance          | g <sub>FS</sub>     | V <sub>DS</sub> =25V, I <sub>D</sub> =15A                |      | 15  |      | s    |
| Diode Forward Voltage             | V <sub>FSD</sub>    | I <sub>S</sub> =20A                                      |      |     | 1.28 | V    |

**•Electronic Characteristics**

| Parameter                    | Symbol           | Condition   | Min. | Typ  | Max. | Unit |
|------------------------------|------------------|---|------|------|------|------|
| Input capacitance            | C <sub>iss</sub> | V <sub>GS</sub> =0V, V <sub>DS</sub> =25V<br>f = 1MHz | 1200 | 1400 | 1680 | pF   |
| Output capacitance           | C <sub>oss</sub> |   | 520  | 630  | 750  |      |
| Reverse transfer capacitance | C <sub>rss</sub> |   | 25   | 33   | 39   |      |

**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> =30V  | -    | 20  | -    | nC   |
| Gate - Source charge | Q <sub>gs</sub> | I <sub>D</sub> = 8A   | -    | 3.6 | -    |      |
| 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

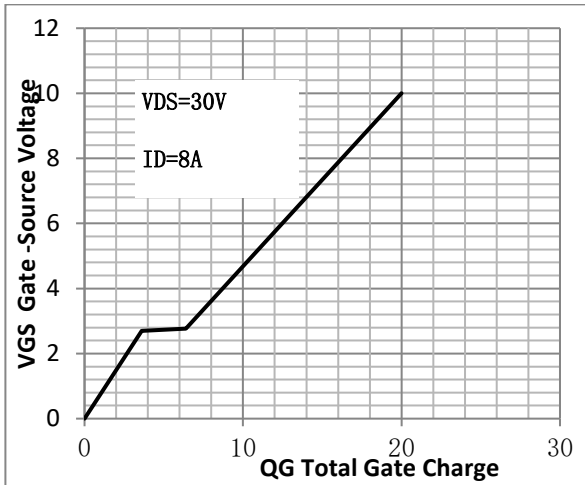


Fig.2 Capacitance Characteristics

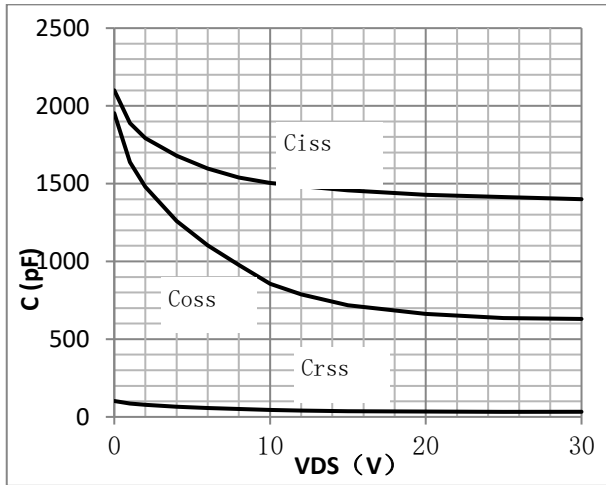


Fig.3 Power Dissipation

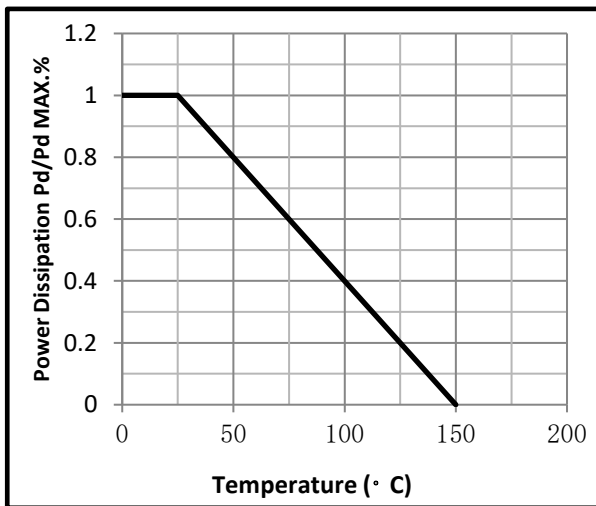


Figure 4. Transfer Characteristics

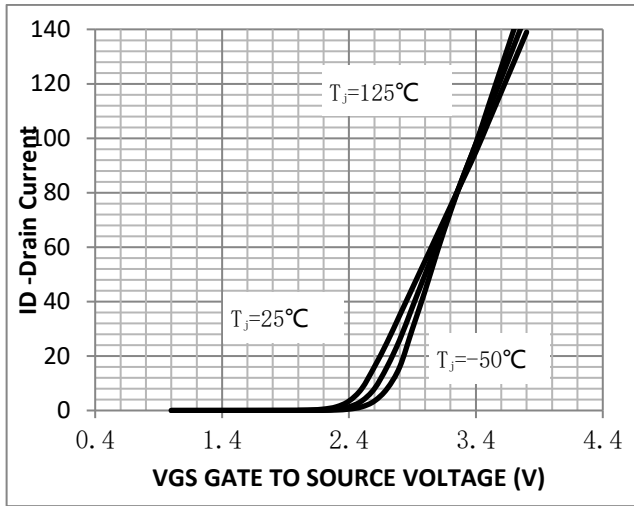


Fig.5 Threshold Voltage V.S Junction Temperature

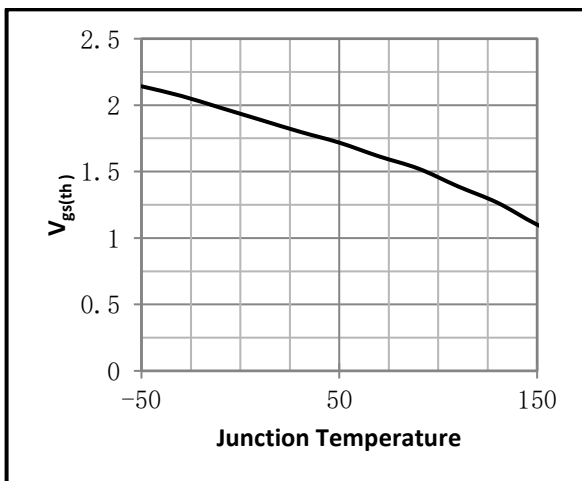


Fig.6 Resistance V.S Drain Current

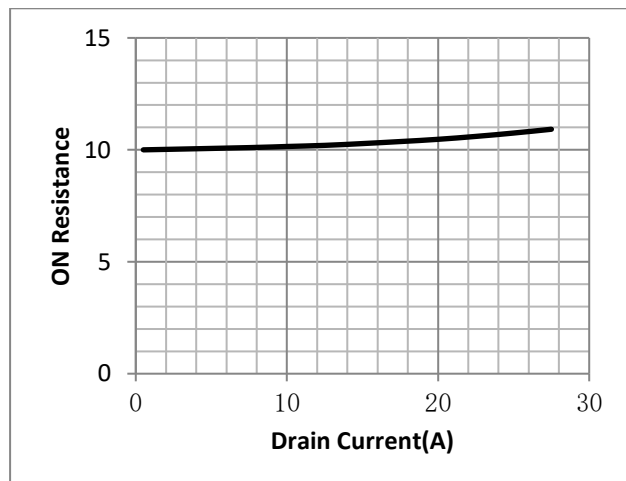


Fig.7 On-Resistance VS Gate Source Voltage

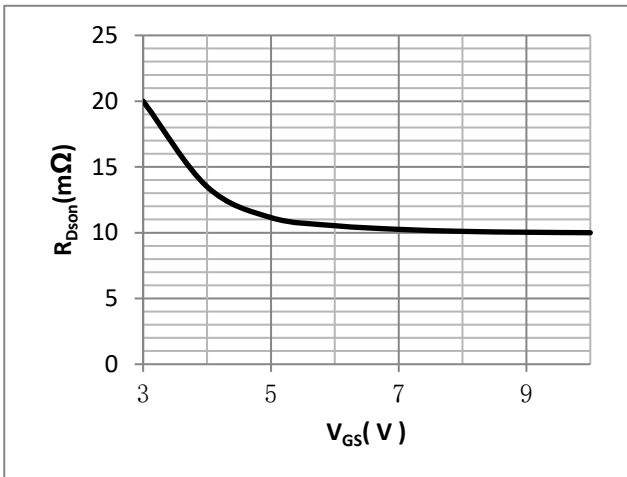


Fig.8 On-Resistance V.S Junction Temperature

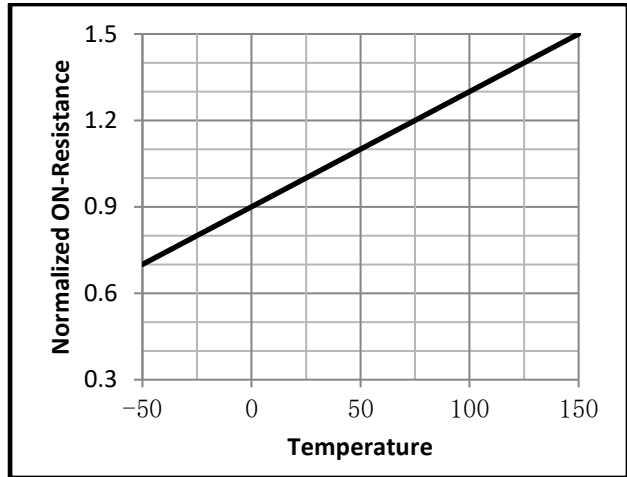


Figure 9. Transfer Characteristics

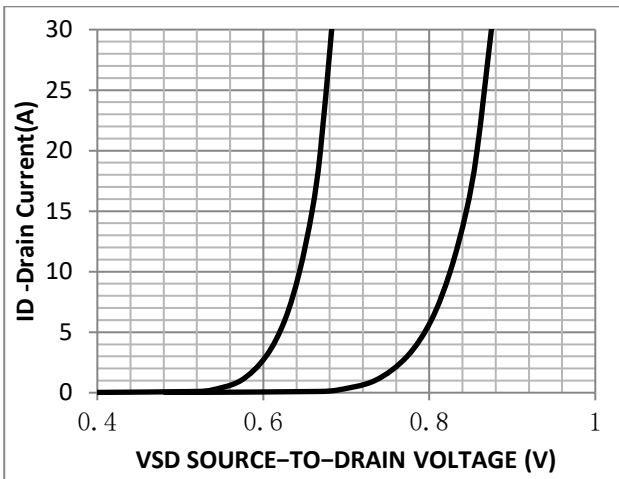


Fig.10 Typical output Characteristics

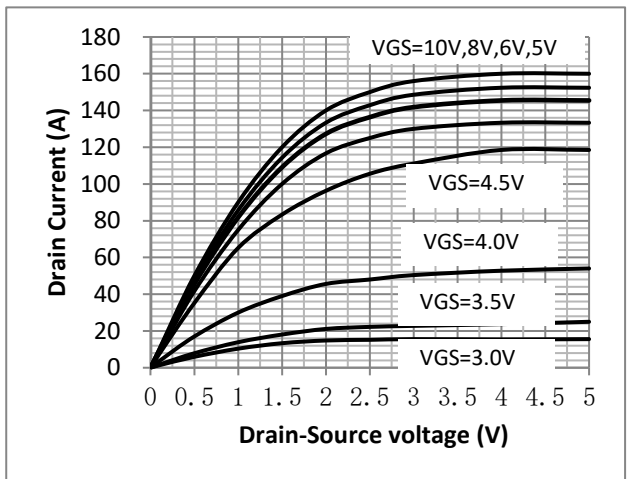


Fig.11 SOA Maximum Safe Operating Area

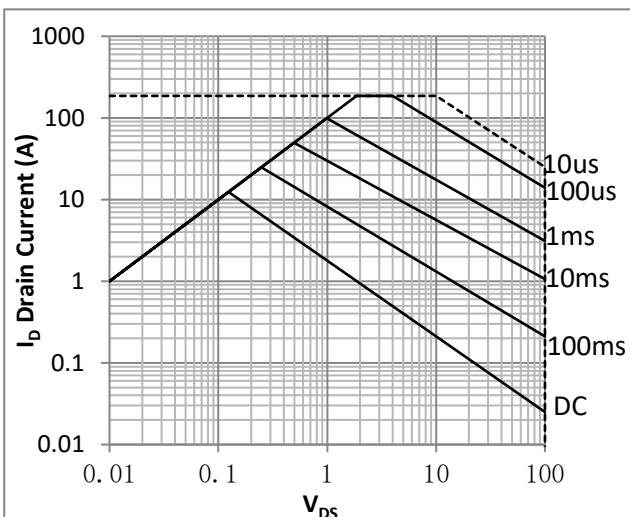


Fig.12 ID-Junction Temperature

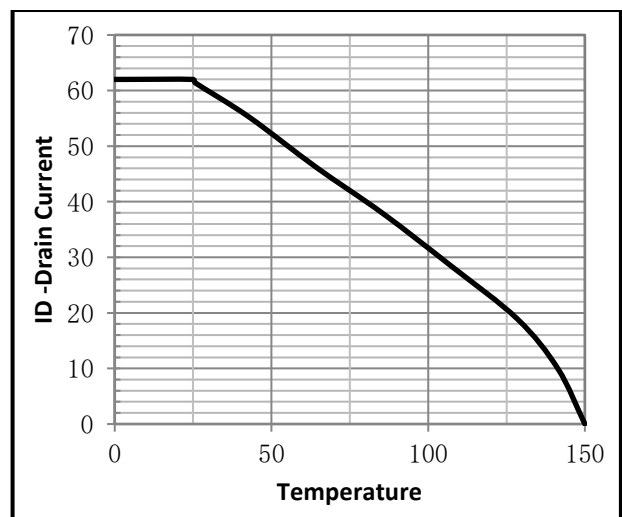


Fig.13 Gate Charge Measurement Circuit

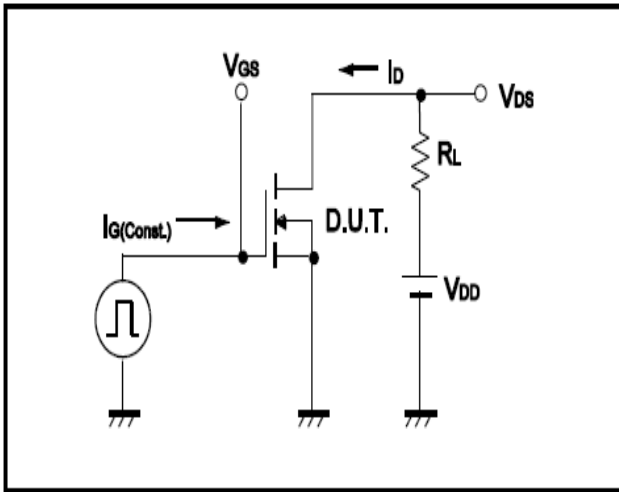


Fig.14 Gate Charge Waveform

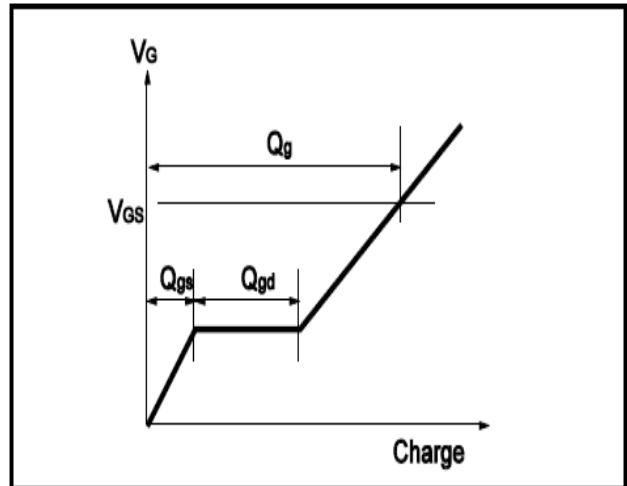


Fig.15 Switching Time Measurement Circuit

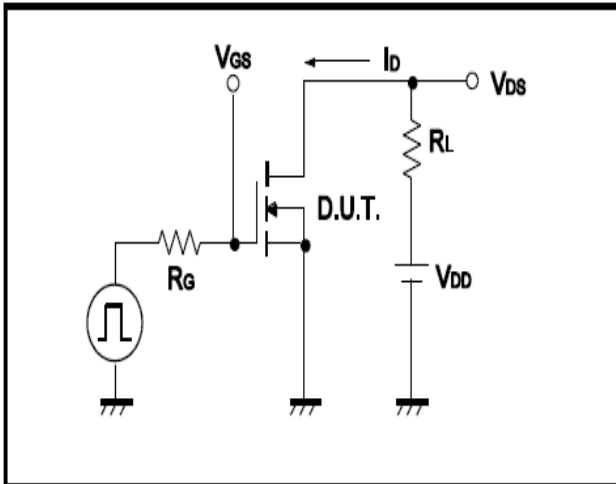
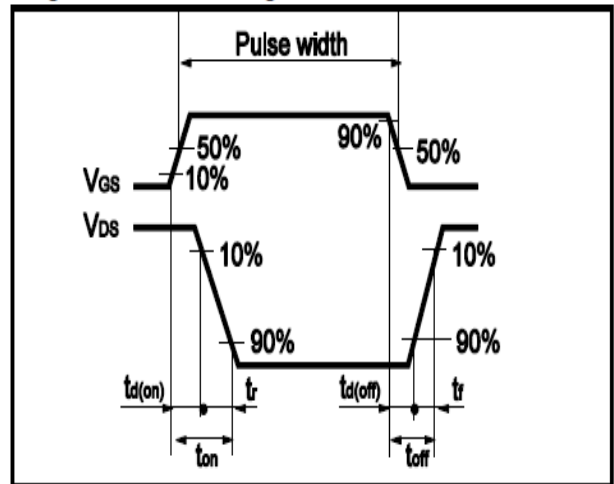


Fig.16 Switching Time Waveform





•Dimensions (TO-251)

Unit: mm

| SYMBOL | min  | max  | SYMBOL | min  | max  |
|--------|------|------|--------|------|------|
| A      | 2.10 | 2.50 | D      | 6.35 | 6.80 |
| A1     | 0.95 | 1.30 | D1     | 5.10 | 5.50 |
| B      | 0.80 | 1.25 | E      | 5.30 | 6.30 |
| b      | 0.50 | 0.80 | e      | 2.24 | 2.35 |
| b1     | 0.70 | 0.90 | E1     | 4.43 | 4.73 |
| c      | 0.45 | 0.60 | L      | 7.00 | 9.40 |
| c1     | 0.45 | 0.60 |        |      |      |

