

### • General Description

The ZM100N02D 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.

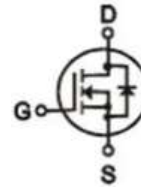
### • Features

- 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

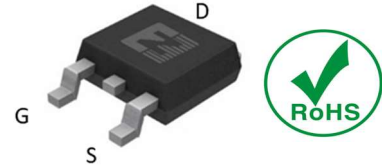
### • Product Summary



$V_{DS} = 20V$

$R_{DS(ON)} = 10m\Omega$

$I_D = 25A$



TO-252

### • Ordering Information:

|                           |           |
|---------------------------|-----------|
| Part NO.                  | ZM100N02D |
| Marking                   | ZM100N02  |
| Packing Information       | REEL TAPE |
| Basic ordering unit (pcs) | 2500      |

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

| Parameter                                  | Symbol                 | Rating     | Unit       |
|--|------------------------|------------|------------|
| Drain-Source Voltage                       | $V_{DS}$               | 20         | V          |
| Gate-Source Voltage                        | $V_{GS}$               | $\pm 12$   | V          |
| Continuous Drain Current                   | $I_{D@TC=25^\circ C}$  | 25         | A          |
|  | $I_{D@TC=75^\circ C}$  | 19         | A          |
|  | $I_{D@TC=100^\circ C}$ | 15.8       | A          |
| Pulsed Drain Current ①                     | $I_{DM}$               | 60         | A          |
| Total Power Dissipation( $TC=25^\circ C$ ) | $P_D@TC=25^\circ C$    | 85         | W          |
| Total Power Dissipation( $TA=25^\circ C$ ) | $P_D@TA=25^\circ C$    | 3.5        | W          |
| Operating Junction Temperature             | $T_J$                  | -55 to 150 | $^\circ C$ |
| Storage Temperature                        | $T_{STG}$              | -55 to 150 | $^\circ C$ |
| Single Pulse Avalanche Energy@ $L=0.1mH$   | $E_{AS}$               | 50         | mJ         |

**•Thermal resistance**

| Parameter                                     | Symbol     | Min. | Typ. | Max. | Unit          |
|---|------------|------|------|------|---------------|
| Thermal resistance, junction - case           | $R_{thJC}$ | -    | -    | 1.5  | $^{\circ}C/W$ |
| Thermal resistance, junction - ambient        | $R_{thJA}$ | -    | -    | 35   | $^{\circ}C/W$ |
| Soldering temperature, wave soldering for 10s | $T_{sold}$ | -    | -    | 265  | $^{\circ}C$   |

**•Electronic Characteristics**

| Parameter                         | Symbol       | Condition                         | Min. | Typ | Max.      | Unit       |
|-----------------------------------|--------------|-----------------------------------|------|-----|-----------|------------|
| Drain-Source Breakdown Voltage    | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$     | 20   |     |           | V          |
| Gate Threshold Voltage            | $V_{GS(TH)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$ | 0.5  |     | 1.2       | V          |
| Drain-Source Leakage Current      | $I_{DSS}$    | $V_{DS} = 20V, V_{GS} = 0V$       |      |     | 1.0       | $\mu A$    |
| Gate- Source Leakage Current      | $I_{GSS}$    | $V_{GS} = \pm 12V, V_{DS} = 0V$   |      |     | $\pm 100$ | nA         |
| Static Drain-source On Resistance | $R_{DS(ON)}$ | $V_{GS} = 4.5V, I_D = 10A$        |      | 10  | 13        | m $\Omega$ |
|                                   |              | $V_{GS} = 2.5V, I_D = 8A$         |      | 13  | 16        | m $\Omega$ |
| Forward Trans conductance         | $g_{FS}$     | $V_{DS} = 10V, I_D = 10A$         |      | 12  |           | s          |
| Source-drain voltage              | $V_{SD}$     | $I_S = 10A$                       |      |     | 1.28      | V          |

**•Electronic Characteristics**

| Parameter                    | Symbol    | Condition                    | Min. | Typ | Max. | Unit |
|------------------------------|-----------|------------------------------|------|-----|------|------|
| Input capacitance            | $C_{iss}$ | $V_{DS} = 15V$<br>$f = 1MHz$ | -    | 950 | -    | pF   |
| Output capacitance           | $C_{oss}$ |                              | -    | 230 | -    |      |
| Reverse transfer capacitance | $C_{rss}$ |                              | -    | 100 | -    |      |

**•Gate Charge characteristics**

| Parameter            | Symbol   | Condition       | Min. | Typ | Max. | Unit |
|----------------------|----------|-----------------|------|-----|------|------|
| Total gate charge    | $Q_g$    | $V_{DD} = 15V$  | -    | 12  | -    | nC   |
| Gate - Source charge | $Q_{gs}$ | $I_D = 10A$     | -    | 4   | -    |      |
| Gate - Drain charge  | $Q_{gd}$ | $V_{GS} = 4.5V$ | -    | 6   | -    |      |

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

Fig.1 Gate-Charge Characteristics

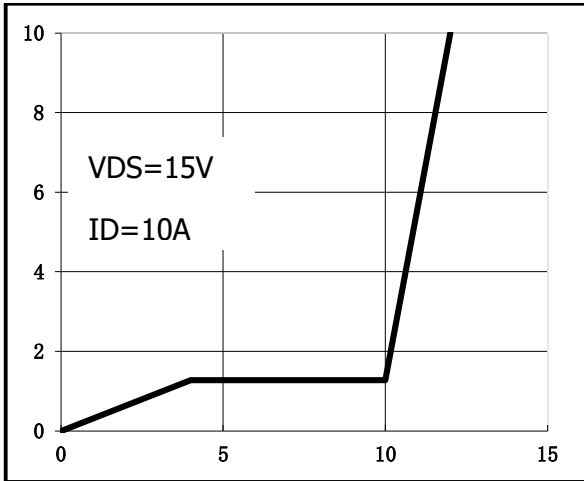


Fig.2 Capacitance Characteristics

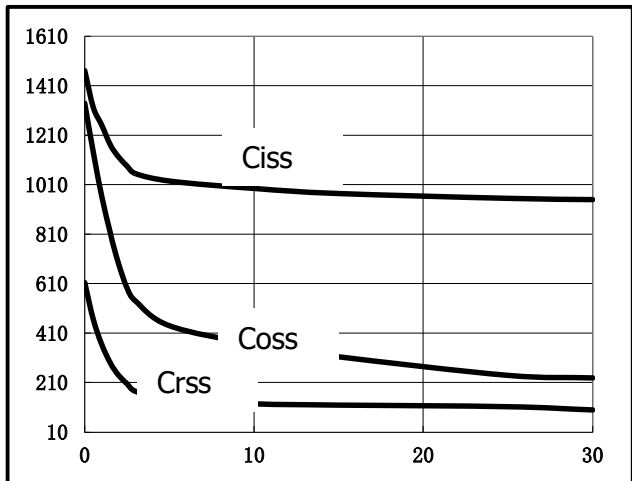


Fig.3 Power Dissipation Derating Curve

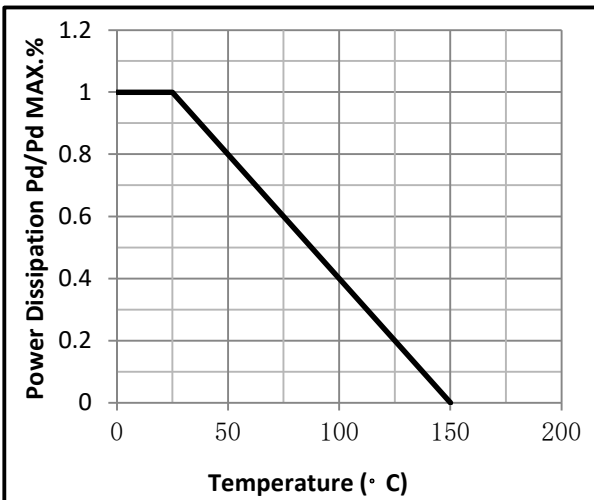


Fig.4 Typical output Characteristics

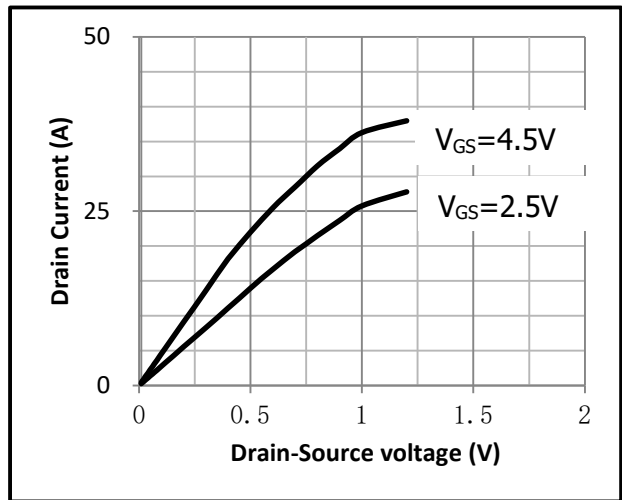


Fig.5 Threshold Voltage V.S Junction Temperature

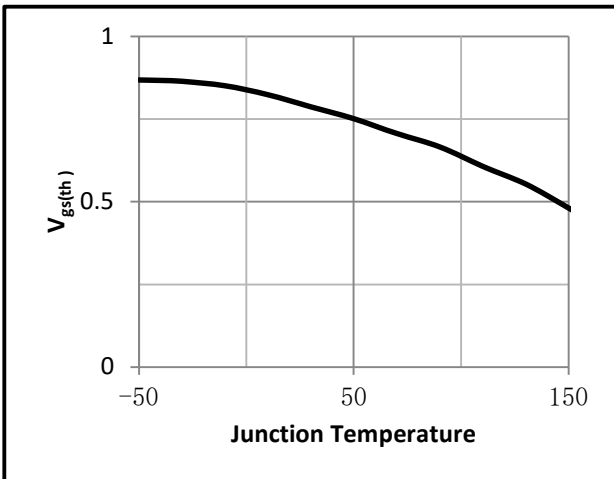


Fig.6 Resistance V.S Drain Current

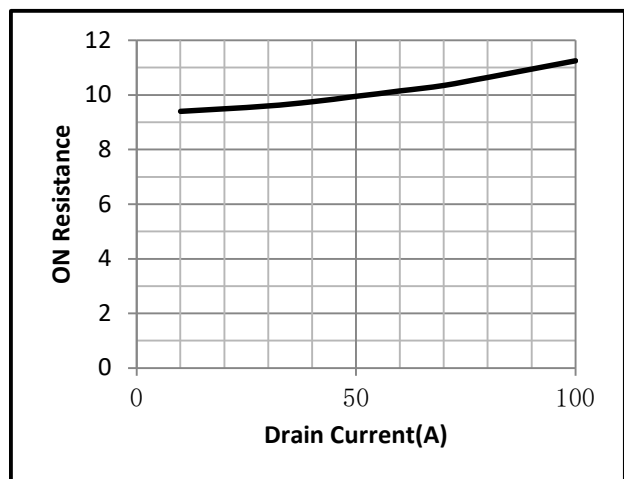


Fig.7 On-Resistance VS Gate Source Voltage

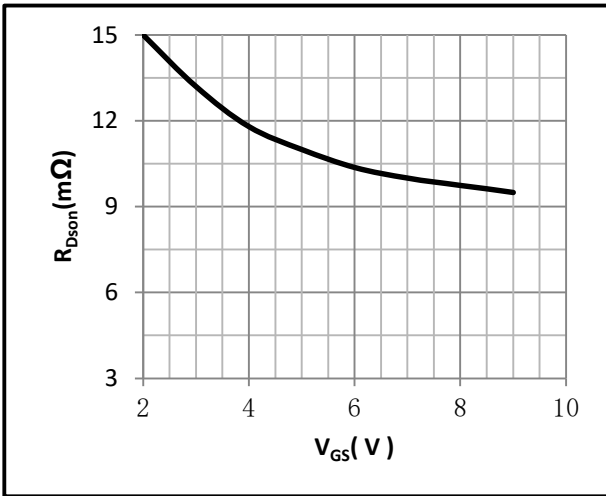


Fig.8 On-Resistance V.S Junction Temperature

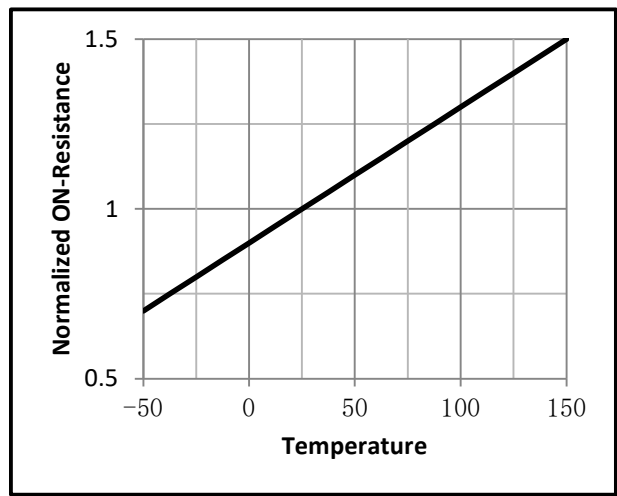


Fig.9 Switching Time Measurement Circuit

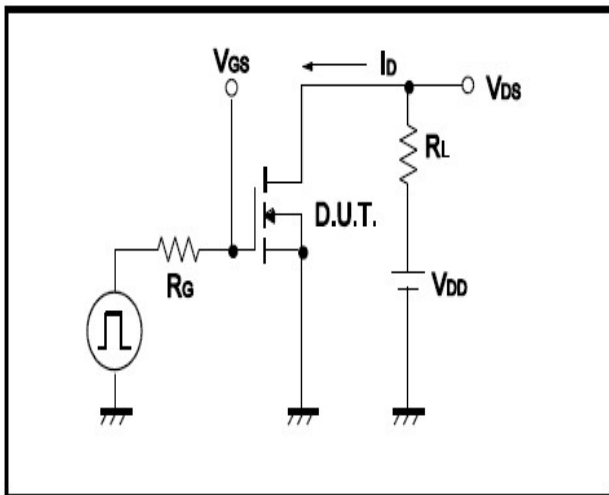


Fig.10 Switching Time Waveform

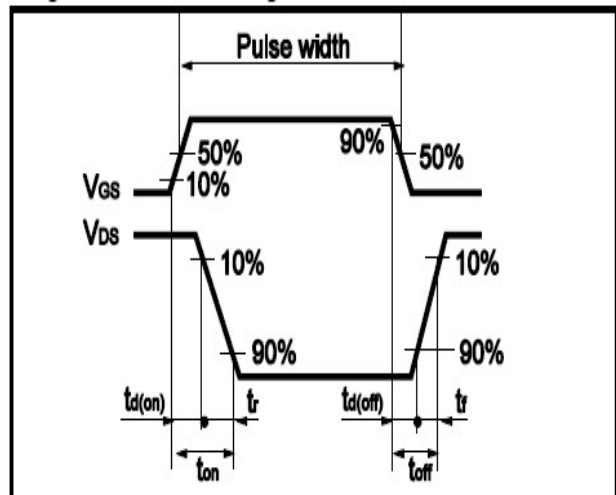


Fig.11 Avalanche Measurement Circuit

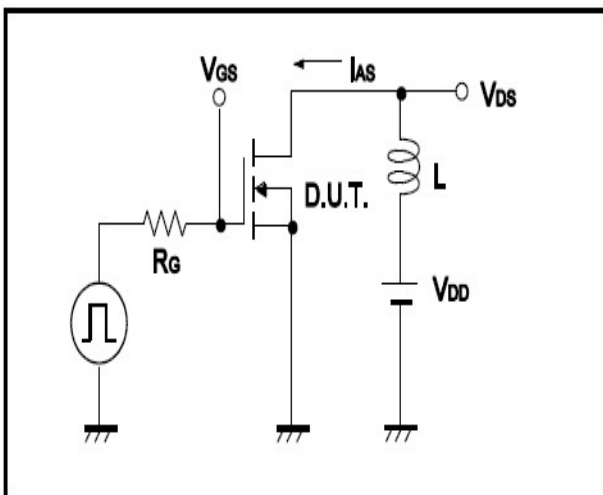
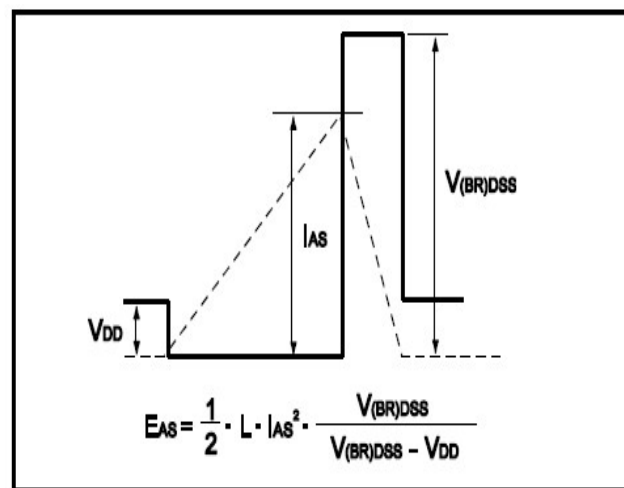


Fig.12 Avalanche Waveform





•Dimensions (TO-252)

Unit: mm

| SYMBOL | min  | max   | SYMBOL | min  | max  |
|--------|------|-------|--------|------|------|
| A      | 2.10 | 2.50  | B      | 0.85 | 1.25 |
| b      | 0.50 | 0.80  | b1     | 0.50 | 0.90 |
| b2     | 0.45 | 0.70  | C      | 0.45 | 0.70 |
| D      | 6.30 | 6.75  | D1     | 5.10 | 5.50 |
| E      | 5.30 | 6.30  | e1     | 2.25 | 2.35 |
| L1     | 9.20 | 10.60 | e2     | 4.45 | 4.75 |
| L2     | 0.90 | 1.75  | L3     | 0.60 | 1.10 |
| K      | 0.00 | 0.23  |        |      |      |

