

**• General Description**

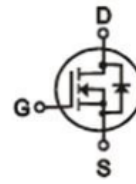
It combines advanced SGT MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ .

**• 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**

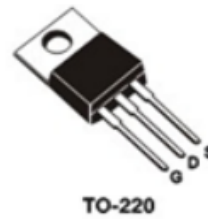
- Synchronous Rectification for AC-DC/DC-DC converter
- Oring switches
- Power Tools

**• Product Summary**


$V_{DS} = 100V$

$R_{DS(ON)} = 3.5m\Omega$

$I_D = 175A$


**• Ordering Information:**

|                           |              |
|---------------------------|--------------|
| Part NO.                  | ZMS035N10HPC |
| Marking                   | ZMS035N10H   |
| Packing Information       | Bulk Tube    |
| Basic ordering unit (pcs) | 800          |

**• Absolute Maximum Ratings (T<sub>C</sub> = 25°C)**

| Parameter                      | Symbol                    | Rating     | Unit |
|--------------------------------|---------------------------|------------|------|
| Drain-Source Voltage           | $V_{DS}$                  | 100        | V    |
| Gate-Source Voltage            | $V_{GS}$                  | ±20        | V    |
| Continuous Drain Current       | $I_D @ T_C = 25^\circ C$  | 175        | A    |
|                                | $I_D @ T_C = 75^\circ C$  | 133        | A    |
|                                | $I_D @ T_C = 100^\circ C$ | 110        | A    |
| Pulsed Drain Current ①         | $I_{DM}$                  | 525        | A    |
| Total Power Dissipation        | $P_D @ T_C = 25^\circ C$  | 125        | W    |
| Total Power Dissipation        | $P_D @ T_A = 25^\circ C$  | 3.4        | W    |
| Operating Junction Temperature | $T_J$                     | -55 to 175 | °C   |
| Storage Temperature            | $T_{STG}$                 | -55 to 175 | °C   |
| Single Pulse Avalanche Energy  | $E_{AS}$                  | 320        | mJ   |

**•Thermal resistance**

| Parameter                                     | Symbol     | Min. | Typ. | Max. | Unit  |
|---|------------|------|------|------|-------|
| Thermal resistance, junction - case           | $R_{thJC}$ | -    | -    | 1.0  | ° C/W |
| Thermal resistance, junction - ambient        | $R_{thJA}$ | -    | -    | 35   | ° C/W |
| Soldering temperature, wave soldering for 10s | $T_{sold}$ | -    | -    | 265  | ° C   |

**•Electronic Characteristics**

| Parameter                         | Symbol       | Condition                         | Min. | Typ | Max.      | Unit       |
|-----------------------------------|--------------|-----------------------------------|------|-----|-----------|------------|
| Drain-Source Breakdown Voltage    | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$     | 100  |     |           | V          |
| Gate Threshold Voltage            | $V_{GS(TH)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$ | 2.0  |     | 4.0       | V          |
| Drain-Source Leakage Current      | $I_{DSS}$    | $V_{DS} = 100V, V_{GS} = 0V$      |      |     | 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 | $R_{DS(ON)}$ | $V_{GS} = 10V, I_D = 25A$         |      | 3.5 | 4.6       | m $\Omega$ |
| Forward Transconductance          | $g_{FS}$     | $V_{DS} = 25V, I_D = 10A$         |      | 28  |           | s          |
| Source-drain voltage              | $V_{SD}$     | $I_S = 25A$                       |      |     | 1.28      | V          |

**•Electronic Characteristics**

| Parameter                    | Symbol    | Condition                                 | Min. | Typ  | Max. | Unit |
|------------------------------|-----------|---|------|------|------|------|
| Input capacitance            | $C_{iss}$ | $V_{GS} = 0V, V_{DS} = 25V$<br>$f = 1MHz$ | -    | 4028 | -    | pF   |
| Output capacitance           | $C_{oss}$ |   | -    | 1960 | -    |      |
| Reverse transfer capacitance | $C_{rss}$ |   | -    | 44   | -    |      |

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

| Parameter                          | Symbol   | Condition                            | Min. | Typ | Max. | Unit |
|------------------------------------|----------|--------------------------------------|------|-----|------|------|
| Total gate charge                  | $Q_g$    | $V_{DD} = 25V$                       | -    | 48  | -    | nC   |
| Gate - Source charge               | $Q_{gs}$ | $I_D = 8A$                           | -    | 16  | -    |      |
| Gate - Drain charge                | $Q_{gd}$ | $V_{GS} = 10V$                       | -    | 4.9 | -    |      |
| Body Diode Reverse Recovery Time   | $t_{rr}$ | $I_F = 20A,$<br>$di/dt = 100A/\mu s$ |      | TBD |      | nS   |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | $I_F = 20A,$<br>$di/dt = 100A/\mu s$ |      | TBD |      | nC   |

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

Fig.1 Gate-Charge Characteristics

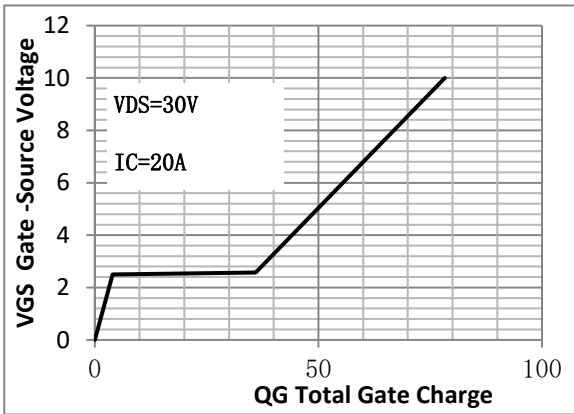


Fig.2 Capacitance Characteristics

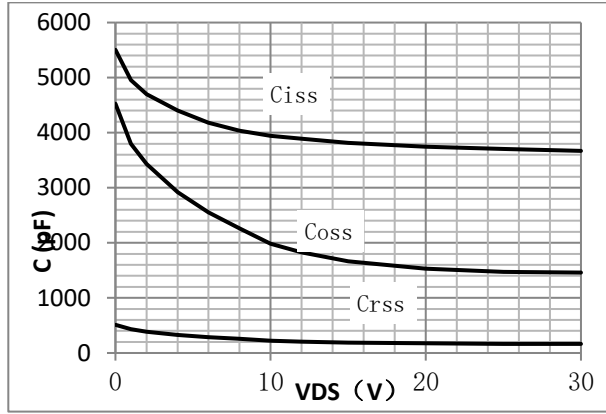


Fig.3 Power Dissipation

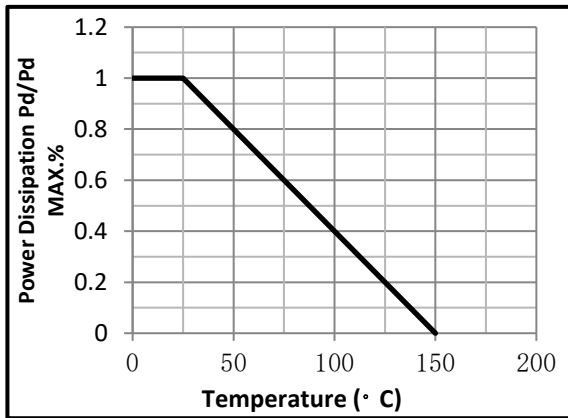


Fig.4 Typical output Characteristics

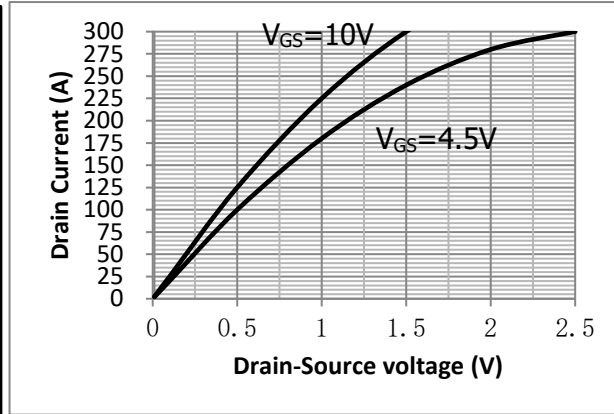


Fig.5 Threshold Voltage V.S Junction Temperature

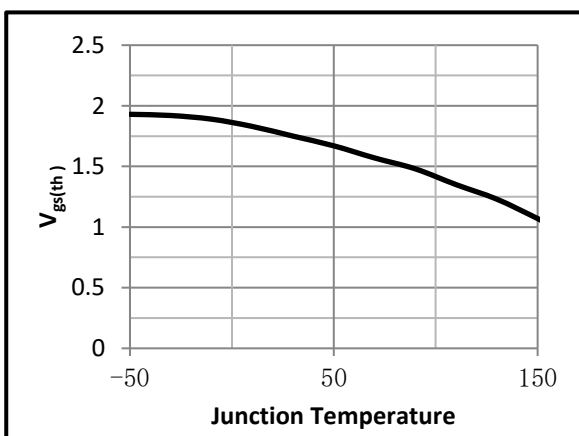


Fig.6 Resistance V.S Drain Current

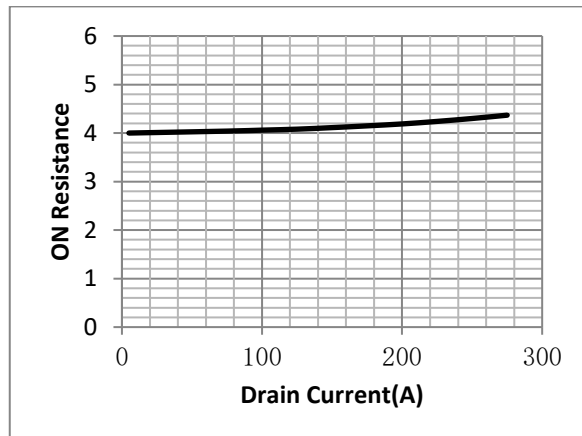


Fig.7 On-Resistance VS Gate Source Voltage

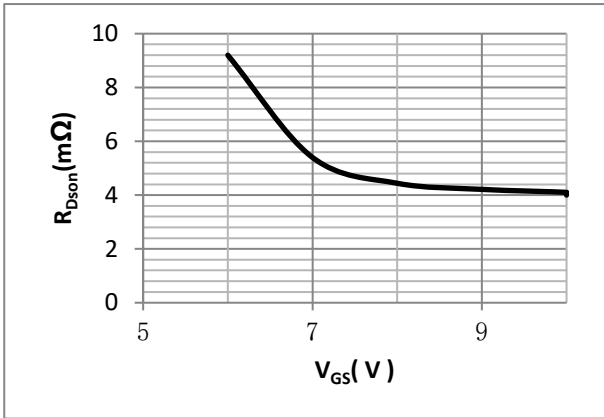


Fig.8 On-Resistance V.S Junction Temperature

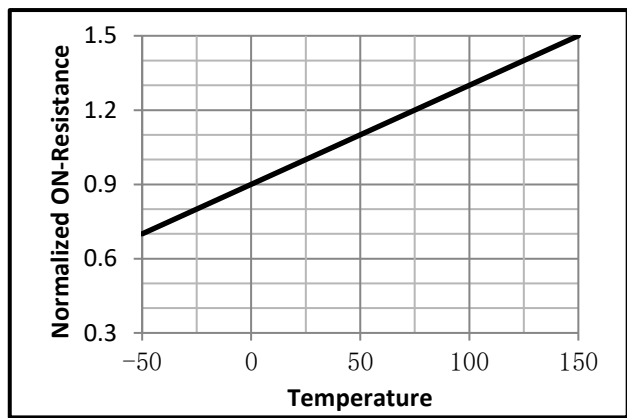


Fig.9 SOA Maximum Safe Operating Area

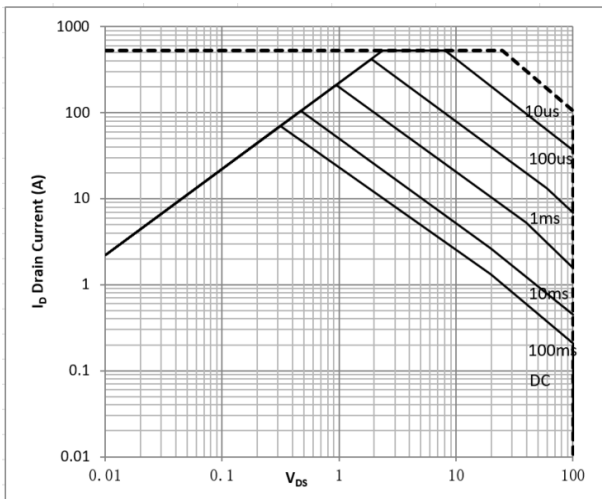


Fig.10  $I_D$ -Junction Temperature

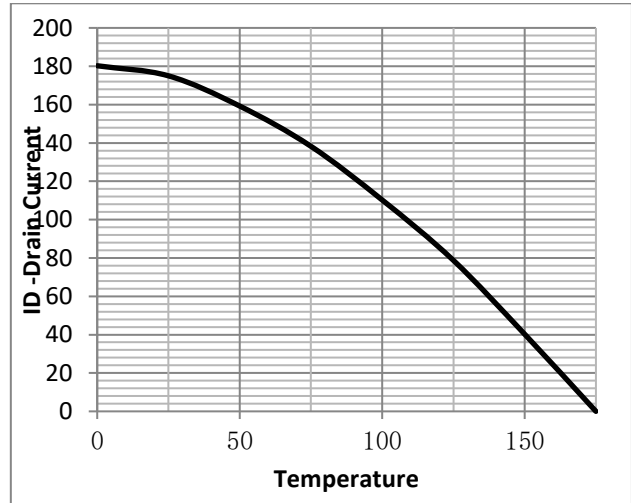


Fig.11 Switching Time Measurement Circuit

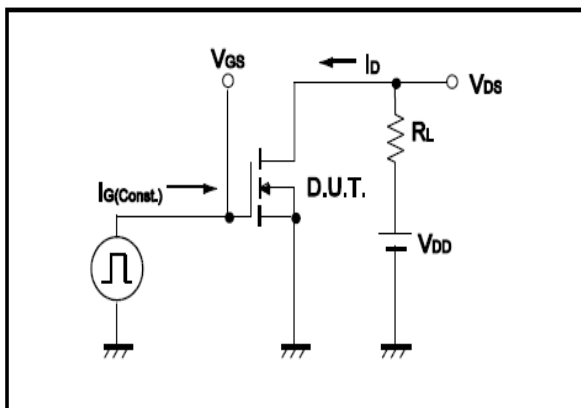


Fig.12 Gate Charge Waveform

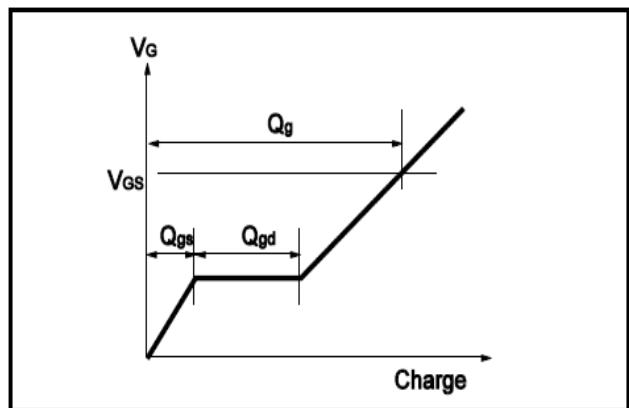


Fig.13 Switching Time Measurement Circuit

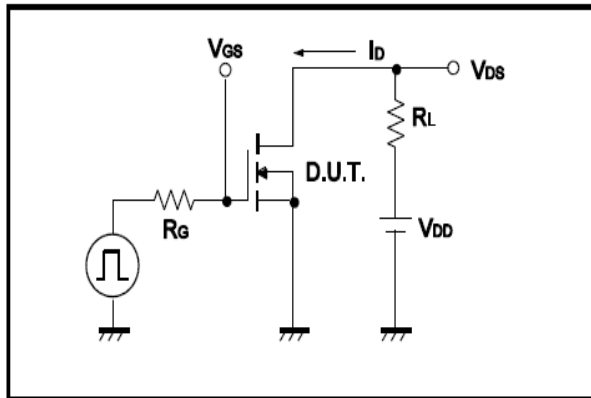


Fig.14 Gate Charge Waveform

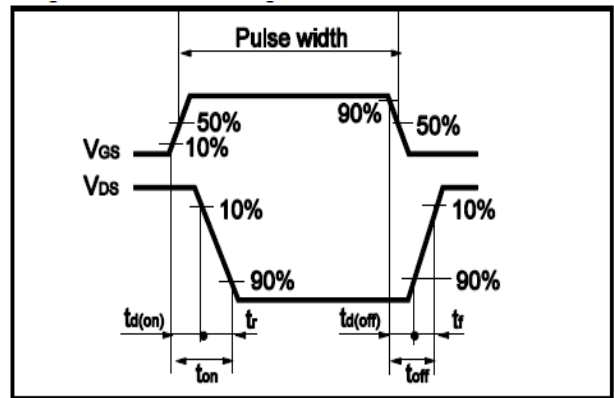


Fig.15 Avalanche Measurement Circuit

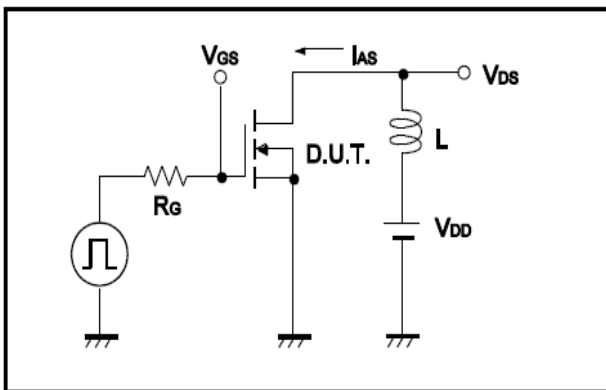
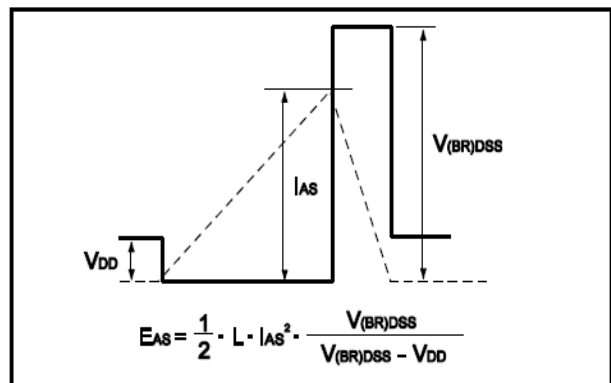


Fig.16 Avalanche Waveform



•Dimensions (TO-220)

Unit: mm

| SYMBOL | min   | nom | max   | SYMBOL | min   | nom  | max   |
|--------|-------|-----|-------|--------|-------|------|-------|
| A      | 4.00  |     | 4.80  | E      | 9.90  |      | 10.70 |
| B      | 1.20  |     | 1.50  | e      |       | 2.54 |       |
| B1     | 1.00  |     | 1.40  | F      | 1.10  |      | 1.45  |
| b1     | 0.65  |     | 1.00  | L      | 12.50 |      | 14.50 |
| c      | 0.35  |     | 0.75  | L1     | 3.00  | 3.50 | 4.00  |
| D      | 15.00 |     | 16.50 | Q      | 2.50  |      | 3.00  |
| D1     | 5.90  |     | 6.90  | Q1     | 2.00  |      | 3.00  |
|        |       |     |       | ΦP     | 3.60  |      | 3.90  |

