

• General Description

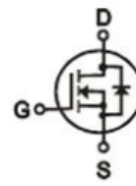
It combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

• 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

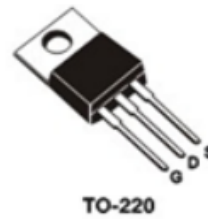
- Synchronous Rectification for AC-DC/DC-DC converter
- Power Tools

• Product Summary


$V_{DS} = 120V$

$R_{DS(ON)} = 6.5m\Omega$

$I_D = 120A$


• Ordering Information:

| | |
|---------------------------|------------|
| Part NO. | ZMS065N12P |
| Marking | ZMS065N12 |
| Packing Information | Bulk Tube |
| Basic ordering unit (pcs) | 1000 |

• Absolute Maximum Ratings (T_C = 25°C)

| Parameter | Symbol | Rating | Unit |
|---|------------------------|------------|------|
| Drain-Source Voltage | V_{DS} | 120 | V |
| Gate-Source Voltage | V_{GS} | ±20 | V |
| Continuous Drain Current | $I_D @ TC=25^\circ C$ | 120 | A |
| | $I_D @ TC=75^\circ C$ | 91 | A |
| | $I_D @ TC=100^\circ C$ | 75 | A |
| Pulsed Drain Current ① | I_{DM} | 360 | A |
| Total Power Dissipation | $P_D @ TC=25^\circ C$ | 85 | W |
| Total Power Dissipation | $P_D @ TA=25^\circ C$ | 3.4 | W |
| Operating Junction Temperature | T_J | -55 to 150 | °C |
| Storage Temperature | T_{STG} | -55 to 150 | °C |
| Single Pulse Avalanche Energy @ L=0.1mH | E_{AS} | 320 | mJ |

•Thermal resistance

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|------------|------|------|------|-------|
| Thermal resistance, junction - case | R_{thJC} | - | - | 1.5 | ° C/W |
| Thermal resistance, junction - ambient | R_{thJA} | - | - | 37 | ° 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} | $V_{GS} = 0V, I_D = 250\mu A$ | 120 | | | 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} | $V_{DS} = 120V, V_{GS} = 0V$ | | | 1.0 | μA |
| Gate- Source Leakage Current | I_{GSS} | $V_{GS} = \pm 20V, V_{DS} = 0V$ | | | ± 100 | nA |
| Static Drain-source On Resistance | $R_{DS(ON)}$ | $V_{GS} = 10V, I_D = 25A$ | | 6.5 | 8.4 | m Ω |
| | | $V_{GS} = 10V, I_D = 20A$ | | 8 | 10.4 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS} = 25V, I_D = 10A$ | | 40 | | 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} | $V_{GS} = 0V, V_{DS} = 25V$ $f = 1MHz$ | - | 3750 | - | pF |
| Output capacitance | C_{oss} | | - | 1830 | - | |
| Reverse transfer capacitance | C_{rss} | | - | 190 | - | |

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

| Parameter | Symbol | Condition | Min. | Typ | Max. | Unit |
|------------------------------------|----------|--------------------------------------|------|-----|------|------|
| Total gate charge | Q_g | $V_{DD} = 25V$ | - | 47 | - | nC |
| Gate - Source charge | Q_{gs} | $I_D = 8A$ | - | 13 | - | |
| Gate - Drain charge | Q_{gd} | $V_{GS} = 10V$ | - | 10 | - | |
| Body Diode Reverse Recovery Time | t_{rr} | $I_F = 20A,$ $di/dt = 100A/\mu s$ | | 56 | | nS |
| Body Diode Reverse Recovery Charge | Q_{rr} | $I_F = 20A,$ $di/dt = 100A/\mu s$ | | 38 | | nC |

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

Fig.1 Gate-Charge Characteristics

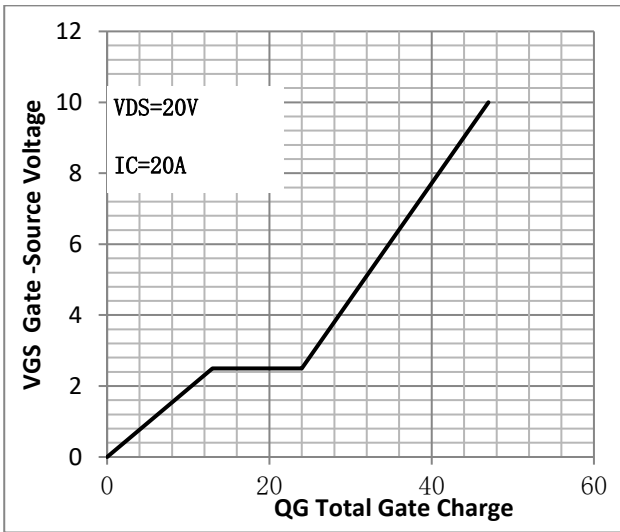


Fig.2 Capacitance Characteristics

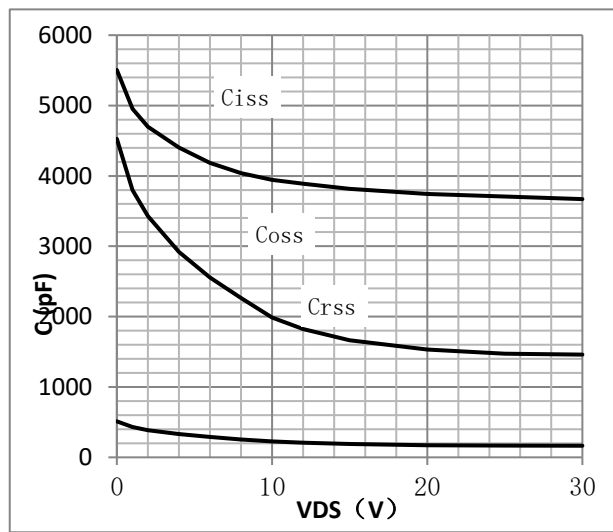


Fig.3 Power Dissipation

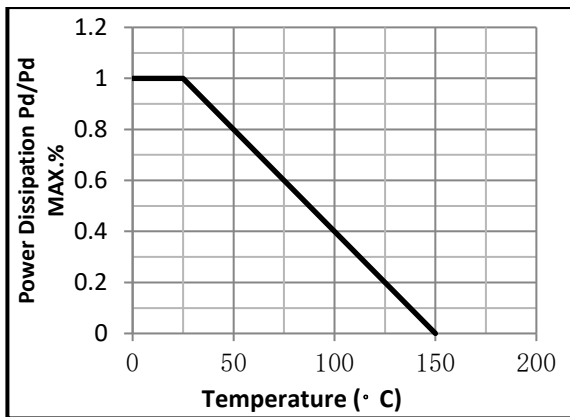


Fig.4 Typical output Characteristics

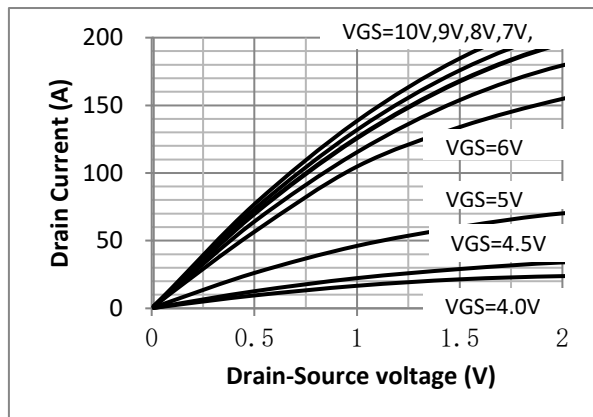


Fig.5 Threshold Voltage V.S Junction Temperature

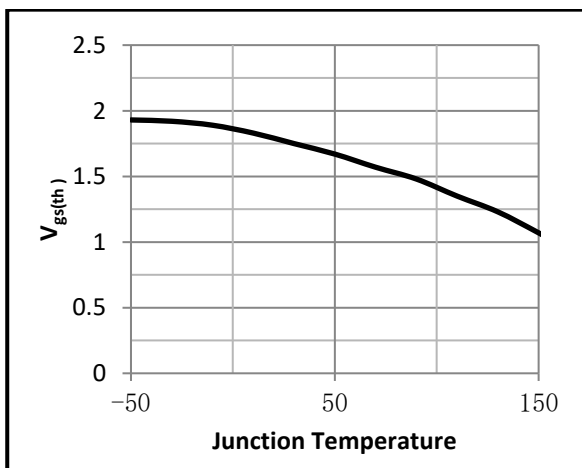


Fig.6 Resistance V.S Drain Current

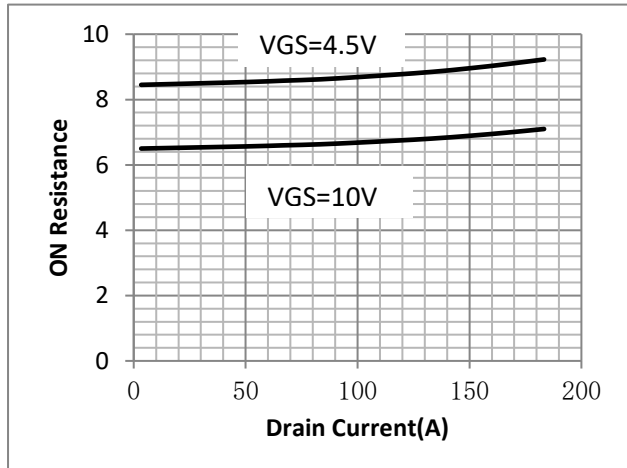


Fig.7 On-Resistance VS Gate Source Voltage

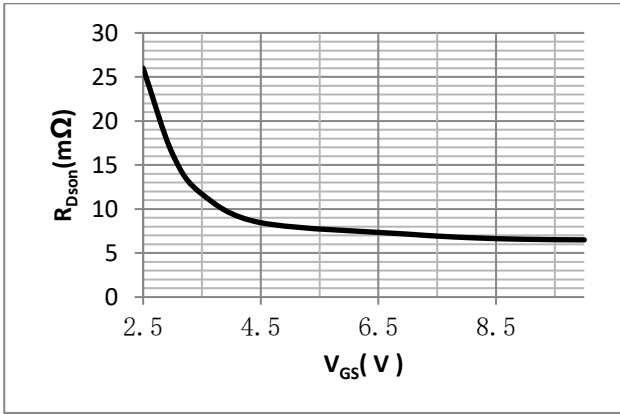


Fig.8 On-Resistance V.S Junction Temperature

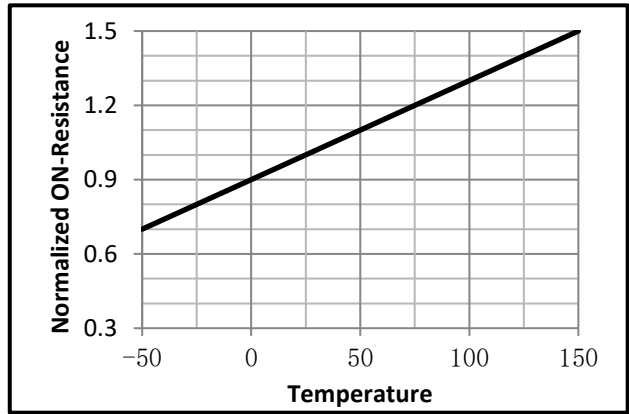


Fig.9 SOA Maximum Safe Operating Area

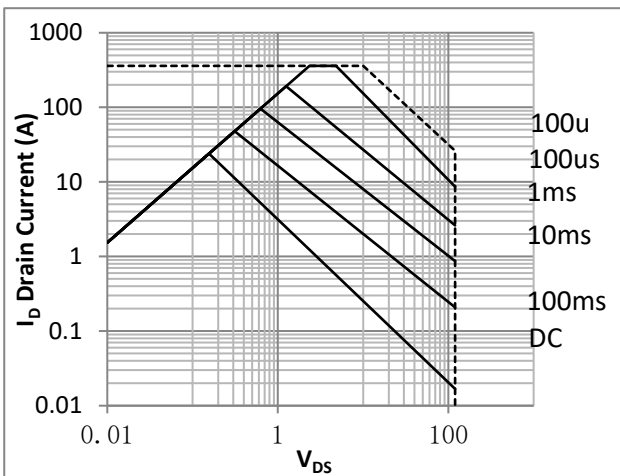


Fig.10 I_D-Junction Temperature

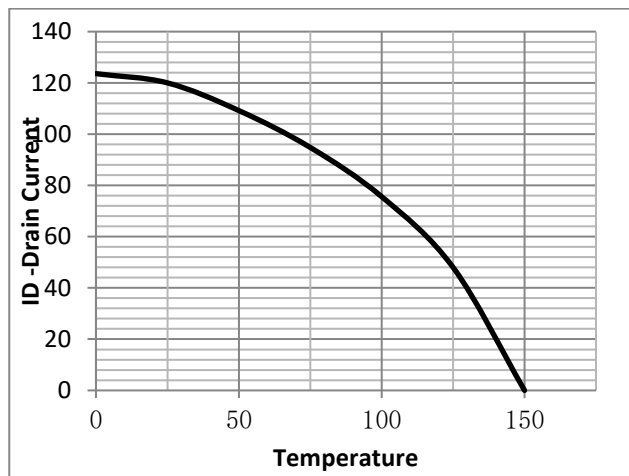


Fig.11 Switching Time Measurement Circuit

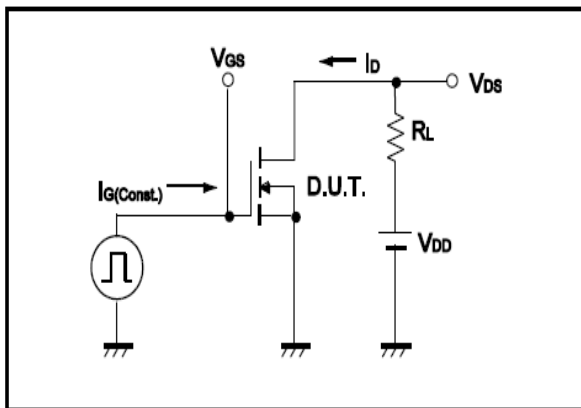


Fig.12 Gate Charge Waveform

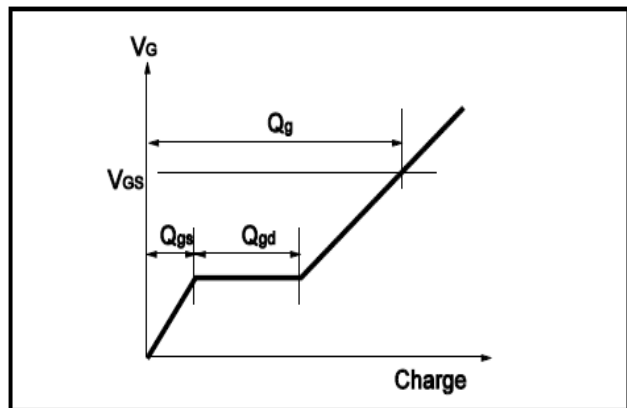


Fig.13 Switching Time Measurement Circuit

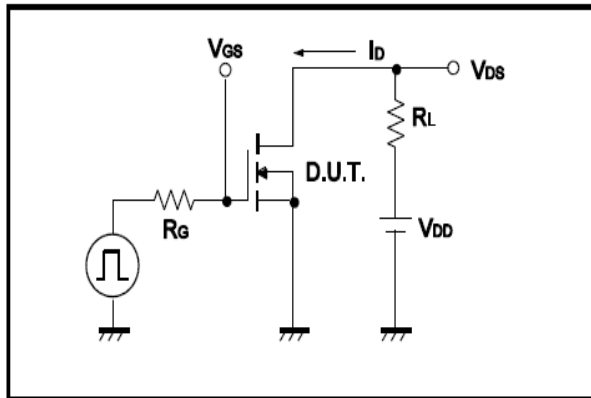


Fig.14 Gate Charge Waveform

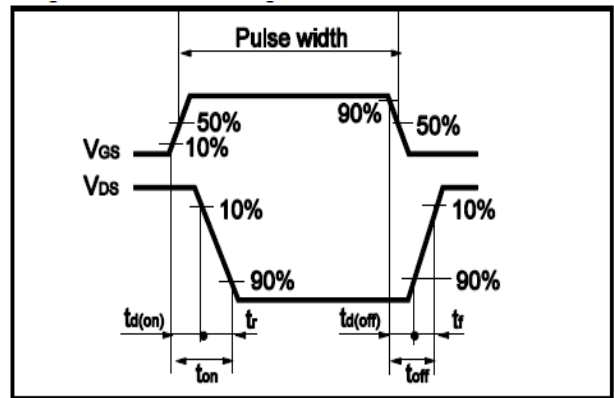


Fig.15 Avalanche Measurement Circuit

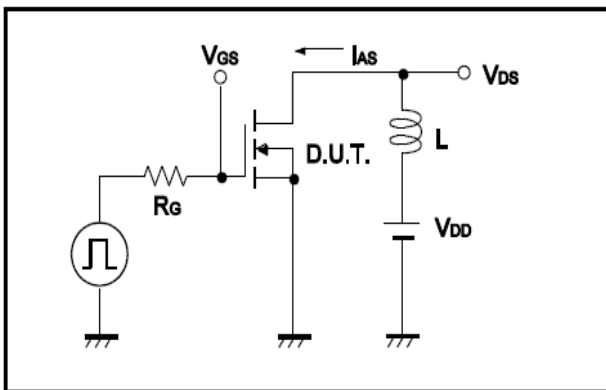
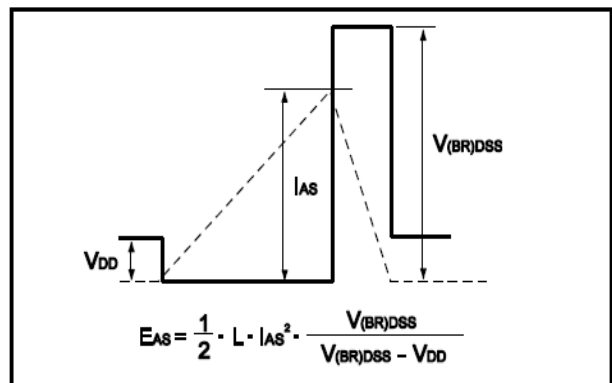


Fig.16 Avalanche Waveform





• 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 |

