# 80V N-Channel Power SpeedFET

## • General Description

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

## • Features

■Low $R_{DS(ON)}$ to minimize conductive loss

■Low Gate Charge for fast switching

■Low Thermal resistance

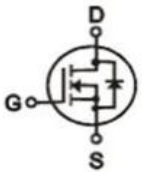
## •Application

■BLDC Motor driver

■DC-DC

■Battery protection

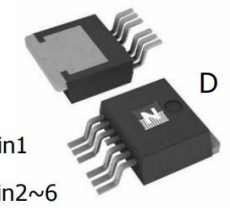
## • Product Summary




$V_{DS}$= 80V

$R_{DS(ON)}$ = 1.6mΩ

$I_D$= 200A




TO-263-6

## •Ordering Information:

| | |
|---|---|
| Part NO. | ZMS015N08HB6 |
| Marking | ZMS015N08H |
| Packing Information | REEL TAPE |
| Basic ordering unit (pcs) | 800 |

## •Absolute Maximum Ratings ($T_C$=25℃)

| Parameter | Symbol | Conditions | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 25 °C ≤ $T_j$ ≤ 175 °C | 80 | V |
| Gate-Source Voltage | $V_{GS}$ | | ±20 | V |
| Continuous Drain Current | $I_D$ | $T_C$=25℃ | 200 | A |
| | $I_D$ | $T_C$=75℃ | 156 | A |
| | $I_D$ | $T_C$=100℃ | 127 | A |
| Pulsed Drain Current | $I_{DM}$ | Pulsed; $t_p$ ≤ 10 μs; $T_{mb}$ = 25 °C; | 600 | A |
| Total Power Dissipation | $P_D$ | $T_C$=25℃ | 179 | W |
| Total Power Dissipation | $P_D$ | $T_A$=25℃ | 4.2 | W |
| Operating Junction Temperature | $T_J$ | | -55 to +150 | ℃ |
| Storage Temperature | $T_{STG}$ | | -55 to +150 | ℃ |
| Single Pulse Avalanche Energy | $E_{AS}$ | L=0.1mH, VGS=10V, Rg=25Ω, | 310 | mJ |
| | | L=0.5mH, VGS=10V, Rg=25Ω, | 713 | mJ |
| ESD Level (HBM) | CLASS 2 | | | |

## ●Thermal resistance

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Thermal resistance, junction - case | $R_{thJC}$ | | - | 0.7 | °C/W |
| Thermal resistance, junction-ambient | $R_{thJA}$① | | - | 30 | °C/W |
| Soldering temperature | Tsold | | - | 260 | °C |

## ●Electronic Characteristics

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$ =0V, $I_D$ =250uA | 80 | | | V |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS}$ =$V_{DS}$, $I_D$ =250uA | 2.0 | 2.7 | 4.0 | V |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{GS}$=0V, $V_{DS}$= 80V | | | 1.0 | uA |
| Gate- Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V, $V_{DS}$ = 0V | | | 100 | nA |
| Static Drain-source On Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$= 30A | | 1.6 | 2.1 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{GS}$ =5V, $I_{SD}$ = 20A | | 28 | | s |
| Diode Forward Voltage | $V_{FSD}$ | $V_{GS}$ =0V, $I_{SD}$ = 30A | | | 1.3 | V |

## ●Dynamic characteristics

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Input capacitance | Ciss | f = 1MHz, $V_{DS}$=25V | - | 9130 | - | pF |
| Output capacitance | Coss | | - | 6640 | - | |
| Reverse transfer capacitance | Crss | | - | 117 | - | |
| Gate Risistance | Rg | f = 1MHz | - | 2.5 | | Ω |
| Total gate charge | Qg | $V_{DD}$ = 15V, $I_D$ = 20A, $V_{GS}$ = 10V | - | 121 | - | nC |
| Gate - Source charge | Qgs | | - | 24 | - | |
| Gate - Drain charge | Qgd | | - | 23 | - | |
| Turn-ON Delay time | $t_{D(on)}$ | $V_{GS}$=10V,$V_{DS}$=15V, $R_G$ =3.3Ω, $I_D$ =20A | - | 19 | - | ns |
| Turn-ON Rise time | $t_r$ | | - | 14 | - | ns |
| Turn-Off Delay time | $t_{D(off)}$ | | - | 31 | - | ns |
| Turn-Off Fall time | $t_f$ | | - | 37 | - | ns |
| Reverse Recovery Time | $t_{RR}$ | $V_{DD}$=20V, $dI_S/dt$ = 100A/us, $I_S$=50A | - | 76 | - | ns |
| Reverse Recovery Charge | $Q_{RR}$ | | - | 120 | - | nC |

Fig.1 Gate-Charge Characteristics

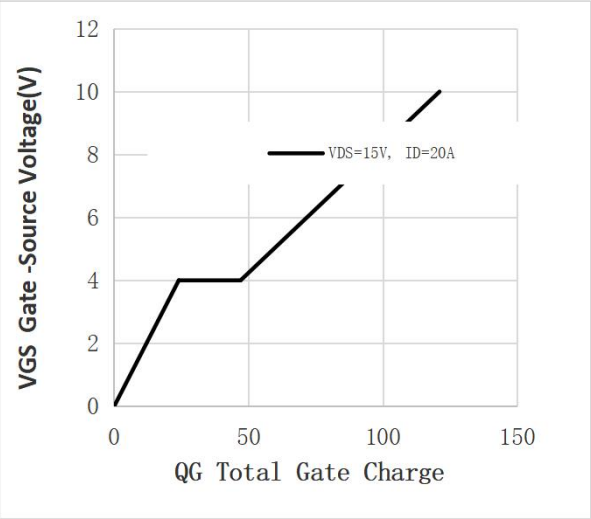



Fig.2 Capacitance Characteristics

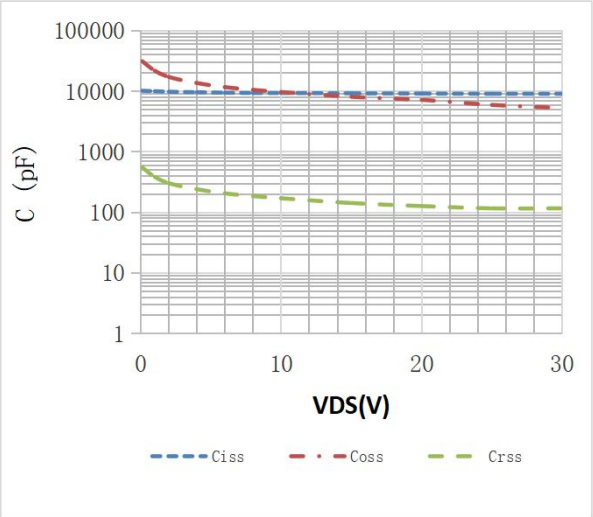



Fig.3 Power Dissipation

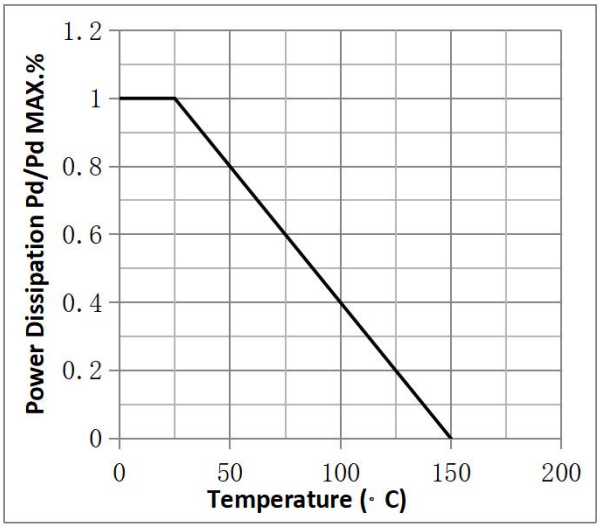



Fig.4 Typical output Characteristics

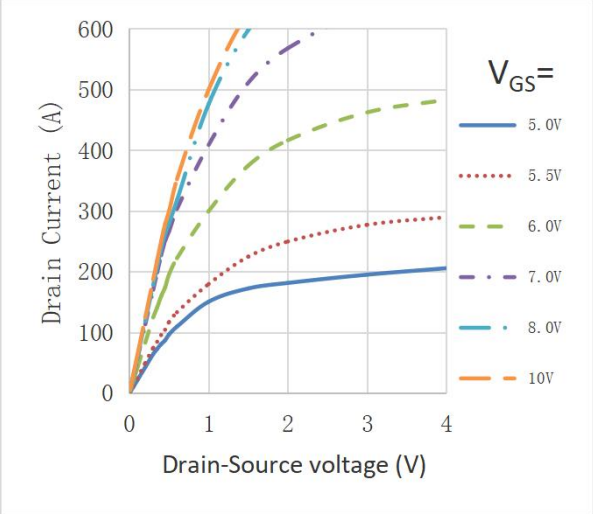



Fig.5 Threshold Voltage V.S Junction Temperature

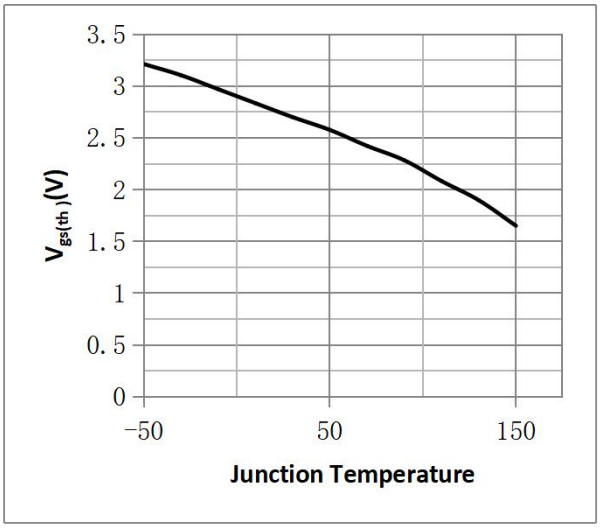



Fig.6 Resistance V.S Drain Current

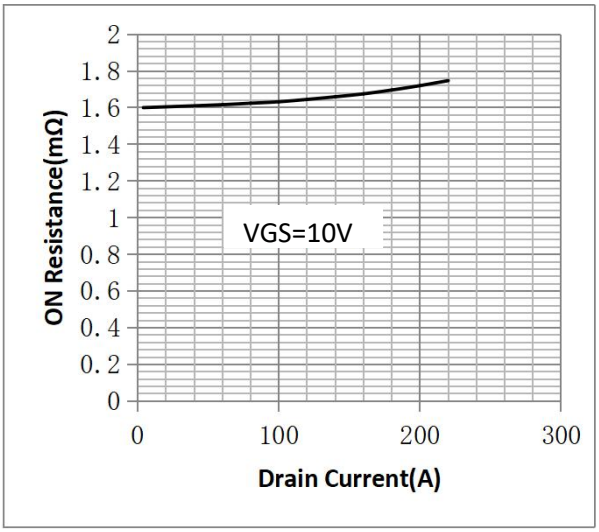


Fig.7 On-Resistance VS Gate Source Voltage

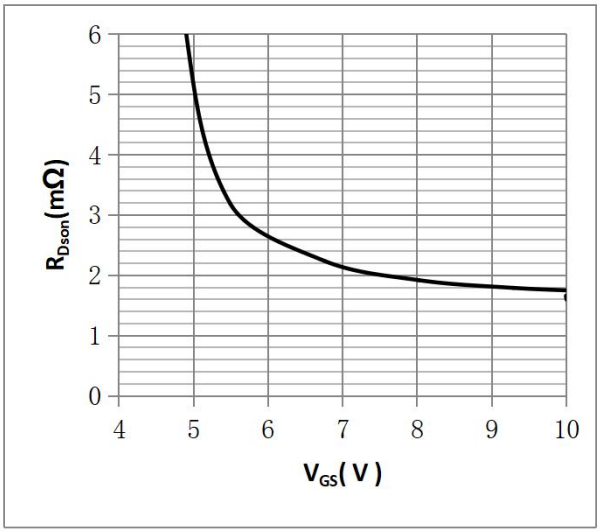



Fig.8 On-Resistance V.S Junction Temperature

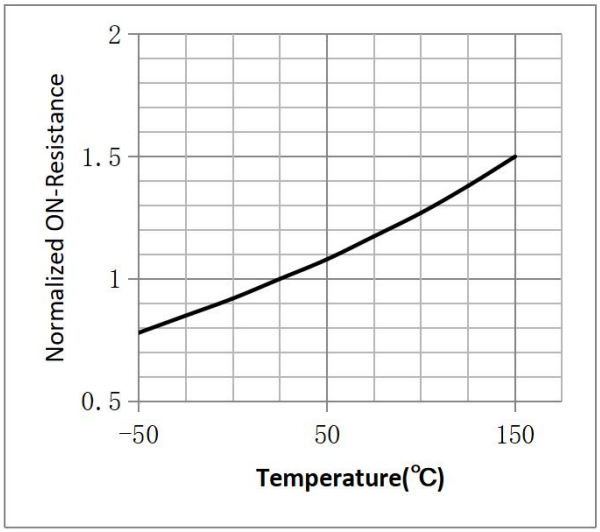



Figure 9. Diode Forward Voltage vs. Current

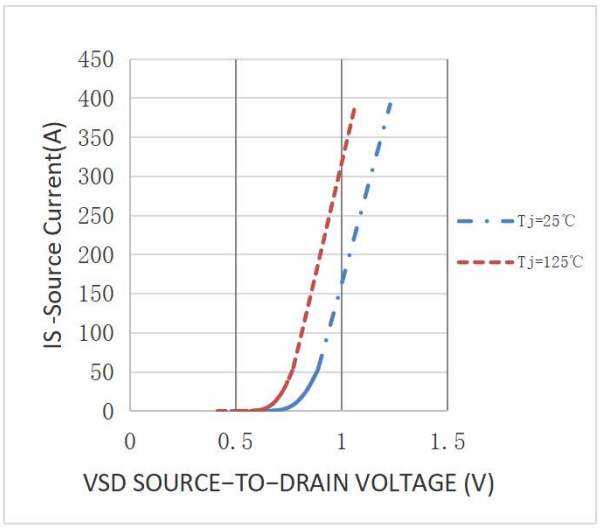



Figure 10. Transfer Characteristics

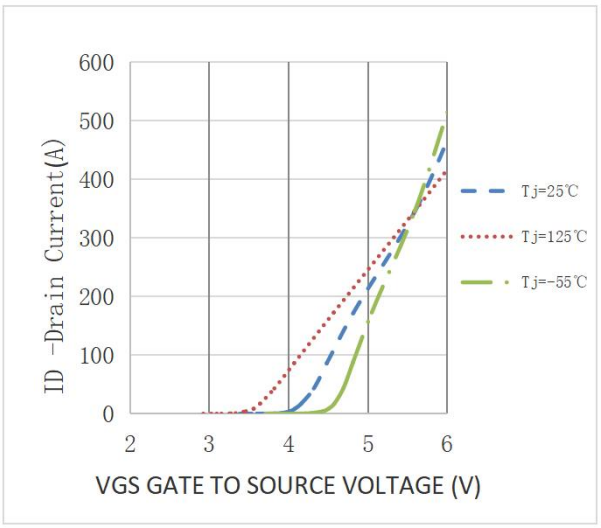



Fig.11 SOA Maximum Safe Operating Area

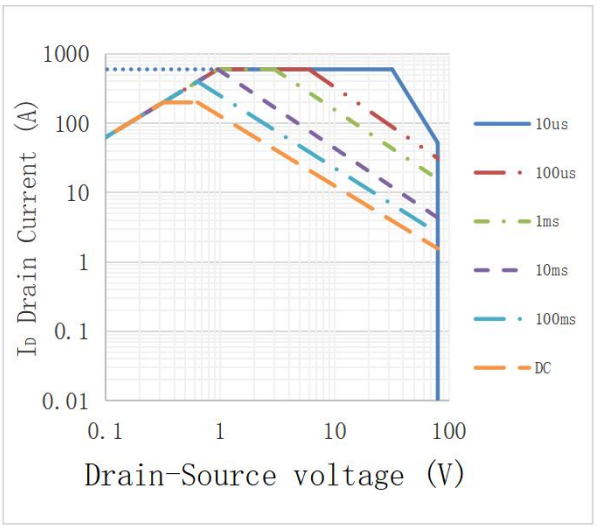
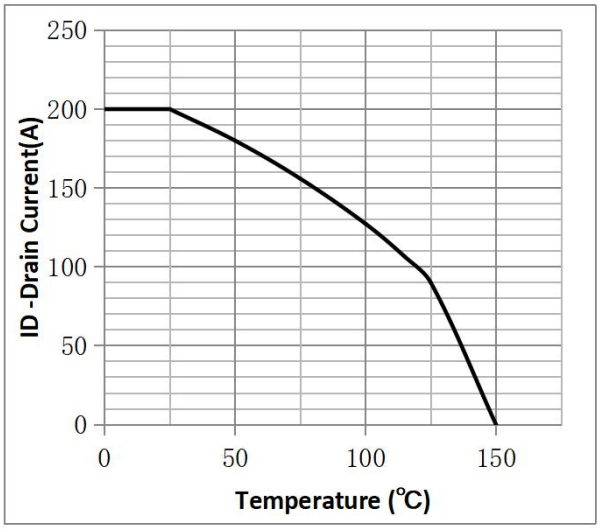
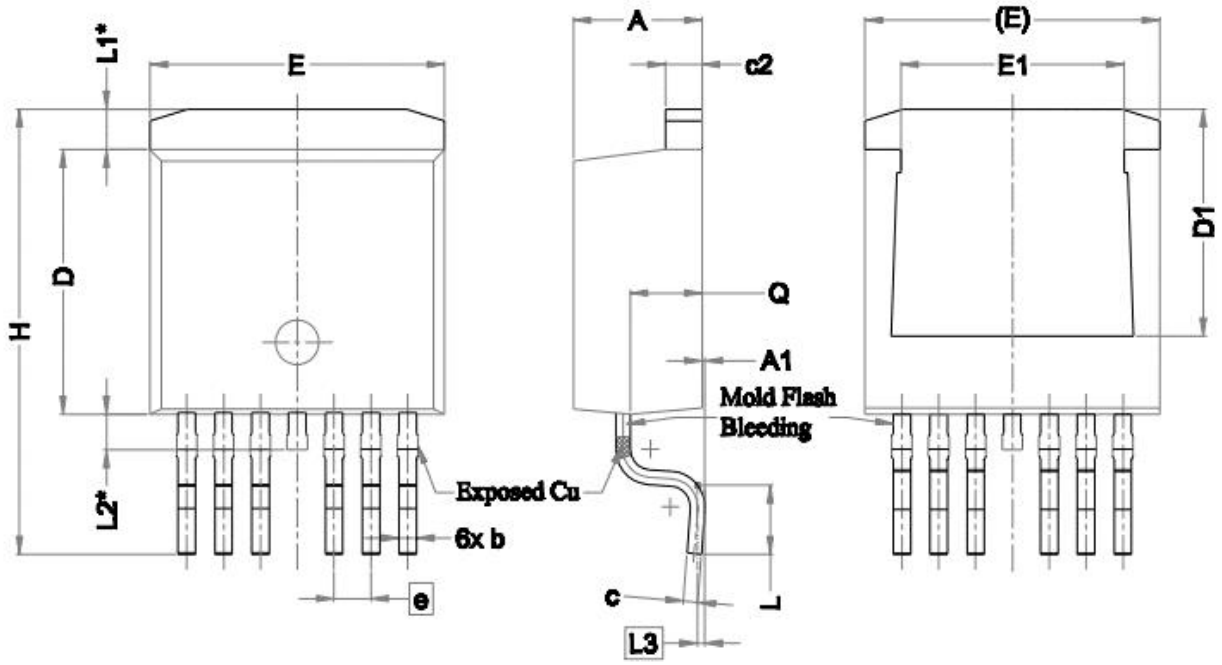



Fig.12 ID vs. Case Temperature②

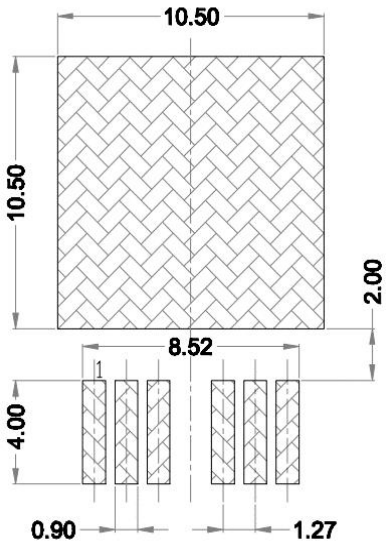


## ●TO-263-6 Package Outline




| SYMBOL | DIMENSIONS | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 4.24 | 4.44 | 4.64 |
| A1 | 0.00 | 0.10 | 0.25 |
| b | 0.50 | 0.60 | 0.70 |
| c | 0.40 | 0.50 | 0.60 |
| c2 | 1.15 | 1.27 | 1.40 |
| D | 8.82 | 8.92 | 9.02 |
| D1 | 6.86 | 7.65 | — |
| E | 9.96 | 10.16 | 10.36 |
| E1 | 6.89 | 7.77 | 7.89 |
| e | 1.27 BSC | | |
| H | 14.61 | 15.00 | 15.88 |
| L | 1.78 | 2.32 | 2.79 |
| L1 | 1.36 REF. | | |
| L2 | 1.20 REF. | | |
| L3 | 0.25 BSC | | |
| Q | 2.30 | 2.48 | 2.70 |

Land Pattern
(Only for Reference)



**Note:**

①Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate；

②Practically the current will be limited by PCB, thermal design and operating temperature. $V_{GS}$=10V.

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Revision History

| Version | Date | Change |
|---|---|---|
| A | 2022.9.6 | |
| B | 2023.9.5 | ID modify |
| C | 2024.5.20 | Qg Curve modify, |
| | | |
| | | |
| | | |
| | | |