

**• General Description**

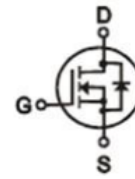
The ZM300N15HP combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ .

**• 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**

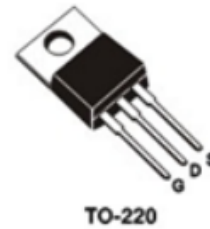
- SMPS 2<sup>nd</sup> Synchronous Rectifier
- BLDC Motor driver

**• Product Summary**


$V_{DS} = 150V$

$R_{DS(ON)} = 30m\Omega$

$I_D = 40A$


**• Ordering Information:**

|                           |            |
|---------------------------|------------|
| Part NO.                  | ZM300N15HP |
| Marking                   | ZM300N15H  |
| Packing Information       | TUBE       |
| Basic ordering unit (pcs) | 900        |

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

| Parameter                                  | Symbol                 | Rating     | Unit       |
|--|------------------------|------------|------------|
| Drain-Source Voltage                       | $V_{DS}$               | 150        | V          |
| Gate-Source Voltage                        | $V_{GS}$               | $\pm 20$   | V          |
| Continuous Drain Current                   | $I_D @ TC=25^\circ C$  | 40         | A          |
|  | $I_D @ TC=75^\circ C$  | 30         | A          |
|  | $I_D @ TC=100^\circ C$ | 28         | A          |
| Pulsed Drain Current <sup>①</sup>          | $I_{DM}$               | 120        | A          |
| Total Power Dissipation( $TC=25^\circ C$ ) | $P_D @ TC=25^\circ C$  | 90         | W          |
| Total Power Dissipation( $TA=25^\circ C$ ) | $P_D @ TA=25^\circ C$  | 2.5        | W          |
| Operating Junction Temperature             | $T_J$                  | -55 to 150 | $^\circ C$ |
| Storage Temperature                        | $T_{STG}$              | -55 to 150 | $^\circ C$ |

**•Thermal resistance**

| Parameter                                    | Symbol            | Min. | Typ. | Max. | Unit  |
|--|-------------------|------|------|------|-------|
| Thermal resistance, junction - case          | R <sub>thJC</sub> | -    | -    | 1.3  | ° C/W |
| Thermal resistance, junction - ambient       | R <sub>thJA</sub> | -    | -    | 50   | ° 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               | 150  |     |      | V    |
| Gate Threshold Voltage            | V <sub>GS(TH)</sub> | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA | 2.0  |     | 4.0  | V    |
| Drain-Source Leakage Current      | I <sub>DSS</sub>    | V <sub>DS</sub> =150V, 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                |      | 30  | 39   | mΩ   |
| Forward Transconductance          | g <sub>FS</sub>     | V <sub>DS</sub> =10V, I <sub>D</sub> =20A                |      | 7   |      | s    |
|                                   |                     |  |      |     |      |      |

**•Electronic Characteristics**

| Parameter                    | Symbol           | Condition | Min. | Typ  | Max. | Unit |
|------------------------------|------------------|-----------|------|------|------|------|
| Input capacitance            | C <sub>iss</sub> | f = 1MHz  | -    | 3400 | -    | pF   |
| Output capacitance           | C <sub>oss</sub> |           | -    | 169  | -    |      |
| Reverse transfer capacitance | C <sub>rss</sub> |           | -    | 98   | -    |      |

**•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> =25V  | -    | 57  | -    | nC   |
| Gate - Source charge | Q <sub>gs</sub> | I <sub>D</sub> = 8A   | -    | 12  | -    |      |
| Gate - Drain charge  | Q <sub>gd</sub> | V <sub>GS</sub> = 10V | -    | 11  | -    |      |

Note: ① Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2% ;

Fig.1 Power Dissipation Derating Curve

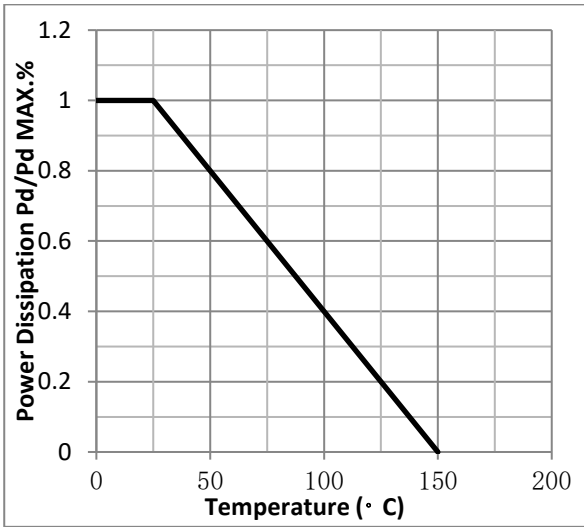


Fig.2 Typical output Characteristics

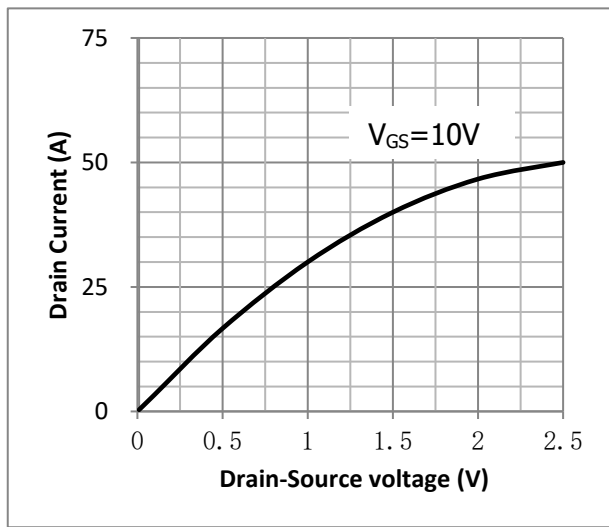


Fig.3 Threshold Voltage V.S Junction Temperature

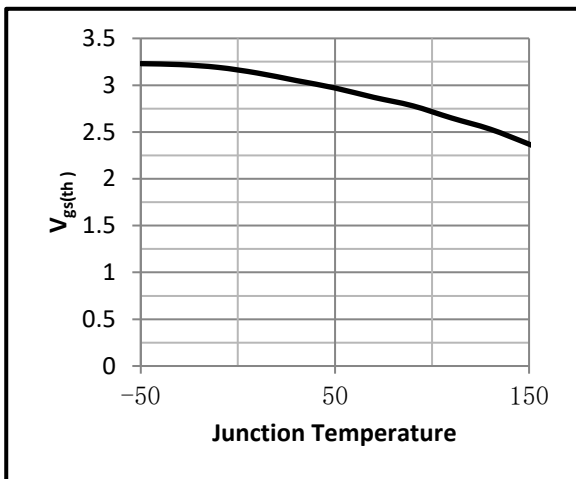


Fig.4 Resistance V.S Drain Current

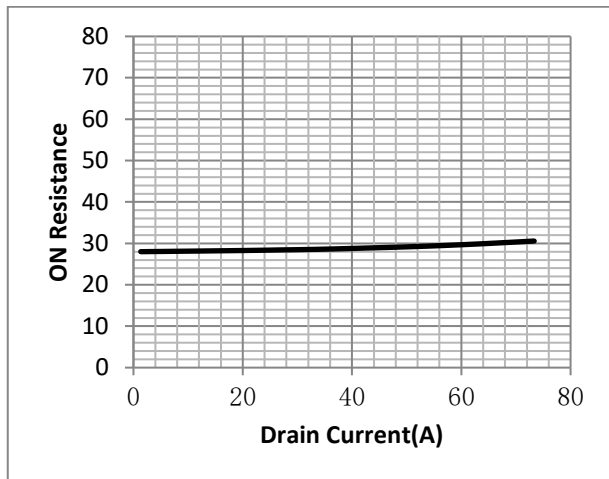


Fig.5 On-Resistance VS Gate Source Voltage

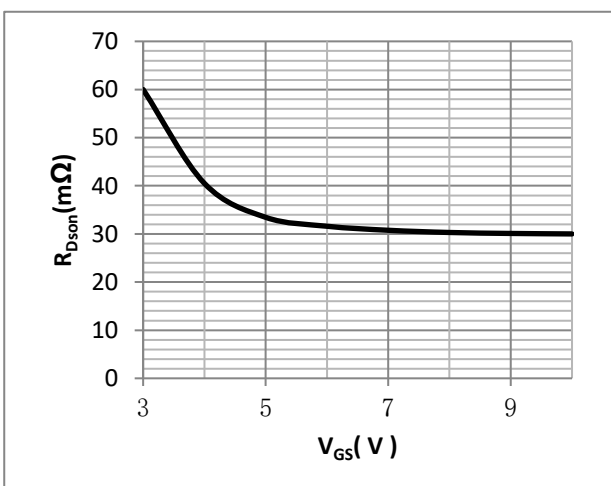


Fig.6 On-Resistance V.S Junction Temperature

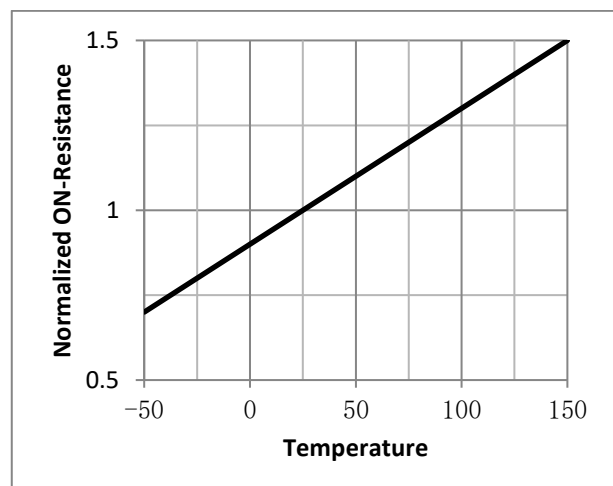


Fig.7 Switching Time Measurement Circuit

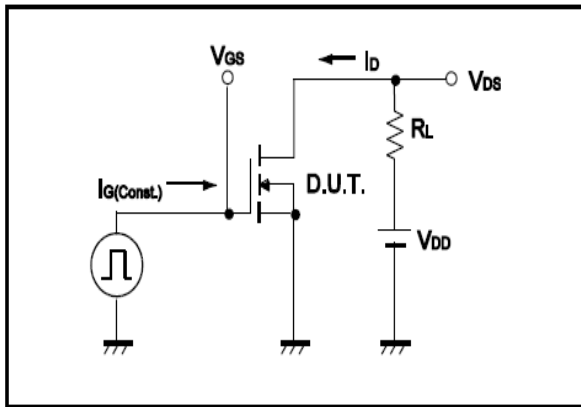


Fig.8 Gate Charge Waveform

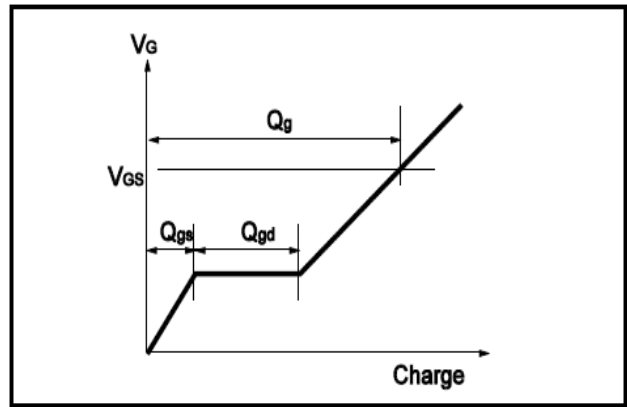


Fig.9 Switching Time Measurement Circuit

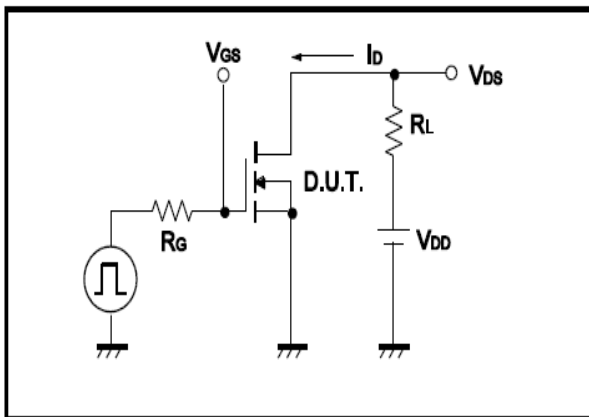


Fig.10 Gate Charge Waveform

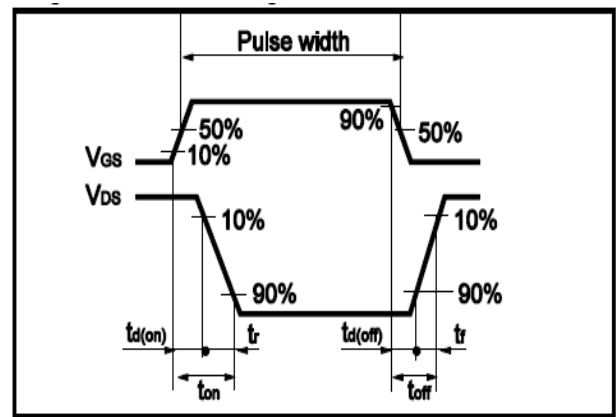


Fig.11 Avalanche Measurement Circuit

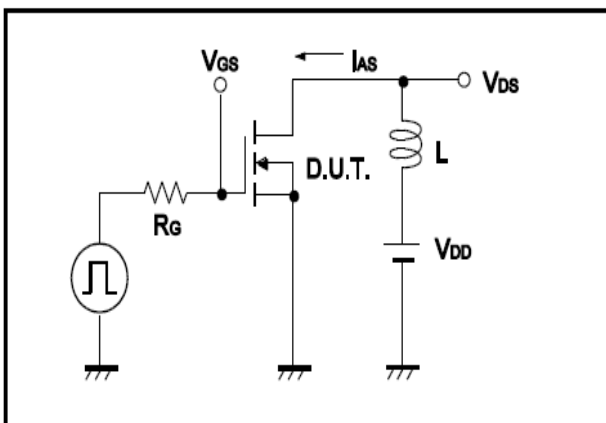
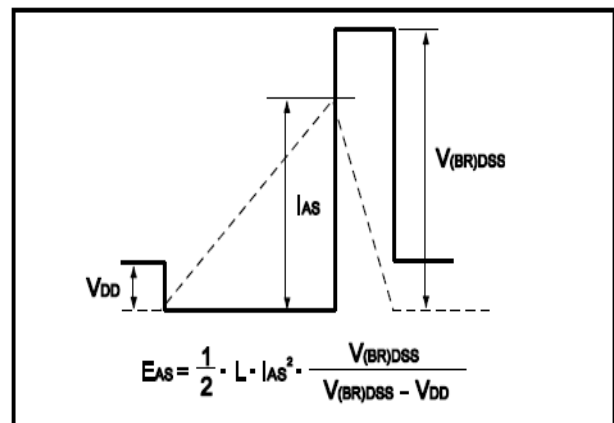


Fig.12 Avalanche Waveform



•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  |

