



## Description

### JMT P-channel Enhancement Mode Power MOSFET

#### Features

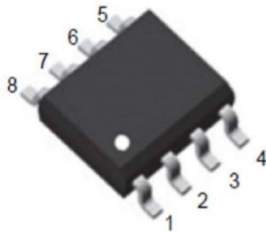
- $V_{DS} = -30V$ ,  $I_D = -9A$   
 $R_{DS(ON)} < 25m\Omega$  @  $V_{GS} = -10V$   
 $R_{DS(ON)} < 38m\Omega$  @  $V_{GS} = -4.5V$
- Advanced Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead free product is acquired

#### Application

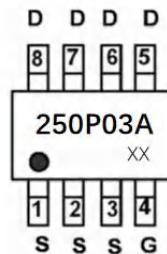
- PWM Applications
- Load Switch
- Power Management



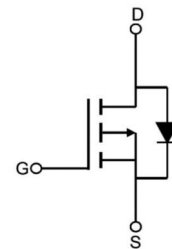
*100% UIS TESTED!*  
*100% ΔVds TESTED!*



SOP-8 top view



Marking and pin Assignment



Schematic Diagram

## Package Marking and Ordering Information

| Device Marking | Device      | OUTLINE | Device Package | Reel Size | Reel (PCS) | Per Carton (PCS) |
|----------------|-------------|---------|----------------|-----------|------------|------------------|
| 250P03A        | JMTP250P03A | TAPING  | SOP-8          | 13inch    | 4000       | 48000            |

## Absolute Maximum Ratings ( $T_A = 25^\circ C$ unless otherwise specified)

| Symbol          | Parameter                                       | Max.                | Units        |
|-----------------|---|---------------------|--------------|
| $V_{DSS}$       | Drain-Source Voltage                            | -30                 | V            |
| $V_{GSS}$       | Gate-Source Voltage                             | $\pm 20$            | V            |
| $I_D$           | Continuous Drain Current                        | $T_A = 25^\circ C$  | -9           |
|                 |   | $T_A = 100^\circ C$ | -5.9         |
| $I_{DM}$        | Pulsed Drain Current <sup>note1</sup>           | -36                 | A            |
| $E_{AS}$        | Single Pulsed Avalanche Energy <sup>note2</sup> | 25                  | mJ           |
| $P_D$           | Power Dissipation                               | $T_A = 25^\circ C$  | 3.3          |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient         | 38                  | $^\circ C/W$ |
| $T_J, T_{STG}$  | Operating and Storage Temperature Range         | -55 to +150         | $^\circ C$   |



## Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

| Symbol  | Parameter   | Test Condition   | Min. | Typ. | Max. | Units |
|---|---|--|------|------|------|-------|
| <b>Off Characteristic</b>                                     |   |  |      |      |      |       |
| V <sub>(BR)DSS</sub>  | Drain-Source Breakdown Voltage                            | V <sub>GS</sub> =0V, I <sub>D</sub> = -250μA   | -30  | -    | -    | V     |
| I <sub>DSS</sub>  | Zero Gate Voltage Drain Current                           | V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V,  | -    | -    | -1   | μA    |
| I <sub>GSS</sub>  | Gate to Body Leakage Current                              | V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V  | -    | -    | ±100 | nA    |
| <b>On Characteristics</b>                                     |   |  |      |      |      |       |
| V <sub>GS(th)</sub>   | Gate Threshold Voltage                                    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                  | -1.0 | -1.5 | -2.5 | V     |
| R <sub>DS(on)</sub>   | Static Drain-Source on-Resistance<br><small>Note3</small> | V <sub>GS</sub> = -10V, I <sub>D</sub> = -9A   | -    | 19   | 25   | mΩ    |
|   |   | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -5A  | -    | 27   | 38   |       |
| <b>Dynamic Characteristics</b>                                |   |  |      |      |      |       |
| C <sub>iss</sub>  | Input Capacitance   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V,<br>f = 1.0MHz                                  | -    | 1200 | -    | pF    |
| C <sub>oss</sub>  | Output Capacitance  |  | -    | 155  | -    | pF    |
| C <sub>rss</sub>  | Reverse Transfer Capacitance                              |  | -    | 139  | -    | pF    |
| Q <sub>g</sub>  | Total Gate Charge   | V <sub>DS</sub> = -15V, I <sub>D</sub> = -8A,<br>V <sub>GS</sub> = -10V                      | -    | 52   | -    | nC    |
| Q <sub>gs</sub>   | Gate-Source Charge  |  | -    | 9.8  | -    | nC    |
| Q <sub>gd</sub>   | Gate-Drain("Miller") Charge                               |  | -    | 8.3  | -    | nC    |
| <b>Switching Characteristics</b>                              |   |  |      |      |      |       |
| t <sub>d(on)</sub>  | Turn-on Delay Time  | V <sub>DD</sub> = -15V, I <sub>D</sub> = -1A,<br>V <sub>GS</sub> =-10V, R <sub>GEN</sub> =6Ω | -    | 13   | -    | ns    |
| t <sub>r</sub>  | Turn-on Rise Time   |  | -    | 15   | -    | ns    |
| t <sub>d(off)</sub>   | Turn-off Delay Time                                       |  | -    | 198  | -    | ns    |
| t <sub>f</sub>  | Turn-off Fall Time  |  | -    | 98   | -    | ns    |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b> |   |  |      |      |      |       |
| I <sub>S</sub>  | Maximum Continuous Drain to Source Diode Forward Current  |  | -    | -    | -9   | A     |
| I <sub>SM</sub>   | Maximum Pulsed Drain to Source Diode Forward Current      |  | -    | -    | -36  | A     |
| V <sub>SD</sub>   | Drain to Source Diode Forward Voltage                     | V <sub>GS</sub> = 0V, I <sub>S</sub> = -9A   | -    | -0.8 | -1.2 | V     |

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

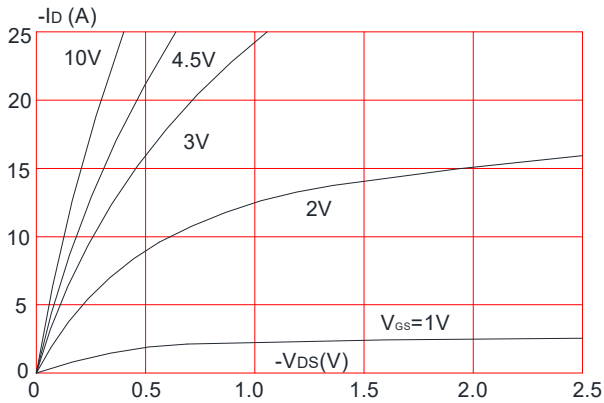
2. EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=-15V, V<sub>G</sub>=-10V, R<sub>G</sub>=25Ω, L=0.5mH, I<sub>AS</sub>=-10A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

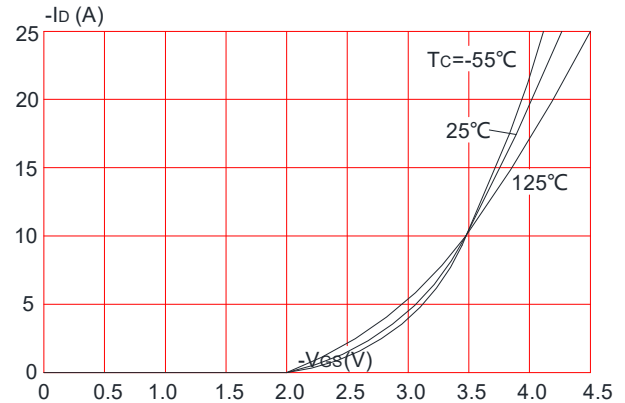


## Typical Performance Characteristics

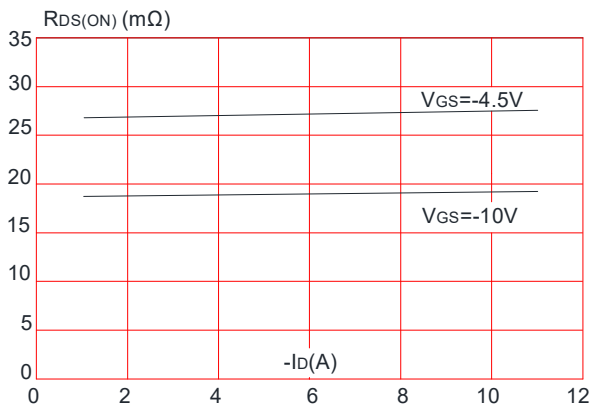
**Figure 1: Output Characteristics**



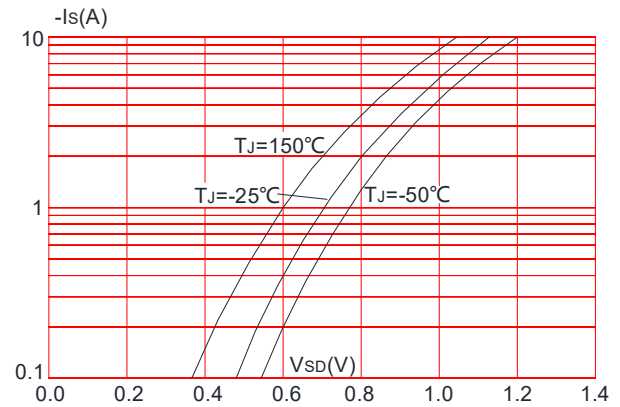
**Figure 2: Typical Transfer Characteristics**



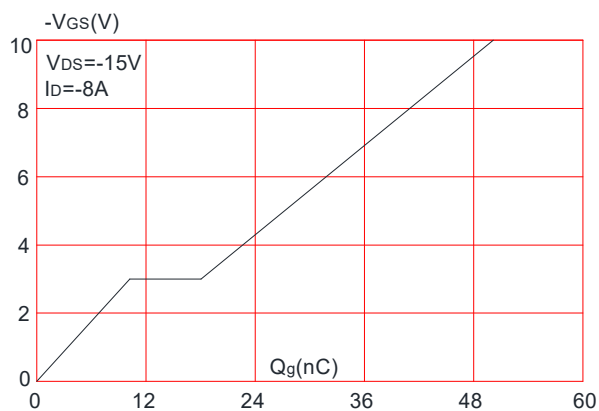
**Figure 3: On-resistance vs. Drain Current**



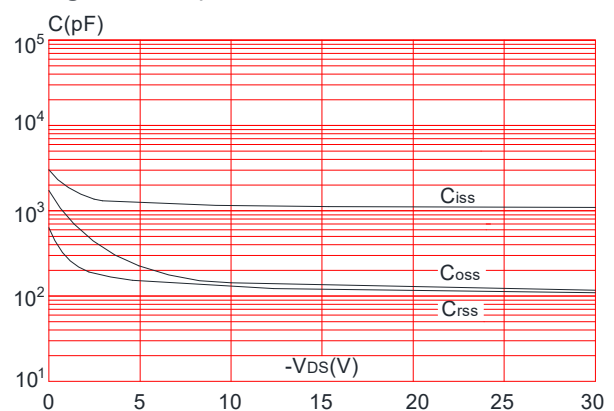
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**

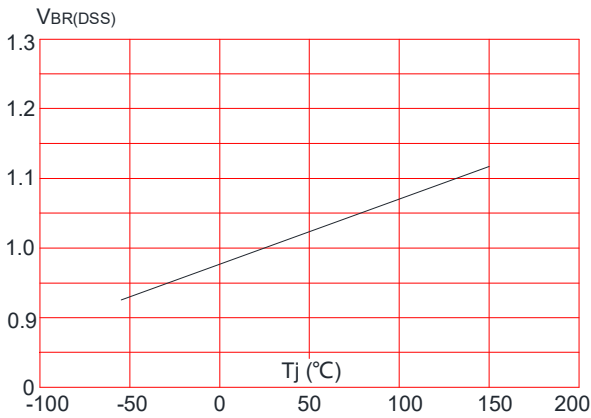


**Figure 6: Capacitance Characteristics**

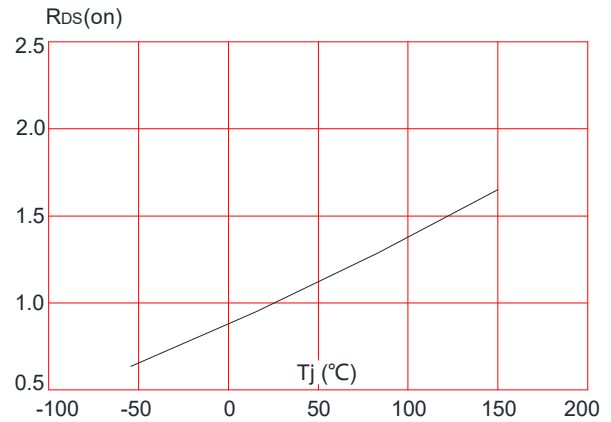




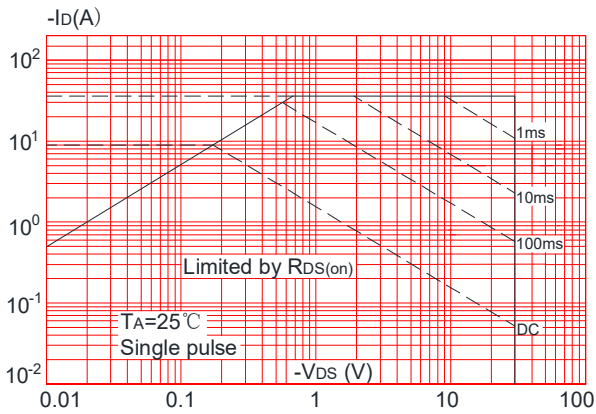
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



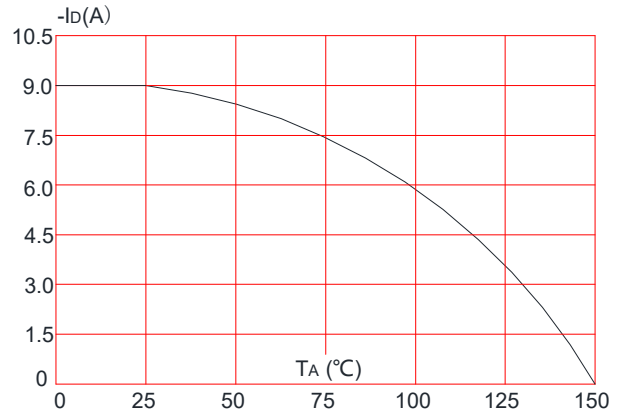
**Figure 8:** Normalized on Resistance vs. Junction Temperature



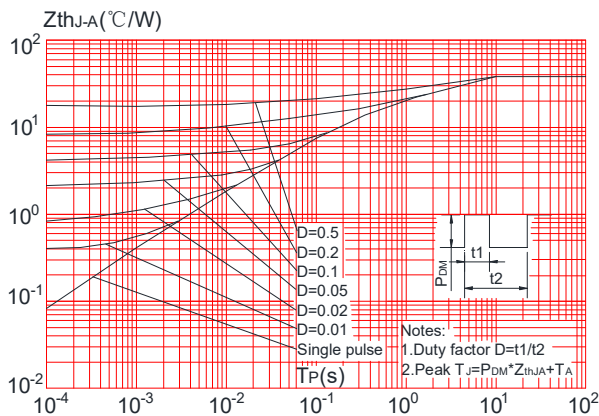
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



## Test Circuit

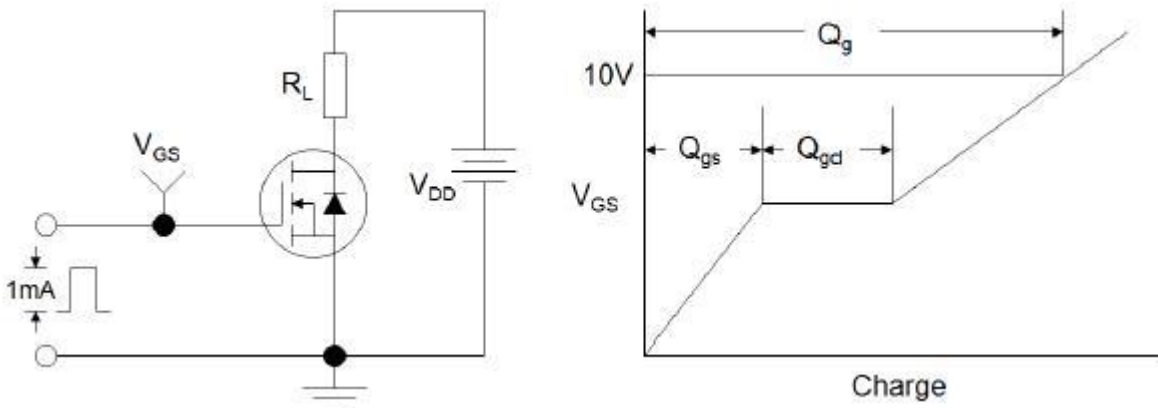


Figure1:Gate Charge Test Circuit & Waveform

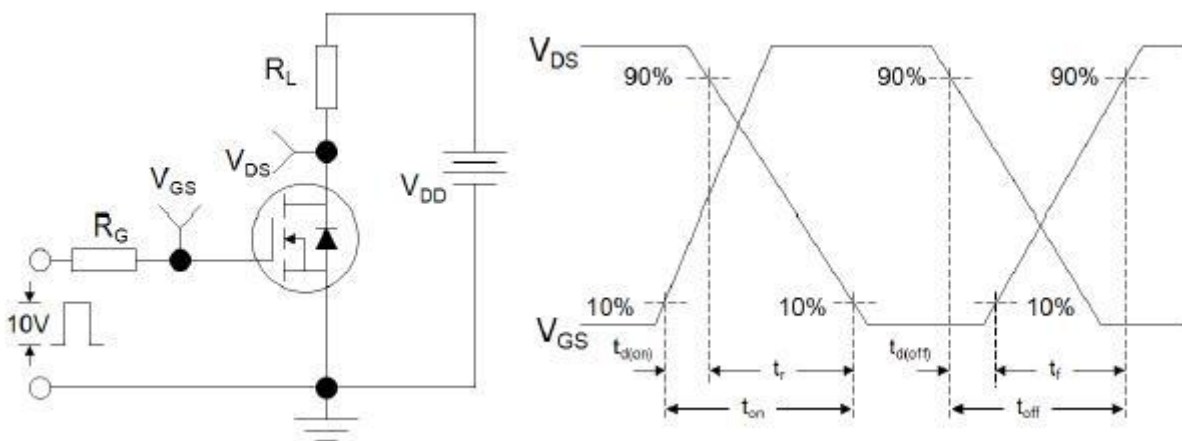


Figure 2: Resistive Switching Test Circuit & Waveforms

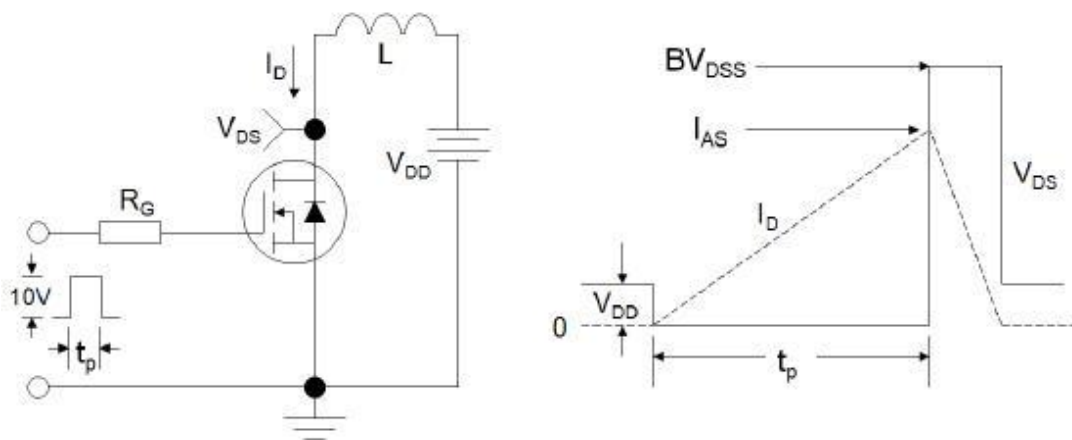
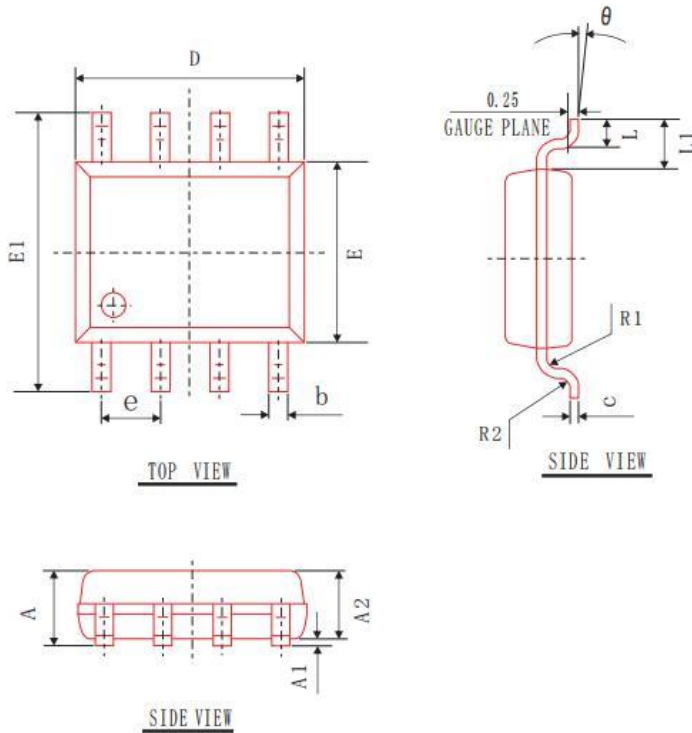


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



## Package Mechanical Data-SOP-8



COMMON DIMENSIONS  
(UNITS OF MEASURE=mm)


| SYMBOL   | MIN      | NOM   | MAX   |
|----------|----------|-------|-------|
| A        | 1.40     | 1.60  | 1.80  |
| A1       | 0.05     | 0.15  | 0.25  |
| A2       | 1.35     | 1.45  | 1.55  |
| b        | 0.30     | 0.40  | 0.50  |
| c        | 0.153    | 0.203 | 0.253 |
| D        | 4.80     | 4.90  | 5.00  |
| E        | 3.80     | 3.90  | 4.00  |
| E1       | 5.80     | 6.00  | 6.20  |
| L        | 0.45     | 0.70  | 1.00  |
| $\theta$ | 2°       | 4°    | 6°    |
| L1       | 1.04 REF |       |       |
| e        | 1.27 BSC |       |       |
| R1       | 0.07 TYP |       |       |
| R2       | 0.07 TYP |       |       |

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