

## Description

### JMT N-channel Enhancement Mode Power MOSFET

#### Features

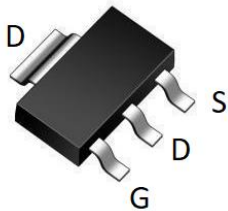
- $V_{DS}=60V$ ,  $I_D=5A$   
 $R_{DS(ON)} < 100m\Omega @ V_{GS} = 10V$   
 $R_{DS(ON)} < 125m\Omega @ V_{GS} = 4.5V$
- Advanced Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead free product is acquired

#### Application

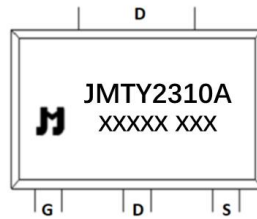
- Load Switch
- PWM Application
- Power management



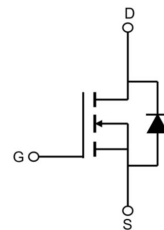
*100% UIS TESTED!*  
*100% ΔVds TESTED!*



SOT-223-3L 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) |
|----------------|-----------|---------|----------------|-----------|------------|------------------|
| JMTY2310A      | JMTY2310A | TAPING  | SOT-223-3L     | 13inch    | 4000       | 40000            |

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

| Symbol          | Parameter                                       | Max.                | Units        |
|-----------------|---|---------------------|--------------|
| $V_{DSS}$       | Drain-Source Voltage                            | 60                  | V            |
| $V_{GSS}$       | Gate-Source Voltage                             | $\pm 20$            | V            |
| $I_D$           | Continuous Drain Current                        | $T_A = 25^\circ C$  | 5            |
|                 |   | $T_A = 100^\circ C$ | 3.3          |
| $I_{DM}$        | Pulsed Drain Current <sup>note1</sup>           | 20                  | A            |
| EAS             | Single Pulsed Avalanche Energy <sup>note2</sup> | 4                   | mJ           |
| $P_D$           | Power Dissipation                               | 4                   | W            |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Case            | 31                  | $^\circ C/W$ |
| $T_J, T_{STG}$  | 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   | 60   | -    | -    | V     |
| I <sub>DSS</sub>  | Zero Gate Voltage Drain Current                           | V <sub>DS</sub> =60V, 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  | 2.2  | V     |
| R <sub>DS(on)</sub>   | Static Drain-Source on-Resistance<br><small>note2</small> | V <sub>GS</sub> =10V, I <sub>D</sub> =3A  | -    | 75   | 100  | mΩ    |
|   |   | V <sub>GS</sub> =4.5V, I <sub>D</sub> =2A   | -    | 87   | 125  |       |
| <b>Dynamic Characteristics</b>                                |   |   |      |      |      |       |
| C <sub>iss</sub>  | Input Capacitance   | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V,<br>f = 1.0MHz                                | -    | 350  | -    | pF    |
| C <sub>oss</sub>  | Output Capacitance  |   | -    | 29   | -    | pF    |
| C <sub>rss</sub>  | Reverse Transfer Capacitance                              |   | -    | 23   | -    | pF    |
| Q <sub>g</sub>  | Total Gate Charge   | V <sub>DS</sub> = 30V, I <sub>D</sub> = 3A,<br>V <sub>GS</sub> = 10V                      | -    | 9    | -    | nC    |
| Q <sub>gs</sub>   | Gate-Source Charge  |   | -    | 1.5  | -    | nC    |
| Q <sub>gd</sub>   | Gate-Drain("Miller") Charge                               |   | -    | 2    | -    | nC    |
| <b>Switching Characteristics</b>                              |   |   |      |      |      |       |
| t <sub>d(on)</sub>  | Turn-on Delay Time  | V <sub>DD</sub> = 30V, I <sub>D</sub> =2A,<br>R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =10V, | -    | 5    | -    | ns    |
| t <sub>r</sub>  | Turn-on Rise Time   |   | -    | 7    | -    | ns    |
| t <sub>d(off)</sub>   | Turn-off Delay Time                                       |   | -    | 37   | -    | ns    |
| t <sub>f</sub>  | Turn-off Fall Time  |   | -    | 22   | -    | ns    |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b> |   |   |      |      |      |       |
| I <sub>S</sub>  | Maximum Continuous Drain to Source Diode Forward Current  |   | -    | -    | 5    | A     |
| I <sub>SM</sub>   | Maximum Pulsed Drain to Source Diode Forward Current      |   | -    | -    | 20   | A     |
| V <sub>SD</sub>   | Drain to Source Diode Forward Voltage                     | V <sub>GS</sub> =0V, I <sub>S</sub> =5A   | -    | -    | 1.2  | V     |

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

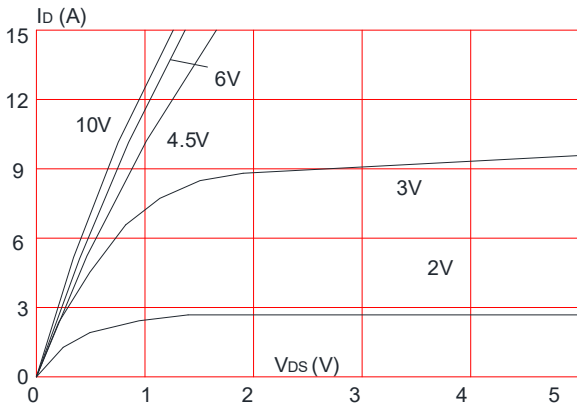
2. EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=30V, V<sub>G</sub>=10V, L=0.5mH, R<sub>g</sub>=25Ω, I<sub>AS</sub>=4A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

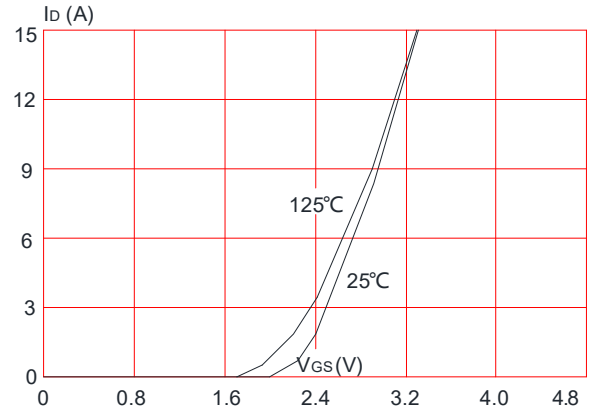


## Typical Performance Characteristics

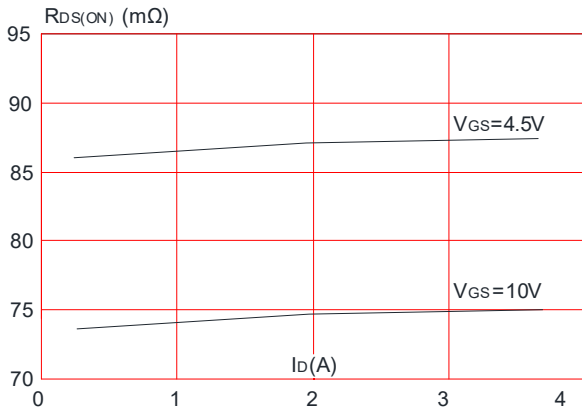
**Figure 1: Output Characteristics**



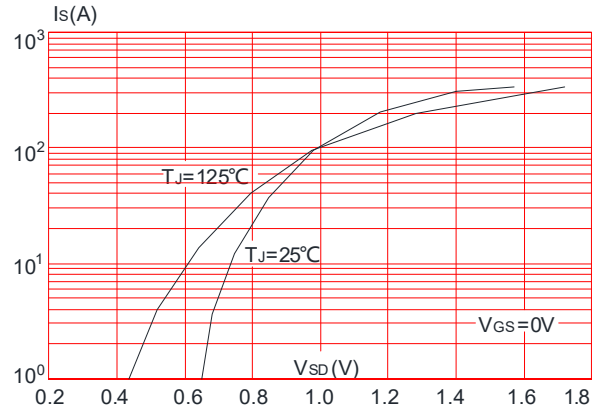
**Figure 2: Typical Transfer Characteristics**



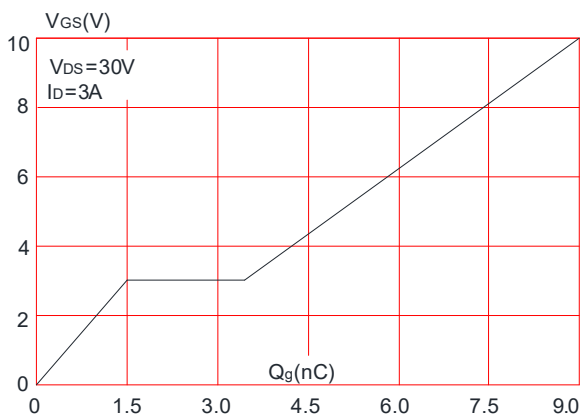
**Figure 3: On-resistance vs. Drain Current**



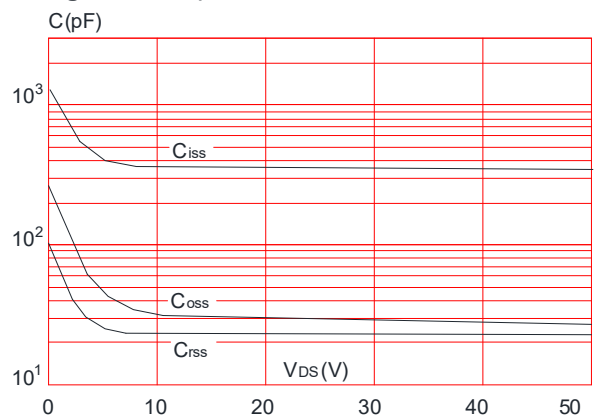
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**

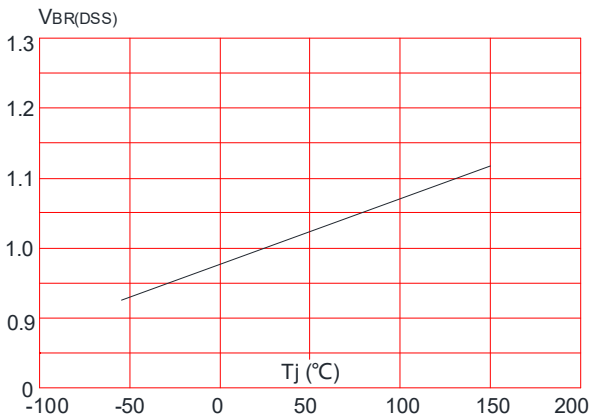


**Figure 6: Capacitance Characteristics**

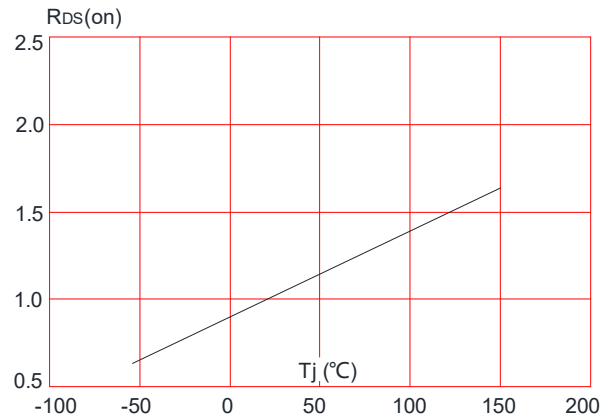




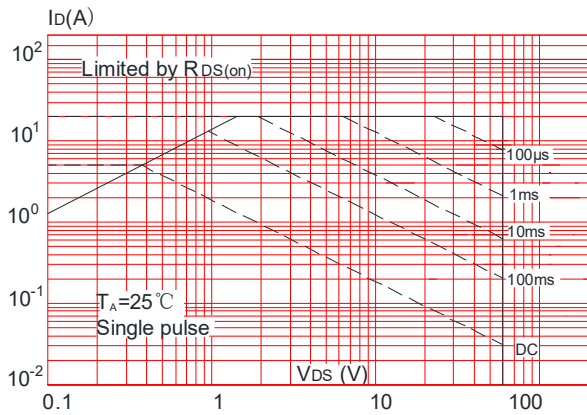
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



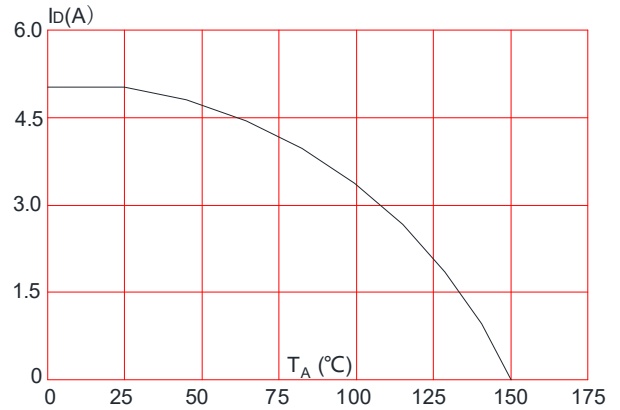
**Figure 8:** Normalized on Resistance vs. Junction Temperature



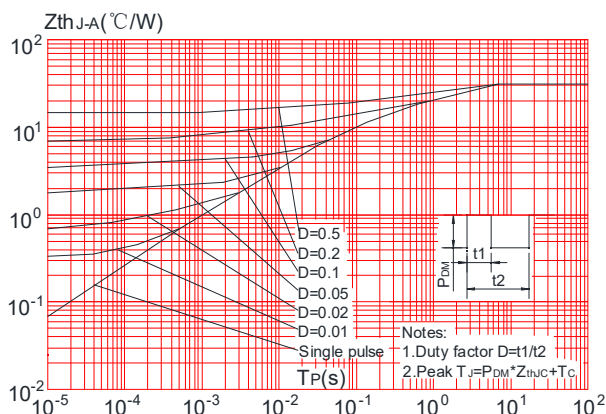
**Figure 9:** Maximum Safe Operating Area



**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

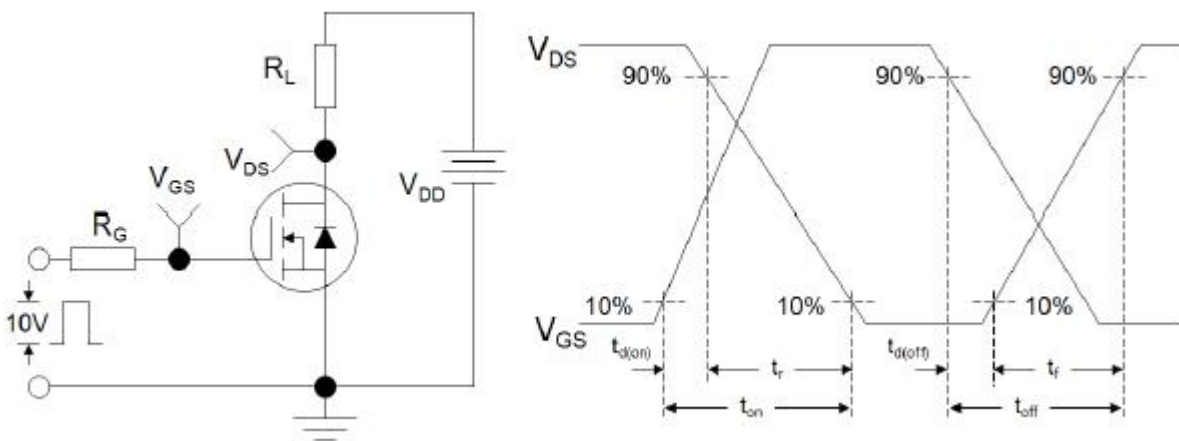


Figure 2: Resistive Switching Test Circuit & Waveforms

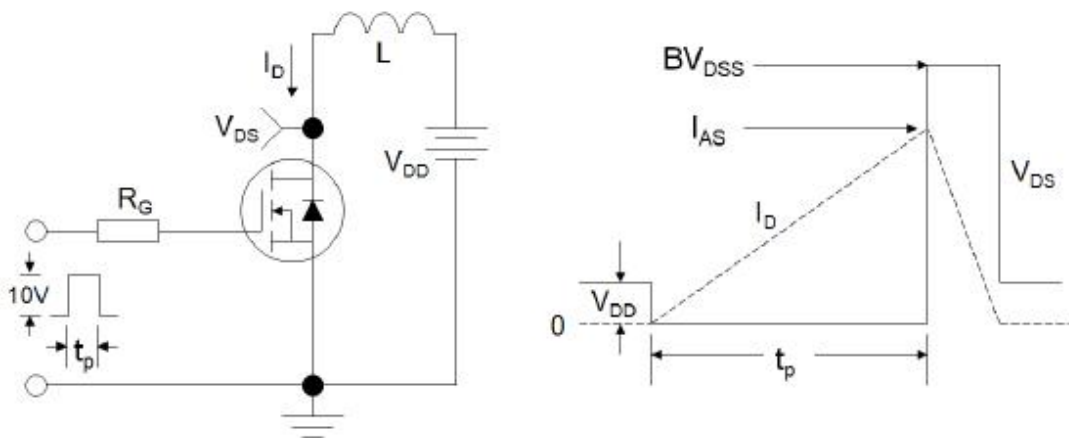
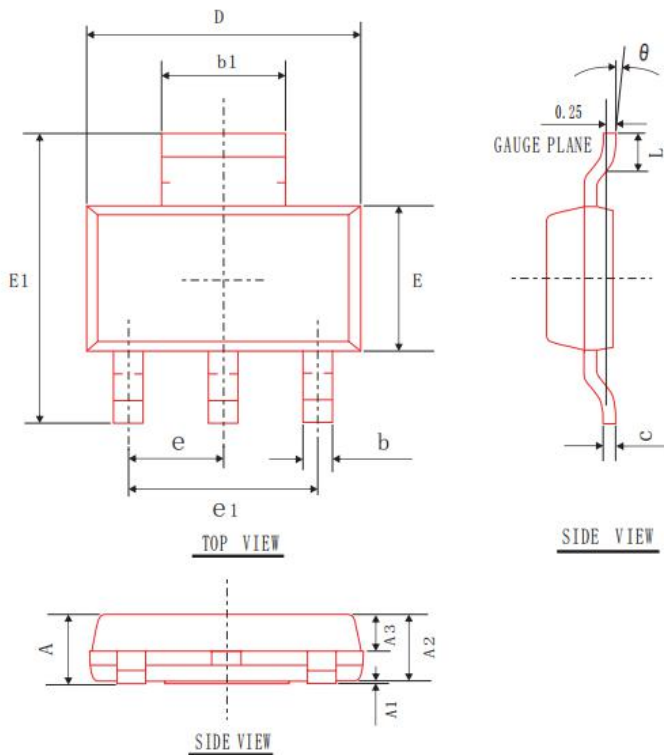


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



## Package Mechanical Data-SOT-223-3L



COMMON DIMENSIONS  
(UNITS OF MEASURE=mm)

| SYMBOL   | MIN     | NOM  | MAX  |
|----------|---------|------|------|
| A        | ---     | ---  | 1.80 |
| A1       | 0.00    | 0.05 | 0.10 |
| A2       | 1.50    | 1.60 | 1.70 |
| A3       | 0.85    | 0.90 | 0.95 |
| b        | 0.66    | 0.70 | 0.80 |
| b1       | 2.96    | 3.00 | 3.10 |
| c        | 0.25    | 0.30 | 0.35 |
| D        | 6.30    | 6.50 | 6.70 |
| E        | 3.30    | 3.50 | 3.70 |
| E1       | 6.80    | 7.00 | 7.20 |
| e1       | 4.40    | 4.60 | 4.80 |
| L        | 0.90    | ---  | 1.15 |
| $\theta$ | 0°      | 5°   | 10°  |
| e        | 2.3 BSC |      |      |

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