



## JMTK2006A

## Description

## JMT N-channel Enhancement Mode Power MOSFET

## Features

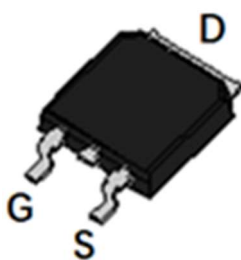
- 20V, 60A  
 $R_{DS(ON)} < 6.5m\Omega @ V_{GS} = 4.5V$   
 $R_{DS(ON)} < 10m\Omega @ V_{GS} = 2.5V$
- Advanced Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead free product is acquired

## Application

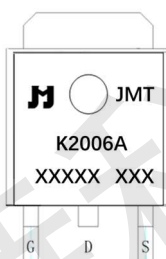
- Load Switch
- PWM Application
- Power management



100% UIS TESTED!  
100%  $\Delta V_{ds}$  TESTED!



TO-252(DPAK) 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) |
|----------------|-----------|---------|----------------|-----------|------------|------------------|
| JMTK2006A      | JMTK2006A | TAPING  | TO-252         | 13inch    | 2500       | 25000            |

Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$  unless otherwise specified)

| Symbol                            | Parameter                                       |                        | Max.        | Units |
|-----------------------------------|-------------------------------------------------|------------------------|-------------|-------|
| V <sub>DSS</sub>                  | Drain-Source Voltage                            |                        | 20          | V     |
| V <sub>GSS</sub>                  | Gate-Source Voltage                             |                        | ±12         | V     |
| I <sub>D</sub>                    | Continuous Drain Current                        | T <sub>C</sub> = 25°C  | 60          | A     |
|                                   |                                                 | T <sub>C</sub> = 100°C | 39          | A     |
| I <sub>DM</sub>                   | Pulsed Drain Current <sup>note1</sup>           |                        | 240         | A     |
| E <sub>AS</sub>                   | Single Pulsed Avalanche Energy <sup>note2</sup> |                        | 47.6        | mJ    |
| P <sub>D</sub>                    | Power Dissipation                               | T <sub>C</sub> = 25°C  | 37          | W     |
| R <sub>θJC</sub>                  | Thermal Resistance, Junction to Case            |                        | 4           | °C/W  |
| T <sub>J</sub> , T <sub>STG</sub> | Operating and Storage Temperature Range         |                        | -55 to +175 | °C    |

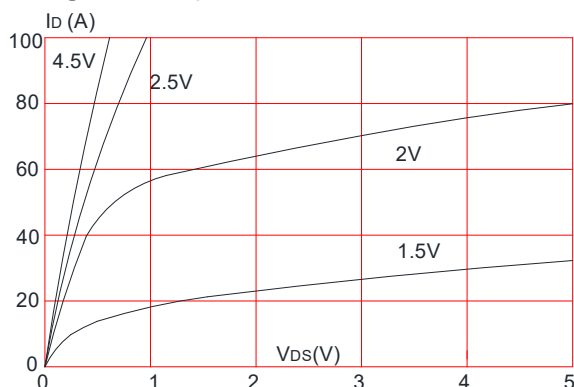
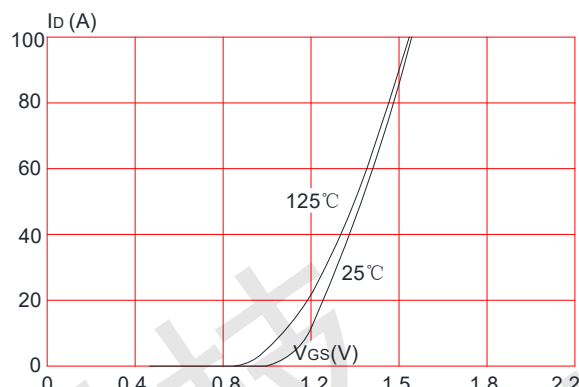
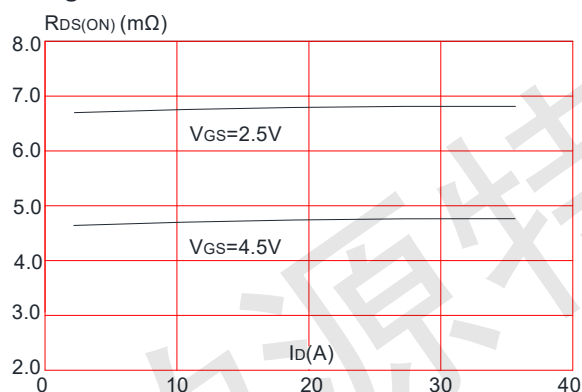
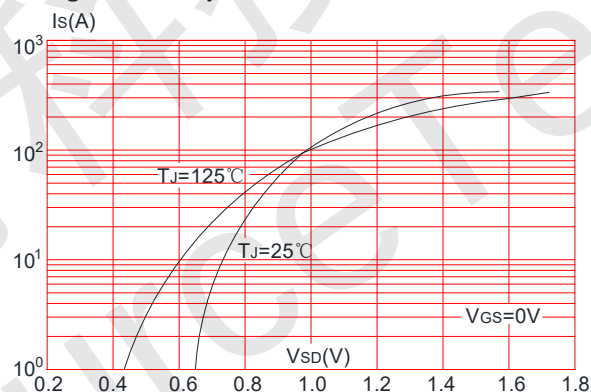
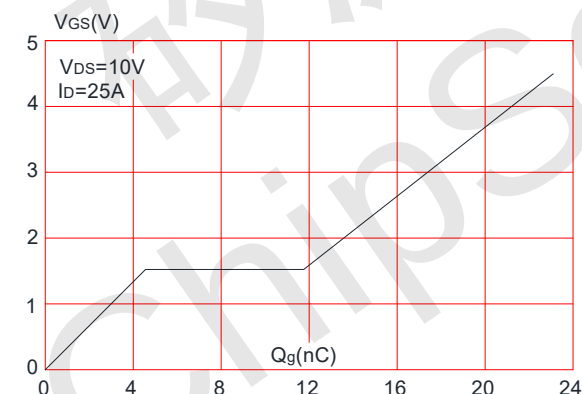
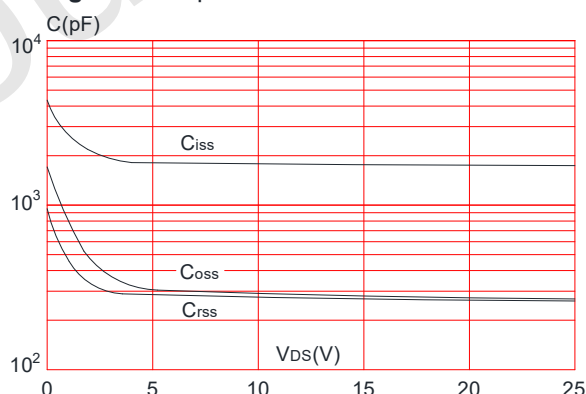
Version :P1.0

**JMTK2006A****Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

| Symbol                                                 | Parameter                                                | Test Condition                                                                               | Min. | Typ. | Max. | Units |
|--------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------|------|------|------|-------|
| Off Characteristic                                     |                                                          |                                                                                              |      |      |      |       |
| V <sub>(BR)DSS</sub>                                   | Drain-Source Breakdown Voltage                           | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                                   | 20   | -    | -    | V     |
| I <sub>DSS</sub>                                       | Zero Gate Voltage Drain Current                          | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V,                                                   | -    | -    | 1.0  | μA    |
| I <sub>GSS</sub>                                       | Gate to Body Leakage Current                             | V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V                                                   | -    | -    | ±100 | nA    |
| On Characteristics                                     |                                                          |                                                                                              |      |      |      |       |
| V <sub>GS(th)</sub>                                    | Gate Threshold Voltage                                   | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                     | 0.4  | 0.7  | 1.0  | V     |
| R <sub>DS(on)</sub>                                    | Static Drain-Source on-Resistance<br>note3               | V <sub>GS</sub> =4.5V, I <sub>D</sub> =25A                                                   | -    | 4.8  | 6.5  | mΩ    |
|                                                        |                                                          | V <sub>GS</sub> =2.5V, I <sub>D</sub> =15A                                                   | -    | 6.8  | 10   |       |
| Dynamic Characteristics                                |                                                          |                                                                                              |      |      |      |       |
| C <sub>iss</sub>                                       | Input Capacitance                                        | V <sub>DS</sub> =10V, V <sub>GS</sub> =0V,<br>f=1.0MHz                                       | -    | 1795 | -    | pF    |
| C <sub>oss</sub>                                       | Output Capacitance                                       |                                                                                              | -    | 292  | -    | pF    |
| C <sub>rss</sub>                                       | Reverse Transfer Capacitance                             |                                                                                              | -    | 277  | -    | pF    |
| Q <sub>g</sub>                                         | Total Gate Charge                                        | V <sub>DS</sub> =10V, I <sub>D</sub> =25A,<br>V <sub>GS</sub> =4.5V                          | -    | 23   | -    | nC    |
| Q <sub>gs</sub>                                        | Gate-Source Charge                                       |                                                                                              | -    | 4.5  | -    | nC    |
| Q <sub>gd</sub>                                        | Gate-Drain(“Miller”) Charge                              |                                                                                              | -    | 7.3  | -    | nC    |
| Switching Characteristics                              |                                                          |                                                                                              |      |      |      |       |
| t <sub>d(on)</sub>                                     | Turn-on Delay Time                                       | V <sub>DS</sub> =10V,<br>I <sub>D</sub> =25A, R <sub>GEN</sub> =3Ω,<br>V <sub>GS</sub> =4.5V | -    | 15   | -    | ns    |
| t <sub>r</sub>                                         | Turn-on Rise Time                                        |                                                                                              | -    | 37   | -    | ns    |
| t <sub>d(off)</sub>                                    | Turn-off Delay Time                                      |                                                                                              | -    | 52   | -    | ns    |
| t <sub>f</sub>                                         | Turn-off Fall Time                                       |                                                                                              | -    | 21   | -    | ns    |
| Drain-Source Diode Characteristics and Maximum Ratings |                                                          |                                                                                              |      |      |      |       |
| I <sub>S</sub>                                         | Maximum Continuous Drain to Source Diode Forward Current |                                                                                              | -    | -    | 60   | A     |
| I <sub>SM</sub>                                        | Maximum Pulsed Drain to Source Diode Forward Current     |                                                                                              | -    | -    | 240  | A     |
| V <sub>SD</sub>                                        | Drain to Source Diode Forward Voltage                    | V <sub>GS</sub> =0V, I <sub>S</sub> =30A                                                     | -    | -    | 1.2  | V     |
| t <sub>rr</sub>                                        | Body Diode Reverse Recovery Time                         | IF=25A, dI/dt=100A/μs                                                                        | -    | 25   | -    | ns    |
| Q <sub>rr</sub>                                        | Body Diode Reverse Recovery Charge                       |                                                                                              | -    | 21   | -    | nC    |

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

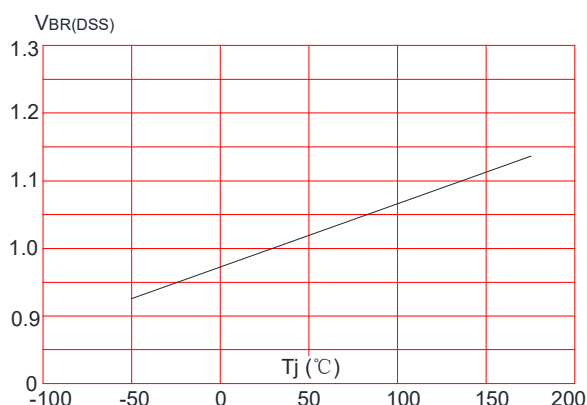
2. EAS condition:  $T_J=25^{\circ}\text{C}$ ,  $V_{DD}=10V$ ,  $V_G=4.5V$ ,  $L=0.5mH$ ,  $R_G=25\Omega$ ,  $I_{AS}=13.8A$ 3. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$

**JMTK2006A****Typical Performance Characteristics****Figure1: 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**

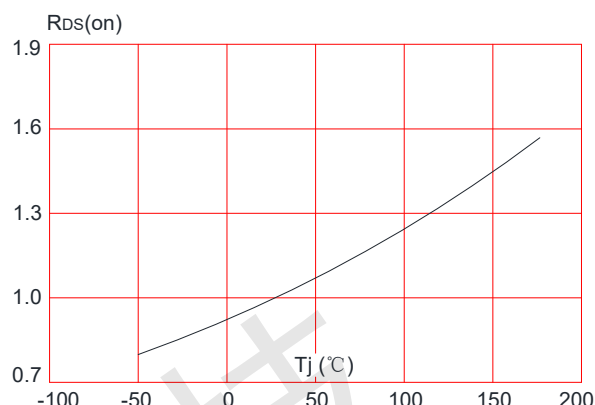


## JMTK2006A

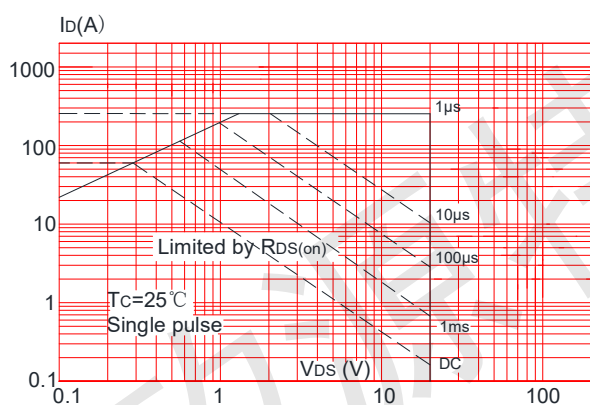
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



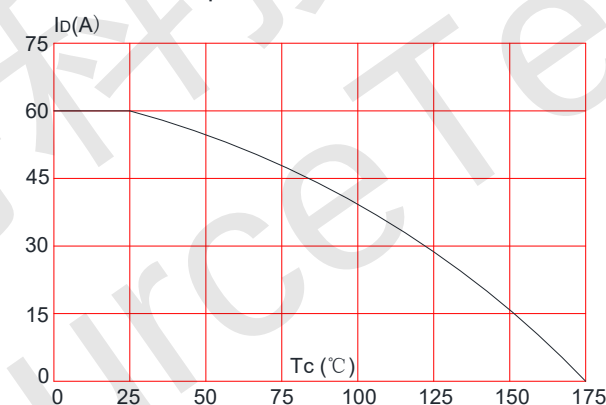
**Figure 8:** Normalized on Resistance vs. Junction Temperature



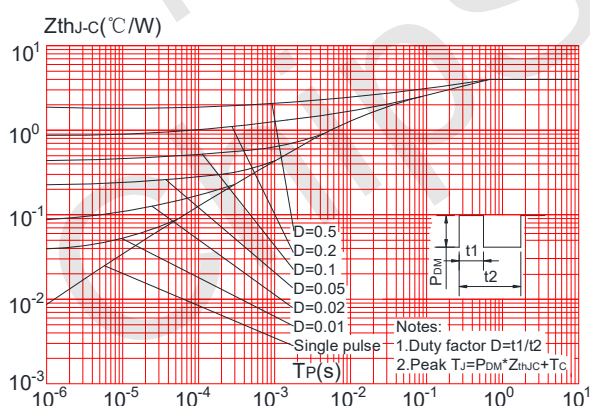
**Figure 9:** Maximum Safe Operating Area



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



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





## JMTK2006A

### Test Circuit

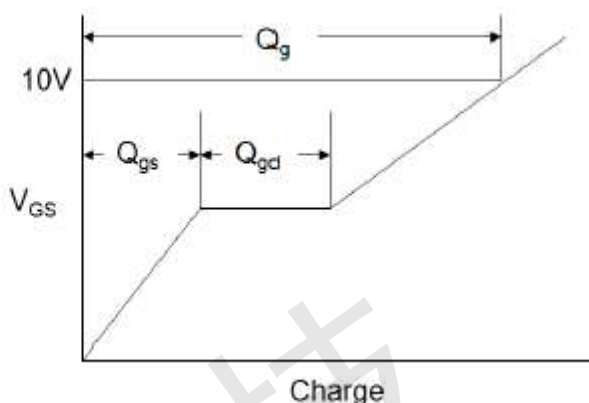
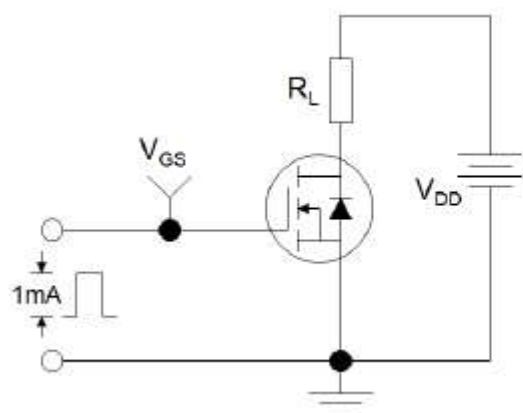


Figure1:Gate Charge Test Circuit & Waveform

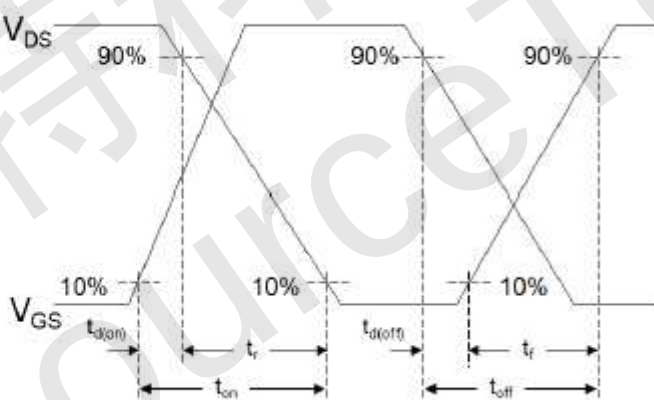
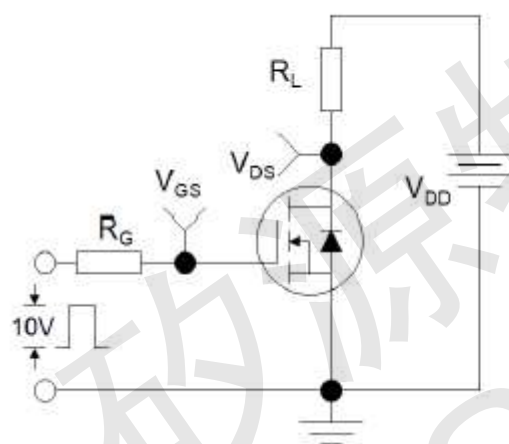


Figure 2: Resistive Switching Test Circuit & Waveforms

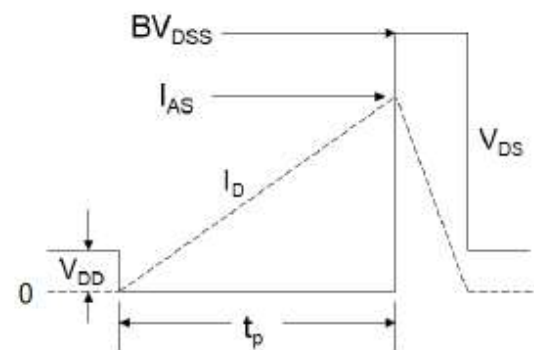
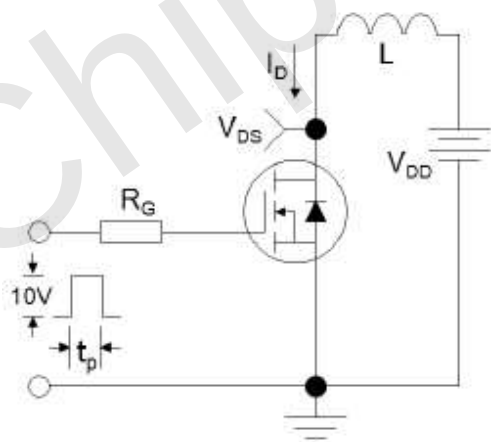
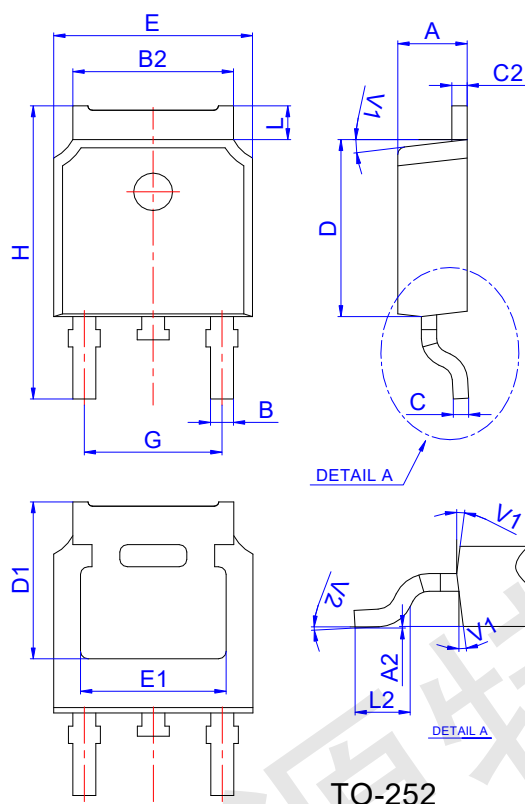


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



**JMTK2006A****Package Mechanical Data-TO-252**

TO-252

| Ref. | Dimensions  |      |       |          |      |       |
|------|-------------|------|-------|----------|------|-------|
|      | Millimeters |      |       | Inches   |      |       |
|      | Min.        | Typ. | Max.  | Min.     | Typ. | Max.  |
| A    | 2.10        |      | 2.50  | 0.083    |      | 0.098 |
| A2   | 0           |      | 0.10  | 0        |      | 0.004 |
| B    | 0.66        |      | 0.86  | 0.026    |      | 0.034 |
| B2   | 5.18        |      | 5.48  | 0.202    |      | 0.216 |
| C    | 0.40        |      | 0.60  | 0.016    |      | 0.024 |
| C2   | 0.44        |      | 0.58  | 0.017    |      | 0.023 |
| D    | 5.90        |      | 6.30  | 0.232    |      | 0.248 |
| D1   | 5.30REF     |      |       | 0.209REF |      |       |
| E    | 6.40        |      | 6.80  | 0.252    |      | 0.268 |
| E1   | 4.63        |      |       | 0.182    |      |       |
| G    | 4.47        |      | 4.67  | 0.176    |      | 0.184 |
| H    | 9.50        |      | 10.70 | 0.374    |      | 0.421 |
| L    | 1.09        |      | 1.21  | 0.043    |      | 0.048 |
| L2   | 1.35        |      | 1.65  | 0.053    |      | 0.065 |
| V1   |             | 7°   |       |          | 7°   |       |
| V2   | 0°          |      | 6°    | 0°       |      | 6°    |

**Reel Specification-TO-252**