



Description

JMT N-channel Enhancement Mode Power MOSFET

Features

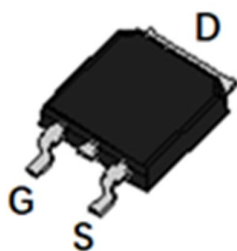
- 40V,60A
 $R_{DS(ON)} < 7m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 12m\Omega @ V_{GS} = 4.5V$
- Lead free and Green Device Available
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

Application

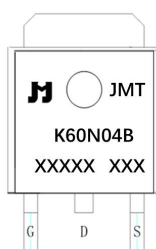
- Load Switch
- PWM Application
- Power management



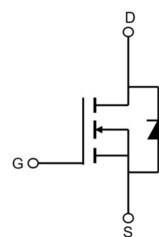
100% UIS TESTED!
100% ΔVds TESTED!



TO-252-3L(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) |
|----------------|------------|---------|----------------|-----------|------------|------------------|
| JMTK60N04B | JMTK60N04B | TAPING | TO-252-3L | 13inch | 2500 | 25000 |

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

| Symbol | Parameter | Max. | Units |
|-----------------------------------|---|------------------------|-------|
| V _{DSS} | Drain-Source Voltage | 40 | V |
| V _{GSS} | Gate-Source Voltage | ±20 | V |
| I _D | Continuous Drain Current | T _C = 25°C | 60 |
| | | T _C = 100°C | 39 |
| I _{DM} | Pulsed Drain Current ^{note1} | 240 | A |
| E _{AS} | Single Pulsed Avalanche Energy ^{note2} | 56 | mJ |
| P _D | Power Dissipation | T _C = 25°C | 53 |
| R _{θJC} | Thermal Resistance, Junction to Case | 2.8 | °C/W |
| T _J , T _{STG} | Operating and Storage Temperature Range | -55 to +175 | °C |



Electrical Characteristics (T_J=25°C unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|------|------|------|-------|
| Off Characteristic | | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 40 | - | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =40V, V _{GS} =0V, | - | - | 1.0 | μA |
| I _{GSS} | Gate to Body Leakage Current | V _{DS} =0V, V _{GS} =±20V | - | - | ±100 | nA |
| On Characteristics | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 1.0 | 1.7 | 2.5 | V |
| R _{DS(on)} | Static Drain-Source on-Resistance <small>note3</small> | V _{GS} =10V, I _D =30A | - | 5.5 | 7 | mΩ |
| | | V _{GS} =4.5V, I _D =20A | - | 9 | 12 | |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =20V, V _{GS} =0V, f=1.0MHz | - | 2400 | - | pF |
| C _{oss} | Output Capacitance | | - | 192 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | | - | 165 | - | pF |
| Q _g | Total Gate Charge | V _{DS} =20V, I _D =25A, V _{GS} =10V | - | 45 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 8 | - | nC |
| Q _{gd} | Gate-Drain("Miller") Charge | | - | 10 | - | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} =30V, I _D =25A, R _L =1.2Ω, R _{GEN} =3Ω, V _{GS} =10V | - | 12 | - | ns |
| t _r | Turn-on Rise Time | | - | 75 | - | ns |
| t _{d(off)} | Turn-off Delay Time | | - | 50 | - | ns |
| t _f | Turn-off Fall Time | | - | 105 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I _S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 60 | A |
| I _{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 240 | A |
| V _{SD} | Drain to Source Diode Forward Voltage | V _{GS} =0V, I _S =30A | - | - | 1.2 | V |
| t _{rr} | Body Diode Reverse Recovery Time | T _J =25°C, I _F =30A, dI/dt=100A/μs | - | 15 | - | ns |
| Q _{rr} | Body Diode Reverse Recovery Charge | | - | 8 | - | nC |

- Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
 2. EAS condition: T_J=25°C, V_{DD}=20V, V_G=10V, R_G=25Ω, L=0.5mH, I_{AS}=15A
 3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%



Typical Performance Characteristics

Figure 1: Output Characteristics

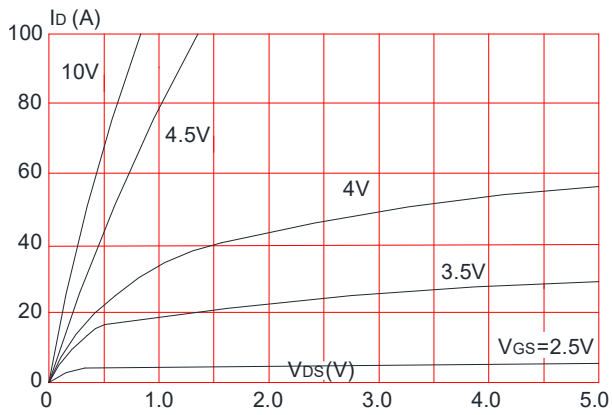


Figure 2: Typical Transfer Characteristics

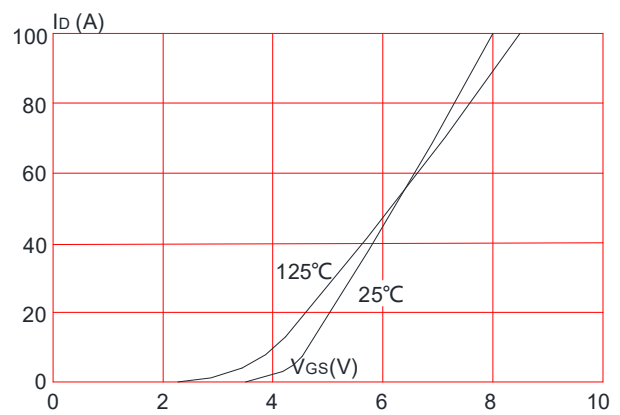


Figure 3: On-resistance vs. Drain Current

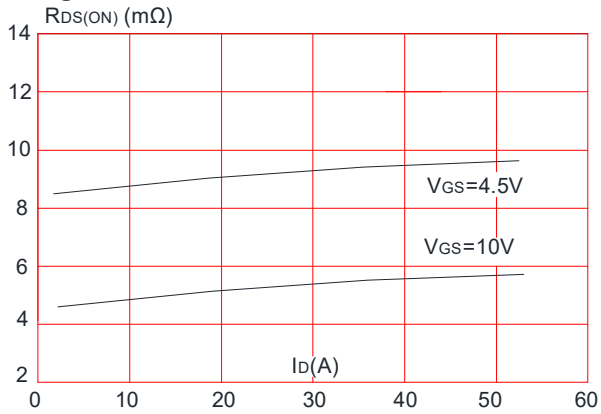


Figure 4: Body Diode Characteristics

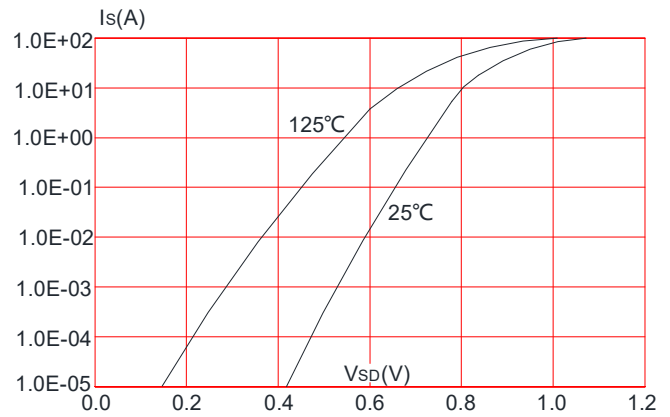


Figure 5: Gate Charge Characteristics

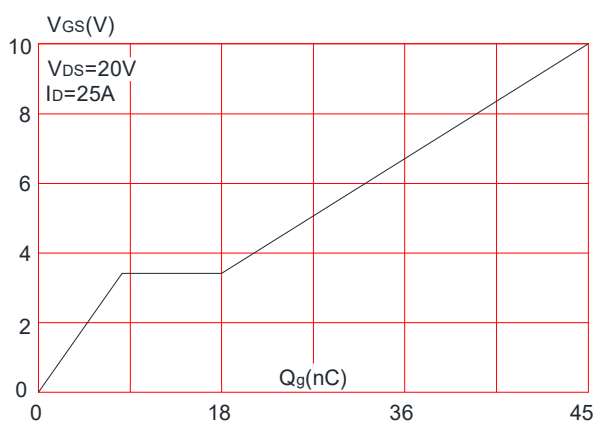


Figure 6: Capacitance Characteristics

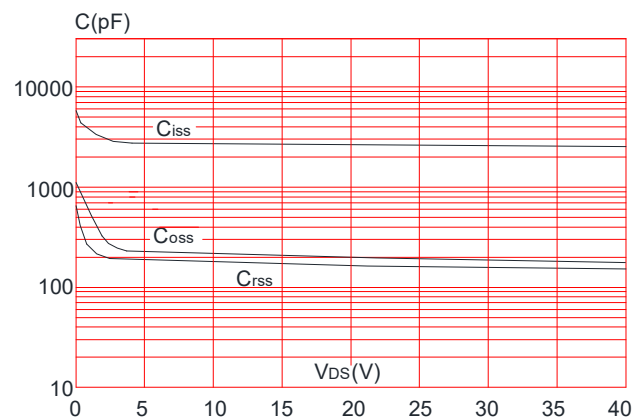




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

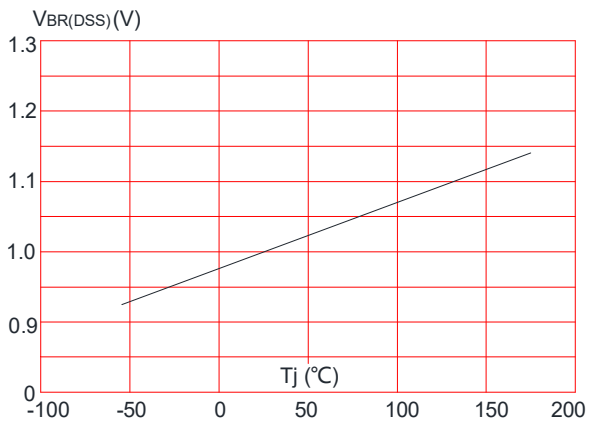


Figure 8: Normalized on Resistance vs. Junction Temperature

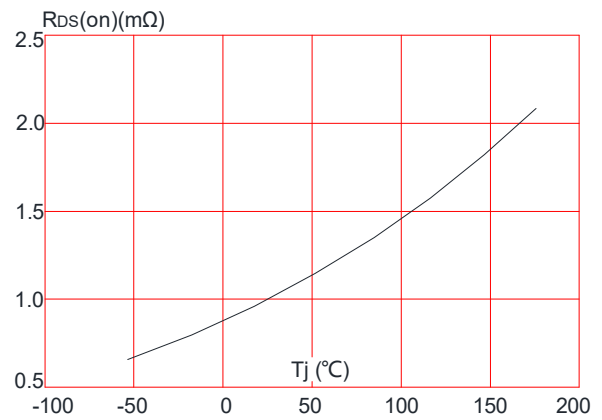


Figure 9: Maximum Safe Operating Area

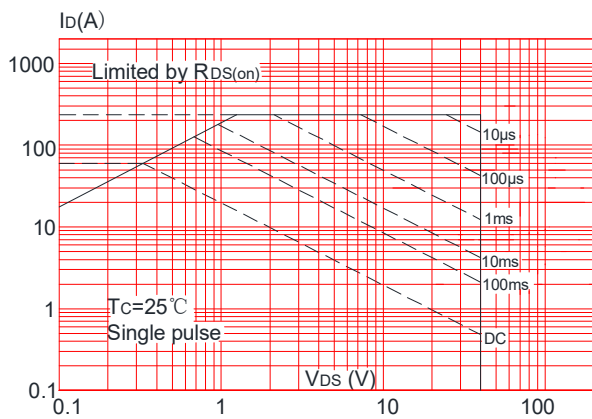


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

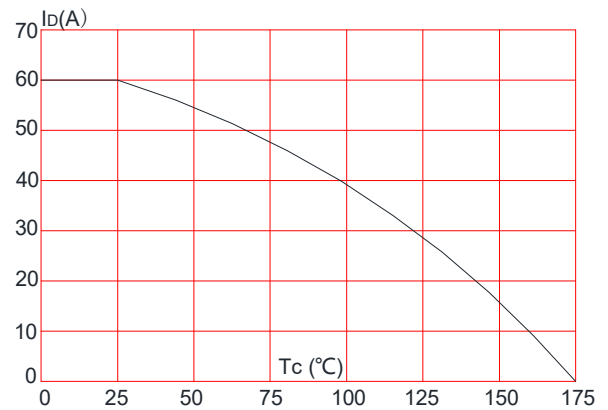
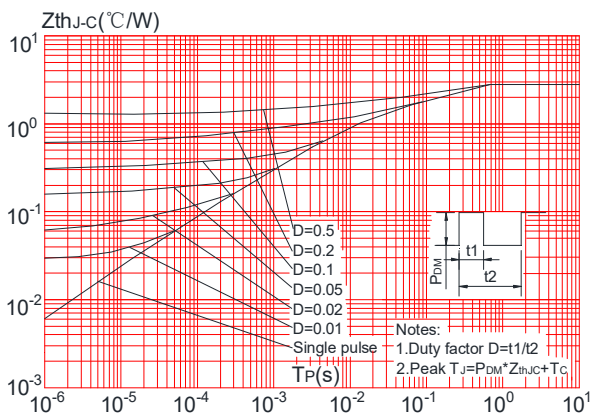


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Test Circuit

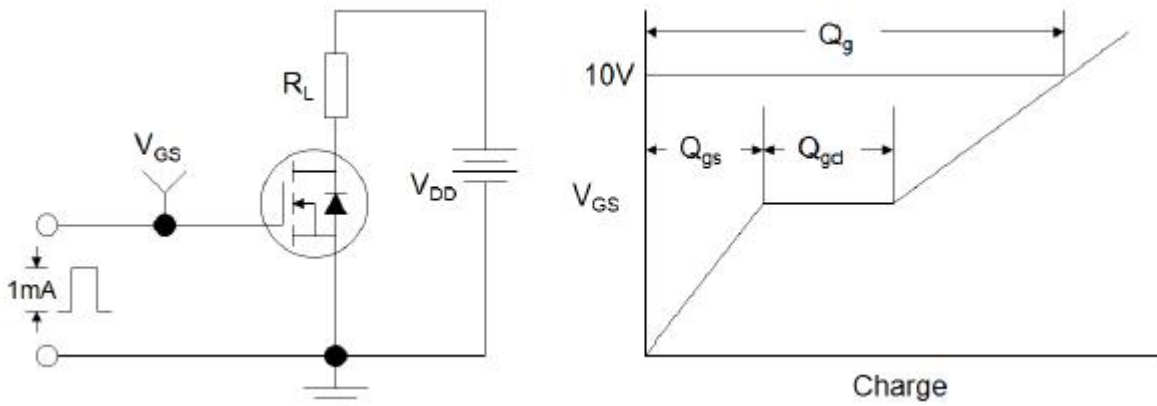


Figure1:Gate Charge Test Circuit & Waveform

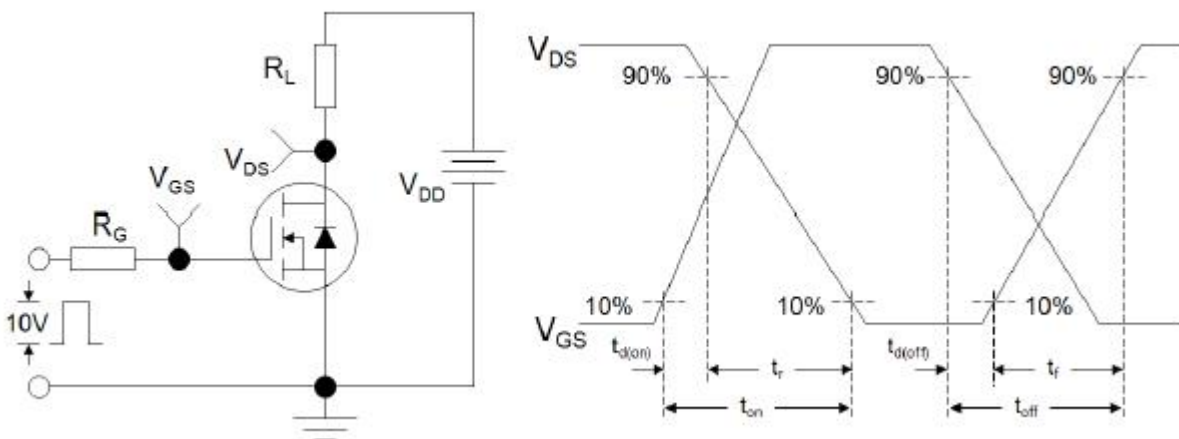


Figure 2: Resistive Switching Test Circuit & Waveforms

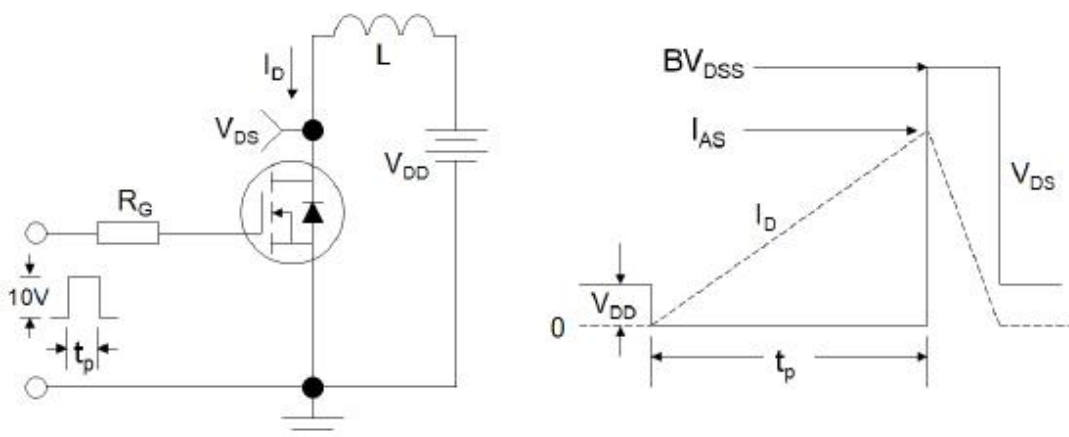
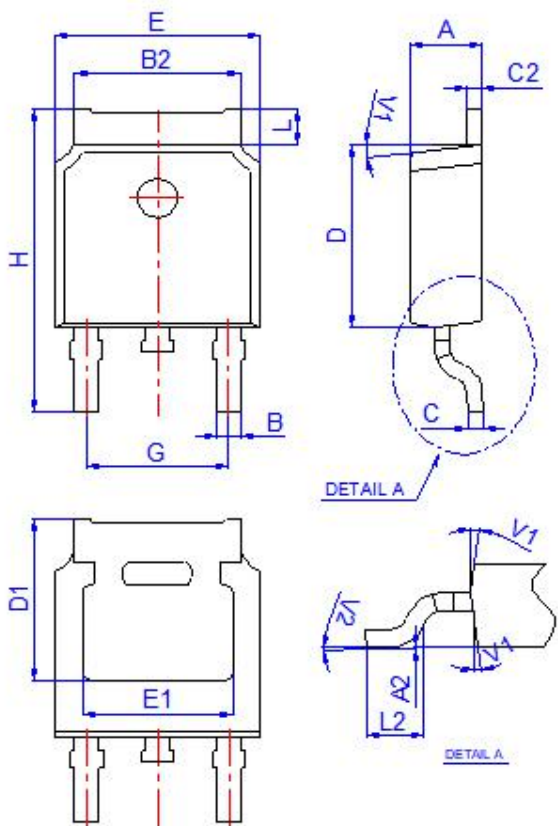


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



Package Mechanical Data-TO-252-3L



| 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° |

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