



Description

JMT N-channel Enhancement Mode Power MOSFET

Features

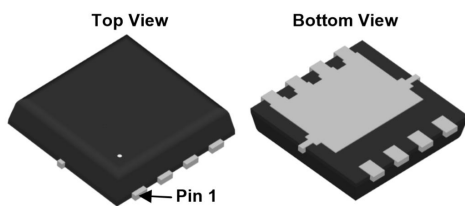
- 40V, 50A
 $R_{DS(ON)} < 7.7m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 16m\Omega @ V_{GS} = 4.5V$
- Lead free and Green Device Available
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

Application

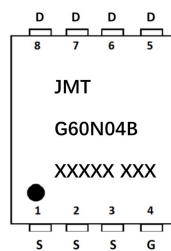
- Load Switch
- PWM Application
- Power management



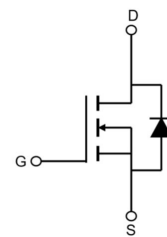
100% UIS TESTED!
100% ΔVds TESTED!



PDFN5x6-8L



Marking and pin Assignment



Schematic Diagram

Package Marking and Ordering Information

| Device Marking | Device | OUTLINE | Device Package | Reel Size | Reel (PCS) | Per Carton (PCS) |
|----------------|------------|---------|----------------|-----------|------------|------------------|
| JMTG60N04B | JMTG60N04B | TAPING | PDFN5x6-8L | 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 | 50 |
| | | T _C = 100°C | 33 |
| I _{DM} | Pulsed Drain Current ^{note1} | 200 | A |
| E _{AS} | Single Pulsed Avalanche Energy ^{note2} | 56 | mJ |
| P _D | Power Dissipation | T _C = 25°C | 33.7 |
| R _{θJC} | Thermal Resistance, Junction to Case | 3.7 | °C/W |
| T _J , T _{STG} | Operating and Storage Temperature Range | -55 to +150 | °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 | 1.1 | 1.7 | 2.4 | V |
| R _{DS(on)} | Static Drain-Source on-Resistance <small>note3</small> | V _{GS} =10V, I _D =30A | - | 5.9 | 7.7 | mΩ |
| | | V _{GS} =4.5V, I _D =20A | - | 11 | 16 | |
| 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 | | - | - | 50 | A |
| I _{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 200 | 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

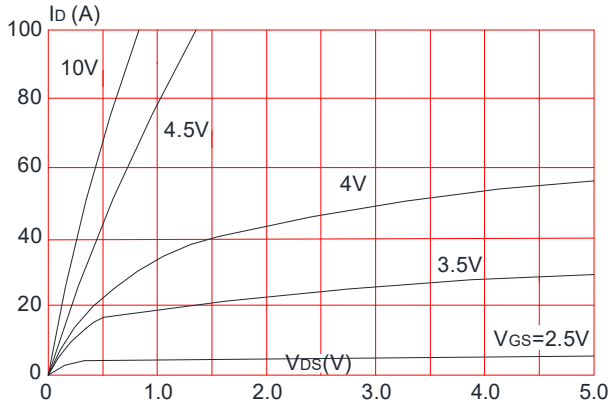


Figure 2: Typical Transfer Characteristics

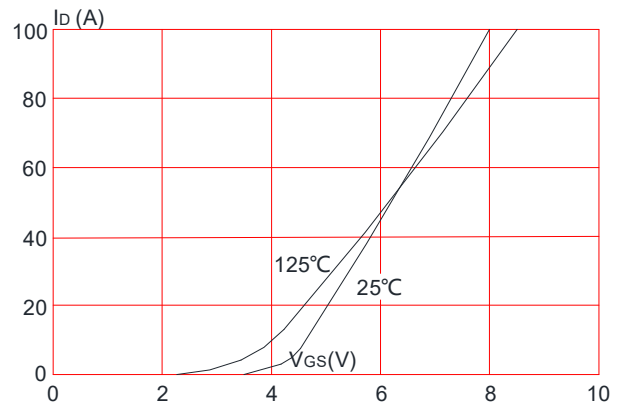


Figure 3: On-resistance vs. Drain Current

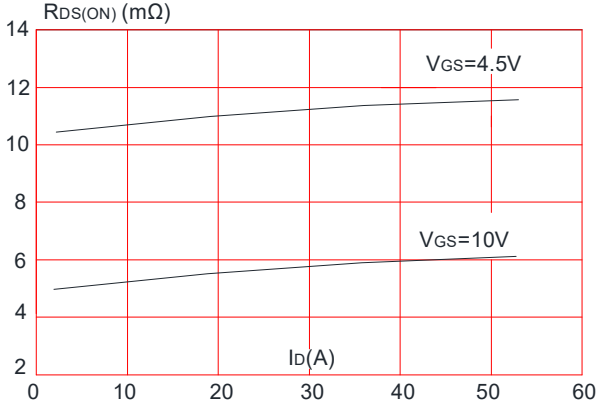


Figure 4: Body Diode Characteristics

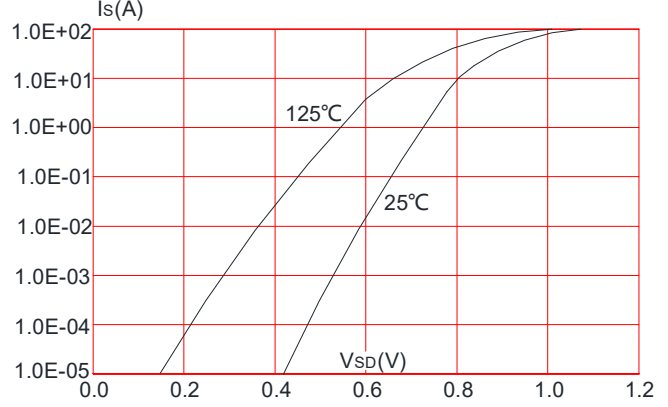


Figure 5: Gate Charge Characteristics

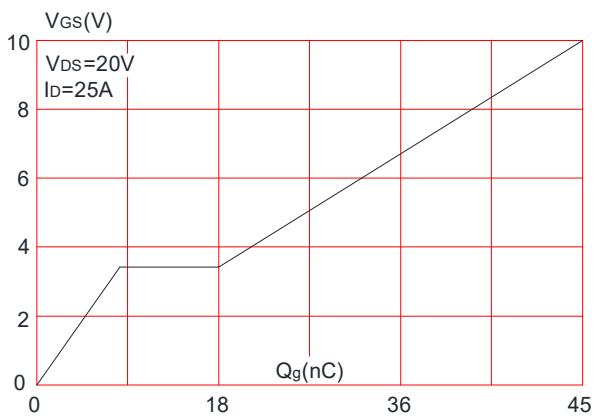


Figure 6: Capacitance Characteristics

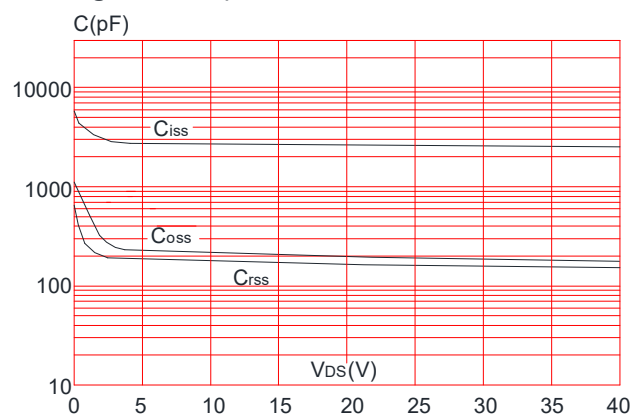




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

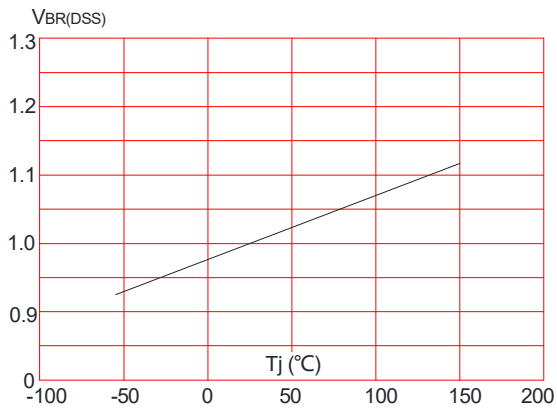


Figure 8: Normalized on Resistance vs. Junction Temperature

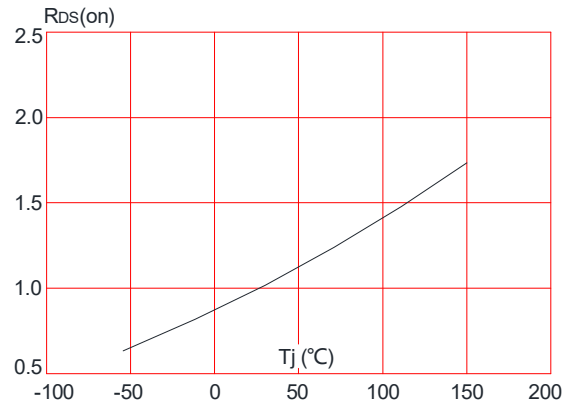


Figure 9: Maximum Safe Operating Area

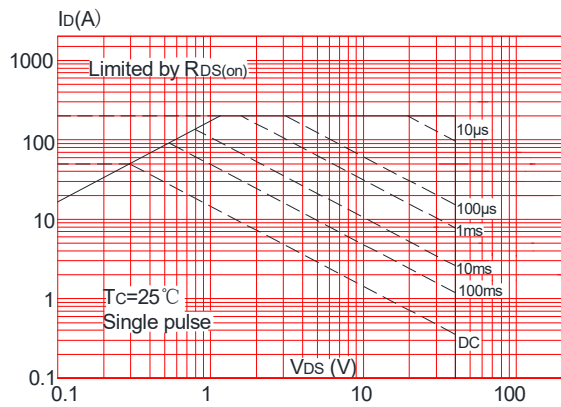


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

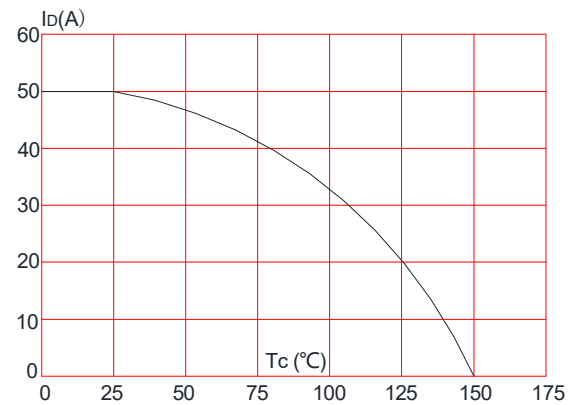
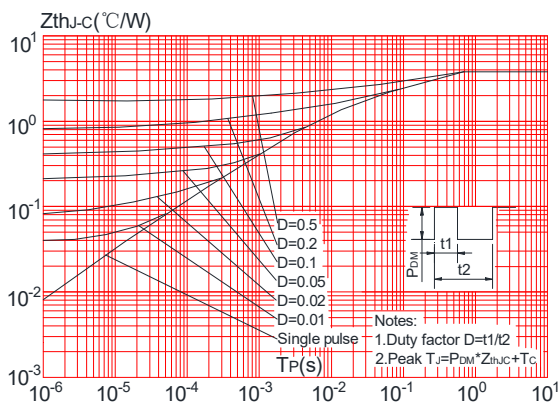


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Test Circuit

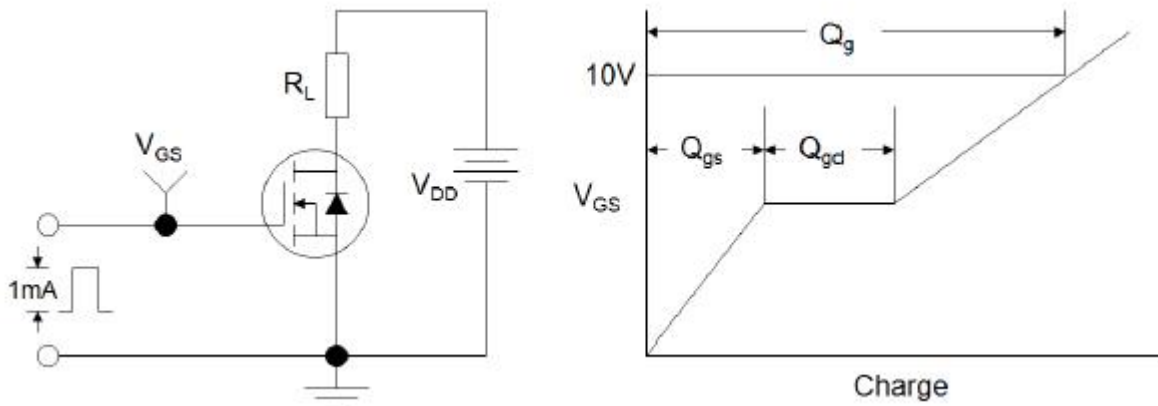


Figure1:Gate Charge Test Circuit & Waveform

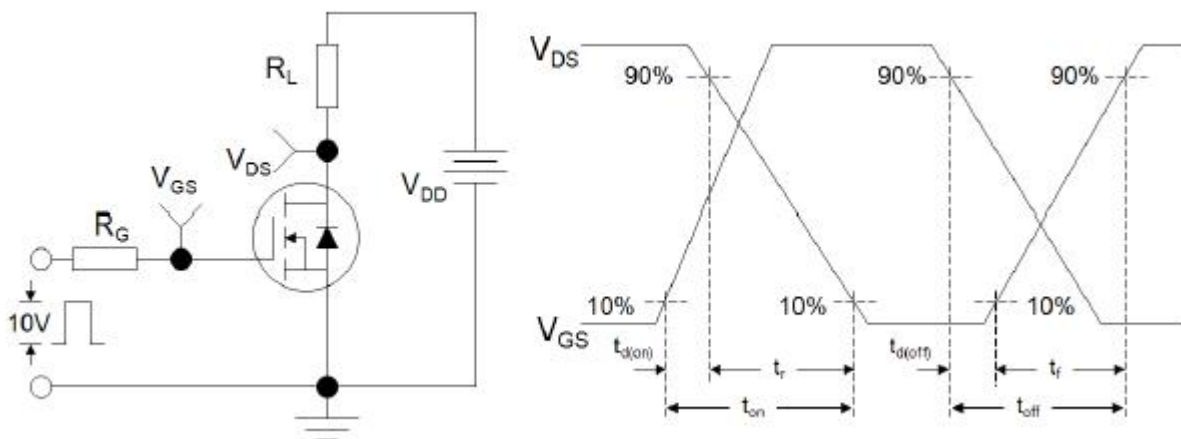


Figure 2: Resistive Switching Test Circuit & Waveforms

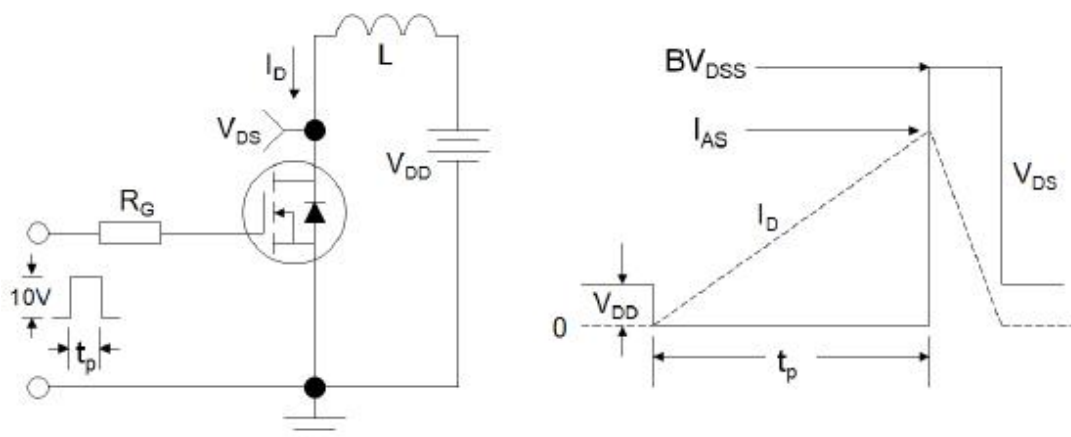
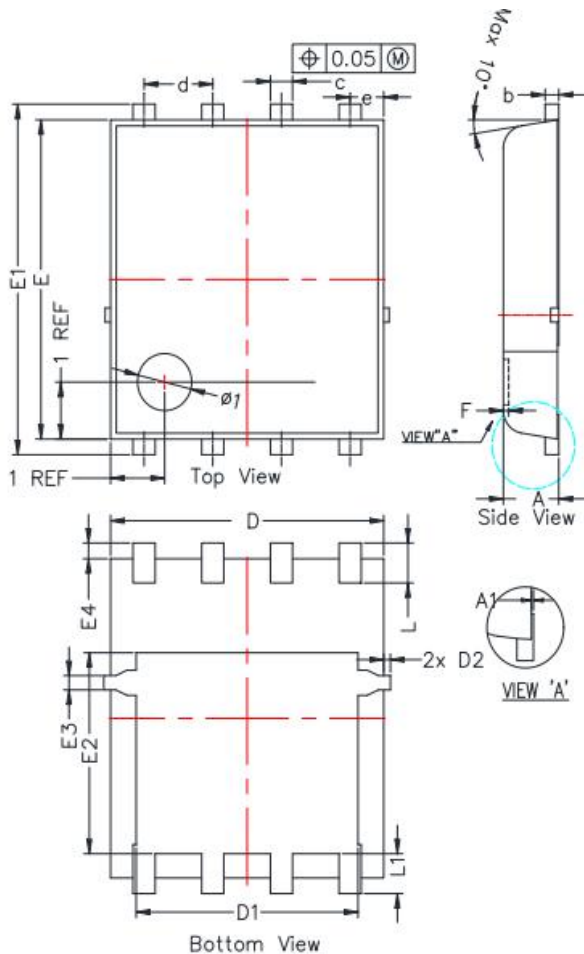


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



Package Mechanical Data-PDFN5x6-8L



| SYMBOLS | DIMENSION IN MM | | | DIMENSION IN INCHES | | |
|---------|-----------------|-------|-------|---------------------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| * A | 0.900 | 1.000 | 1.100 | 0.035 | 0.039 | 0.043 |
| A1 | 0.000 | --- | 0.050 | 0.000 | ---- | 0.002 |
| b | 0.246 | 0.254 | 0.312 | 0.010 | 0.010 | 0.012 |
| * c | 0.310 | 0.410 | 0.510 | 0.012 | 0.016 | 0.020 |
| d | 1.27 BSC | | | 0.050 BSC | | |
| * D | 4.950 | 5.050 | 5.150 | 0.195 | 0.199 | 0.203 |
| D1 | 4.000 | 4.100 | 4.200 | 0.157 | 0.161 | 0.165 |
| * D2 | --- | --- | 0.125 | --- | --- | 0.005 |
| e | 0.62 BSC | | | 0.024 BSC | | |
| * E | 5.500 | 5.600 | 5.700 | 0.217 | 0.220 | 0.224 |
| * E1 | 6.050 | 6.150 | 6.250 | 0.238 | 0.242 | 0.246 |
| E2 | 3.425 | 3.525 | 3.625 | 0.135 | 0.139 | 0.143 |
| E3 | 0.150 | 0.250 | 0.350 | 0.006 | 0.010 | 0.014 |
| * E4 | 0.175 | 0.275 | 0.375 | 0.007 | 0.011 | 0.015 |
| F | - | - | 0.100 | - | - | 0.004 |
| * L | 0.500 | 0.600 | 0.700 | 0.02 | 0.02 | 0.03 |
| L1 | 0.600 | 0.700 | 0.800 | 0.02 | 0.03 | 0.03 |

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