



Description

JMT N-channel Enhancement Mode Power MOSFET

Features

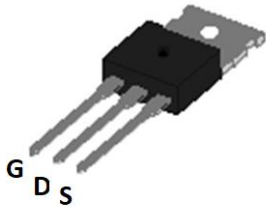
- 100V,59A
 $R_{DS(ON)} < 20m\Omega @ V_{GS} = 10V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free

Application

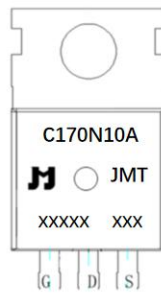
- Load Switch
- PWM Application
- Power Management



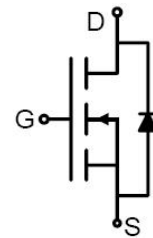
100% UIS TESTED!
100% ΔVds TESTED!



TO-220C-3L top view



Marking and pin Assignment



Schematic Diagram

Package Marking and Ordering Information

| Device Marking | Device | Outline | Package | TUBE (pcs) | Inner BOX (pcs) | Per Carton (pcs) |
|----------------|-------------|---------|------------|------------|-----------------|------------------|
| JMTC170N10A | JMTC170N10A | TUBE | TO-220C-3L | 50 | 1000 | 5000 |

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

| Symbol | Parameter | Max. | Units |
|-----------------|---|---------------------|--------------|
| V_{DSS} | Drain-Source Voltage | 100 | V |
| V_{GSS} | Gate-Source Voltage | ± 25 | V |
| I_D | Continuous Drain Current | $T_C = 25^\circ C$ | 59 |
| | | $T_C = 100^\circ C$ | 38 |
| I_{DM} | Pulsed Drain Current ^{note1} | 236 | A |
| E_{AS} | Single Pulsed Avalanche Energy ^{note2} | 108 | mJ |
| P_D | Power Dissipation | $T_C = 25^\circ C$ | 146 |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 1 | $^\circ C/W$ |
| T_J, T_{STG} | Operating and Storage Temperature Range | -55 to +175 | $^\circ C$ |



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

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|------|------|------|-------|
| Off Characteristics | | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 100 | - | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =100V, V _{GS} =0V, | - | - | 1.0 | μA |
| I _{GSS} | Gate to Body Leakage Current | V _{DS} =0V, V _{GS} =±25V | - | - | ±100 | nA |
| On Characteristics | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 2 | 3 | 4 | V |
| R _{DS(on)} | Static Drain-Source on-Resistance <small>note3</small> | V _{GS} =10V, I _D =30A | - | 15 | 20 | mΩ |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =25V, V _{GS} =0V, f=1.0MHz | - | 5191 | - | pF |
| C _{oss} | Output Capacitance | | - | 239 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | | - | 164 | - | pF |
| Q _g | Total Gate Charge | V _{DD} =30V, I _D =30A, V _{GS} =10V | - | 94 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 16 | - | nC |
| Q _{gd} | Gate-Drain("Miller") Charge | | - | 24 | - | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} =30V, I _D =2A, R _L =15Ω, R _{GEN} =2.5Ω, V _{GS} =10V | - | 15 | - | ns |
| t _r | Turn-on Rise Time | | - | 11 | - | ns |
| t _{d(off)} | Turn-off Delay Time | | - | 52 | - | ns |
| t _f | Turn-off Fall Time | | - | 13 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I _S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 59 | A |
| I _{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 236 | A |
| V _{SD} | Drain to Source Diode Forward Voltage | V _{GS} =0V, I _S =30A | - | - | 1.2 | V |
| trr | Body Diode Reverse Recovery Time | I _F =28A, di/dt=100A/μs | - | 33 | - | ns |
| Qrr | Body Diode Reverse Recovery Charge | | - | 54 | - | nC |

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

2. EAS condition: Starting T_J=25°C, V_{DD}=50V, V_G=10V, L=0.5mH, R_G=25Ω, I_{AS}=20.8A

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



Typical Performance Characteristics

Figure 1: Output Characteristics

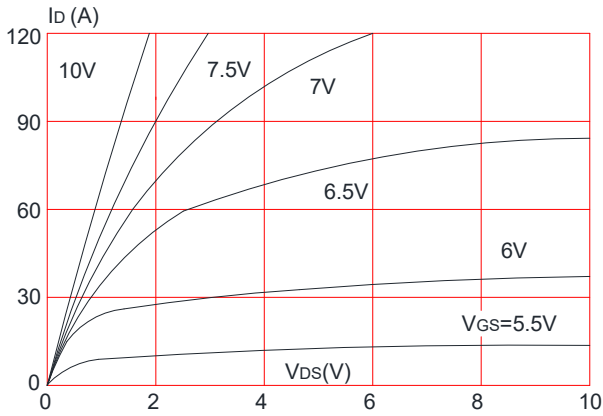


Figure 2: Typical Transfer Characteristics

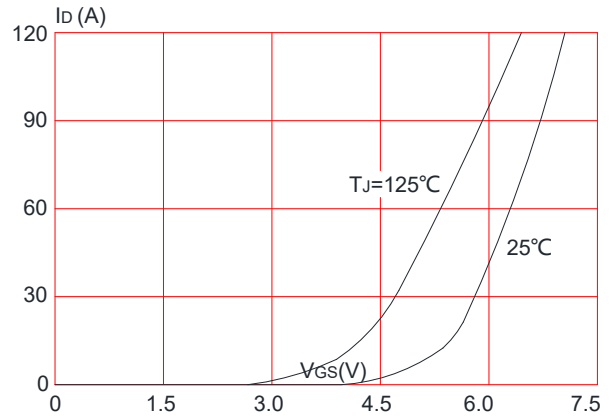


Figure 3: On-resistance vs. Drain Current

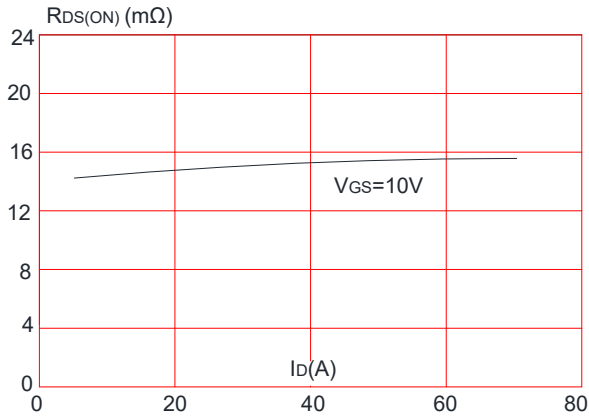


Figure 4: Body Diode Characteristics

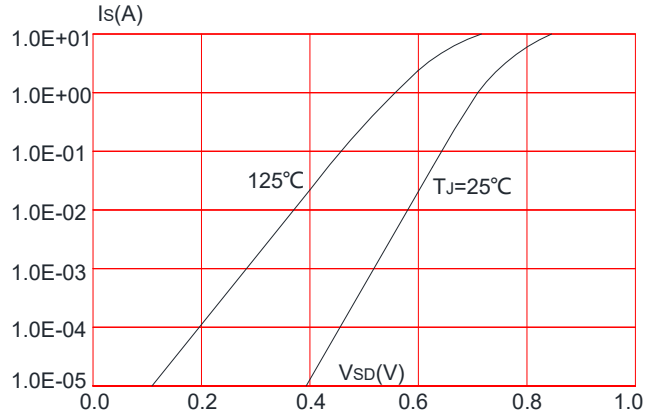


Figure 5: Gate Charge Characteristics

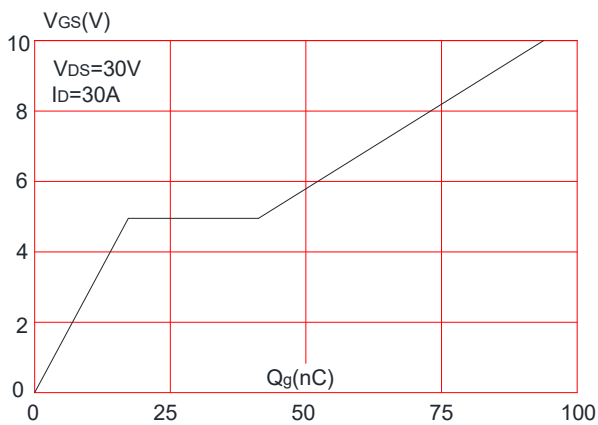
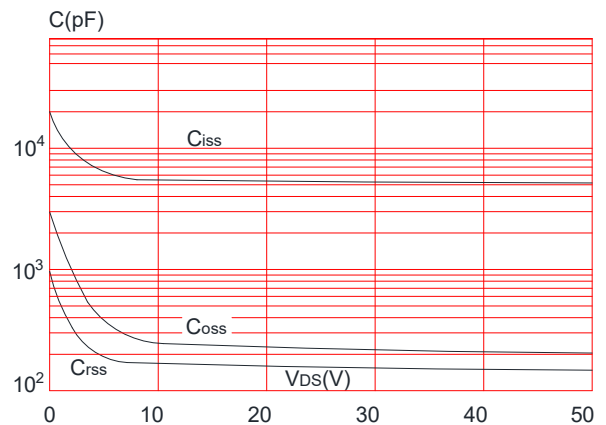


Figure 6: Capacitance Characteristics





JMTC170N10A

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

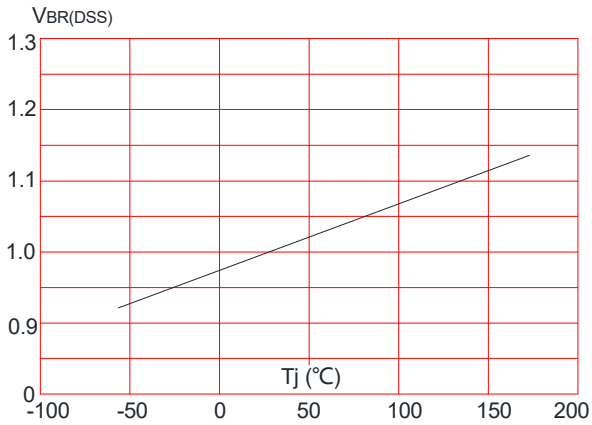


Figure 8: Normalized on Resistance vs. Junction Temperature

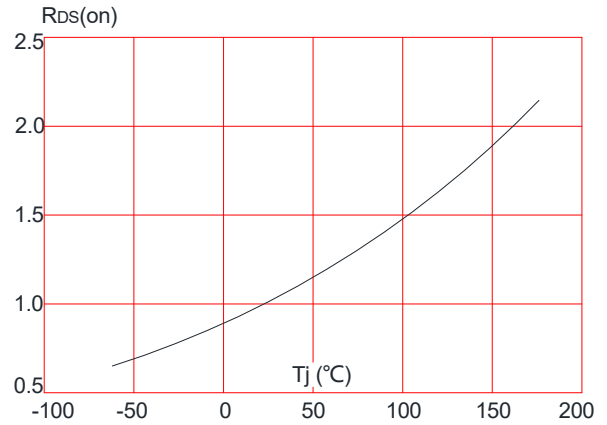


Figure 9: Maximum Safe Operating Area

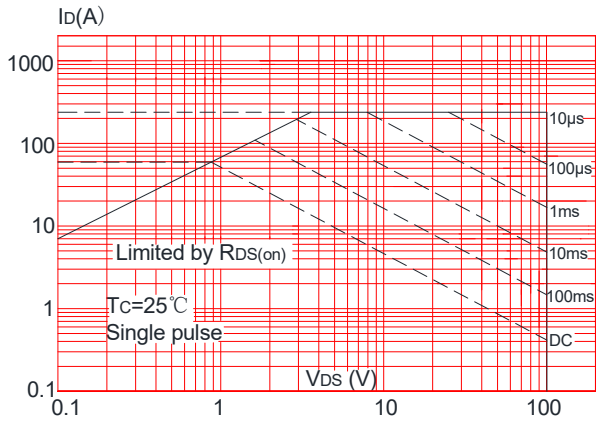


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

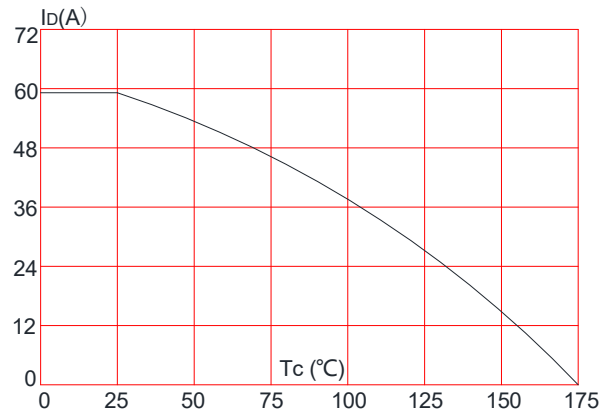
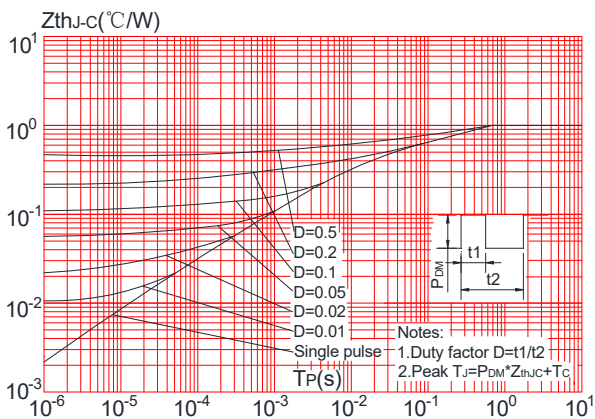


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Test Circuit

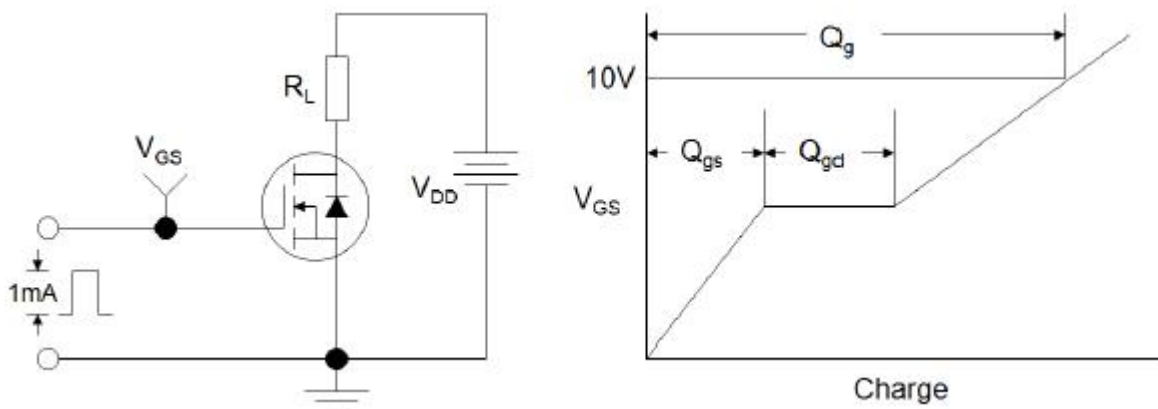


Figure1:Gate Charge Test Circuit & Waveform

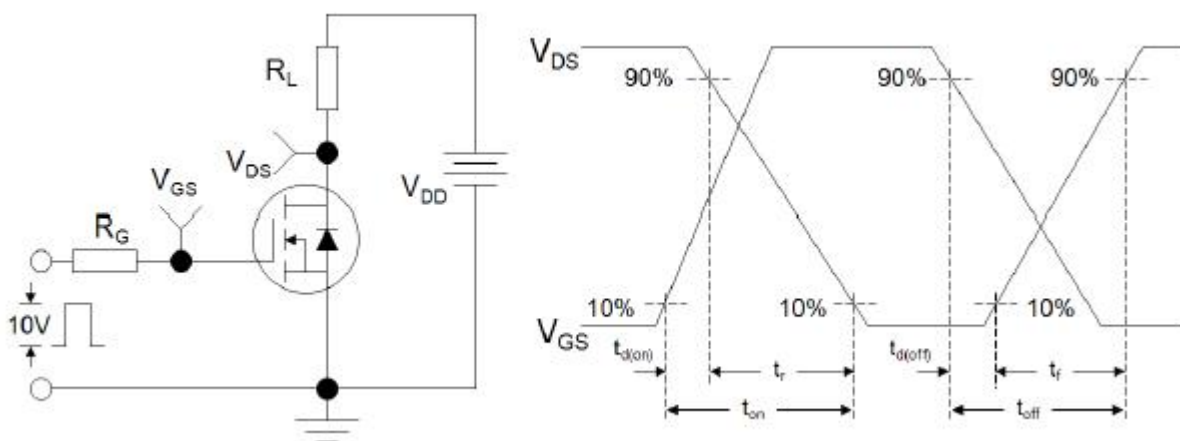


Figure 2: Resistive Switching Test Circuit & Waveforms

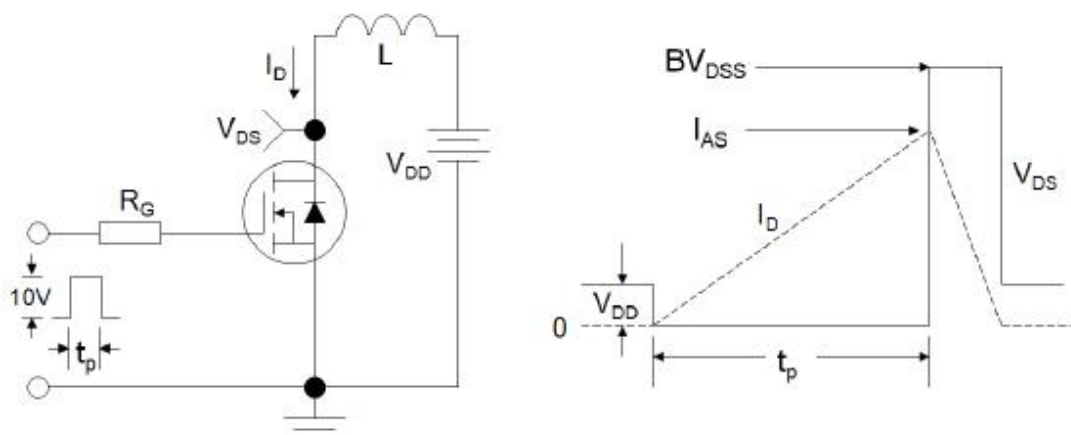
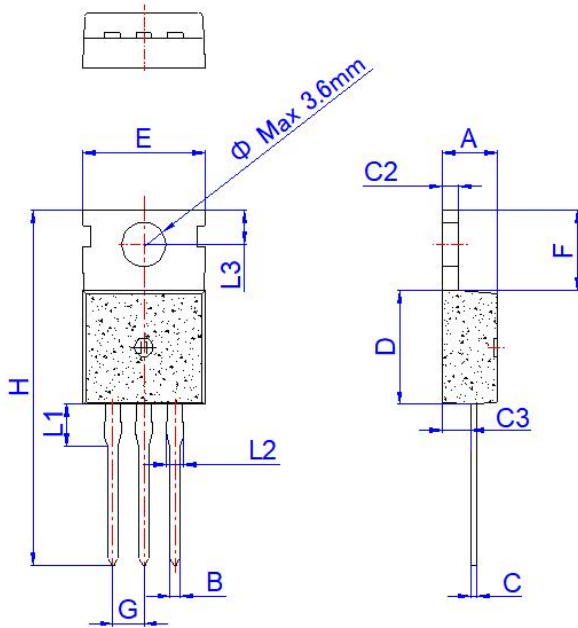


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



Package Mechanical Data-TO-220C-3L



| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| B | 0.70 | | 0.90 | 0.028 | | 0.035 |
| C | 0.45 | | 0.60 | 0.018 | | 0.024 |
| C2 | 1.23 | | 1.32 | 0.048 | | 0.052 |
| C3 | 2.20 | | 2.60 | 0.087 | | 0.102 |
| D | 8.90 | | 9.90 | 0.350 | | 0.390 |
| E | 9.90 | | 10.3 | 0.390 | | 0.406 |
| F | 6.30 | | 6.90 | 0.248 | | 0.272 |
| G | | 2.54 | | | 0.1 | |
| H | 28.0 | | 29.8 | 1.102 | | 1.173 |
| L1 | | 3.39 | | | 0.133 | |
| L2 | 1.14 | | 1.70 | 0.045 | | 0.067 |
| L3 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| Φ | | 3.6 | | | 0.142 | |

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