

Description

JMP N-channel Enhancement Mode Power MOSFET

Features

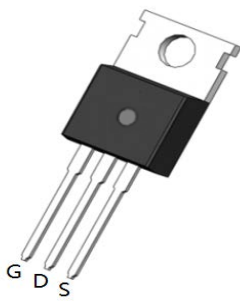
- 650V, 20A
- $R_{DS(ON)} < 0.47\Omega @ V_{GS} = 10V$
- Fast Switching
- Improved dv/dt Capability

Applications

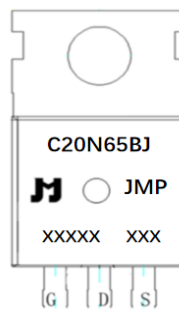
- Load Switch
- PWM Application
- Power Management



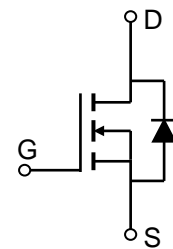
100% UIS TESTED!
100% ΔVds TESTED!



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) |
|----------------|-------------|---------|------------|------------|-----------------|------------------|
| JMPC20N65BJ | JMPC20N65BJ | TUBE | TO-220C-3L | 50 | 1000 | 5000 |

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

| Symbol | Parameter | Value | Units |
|-----------------|--|---------------------------|-------|
| V_{DS} | Drain-to-Source Voltage | 650 | V |
| V_{GS} | Gate-to-Source Voltage | ± 30 | V |
| I_D | Continuous Drain Current | $T_C = 25^\circ\text{C}$ | 20 |
| | | $T_C = 100^\circ\text{C}$ | 13 |
| I_{DM} | Pulsed Drain Current ⁽¹⁾ | 80 | A |
| E_{AS} | Single Pulsed Avalanche Energy ⁽²⁾ | 980 | mJ |
| P_D | Power Dissipation | $T_C = 25^\circ\text{C}$ | 208 |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient ⁽³⁾ | 61 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 0.6 | |
| T_J, T_{STG} | Junction & Storage Temperature Range | -55 to 150 | °C |



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

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|--|---|------|------|------|------|
| Off Characteristics | | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | I _D = 250μA, V _{GS} = 0V | 650 | - | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} = 650V, V _{GS} = 0V | - | - | 1.0 | μA |
| I _{GSS} | Gate-Body Leakage Current | V _{DS} = 0V, V _{GS} = ±30V | - | - | ±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 ⁽⁴⁾ | V _{GS} = 10V, I _D = 10A | - | 0.4 | 0.47 | Ω |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} = 0V, V _{DS} = 25V, f = 1MHz | - | 3234 | - | pF |
| C _{oss} | Output Capacitance | | - | 266 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | | - | 34 | - | pF |
| Q _g | Total Gate Charge | V _{GS} = 0 to 10V V _{DS} = 520V, I _D = 20A | - | 73 | - | nC |
| Q _{gs} | Gate Source Charge | | - | 17 | - | nC |
| Q _{gd} | Gate Drain("Miller") Charge | | - | 29 | - | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-On DelayTime | V _{GS} = 10V, V _{DD} = 330V I _D = 20A, R _{GEN} = 24Ω | - | 45 | - | ns |
| t _r | Turn-On Rise Time | | - | 64 | - | ns |
| t _{d(off)} | Turn-Off DelayTime | | - | 218 | - | ns |
| t _f | Turn-Off Fall Time | | - | 84 | - | ns |
| Drain-Source Diode Characteristics and Max Ratings | | | | | | |
| I _S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 20 | A |
| I _{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 80 | A |
| V _{SD} | Drain to Source Diode Forward Voltage | V _{GS} = 0V, I _S = 20A | - | - | 1.2 | V |
| t _{rr} | Body Diode Reverse Recovery Time | I _F = 20A, di/dt = 100A/us | - | 494 | - | ns |
| Q _{rr} | Body Diode Reverse Recovery Charge | | - | 7.9 | - | μC |

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting T_J=25C, V_{DD}=50V, V_G=10V, R_G=25ohm, L=10mH, I_{AS}=14A
 3. R_{θJA} is measured with the device mounted on a minimum recommended pad of 2oz copper FR4 PCB
 4. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5%.

Typical Performance Characteristics

Figure 1: Output Characteristics

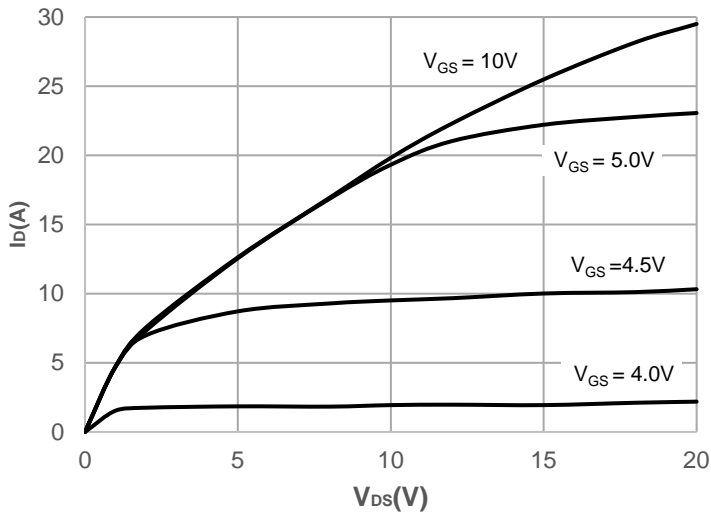


Figure 2: Typical Transfer Characteristics

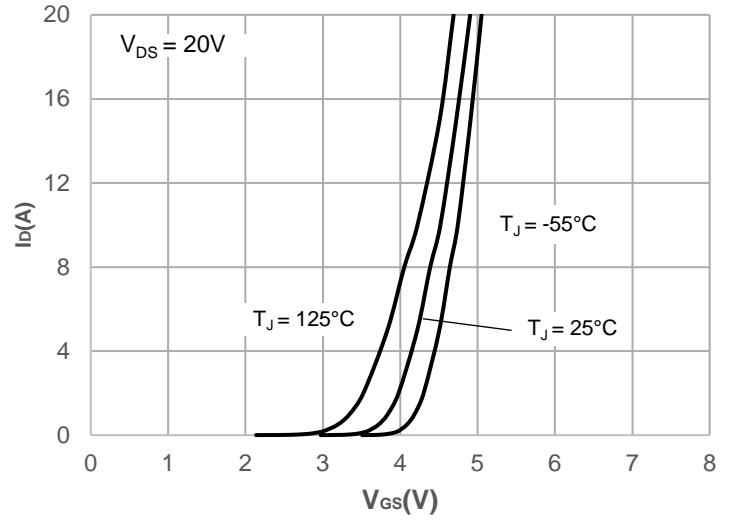


Figure 3: On-resistance vs. Drain Current

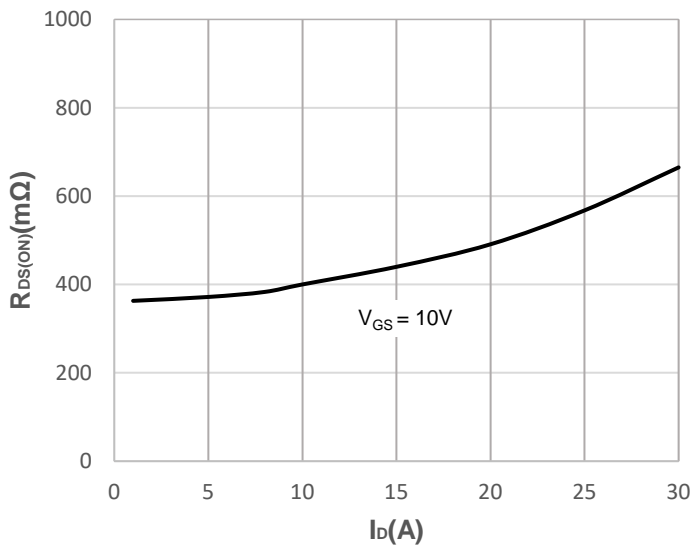


Figure 4: Body Diode Characteristics

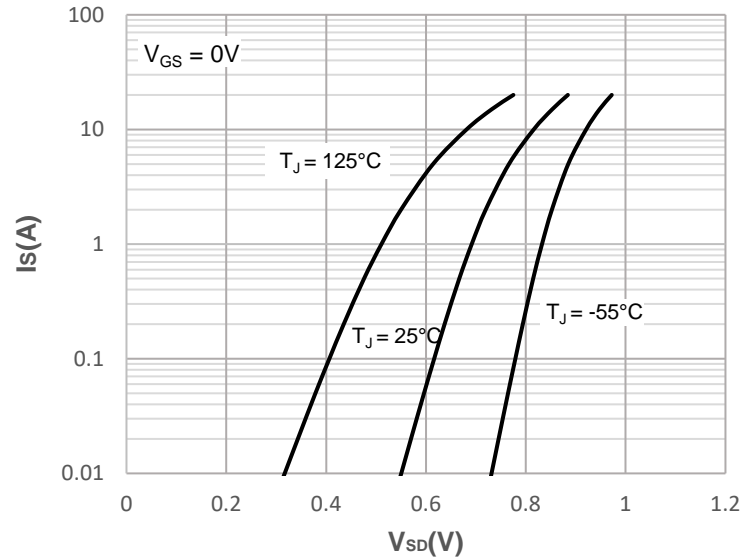


Figure 5: Gate Charge Characteristics

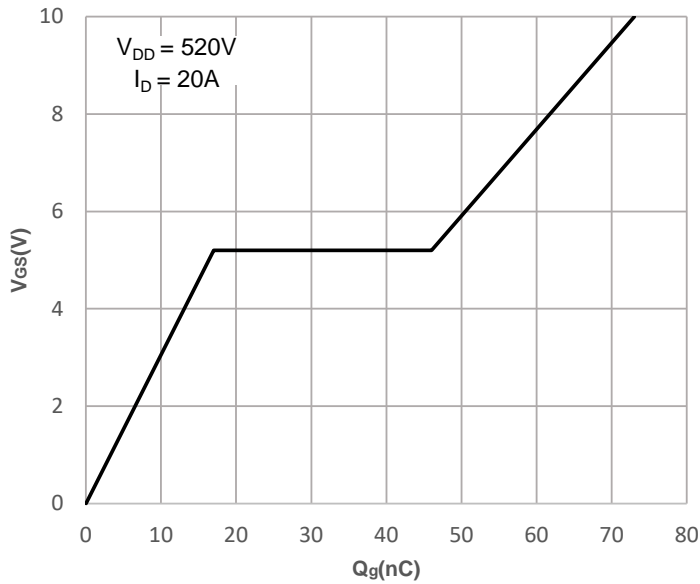
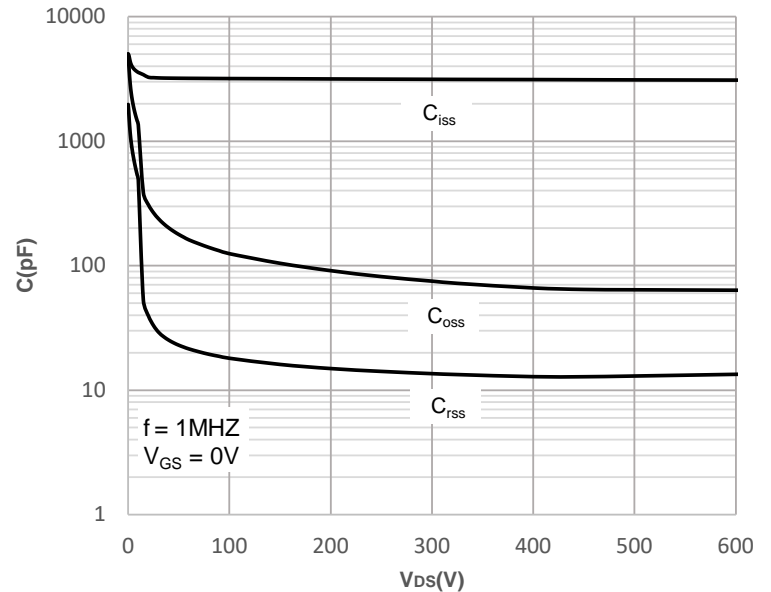


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

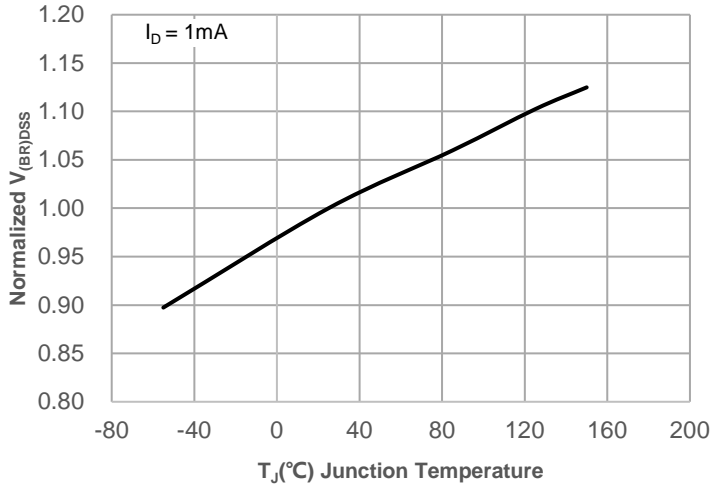


Figure 8: Normalized on Resistance vs. Junction Temperature

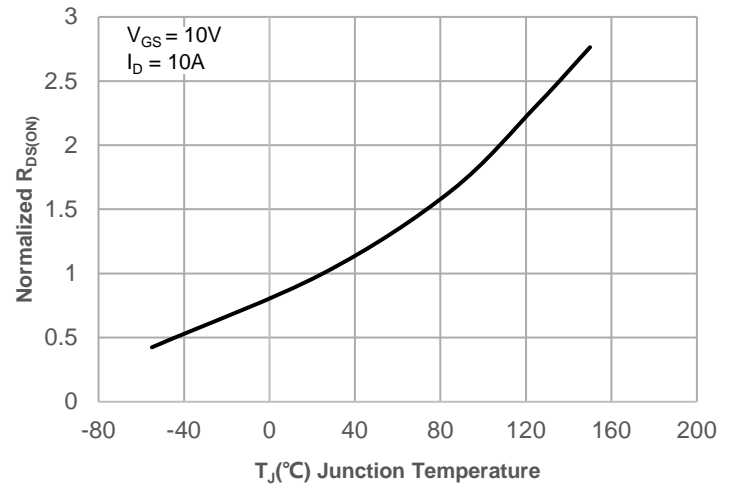


Figure 9: Maximum Safe Operating Area

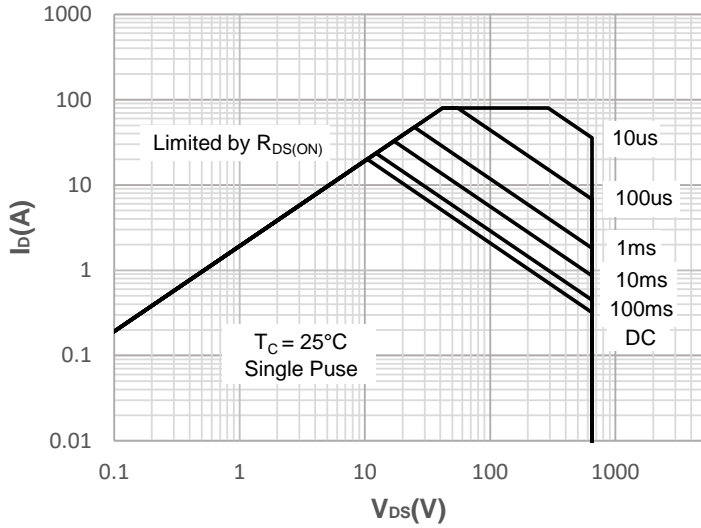


Figure 10: Maximum Continuous Driant Current vs. Case Temperature

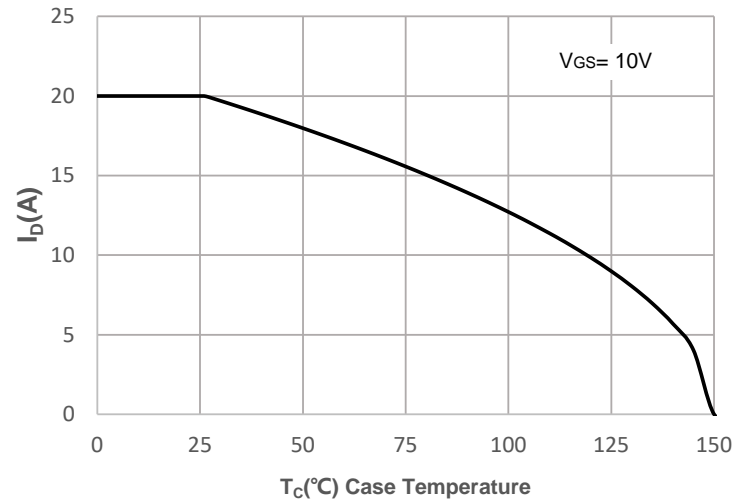


Figure 11: Normalized Maximum Transient Thermal Impedance

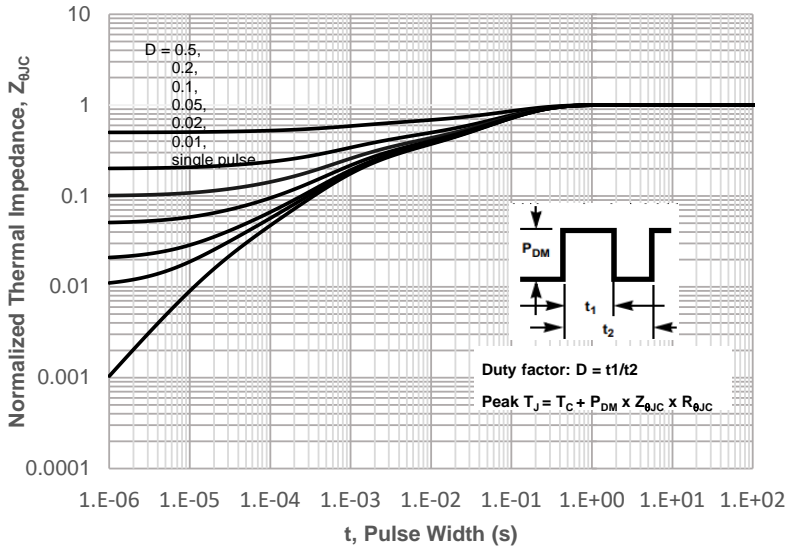
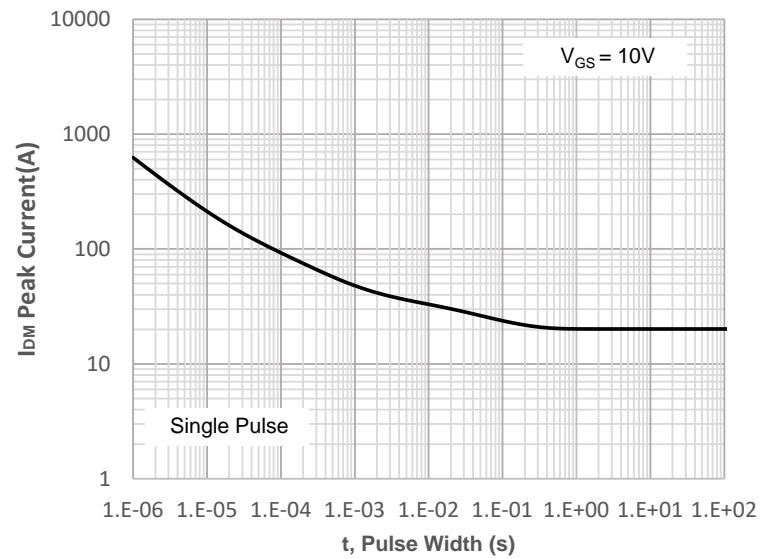


Figure 12: Peak Current Capacity



Test Circuit

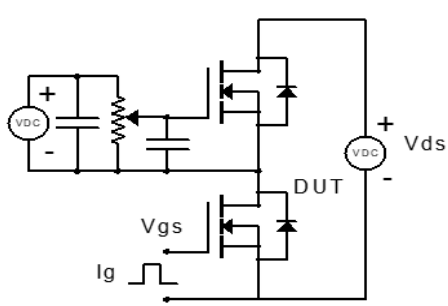


Figure 1: Gate Charge Test Circuit & Waveform

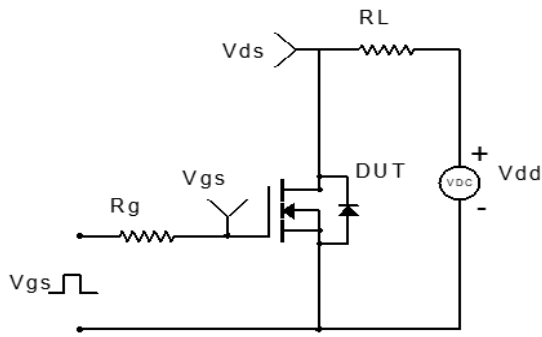


Figure 2: Resistive Switching Test Circuit & Waveform

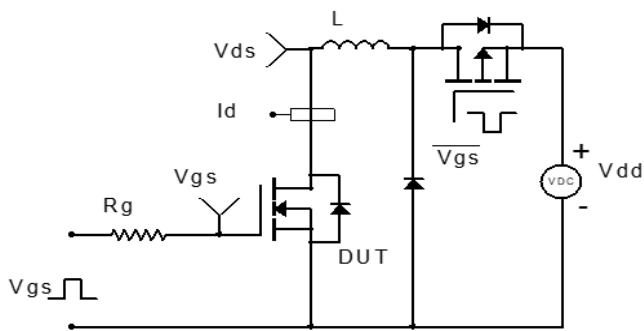


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

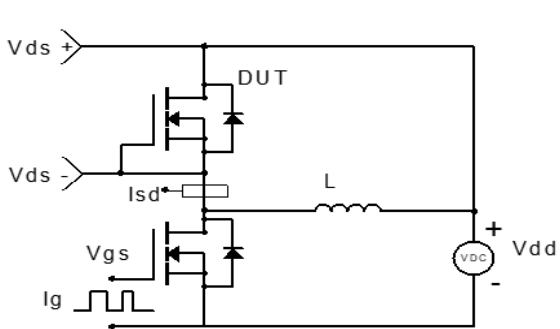
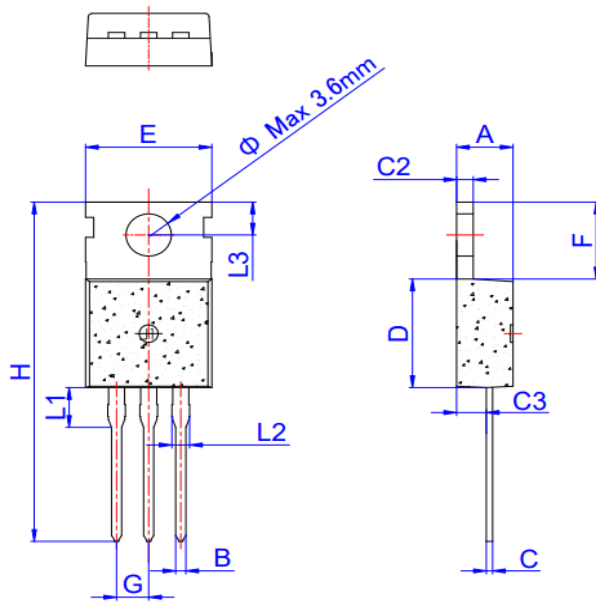


Figure 4: Diode Recovery Test Circuit & Waveform

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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