

## Description

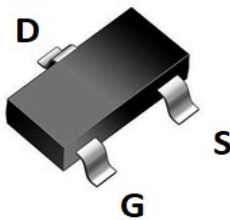
### JMT P-channel Enhancement Mode Power MosFET

#### Features

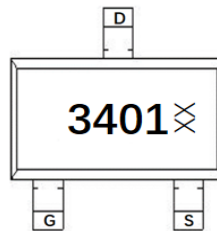
- -30V, -4.2A  
 $R_{DS(ON)} < 47m\Omega @ V_{GS} = -10V$   
 $R_{DS(ON)} < 53m\Omega @ V_{GS} = -4.5V$   
 $R_{DS(ON)} < 68m\Omega @ V_{GS} = -2.5V$
- Advanced Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead Free

#### Applications

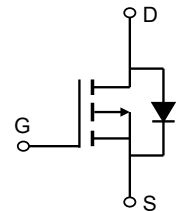
- Load Switch
- PWM Application
- Power Management



SOT-23-3L Top View



Marking and Pin Assignment



Schematic Diagram

## Package Marking and Ordering Information

| Device Marking | Device    | Outline | Package   | Reel Size | Reel(pcs) | Per Carton (pcs) |
|----------------|-----------|---------|-----------|-----------|-----------|------------------|
| 3401           | JMTJ3401A | TAPING  | SOT-23-3L | 7"        | 3000      | 120000           |

## Absolute Maximum Ratings (@ $T_A = 25^\circ C$ unless otherwise specified)

| Symbol          | Parameter  | Value               | Units        |
|-----------------|--|---------------------|--------------|
| $V_{DS}$        | Drain-to-Source Voltage                                | -30                 | V            |
| $V_{GS}$        | Gate-to-Source Voltage                                 | $\pm 12$            | V            |
| $I_D$           | Continuous Drain Current                               | $T_A = 25^\circ C$  | -4.2         |
|                 |  | $T_A = 100^\circ C$ | -3           |
| $I_{DM}$        | Pulsed Drain Current <sup>(1)</sup>                    | -17                 | A            |
| $P_D$           | Power Dissipation                                      | $T_A = 25^\circ C$  | 1.1          |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient <sup>(2)</sup> | 119                 | $^\circ C/W$ |
| $T_J, T_{STG}$  | Junction & Storage Temperature Range                   | -55 to 150          | $^\circ C$   |



## Electrical Characteristics (T<sub>J</sub> = 25°C unless otherwise specified)

| Symbol  | Parameter  | Conditions   | Min. | Typ. | Max. | Unit |
|---|--|--|------|------|------|------|
| <b>Off Characteristics</b>                                |  |  |      |      |      |      |
| V <sub>(BR)DSS</sub>                                      | Drain-Source Breakdown Voltage                           | I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V  | -30  | -    | -    | V    |
| I <sub>DSS</sub>  | Zero Gate Voltage Drain Current                          | V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V   | -    | -    | 1.0  | μA   |
| I <sub>GSS</sub>  | Gate-Body Leakage Current                                | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±12V   | -    | -    | ±100 | nA   |
| <b>On Characteristics</b>                                 |  |  |      |      |      |      |
| V <sub>GS(th)</sub>                                       | Gate Threshold Voltage                                   | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                    | -0.6 | -0.9 | -1.3 | V    |
| R <sub>DS(on)</sub>                                       | Static Drain-Source ON-Resistance <sup>(3)</sup>         | V <sub>GS</sub> = -10V, I <sub>D</sub> = -4A   | -    | 36   | 47   | mΩ   |
|   |  | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3A  | -    | 41   | 53   | mΩ   |
|   |  | V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -1A  | -    | 52   | 68   | mΩ   |
| <b>Dynamic Characteristics</b>                            |  |  |      |      |      |      |
| C <sub>iss</sub>  | Input Capacitance  | V <sub>GS</sub> = 0V, V <sub>DS</sub> = -15V,<br>f = 1MHz                                      | -    | 762  | -    | pF   |
| C <sub>oss</sub>  | Output Capacitance                                       |  | -    | 74   | -    | pF   |
| C <sub>rss</sub>  | Reverse Transfer Capacitance                             |  | -    | 61   | -    | pF   |
| Q <sub>g</sub>  | Total Gate Charge  | V <sub>GS</sub> = 0 to -4.5V<br>V <sub>DS</sub> = -15V, I <sub>D</sub> = -3A                   | -    | 8    | -    | nC   |
| Q <sub>gs</sub>   | Gate Source Charge                                       |  | -    | 2    | -    | nC   |
| Q <sub>gd</sub>   | Gate Drain ("Miller") Charge                             |  | -    | 2    | -    | nC   |
| <b>Switching Characteristics</b>                          |  |  |      |      |      |      |
| t <sub>d(on)</sub>  | Turn-On DelayTime  | V <sub>GS</sub> = -4.5V, V <sub>DD</sub> = -15V<br>I <sub>D</sub> = -3A, R <sub>GEN</sub> = 3Ω | -    | 8    | -    | ns   |
| t <sub>r</sub>  | Turn-On Rise Time  |  | -    | 16   | -    | ns   |
| t <sub>d(off)</sub>                                       | Turn-Off DelayTime                                       |  | -    | 46   | -    | ns   |
| t <sub>f</sub>  | Turn-Off Fall Time                                       |  | -    | 34   | -    | ns   |
| <b>Drain-Source Diode Characteristics and Max Ratings</b> |  |  |      |      |      |      |
| I <sub>S</sub>  | Maximum Continuous Drain to Source Diode Forward Current |  | -    | -    | -4.2 | A    |
| I <sub>SM</sub>   | Maximum Pulsed Drain to Source Diode Forward Current     |  | -    | -    | -17  | A    |
| V <sub>SD</sub>   | Drain to Source Diode Forward Voltage                    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -4.2A   | -    | -    | -1.2 | V    |
| t <sub>rr</sub>   | Body Diode Reverse Recovery Time                         | I <sub>F</sub> = -3A, di/dt = 100A/us  | -    | 8    | -    | ns   |
| Q <sub>rr</sub>   | Body Diode Reverse Recovery Charge                       |  | -    | 3    | -    | nC   |

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
  2. R<sub>θJA</sub> is measured with the device mounted on a 1inch<sup>2</sup> pad of 2oz copper FR4 PCB
  3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5%.

## Typical Performance Characteristics

Figure 1: Output Characteristics

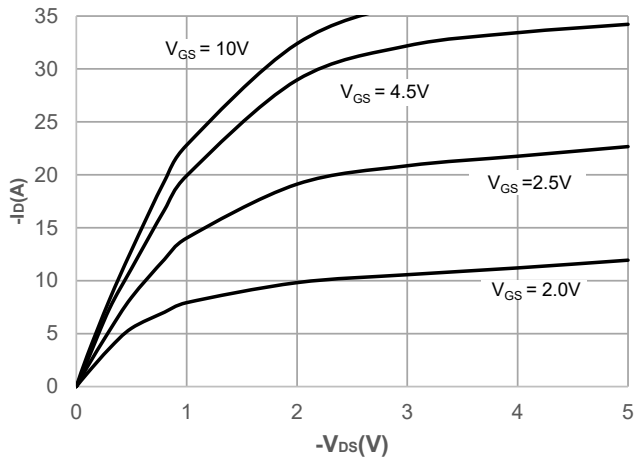


Figure 2: Typical Transfer Characteristics

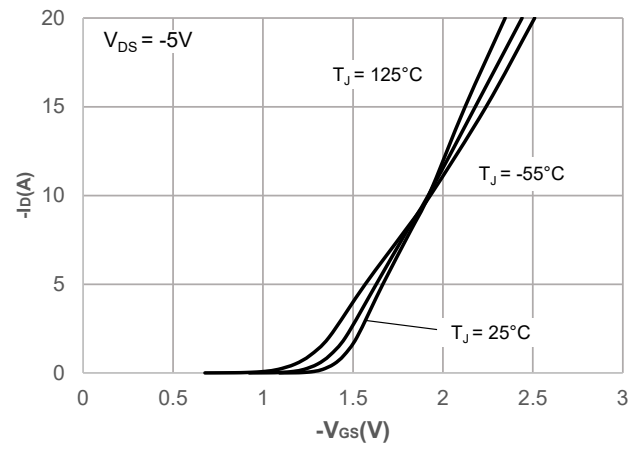


Figure 3: On-resistance vs. Drain Current

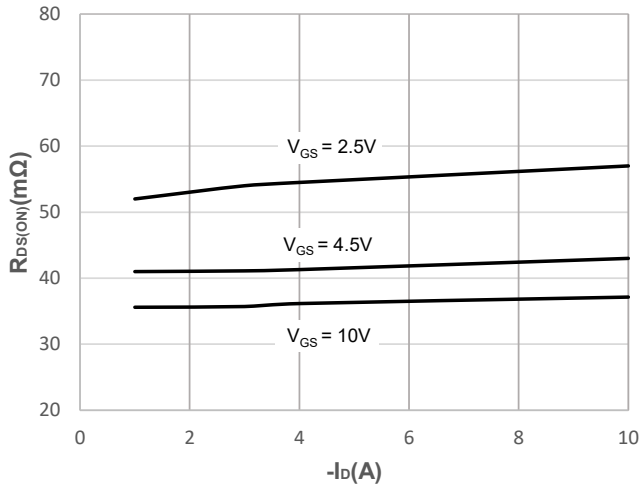


Figure 4: Body Diode Characteristics

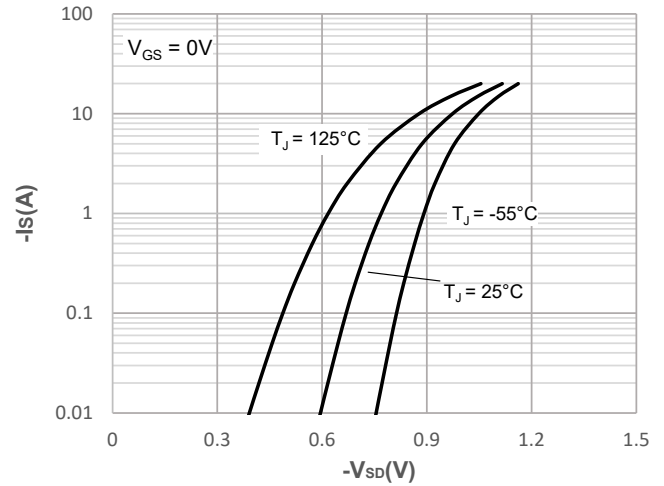


Figure 5: Gate Charge Characteristics

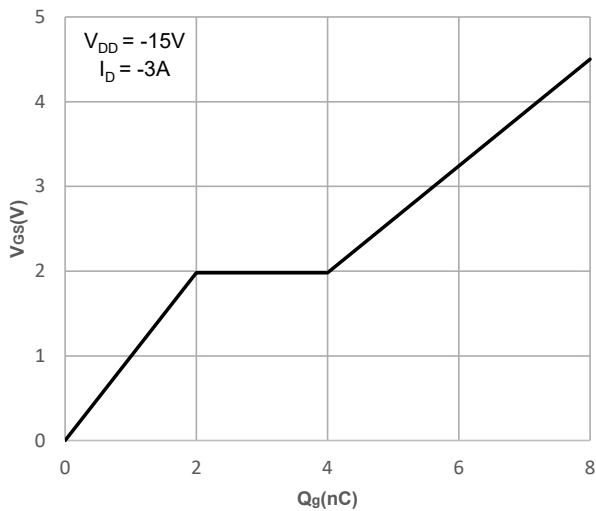
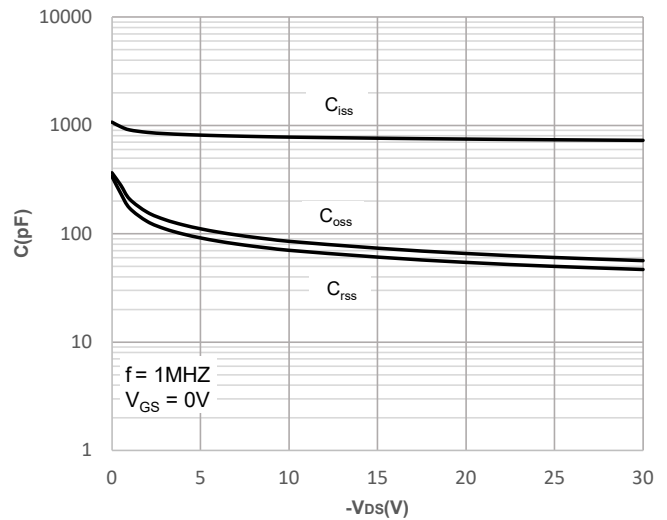


Figure 6: Capacitance Characteristics



## Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

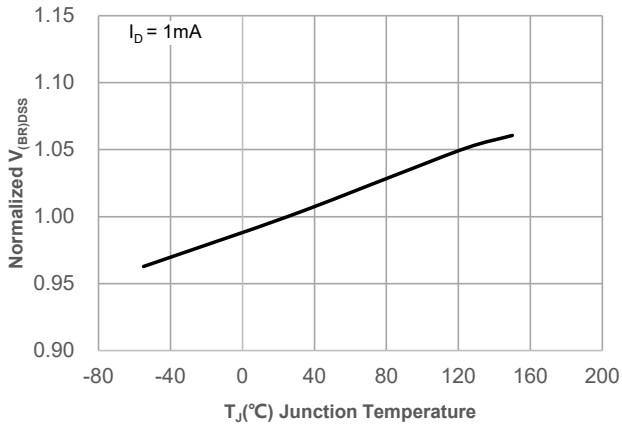


Figure 8: Normalized on Resistance vs. Junction Temperature

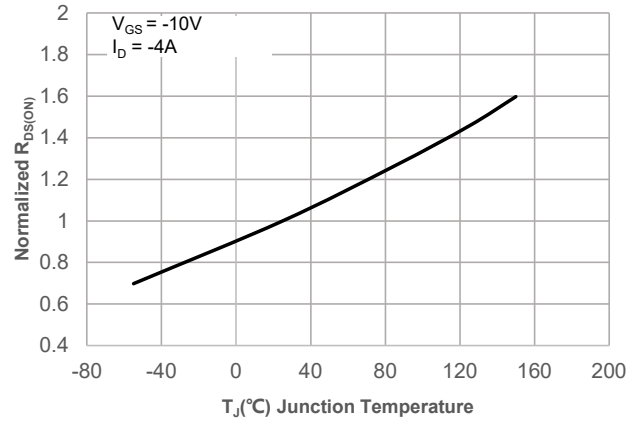


Figure 9: Maximum Safe Operating Area

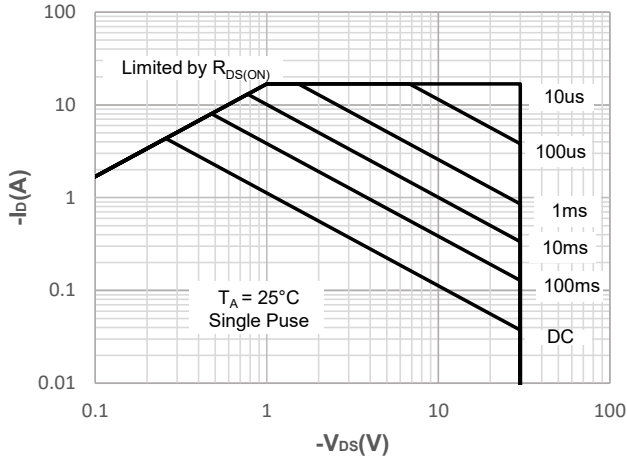


Figure 10: Maximum Continuous Driand Current vs. Ambient Temperature

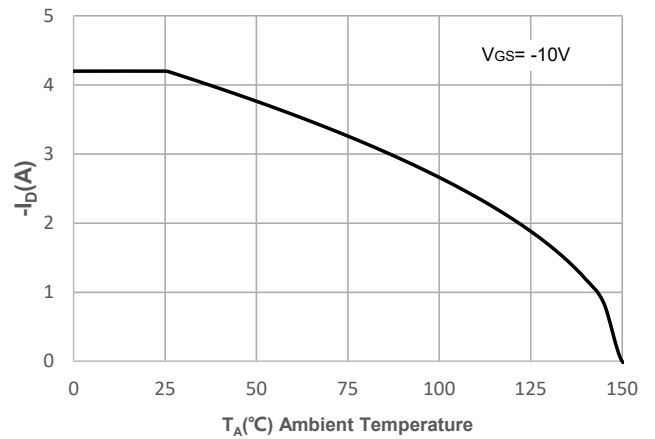


Figure 11: Normalized Maximum Transient Thermal Impedance

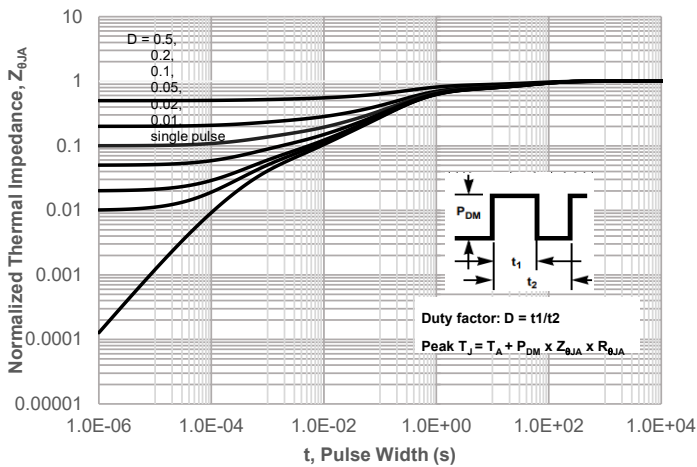
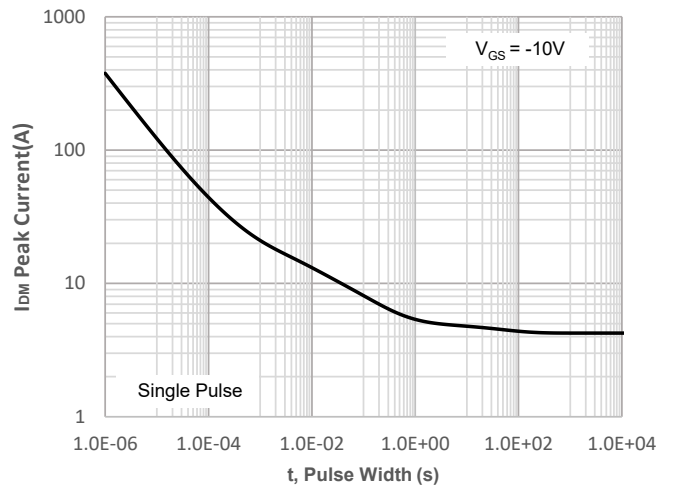


Figure 12: Peak Current Capacity



## Test Circuit

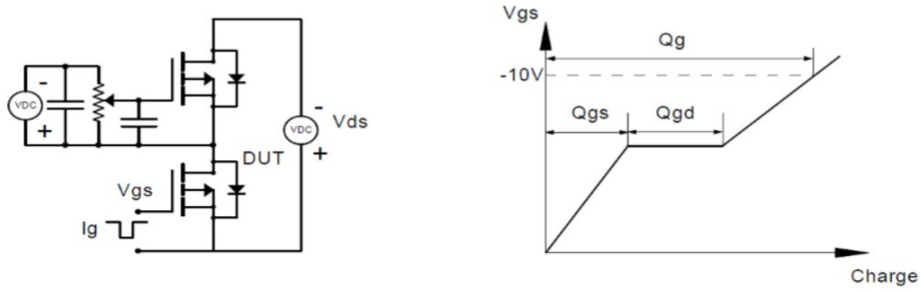


Figure 1: Gate Charge Test Circuit & Waveform

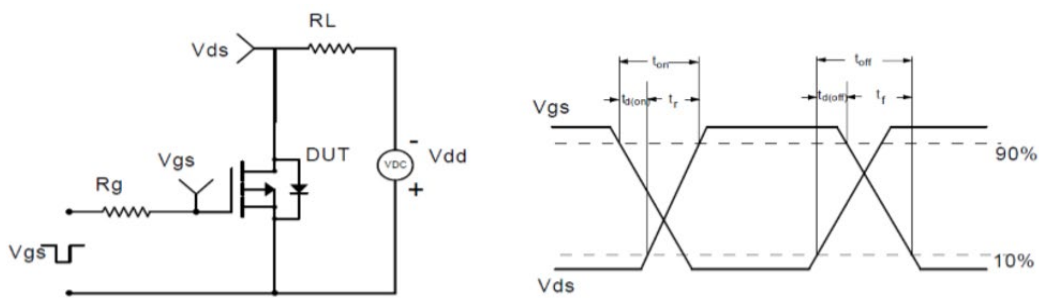


Figure 2: Resistive Switching Test Circuit & Waveform

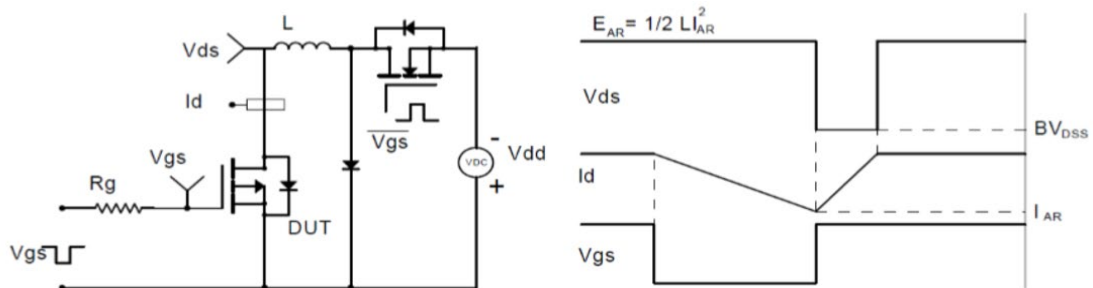


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

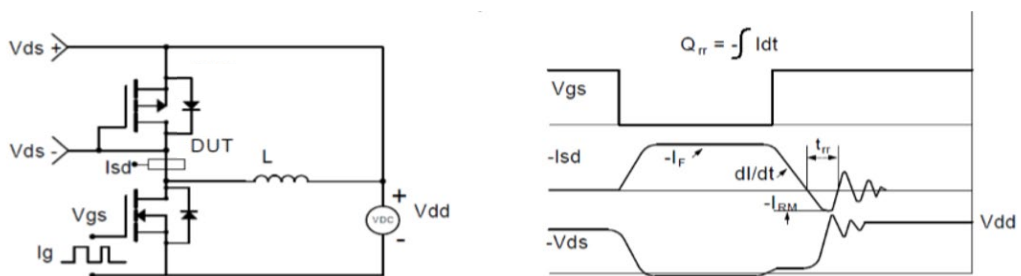
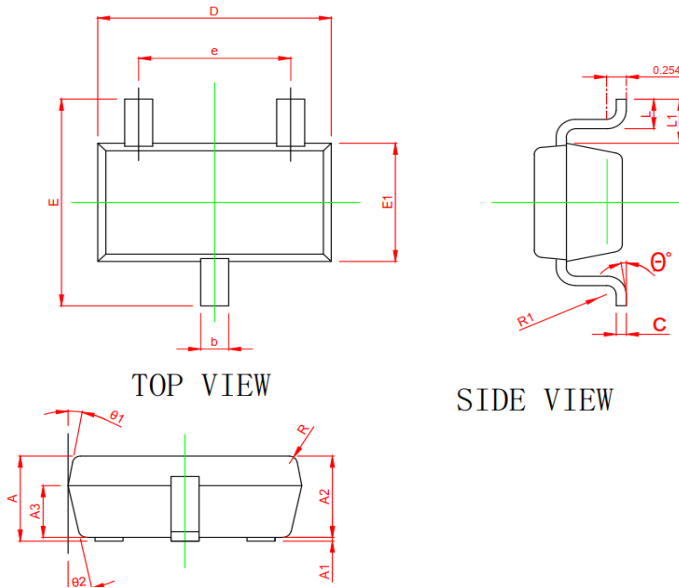



Figure 4: Diode Recovery Test Circuit & Waveform

## Package Mechanical Data(SOT-23-3L)



| SYMBOL     | MILLIMETER |      |      |
|------------|------------|------|------|
|            | MIN        | NOM  | MAX  |
| A          | -          | -    | 1.25 |
| * A1       | 0.02       | -    | 0.10 |
| * A2       | 1.05       | 1.10 | 1.15 |
| A3         | 0.65       | 0.70 | 0.75 |
| * b        | 0.30       | 0.35 | 0.45 |
| * c        | 0.127 BSC  |      |      |
| * D        | 2.87       | 2.92 | 2.97 |
| * E        | 2.72       | 2.80 | 2.88 |
| * E1       | 1.55       | 1.60 | 1.65 |
| * e        | 1.85       | 1.90 | 1.95 |
| * L        | 0.32       | 0.40 | 0.48 |
| * L1       | 0.55       | 0.60 | 0.65 |
| R          | 0.10 REF   |      |      |
| R1         | 0.12 REF   |      |      |
| * $\theta$ | 0          | --   | 8°   |
| $\theta 1$ | 8°         | 10°  | 12°  |
| $\theta 2$ | 10°        | 12°  | 14°  |

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