

SDM3401AV

-30V P-Channel MOSFETs

Rev A.0

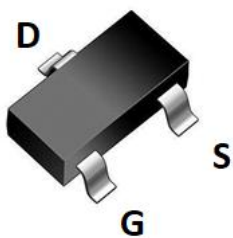
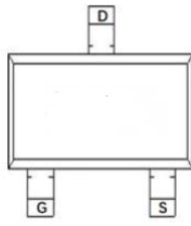
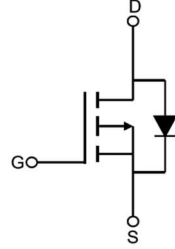
Feature

- ✧ Excellent $R_{DS(ON)}$
- ✧ Low Gate Charge
- ✧ Advanced Trench Technology
- ✧ Green product (RoHS compliant), lead free

Product Summary

| | | |
|---|------|------------|
| V_{DS} | -30 | V |
| $V_{GS(th_Typ)}$ | -0.9 | V |
| $R_{DS(ON_Typ)}$ (at $V_{GS} = -10V$) | 36 | m Ω |
| I_D (at $V_{GS} = -10V$) | -4.2 | A |

| Type | Package | Marking | Outline | Media | Quantity (pcs) |
|-----------|-----------|---------|---------|---------|----------------|
| SDM3401AV | SOT-23-3L | 3401 | Tape | 7" Reel | 3000 |

| | | |
|--|---|--|
|  <p>SOT-23 top view</p> |  <p>Pin Assignment</p> |  <p>Schematic Diagram</p> |
|--|---|--|

Absolute Maximum Ratings (Rating at $T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Maximum | Unit |
|--|----------------|-------------------------|------------------|
| Drain-Source Voltage | V_{DS} | -30 | V |
| Gate-Source Voltage | V_{GS} | ± 12 | V |
| Continuous Drain Current | I_D | $T_A=25^\circ\text{C}$ | -4.2 |
| | | $T_A=100^\circ\text{C}$ | -3 |
| Pulsed Drain Current ⁽¹⁾ | I_{DM} | -17 | A |
| Maximum Body-Diode Continuous Current | I_S | -4.2 | A |
| Power Dissipation | P_D | 1.1 | W |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Electrical Characteristics (Rating at $T_J=25^{\circ}\text{C}$ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------------------------|--|---|------|------|-----------|---------------|
| STATIC PARAMETERS | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$ | -30 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=-30\text{V}$, $V_{GS}=0\text{V}$ | - | - | -1 | μA |
| I_{GSS} | Gate-Body Leakage Current | $V_{DS}=0\text{V}$, $V_{GS}=\pm 12\text{V}$ | - | - | ± 100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$ | -0.6 | -0.9 | -1.3 | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance ⁽³⁾ | $V_{GS}=-10\text{V}$, $I_D=-4\text{A}$ | - | 36 | 47 | m Ω |
| | | $V_{GS}=-4.5\text{V}$, $I_D=-3\text{A}$ | - | 41 | 53 | |
| | | $V_{GS}=-2.5\text{V}$, $I_D=-1\text{A}$ | - | 52 | 68 | |
| V_{SD} | Diode Forward Voltage | $I_S=-4.2\text{A}$, $V_{GS}=0\text{V}$ | - | - | -1.2 | V |
| DYNAMIC PARAMETERS | | | | | | |
| C_{iss} | Input Capacitance | $V_{GS}=0\text{V}$, $V_{DS}=-15\text{V}$, $f=1\text{MHz}$ | - | 763 | - | pF |
| C_{oss} | Output Capacitance | | - | 75 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | | - | 63 | - | pF |
| SWITCHING PARAMETERS | | | | | | |
| Q_g | Total Gate Charge | $V_{GS}=-4.5\sim 0\text{V}$, $V_{DS}=-15\text{V}$, $I_D=-3\text{A}$ | - | 8.1 | - | nC |
| Q_{gs} | Gate Source Charge | | - | 2.3 | - | nC |
| Q_{gd} | Gate Drain Charge | | - | 2.3 | - | nC |
| $t_{D(on)}$ | Turn-On Delay Time | $V_{GS}=-4.5\text{V}$, $V_{DD}=-15\text{V}$, $R_G=3.0\Omega$, $I_D=-3\text{A}$ | - | 8.1 | - | ns |
| t_r | Turn-On Rise Time | | - | 17 | - | ns |
| $t_{D(off)}$ | Turn-Off Delay Time | | - | 47 | - | ns |
| t_f | Turn-Off Fall Time | | - | 35 | - | ns |
| t_{rr} | Body Diode Reverse Recovery Time | $I_F=-3\text{A}$, $di/dt=100\text{A}/\mu\text{s}$ | - | 8.1 | - | ns |
| Q_{rr} | Body Diode Reverse Recovery Charge | $I_F=-3\text{A}$, $di/dt=100\text{A}/\mu\text{s}$ | - | 3.1 | - | nC |

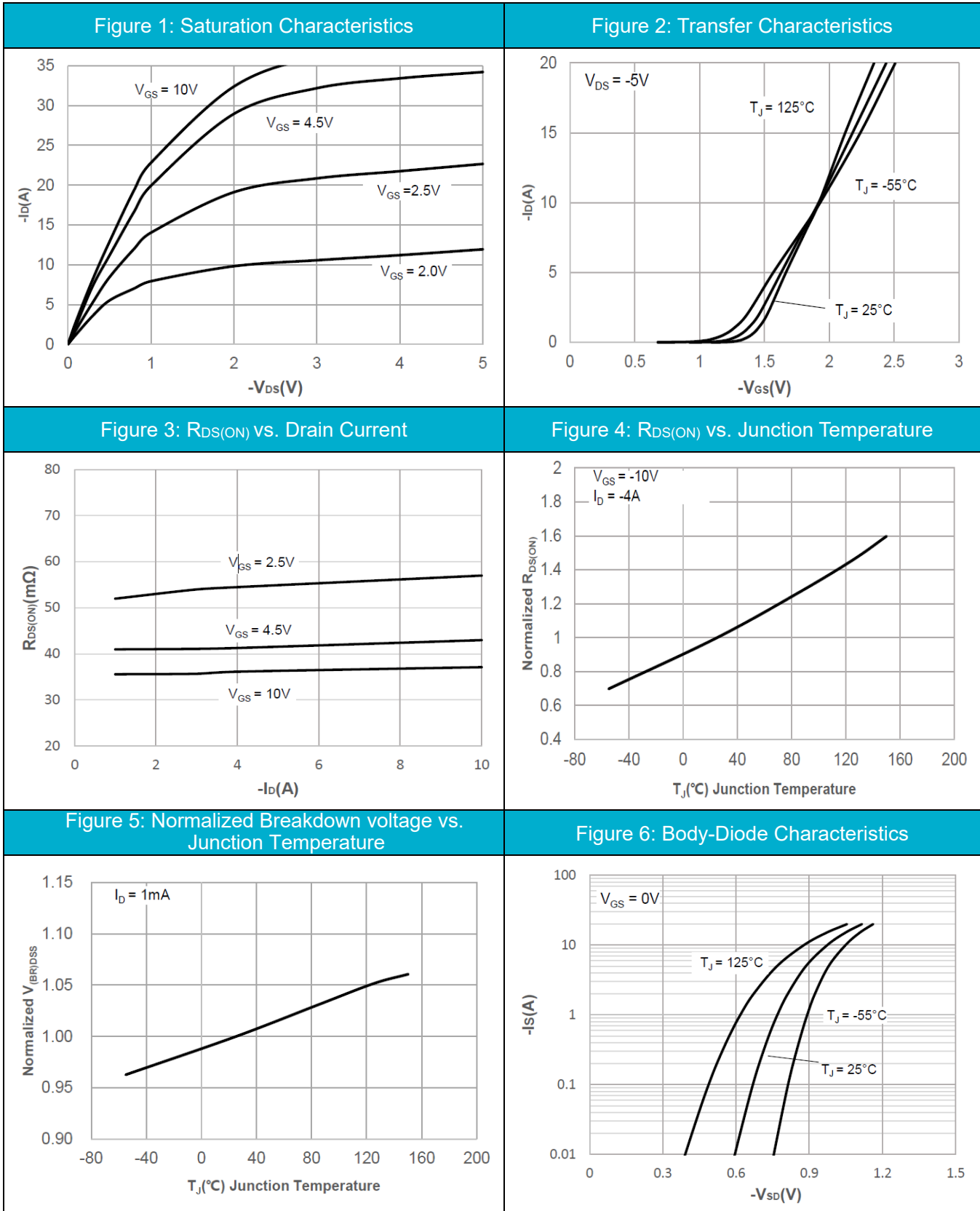
Thermal Resistances

| Symbol | Parameter | Typ | Max | Unit |
|-----------------|--|-----|-----|-------|
| $R_{\theta JA}$ | Thermal resistance from junction to ambient ⁽²⁾ | - | 119 | °C /W |

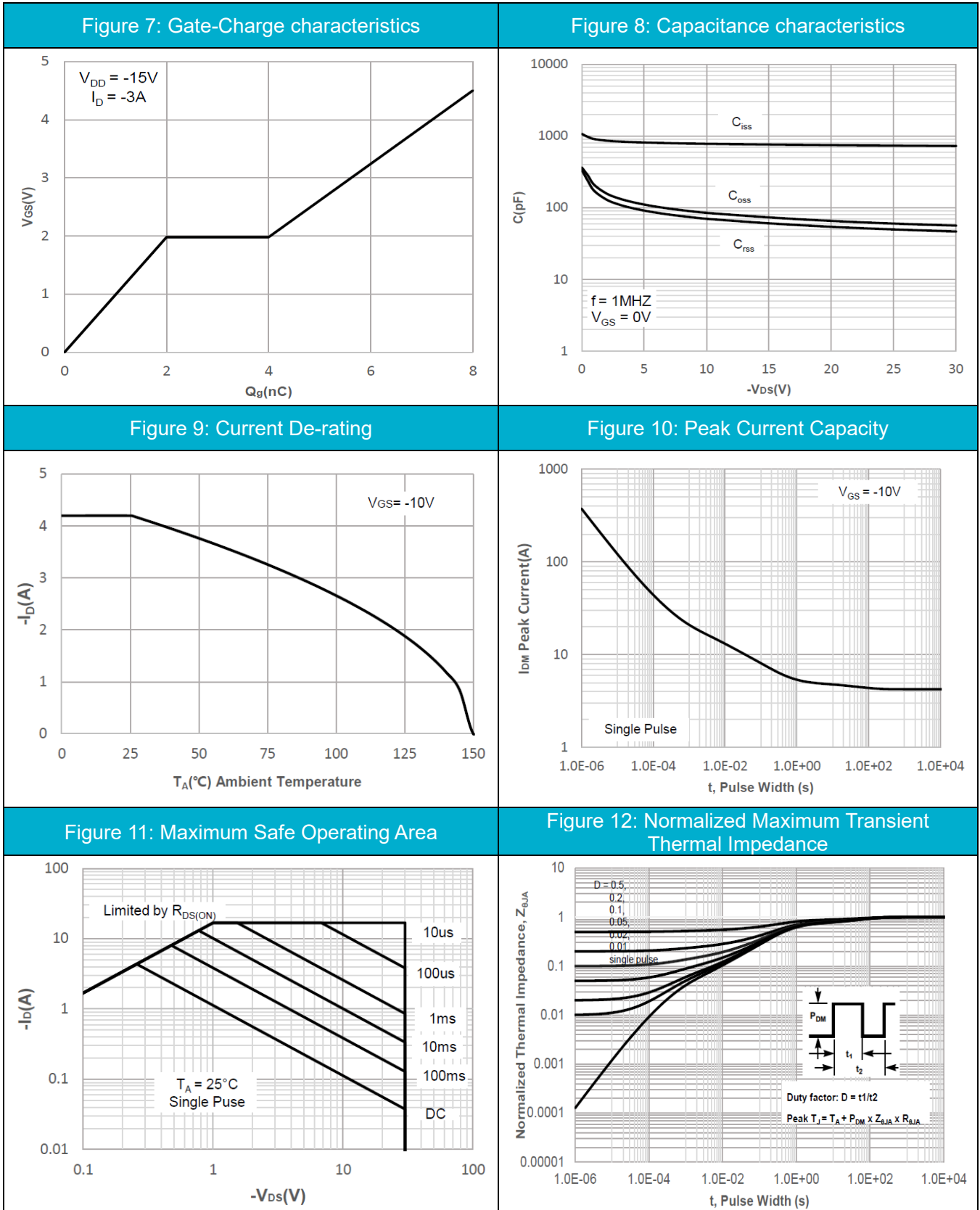
Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$.

Typical Electrical and Thermal Characteristics



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Test Circuit

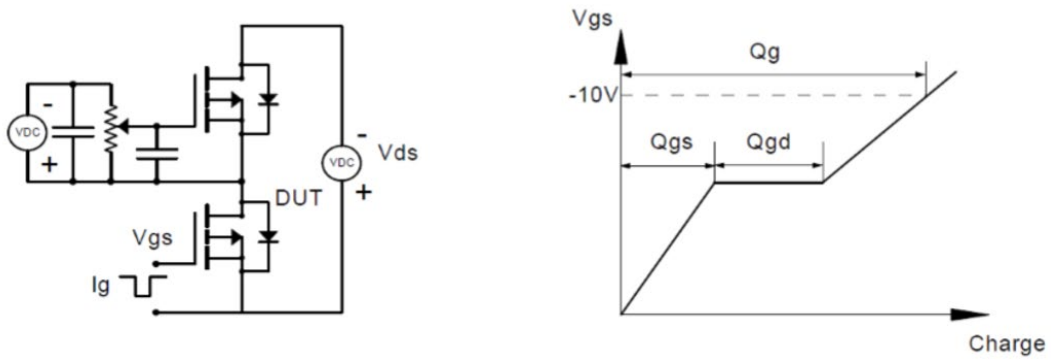


Figure1: Gate Charge Test Circuit & Waveforms

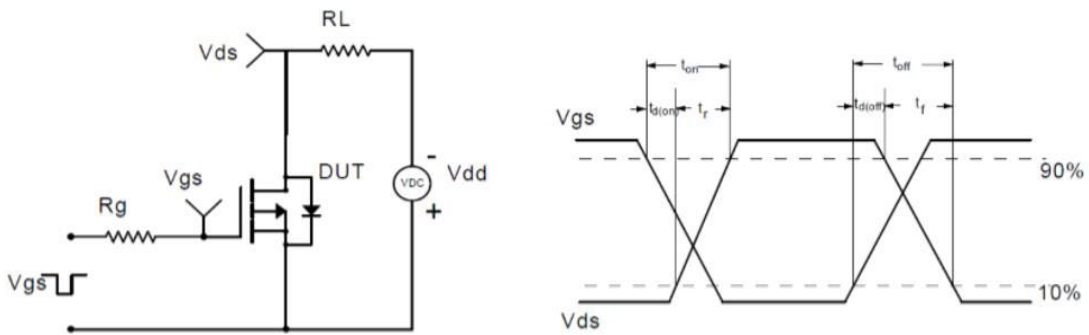


Figure2: Resistive Switching Test Circuit & Waveforms

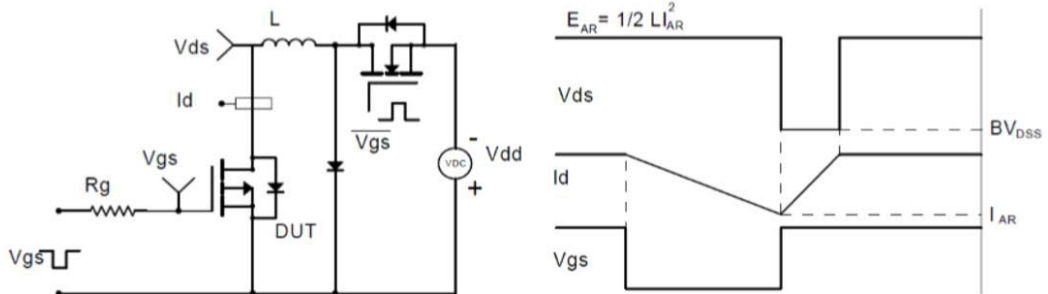


Figure3: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

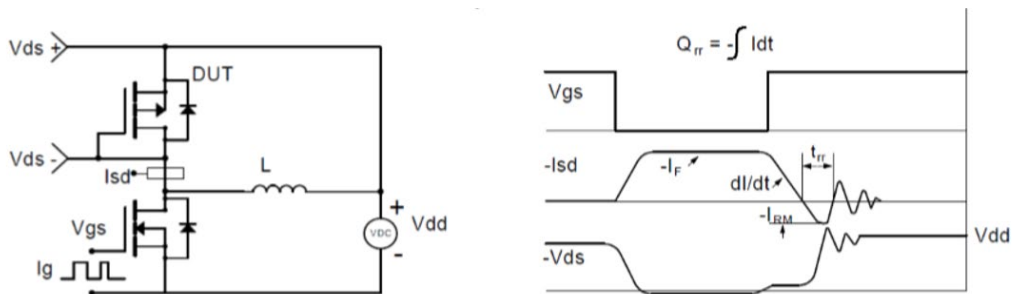
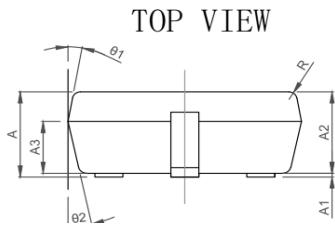
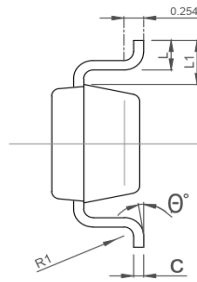
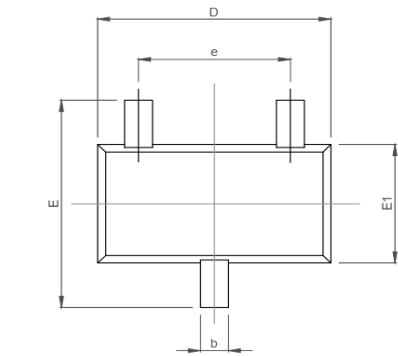


Figure4: Diode Recovery Test Circuit & Waveforms

SOT-23-3L Package Information



SIDE VIEW

| 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 | | |
| * θ | 0 | -- | 8° |
| θ_1 | 8° | 10° | 12° |
| θ_2 | 10° | 12° | 14° |

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