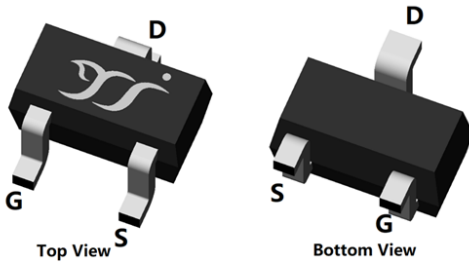
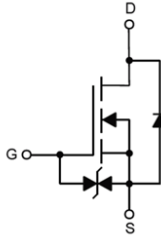


N-Channel Enhancement Mode Field Effect Transistor



SOT-523



Product Summary

- V_{DS} 30V
- I_D 150mA
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<2.5\Omega$
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) $<3\Omega$
- Gate-Source ESD Rating Up to 2KV (HBM)

General Description

- Trench Power LV MOSFET technology
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free
- Part no. with suffix "Q" means AEC-Q101 qualified

Applications

- Power management
- Portable equipment

Limiting Values

| Parameter | Conditions | | Symbol | Min | Max | Unit |
|--|--|-------------------------------------|----------------|-----|-----|------------------|
| Drain-source Voltage | | | V_{DS} | - | 30 | V |
| Gate-source Voltage | | | V_{GS} | -20 | 20 | |
| Continuous Drain Current (Note 1,2) | Steady-State | $T_A=25^\circ\text{C}, V_{GS}=10V$ | I_D | - | 150 | mA |
| | | $T_A=100^\circ\text{C}, V_{GS}=10V$ | | - | 95 | |
| Pulsed Drain Current | $T_C=25^\circ\text{C}, t_p \leq 10\mu\text{s}$ | | I_{DM} | - | 800 | |
| Maximum Body-Diode Continuous Current | $T_C=25^\circ\text{C}$ | | I_S | | 150 | |
| Total Power Dissipation (Note 1,2) | Steady-State | $T_A=25^\circ\text{C}$ | P_D | - | 205 | mW |
| | | $T_A=100^\circ\text{C}$ | | - | 80 | |
| Junction and Storage Temperature Range | | | T_J, T_{STG} | -55 | 150 | $^\circ\text{C}$ |

Thermal Resistance

| Parameter | | Symbol | Typ | Max | Units |
|---|--------------|-----------------|-----|-----|---------------------------|
| Thermal Resistance Junction-to-Ambient (Note 2) | Steady-State | $R_{\theta JA}$ | - | 600 | $^\circ\text{C}/\text{W}$ |

Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|---------|----------------------|-------------------------|----------------------------|---------------|
| 2SK3019KEJQ | F2 | KN | 3000 | 30000 | 120000 | 7" reel |



2SK3019KEJQ

■ Electrical Characteristics

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|-----------------------------------|--------------|---|-----|------|----------|----------|
| Static Parameter | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A, T_j=25^\circ C$ | 30 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=30V, V_{GS}=0V, T_j=25^\circ C$ | - | - | 1 | μA |
| | | $V_{DS}=30V, V_{GS}=0V, T_j=150^\circ C$ | - | - | 100 | |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V, T_j=25^\circ C$ | - | - | ± 10 | μA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A, T_j=25^\circ C$ | 0.6 | 1.0 | 1.5 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=150mA, T_j=25^\circ C$ | - | 1.7 | 2.5 | Ω |
| | | $V_{GS}=4.5V, I_D=100mA, T_j=25^\circ C$ | - | 2 | 3 | Ω |
| Diode Forward Voltage | V_{SD} | $I_S=150mA, V_{GS}=0V, T_j=25^\circ C$ | - | - | 1.3 | V |
| Gate Resistance | R_G | $f=1MHz, T_j=25^\circ C$ | - | 150 | - | Ω |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=15V, V_{GS}=0V, f=1MHz, T_j=25^\circ C$ | - | 11 | - | pF |
| Output Capacitance | C_{oss} | | - | 5 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 2.5 | - | |
| Switching Parameters | | | | | | |
| Total Gate Charge | Q_g | $V_{GS}=10V, V_{DS}=15V, I_D=1A, T_j=25^\circ C$ | - | 1.22 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 0.48 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 0.2 | - | |
| Reverse Recovery Charge | Q_{rr} | $I_F=1A, di/dt=100A/\mu s, V_{GS}=0V, V_R=15V, T_j=25^\circ C$ | - | 4.4 | - | nC |
| Reverse Recovery Time | t_{rr} | | - | 14 | - | ns |
| Turn-on Delay Time | $t_{D(on)}$ | $V_{GS}=10V, V_{DS}=15V, I_D=1A, R_{GEN}=2.3\Omega, T_j=25^\circ C$ | - | 3 | - | ns |
| Turn-on Rise Time | t_r | | - | 19 | - | |
| Turn-off Delay Time | $t_{D(off)}$ | | - | 7 | - | |
| Turn-off Fall Time | t_f | | - | 20 | - | |

Note:

- The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- The value of $R_{\theta JA}$ is measured with the device mounted on the 40mm*40mm*1.1mm single layer FR-4 PCB board with 1 in² pad of 2oz. Copper, in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of 150 $^\circ C$. The value in any given application depends on the user's specific board design.



Typical Electrical and Thermal Characteristics Diagrams

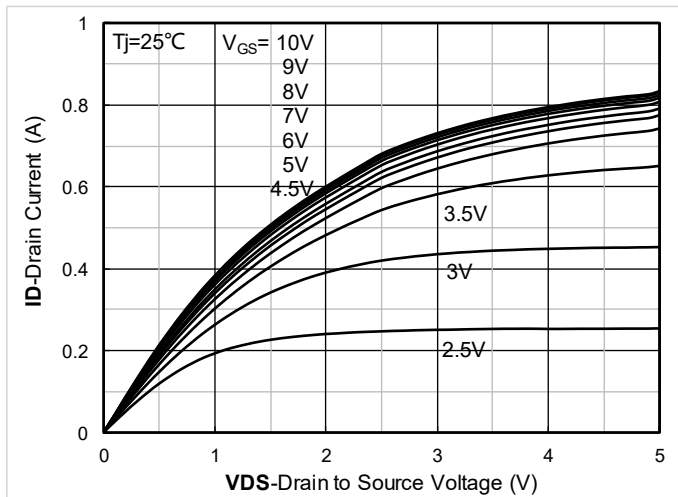


Figure 1. Output Characteristics; typical values

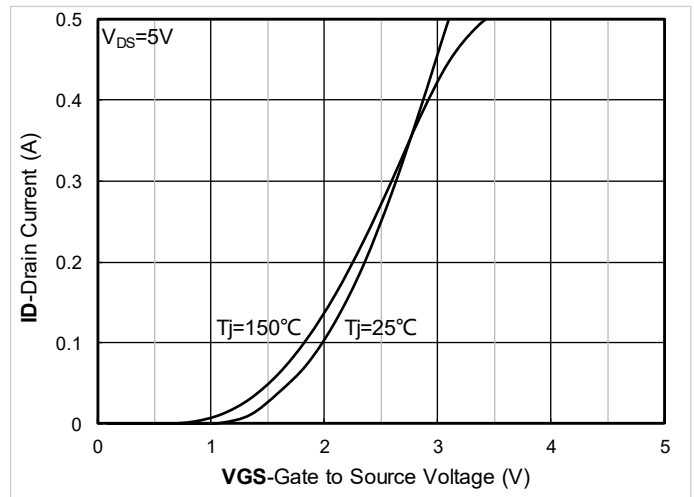


Figure 2. Transfer Characteristics; typical values

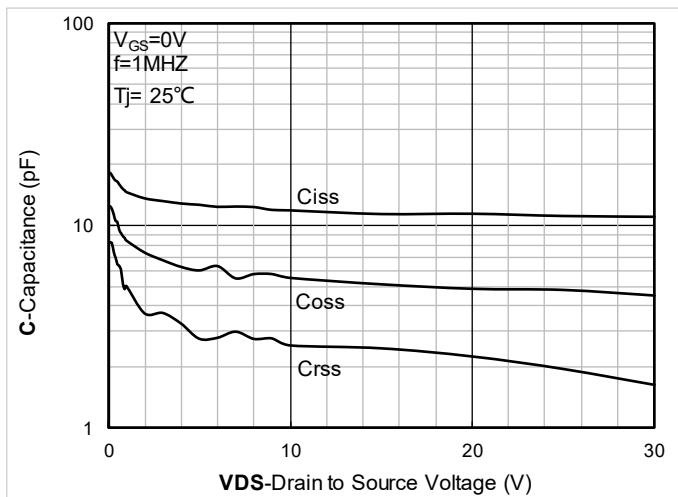


Figure 3. Capacitance Characteristics; typical values

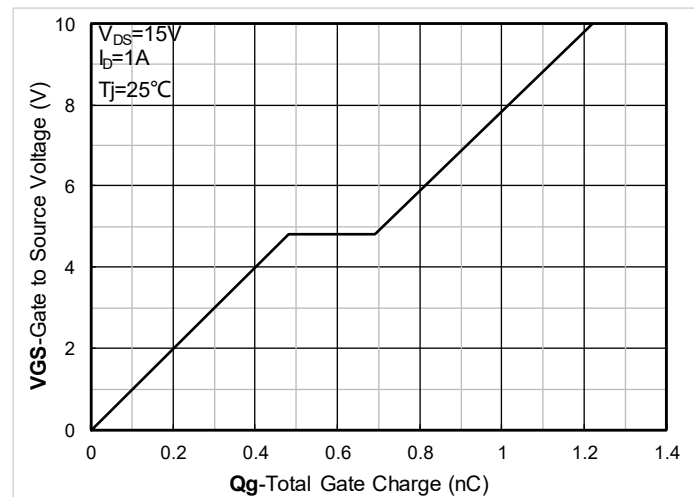


Figure 4. Gate Charge; typical values

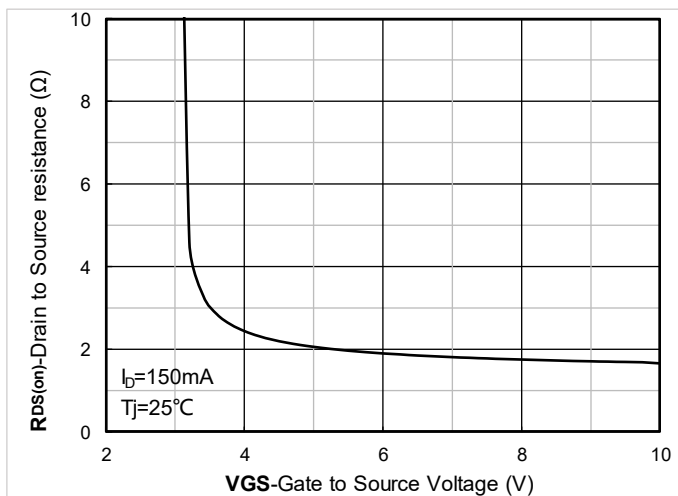


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

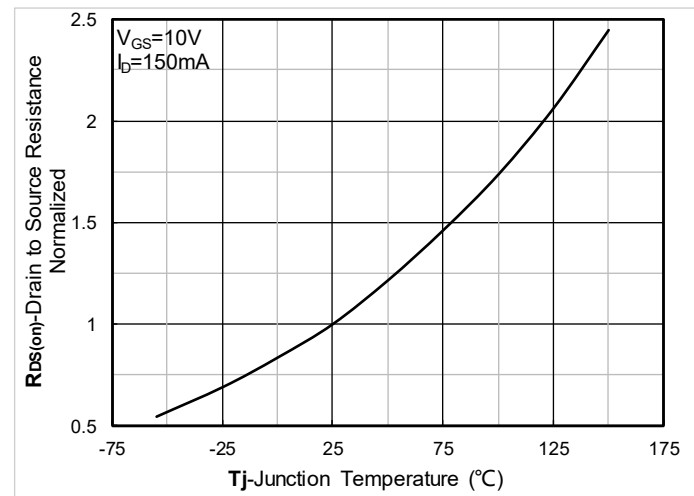


Figure 6. Normalized On-Resistance



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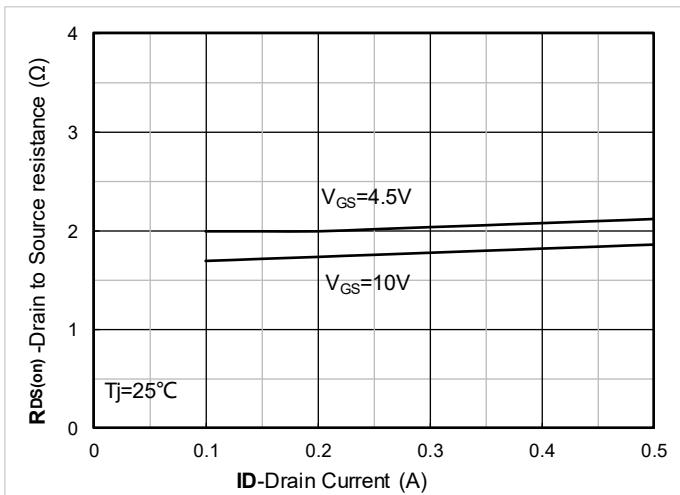


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

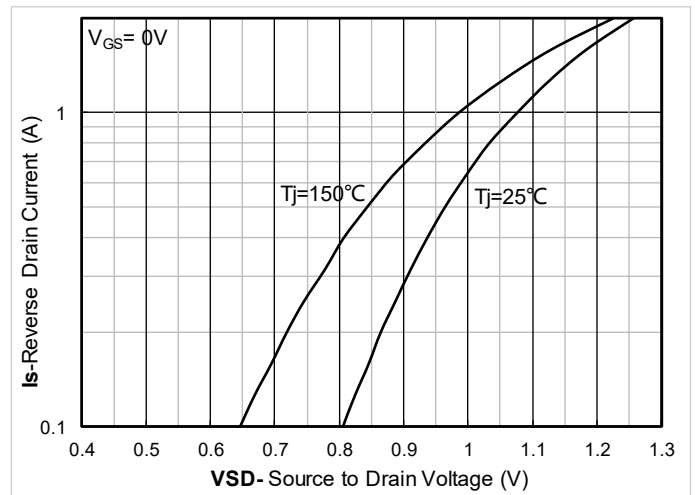


Figure 8. Forward characteristics of reverse diode; typical values

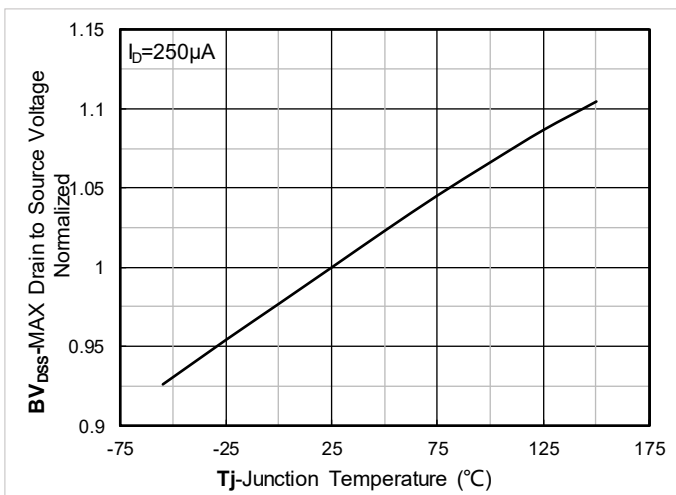


Figure 9. Normalized breakdown voltage

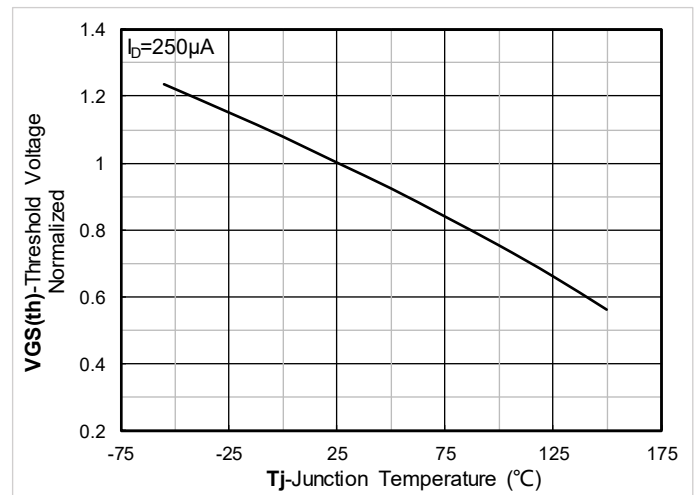


Figure 10. Normalized Threshold voltage

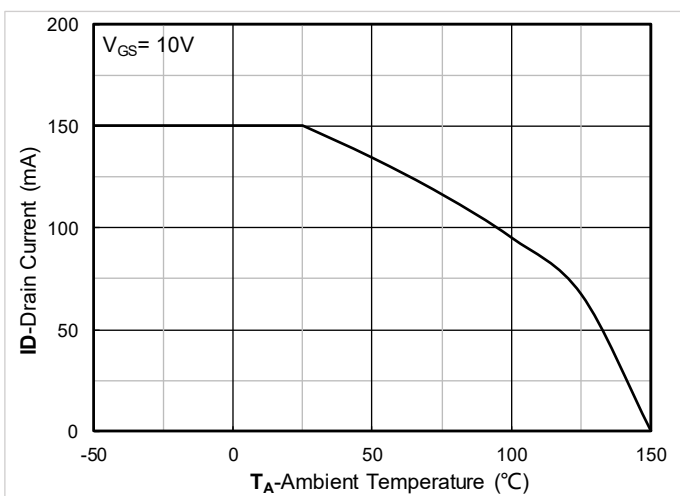


Figure 11. Current dissipation

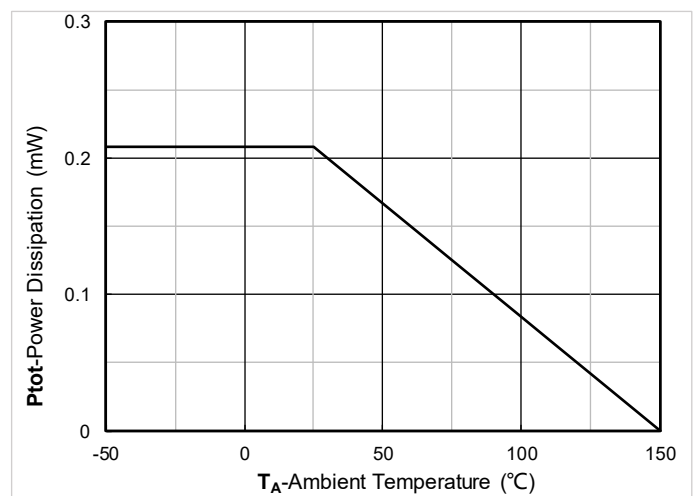


Figure 12. Power dissipation



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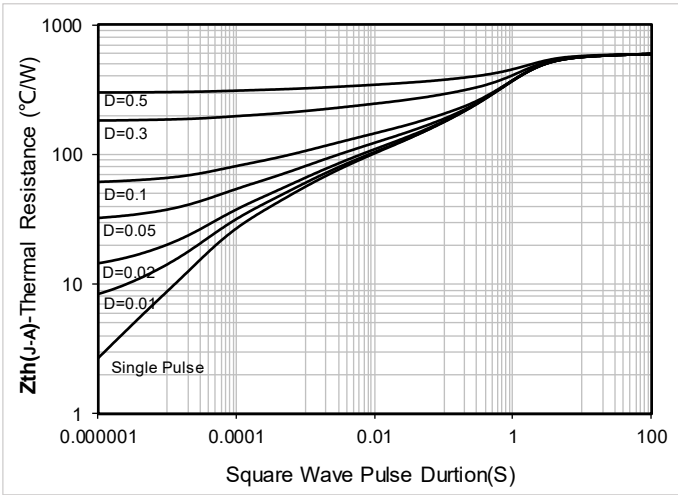


Figure 13. Maximum Transient Thermal Impedance

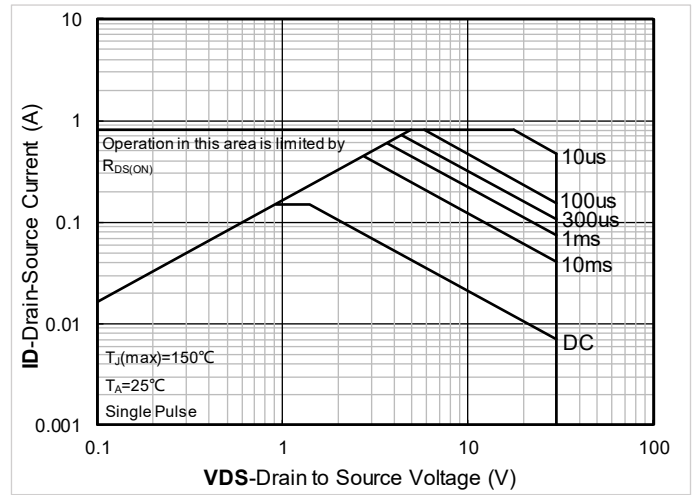


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

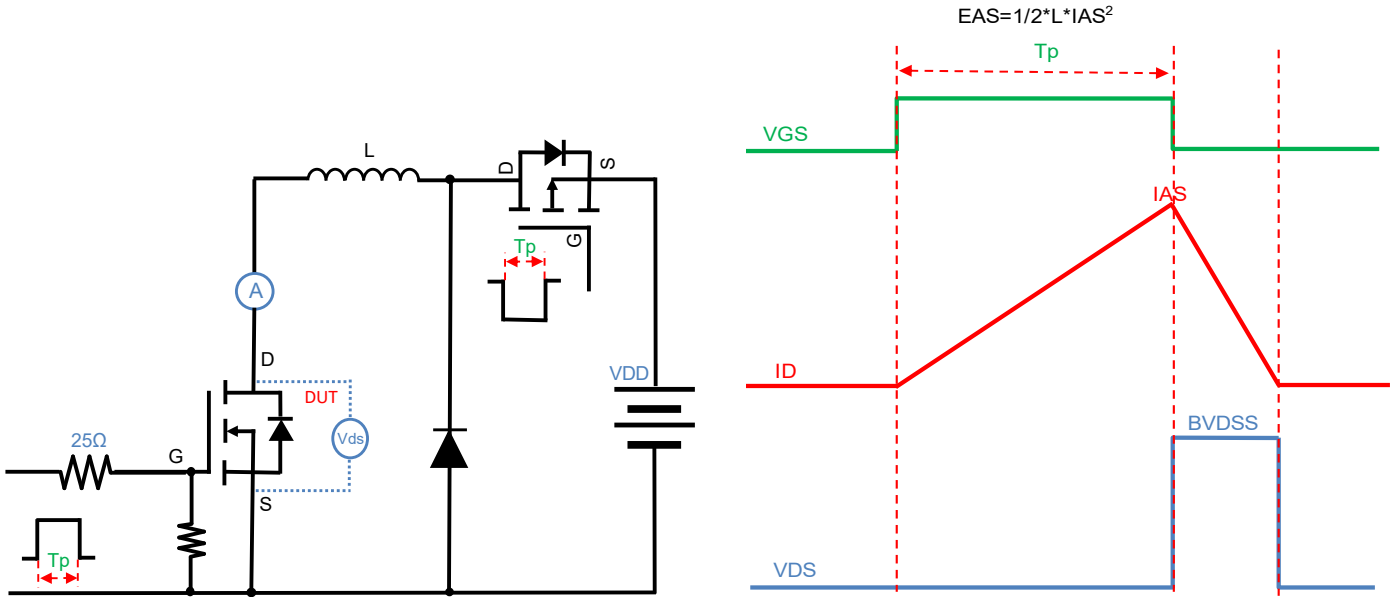


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

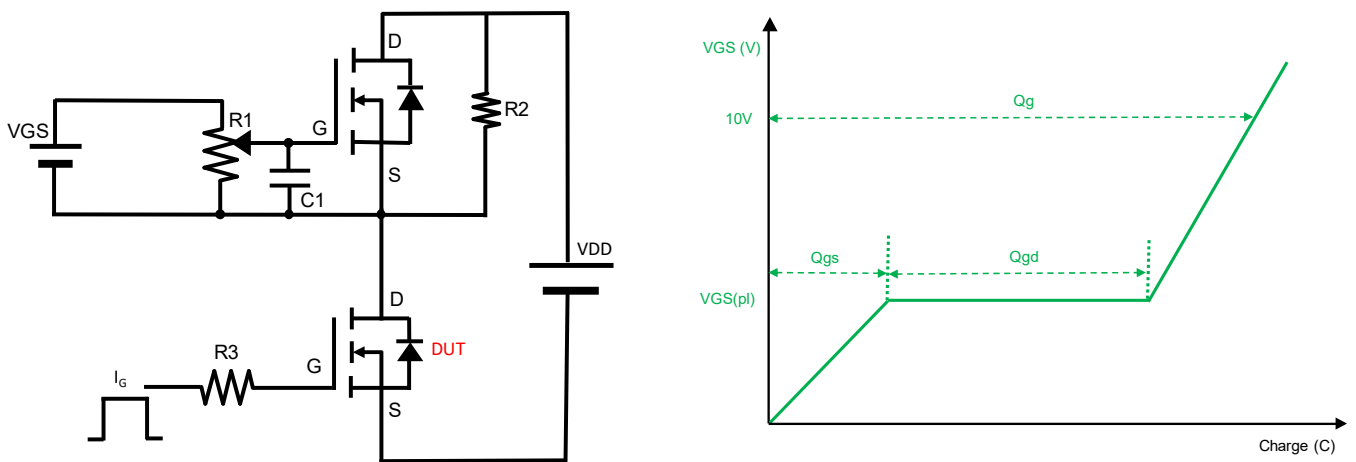


Figure B. Gate Charge Test Circuit & Waveform

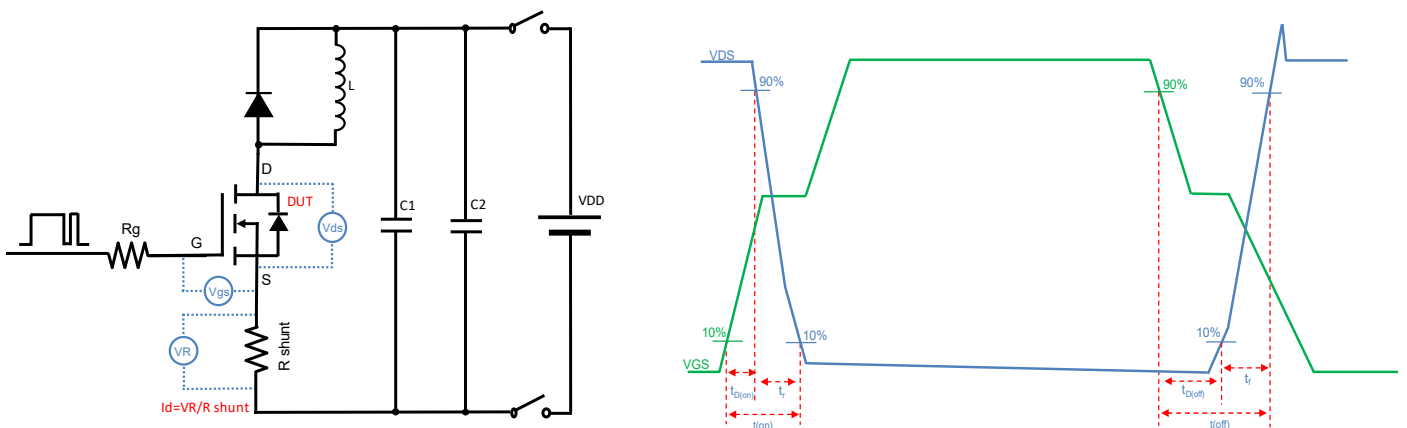


Figure C. Resistive Switching Test Circuit & Waveform

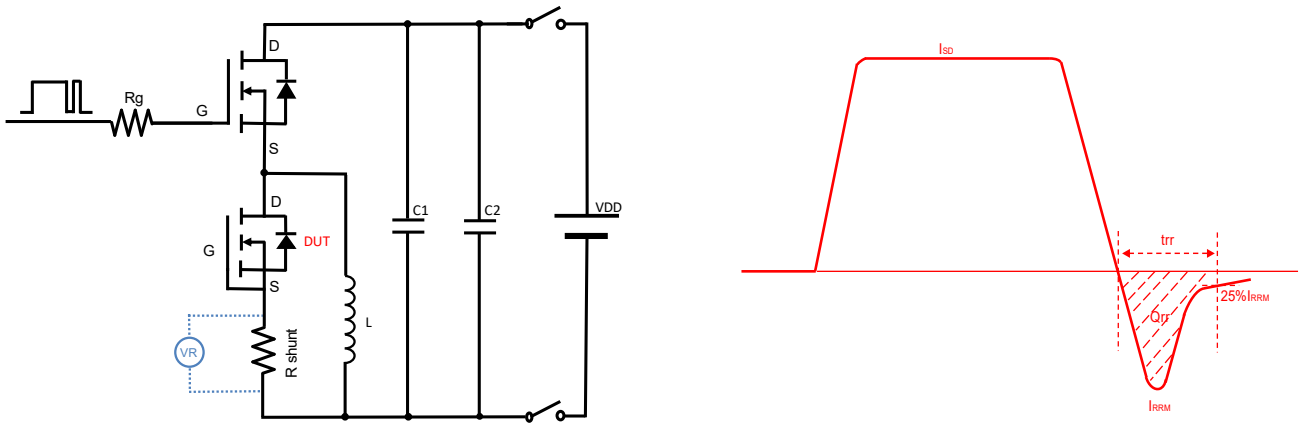
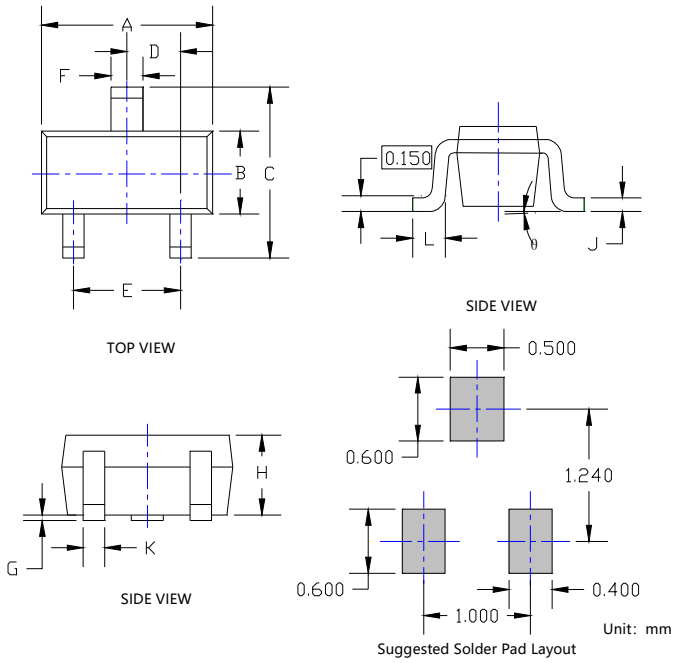


Figure D. Diode Recovery Test Circuit & Waveform



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■ SOT-523 Package Information



| SYMBOL | DIMENSIONS | | | |
|----------|------------|-------|------------|-------|
| | INCHES | | Millimeter | |
| | MIN. | MAX. | MIN. | MAX. |
| A | 0.059 | 0.067 | 1.500 | 1.700 |
| B | 0.030 | 0.033 | 0.750 | 0.850 |
| C | 0.057 | 0.069 | 1.450 | 1.750 |
| D | 0.020TYP | | 0.500TYP | |
| E | 0.035 | 0.043 | 0.900 | 1.100 |
| F | 0.010 | 0.018 | 0.250 | 0.450 |
| G | 0.000 | 0.004 | 0.000 | 0.100 |
| H | 0.024 | 0.031 | 0.600 | 0.800 |
| J | 0.004 | 0.008 | 0.100 | 0.200 |
| K | 0.006 | 0.014 | 0.150 | 0.350 |
| L | 0.010 | 0.018 | 0.260 | 0.460 |
| θ | 0° | 8° | 0° | 8° |

NOTE:

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
2. TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
3. THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.



2SK3019KEJQ

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