

General Description

The AO4466 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications. The source leads are separated to allow a Kelvin connection to the source, which may be used to bypass the source inductance.

* RoHS and Halogen-Free Compliant

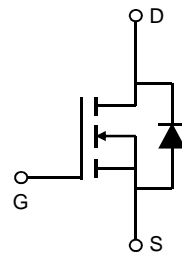
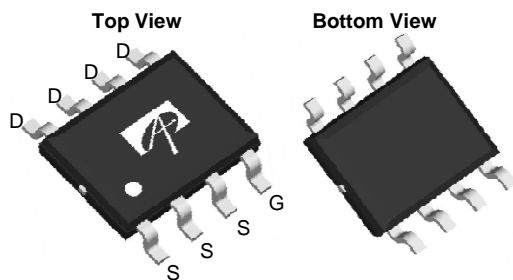
Product Summary

$V_{DS} (V) = 30V$
 $I_D = 10A$ ($V_{GS} = 10V$)
 $R_{DS(ON)} < 23m\Omega$ ($V_{GS} = 10V$)
 $R_{DS(ON)} < 35m\Omega$ ($V_{GS} = 4.5V$)

100% UIS Tested
 100% Rg Tested



SOIC-8



Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

| Parameter | Symbol | Maximum | Units |
|---|----------------|------------------|------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ^{AF} | I_D | 10 | A |
| | | $T_A=70^\circ C$ | |
| Pulsed Drain Current ^B | I_{DM} | 64 | |
| Power Dissipation | P_D | 3.1 | W |
| | | $T_A=70^\circ C$ | |
| Avalanche Current ^{B, G} | I_{AR} | 12 | A |
| Repetitive avalanche energy 0.1mH ^{B, G} | E_{AR} | 7 | mJ |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | $^\circ C$ |

Thermal Characteristics

| Parameter | Symbol | Typ | Max | Units |
|--|-----------------|--------------|-----|--------------|
| Maximum Junction-to-Ambient ^A | $R_{\theta JA}$ | 36 | 40 | $^\circ C/W$ |
| | | Steady-State | 62 | |
| Maximum Junction-to-Lead ^C | $R_{\theta JL}$ | 18 | 24 | $^\circ C/W$ |

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|---------------------------------------|---|------------------------------------|--------------|----------|-------|
| STATIC PARAMETERS | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | I _D =250μA, V _{GS} =0V | 30 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =30 V _{GS} =0V T _J =55°C | | | 1 5 | μA |
| I _{GSS} | Gate-Body leakage current | V _{DS} =0V, V _{GS} = ±20V | | | 100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} I _D =250μA | 1.5 | 2.1 | 2.6 | V |
| I _{D(ON)} | On state drain current | V _{GS} =4.5V, V _{DS} =5V | 64 | | | A |
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =10V, I _D =10A T _J =125°C | | 16.7 24.3 | 23 30 | mΩ |
| | | V _{GS} =4.5V, I _D =5A | | 23.7 | 35 | |
| g _{FS} | Forward Transconductance | V _{DS} =5V, I _D =10A | | 17 | | S |
| V _{SD} | Diode Forward Voltage | I _S =1A, V _{GS} =0V | | 0.75 | 1 | V |
| I _S | Maximum Body-Diode Continuous Current | | | | 2.4 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =15V, f=1MHz | 298 | 373 | 448 | pF |
| C _{oss} | Output Capacitance | | 46 | 67 | 88 | pF |
| C _{rss} | Reverse Transfer Capacitance | | 24 | 41 | 58 | pF |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, f=1MHz | 0.6 | 1.8 | 2.8 | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Q _{g(10V)} | Total Gate Charge | V _{GS} =10V, V _{DS} =15V, I _D =10A | 5.7 | 7.1 | 8.6 | nC |
| Q _{g(4.5V)} | Total Gate Charge | | 2.7 | 3.5 | 4.2 | nC |
| Q _{gs} | Gate Source Charge | | | 1.2 | | nC |
| Q _{gd} | Gate Drain Charge | | | 1.6 | | nC |
| t _{D(on)} | Turn-On DelayTime | V _{GS} =10V, V _{DS} =15V, R _L =1.5Ω, R _{GEN} =3Ω | | 4.3 | | ns |
| t _r | Turn-On Rise Time | | | 2.8 | | ns |
| t _{D(off)} | Turn-Off DelayTime | | | 15.8 | | ns |
| t _f | Turn-Off Fall Time | | | 3 | | ns |
| t _{rr} | Body Diode Reverse Recovery Time | | I _F =10A, dI/dt=100A/μs | 8.4 | 10.5 | 12.6 |
| Q _{rr} | Body Diode Reverse Recovery Charge | I _F =10A, dI/dt=100A/μs | 3.6 | 4.5 | 5.4 | nC |
| t _{rr} | Body Diode Reverse Recovery Time | I _F =10A, dI/dt=500A/μs | 4.7 | 6.0 | 7.2 | ns |
| Q _{rr} | Body Diode Reverse Recovery Charge | I _F =10A, dI/dt=500A/μs | 5.3 | 6.6 | 8 | nC |

A: The value of R_{θJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The SOA curve provides a single pulse rating.

F: The current rating is based on the t ≤ 10s junction to ambient thermal resistance rating.

G: L=100uH, V_{DD}=0V, R_G=0Ω, rated V_{DS}=30V and V_{GS}=10V

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

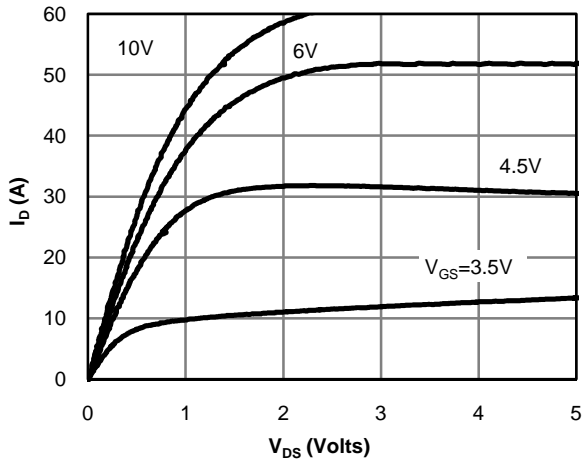


Fig 1: On-Region Characteristics

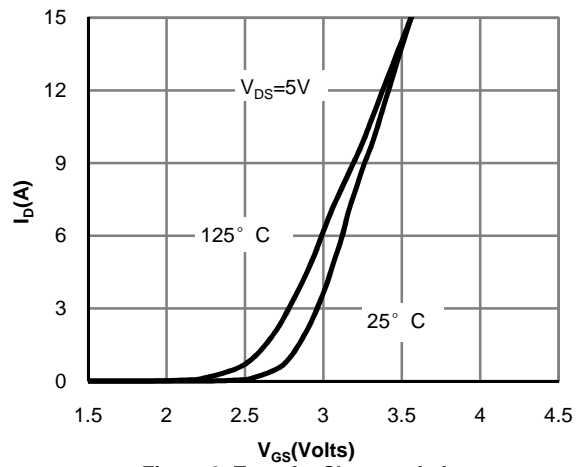


Figure 2: Transfer Characteristics

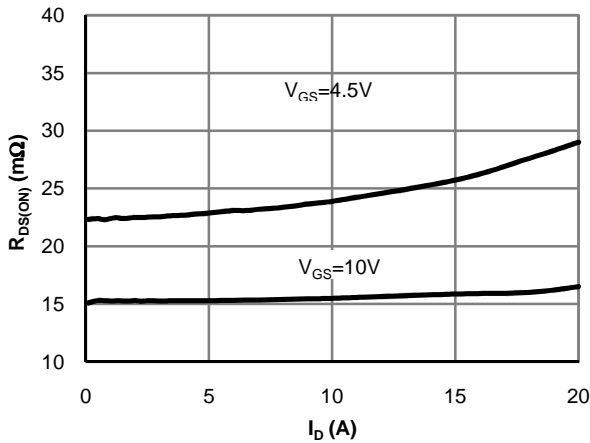


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

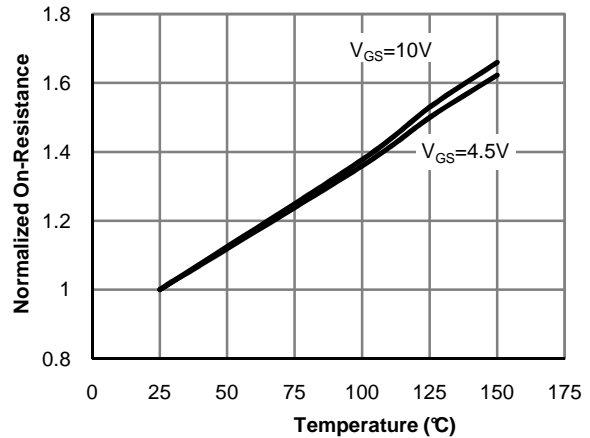


Figure 4: On-Resistance vs. Junction Temperature

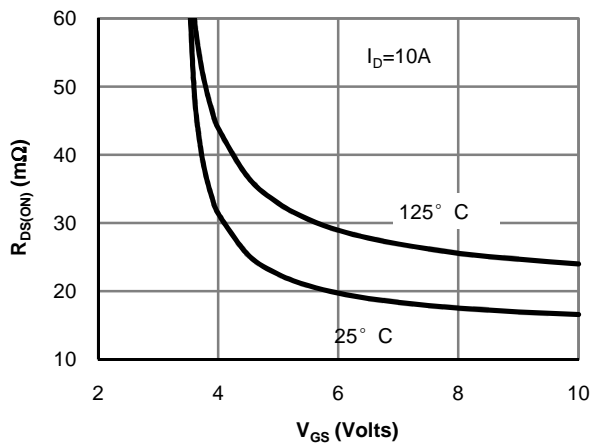


Figure 5: On-Resistance vs. Gate-Source Voltage

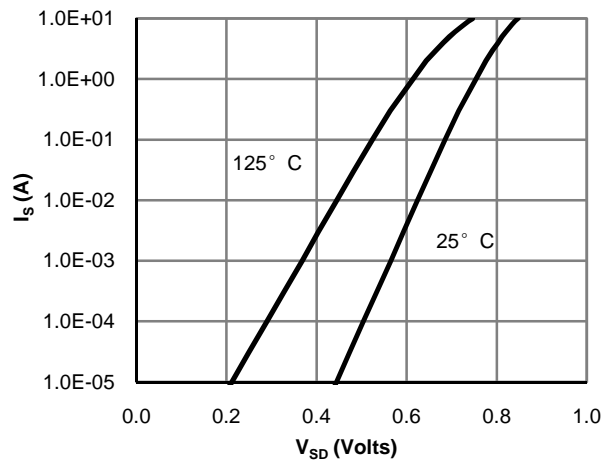


Figure 6: Body-Diode Characteristics

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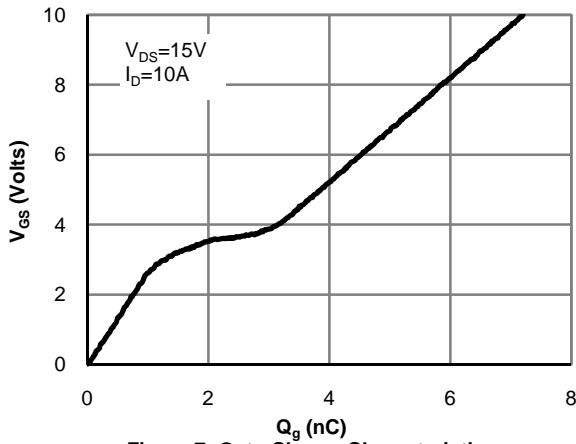


Figure 7: Gate-Charge Characteristics

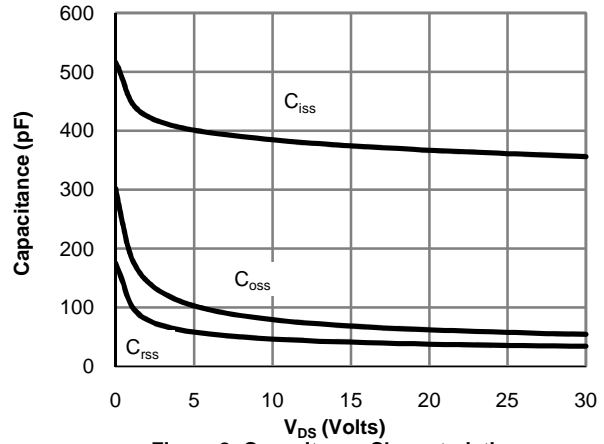


Figure 8: Capacitance Characteristics

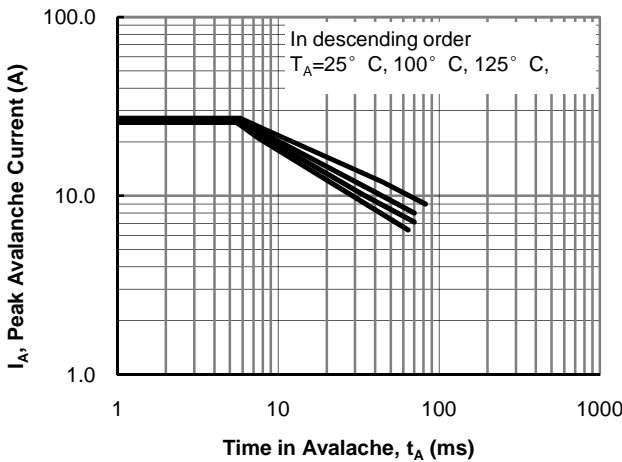


Figure 9: Single Pulse Avalanche Capability

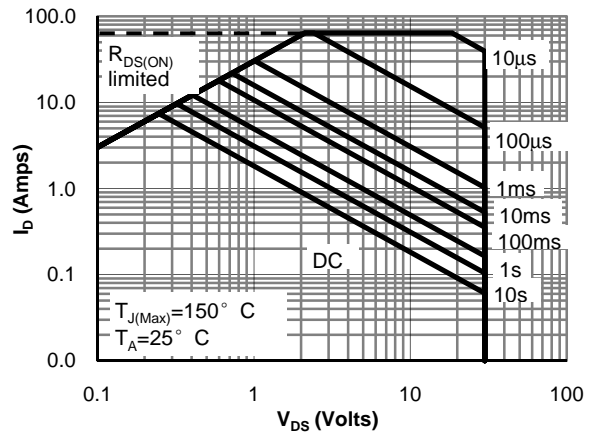


Figure 10: Maximum Forward Biased Safe Operating Area (Note E)

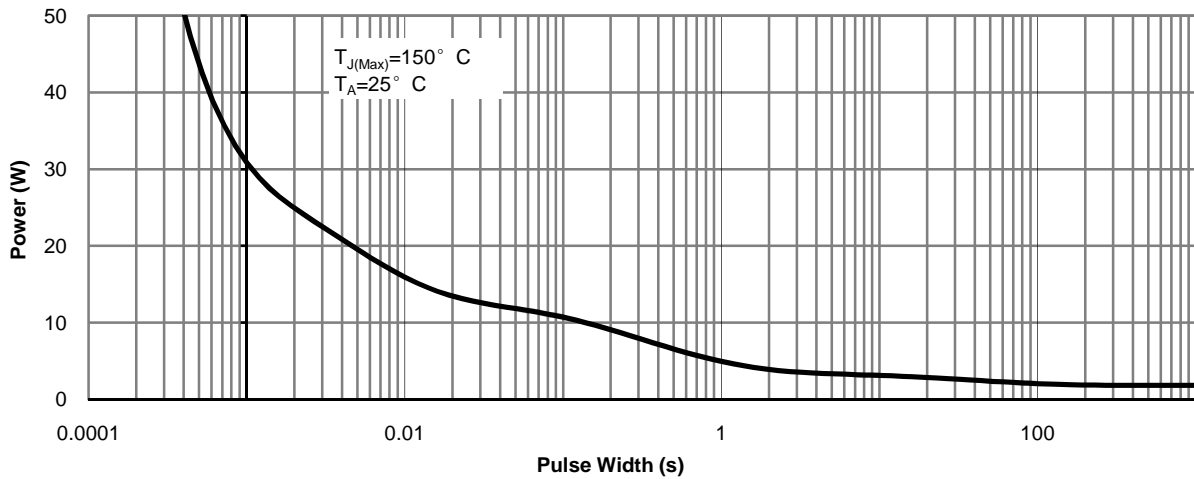
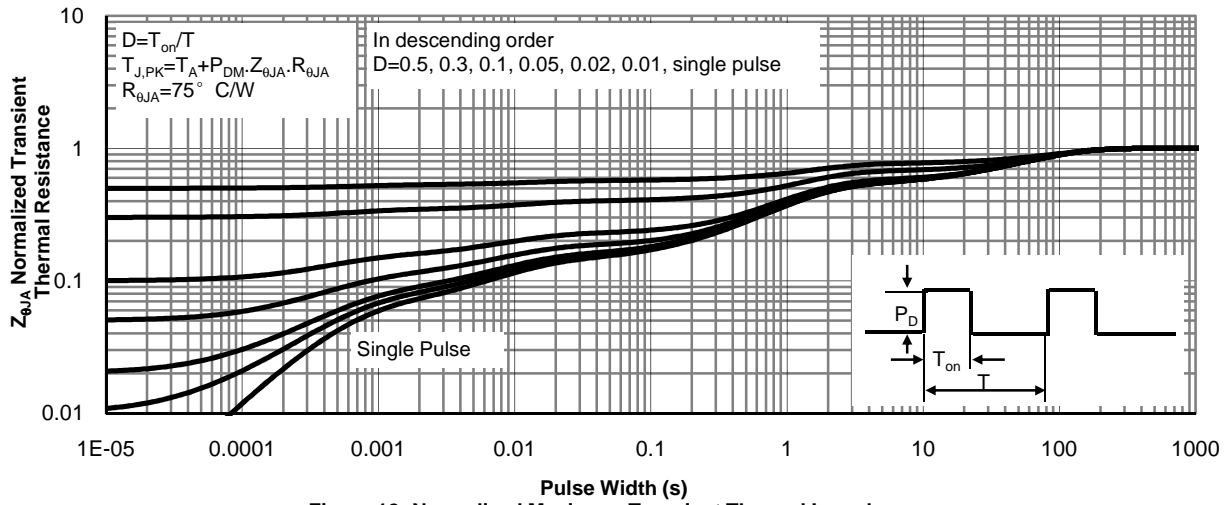
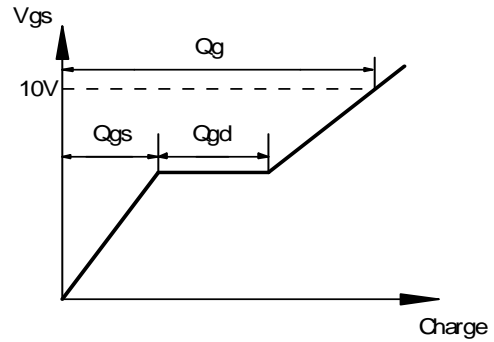
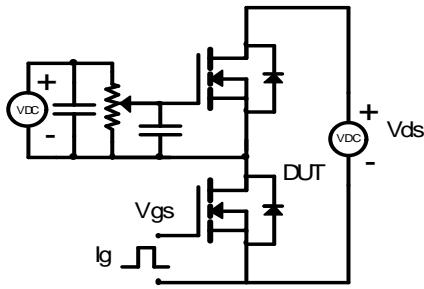


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note E)

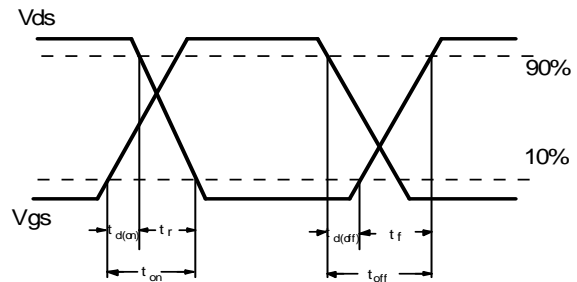
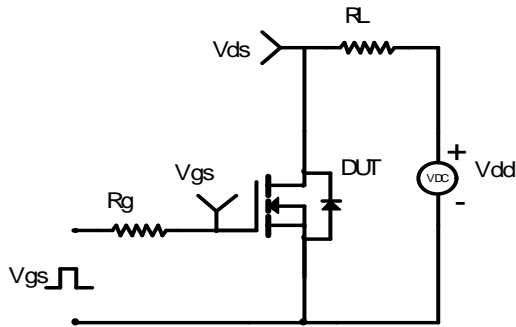
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



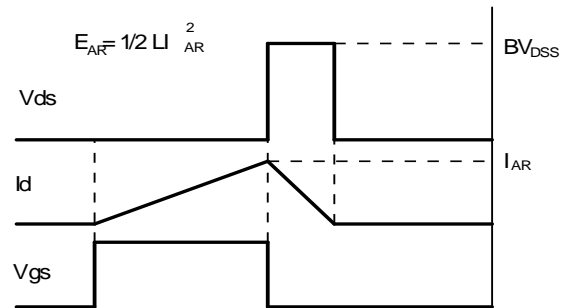
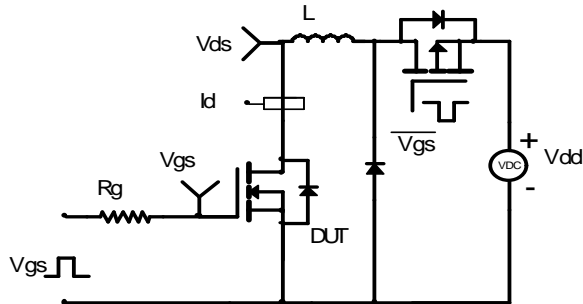
Gate Charge Test Circuit & Waveform



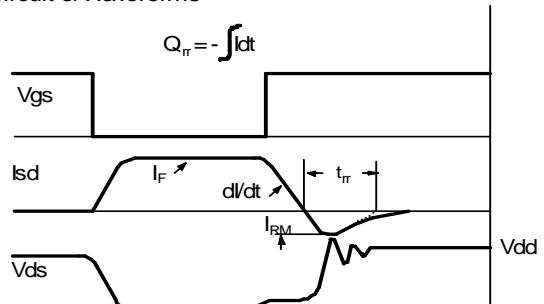
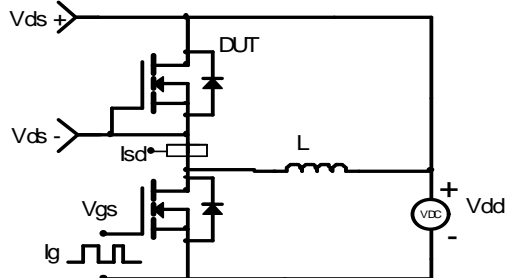
Resistive Switching Test Circuit & Waveforms



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