

General Description

SRFET™ The AO4726 uses advanced trench technology with a monolithically integrated Schottky diode to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a low side FET in SMPS, load switching and general purpose applications.

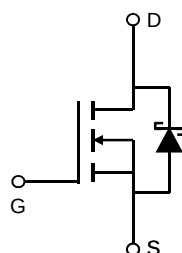
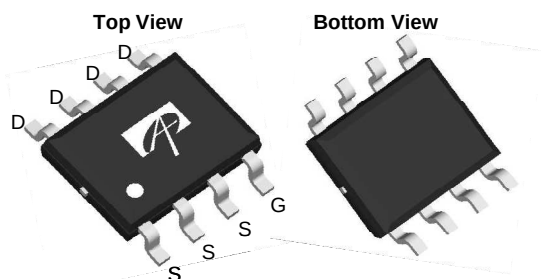
Product Summary

$V_{DS} (V) = 30V$
 $I_D = 20A (V_{GS} = 10V)$
 $R_{DS(ON)} < 4.5m\Omega (V_{GS} = 10V)$
 $R_{DS(ON)} < 5.5m\Omega (V_{GS} = 4.5V)$

100% UIS Tested
 100% R_g Tested



SOIC-8



SRFET™
 Soft Recovery MOSFET:
 Integrated Schottky Diode

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}	± 12	
Continuous Drain Current ^{AF}	$T_A=25^\circ C$	20	A
	$T_A=70^\circ C$	16	
Pulsed Drain Current ^B	I_{DM}	105	
Avalanche Current ^B	I_{AR}	30	
Repetitive avalanche energy $L=0.3mH$ ^B	E_{AR}	45	mJ
Power Dissipation	$T_A=25^\circ C$	3.1	W
	$T_A=70^\circ C$	2.0	
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	$R_{\theta JA}$	32	40	$^\circ C/W$
Maximum Junction-to-Ambient ^A		60	75	$^\circ C/W$
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	17	24	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=10\text{mA}$, $V_{GS}=0\text{V}$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}$, $V_{GS}=0\text{V}$ $T_J=125^\circ\text{C}$			0.5 100	mA
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	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.2	1.6	2.1	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$, $V_{DS}=5\text{V}$	105			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=20\text{A}$ $T_J=125^\circ\text{C}$		3.7 5.6	4.5 6.7	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=20\text{A}$		4.3	5.5	m Ω
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=20\text{A}$		150		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.40	0.7	V
I_S	Maximum Body-Diode + Schottky Continuous Current				5.0	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1\text{MHz}$	2500	3160	3800	pF
C_{oss}	Output Capacitance		240	350	460	pF
C_{rss}	Reverse Transfer Capacitance		150	260	270	pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$	0.4	0.8	1.2	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $I_D=20\text{A}$	49	61	73	nC
$Q_g(4.5\text{V})$	Total Gate Charge		22	27	32	nC
Q_{gs}	Gate Source Charge		6.5	8	9.5	nC
Q_{gd}	Gate Drain Charge		5.5	9	12.5	nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $R_L=0.83\Omega$, $R_{GEN}=3\Omega$		10		ns
t_r	Turn-On Rise Time			3		ns
$t_{D(off)}$	Turn-Off DelayTime			50		ns
t_f	Turn-Off Fall Time			6		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=20\text{A}$, $dI/dt=500\text{A}/\mu\text{s}$	8	10	12	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=20\text{A}$, $dI/dt=500\text{A}/\mu\text{s}$	11	14	17	nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. 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 $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ 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 $T_A=25^\circ\text{C}$. The SOA curve provides a single pulse rating.

F: The current rating is based on the $t \leq 10\text{s}$ junction to ambient thermal resistance rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

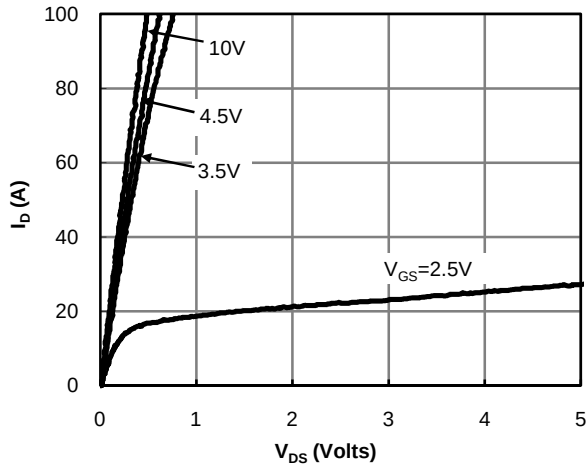


Fig 1: On-Region Characteristics (Note D)

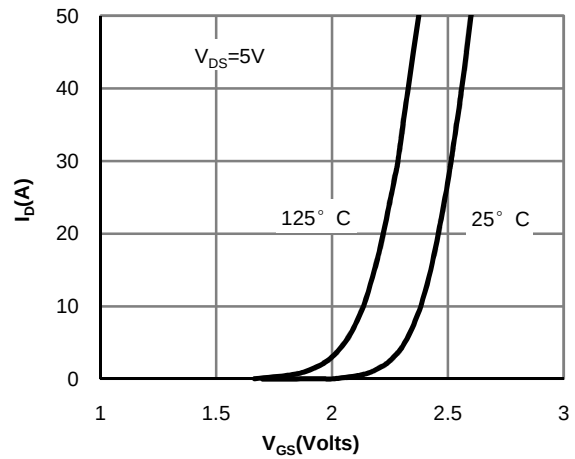


Figure 2: Transfer Characteristics (Note D)

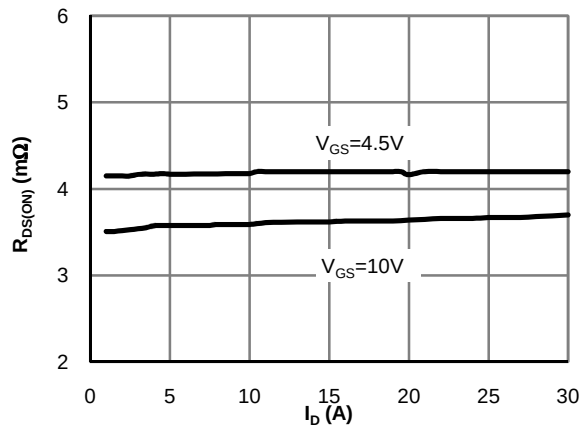


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note D)

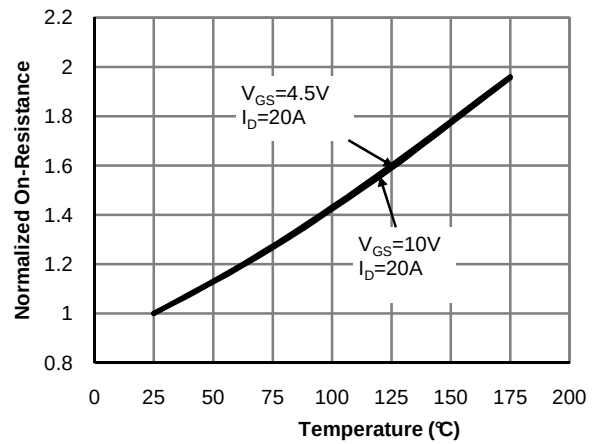


Figure 4: On-Resistance vs. Junction Temperature (Note D)

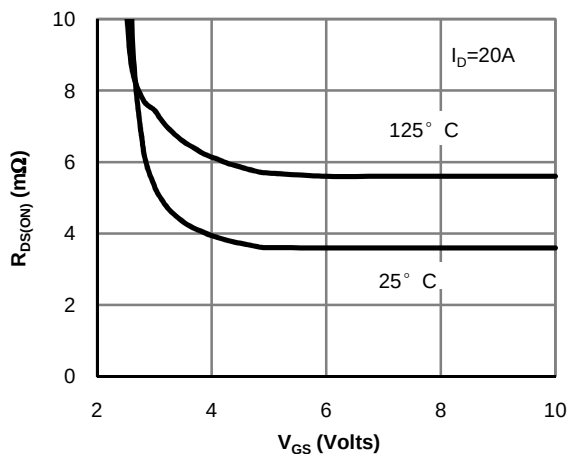


Figure 5: On-Resistance vs. Gate-Source Voltage (Note D)

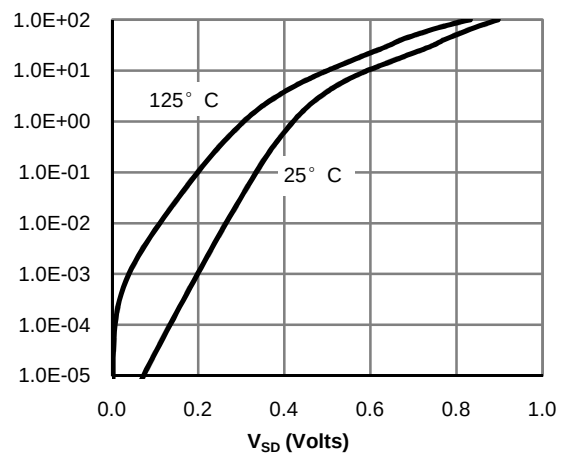
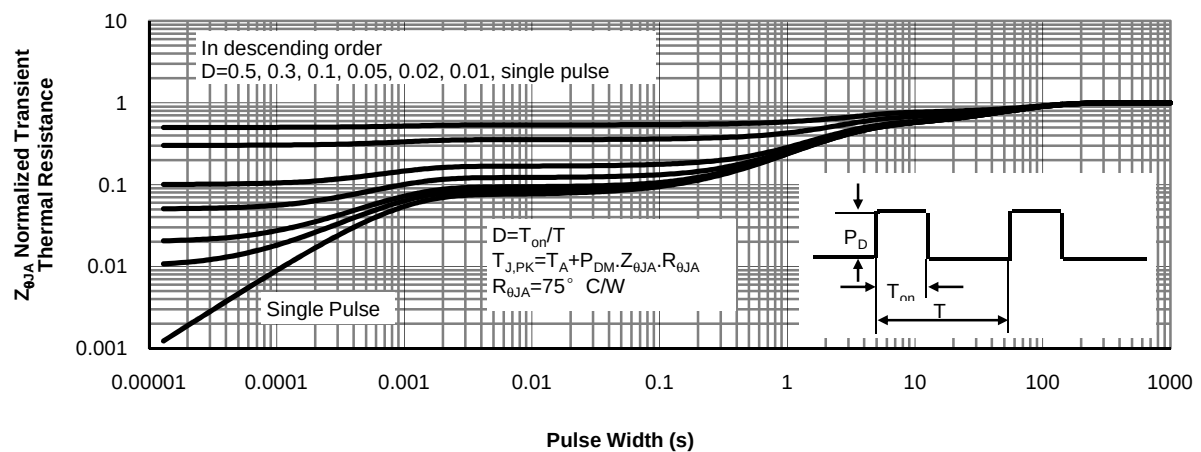
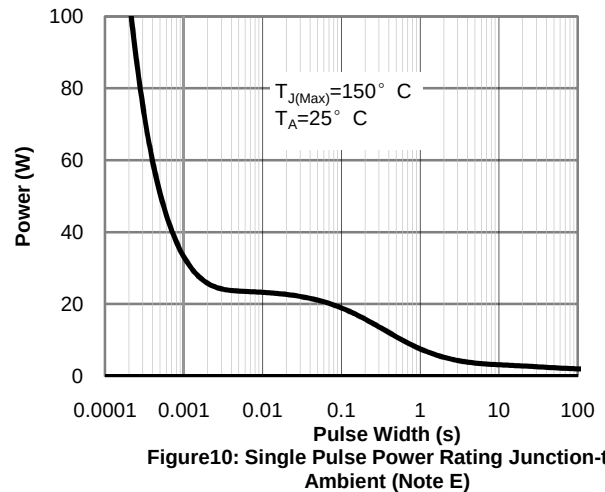
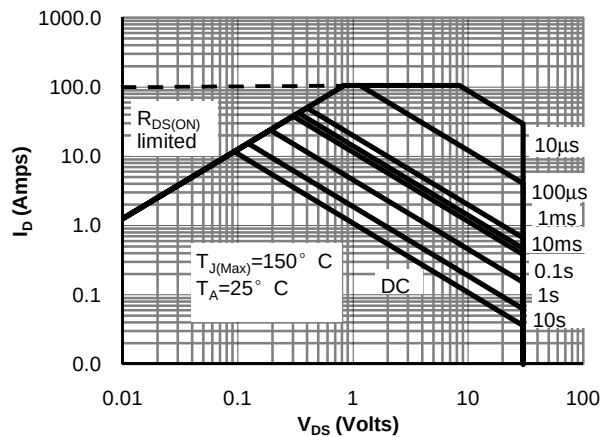
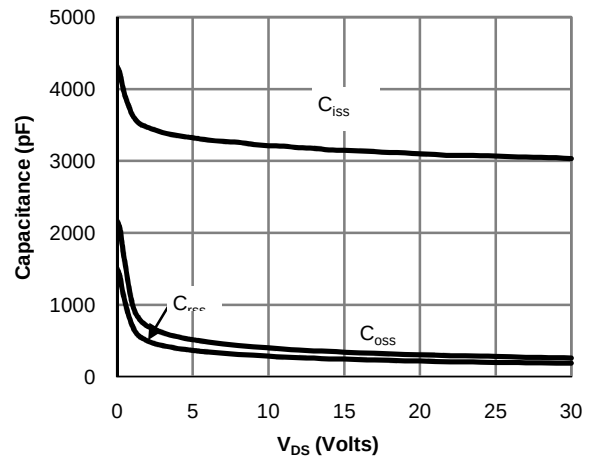
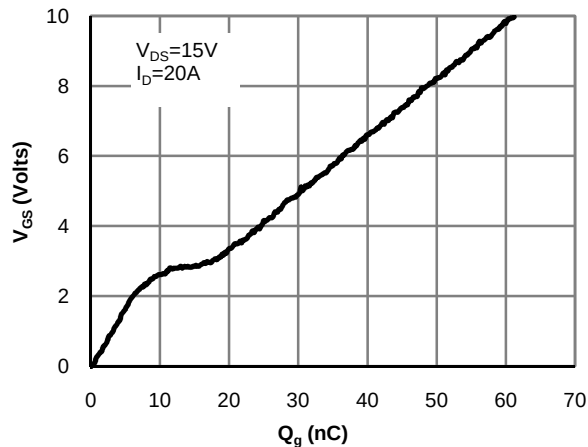


Figure 6: Body-Diode Characteristics (Note D)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



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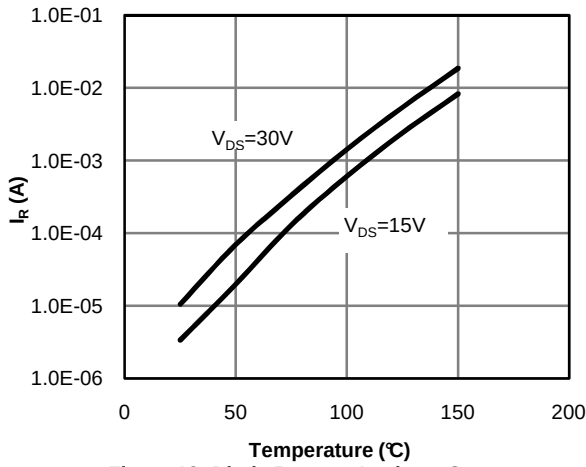


Figure 12: Diode Reverse Leakage Current vs. Junction Temperature

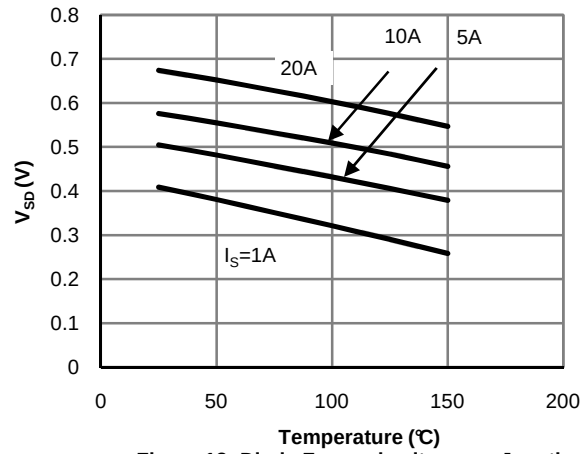


Figure 13: Diode Forward voltage vs. Junction Temperature

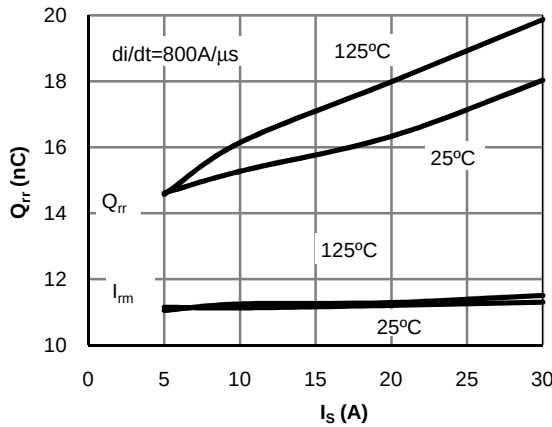


Figure 14: Diode Reverse Recovery Charge and Peak Current vs. Conduction Current

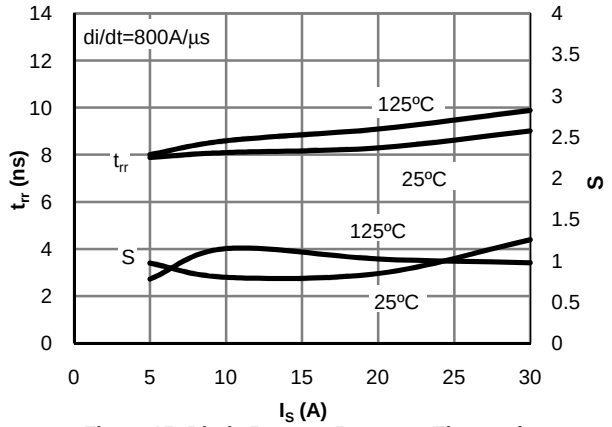


Figure 15: Diode Reverse Recovery Time and Softness Factor vs. Conduction Current

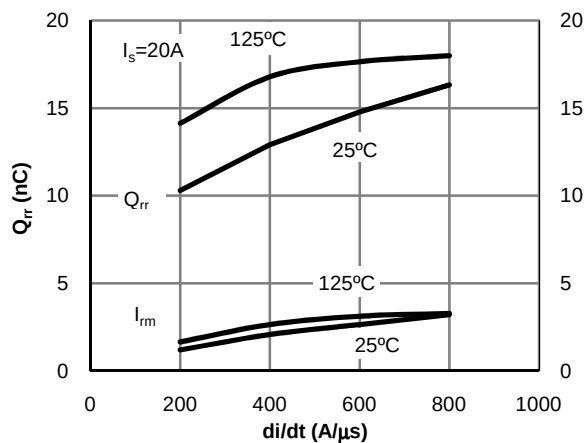


Figure 16: Diode Reverse Recovery Charge and Peak Current vs. di/dt

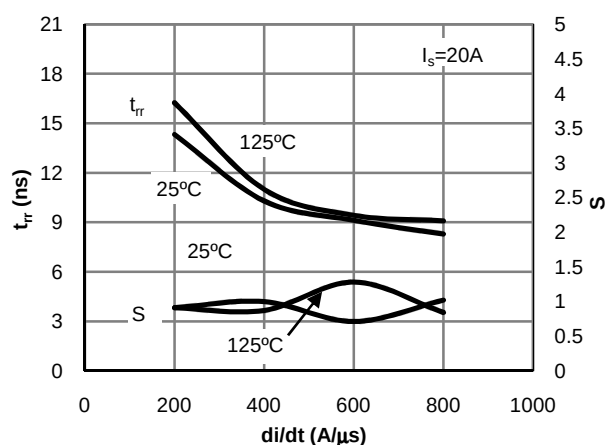
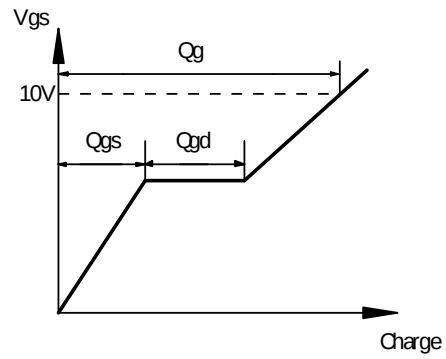
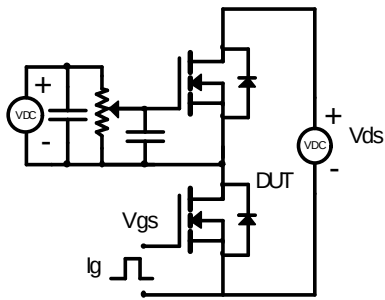
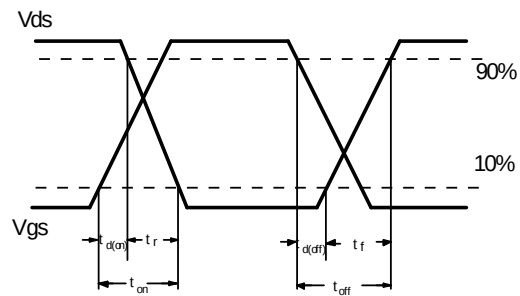
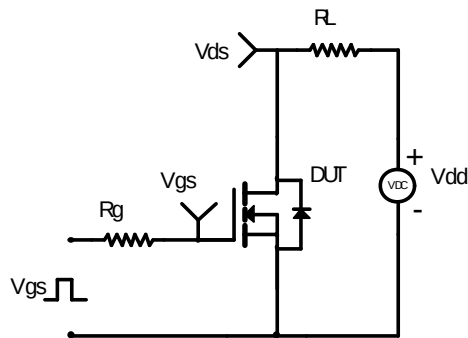


Figure 17: Diode Reverse Recovery Time and Softness Factor vs. di/dt

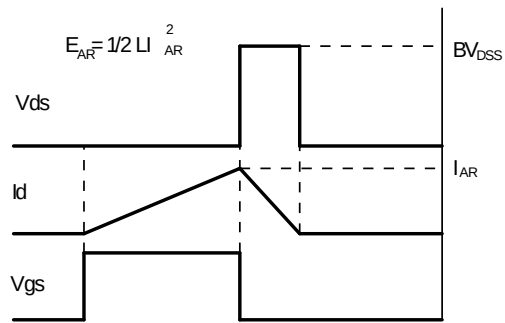
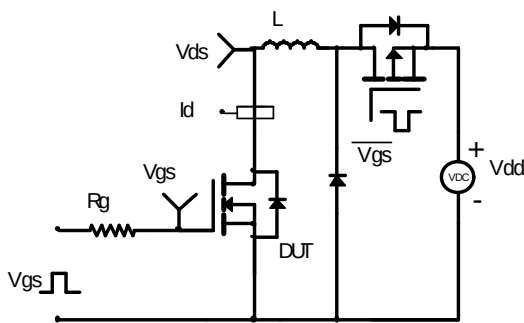
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

