General Description

The AON4703 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. A Schottky diode is provided to facilitate the implementation of a bidirectional blocking switch, or for buck converter applications

Features
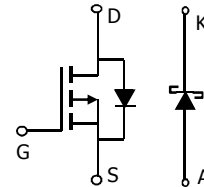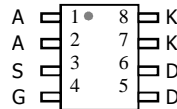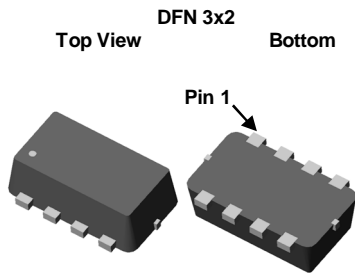
V_{DS} (V) = -20V
I_D = -3.4A   (V_{GS} = -4.5V)
$R_{DS(ON)}$ < 90mΩ (V_{GS} = -4.5V)
$R_{DS(ON)}$ < 120mΩ (V_{GS} = -2.5V)
$R_{DS(ON)}$ < 160mΩ (V_{GS} = -1.8V)
SCHOTTKY
V_{KA} (V) = 20V, I_F = 1A, V_F<0.5V @ 1A

Green Product

DFN 3x2
Top View   **Bottom**

Pin 1

Absolute Maximum Ratings T_A=25℃ unless otherwise noted

Parameter		Symbol	MOSFET	Schottky	Units
Drain-Source Voltage		V_{DS}	-20		V
Gate-Source Voltage		V_{GS}	±8		V
Continuous Drain Current [A]	T_A=25℃	I_D	-3.4		A
	T_A=70℃		-2.7		
Pulsed Drain Current [B]		I_{DM}	-15		
Schottky reverse voltage		V_{KA}		20	V
Continuous Forward Current [A]	T_A=25℃	I_F		1.9	A
	T_A=70℃			1.2	
Pulsed Forward Current [B]		I_{FM}		7	
Power Dissipation	T_A=25℃	P_D	1.7	0.96	W
	T_A=70℃		1.1	0.62	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	-55 to 150	℃

Parameter: Thermal Characteristics MOSFET		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{θJA}$	51	75	℃/W
Maximum Junction-to-Ambient [A]	Steady-State		88	110	
Maximum Junction-to-Lead [C]	Steady-State	$R_{θJL}$	28	35	
Thermal Characteristics Schottky					
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{θJA}$	66	80	℃/W
Maximum Junction-to-Ambient [A]	Steady-State		95	130	
Maximum Junction-to-Lead [C]	Steady-State	$R_{θJL}$	40	50	

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		-20			V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=-20V, V$_{GS}$=0V				-1	µA
			T$_J$=55°C			-5	
I$_{GSS}$	Gate-Body leakage current	V$_{DS}$=0V, V$_{GS}$=±8V				±100	nA
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$ I$_D$=-250µA		-0.4	-0.65	-1	V
I$_{D(ON)}$	On state drain current	V$_{GS}$=-4.5V, V$_{DS}$=-5V		-15			A
R$_{DS(ON)}$	Static Drain-Source On-Resistance	V$_{GS}$=-4.5V, I$_D$=-3.4A			51	90	mΩ
			T$_J$=125°C		64	135	
		V$_{GS}$=-2.5V, I$_D$=-2.5A			65	120	mΩ
		V$_{GS}$=-1.8V, I$_D$=-1.5A			83	160	mΩ
g$_{FS}$	Forward Transconductance	V$_{DS}$=-5V, I$_D$=-3.4A			12		S
V$_{SD}$	Diode Forward Voltage	I$_S$=-1A, V$_{GS}$=0V			-0.7	-1	V
I$_S$	Maximum Body-Diode Continuous Current					-2	A
DYNAMIC PARAMETERS							
C$_{iss}$	Input Capacitance	V$_{GS}$=0V, V$_{DS}$=-10V, f=1MHz			560	745	pF
C$_{oss}$	Output Capacitance				80		pF
C$_{rss}$	Reverse Transfer Capacitance				70		pF
R$_g$	Gate resistance	V$_{GS}$=0V, V$_{DS}$=0V, f=1MHz			15	23	Ω
SWITCHING PARAMETERS							
Q$_g$	Total Gate Charge	V$_{GS}$=-4.5V, V$_{DS}$=-10V, I$_D$=-3.4A			8.5	11	nC
Q$_{gs}$	Gate Source Charge				1.2		nC
Q$_{gd}$	Gate Drain Charge				2.1		nC
t$_{D(on)}$	Turn-On DelayTime	V$_{GS}$=-4.5V, V$_{DS}$=-10V, R$_L$=2.9Ω, R$_{GEN}$=3Ω			7.2		ns
t$_r$	Turn-On Rise Time				36		ns
t$_{D(off)}$	Turn-Off DelayTime				53		ns
t$_f$	Turn-Off Fall Time				56		ns
t$_{rr}$	Body Diode Reverse Recovery Time	I$_F$=-3.4A, dI/dt=100A/µs			37	49	ns
Q$_{rr}$	Body Diode Reverse Recovery Charge	I$_F$=-3.4A, dI/dt=100A/µs			27		nC
SCHOTTKY PARAMETERS							
V$_F$	Forward Voltage Drop	I$_F$=1A			0.4	0.5	V
I$_{rm}$	Maximum reverse leakage current	V$_R$=16V				0.2	mA
		V$_R$=16V, T$_J$=125°C				20	
C$_T$	Junction Capacitance	V$_R$=10V			44		pF
t$_{rr}$	Schottky Reverse Recovery Time	I$_F$=1A, dI/dt=100A/µs			11	14	ns
Q$_{rr}$	Schottky Reverse Recovery Charge	I$_F$=1A, dI/dt=100A/µs			2.5		nC

A: The value of R$_{θJA}$ is measured with the device mounted on 1in^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 t ≤ 300µs 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 thermal resistance rating.

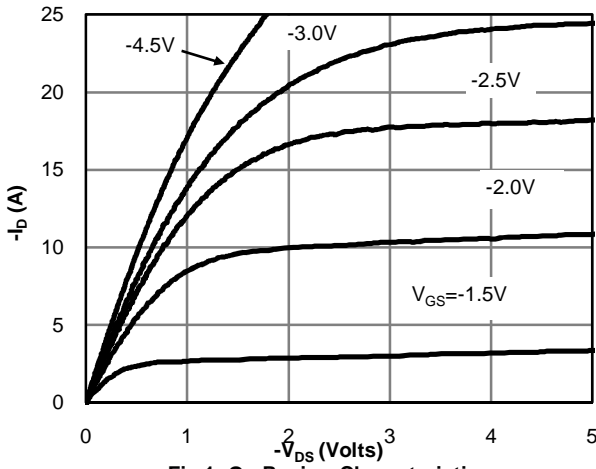**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

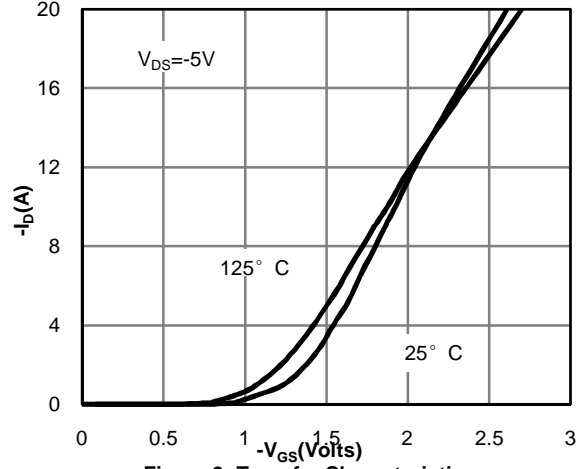Fig 1: On-Region Characteristics
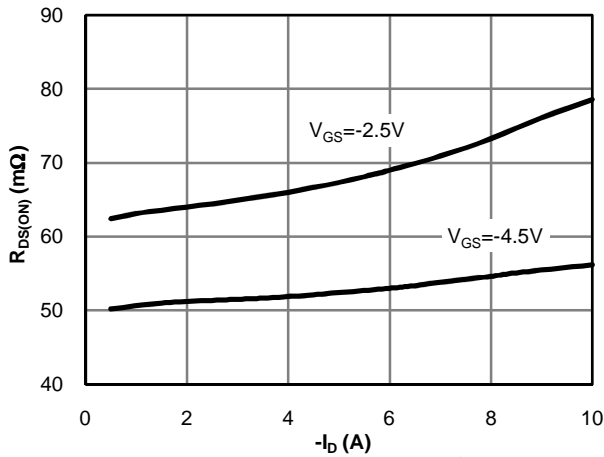

Figure 2: Transfer Characteristics

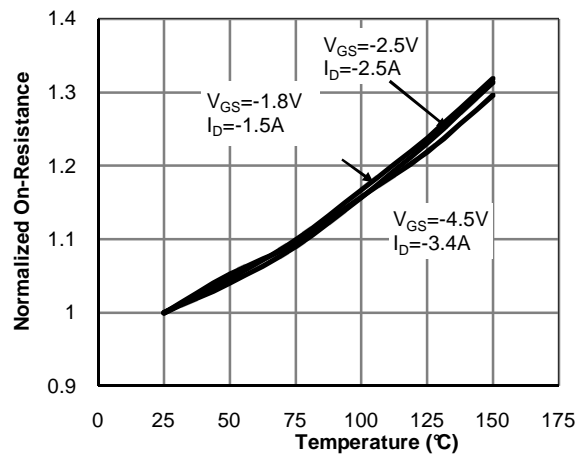Figure 3: On-Resistance vs. Drain Current and Gate Voltage

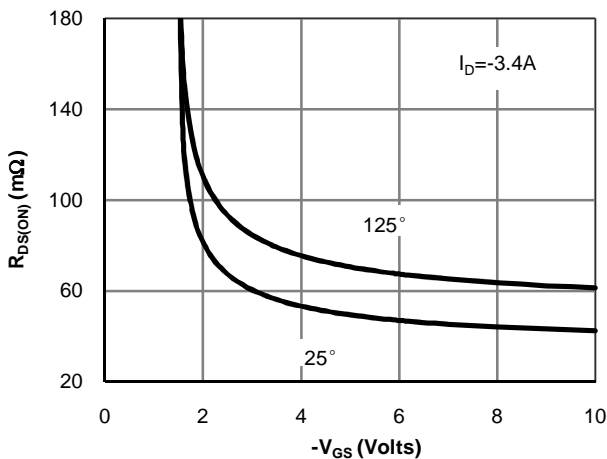Figure 4: On-Resistance vs. Junction Temperature

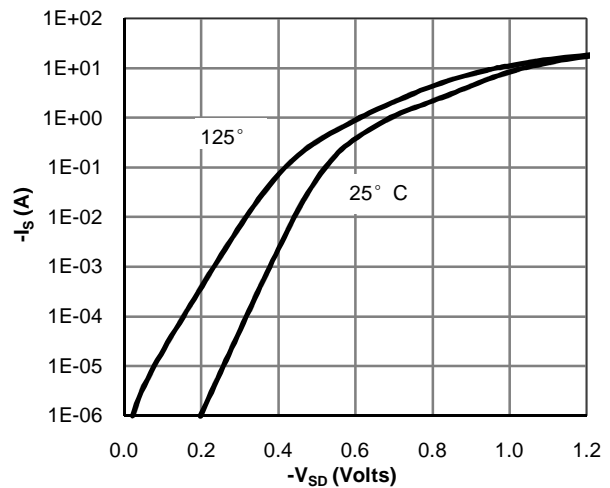
Figure 5: On-Resistance vs. Gate-Source Voltage

Figure 6: Body-Diode Characteristics
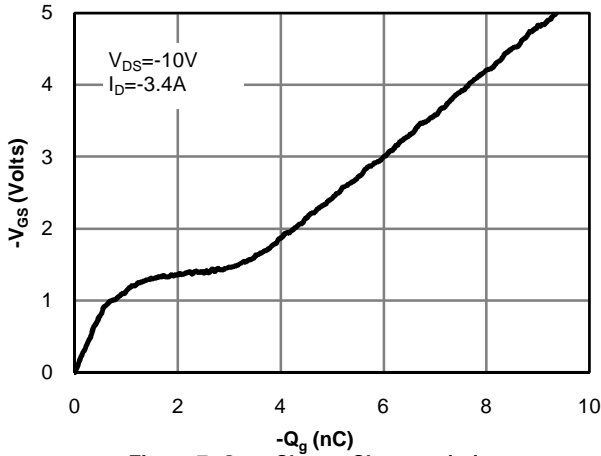
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

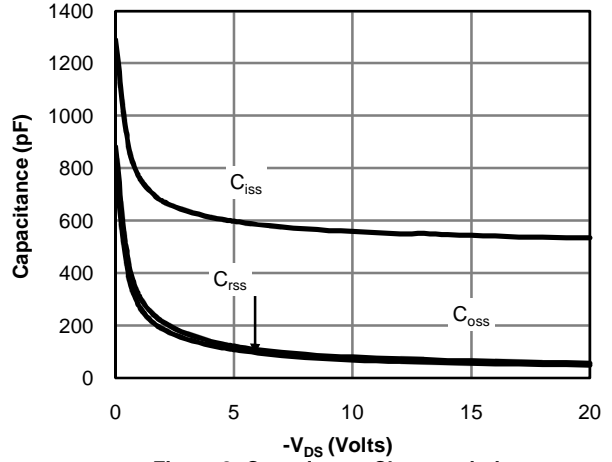Figure 7: Gate-Charge Characteristics
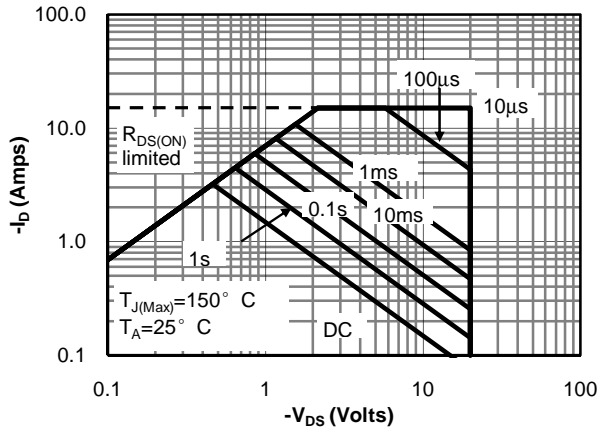

Figure 8: Capacitance Characteristics

Figure 9: Maximum Forward Biased Safe Operating Area (Note E)
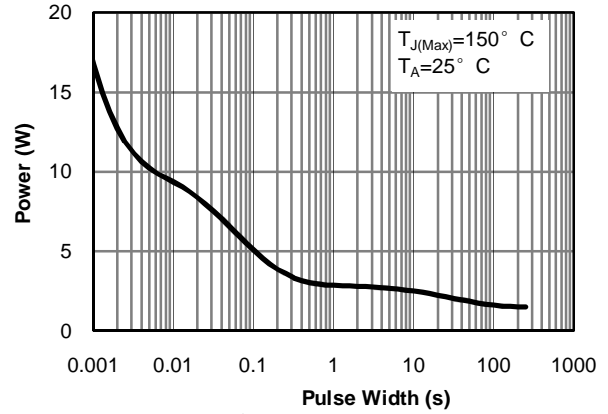
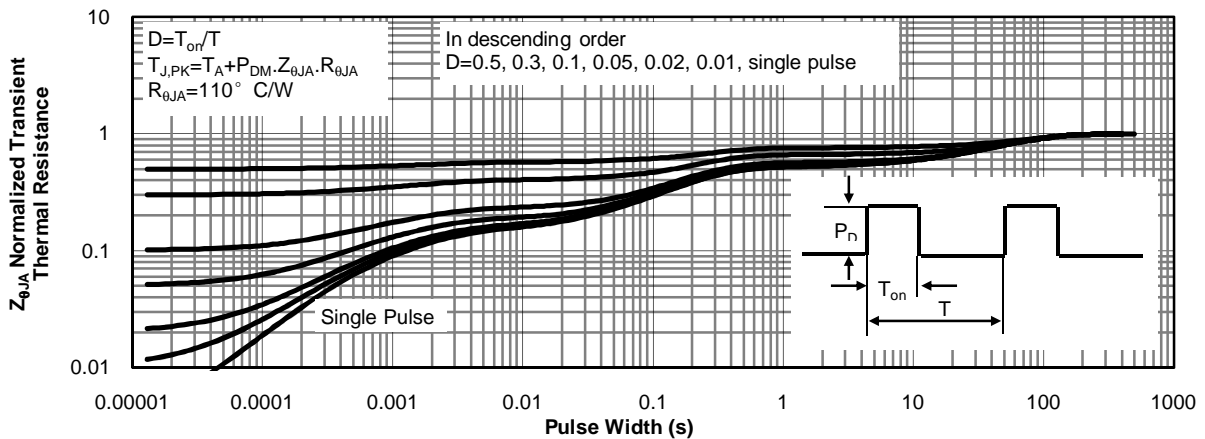Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

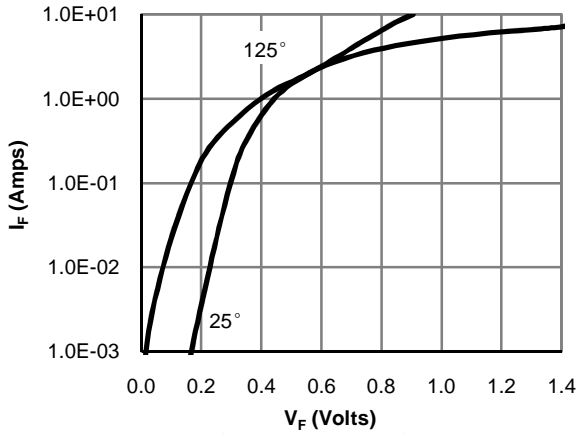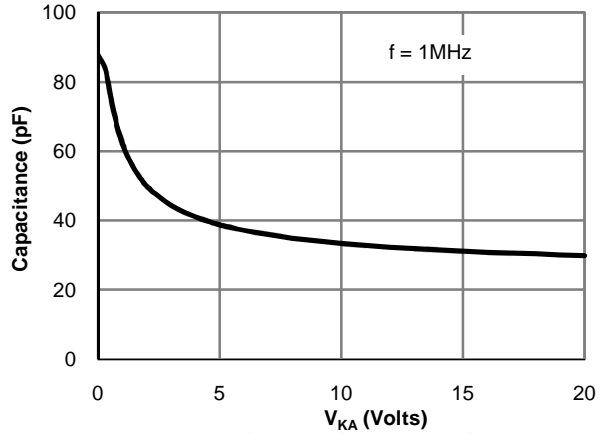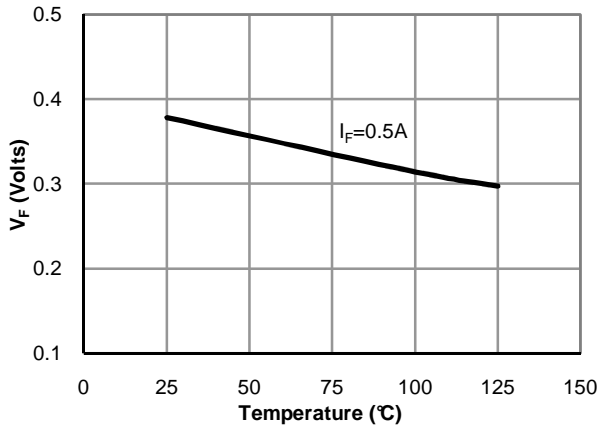Figure 11: Normalized Maximum Transient Thermal Impedance

AON4703

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS: SCHOTTKY

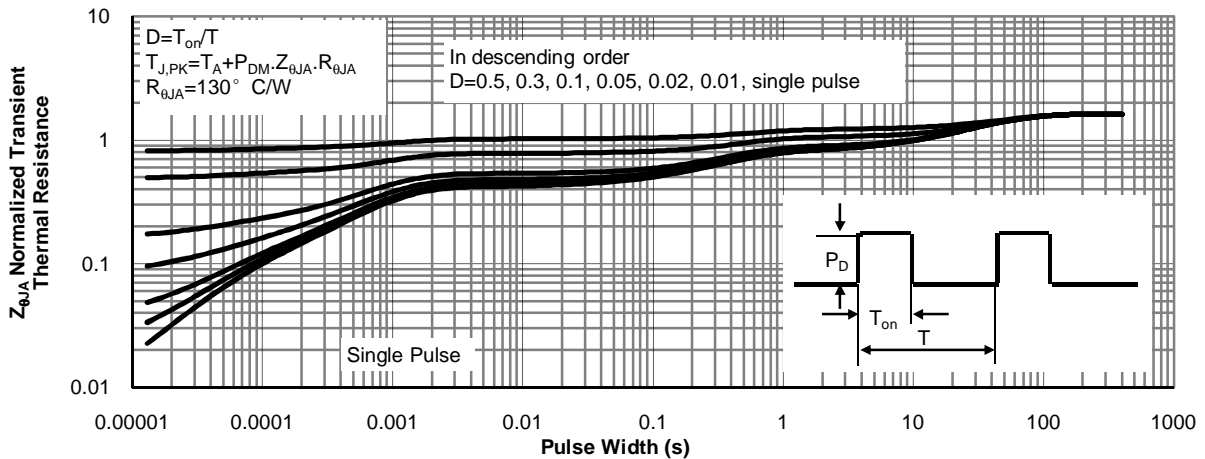Figure 12: Schottky Forward Characteristics

125°

25°

Figure 13: Schottky Capacitance Characteristics

f = 1MHz

I_F=0.5A

Figure 14: Schottky Forward Drop vs. Junction Temperature

V_R=16V
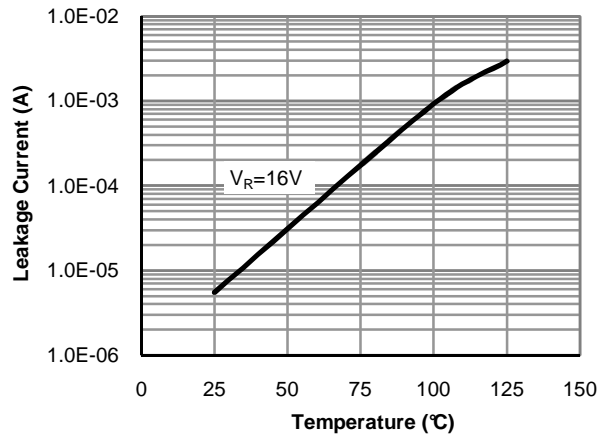
Figure 15: Schottky Leakage current vs. Junction Temperature

$D=T_{on}/T$
$T_{J,PK}=T_A+P_{DM}.Z_{\theta JA}.R_{\theta JA}$
$R_{\theta JA}$=130° C/W

In descending order
D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse
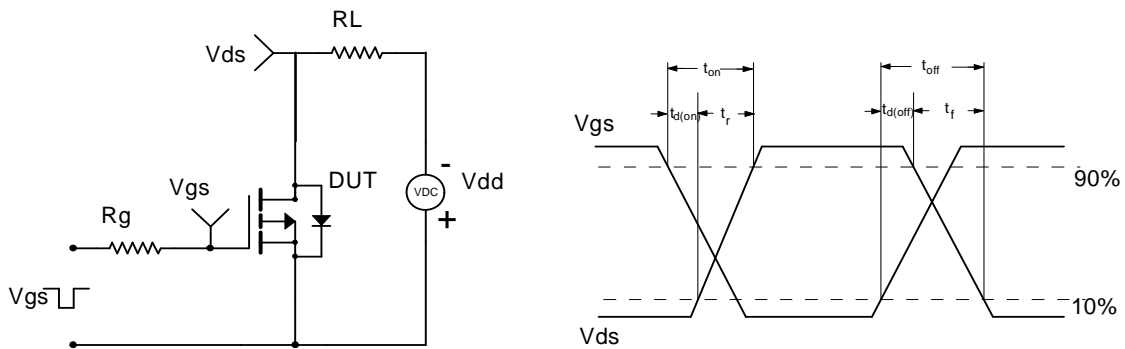
Single Pulse

P_D

T_{on}

T

Figure 16: Schottky Normalized Maximum Transient Thermal Impedance

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Gate Charge Test Circuit & Waveform
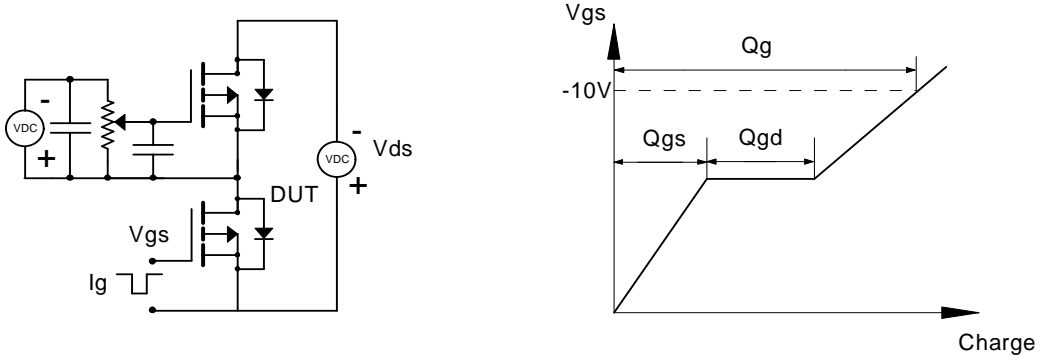
Resistive Switching Test Circuit & Waveforms

Diode Recovery Test Circuit & Waveforms

$$Q_{rr} = -\int I dt$$