

General Description

The AON6404 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

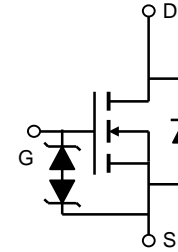
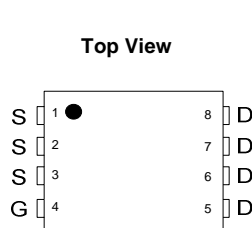
Features

$$V_{DS} (V) = 30V$$

$$I_D = 85A (V_{GS} = 10V)$$

$$R_{DS(ON)} < 2.2m\Omega (V_{GS} = 10V)$$

$$R_{DS(ON)} < 3.8m\Omega (V_{GS} = 4.5V)$$



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^{B,G}	$T_C=25^\circ\text{C}$	85	A
	$T_C=100^\circ\text{C}$	67	
Pulsed Drain Current	I_{DM}	160	
Continuous Drain Current ^A	$T_A=25^\circ\text{C}$	25	
	$T_A=70^\circ\text{C}$	20	
Avalanche Current	I_{AS}	85	
Single avalanche energy $L=0.1\text{mH}$	E_{AS}	361	mJ
Power Dissipation ^B	$T_C=25^\circ\text{C}$	83	W
	$T_C=100^\circ\text{C}$	33	
Power Dissipation ^A	$T_A=25^\circ\text{C}$	2.1	W
	$T_A=70^\circ\text{C}$	1.3	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	15	20	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A		Steady-State	45	60
Maximum Junction-to-Case ^C	$R_{\theta JC}$	1.1	1.5	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
B _V DSS	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0V	30	34		V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V T _J =55°C			1 5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} = ±16V			10	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =250μA	1.4	1.7	2	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	160			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A T _J =125°C		1.8 2.5	2.2 3.1	mΩ
		V _{GS} =4.5V, I _D =20A		3	3.8	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		75		S
V _{SD}	Diode Forward Voltage	I _S =85A, V _{GS} =0V		0.87	1.3	V
I _S	Maximum Body-Diode Continuous Current				85	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		7420	9000	pF
C _{oss}	Output Capacitance			1045		pF
C _{rss}	Reverse Transfer Capacitance			720		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.2	1.8	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =20A		118	155	nC
Q _{g(4.5V)}	Total Gate Charge			54		nC
Q _{gs}	Gate Source Charge			29		nC
Q _{gd}	Gate Drain Charge			22		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =0.75Ω, R _{GEN} =3Ω		17		ns
t _r	Turn-On Rise Time			18		ns
t _{D(off)}	Turn-Off DelayTime			67		ns
t _f	Turn-Off Fall Time			25		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =20A, di/dt=100A/μs		60	80	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =20A, di/dt=100A/μs		66		nC

A: The value of R_{θJA} is measured with the device in a still air environment with T_A=25°C, with the device mounted on 1 in2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C

B: The power dissipation P_D is based on T_{J(MAX)}=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsink is used.

C: Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C.

D: The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.

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

F: These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)}=150°C. The SOA curve provides a single pulse rating.

G: Maximum current is limited by the package.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

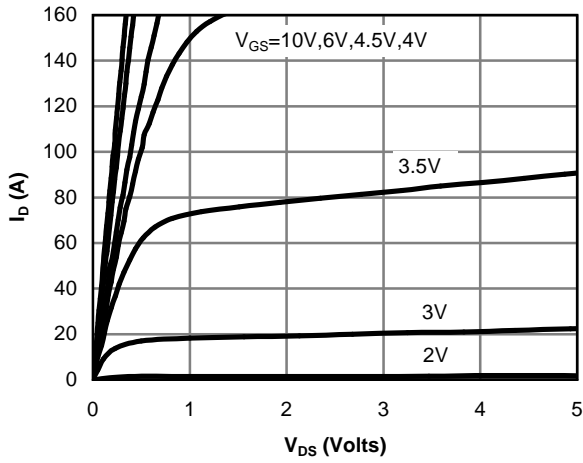


Fig 1: On-Region Characteristics

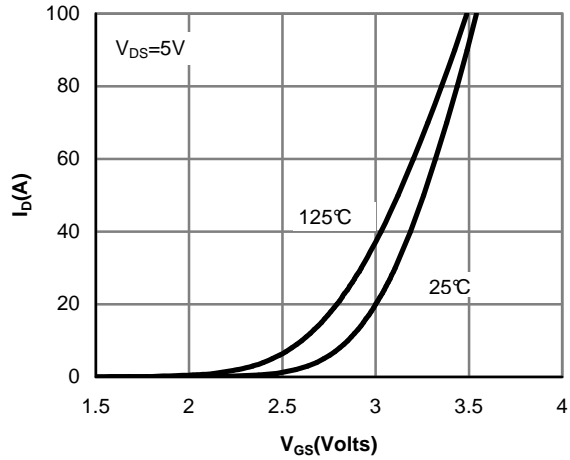


Figure 2: Transfer Characteristics

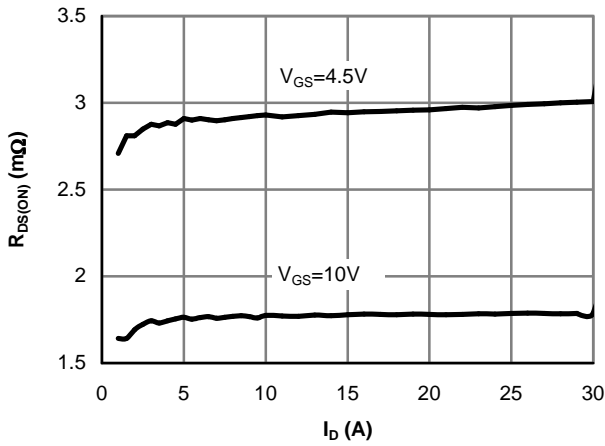


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

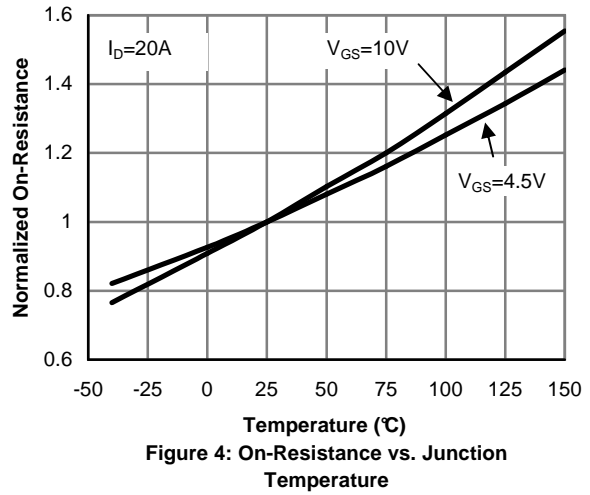


Figure 4: On-Resistance vs. Junction Temperature

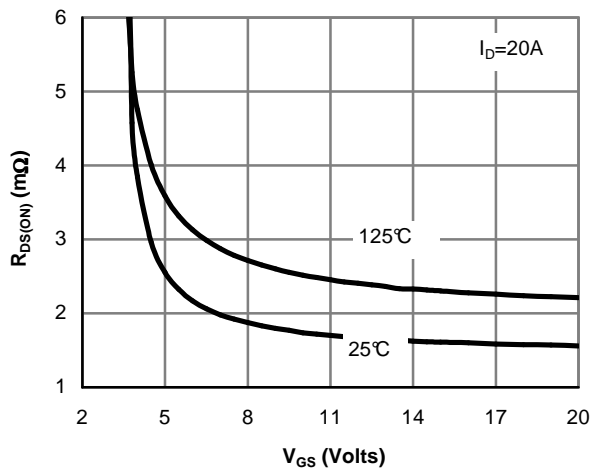


Figure 5: On-Resistance vs. Gate-Source Voltage

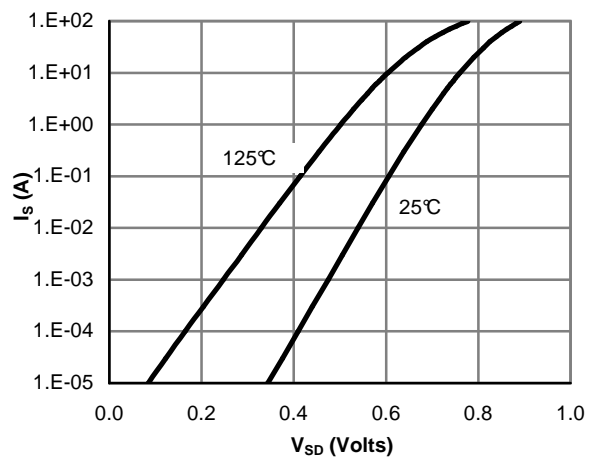


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

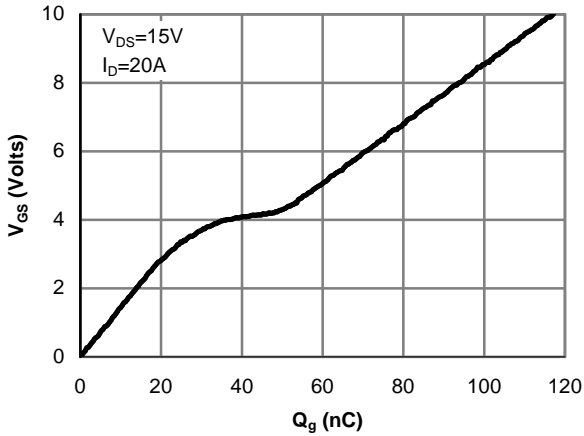


Figure 7: Gate-Charge Characteristics

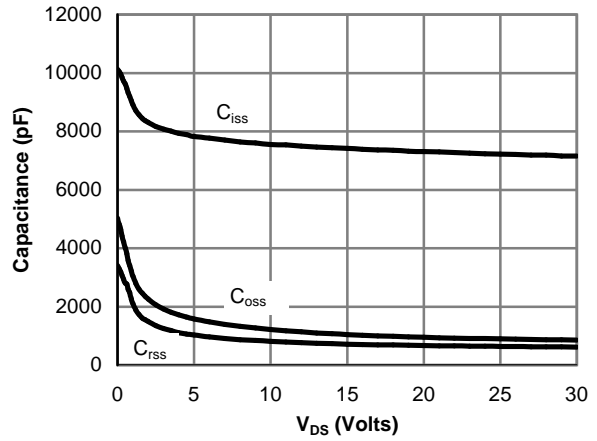


Figure 8: Capacitance Characteristics

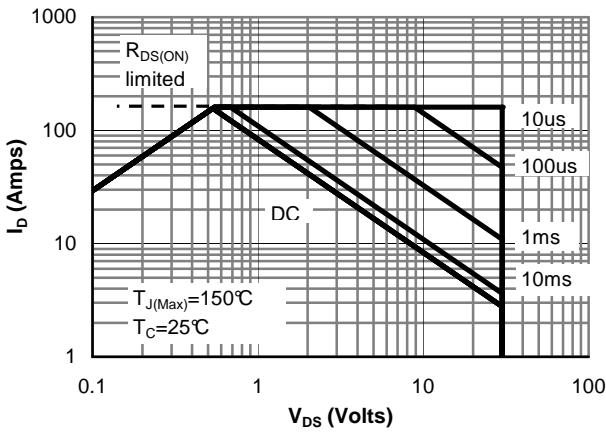


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

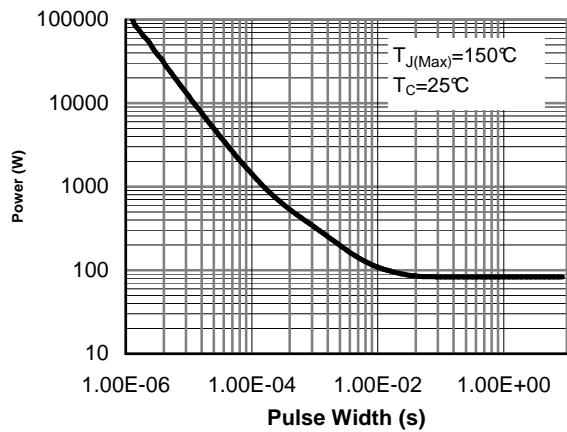


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

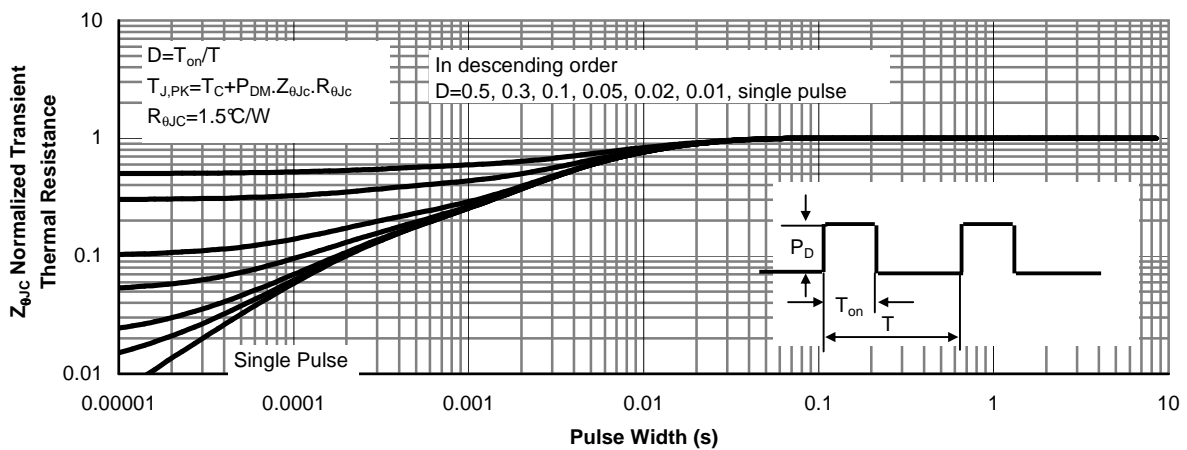


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

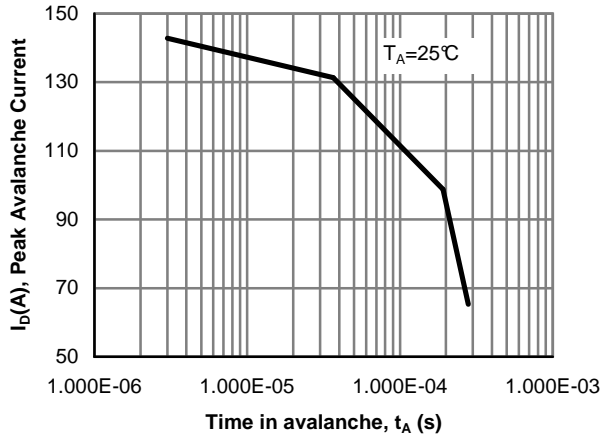


Figure 12: Single Pulse Avalanche capability

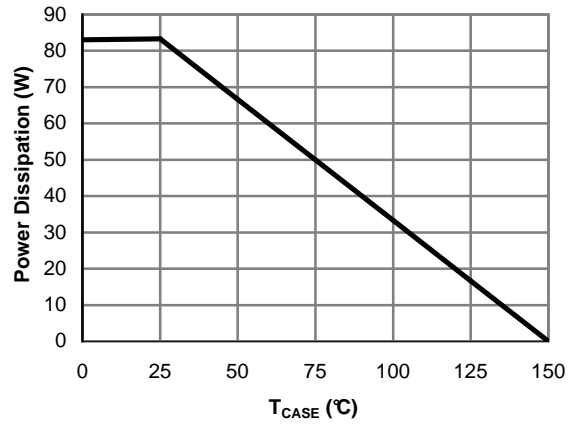


Figure 13: Power De-rating (Note B)

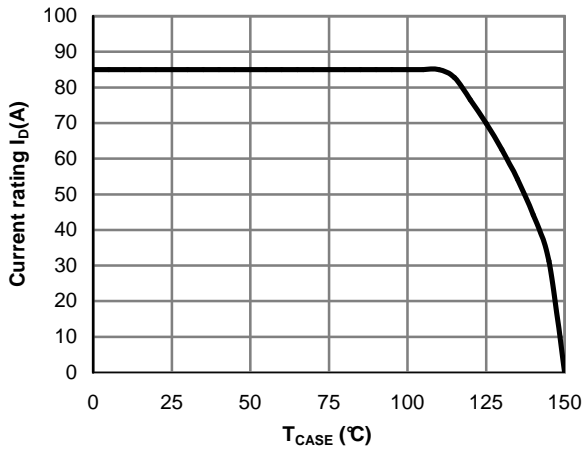


Figure 14: Current De-rating (Note B,G)

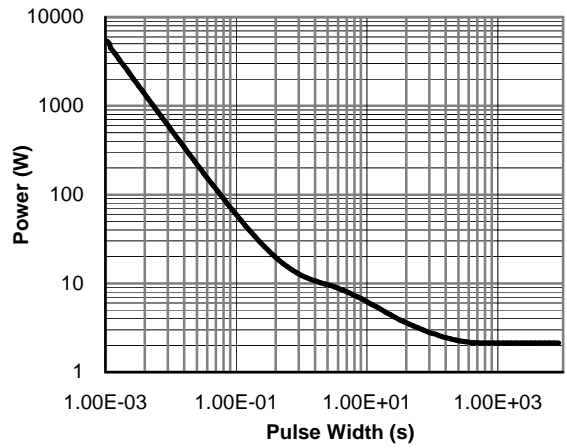


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note A)

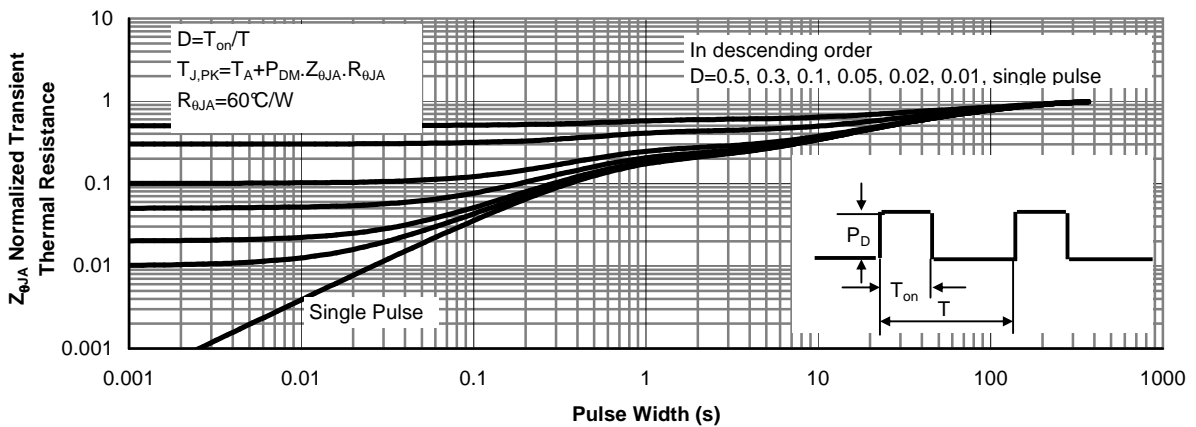
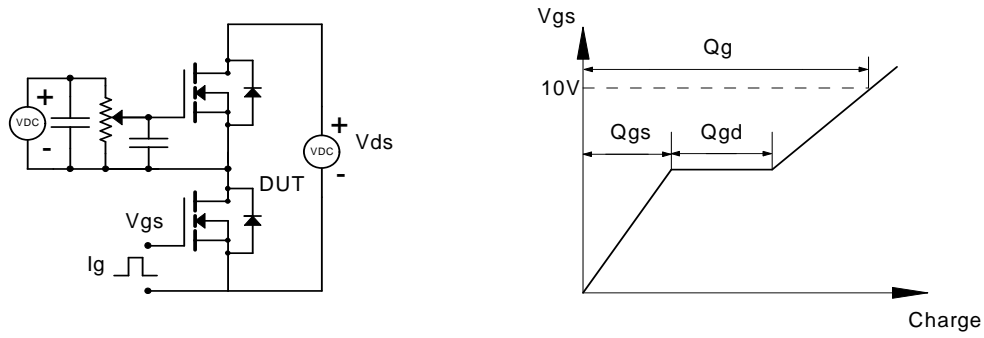
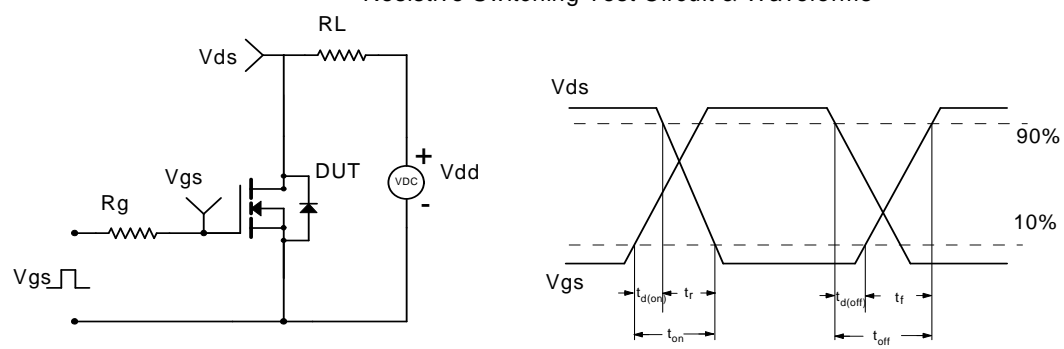


Figure 16: Normalized Maximum Transient Thermal Impedance (Note A)

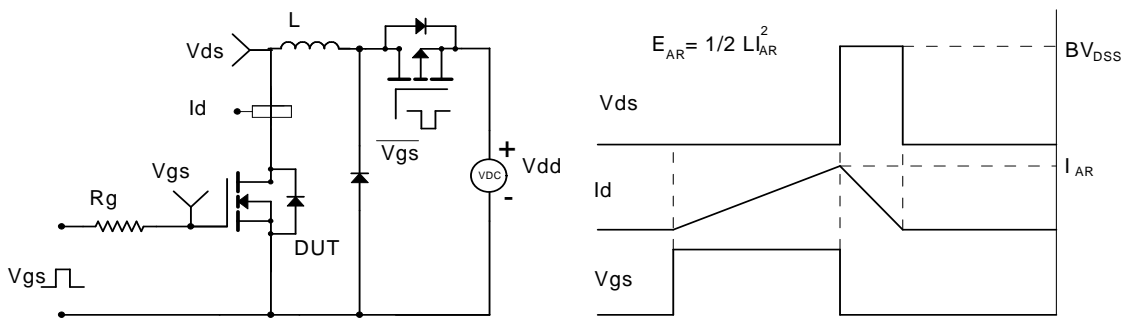
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

