ALPHA & OMEGA SEMICONDUCTOR

Green Product

AON7430
30V N-Channel MOSFET

General Description

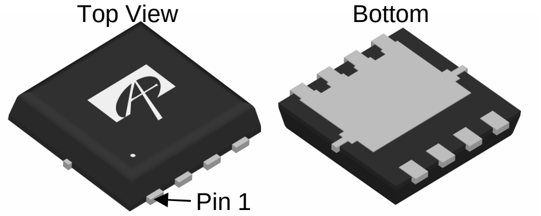
The AON7430 uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge.
This device is suitable for high side switch in SMPS and general purpose applications.

Features

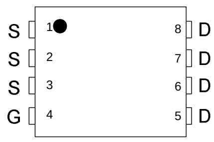
V_{DS} (V) = 30V
I_D = 34A (${V_{GS}}$ = 10V)
$R_{DS(ON)}$ < 12mΩ (V_{GS} = 10V)
$R_{DS(ON)}$ < 16mΩ (V_{GS} = 4.5V)

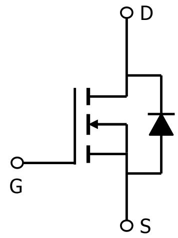
100% UIS Tested
100% R_g Tested

DFN 3x3 EP



Top View





Absolute Maximum Ratings T_A=25℃ unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C=25℃	I_D	34	A
	T_C=100℃		21	
Pulsed Drain Current [C]		I_{DM}	80	
Continuous Drain Current [A]	T_A=25℃	I_{DSM}	13	A
	T_A=70℃		10.2	
Avalanche Current [C]		I_{AR}	22	A
Repetitive avalanche energy L=0.1mH [C]		E_{AR}	24	mJ
Power Dissipation [B]	T_C=25℃	P_D	23	W
	T_C=100℃		9	
Power Dissipation [A]	T_A=25℃	P_{DSM}	3.1	W
	T_A=70℃		2	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	30	40	℃/W
Maximum Junction-to-Ambient [A]	Steady-State		60	75	℃/W
Maximum Junction-to-Case [B]	Steady-State	$R_{\theta JC}$	4.5	5.4	℃/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}=30V, V_{GS}=0V				1	µA
			T_J=55°C			5	
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	1.9	2.5	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V		80			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A			10	12	mΩ
			T_J=125°C		16	19	
		V_{GS}=4.5V, I_D=20A			13	16	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A			45		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V			0.7	1	V
I_S	Maximum Body-Diode Continuous Current					25	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		610	760	910	pF
C_{oss}	Output Capacitance			88	125	160	pF
C_{rss}	Reverse Transfer Capacitance			40	70	100	pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		0.8	1.6	2.4	Ω
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=20A		11	14	17	nC
Q_g(4.5V)	Total Gate Charge			5	6.6	8	nC
Q_{gs}	Gate Source Charge			1.9	2.4	2.9	nC
Q_{gd}	Gate Drain Charge			1.8	3	4.2	nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=0.75Ω, R_{GEN}=3Ω			4.4		ns
t_r	Turn-On Rise Time				9		ns
$t_{D(off)}$	Turn-Off DelayTime				17		ns
t_f	Turn-Off Fall Time				6		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, dI/dt=500A/µs		5.6	7	8	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, dI/dt=500A/µs		6.4	8	9.6	nC

A. The value of $R_{\theta JA}$ 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 Power dissipation P_{DSM} is based on $R_{\theta JA}$ t ≤ 10s value and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150°C may be u sed if the PCB allows it.
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 heatsinking is used.
C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to case $R_{\theta JC}$ and case to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300µs pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-case thermal impedence which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C.
G. The maximum current rating is limited by bond-wires.
H. 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.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

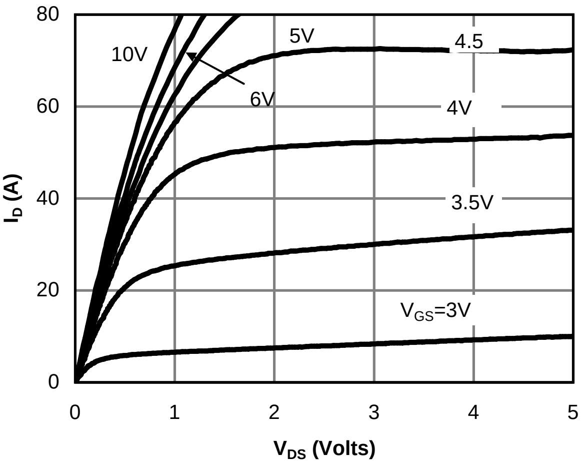


Fig 1: On-Region Characteristics

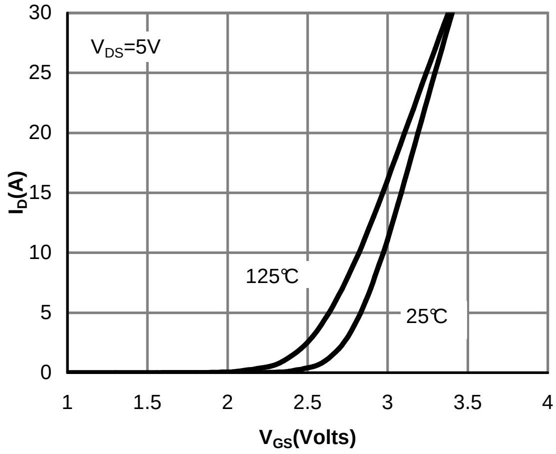


Figure 2: Transfer Characteristics

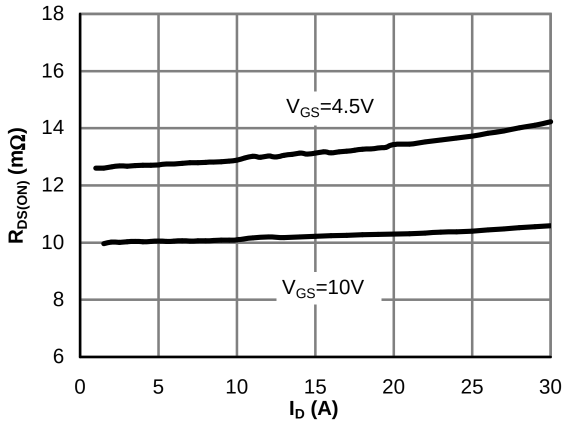


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

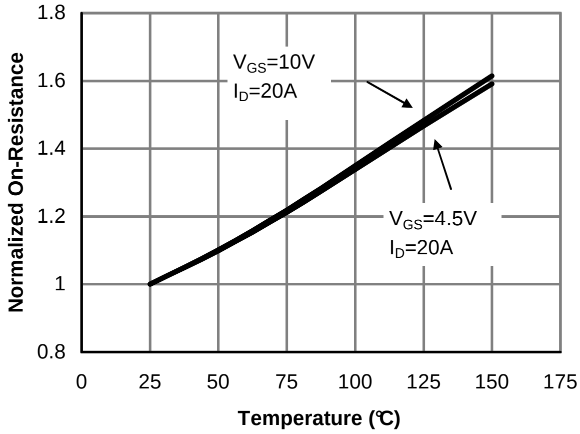


Figure 4: On-Resistance vs. Junction Temperature

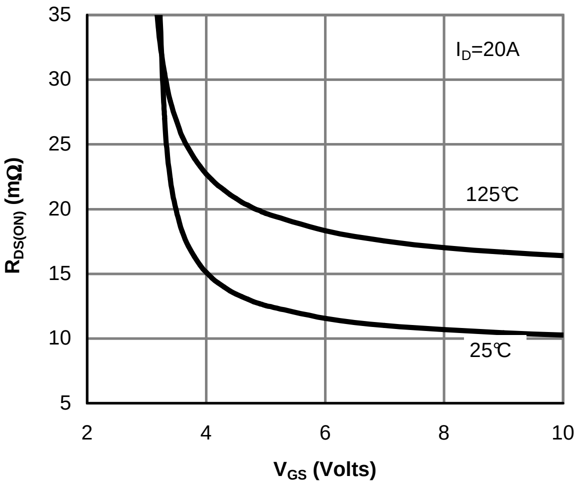


Figure 5: On-Resistance vs. Gate-Source Voltage

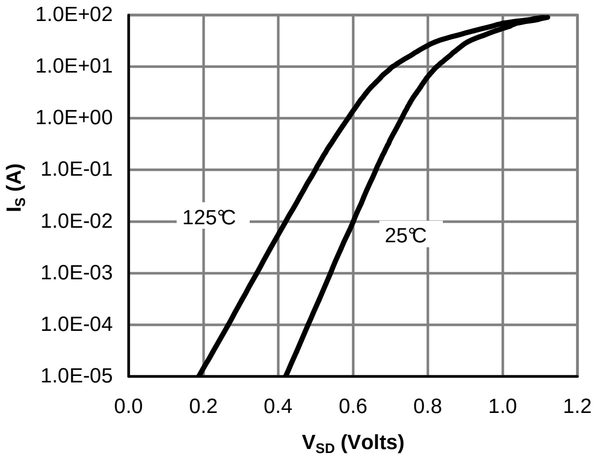


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

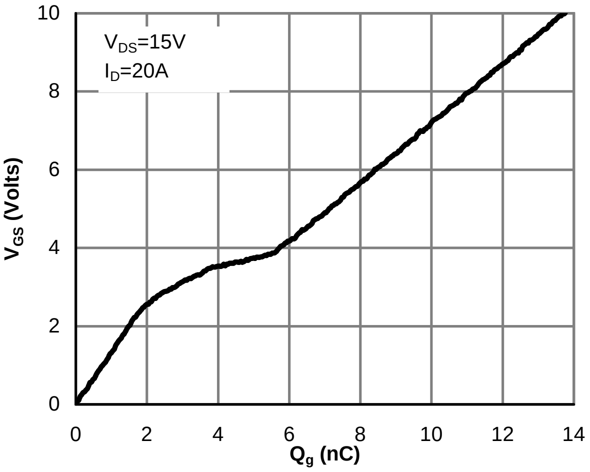


Figure 7: Gate-Charge Characteristics

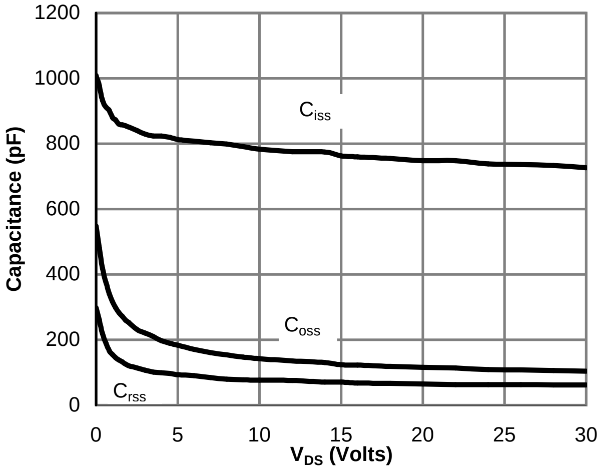


Figure 8: Capacitance Characteristics

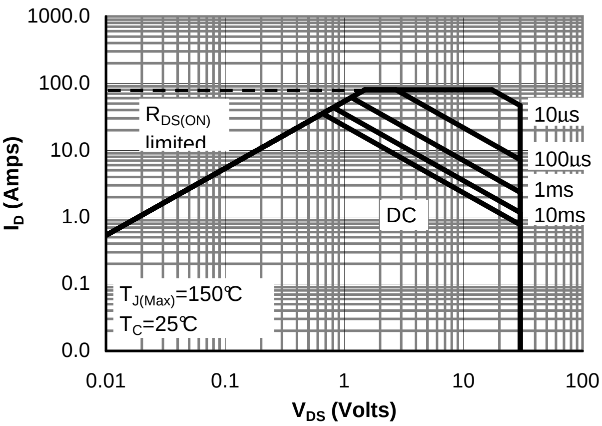


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

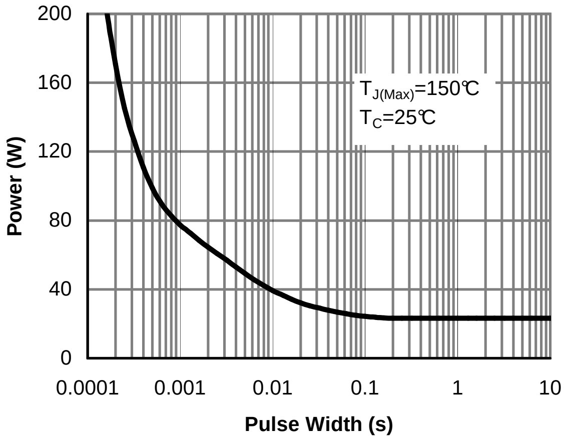


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

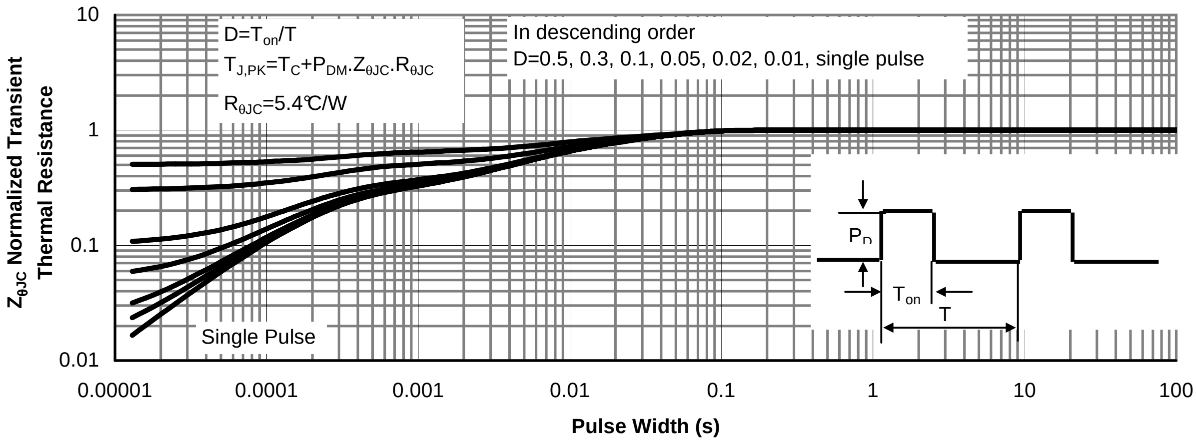


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

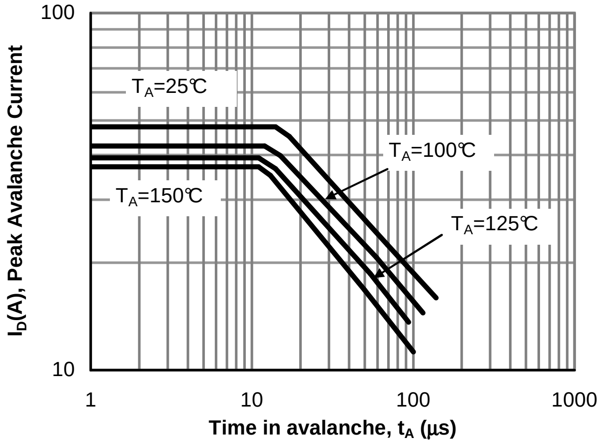


Figure 12: Single Pulse Avalanche capability (Note C)

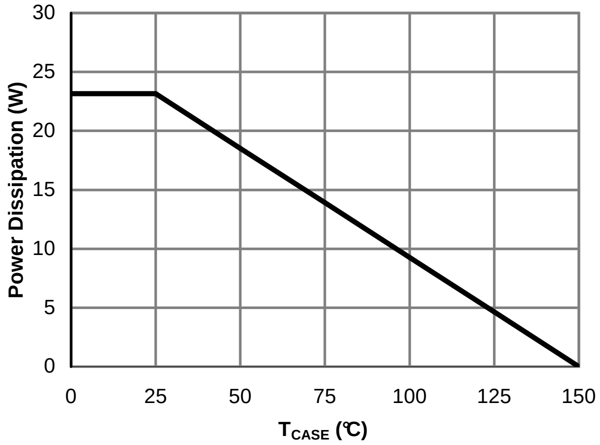


Figure 13: Power De-rating (Note F)

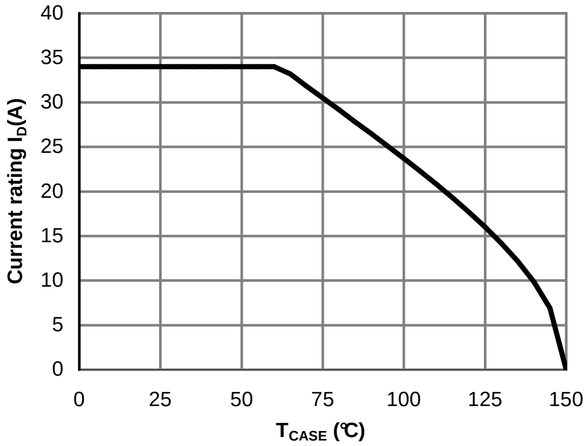


Figure 14: Current De-rating (Note F)

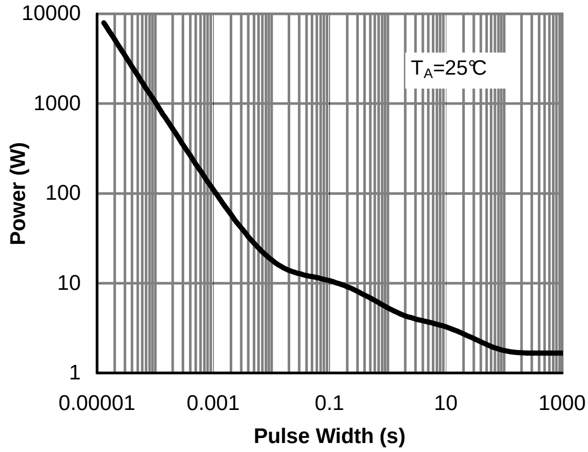


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

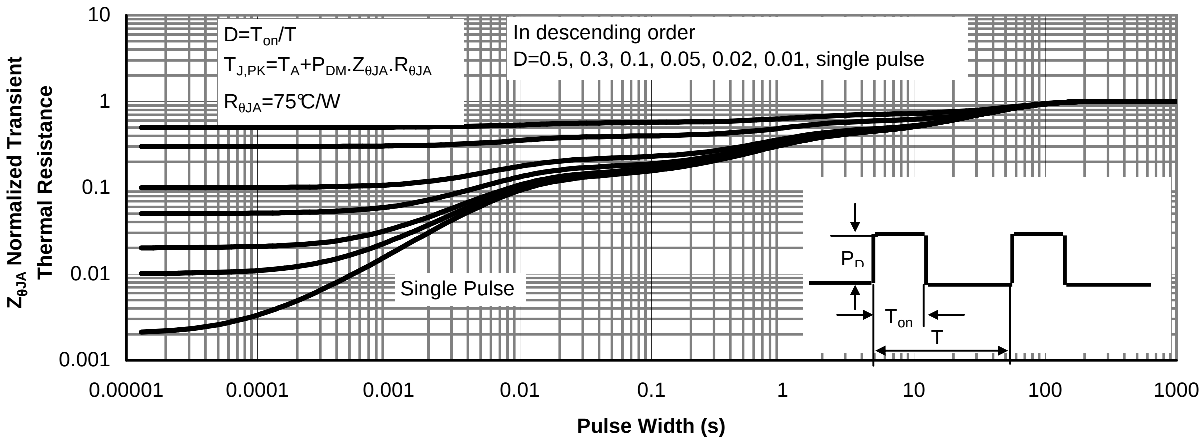
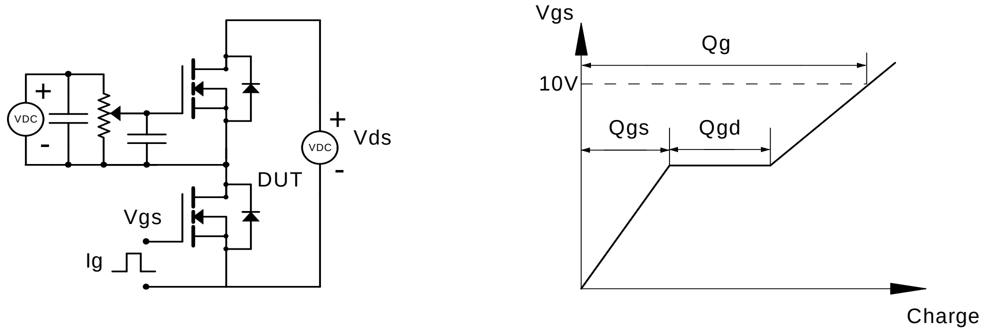
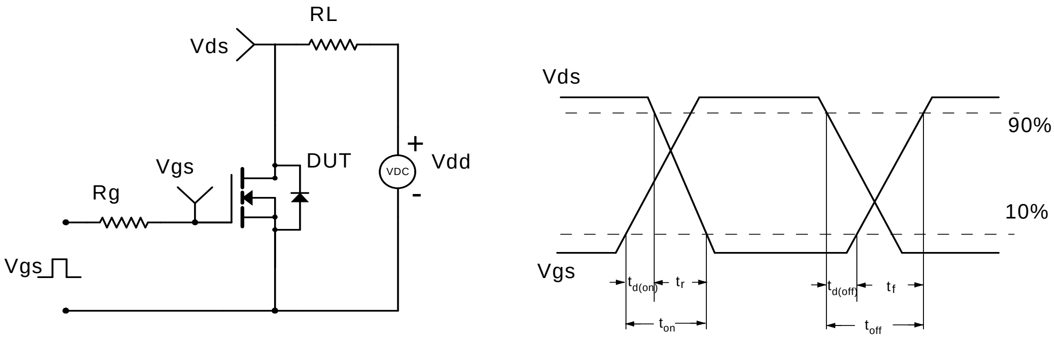


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

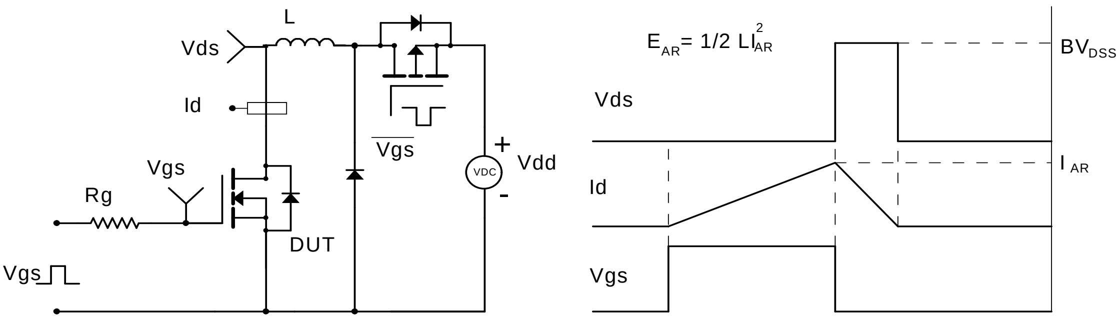
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms