

General Description

- Trench Power AlphaSGT™ technology
- Source Down package with center gate
- Top side cooling
- Low $R_{DS(ON)}$
- Logic level
- Low Gate Charge
- MSL1
- RoHS 2.0 and Halogen-Free Compliant

Applications

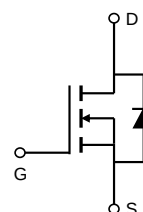
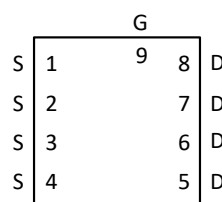
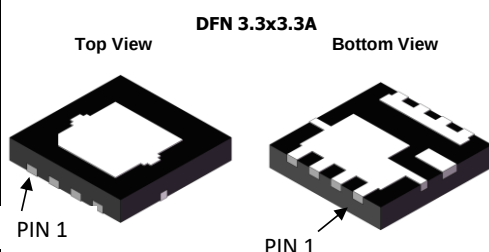
- High-frequency switching applications

Product Summary

V_{DS}	80V
I_D (at $V_{GS}=10V$)	119A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 4.7m Ω
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 5.8m Ω

100% UIS Tested
100% Rg Tested

Max $T_j=175^{\circ}C$



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AONC68816	DFN3.3x3.3A	Tape & Reel	3000

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	80	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	119	A
$T_C=25^{\circ}C$		84	
Pulsed Drain Current ^C	I_{DM}	476	
Avalanche Current ^C	I_{AS}	40	A
Avalanche energy $L=0.1mH$ ^C	E_{AS}	80	mJ
Power Dissipation ^B	P_D	166	W
$T_C=25^{\circ}C$		83	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^{\circ}C$

Thermal Characteristics

Parameter	Symbol	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	25	$^{\circ}C/W$
$t \leq 10s$			
Maximum Junction-to-Ambient ^{A,D}	$R_{\theta JA}$	45	$^{\circ}C/W$
Maximum Junction-to-Case, top	$R_{\theta JC}$	0.9	$^{\circ}C/W$
Maximum Junction-to-Case, bottom	$R_{\theta JC}$	1.1	$^{\circ}C/W$

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	80			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =80V, 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	1.3	1.85	2.4	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A T _J =125°C		3.9 7.3	4.7 8.8	mΩ
		V _{GS} =4.5V, I _D =20A		4.6	5.8	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		106		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.7	1	V
I _S	Maximum Body-Diode Continuous Current				119	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =40V, f=1MHz		2800		pF
C _{oss}	Output Capacitance			330		pF
C _{rss}	Reverse Transfer Capacitance			12		pF
R _g	Gate resistance	f=1MHz	0.2	0.6	0.9	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge	V _{GS} =10V, V _{DS} =40V, I _D =20A		42	60	nC
Q _{g(4.5V)}	Total Gate Charge			21	30	nC
Q _{gs}	Gate Source Charge			7.2		nC
Q _{gd}	Gate Drain Charge			8.2		nC
Q _{oss}	Output Charge	V _{GS} =0V, V _{DS} =40V		48		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =40V, R _L =2.0Ω, R _{GEN} =3Ω		8		ns
t _r	Turn-On Rise Time			7		ns
t _{D(off)}	Turn-Off DelayTime			38		ns
t _f	Turn-Off Fall Time			6		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =20A, di/dt=100A/μs		33		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =20A, di/dt=100A/μs		26		nC

- A. The value of R_{θJA} is measured with the device mounted on 1in² 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_{θJA} ≤ 10s and the maximum allowed junction temperature of 175° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175° C may be used if the PCB allows it.
- B. The power dissipation P_D is based on T_{J(MAX)}=175° 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. Single pulse width limited by junction temperature T_{J(MAX)}=175° 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 <300μs 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)}=175° C. The SOA curve provides a single pulse rating.
- G. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

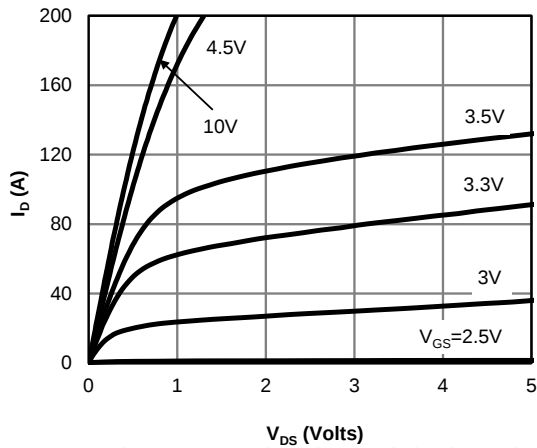


Figure 1: On-Region Characteristics (Note E)

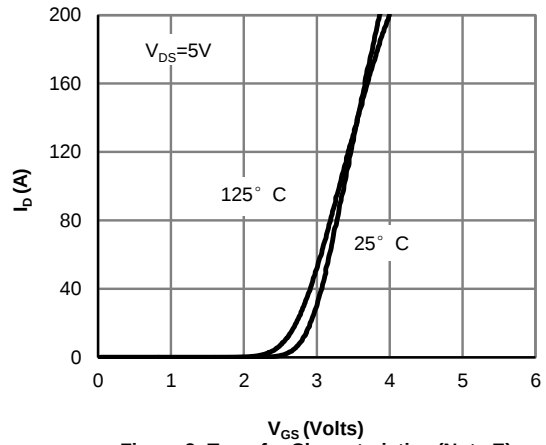


Figure 2: Transfer Characteristics (Note E)

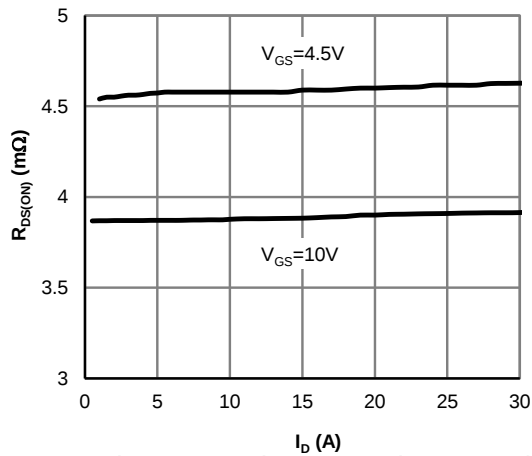


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

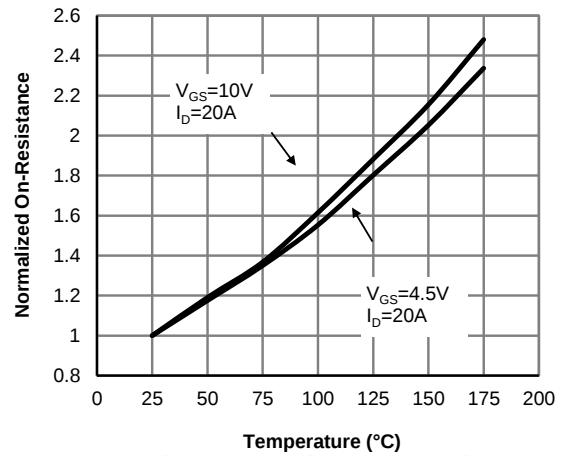


Figure 4: On-Resistance vs. Junction Temperature (Note E)

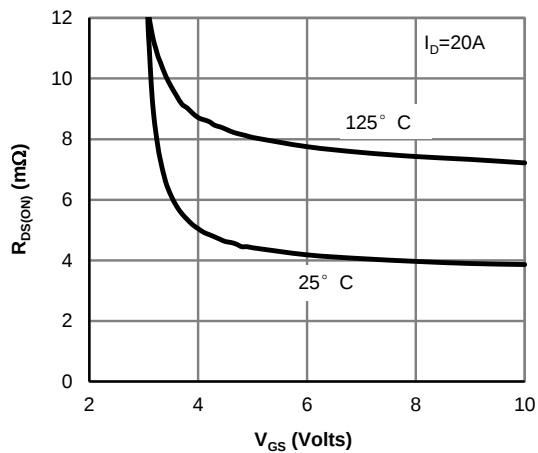


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

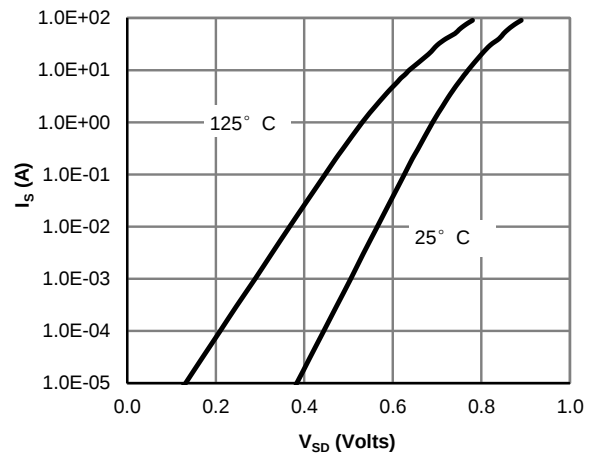


Figure 6: Body-Diode Characteristics (Note E)

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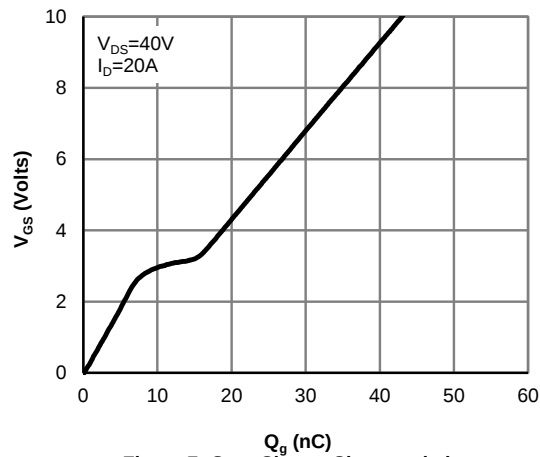


Figure 7: Gate-Charge Characteristics

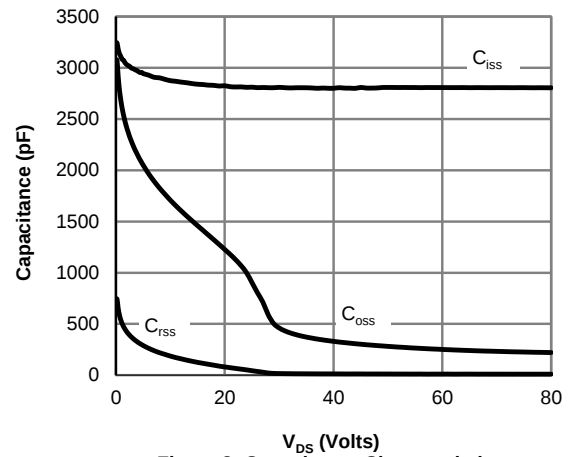


Figure 8: Capacitance Characteristics

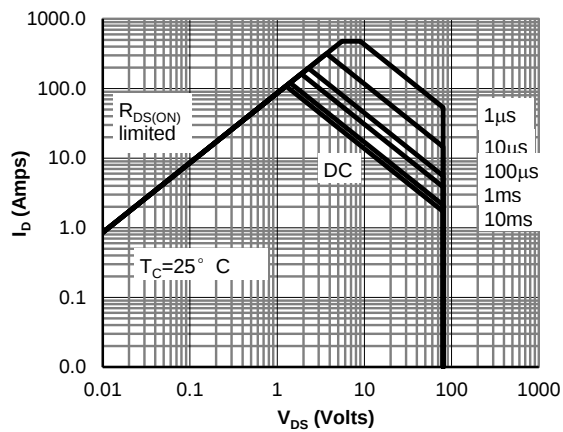


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

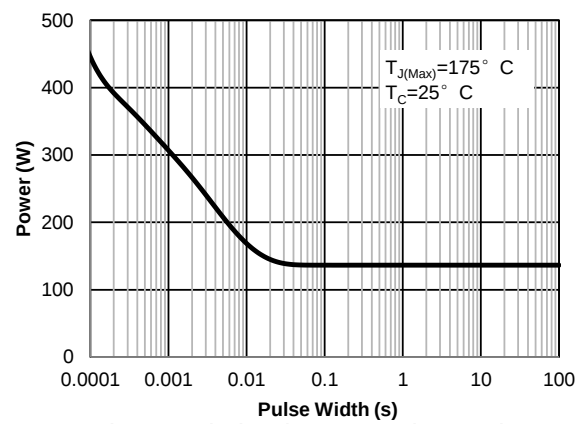


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

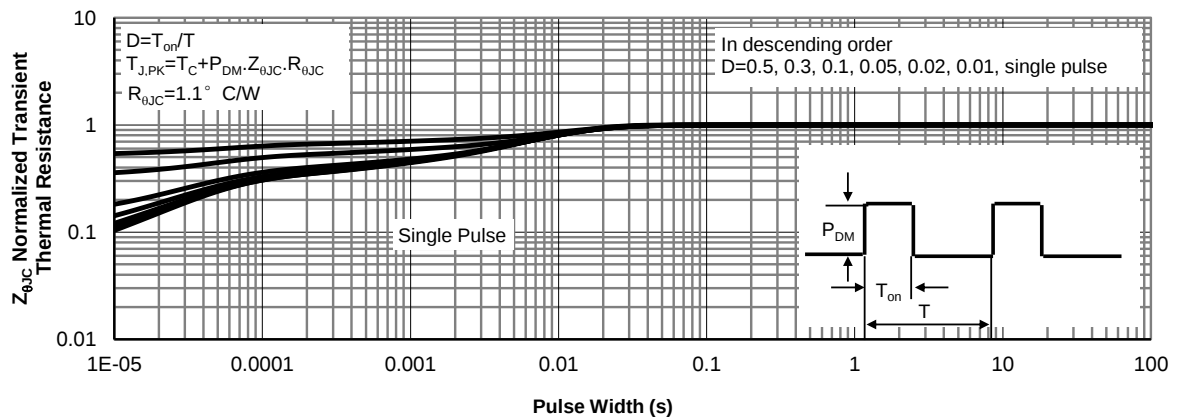
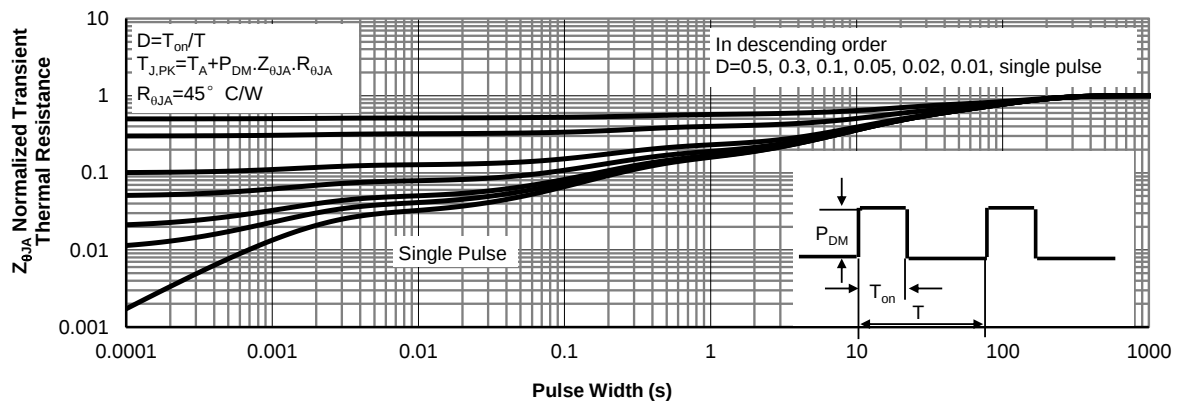
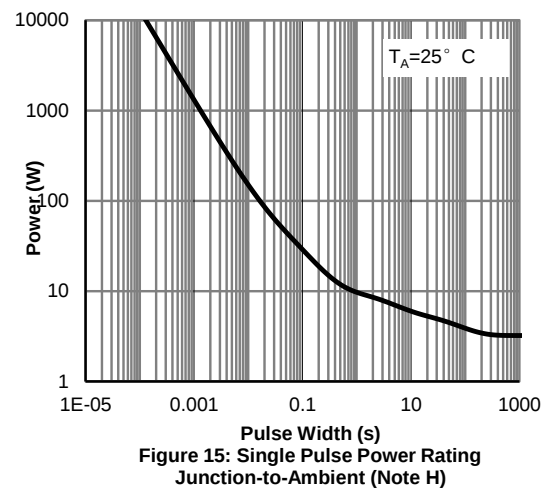
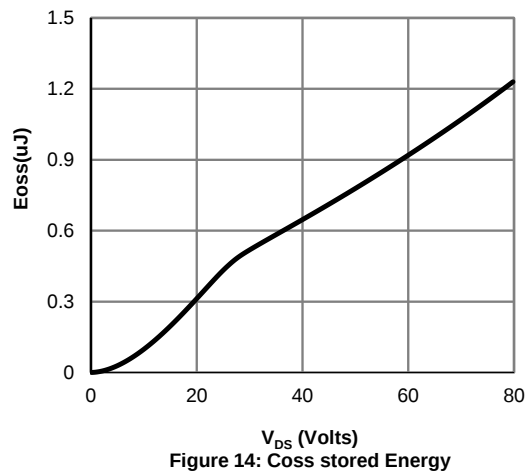
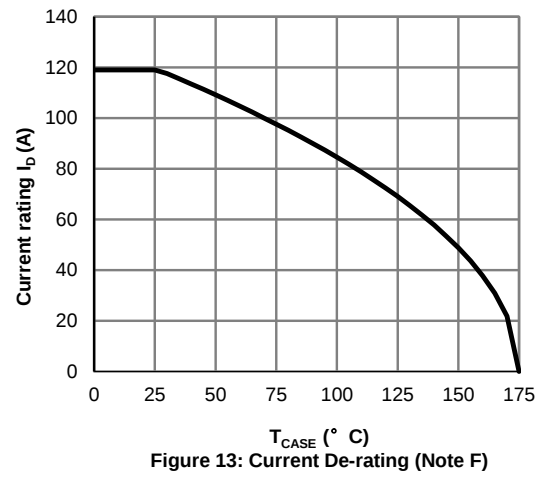
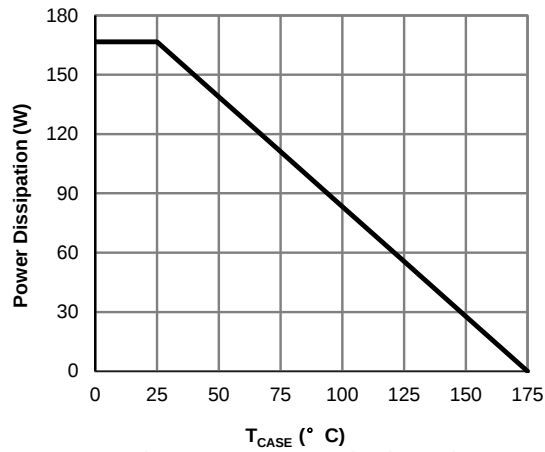


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

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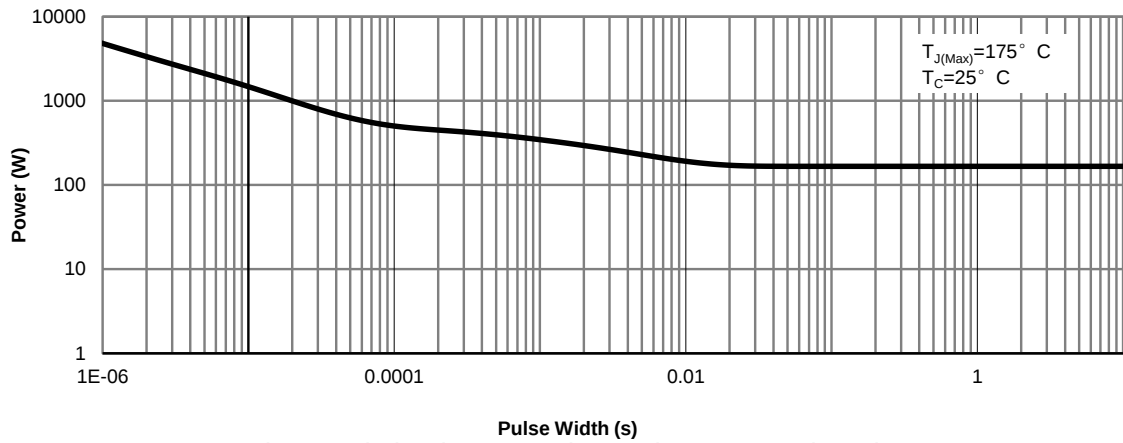


Figure 17: Single Pulse Power Rating Junction-to-Case-Top (Note F)

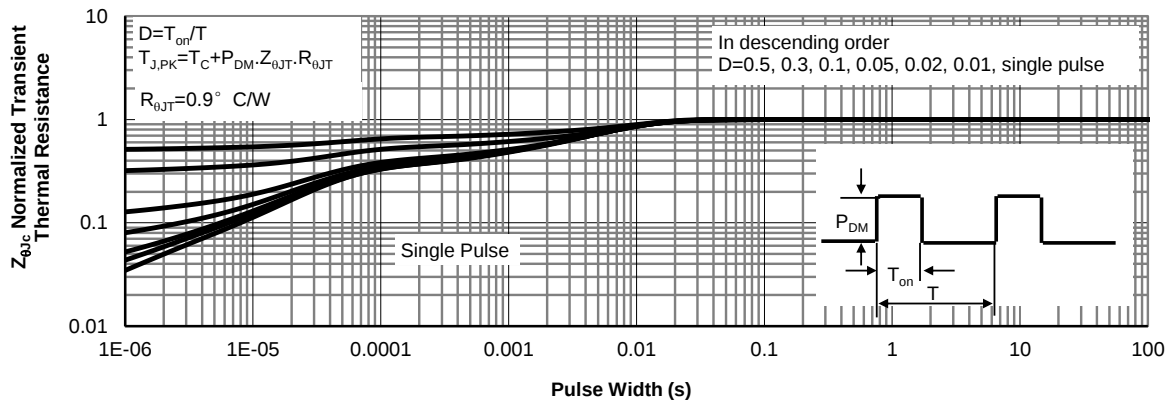


Figure 18: Normalized Maximum Transient Thermal Impedance-Top (Note F)

Figure A: Gate Charge Test Circuit & Waveforms

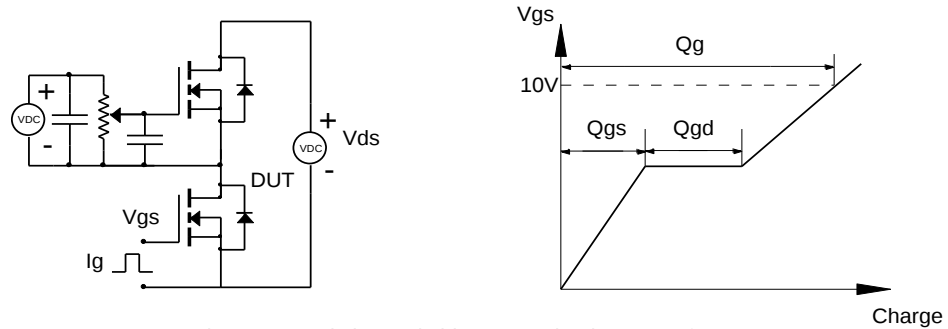


Figure B: Resistive Switching Test Circuit & Waveforms

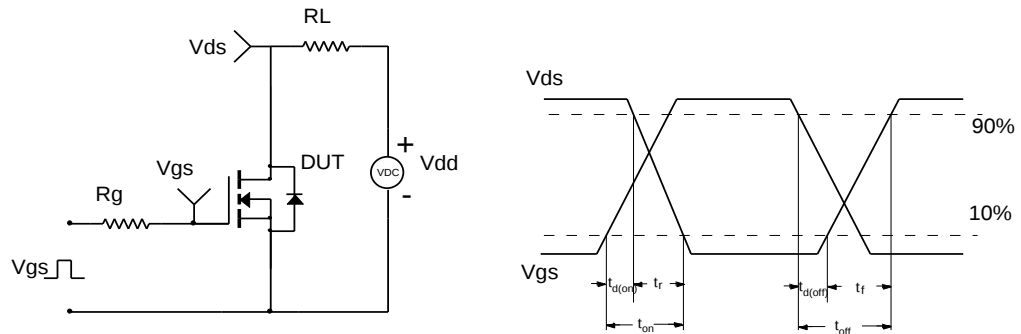


Figure C: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

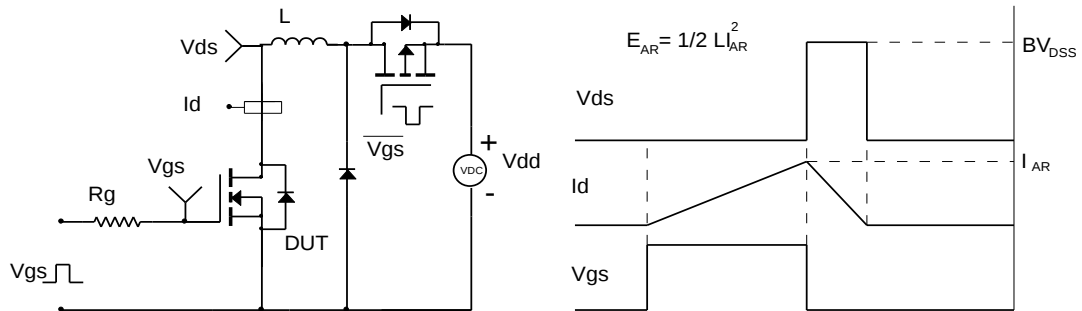


Figure D: Diode Recovery Test Circuit & Waveforms

