AON6411 Datasheet

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DiGi Electronics Part Number	AON6411-DG
Manufacturer	Alpha & Omega Semiconductor Inc.
Manufacturer Product Number	AON6411
Description	MOSFET P-CH 20V 47A/85A 8DFN
Detailed Description	P-Channel 20 V 47A (Ta), 85A (Tc) 7.3W (Ta), 156W (Tc) Surface Mount 8-DFN (5x6)

Tel: +00 852-30501935

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Purchase and inquiry

Manufacturer Product Number:	AON6411	Manufacturer:	Alpha & Omega Semiconductor Inc.
Series:	-	Product Status:	Active
FET Type:	P-Channel	Technology:	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	20 V	Current - Continuous Drain (Id) @ 25°C:	47A (Ta), 85A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	2.5V, 10V	Rds On (Max) @ Id, Vgs:	2.1mOhm @ 20A, 10V
Vgs(th) (Max) @ Id:	1.3V @ 250μA	Gate Charge (Qg) (Max) @ Vgs:	330 nC @ 10 V
Vgs (Max):	±12V	Input Capacitance (Ciss) (Max) @ Vds:	10290 pF @ 10 V
FET Feature:	-	Power Dissipation (Max):	7.3W (Ta), 156W (Tc)
Operating Temperature:	-55°C ~ 150°C (TJ)	Mounting Type:	Surface Mount
Supplier Device Package:	8-DFN (5x6)	Package / Case:	8-PowerSMD, Flat Leads
Base Product Number:	AON641		

Environmental & Export classification

RoHS Status:	ROHS3 Compliant	Moisture Sensitivity Level (MSL):	1 (Unlimited)
REACH Status:	REACH Unaffected	ECCN:	EAR99
HTSUS:	8541.29.0095		

ALPHA & OMEGA
SEMICONDUCTOR

AON6411

20V P-Channel MOSFET

General Description

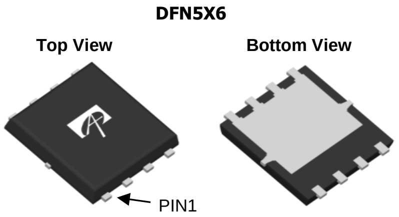
The AON6411 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

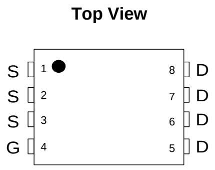
Product Summary

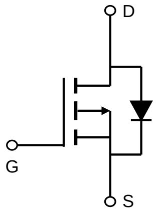
V_{DS}	-20
I_D (at V_{GS}= -10V)	-85A
$R_{DS(ON)}$ (at V_{GS}= -10V)	< 2.1mΩ
$R_{DS(ON)}$ (at V_{GS} =-4.5V)	< 2.5mΩ
$R_{DS(ON)}$ (at V_{GS} =-2.5V)	< 3.6mΩ

100% UIS Tested
100% R_g Tested

Green Product







Absolute Maximum Ratings T_A=25°C unless otherwise noted				
Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current [G]	T_C=25°C	I_D	-85	A
	T_C=100°C		-67	
Pulsed Drain Current [C]		I_{DM}	-340	
Continuous Drain Current	T_A=25°C	I_{DSM}	-47	A
	T_A=70°C		-38	
Avalanche Current [C]		I_{AS}	70	A
Avalanche energy L=0.1mH [C]		E_{AS}	245	mJ
Power Dissipation [B]	T_C=25°C	P_D	156	W
	T_C=100°C		62.5	
Power Dissipation [A]	T_A=25°C	P_{DSM}	7.3	W
	T_A=70°C		4.7	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics					
Parameter		**Symbol**	**Typ**	**Max**	**Units**
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{θJA}$	14	17	°C/W
Maximum Junction-to-Ambient [A D]	Steady-State		40	55	°C/W
Maximum Junction-to-Case	Steady-State	$R_{θJC}$	0.6	0.8	°C/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	-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}=±12V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=$V_{GS,}$ I_D=-250µA	-0.5	-0.85	-1.3	V
$I_{D(ON)}$	On state drain current	V_{GS}=-10V, V_{DS}=-5V	-340			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-20A		1.7	2.1	mΩ
		T_J=125°C		2.45	3	
		V_{GS}=-4.5V, I_D=-20A		2	2.5	mΩ
		V_{GS}=-2.5V, I_D=-20A		2.8	3.6	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-20A		115		S
V_{SD}	Diode Forward Voltage	I_S=-1A,V_{GS}=0V		-0.57	-1	V
I_S	Maximum Body-Diode Continuous Current ^{G}				-85	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-10V, f=1MHz		10290		pF
C_{oss}	Output Capacitance			1910		pF
C_{rss}	Reverse Transfer Capacitance			1395		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		2.1	4.2	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=-10V, V_{DS}=-10V, I_D=-20A		235	330	nC
Q_g(4.5V)	Total Gate Charge			100	140	nC
Q_{gs}	Gate Source Charge			21		nC
Q_{gd}	Gate Drain Charge			36		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-10V, V_{DS}=-10V, R_L=0.5Ω, R_{GEN}=3Ω		9		ns
t_r	Turn-On Rise Time			18		ns
$t_{D(off)}$	Turn-Off DelayTime			282		ns
t_f	Turn-Off Fall Time			90		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-20A, dI/dt=500A/µs		48		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-20A, dI/dt=500A/µs		178		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 $_{\theta JA}$ 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 used 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. Ratings are based on low frequency and duty cycles to keep initial T_J =25° C.Maximum UIS current limited by test equipment.
D. The $R_{\theta JA}$ is the sum of the thermal impedance 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 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. The maximum current rating is package limited.
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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

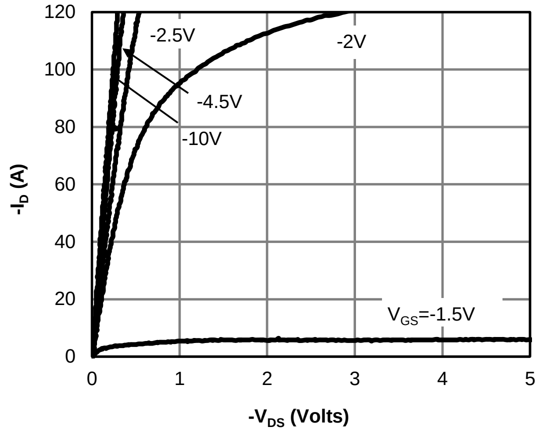


Fig 1: On-Region Characteristics (Note E)

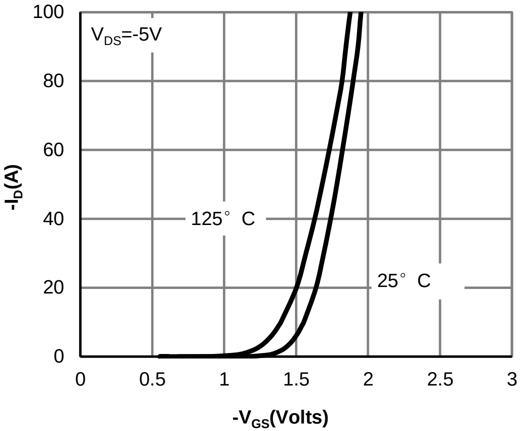


Figure 2: Transfer Characteristics (Note E)

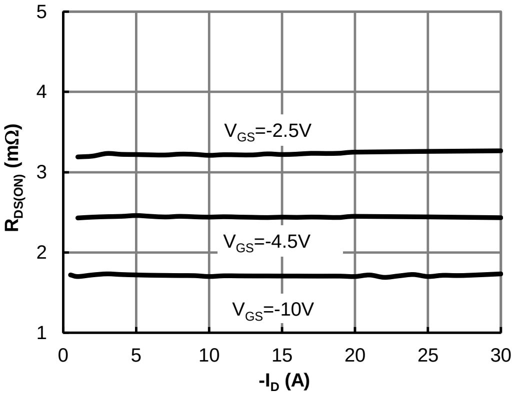


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

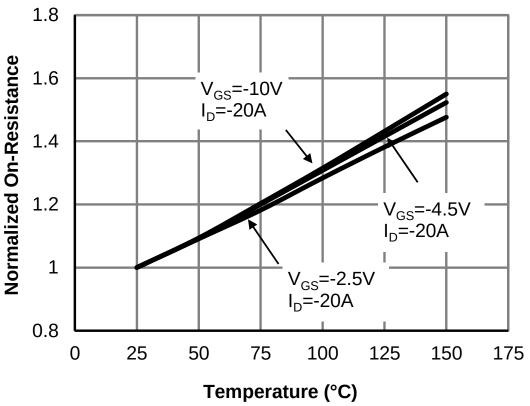


Figure 4: On-Resistance vs. Junction Temperature (Note E)

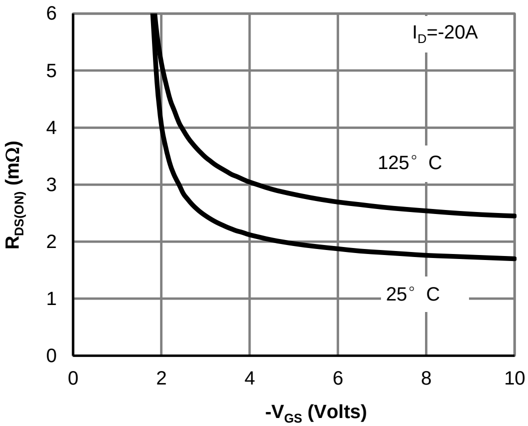


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

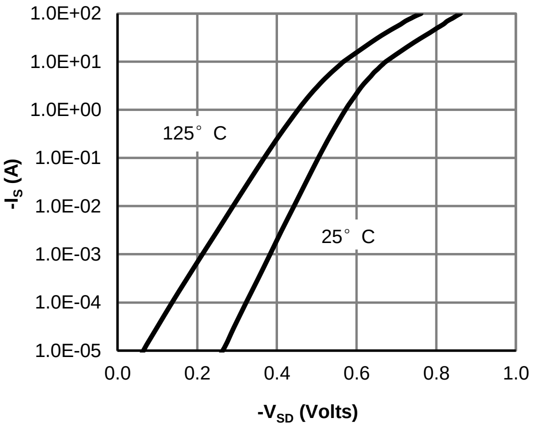


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

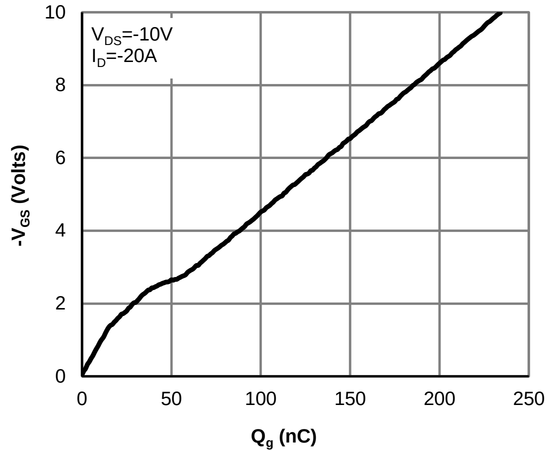


Figure 7: Gate-Charge Characteristics

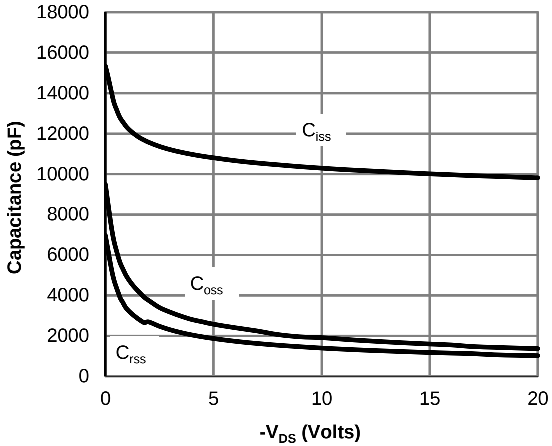


Figure 8: Capacitance Characteristics

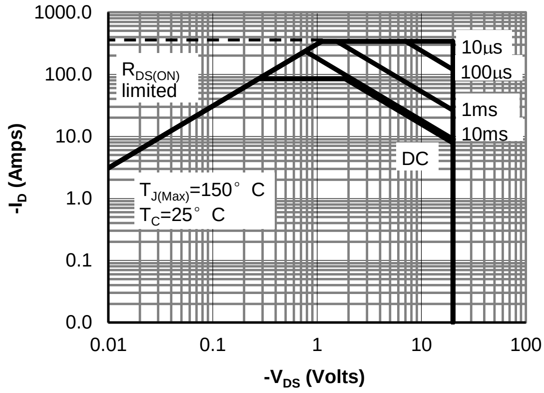


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

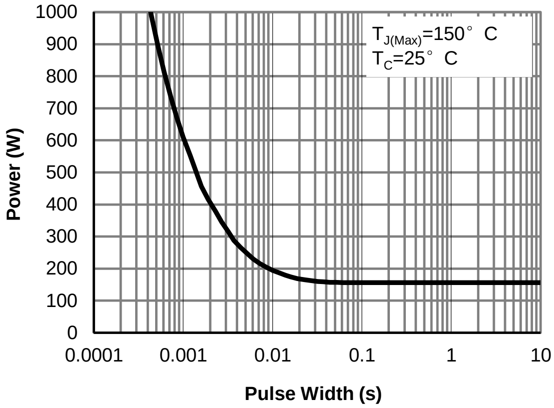


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

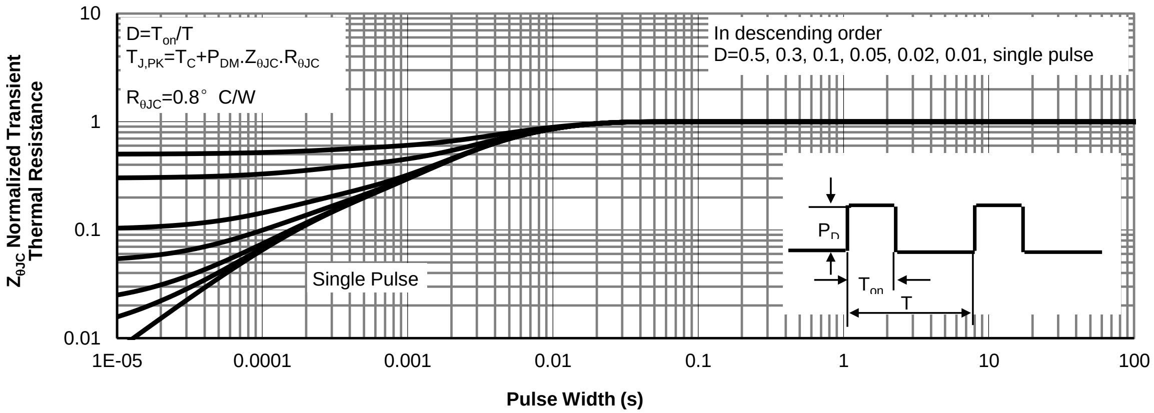


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

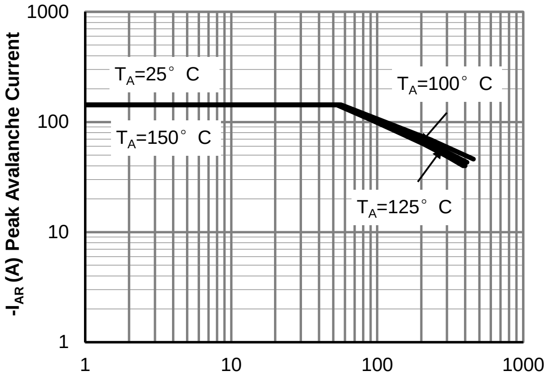


Figure 12: Single Pulse Avalanche capability (Note C)

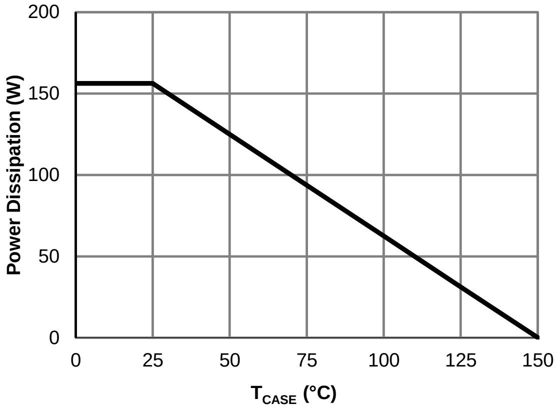


Figure 13: Power De-rating (Note F)

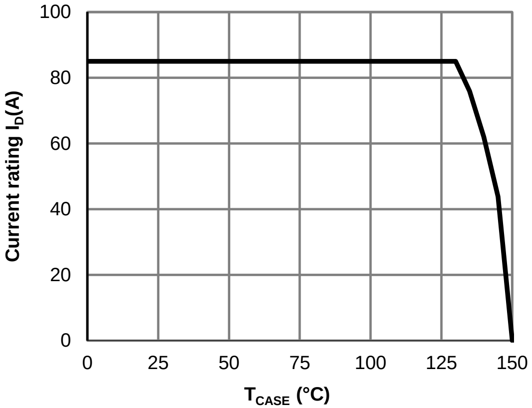


Figure 14: Current De-rating (Note F)

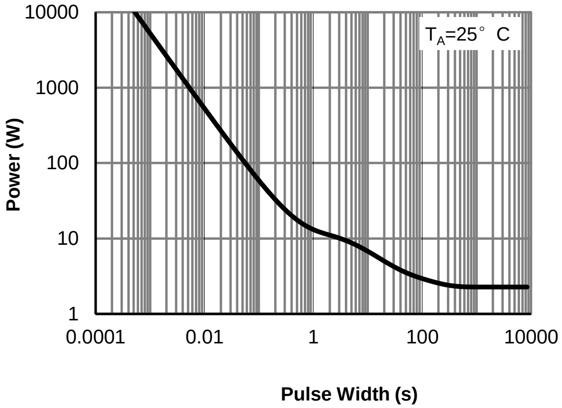


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

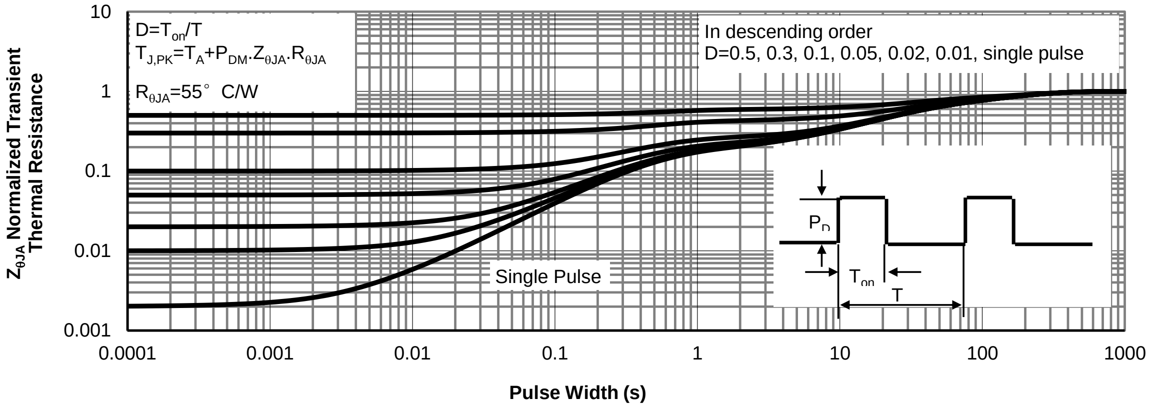
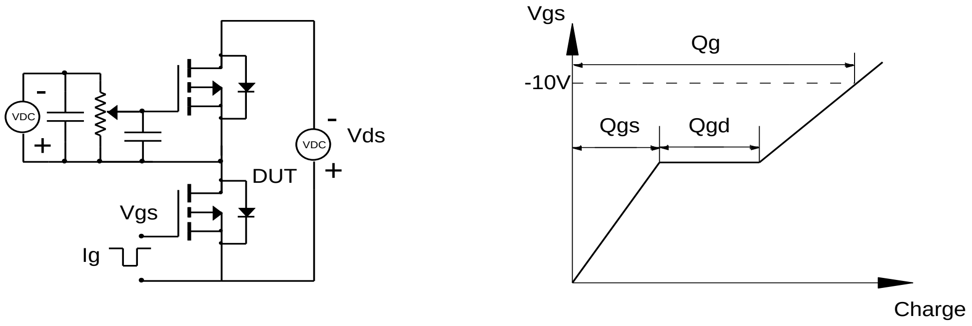
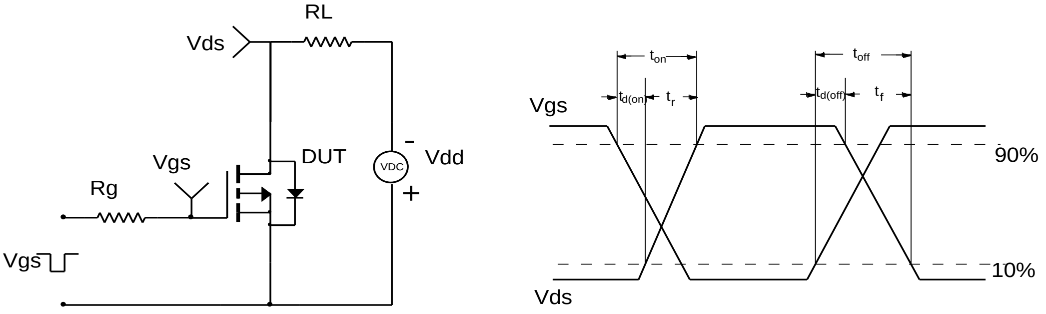


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

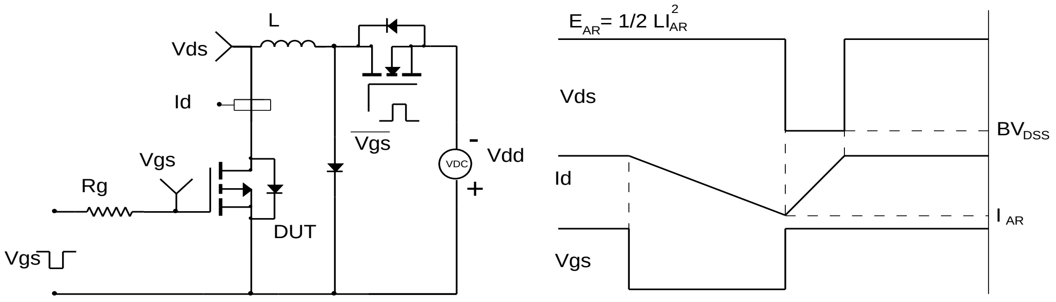
Gate Charge Test Circuit & Waveform



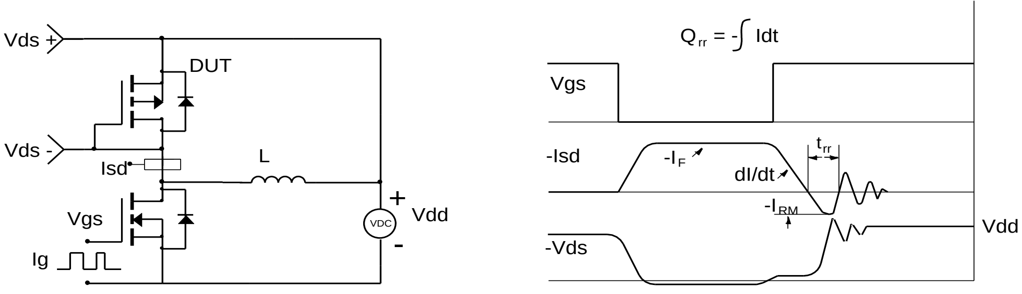
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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CERTIFICATE OF INCORPORATION

I hereby certify that

DIGI ELECTRONICS HK LIMITED

is this day incorporated in Hong Kong under the Companies Ordinance (Chapter 622 of the Laws of Hong Kong), and that this company is a limited company.

Registrar of Companies
Hong Kong Special Administrative Region

MEMBERSHIP
Certificate

The Aviation Suppliers Association has certified as a Regular Member

DIGI ELECTRONICS HK LIMITED

Michele Dickstein
President

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