AOT482L/AOB482L

80V N-Channel MOSFET

SDMOS^{TM}

General Description

The AOT482L/AOB482L is fabricated with SDMOS^{TM} trench technology that combines excellent $R_{DS(ON)}$ with low gate charge and low Q_{rr}.The result is outstanding efficiency with controlled switching behavior. This universal technology is well suited for PWM, load switching and general purpose applications.

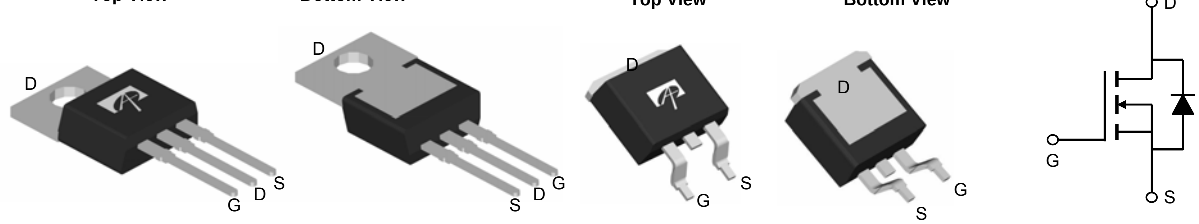
Product Summary

V_{DS}	80V
I_D (at V_{GS}=10V)	105A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 7.2mΩ
$R_{DS(ON)}$ (at V_{GS} = 7V)	< 9mΩ

100% UIS Tested
100% R_g Tested

TO220 | TO-263 D^{2}PAK

Top View | Bottom View | Top View | Bottom View



Absolute Maximum Ratings T_A=25°C unless otherwise noted				
Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	80	V
Gate-Source Voltage		V_{GS}	±25	V
Continuous Drain Current G	T_C=25°C	I_D	105	A
	T_C=100°C		82	
Pulsed Drain Current C		I_{DM}	330	
Continuous Drain Current	T_A=25°C	I_{DSM}	11	A
	T_A=70°C		9	
Avalanche Current C		I_{AS}, I_{AR}	82	A
Avalanche energy L=0.1mH C		E_{AS}, E_{AR}	336	mJ
Power Dissipation B	T_C=25°C	P_D	333	W
	T_C=100°C		167	
Power Dissipation A	T_A=25°C	P_{DSM}	2.1	W
	T_A=70°C		1.3	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C

Thermal Characteristics					
Parameter		**Symbol**	**Typ**	**Max**	**Units**
Maximum Junction-to-Ambient A	t ≤ 10s	$R_{\theta JA}$	11	15	°C/W
Maximum Junction-to-Ambient A D	Steady-State		47	60	°C/W
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	0.36	0.45	°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		80			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=80V, V_{GS}=0V				10	µA
			T_J=55°C			50	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±25V				100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250µA		2.5	3.1	3.7	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V		330			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A			5.9	7.2	mΩ
		TO220	T_J=125°C		11	13	
		V_{GS}=7V, I_D=20A TO220			6.8	9	mΩ
		V_{GS}=10V, I_D=20A TO263			5.6	6.9	mΩ
		V_{GS}=7V, I_D=20A TO263			6.5	8.7	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A			50		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V			0.64	1	V
I_S	Maximum Body-Diode Continuous Current[G]					105	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=40V, f=1MHz		3240	4054	4870	pF
C_{oss}	Output Capacitance			320	458	600	pF
C_{rss}	Reverse Transfer Capacitance			95	160	225	pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		0.2	0.45	0.7	Ω
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=40V, I_D=20A		53	66.8	81	nC
Q_{gs}	Gate Source Charge			16	20.8	25	nC
Q_{gd}	Gate Drain Charge			12	20.2	30	nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=40V, R_L=2Ω, R_{GEN}=3Ω			26		ns
t_r	Turn-On Rise Time				18		ns
$t_{D(off)}$	Turn-Off DelayTime				48		ns
t_f	Turn-Off Fall Time				21		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, dI/dt=500A/µs		18	26	34	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, dI/dt=500A/µs		75	108	140	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 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. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=175°C. Ratings are based on low frequency and duty cycles to keep initial T_J =25°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 $T_{J(MAX)}$=175°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.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

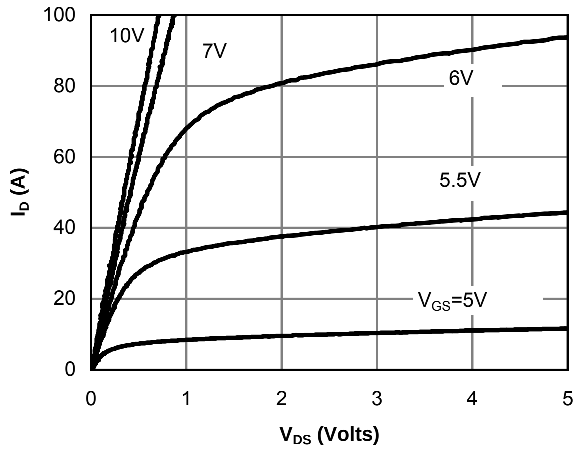


Fig 1: On-Region Characteristics (Note E)

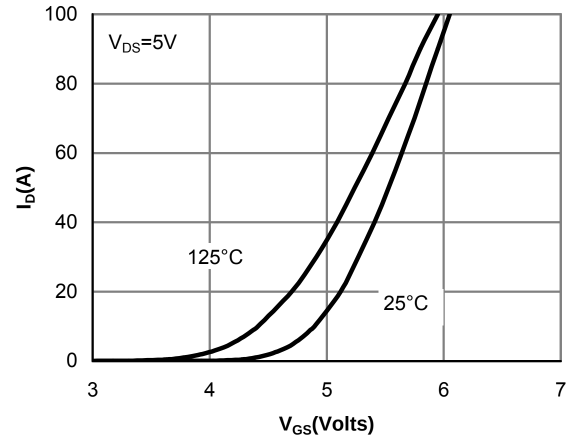


Figure 2: Transfer Characteristics (Note E)

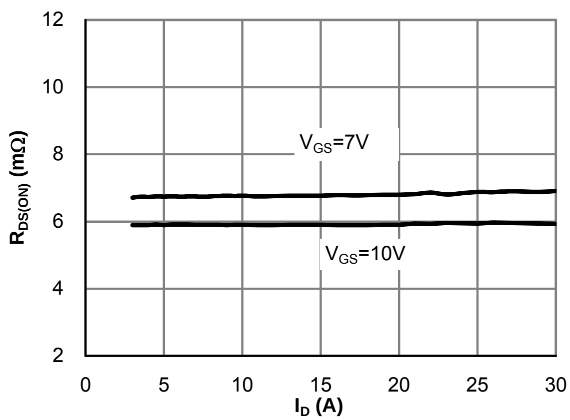


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

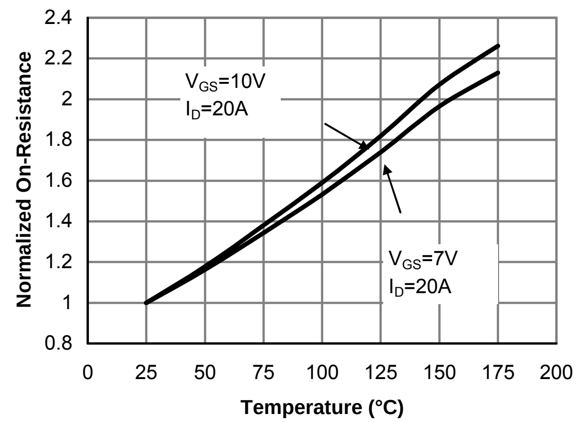


Figure 4: On-Resistance vs. Junction Temperature (Note E)

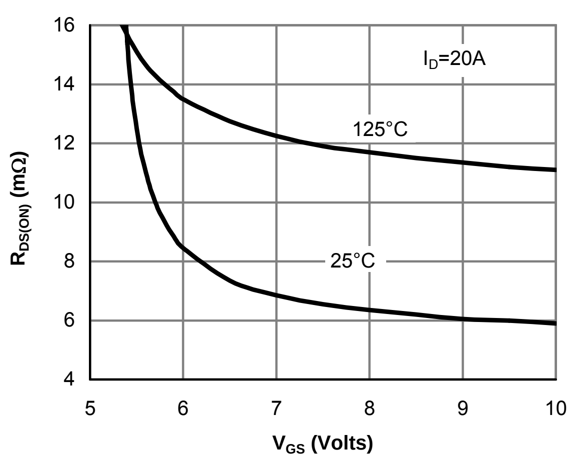


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

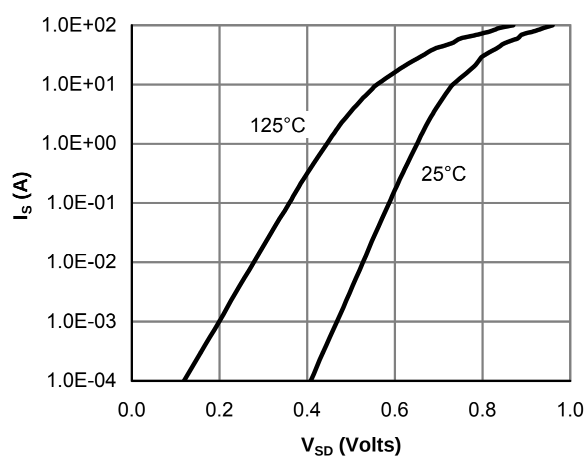


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

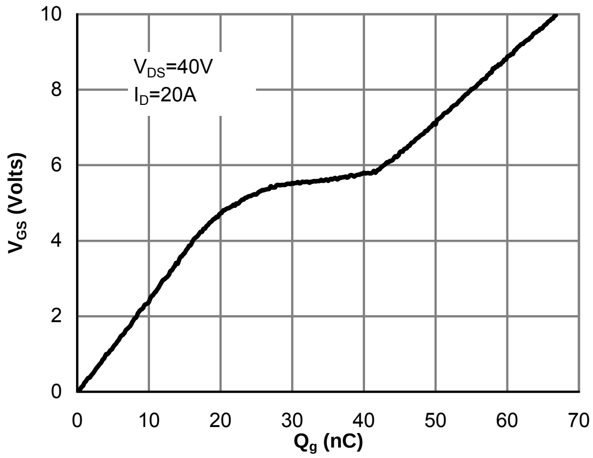


Figure 7: Gate-Charge Characteristics

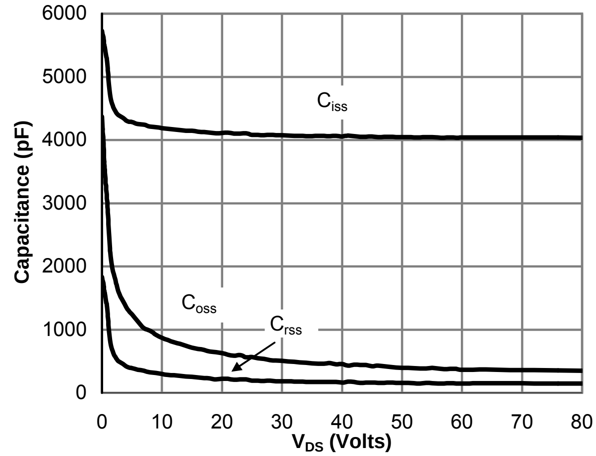


Figure 8: Capacitance Characteristics

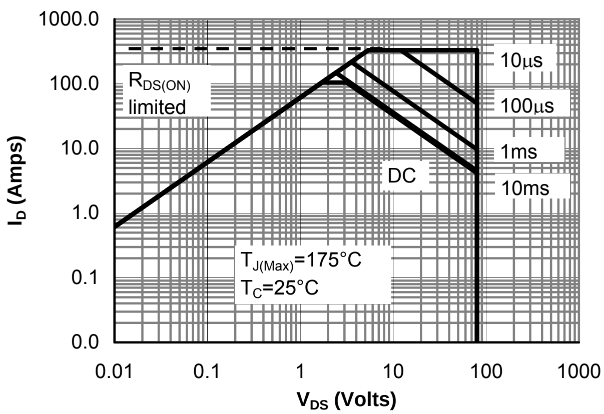


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

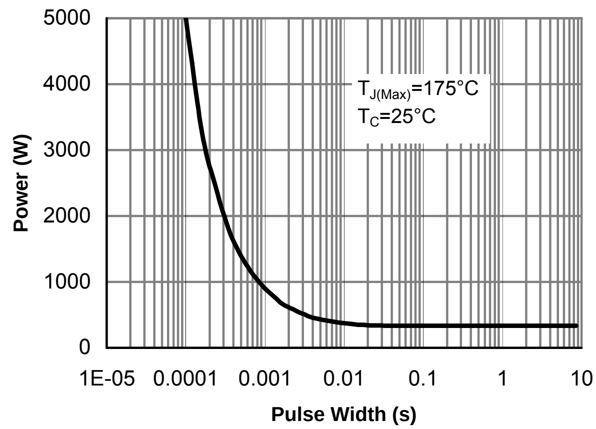


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

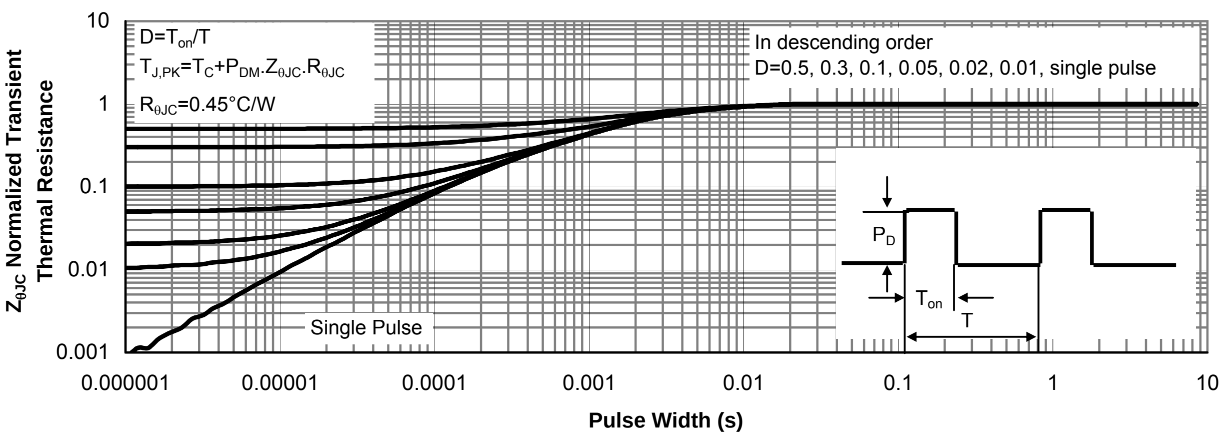


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

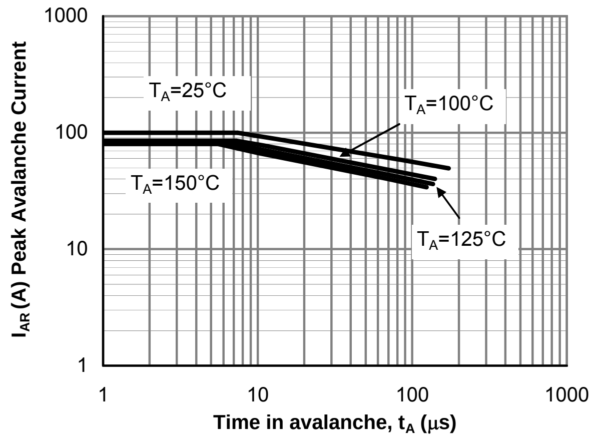


Figure 12: Single Pulse Avalanche capability (Note C)

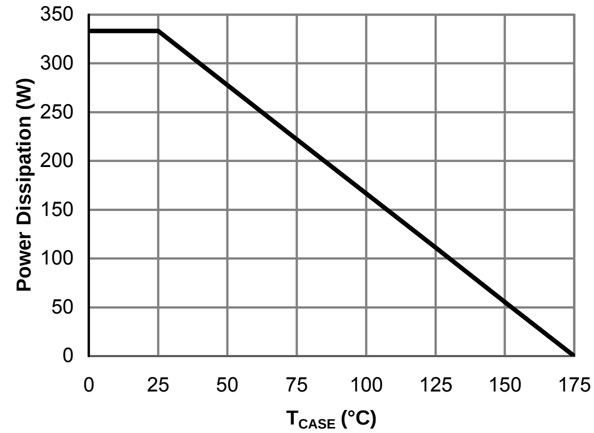


Figure 13: Power De-rating (Note F)

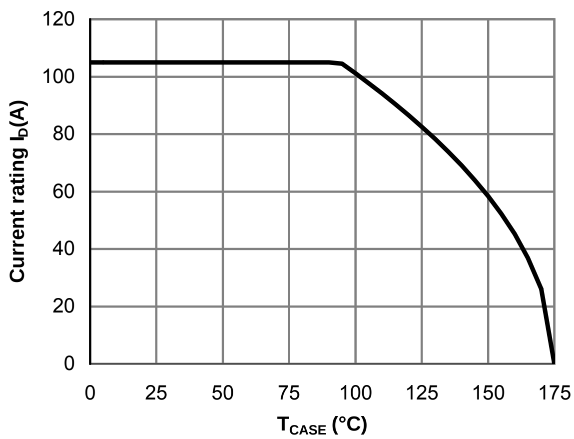


Figure 14: Current De-rating (Note F)

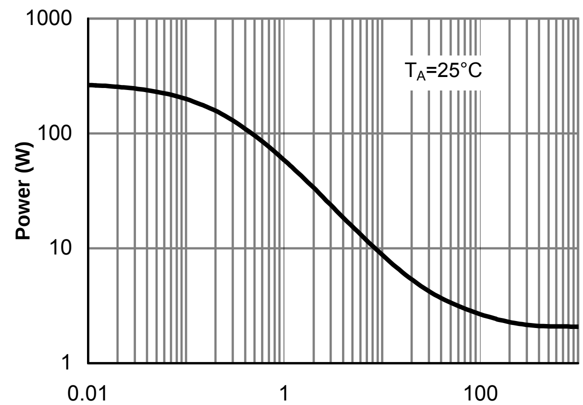


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

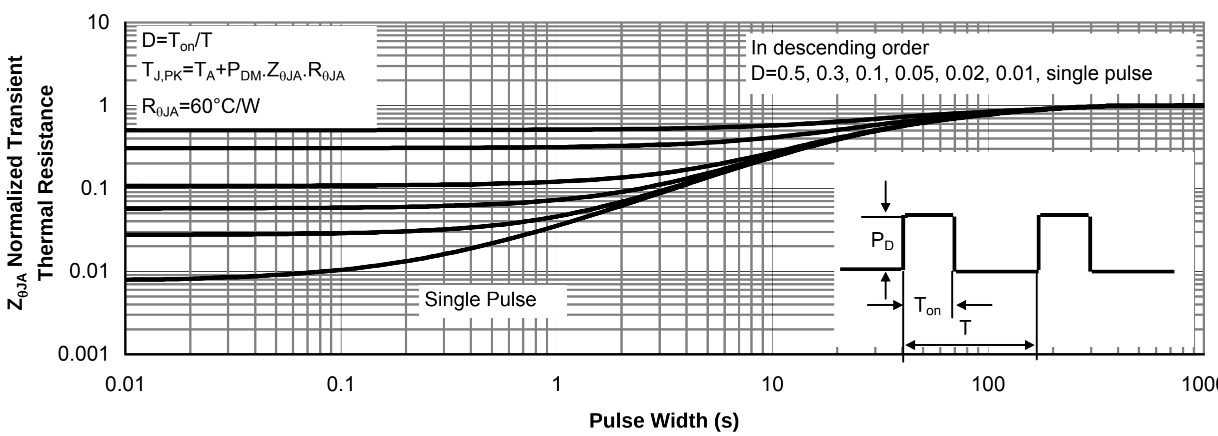


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

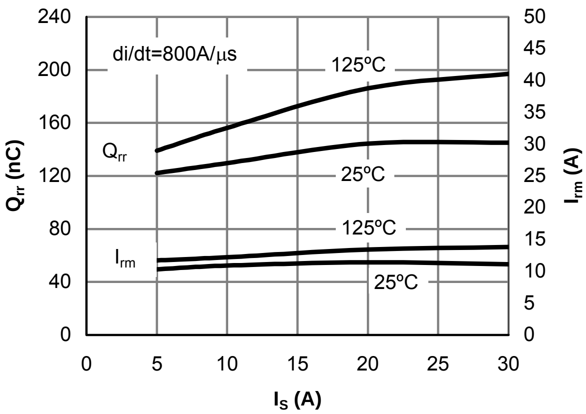


Figure 17: Diode Reverse Recovery Charge and Peak Current vs. Conduction Current

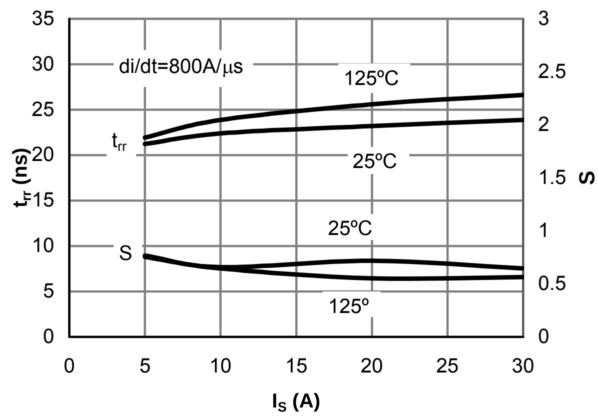


Figure 18: Diode Reverse Recovery Time and Softness Factor vs. Conduction Current

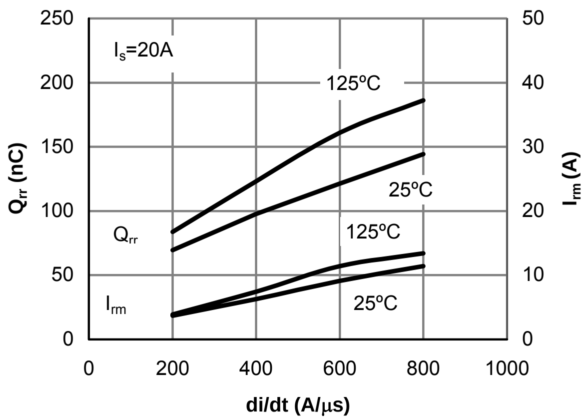


Figure 19: Diode Reverse Recovery Charge and Peak Current vs. di/dt

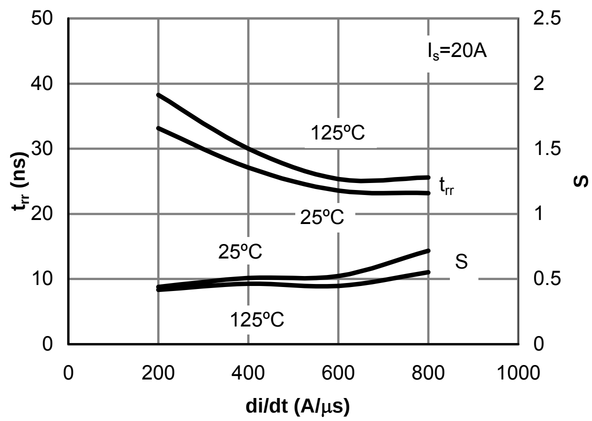
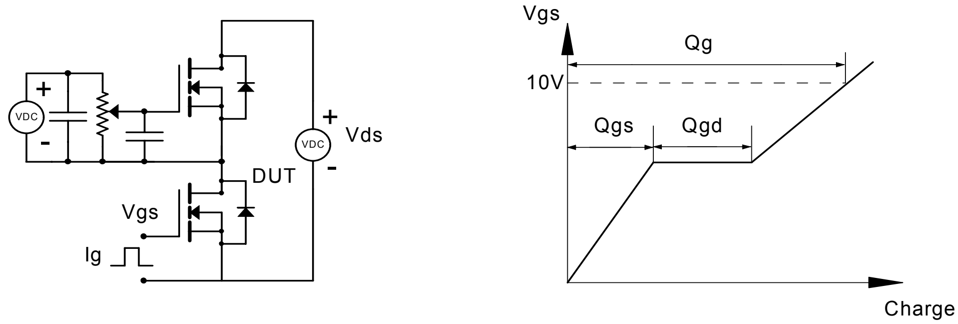
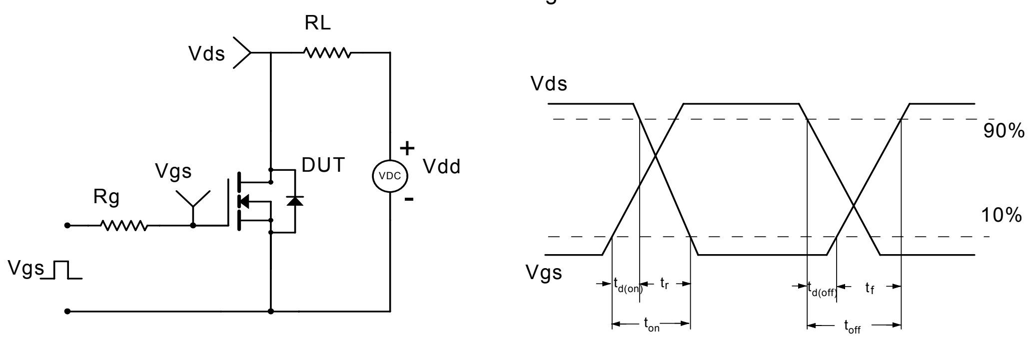


Figure 20: Diode Reverse Recovery Time and Softness Factor vs. di/dt

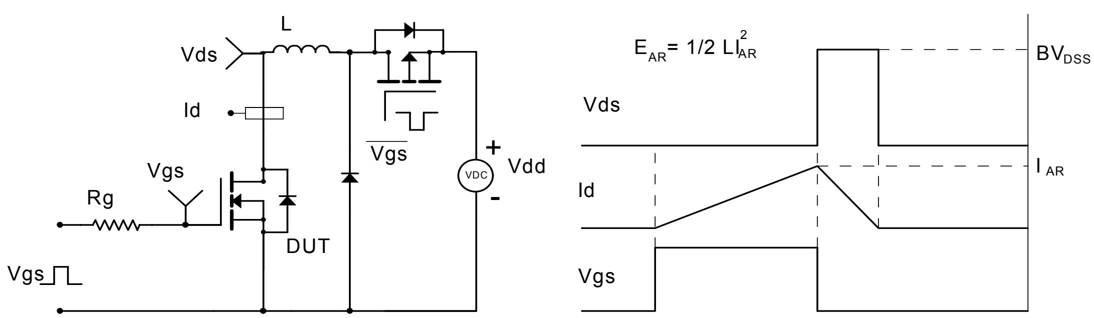
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms