
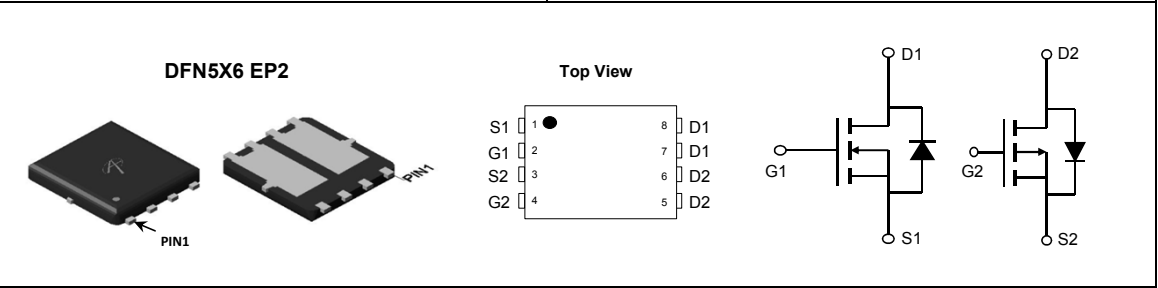


<p>General Description</p> <ul style="list-style-type: none"> • Pch+Nch Complementary MOSFET • Trench Power MOSFET • Low $R_{DS(ON)}$ • Low Gate Charge • Excellent Thermal Performance • RoHS and Halogen Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Motor Drive • DC-FAN 	<p>Product Summary</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>Q1</u></th> <th style="text-align: center;"><u>Q2</u></th> </tr> </thead> <tbody> <tr> <td>V_{DS}</td> <td style="text-align: center;">30V</td> <td style="text-align: center;">-30V</td> </tr> <tr> <td>I_D (at $V_{GS}=10V$)</td> <td style="text-align: center;">16A</td> <td style="text-align: center;">-16A</td> </tr> <tr> <td>$R_{DS(ON)}$ (at $V_{GS}=10V$)</td> <td style="text-align: center;">< 14mΩ</td> <td style="text-align: center;">< 12mΩ</td> </tr> <tr> <td>$R_{DS(ON)}$ (at $V_{GS}=4.5V$)</td> <td style="text-align: center;">< 18mΩ</td> <td style="text-align: center;">< 19.5mΩ</td> </tr> </tbody> </table> <p>100% UIS Tested 100% Rg Tested</p> <div style="text-align: right;">  </div>		<u>Q1</u>	<u>Q2</u>	V_{DS}	30V	-30V	I_D (at $V_{GS}=10V$)	16A	-16A	$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 14m Ω	< 12m Ω	$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 18m Ω	< 19.5m Ω
	<u>Q1</u>	<u>Q2</u>														
V_{DS}	30V	-30V														
I_D (at $V_{GS}=10V$)	16A	-16A														
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 14m Ω	< 12m Ω														
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 18m Ω	< 19.5m Ω														



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AOND32324	DFN 5x6	Tape & Reel	3000

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

Parameter	Symbol	Max Q1	Max Q2	Units
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	± 20	± 25	V
Continuous Drain Current ^G	I_D	$T_C=25^\circ\text{C}$ 16	$T_C=25^\circ\text{C}$ -16	A
Current ^G		$T_C=100^\circ\text{C}$ 16	$T_C=100^\circ\text{C}$ -16	
Pulsed Drain Current ^C	I_{DM}	50	-65	A
Continuous Drain Current	I_{DSM}	$T_A=25^\circ\text{C}$ 13	$T_A=25^\circ\text{C}$ -15	A
Current		$T_A=70^\circ\text{C}$ 10	$T_A=70^\circ\text{C}$ -12	
Avalanche Current ^C	I_{AS}	22	33	A
Avalanche energy	E_{AS}	24	54	mJ
Power Dissipation ^B	P_D	$T_C=25^\circ\text{C}$ 12.5	$T_C=25^\circ\text{C}$ 30	W
		$T_C=100^\circ\text{C}$ 5	$T_C=100^\circ\text{C}$ 12	
Power Dissipation ^A	P_{DSM}	$T_A=25^\circ\text{C}$ 3.5	$T_A=25^\circ\text{C}$ 4.1	W
		$T_A=70^\circ\text{C}$ 2.2	$T_A=70^\circ\text{C}$ 2.6	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150		°C

Thermal Characteristics

Parameter	Symbol	Typ Q1	Typ Q2	Max Q1	Max Q2	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	$t \leq 10s$ 25	$t \leq 10s$ 20	$t \leq 10s$ 35	$t \leq 10s$ 30	°C/W
Maximum Junction-to-Ambient ^{A,B}		Steady-State 50	Steady-State 48	Steady-State 70	Steady-State 65	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	7	3.5	10	4.2	°C/W

Q1 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 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	1.5	1.9	2.5	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =12A T _J =125°C		11 16	14 20	mΩ
		V _{GS} =4.5V, I _D =10A		14	18	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =12A		43		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.75	1	V
I _S	Maximum Body-Diode Continuous Current				10	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		760		pF
C _{oss}	Output Capacitance			125		pF
C _{rss}	Reverse Transfer Capacitance			70		pF
R _g	Gate resistance	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 =12A		14	20	nC
Q _g (4.5V)	Total Gate Charge			6.6	10	nC
Q _{gs}	Gate Source Charge			2.4		nC
Q _{gd}	Gate Drain Charge			3		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =1.25Ω, 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 =12A, di/dt=500A/μs		7		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =12A, di/dt=500A/μs		8		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 150° C. The value in any given application depends on the user's specific board design.

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. Single 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 <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 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

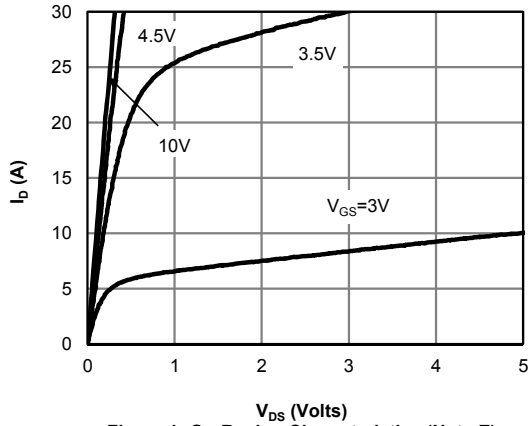


Figure 1: On-Region Characteristics (Note E)

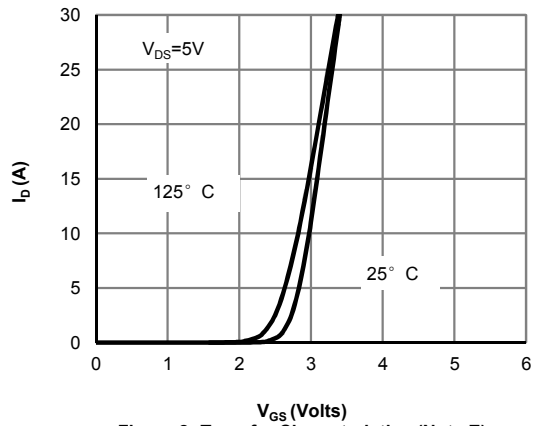


Figure 2: Transfer Characteristics (Note E)

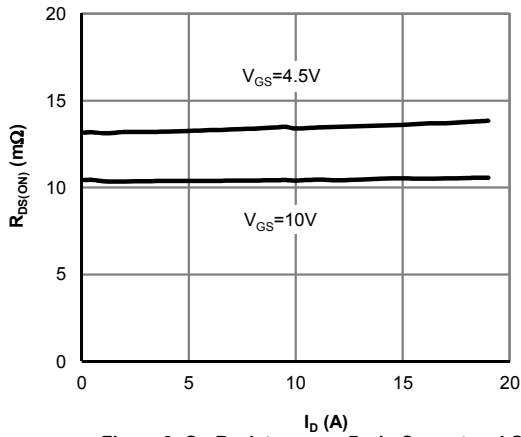


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

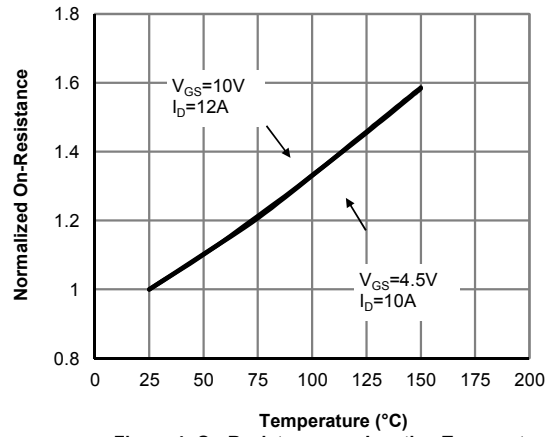


Figure 4: On-Resistance vs. Junction Temperature (Note E)

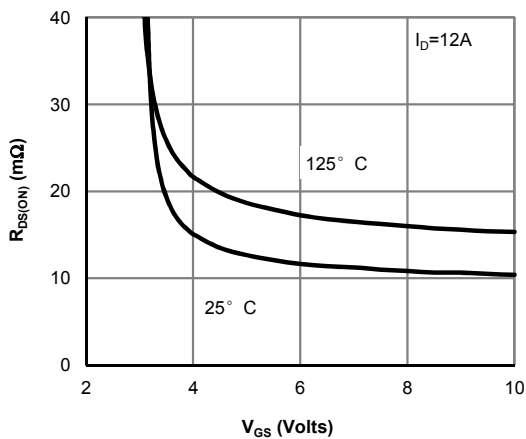


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

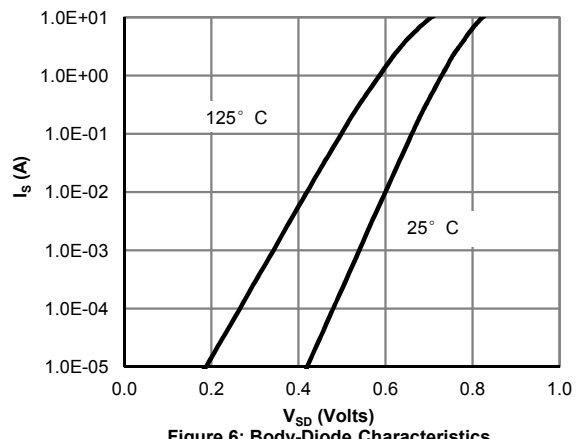


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

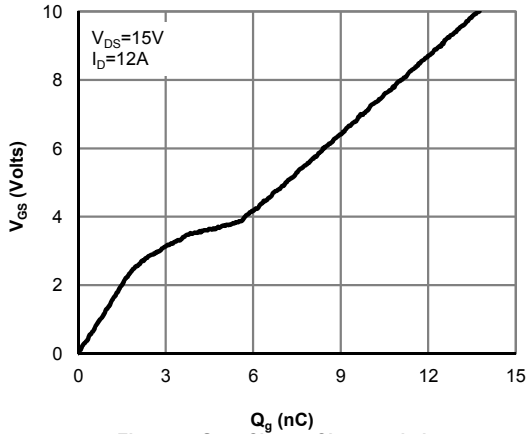


Figure 7: Gate-Charge Characteristics

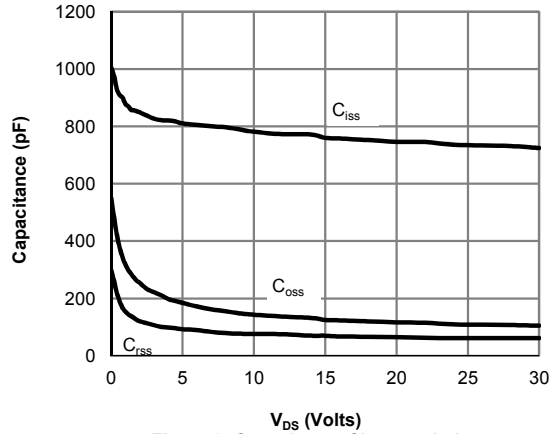


Figure 8: Capacitance Characteristics

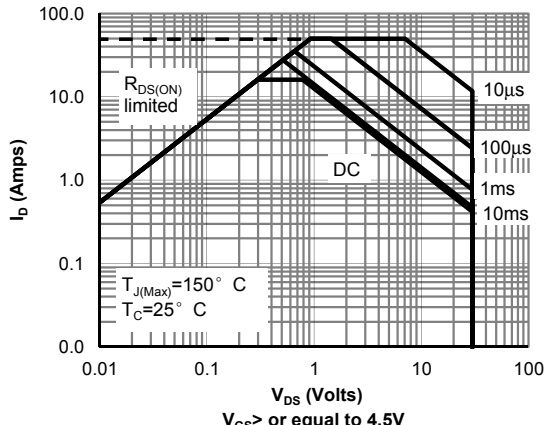


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

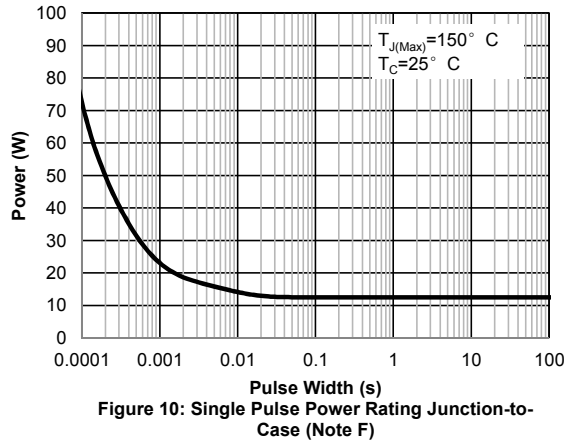


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

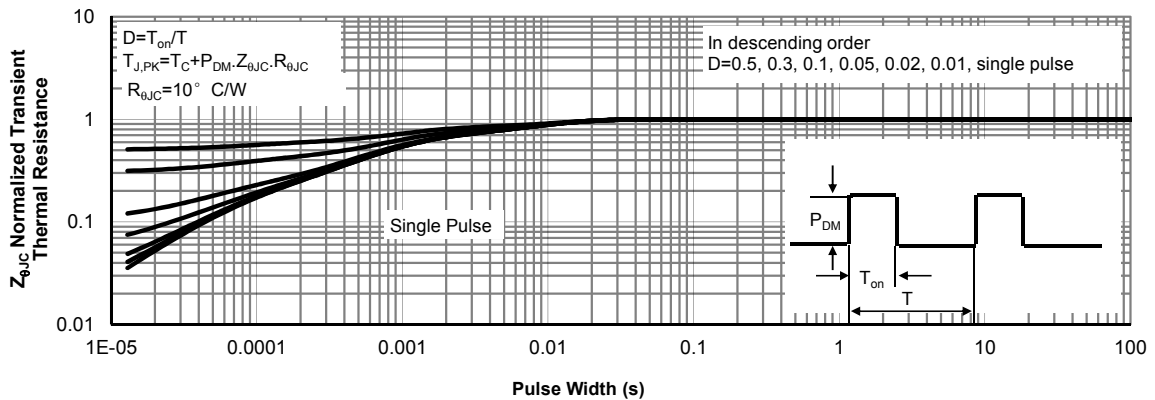


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

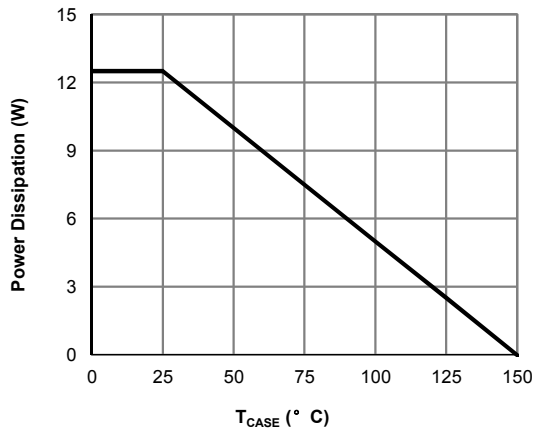


Figure 12: Power De-rating (Note F)

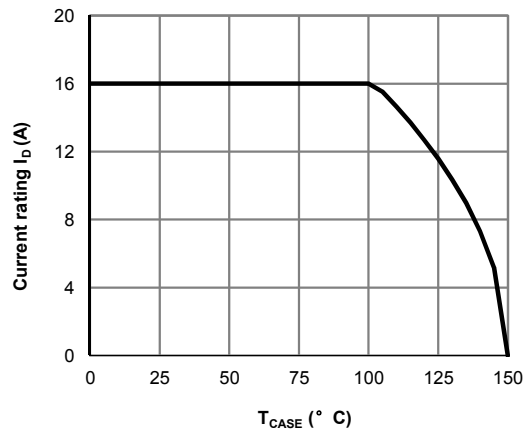


Figure 13: Current De-rating (Note F)

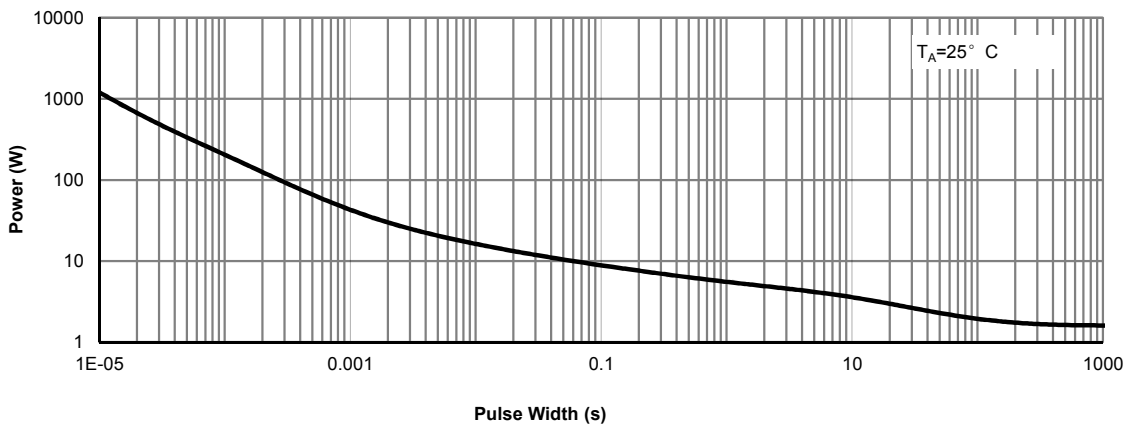


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

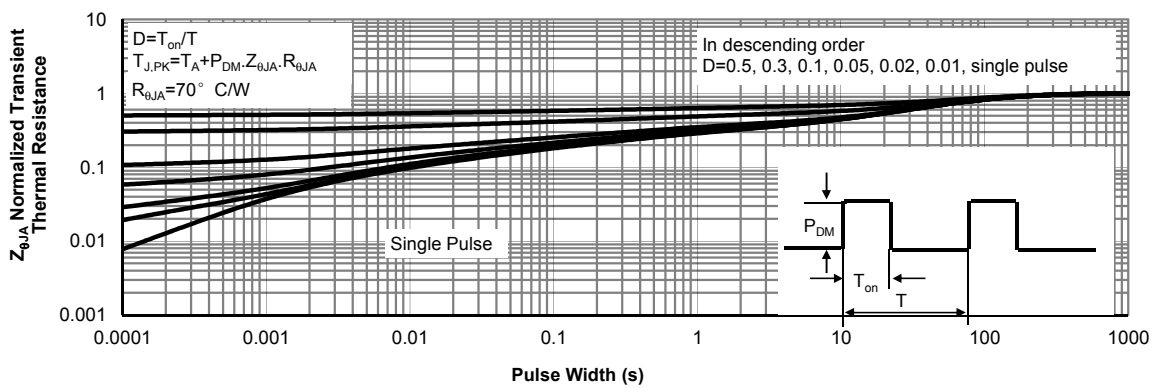


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

Q2 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 T _J =55°C			-1 -5	μA
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	-1.3	-1.8	-2.3	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-16A T _J =125°C		10 14	12 16.8	mΩ
		V _{GS} =-4.5V, I _D =-12A		15.4	19.5	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-16A		43		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.7	-1	V
I _S	Maximum Body-Diode Continuous Current ^G				-16	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz		1995		pF
C _{oss}	Output Capacitance			300		pF
C _{riss}	Reverse Transfer Capacitance			260		pF
R _g	Gate resistance	f=1MHz		4.5	9	Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-16A		35	50	nC
Q _g (4.5V)	Total Gate Charge			17	25	nC
Q _{gs}	Gate Source Charge			5.7		nC
Q _{gd}	Gate Drain Charge			8.8		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-10V, V _{DS} =-15V, R _L =0.9Ω, R _{GEN} =3Ω		11		ns
t _r	Turn-On Rise Time			7.5		ns
t _{D(off)}	Turn-Off DelayTime			43.5		ns
t _f	Turn-Off Fall Time			17.5		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-16A, di/dt=500A/μs		13.3		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-16A, di/dt=500A/μs		20		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 150° C. The value in any given application depends on the user's specific board design.

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. Single 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 <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 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

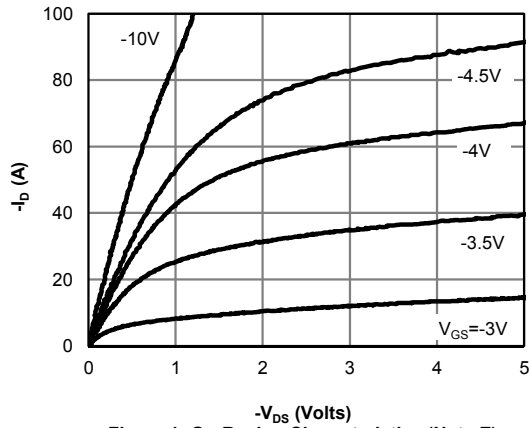


Figure 1: On-Region Characteristics (Note E)

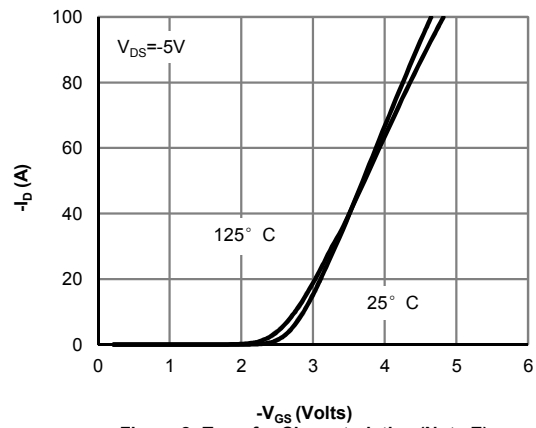


Figure 2: Transfer Characteristics (Note E)

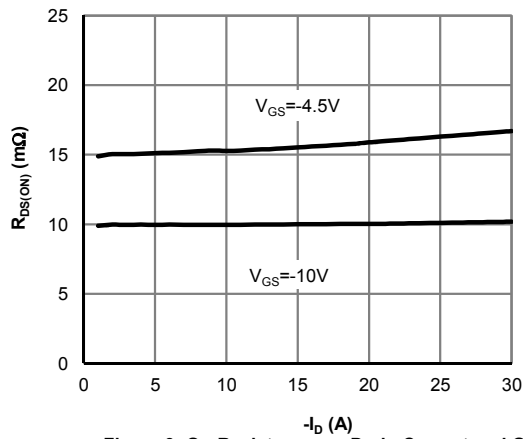


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

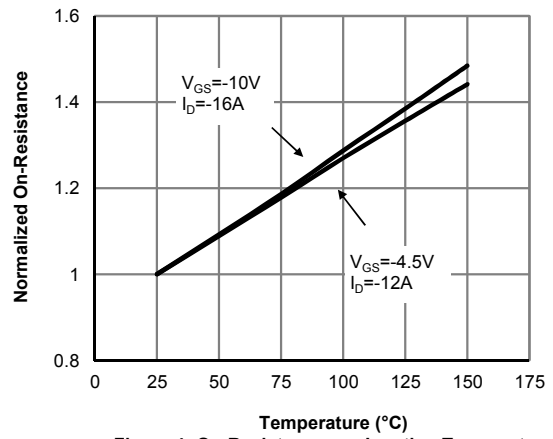


Figure 4: On-Resistance vs. Junction Temperature (Note E)

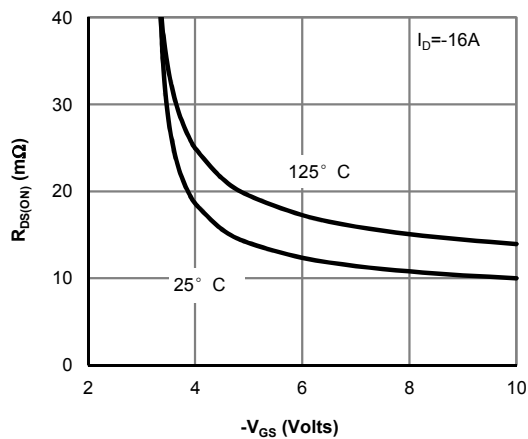


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

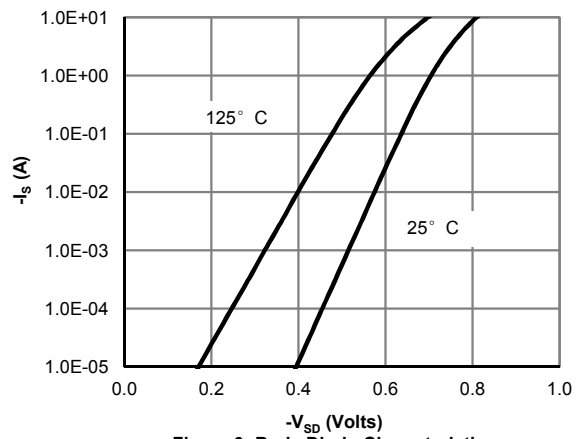


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

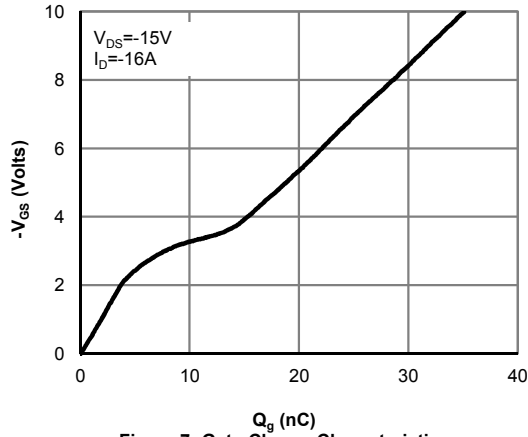


Figure 7: Gate-Charge Characteristics

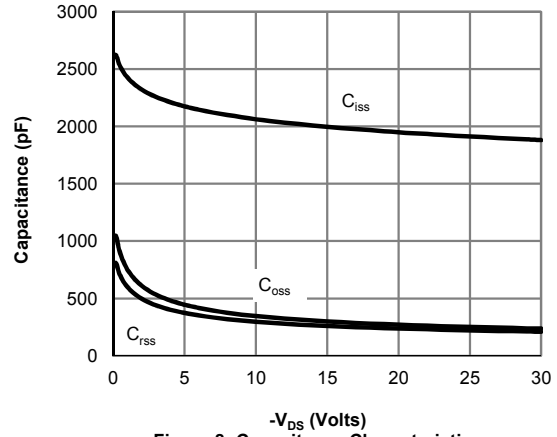


Figure 8: Capacitance Characteristics

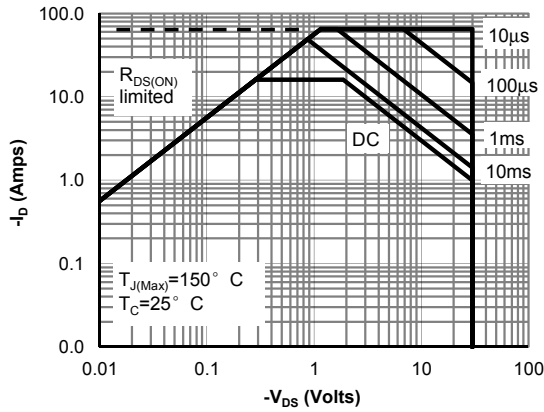


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

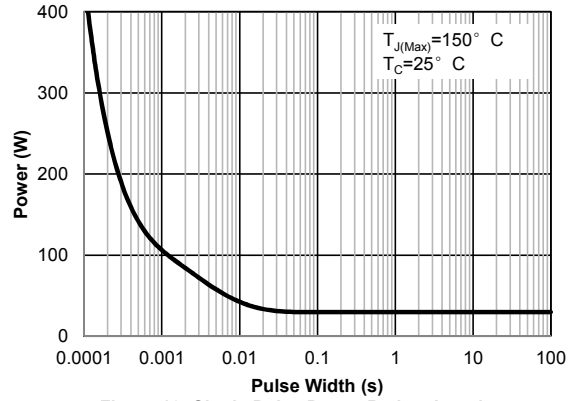


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

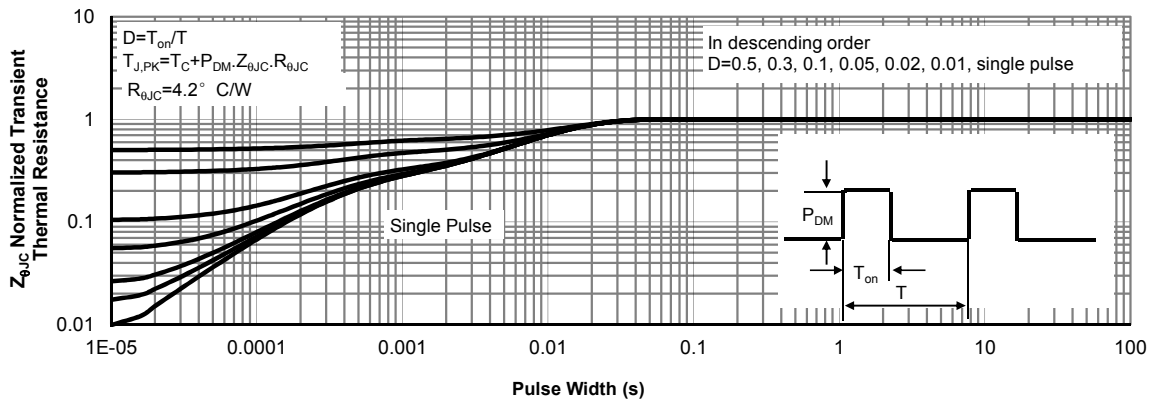


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

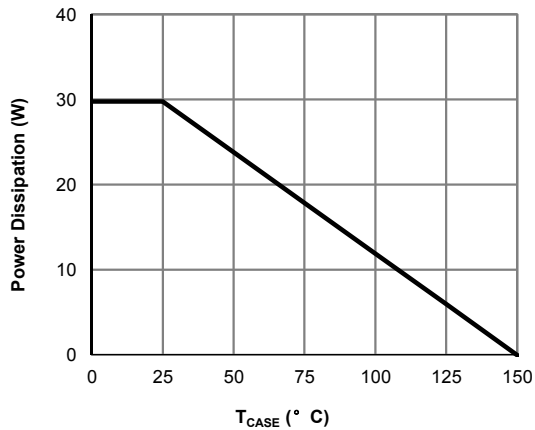


Figure 12: Power De-rating (Note F)

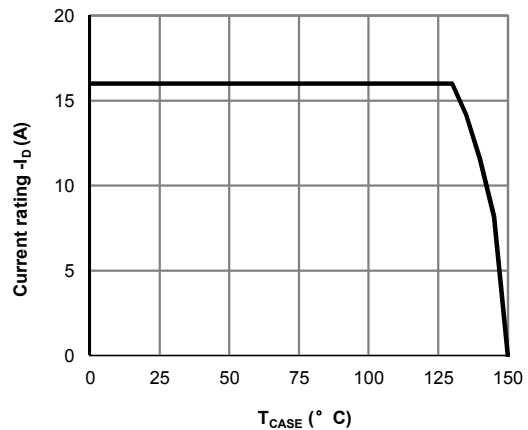


Figure 13: Current De-rating (Note F)

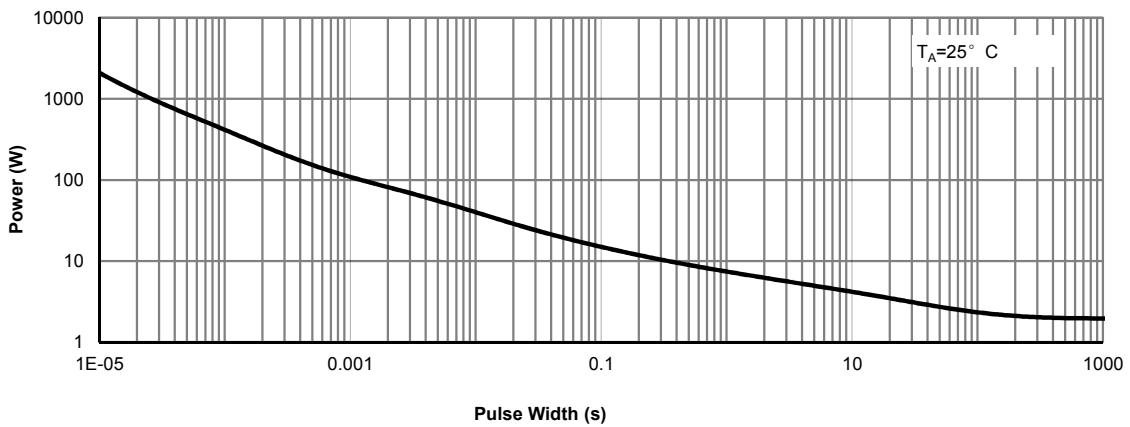


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

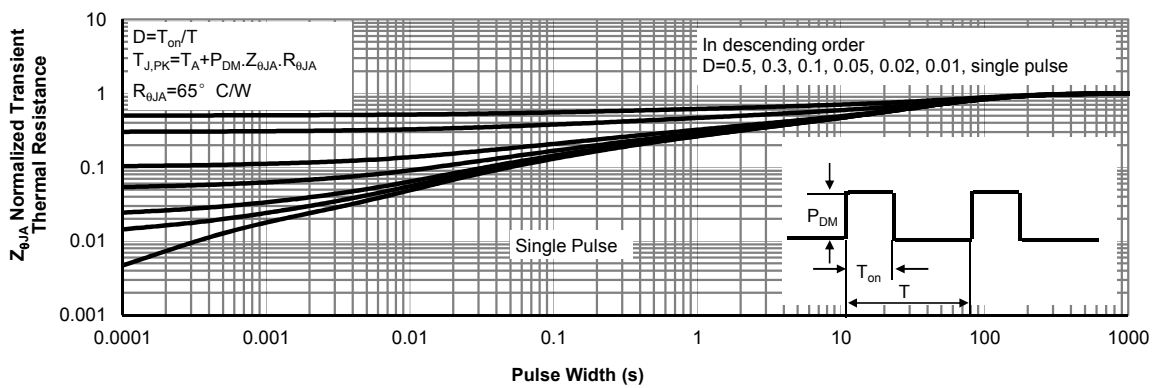


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

Figure A: Gate Charge Test Circuit & Waveforms

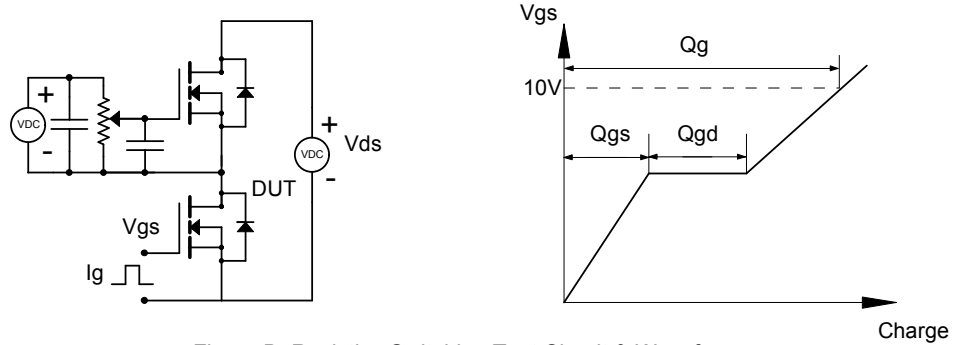


Figure B: Resistive Switching Test Circuit & Waveforms

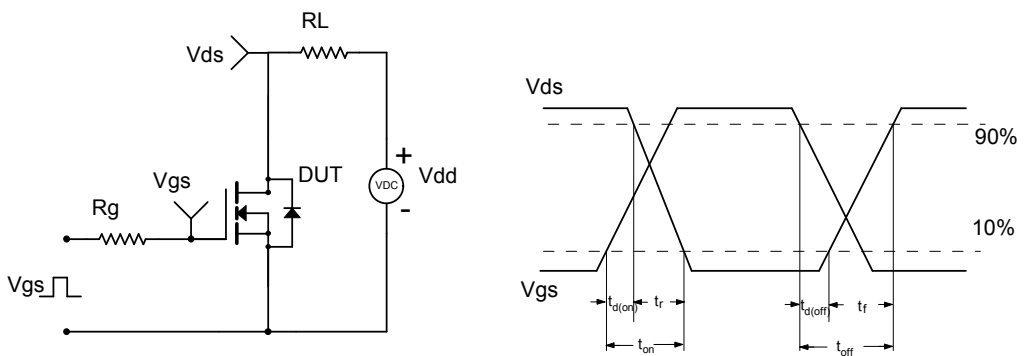


Figure C: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

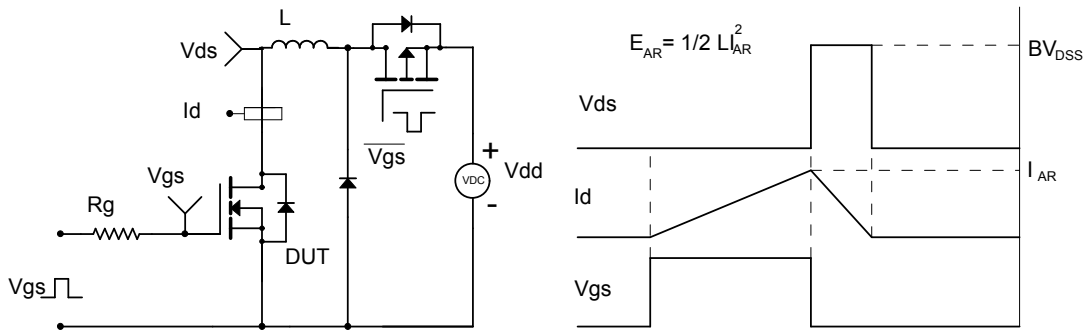
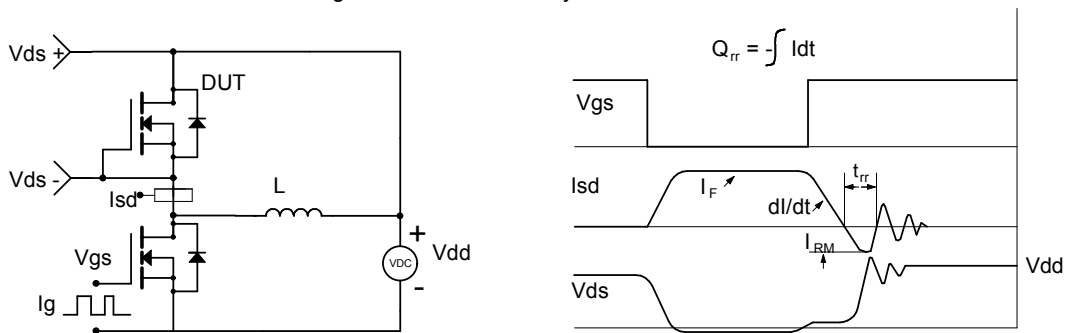
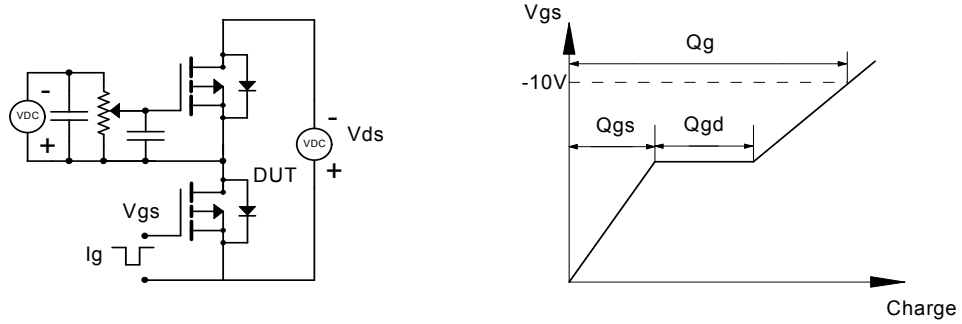


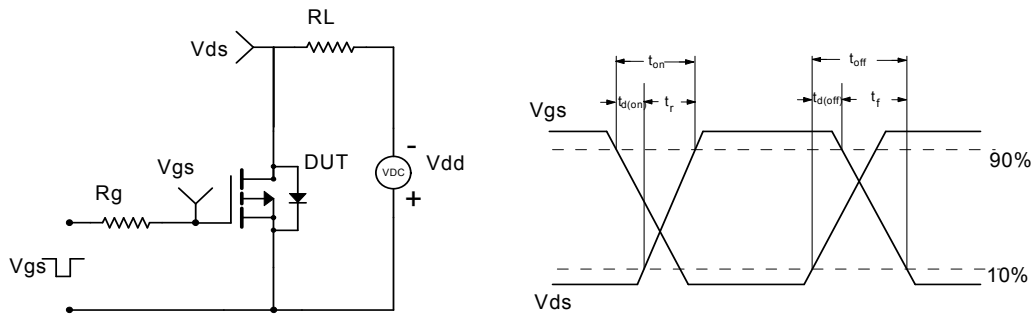
Figure D: Diode Recovery Test Circuit & Waveforms



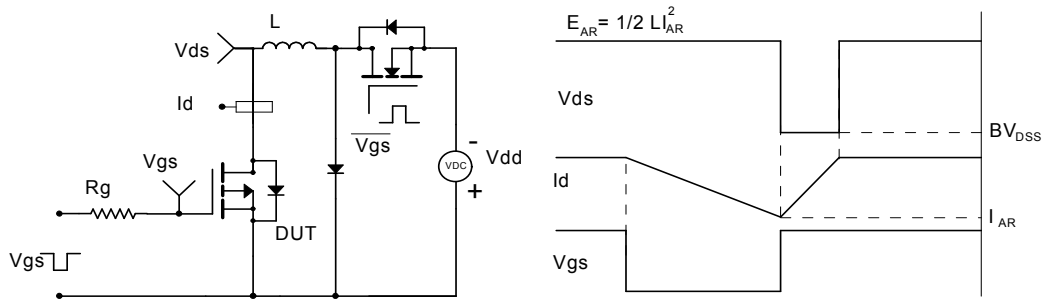
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

