

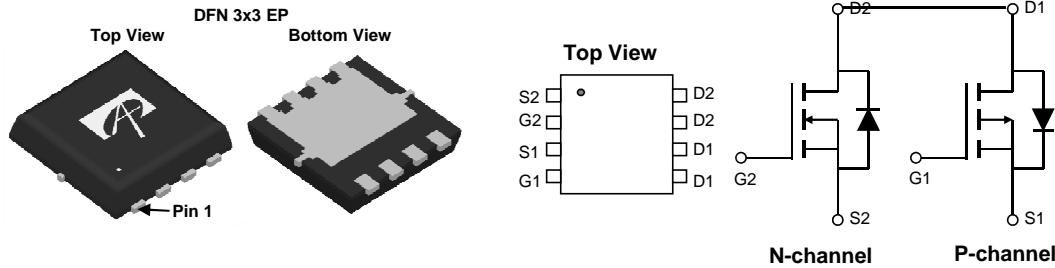
General Description

The AON7611 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used in inverter and other applications.

Product Summary

N-channel	P-channel	
$V_{DS} (V) = 30V$	$V_{DS} (V) = -30V$	
$I_D = 9.0A$	$I_D = -18.5A$	$(V_{GS} = \pm 10V)$
$R_{DS(ON)} < 50m\Omega$	$R_{DS(ON)} < 38m\Omega$	$(V_{GS} = \pm 10V)$
$R_{DS(ON)} < 70m\Omega$	$R_{DS(ON)} < 62m\Omega$	$(V_{GS} = \pm 4.5V)$

100% UIS Tested
100% R_g Tested



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

Parameter	Symbol	Max N-channel	Max P-channel	Units
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current	I_D	$T_A=25^\circ C$	9	A
		$T_A=100^\circ C$	5.5	
Pulsed Drain Current ^C	I_{DM}	20	-35	A
Continuous Drain Current ^A	I_{DSM}	$T_A=25^\circ C$	4	W
		$T_A=70^\circ C$	3	
Avalanche Current ^C	I_{AR}	7	-17	A
Repetitive avalanche energy $L=0.1mH$ ^C	E_{AR}	2	14	mJ
Power Dissipation ^B	P_D	$T_A=25^\circ C$	7	W
		$T_A=100^\circ C$	2.8	
Power Dissipation ^A	P_{DSM}	$T_A=25^\circ C$	1.5	W
		$T_A=70^\circ C$	0.9	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	-55 to 150	$^\circ C$

Thermal Characteristics: N-channel

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A $t \leq 10s$	$R_{\theta JA}$	40	50	$^\circ C/W$
Maximum Junction-to-Ambient ^{A,D} Steady-State		70	85	$^\circ C/W$
Maximum Junction-to-Case ^B Steady-State	$R_{\theta JC}$	15	18	$^\circ C/W$

Thermal Characteristics: P-channel

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A $t \leq 10s$	$R_{\theta JA}$	40	50	$^\circ C/W$
Maximum Junction-to-Ambient ^{A,D} Steady-State		70	85	$^\circ C/W$
Maximum Junction-to-Case ^B Steady-State	$R_{\theta JC}$	5	6	$^\circ C/W$

N-channel 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	2	2.5	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	20			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =4A T _J =125°C		40 64	50 80	mΩ
		V _{GS} =4.5V, I _D =3A		53	70	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =4A		11		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.79	1	V
I _S	Maximum Body-Diode Continuous Current				9.5	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		170		pF
C _{oss}	Output Capacitance			35		pF
C _{riss}	Reverse Transfer Capacitance			23		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	1.7	3.5	5.3	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =4A		4.05	10	nC
Q _{g(4.5V)}	Total Gate Charge			2	6	nC
Q _{gs}	Gate Source Charge			0.55		nC
Q _{gd}	Gate Drain Charge			1		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =3.75Ω, R _{GEN} =3Ω		4.5		ns
t _r	Turn-On Rise Time			1.5		ns
t _{D(off)}	Turn-Off DelayTime			18.5		ns
t _f	Turn-Off Fall Time			15.5		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =4A, dI/dt=100A/μs		7.5		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =4A, dI/dt=100A/μs		2.5		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} 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.

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.

G. The maximum current rating is limited by bond-wires.

H. These tests are performed with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The SOA curve provides a single pulse rating.

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N-channel TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

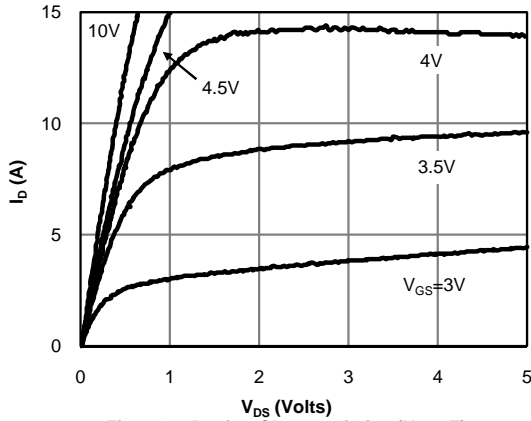


Figure 1: On-Region Characteristics (Note E)

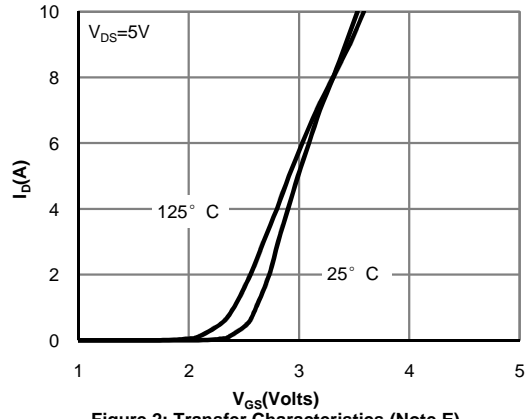


Figure 2: Transfer Characteristics (Note E)

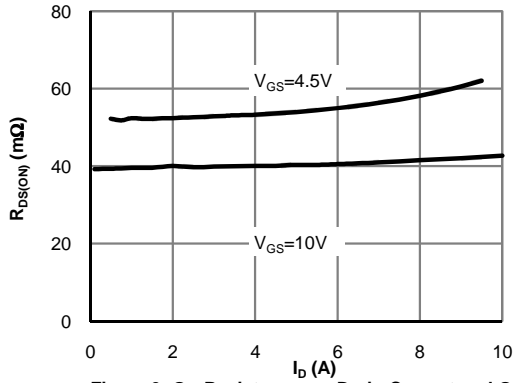


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

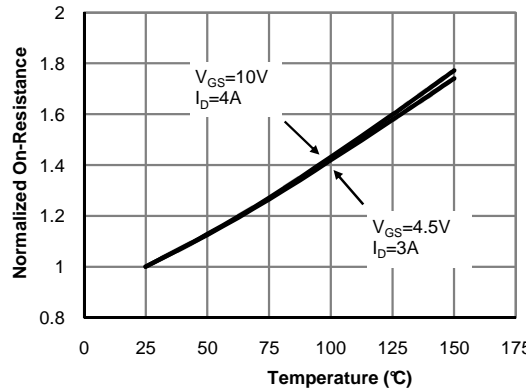


Figure 4: On-Resistance vs. Junction Temperature (Note E)

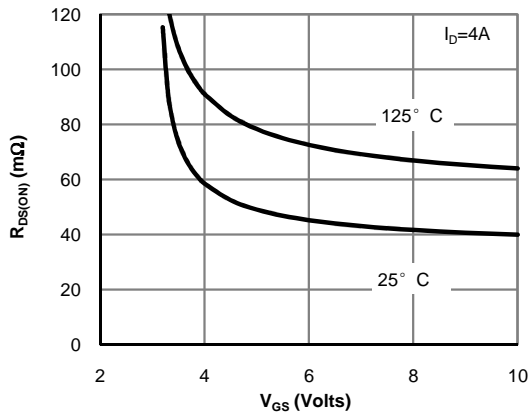


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

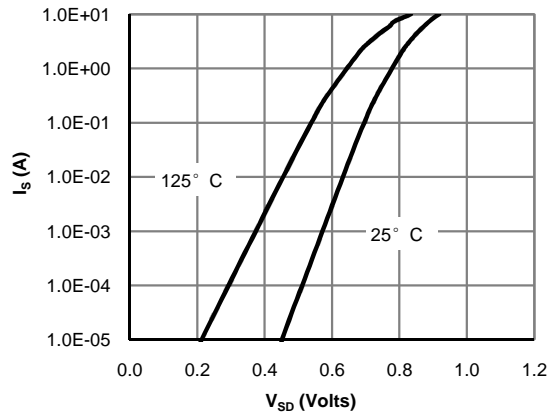


Figure 6: Body-Diode Characteristics (Note E)

N-channel TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

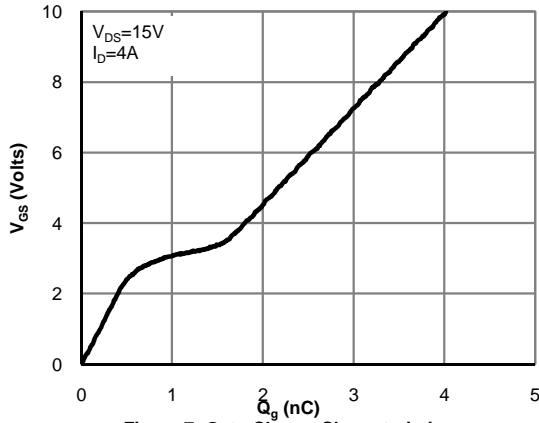


Figure 7: Gate-Charge Characteristics

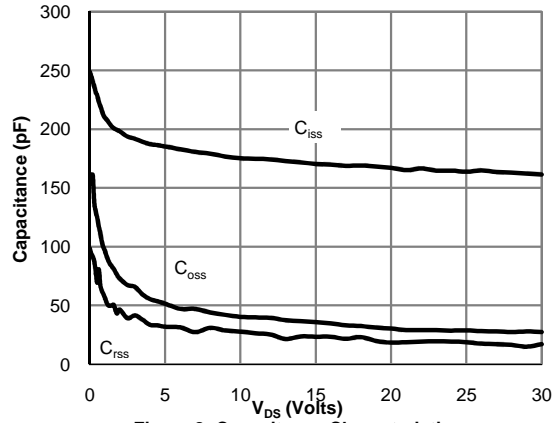


Figure 8: Capacitance Characteristics

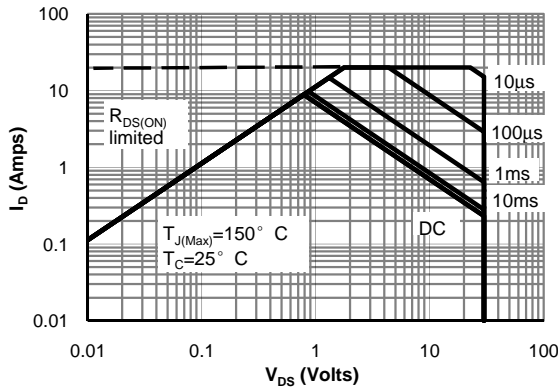


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

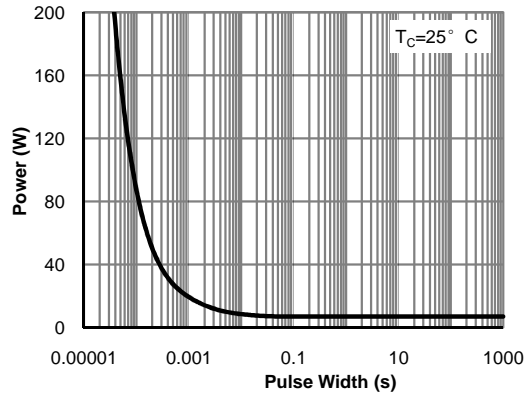


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

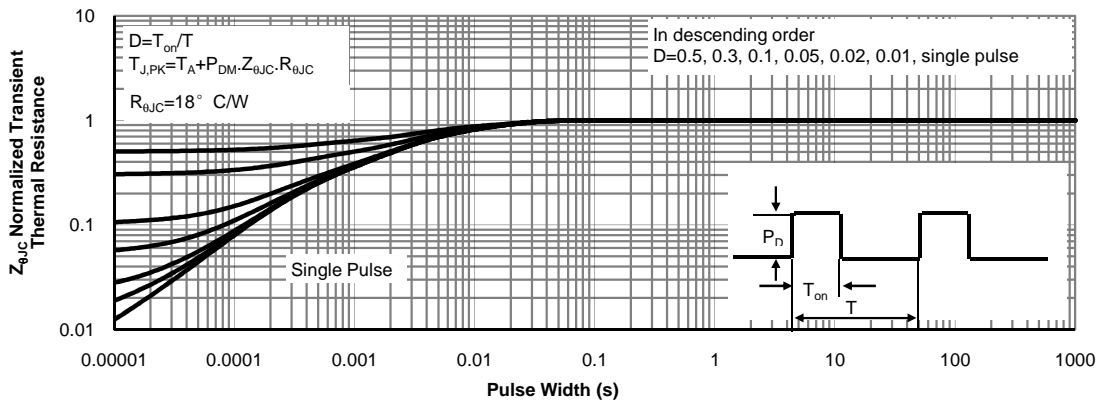


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

N-channel TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

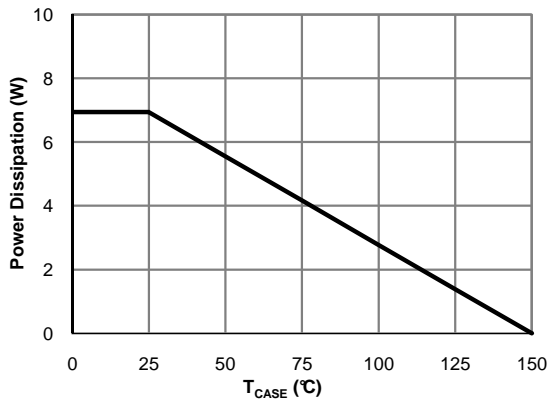


Figure 12: Power De-rating (Note F)

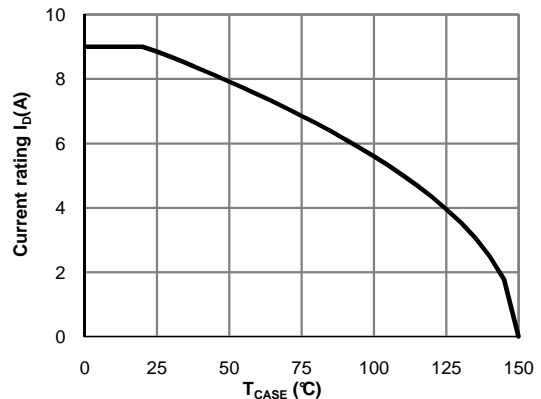


Figure 13: Current De-rating (Note F)

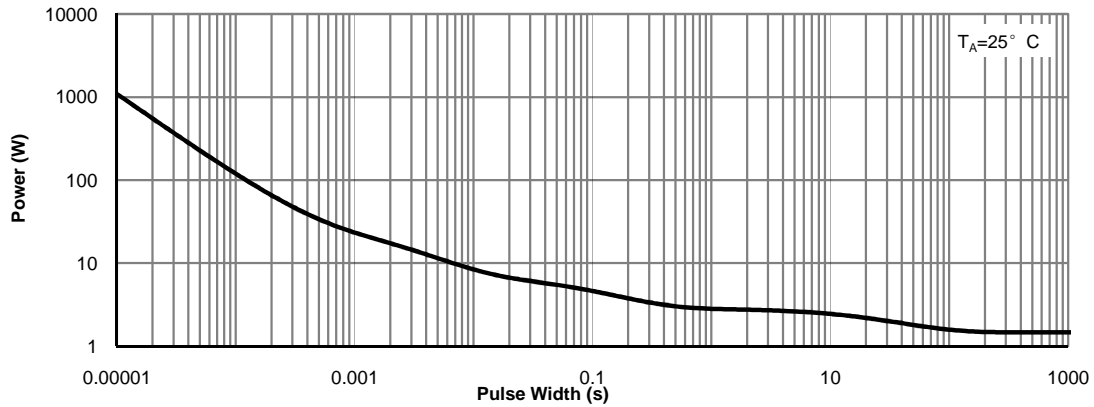


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

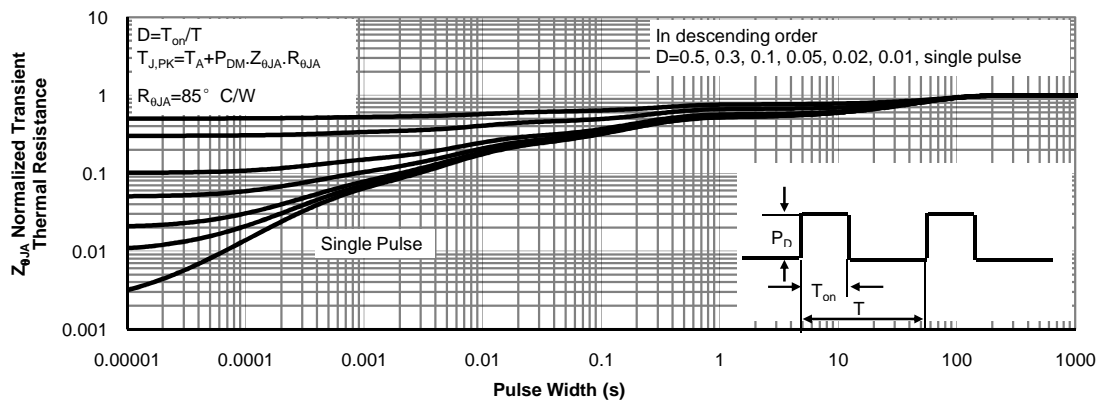
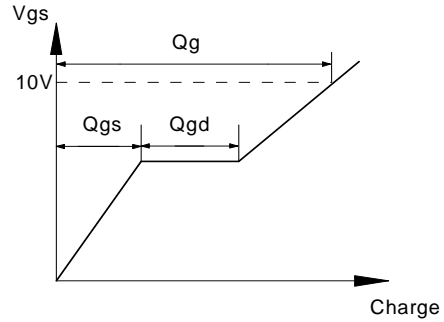
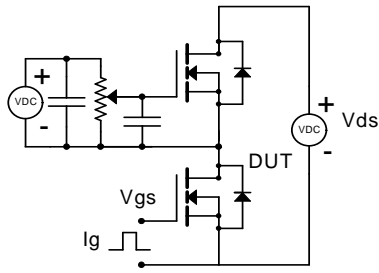
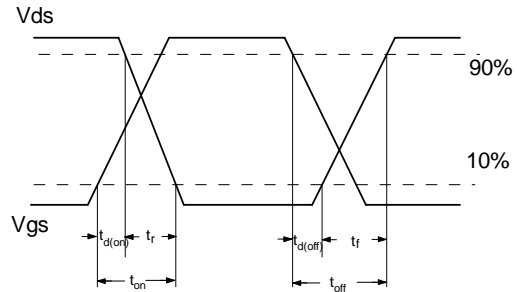
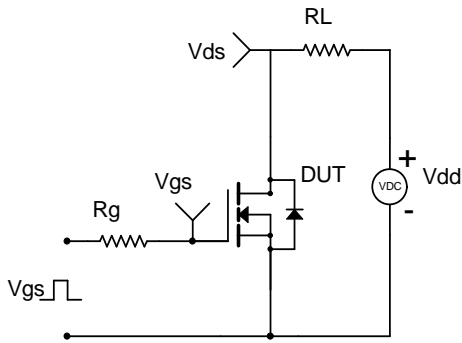


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

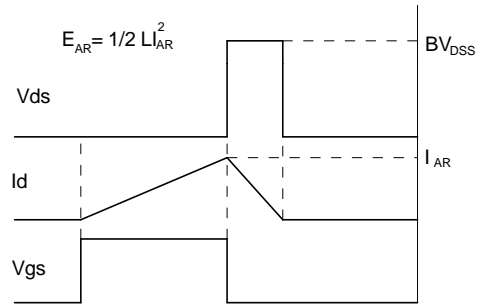
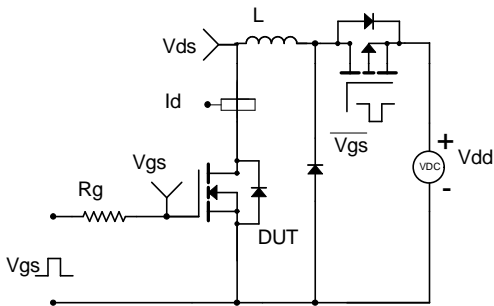
Gate Charge Test Circuit & Waveform



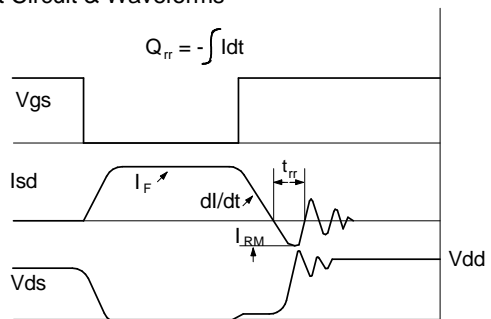
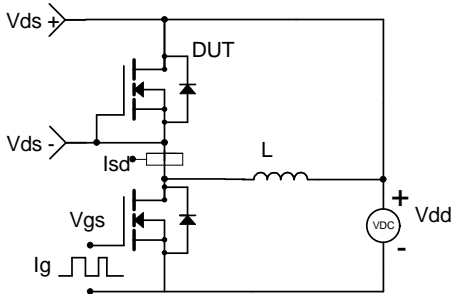
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



P-channel 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	-1.4	-1.9	-2.4	V
I _{D(ON)}	On state drain current	V _{GS} =-10V, V _{DS} =-5V	-35			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-5A T _J =125°C		30 45	38 57	mΩ
		V _{GS} =-4.5V, I _D =-4A		46	62	
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-5A		10		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.76	-1	V
I _S	Maximum Body-Diode Continuous Current				-20	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz		520		pF
C _{oss}	Output Capacitance			100		pF
C _{riss}	Reverse Transfer Capacitance			65		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	3.5	7.5	11.5	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-5A		9.2	20	nC
Q _{g(4.5V)}	Total Gate Charge			4.6	10	nC
Q _{gs}	Gate Source Charge			1.6		nC
Q _{gd}	Gate Drain Charge			2.2		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-10V, V _{DS} =-15V, R _L =3.0Ω, R _{GEN} =3Ω		7.5		ns
t _r	Turn-On Rise Time			5.5		ns
t _{D(off)}	Turn-Off DelayTime			19		ns
t _f	Turn-Off Fall Time			7		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-5A, di/dt=100A/μs		11		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-5A, di/dt=100A/μs		5.3		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} 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.

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.

G. The maximum current rating is limited by bond-wires.

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. The SOA curve provides a single pulse rating.

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P-channel TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

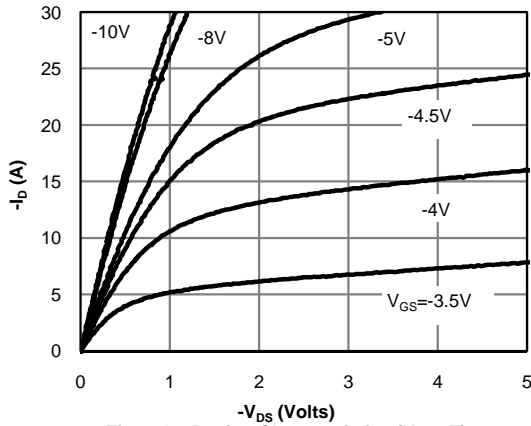


Figure 1: On-Region Characteristics (Note E)

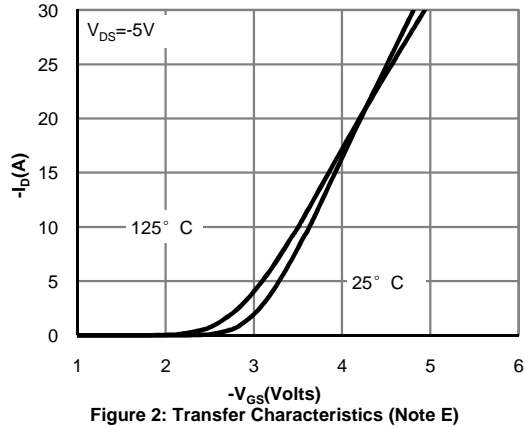


Figure 2: Transfer Characteristics (Note E)

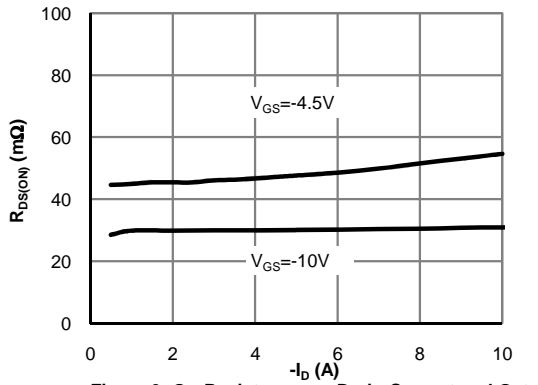


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

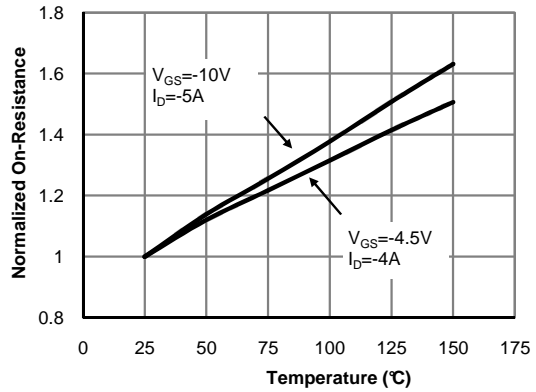


Figure 4: On-Resistance vs. Junction Temperature (Note E)

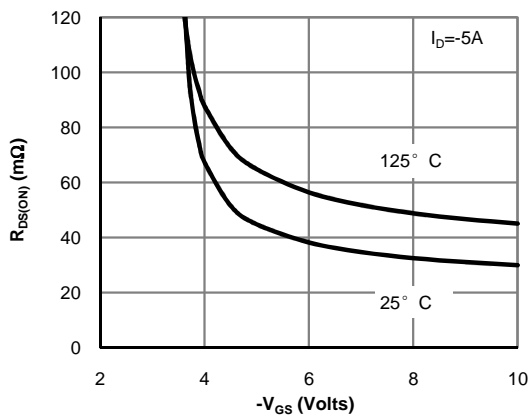


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

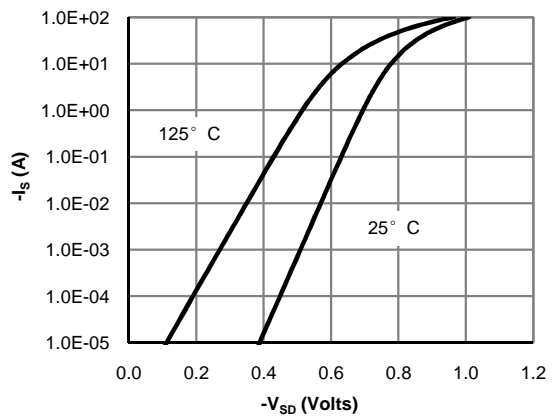


Figure 6: Body-Diode Characteristics (Note E)

P-channel TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

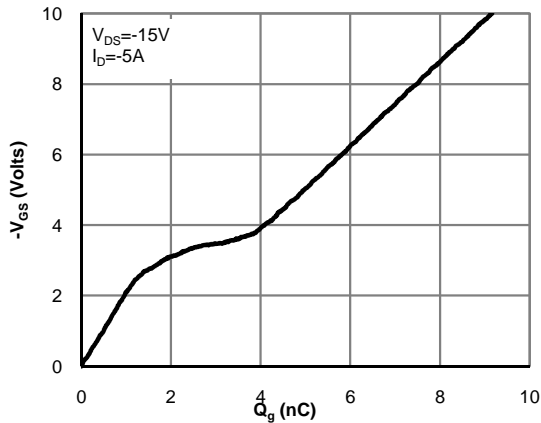


Figure 7: Gate-Charge Characteristics

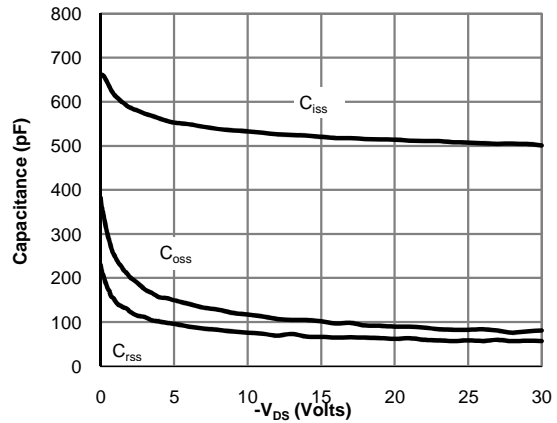


Figure 8: Capacitance Characteristics

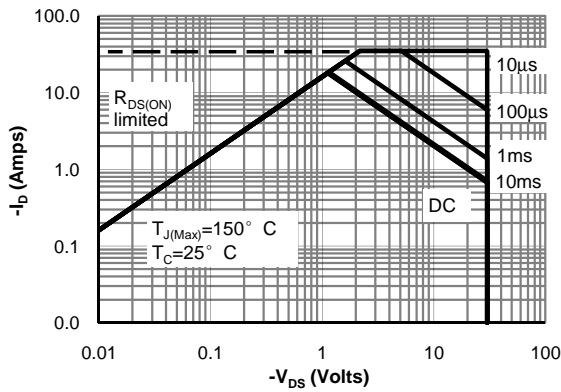


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

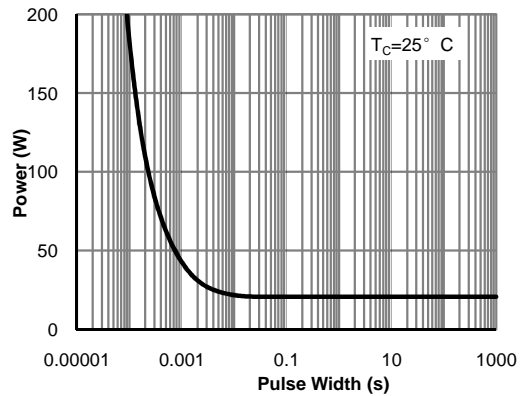


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

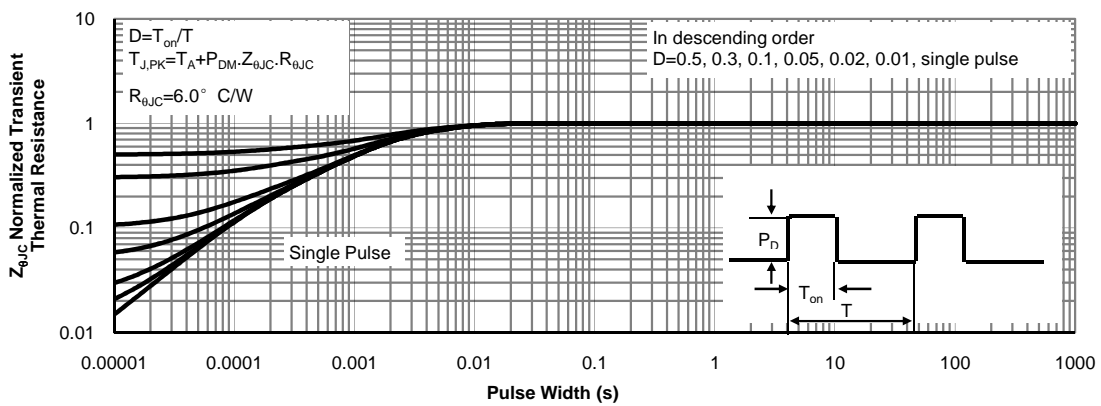


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

P-channel TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

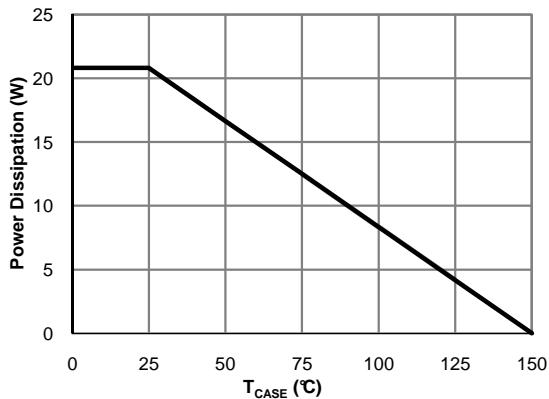


Figure 12: Power De-rating (Note F)

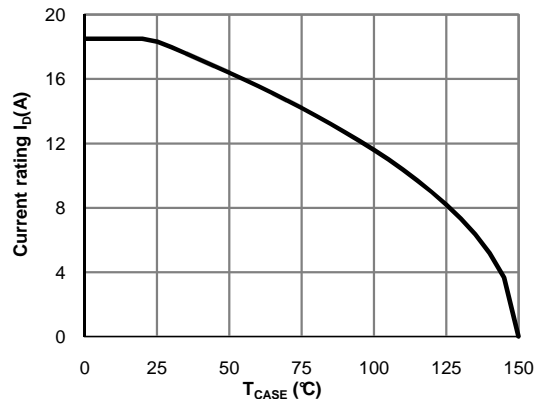


Figure 13: Current De-rating (Note F)



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

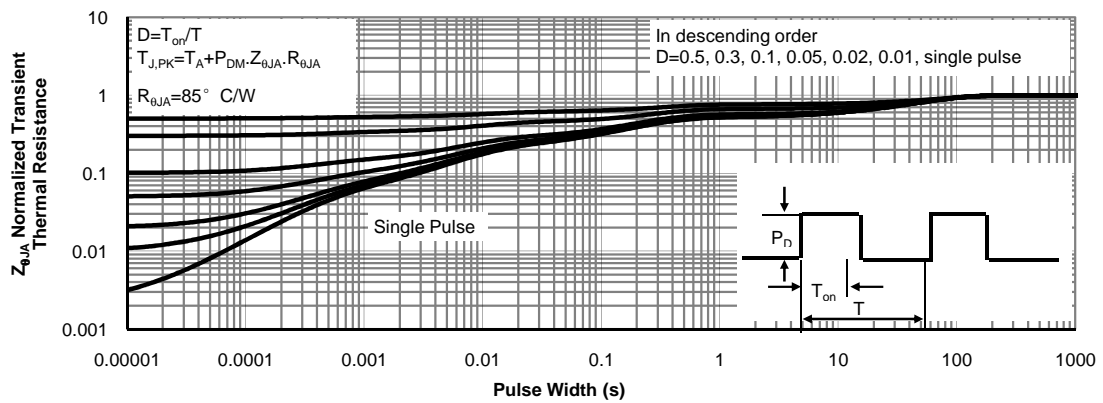
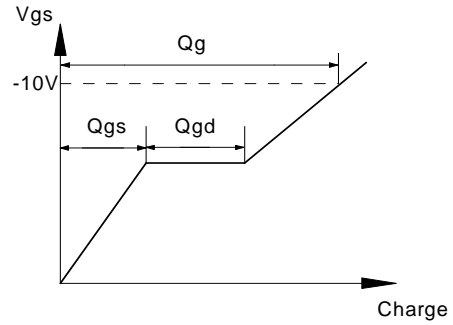
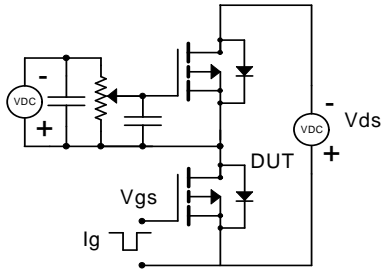
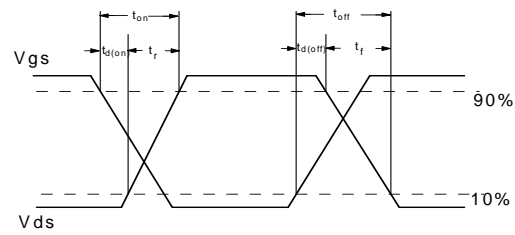
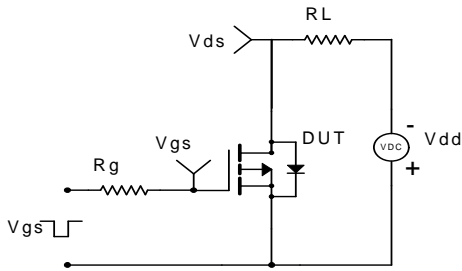


Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)

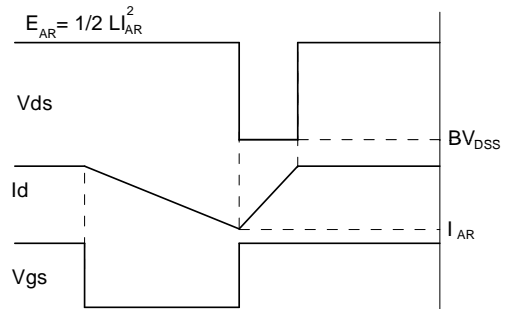
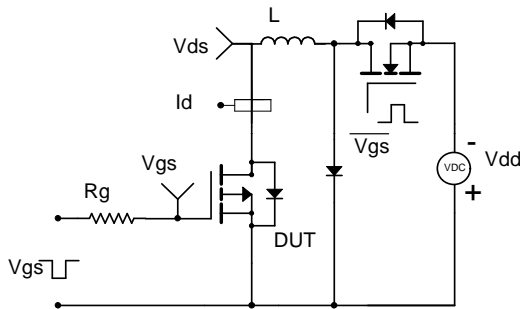
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

