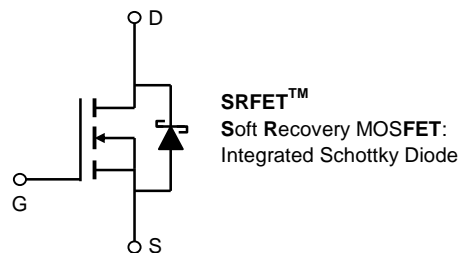


General Description

SRFET™ The AO4718 uses advanced trench technology with a monolithically integrated Schottky diode to provide excellent $R_{DS(ON)}$, and low gate charge. This device is suitable for use as a low side FET in SMPS, load switching and general purpose applications.

Features

V_{DS} (V) = 30V
 I_D = 15A (V_{GS} = 10V)
 $R_{DS(ON)}$ < 9m Ω (V_{GS} = 10V)
 $R_{DS(ON)}$ < 14m Ω (V_{GS} = 4.5V)



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ^{AF}	I_{DSM}	$T_A=25^\circ\text{C}$	15
		$T_A=70^\circ\text{C}$	12
Pulsed Drain Current ^B	I_{DM}	80	A
Avalanche Current ^B	I_{AS}, I_{AR}	25	
Avalanche energy $L=0.3\text{mH}$ ^B	E_{AS}, E_{AR}	94	mJ
Power Dissipation	P_D	$T_A=25^\circ\text{C}$	3.1
		$T_A=70^\circ\text{C}$	2.0
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	32	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	60	75	$^\circ\text{C/W}$
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	17	24	$^\circ\text{C/W}$

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	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V T _J =125°C			0.1 10	mA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} = ±20V			0.1	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =250μA	1.3	1.65	2.5	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	80			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =15A T _J =125°C		7.3 10.3	9 13	mΩ
		V _{GS} =4.5V, I _D =12A		10.8	14	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =15A		43		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.41	0.5	V
I _S	Maximum Body-Diode + Schottky Continuous Current				4	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		1620	1950	pF
C _{oss}	Output Capacitance			382		pF
C _{rss}	Reverse Transfer Capacitance			162		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.2	1.8	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =15A		24.7	32	nC
Q _{g(4.5V)}	Total Gate Charge			12	16	nC
Q _{gs}	Gate Source Charge			4.0		nC
Q _{gd}	Gate Drain Charge			5.6		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =1Ω, R _{GEN} =3Ω		6.3		ns
t _r	Turn-On Rise Time			9.3		ns
t _{D(off)}	Turn-Off DelayTime			21.6		ns
t _f	Turn-Off Fall Time			5.4		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =15A, di/dt=300A/μs		19	23	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =15A, di/dt=300A/μs		36.4		nC

A: The value of R_{θJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

E: 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. The SOA curve provides a single pulse rating.

F: The current rating is based on the t ≤ 10s junction to ambient thermal resistance rating.

Rev3: Nov. 2010

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

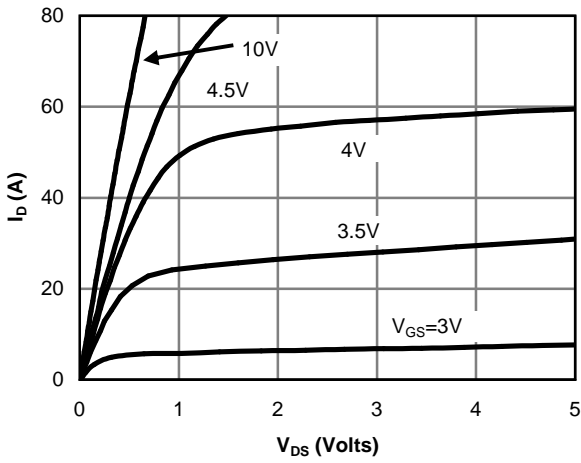


Figure 1: On-Region Characteristics

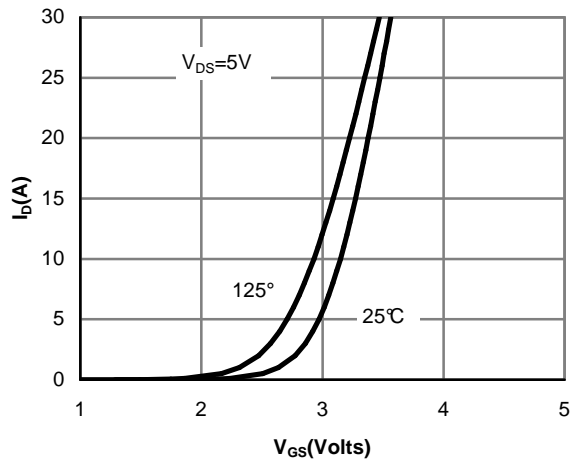


Figure 2: Transfer Characteristics

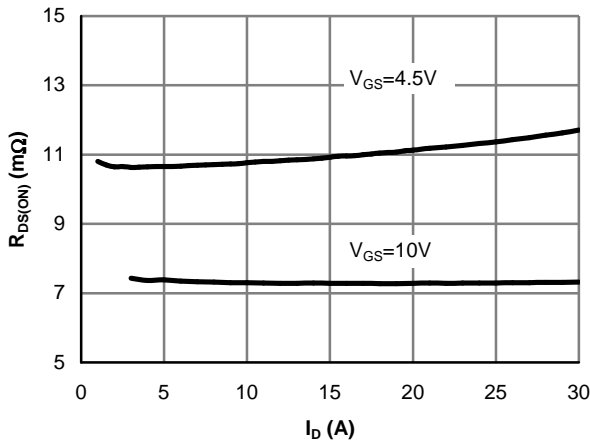


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

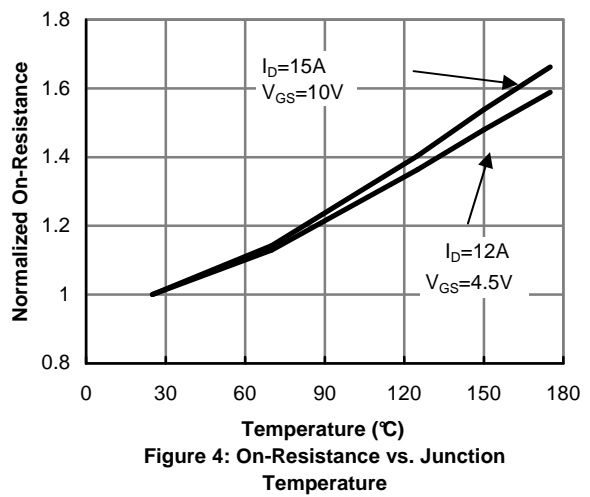


Figure 4: On-Resistance vs. Junction Temperature

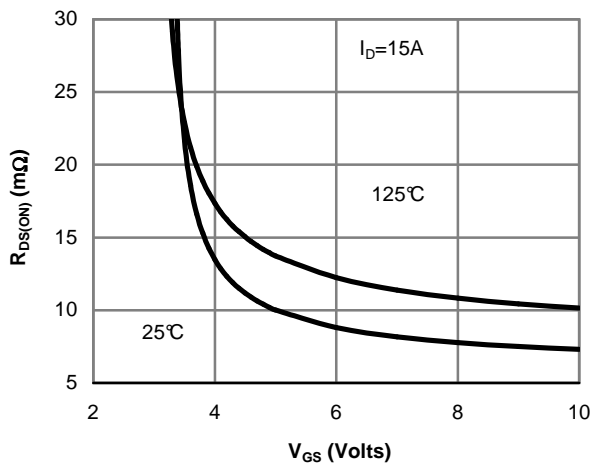


Figure 5: On-Resistance vs. Gate-Source Voltage

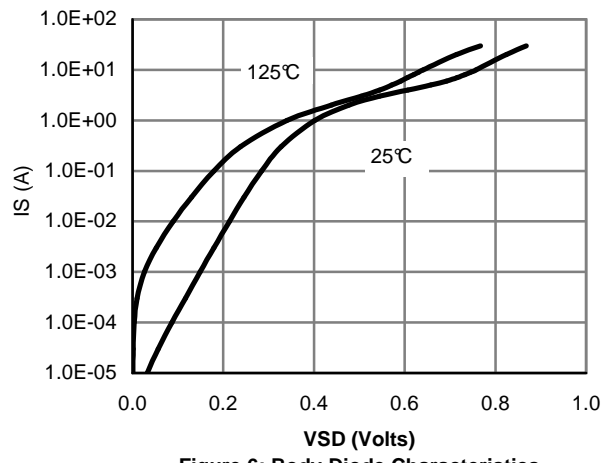


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

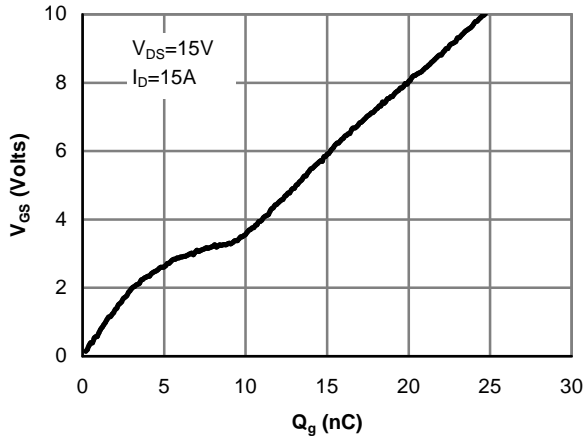


Figure 7: Gate-Charge Characteristics

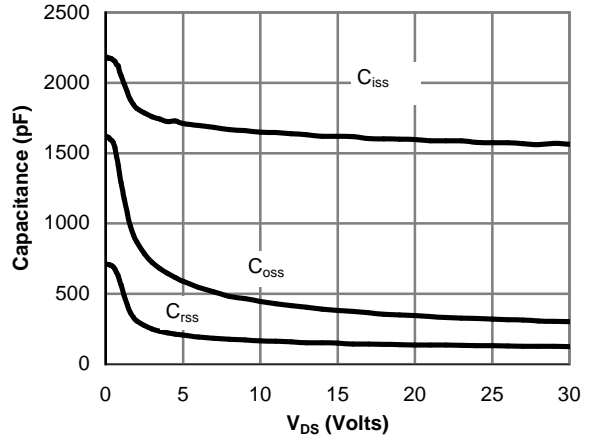


Figure 8: Capacitance Characteristics

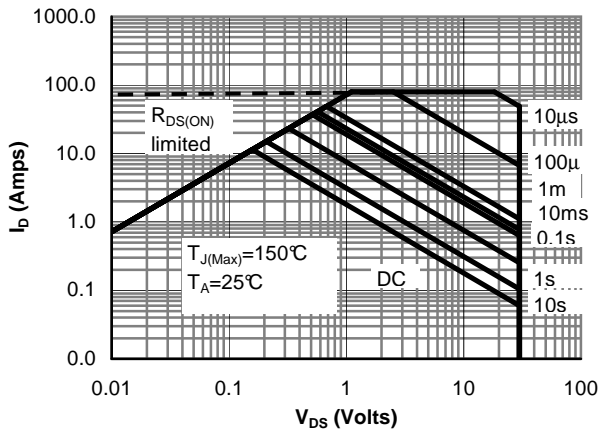


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

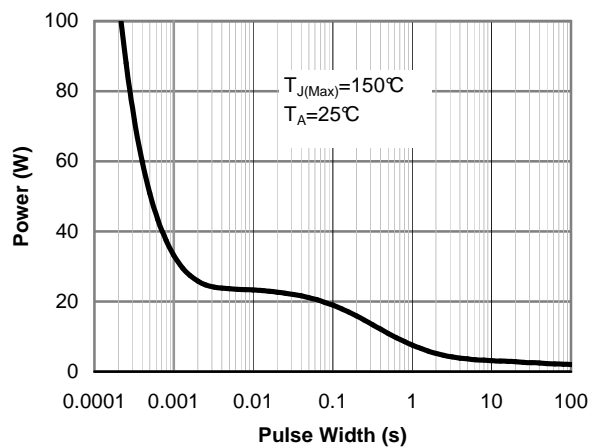


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

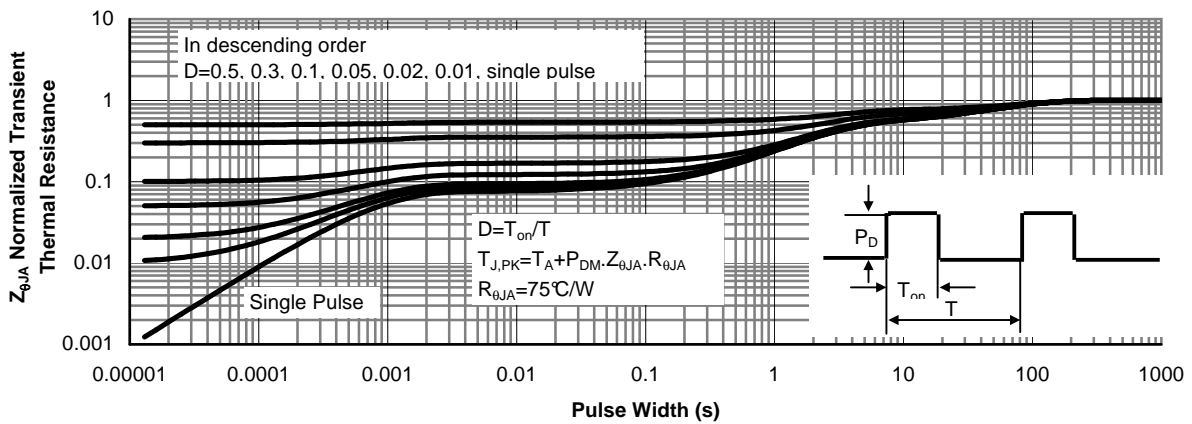
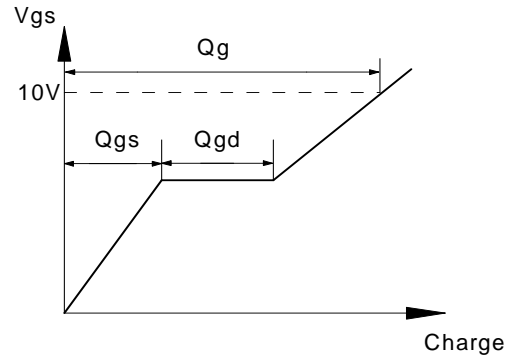
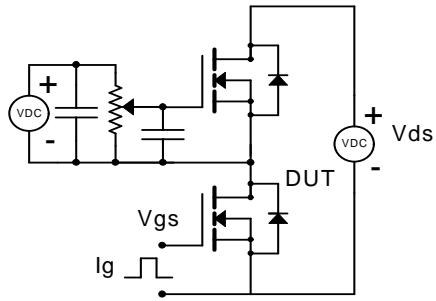
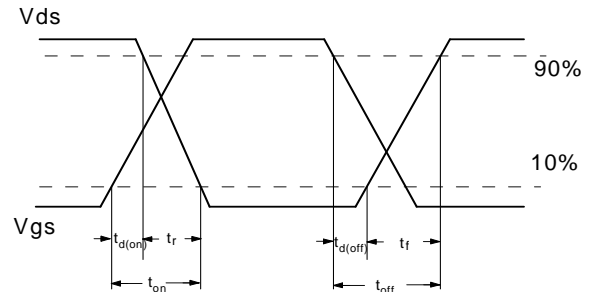
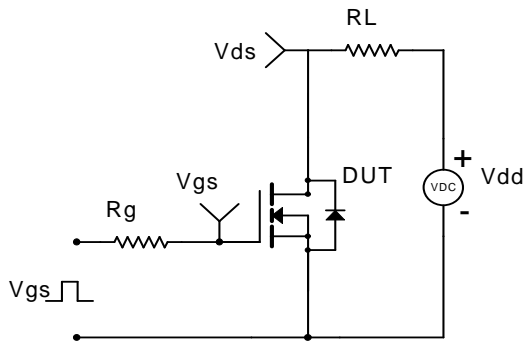


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

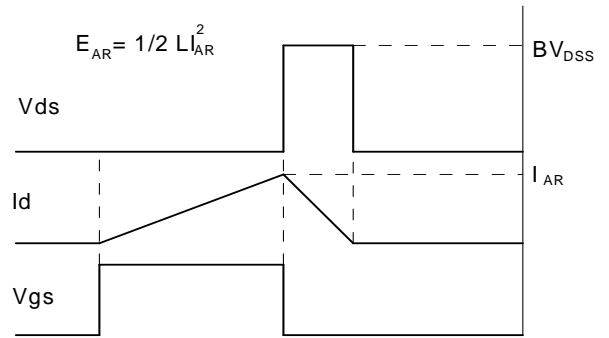
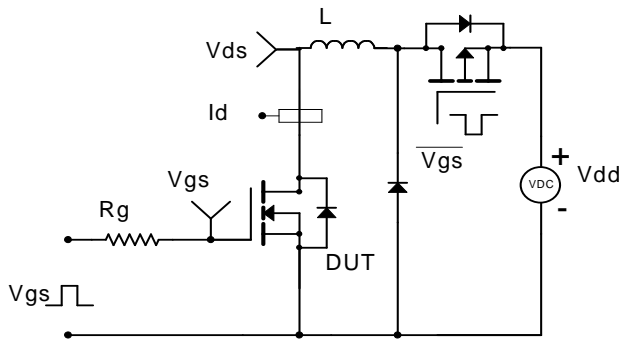
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

