

#### 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.

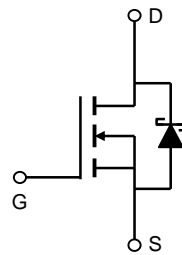
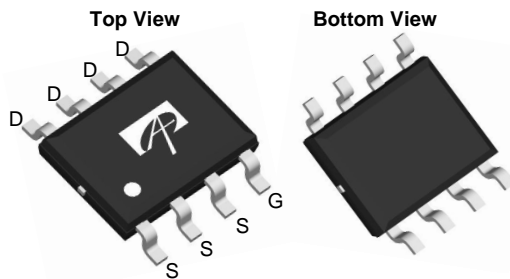
#### Features

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

100% UIS Tested  
 100% Rg Tested



SOIC-8



**SRFET™**  
 Soft Recovery MOSFET:  
 Integrated Schottky Diode

#### 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	$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>AF</sup>	$I_{DSM}$	$T_A=25^\circ\text{C}$	15
		$T_A=70^\circ\text{C}$	12
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	80	A
Avalanche Current <sup>B</sup>	$I_{AS}, I_{AR}$	25	
Avalanche energy $L=0.3\text{mH}$ <sup>B</sup>	$E_{AS}, E_{AR}$	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 <sup>A</sup>	$R_{\theta JA}$	$t \leq 10\text{s}$	32	$^\circ\text{C}/\text{W}$
		Steady-State	60	$^\circ\text{C}/\text{W}$
Maximum Junction-to-Lead <sup>C</sup>	$R_{\theta JL}$	17	24	$^\circ\text{C}/\text{W}$

Electrical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}$ , $V_{GS}=0\text{V}$ $T_J=125^\circ\text{C}$			0.1 10	mA
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 20\text{V}$			0.1	$\mu\text{A}$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	1.3	1.65	2.5	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$ , $V_{DS}=5\text{V}$	80			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$ , $I_D=15\text{A}$ $T_J=125^\circ\text{C}$		7.3 10.3	9 13	m $\Omega$
		$V_{GS}=4.5\text{V}$ , $I_D=12\text{A}$		10.8	14	m $\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=5\text{V}$ , $I_D=15\text{A}$		43		S
$V_{SD}$	Diode Forward Voltage	$I_S=1\text{A}$ , $V_{GS}=0\text{V}$		0.41	0.5	V
$I_S$	Maximum Body-Diode + Schottky Continuous Current				4	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=15\text{V}$ , $f=1\text{MHz}$		1620	1950	pF
$C_{oss}$	Output Capacitance			382		pF
$C_{rss}$	Reverse Transfer Capacitance			162		pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$		1.2	1.8	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $I_D=15\text{A}$		24.7	32	nC
$Q_g(4.5\text{V})$	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	$V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $R_L=1\Omega$ , $R_{GEN}=3\Omega$		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	$I_F=15\text{A}$ , $dI/dt=300\text{A}/\mu\text{s}$		19	23	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=15\text{A}$ , $dI/dt=300\text{A}/\mu\text{s}$		36.4		nC

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . 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  $R_{\theta JA}$  is the sum of the thermal impedance from junction to lead  $R_{\theta JL}$  and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using  $<300\mu\text{s}$  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  $T_A=25^\circ\text{C}$ . The SOA curve provides a single pulse rating.

F: The current rating is based on the  $t \leq 10\text{s}$  junction to ambient thermal resistance rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

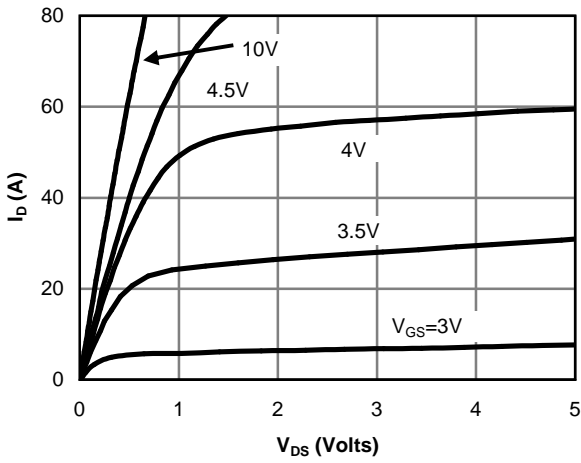


Figure 1: On-Region Characteristics

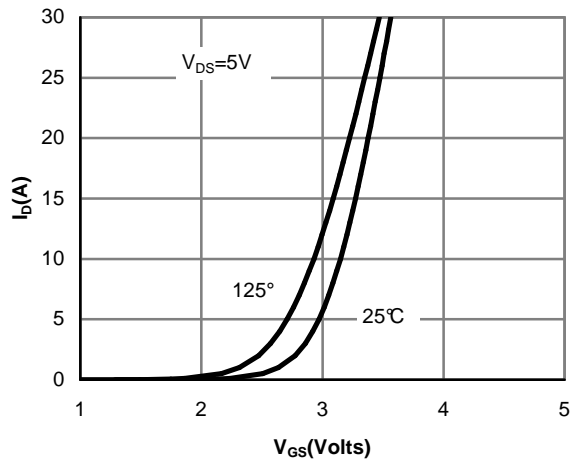


Figure 2: Transfer Characteristics

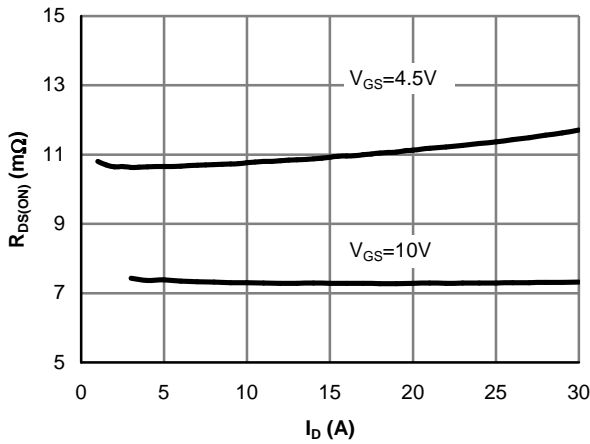


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

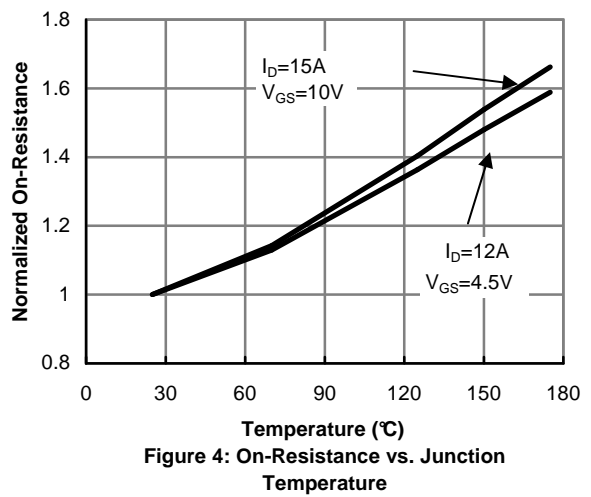


Figure 4: On-Resistance vs. Junction Temperature

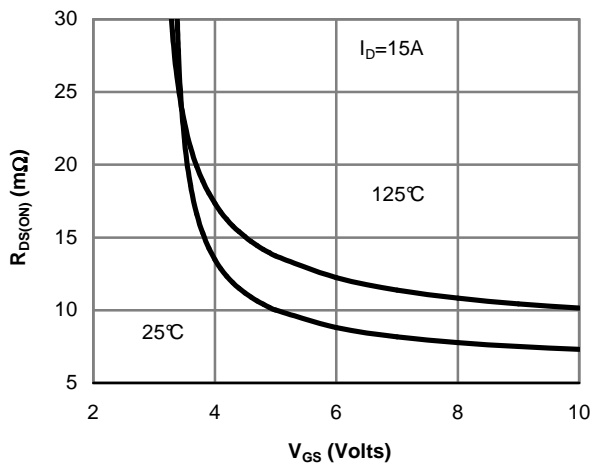


Figure 5: On-Resistance vs. Gate-Source Voltage

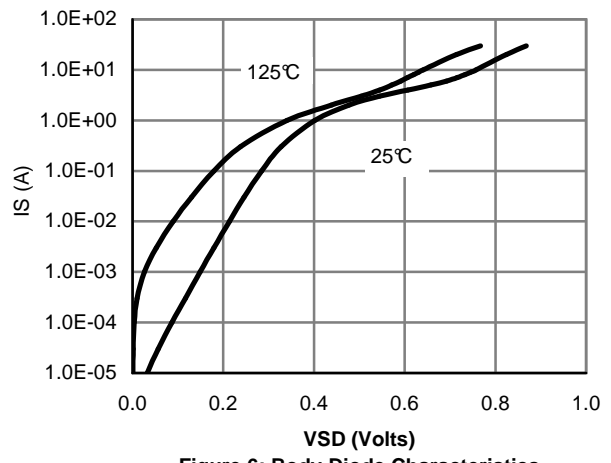


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

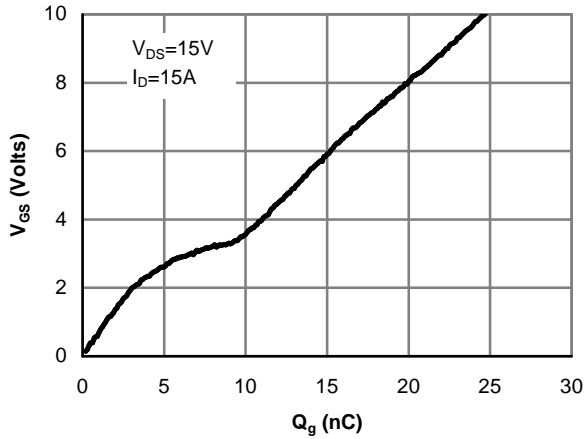


Figure 7: Gate-Charge Characteristics

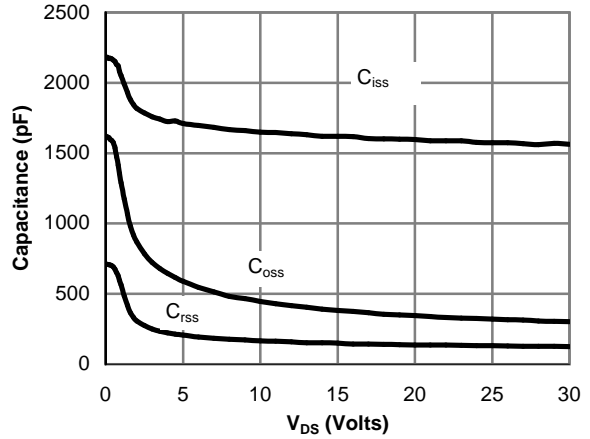


Figure 8: Capacitance Characteristics

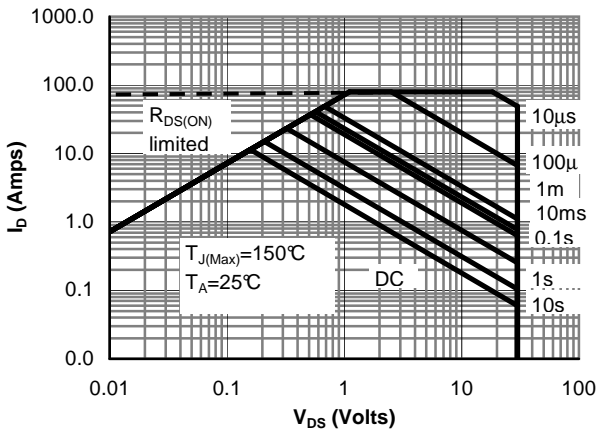


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

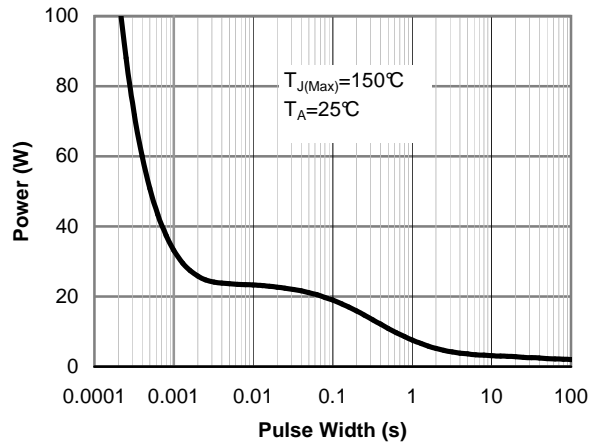


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

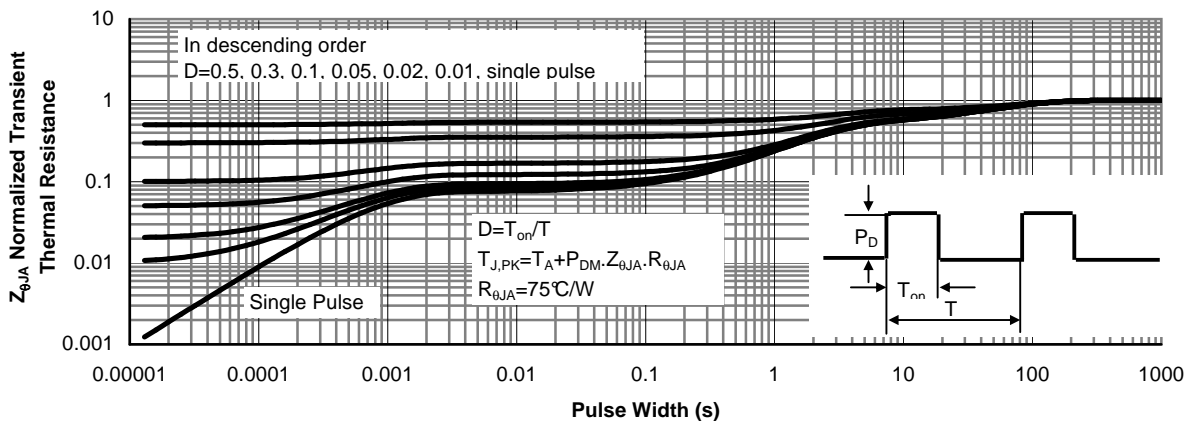
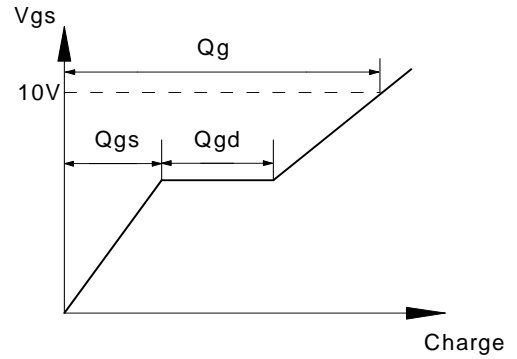
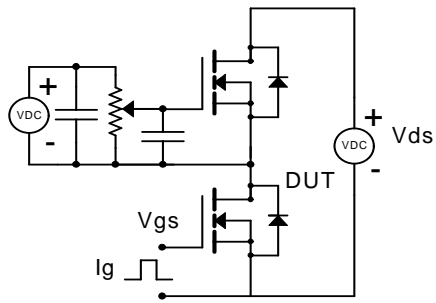
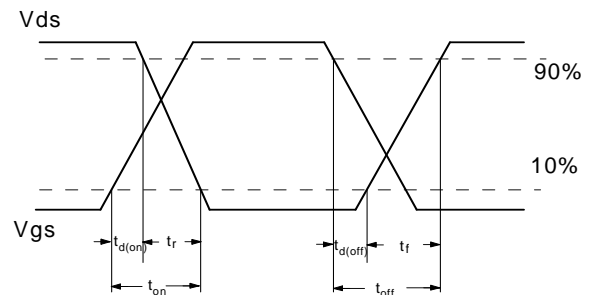
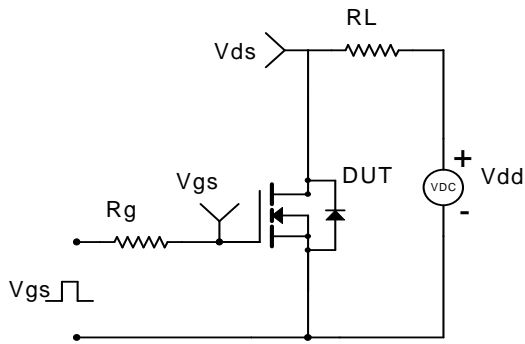


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

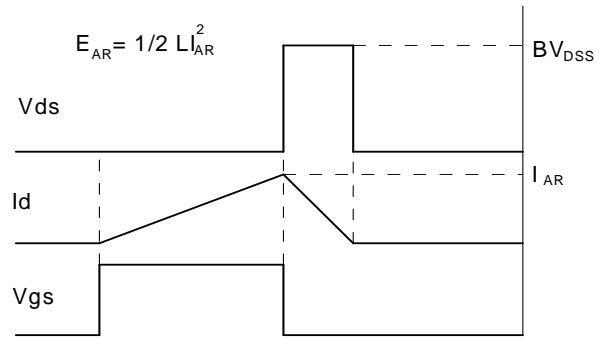
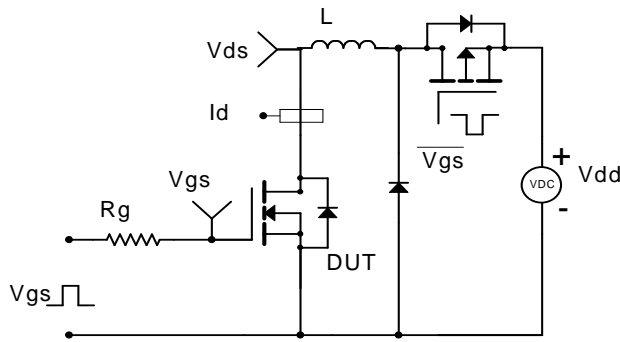
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

