AO4720
N-Channel Enhancement Mode Field Effect Transistor
SRFET ™

General Description

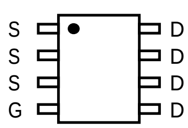
SRFET ™ The AO4720 uses advanced trench technology with a monolithically integrated Schottky diode to provide excellent $R_{DS(ON)}$,and low gate charge. This device is suitable for use as a low side FET in SMPS, load switching and general purpose applications.

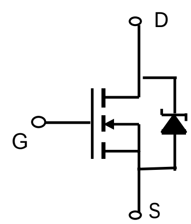
Standard Product AO4720 is Pb-free (meets ROHS & Sony 259 specifications).

Features

V_{DS} (V) = 30V
I_D =13A (V$_{GS}$ = 10V)
$R_{DS(ON)}$ < 11mΩ (V_{GS} = 10V)
$R_{DS(ON)}$ < 17.5mΩ (V_{GS} = 4.5V)

UIS TESTED!
Rg,Ciss,Coss,Crss Tested





SRFET ™
Soft **R**ecovery MOS**FET**:
Integrated Schottky Diode

Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Max 10 Sec	Max Steady State	Units
Drain-Source Voltage		V_{DS}	30		V
Gate-Source Voltage		V_{GS}	±20		V
Continuous Drain Current [AF]	T_A=25°C	I_{DSM}	13	10	A
	T_A=70°C		10.5	7.8	
Pulsed Drain Current [B]		I_{DM}	120		A
Avalanche Current [C]		I_{AR}	21		A
Repetitive avalanche energy L=0.3mH [C]		E_{AR}	66		mJ
Power Dissipation	T_A=25°C	P_{DSM}	3.1	1.7	W
	T_A=70°C		2.0	1.1	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150		°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	32	40	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		60	75	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	17	24	°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=250uA, V_{GS}=0V		30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V				0.1	mA
			T_J=125°C			20	
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	1.62	2	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V		120			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=13A			9.3	11.0	mΩ
			T_J=125°C		13.8	17.3	
		V_{GS}=4.5V, I_D=11A			14	17.5	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=13A			37		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V			0.40	0.5	V
I_S	Maximum Body-Diode + Schottky Continuous Current					5	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz			1267	1600	pF
C_{oss}	Output Capacitance				308		pF
C_{rss}	Reverse Transfer Capacitance				118		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz			1.3	2.0	Ω
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=13A			21	30	nC
Q_g(4.5V)	Total Gate Charge				10.4	14	nC
Q_{gs}	Gate Source Charge				3.0		nC
Q_{gd}	Gate Drain Charge				3.6		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=1.2Ω, R_{GEN}=3Ω			5.2		ns
t_r	Turn-On Rise Time				3.8		ns
$t_{D(off)}$	Turn-Off DelayTime				21.2		ns
t_f	Turn-Off Fall Time				4.4		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=13A, dI/dt=300A/μs			11.2	17	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=13A, dI/dt=300A/μs			10.5		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 value in any given application depends on the user's specific board design.
B: Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
C. The R $_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ 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 power dissipation and current rating is based on the t≤ 10s junction to ambient thermal resistance rating.
Rev1: May. 2007

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

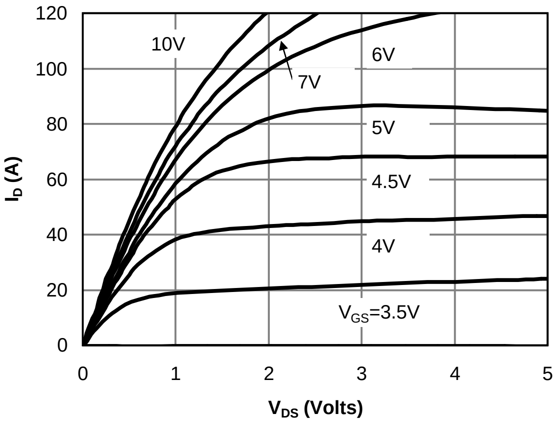


Figure 1: On-Region Characteristics

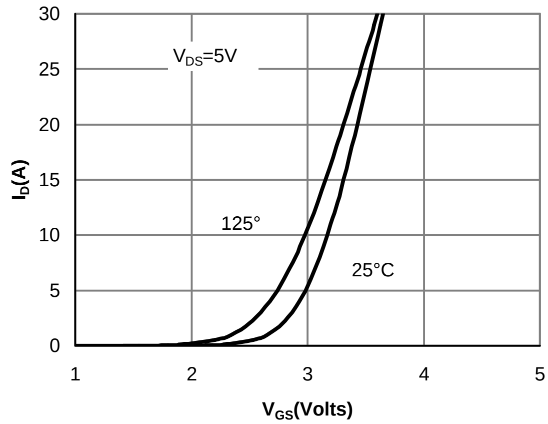


Figure 2: Transfer Characteristics

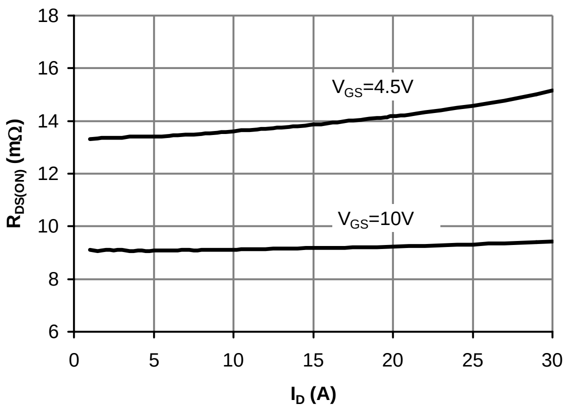


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

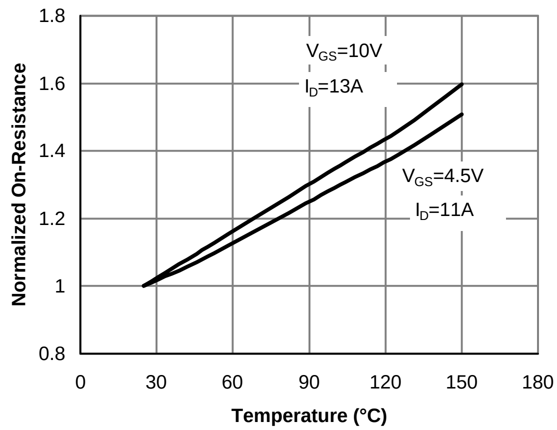


Figure 4: On-Resistance vs. Junction Temperature

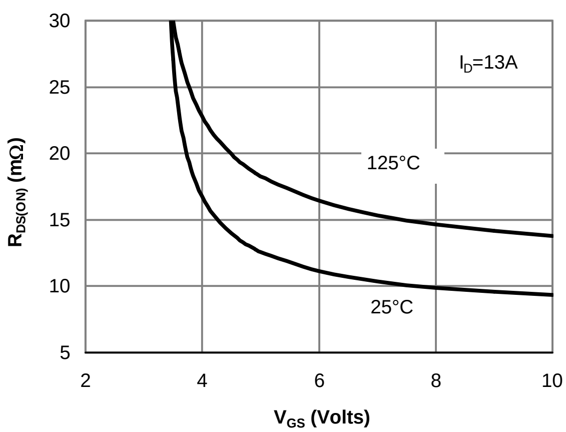


Figure 5: On-Resistance vs. Gate-Source Voltage

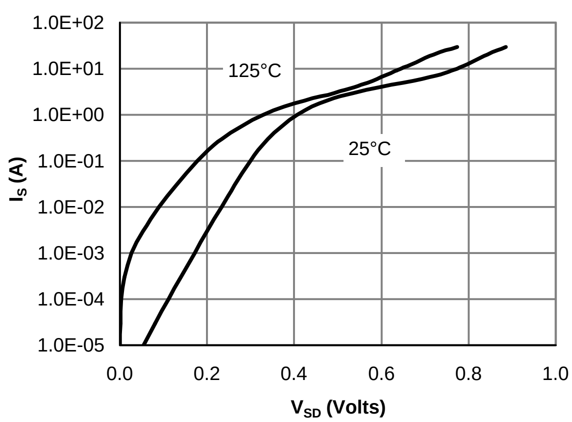


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

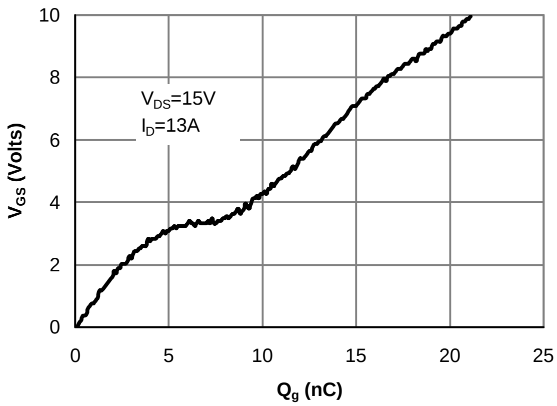


Figure 7: Gate-Charge Characteristics

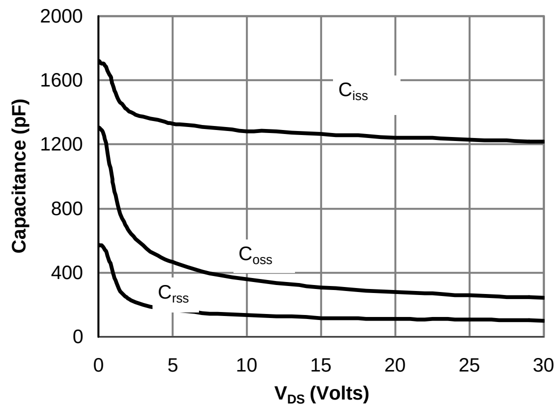


Figure 8: Capacitance Characteristics

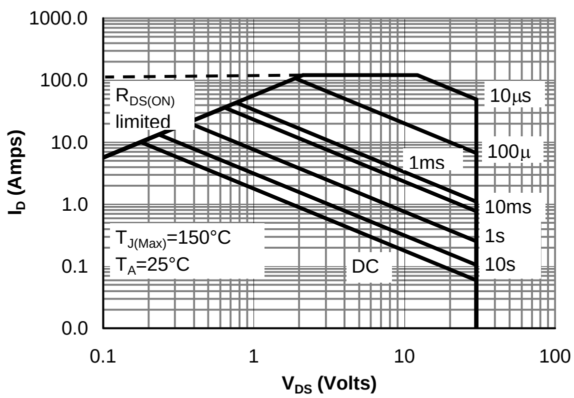


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

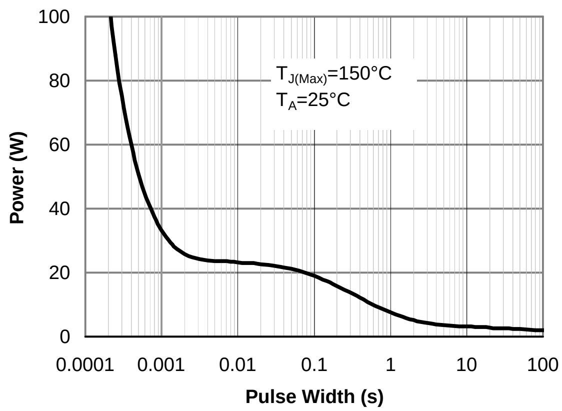


Figure10: Single Pulse Power Rating Junction-to-Ambient (Note E)

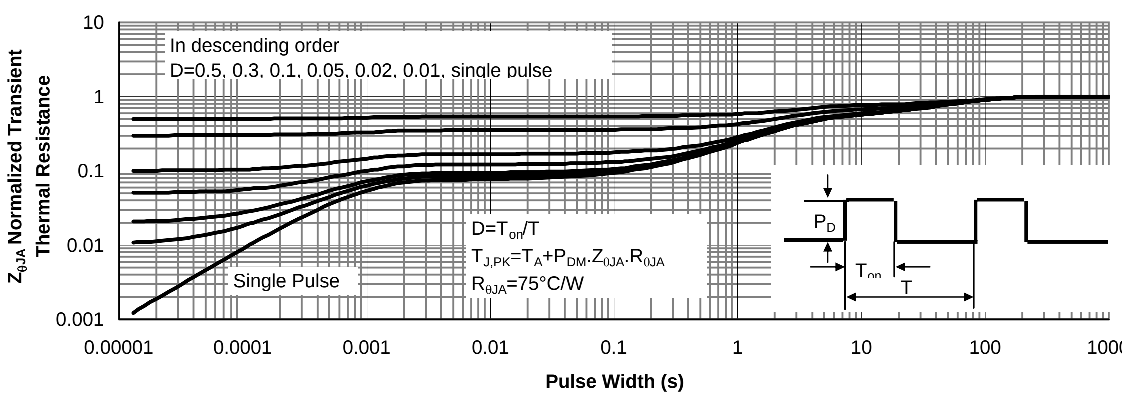


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)