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AO4722

30V N-Channel MOSFET

SRFET™

General Description

SRFET™ The AO4722 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.

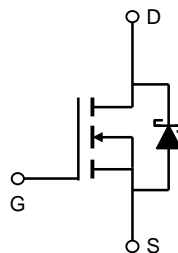
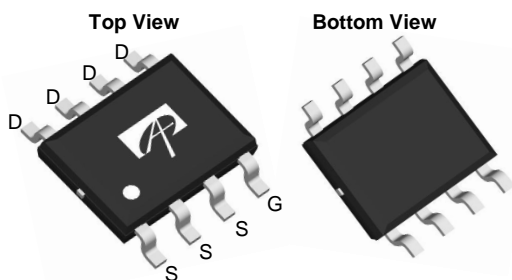
Product Summary

V_{DS} (V) = 30V
 I_D = 11.6A (V_{GS} = 10V)
 $R_{DS(ON)}$ < 14m Ω (V_{GS} = 10V)
 $R_{DS(ON)}$ < 22m Ω (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	10 Sec	Steady State	Units	
Drain-Source Voltage	V_{DS}	30		V	
Gate-Source Voltage	V_{GS}	± 20			
Continuous Drain Current ^A	I_{DSM}	$T_A=25^\circ\text{C}$	11.6	8.5	A
		$T_A=70^\circ\text{C}$	9.3	6.8	
Pulsed Drain Current ^B	I_{DM}	100			
Avalanche Current ^B	I_{AR}	17			
Repetitive avalanche energy $L=0.3\text{mH}$ ^B	E_{AR}	43		mJ	
Power Dissipation	P_{DSM}	$T_A=25^\circ\text{C}$	3.1	1.7	W
		$T_A=70^\circ\text{C}$	2.0	1.1	
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	$^\circ\text{C}/\text{W}$
Maximum Junction-to-Ambient ^A		60	75	$^\circ\text{C}/\text{W}$
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	17	24	$^\circ\text{C}/\text{W}$

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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 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	100			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =11.6A T _J =125°C		11.5	14	mΩ
		V _{GS} =4.5V, I _D =9.3A		17	21	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =11.6A		28		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.43	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		903	1100	pF
C _{oss}	Output Capacitance			225		pF
C _{rss}	Reverse Transfer Capacitance			91		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.7	2.6	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =11.6A		15.3	20	nC
Q _{g(4.5V)}	Total Gate Charge			7.8	10	nC
Q _{gs}	Gate Source Charge			2.0		nC
Q _{gd}	Gate Drain Charge			3.9		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =1.3Ω, R _{GEN} =3Ω		5.0		ns
t _r	Turn-On Rise Time			9.2		ns
t _{D(off)}	Turn-Off DelayTime			17.8		ns
t _f	Turn-Off Fall Time			4.4		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =11.6A, di/dt=300A/μs		17	20	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =11.6A, di/dt=300A/μs		30.0		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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

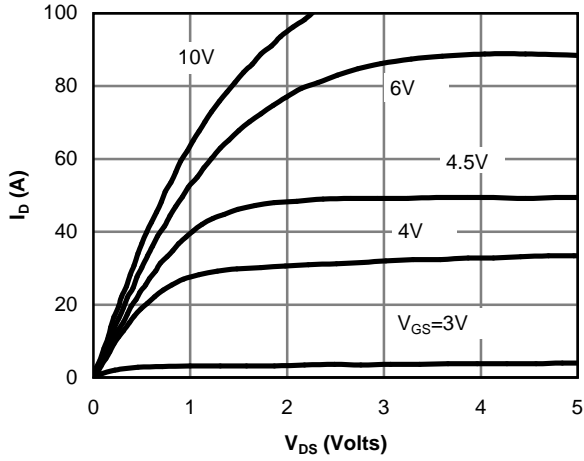


Figure 1: On-Region Characteristics

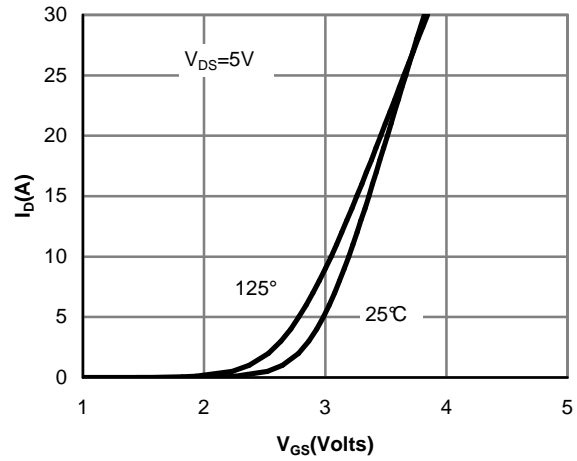


Figure 2: Transfer Characteristics

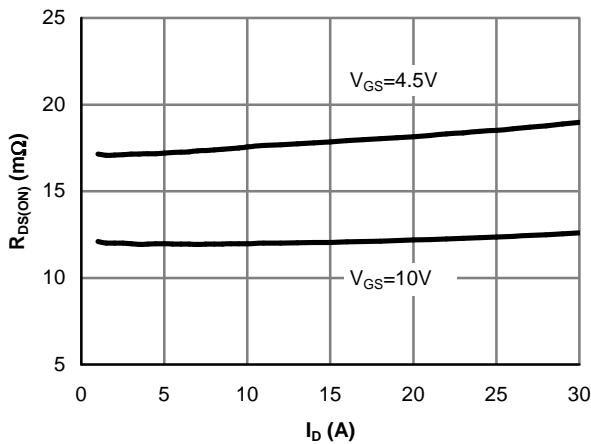


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

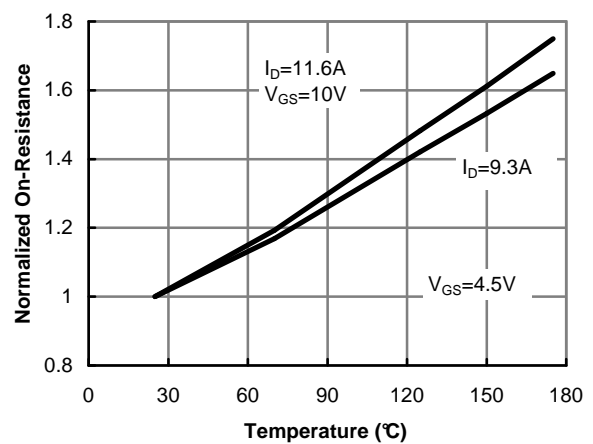


Figure 4: On-Resistance vs. Junction Temperature

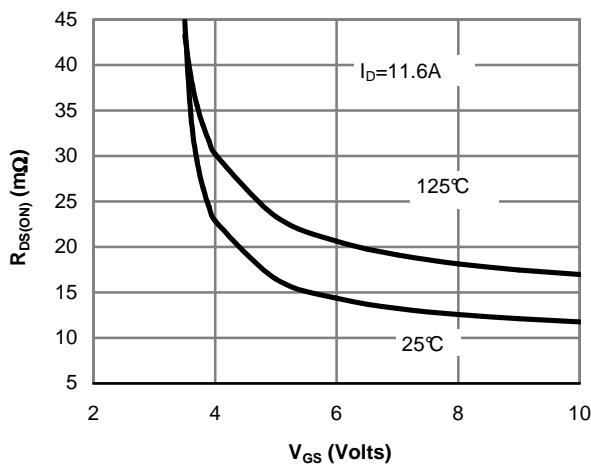


Figure 5: On-Resistance vs. Gate-Source Voltage

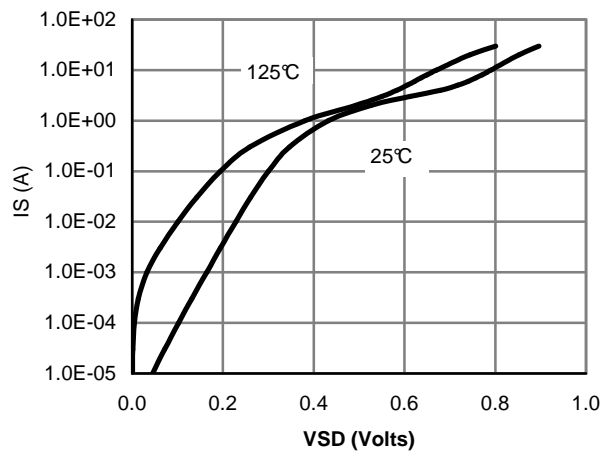


Figure 6: Body-Diode Characteristics

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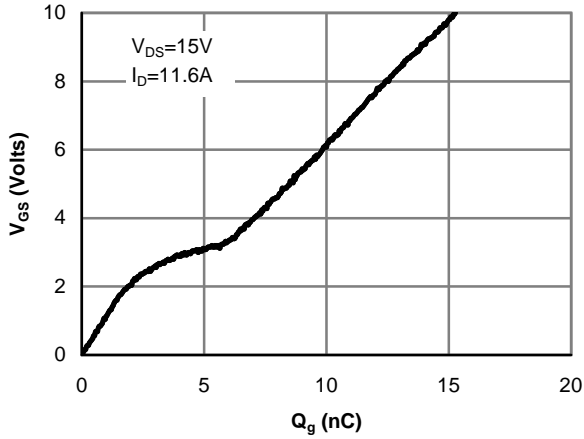


Figure 7: Gate-Charge Characteristics

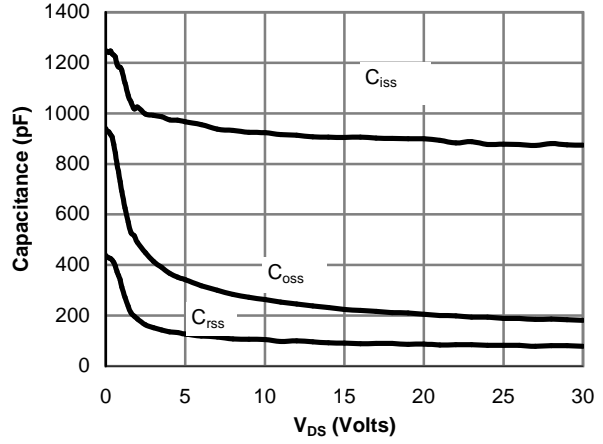


Figure 8: Capacitance Characteristics

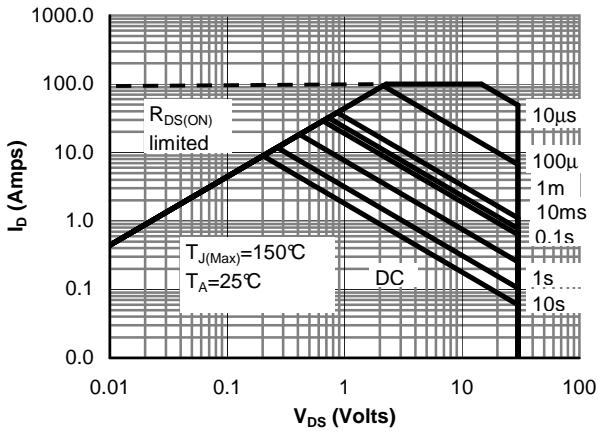


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

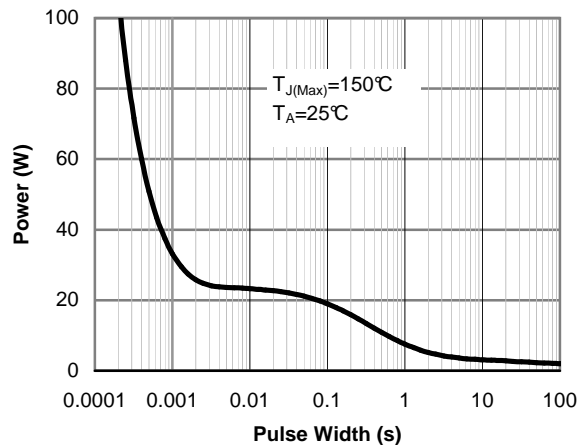


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

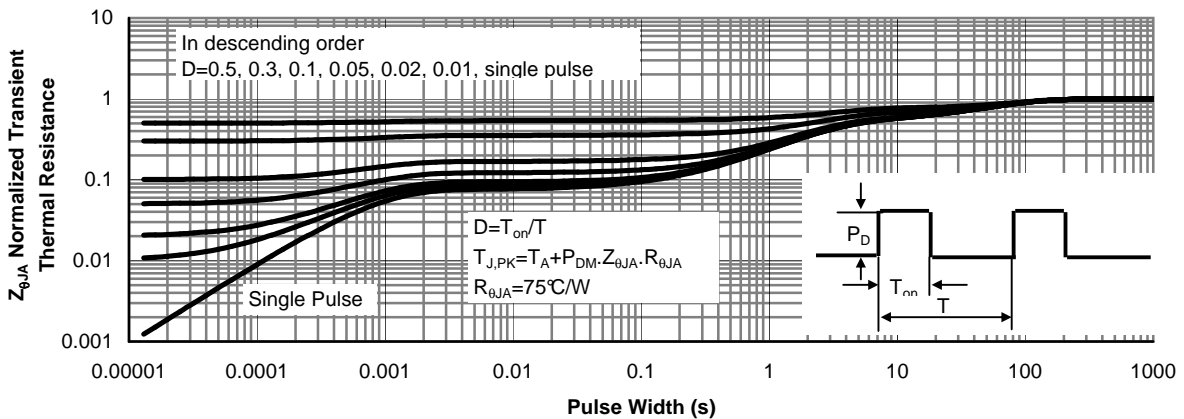


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)