



AO4724

N-Channel Enhancement Mode Field Effect Transistor

SRFET™

General Description

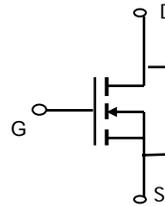
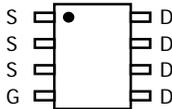
SRFET™ The AO4724 uses advanced trench technology with a monolithically integrated Schottky diode to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a low side FET in SMPS, load switching and general purpose applications. Standard product AO4724 is Pb-free (meets ROHS & Sony 259 specifications).

Features

V_{DS} (V) = 30V
 I_D = 10.5A (V_{GS} = 10V)
 $R_{DS(ON)}$ < 17.5m Ω (V_{GS} = 10V)
 $R_{DS(ON)}$ < 29 m Ω (V_{GS} = 4.5V)

UIS TESTED!
Rg,Ciss,Coss,Crss 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	
		10 Sec	Steady State		
Drain-Source Voltage	V_{DS}	30		V	
Gate-Source Voltage	V_{GS}	± 20		V	
Continuous Drain Current ^{AF}	I_D	$T_A=25^\circ\text{C}$	10.5	7.7	A
		$T_A=70^\circ\text{C}$	8.5	6.2	
Pulsed Drain Current ^B	I_{DM}	80			
Power Dissipation	P_D	$T_A=25^\circ\text{C}$	3.1	1.7	W
		$T_A=70^\circ\text{C}$	2.0	1.1	
Avalanche Current ^B	I_{AR}	13		A	
Repetitive avalanche energy 0.3mH ^B	E_{AR}	25		mJ	
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 ^{AF} $t \leq 10\text{s}$	$R_{\theta JA}$	31	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A Steady-State		59	75	$^\circ\text{C/W}$
Maximum Junction-to-Lead ^C Steady-State	$R_{\theta JL}$	16	24	$^\circ\text{C/W}$

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 =250μA, V _{GS} =0V	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V T _J =55°C			0.1 20	mA
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	1.3	1.64	2	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 =10.5A T _J =125°C		14.4 21.5	17.5 25.8	mΩ
		V _{GS} =4.5V, I _D =8A		22.7	29.0	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =10.5A		23		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.4	0.5	V
I _S	Maximum Body-Diode + Schottky Continuous Current				4.8	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		696	900	pF
C _{oss}	Output Capacitance			199		pF
C _{rss}	Reverse Transfer Capacitance			81		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 =10.5A		12.4	16	nC
Q _{g(4.5V)}	Total Gate Charge			6.1	8	nC
Q _{gs}	Gate Source Charge			2.04		nC
Q _{gd}	Gate Drain Charge			2.7		nC
t _{D(on)}	Turn-On Delay Time	V _{GS} =10V, V _{DS} =15V, R _L =1.43Ω, R _{GEN} =3Ω		2.6		ns
t _r	Turn-On Rise Time			6.8		ns
t _{D(off)}	Turn-Off Delay Time			17		ns
t _f	Turn-Off Fall Time			3.6		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =10.5A, dI/dt=300A/μs		20.2	26	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =10.5A, dI/dt=300A/μs		7.9		nC

A: The value of R_{θJA} 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.

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 <300μs 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 10s junction to ambient thermal resistance rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

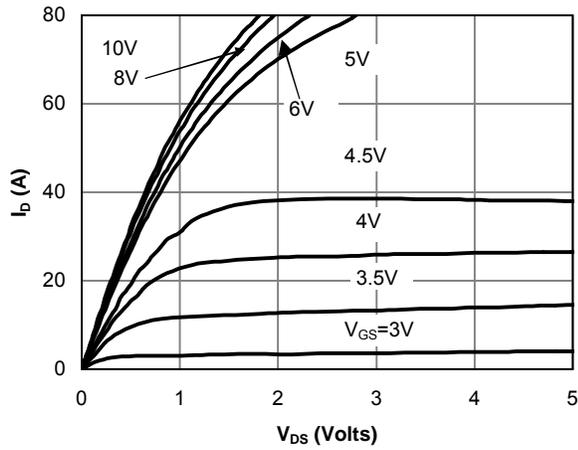


Fig 1: On-Region Characteristics

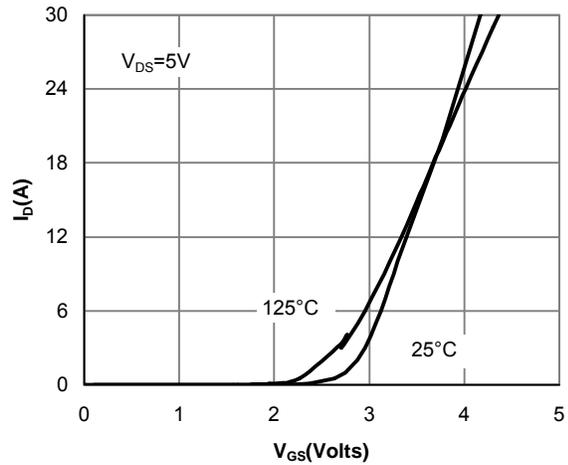


Figure 2: Transfer Characteristics

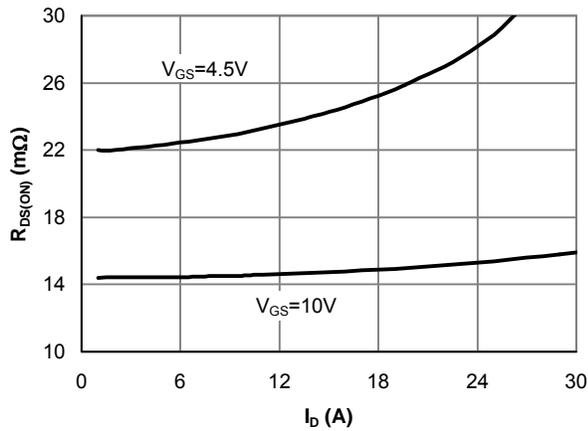


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

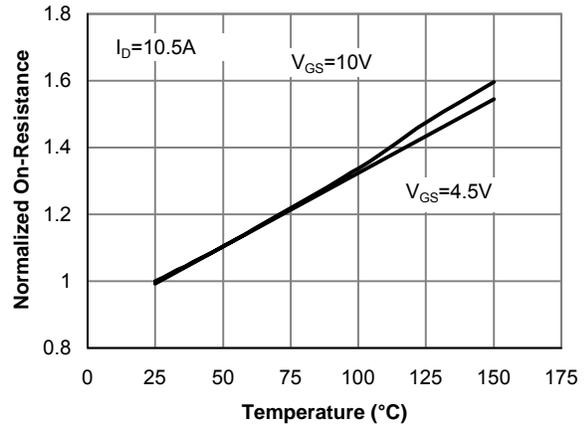


Figure 4: On-Resistance vs. Junction Temperature

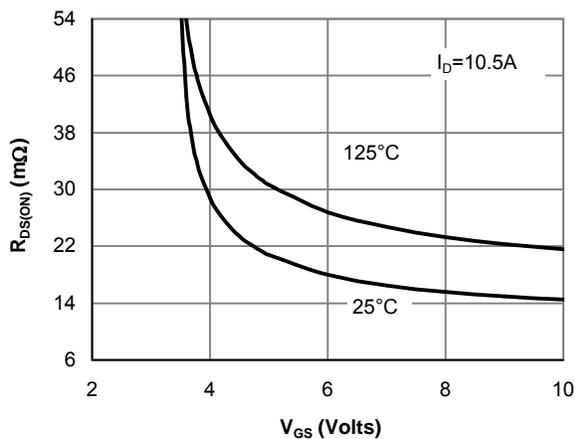


Figure 5: On-Resistance vs. Gate-Source Voltage

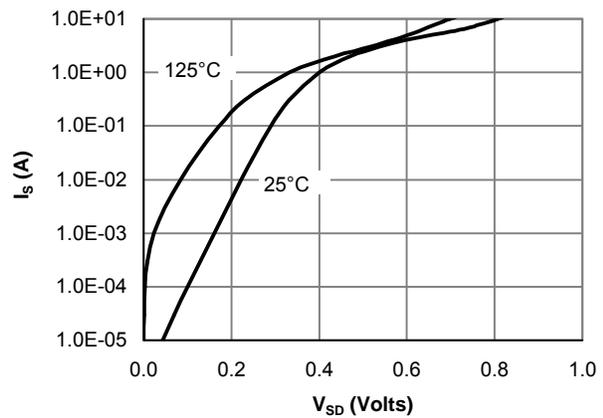


Figure 6: Body-Diode Characteristics

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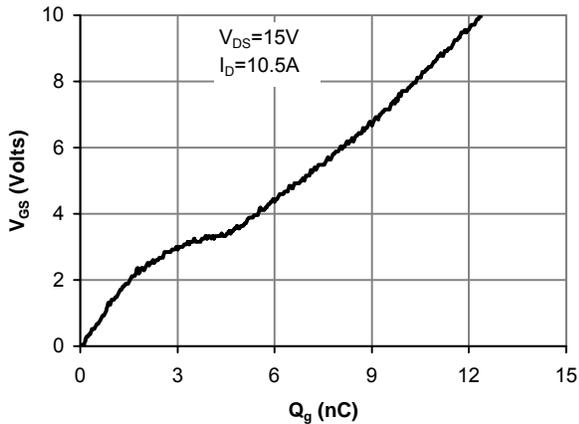


Figure 7: Gate-Charge Characteristics

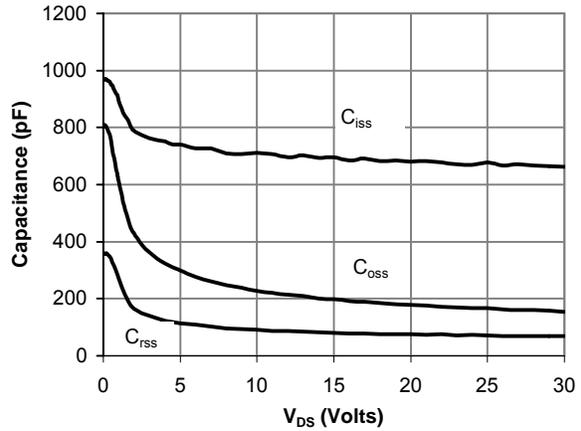


Figure 8: Capacitance Characteristics

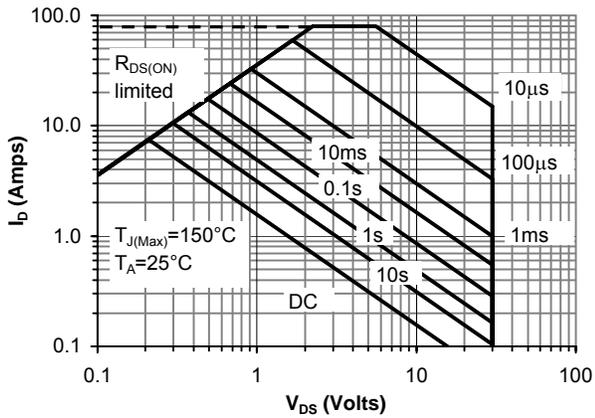


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

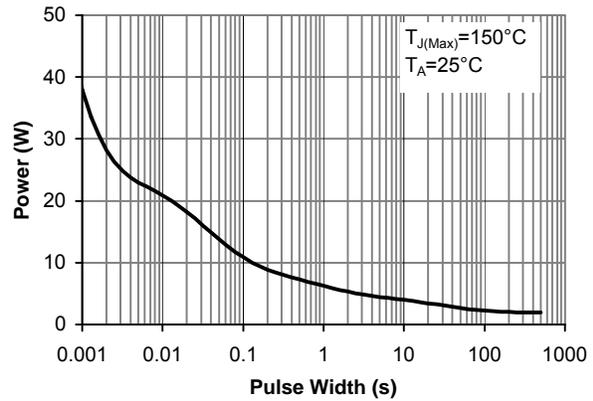


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

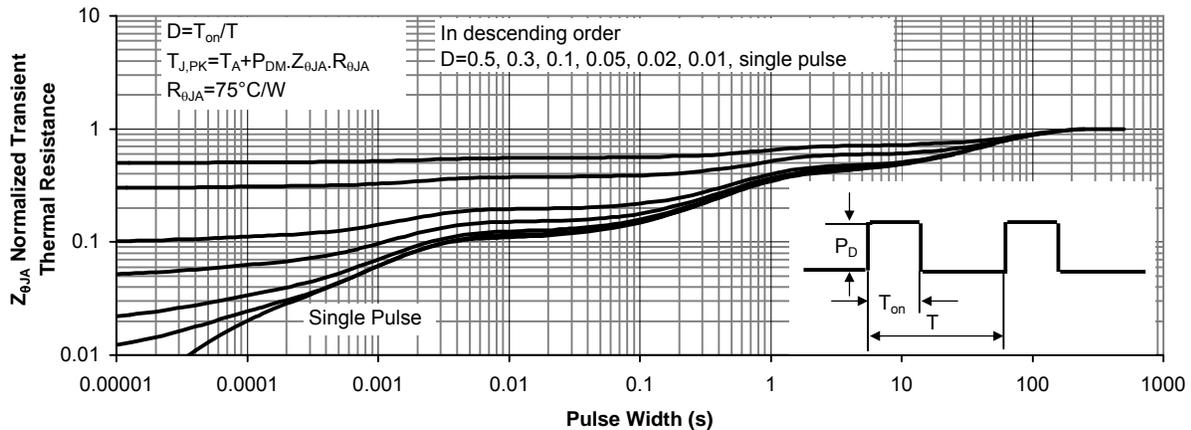


Figure 11: Normalized Maximum Transient Thermal Impedance