ALPHA & OMEGA SEMICONDUCTOR

AO4708

30V N-Channel MOSFET

***SRFET*™**

General Description

***SRFET*™** AO4708 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.

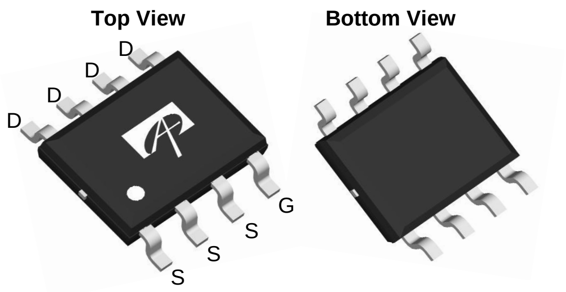
Product Summary

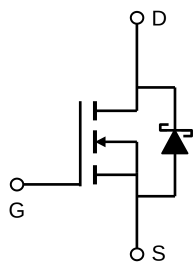
V_{DS} (V) = 30V
I_D =15A (V_{GS} = 10V)
$R_{DS(ON)}$ < 8.7mΩ (V_{GS} = 10V)
$R_{DS(ON)}$ < 10.5mΩ (V_{GS} = 4.5V)

100% UIS Tested
100% Rg Tested

Green Product

SOIC-8





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

Absolute Maximum Ratings T_A=25°C unless otherwise noted				
Parameter		**Symbol**	**Maximum**	**Units**
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current [A]	T_A=25°C	I_{DSM}	15	A
	T_A=70°C		12	
Pulsed Drain Current [B]		I_{DM}	80	A
Avalanche Current [B]		I_{AR}	25	A
Repetitive avalanche energy L=0.3mH [B]		E_{AR}	94	mJ
Power Dissipation[A]	T_A=25°C	P_{DSM}	3.1	W
	T_A=70°C		2.0	
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℃ 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}=24V, V_{GS}=0V				0.1	mA
			T_J=125℃			20	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±12V				0.1	µA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250µA		1.4	1.8	2.4	V
$I_{D(ON)}$	On state drain current	V_{GS}=4.5V, V_{DS}=5V		80			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=15A			7.2	8.7	mΩ
			T_J=125℃		10.5	13.1	
		V_{GS}=4.5V, I_D=14A			8.6	10.5	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=15A			85		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V			0.39	0.5	V
I_S	Maximum Body-Diode + Schottky Continuous Current					5.5	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz			2800	3360	pF
C_{oss}	Output Capacitance				390		pF
C_{rss}	Reverse Transfer Capacitance				145		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz			0.8	1.5	Ω
SWITCHING PARAMETERS							
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=15A			42	52	nC
Q_g(4.5V)	Total Gate Charge				19		nC
Q_{gs}	Gate Source Charge				7		nC
Q_{gd}	Gate Drain Charge				6		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=1Ω, R_{GEN}=3Ω			7		ns
t_r	Turn-On Rise Time				7		ns
$t_{D(off)}$	Turn-Off DelayTime				31		ns
t_f	Turn-Off Fall Time				5		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=15A, dI/dt=300A/µs			13	15	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=15A, dI/dt=300A/µs			12		nC

A: The value of $R_{\theta JA}$ is measured with the device in a still air environment with T_A =25℃. The power dissipation P_{DSM} and current rating I_{DSM} are based on $T_{J(MAX)}$=150℃, using t ≤ 10s junction-to-ambient thermal resistance.

B: Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150℃.

C. The R_{θ}JA is the sum of the thermal impedence 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℃. The SOA curve provides a single pulse rating.

Rev1: Nov. 2010

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

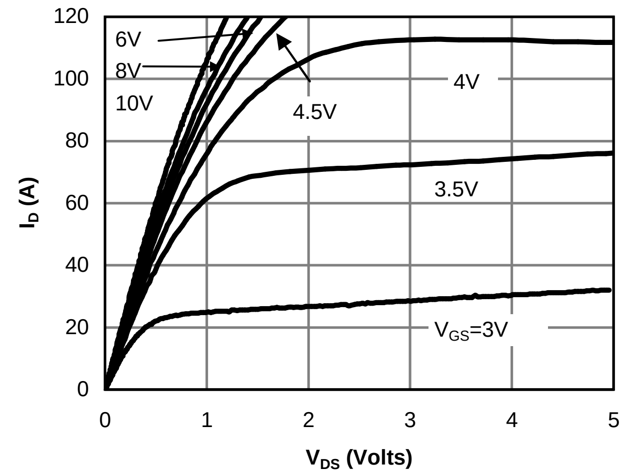


Figure 1: On-Region Characteristics

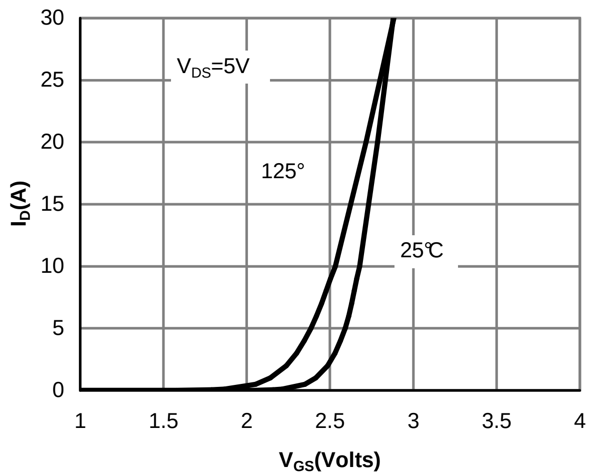


Figure 2: Transfer Characteristics

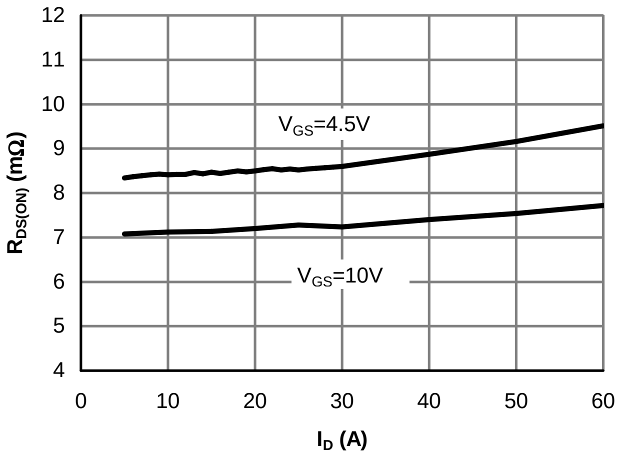


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

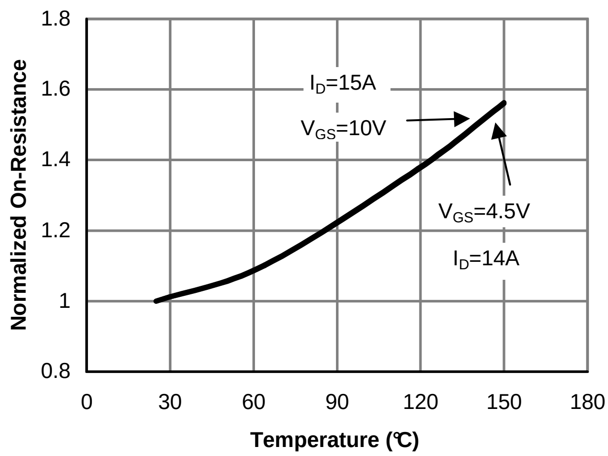


Figure 4: On-Resistance vs. Junction Temperature

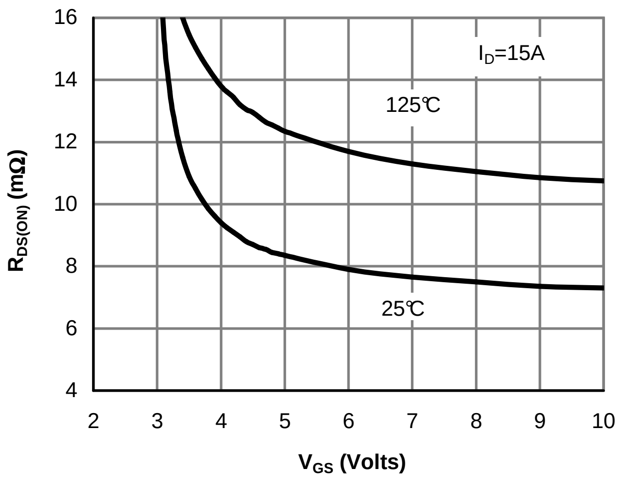


Figure 5: On-Resistance vs. Gate-Source Voltage

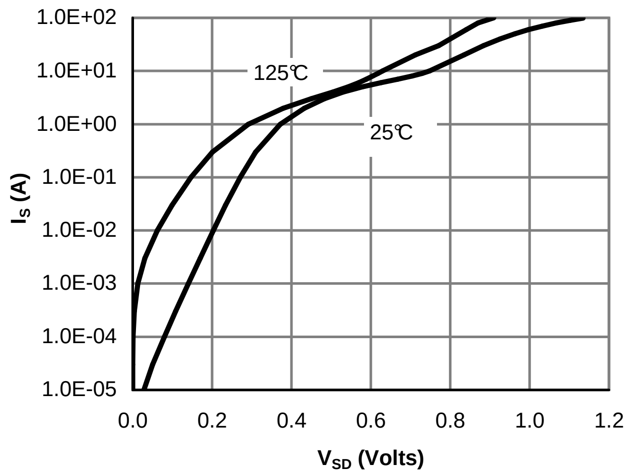


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

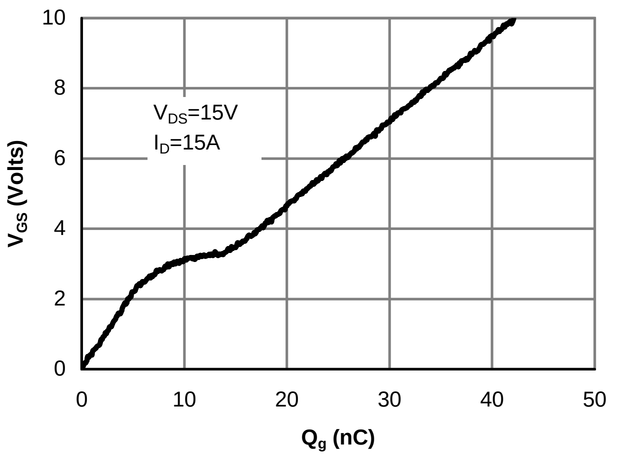


Figure 7: Gate-Charge Characteristics

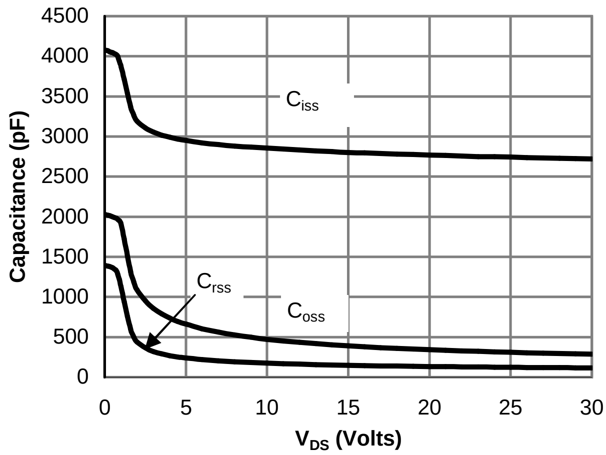


Figure 8: Capacitance Characteristics

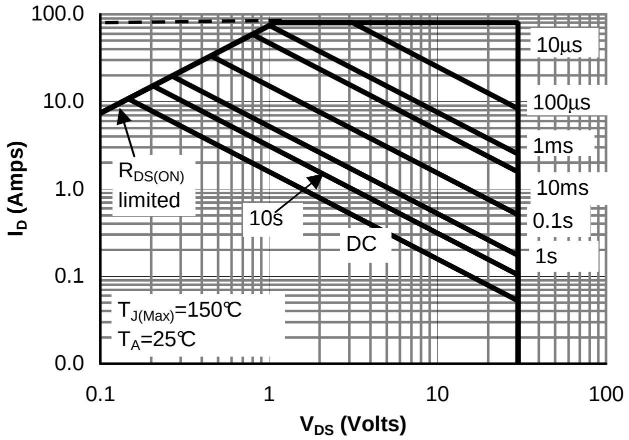


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

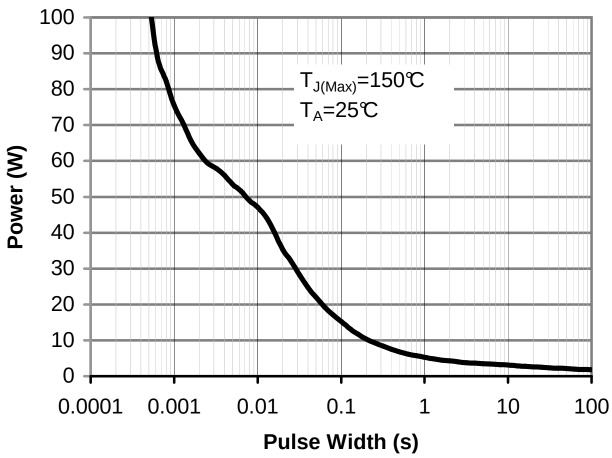


Figure10: Single Pulse Power Rating Junction-to-Ambient (Note E)

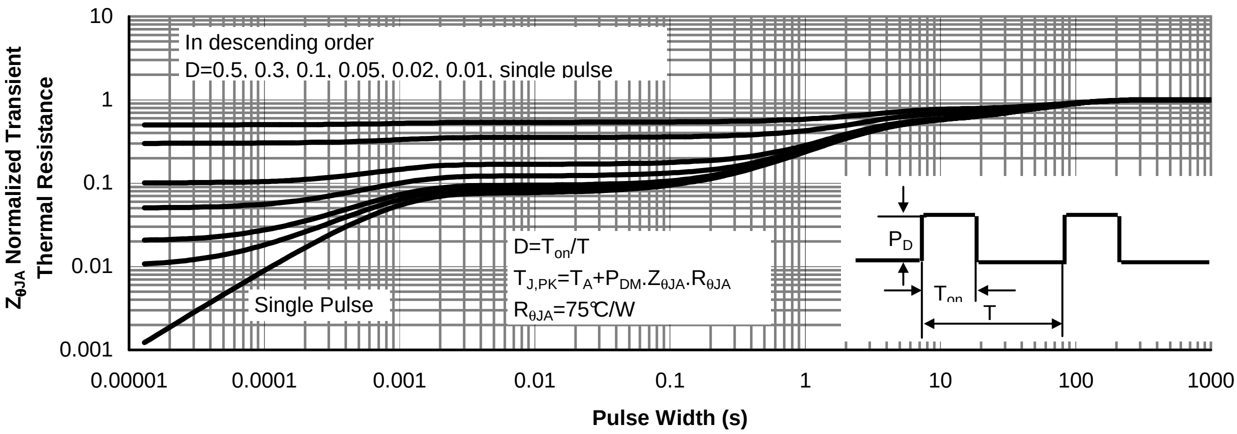


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

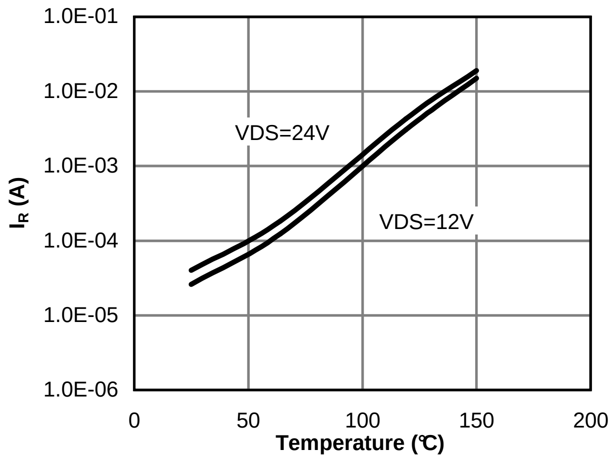


Figure 12: Diode Reverse Leakage Current vs. Junction Temperature

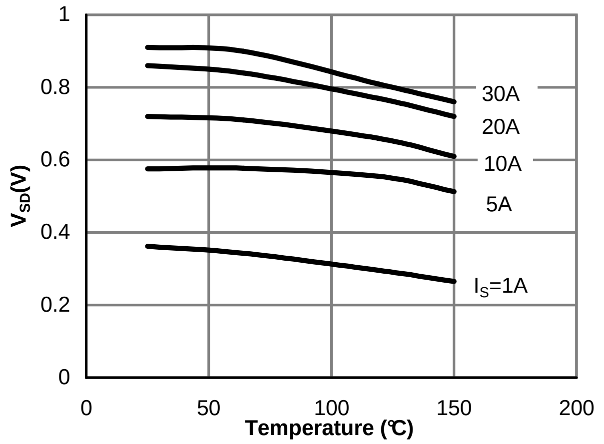


Figure 13: Diode Forward voltage vs. Junction Temperature

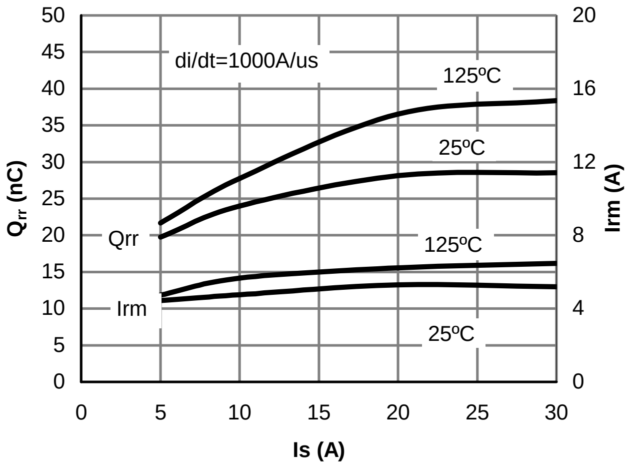


Figure 14: Diode Reverse Recovery Charge and Peak Current vs. Conduction Current

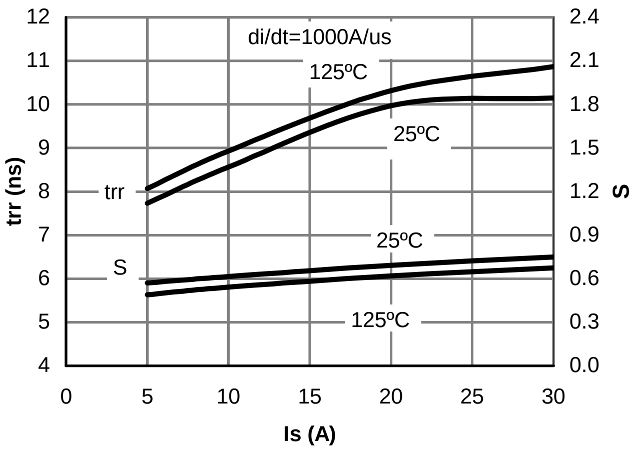


Figure 15: Diode Reverse Recovery Time and Soft Coefficient vs. Conduction Current

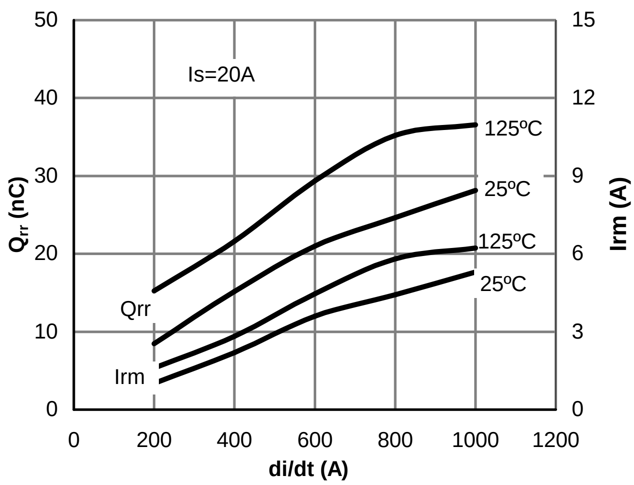


Figure 16: Diode Reverse Recovery Charge and Peak Current vs. di/dt

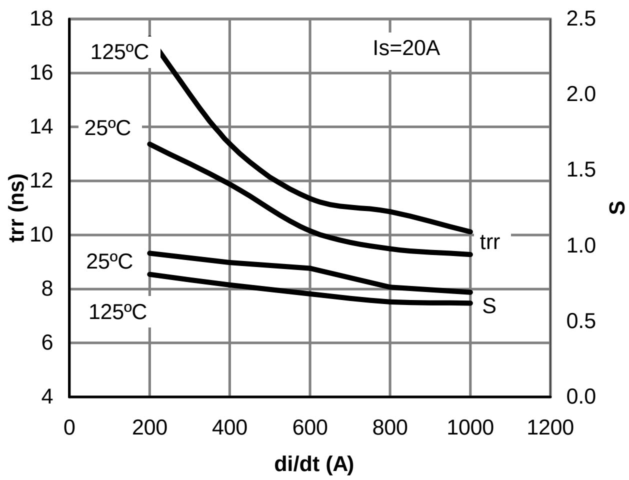


Figure 17: Diode Reverse Recovery Time and Soft Coefficient vs. di/dt