ALPHA & OMEGA SEMICONDUCTOR

AON7700
N-Channel Enhancement Mode Field Effect Transistor
SRFET ™

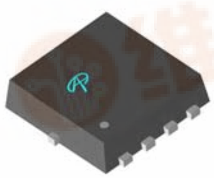
General Description
SRFET™ AON7700/L uses advanced trench technology with a monolithically integrated Schottky diode to provide excellent $R_{DS(ON)}$,and low gate charge.
This device is suitable for use as a low side FET in SMPS, load switching and general purpose applications.

- RoHS Compliant.
- Halogen Free

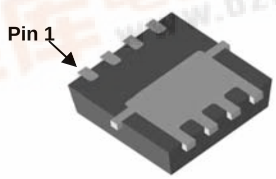
Features
V_{DS} (V) = 30V
I_D = 12A (V$_{GS}$ = 10V)
$R_{DS(ON)}$ < 8.5mΩ (V$_{GS}$ = 10V)
$R_{DS(ON)}$ < 10mΩ (V$_{GS}$ = 4.5V)

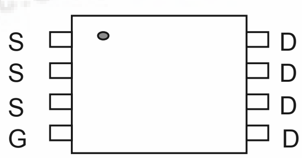
DFN 3x3

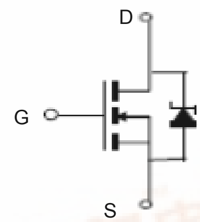
Top View



Bottom View







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 [B,H]	T_C=25°C	I_D	20	A
	T_C=100°C		20	
Pulsed Drain Current [C]		I_{DM}	80	
Continuous Drain Current [G]	T_A=25°C	I_{DSM}	12	
	T_A=70°C		11	
Power Dissipation [B]	T_C=25°C	P_D	33	W
	T_C=100°C		13	
Power Dissipation [A]	T_A=25°C	P_{DSM}	3.1	
	T_A=70°C		2	
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	$R_{\theta JA}$	30	40	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		60	75	°C/W
Maximum Junction-to-Case [D]	Steady-State	$R_{\theta JC}$	3.1	3.7	°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				100	µA
			T_J=55°C			500	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±12V				100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250µA		1	1.7	3	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=12A			6.7	8.5	mΩ
			T_J=125°C		9	12	
		V_{GS}=4.5V, I_D=10A			8	10	
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=12A			27		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V			0.39	0.5	V
I_S	Maximum Body-Diode Continuous Current					6	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz			3395	4250	pF
C_{oss}	Output Capacitance				490		pF
C_{rss}	Reverse Transfer Capacitance				185		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz			1	1.5	Ω
SWITCHING PARAMETERS							
Q_g	Total Gate Charge	V_{GS}=4.5V, V_{DS}=15V, I_D=10A			25	33	nC
Q_{gs}	Gate Source Charge				9.5		nC
Q_{gd}	Gate Drain Charge				8.4		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=1.25Ω, R_{GEN}=3Ω			11		ns
t_r	Turn-On Rise Time				16		ns
$t_{D(off)}$	Turn-Off DelayTime				38		ns
t_f	Turn-Off Fall Time				21		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=12A, dI/dt=100A/µs			28	36	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=12A, dI/dt=100A/µs			15		nC

A: The value of $R_{\theta JA}$ is measured with the device in a still air environment with T_A =25°C. The power dissipation P_{DSM} and current rating I_{DSM} are based on $T_{J(MAX)}$=150°C, using t ≤ 10s junction-to-ambient thermal resistance.
B. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
C: Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to case $R_{\theta JC}$ and case to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300 µs pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-case thermal impedence which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C. The SOA curve provides a single pulse rating.
G. 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.
H. The maximum current rating is limited by bond-wires.
Rev0: September 2007

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

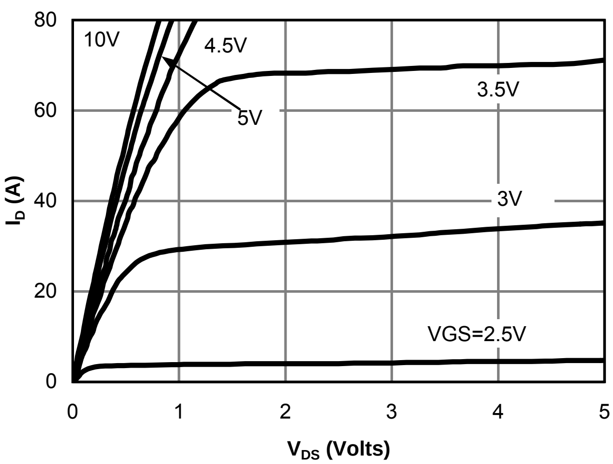


Figure 1: On-Region Characteristics

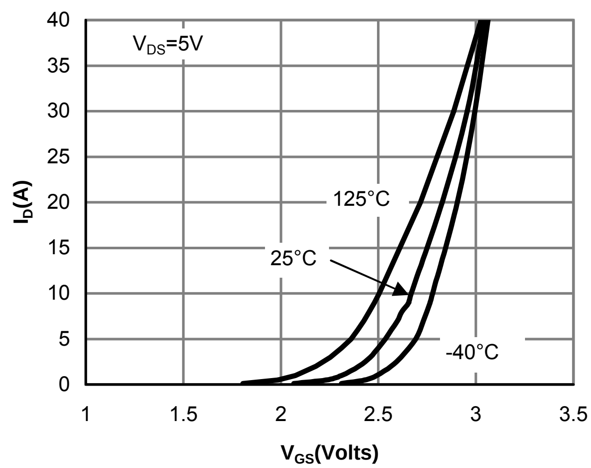


Figure 2: Transfer Characteristics

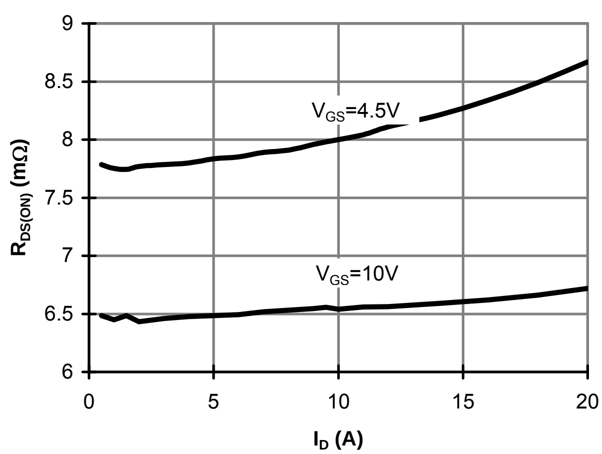


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

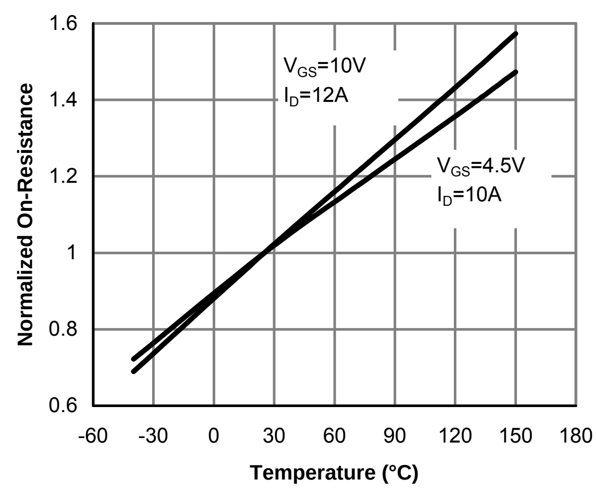


Figure 4: On-Resistance vs. Junction Temperature

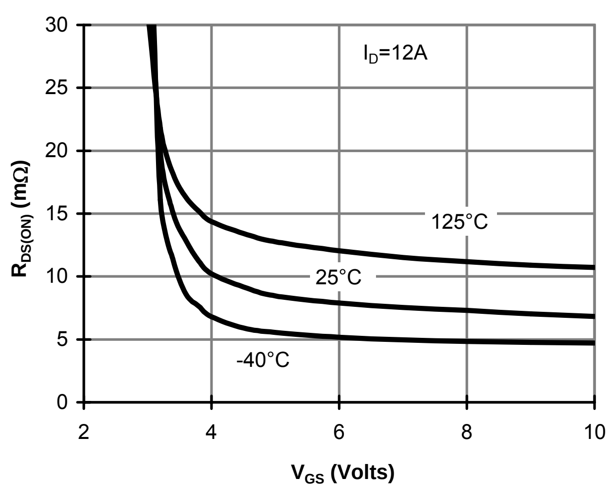


Figure 5: On-Resistance vs. Gate-Source Voltage

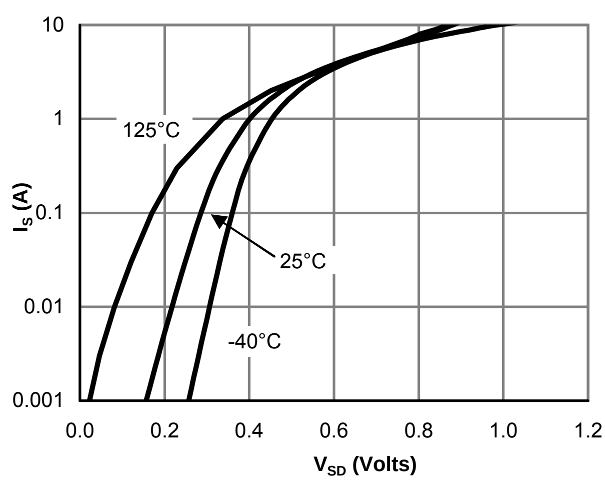


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

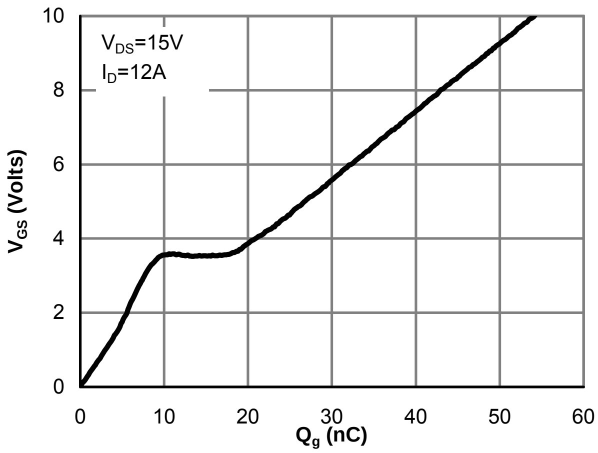


Figure 7: Gate-Charge Characteristics

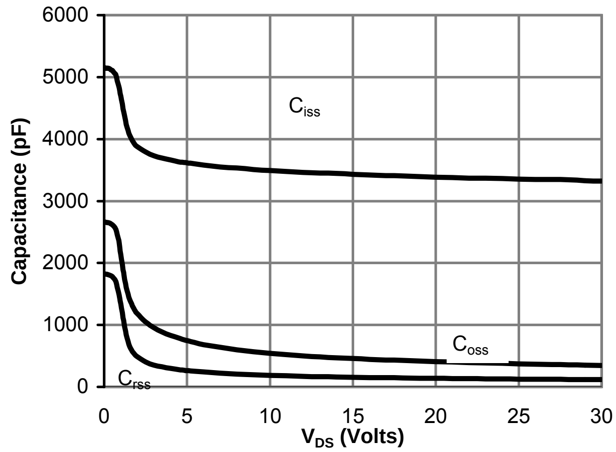


Figure 8: Capacitance Characteristics

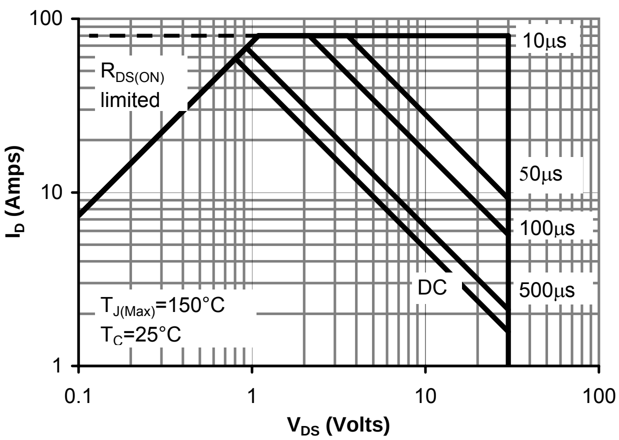


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

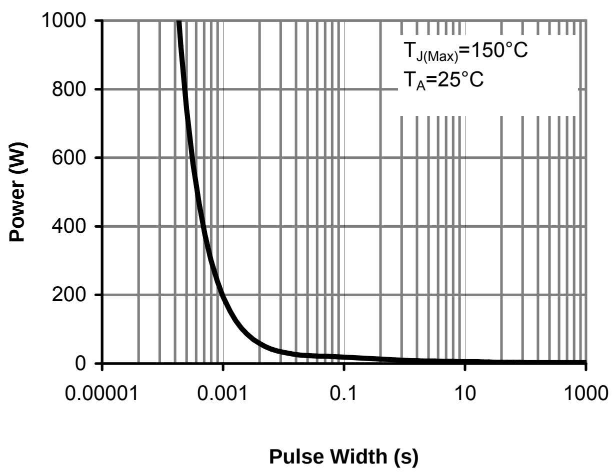


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note G)

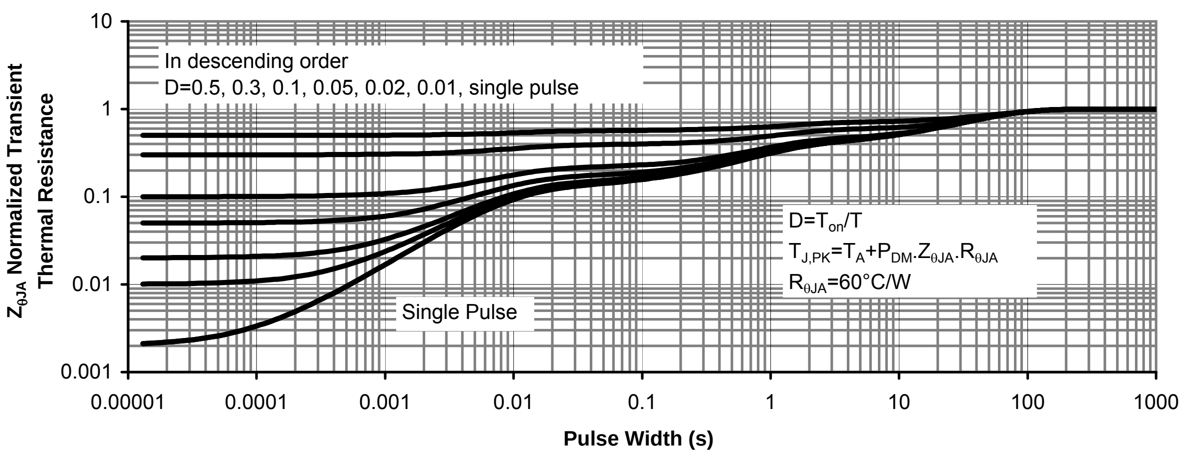


Figure 11: Normalized Maximum Transient Thermal Impedance (Note G)