

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

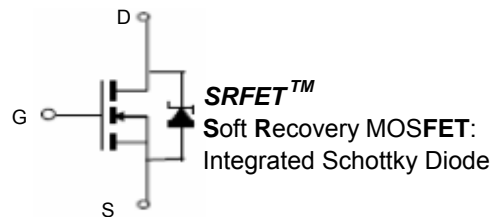
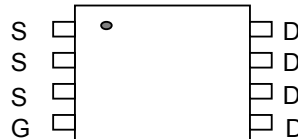
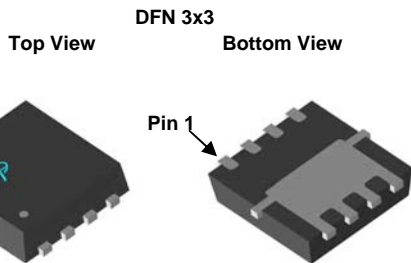
Features

$V_{DS} (V) = 30V$

$I_D = 12A \quad (V_{GS} = 10V)$

$R_{DS(ON)} < 8.5m\Omega \quad (V_{GS} = 10V)$

$R_{DS(ON)} < 10m\Omega \quad (V_{GS} = 4.5V)$


Absolute Maximum Ratings $T_A=25^\circ C$ 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}	I_D	$T_C=25^\circ C$	A
		$T_C=100^\circ C$	
Pulsed Drain Current ^C	I_{DM}	80	A
Continuous Drain Current ^G	I_{DSM}	$T_A=25^\circ C$	W
		$T_A=70^\circ C$	
Power Dissipation ^B	P_D	$T_C=25^\circ C$	W
		$T_C=100^\circ C$	
Power Dissipation ^A	P_{DSM}	$T_A=25^\circ C$	W
		$T_A=70^\circ C$	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	30	40	$^\circ C/W$
Maximum Junction-to-Ambient ^A				
Maximum Junction-to-Case ^D	$R_{\theta JC}$	3.1	3.7	$^\circ C/W$

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			100 500	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 12\text{V}$			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1	1.7	3	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$, $V_{DS}=5\text{V}$	80			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=12\text{A}$ $T_J=125^\circ\text{C}$ $V_{GS}=4.5\text{V}$, $I_D=10\text{A}$		6.7 9 8	8.5 12 10	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=12\text{A}$		27		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.39	0.5	V
I_S	Maximum Body-Diode Continuous Current				6	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1\text{MHz}$		3395	4250	pF
C_{oss}	Output Capacitance			490		pF
C_{rss}	Reverse Transfer Capacitance			185		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		1	1.5	Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	$V_{GS}=4.5\text{V}$, $V_{DS}=15\text{V}$, $I_D=10\text{A}$		25	33	nC
Q_{gs}	Gate Source Charge			9.5		nC
Q_{gd}	Gate Drain Charge			8.4		nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $R_L=1.25\Omega$, $R_{GEN}=3\Omega$		11		ns
t_r	Turn-On Rise Time			16		ns
$t_{D(off)}$	Turn-Off Delay Time			38		ns
t_f	Turn-Off Fall Time			21		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=12\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		28	36	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=12\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		15		nC

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

B: The power dissipation P_D is based on $T_{J(MAX)}=150^\circ\text{C}$, 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 $T_{J(MAX)}=150^\circ\text{C}$.

D: The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.

E: The static characteristics in Figures 1 to 6 are obtained using $<300 \mu\text{s}$ pulses, duty cycle 0.5% max.

F: These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}=150^\circ\text{C}$. The SOA curve provides a single pulse rating.

G: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.

H: The maximum current rating is limited by bond-wires.

Rev0: September 2007

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

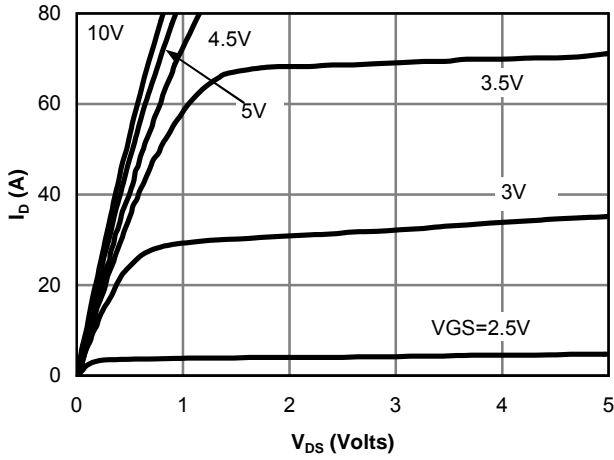


Figure 1: On-Region Characteristics

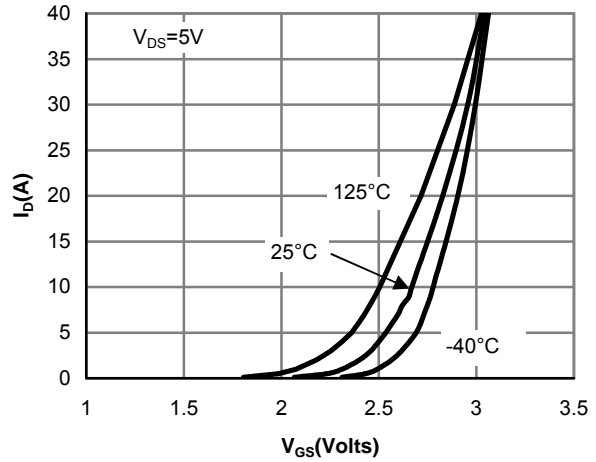


Figure 2: Transfer Characteristics

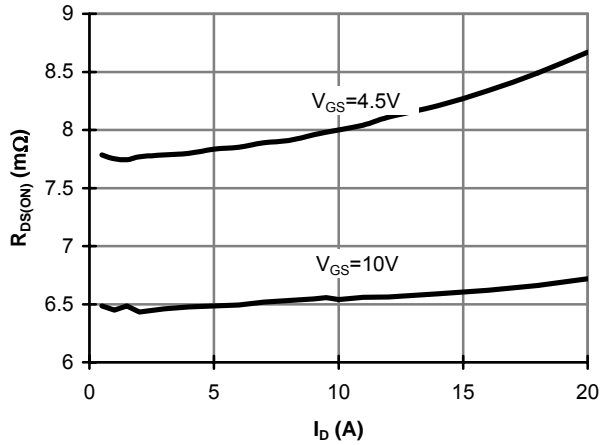


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

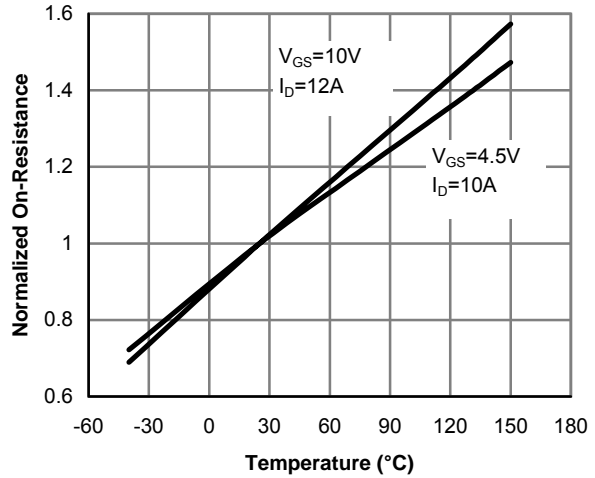


Figure 4: On-Resistance vs. Junction Temperature

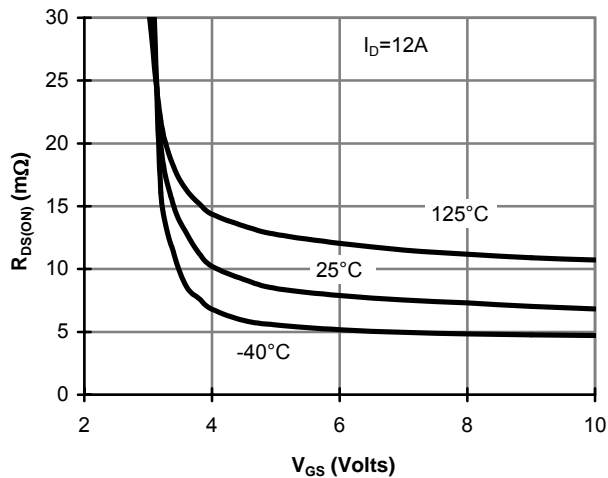


Figure 5: On-Resistance vs. Gate-Source Voltage

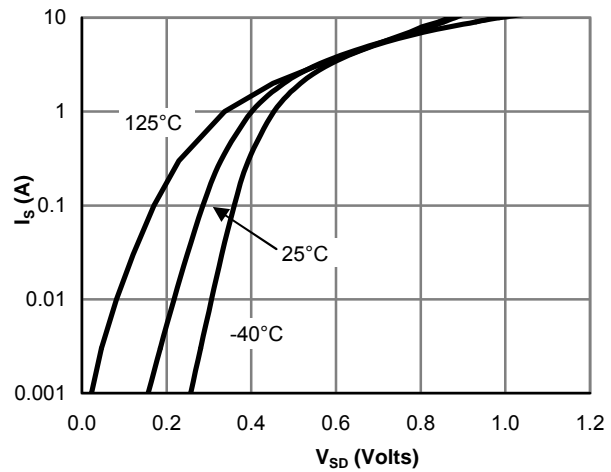


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

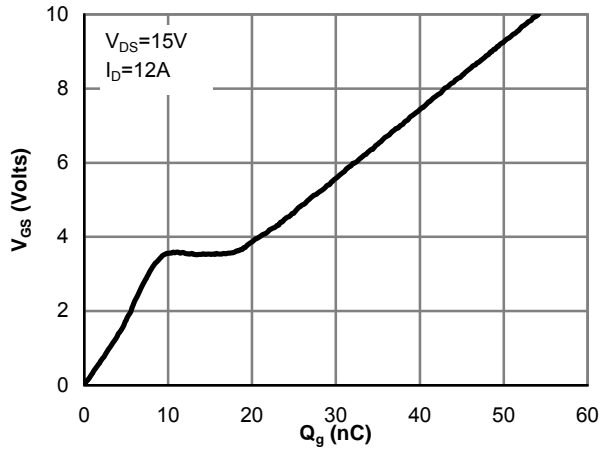


Figure 7: Gate-Charge Characteristics

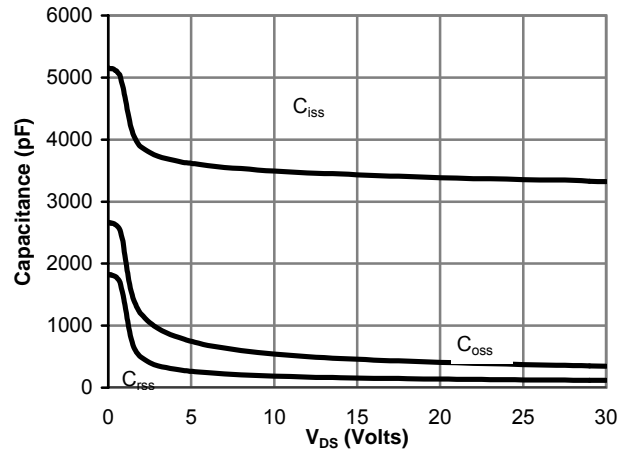


Figure 8: Capacitance Characteristics

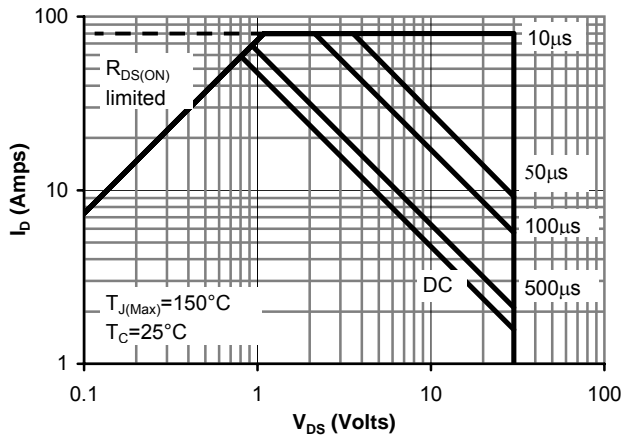


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

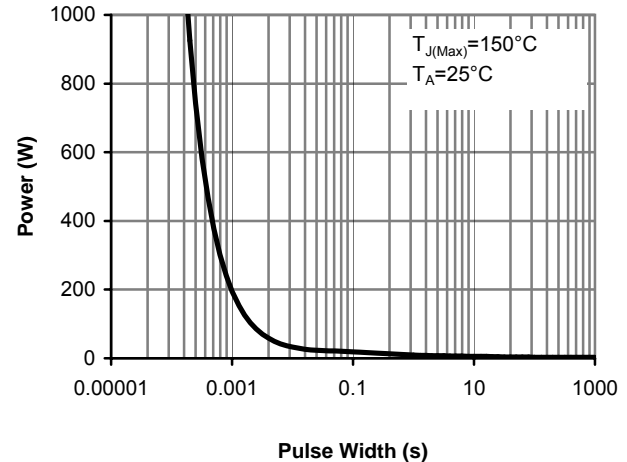


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note G)

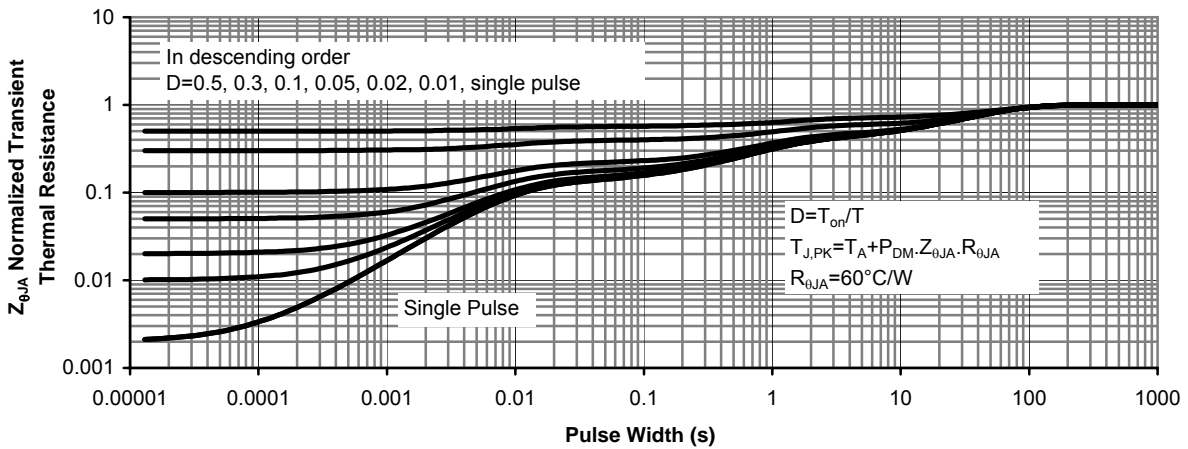


Figure 11: Normalized Maximum Transient Thermal Impedance (Note G)