

AON3702
N-Channel Enhancement Mode Field Effect Transistor
SRFET™

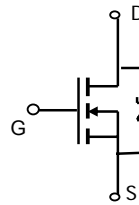
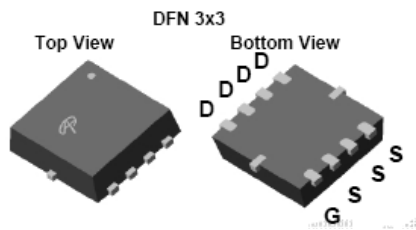
General Description

SRFET™ AON3702 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 AON3702 is Pb-free (meets ROHS & Sony 259 specifications). AON3702L is a Green Product ordering option. AON3702 and AON3702L are electrically identical.*

Features

V_{DS} (V) = 30V
 I_D = 11A (V_{GS} = 10V)
 $R_{DS(ON)} < 14.5m\Omega$ (V_{GS} = 10V)
 $R_{DS(ON)} < 18m\Omega$ (V_{GS} = 4.5V)

R_g, C_{iss}, C_{oss}, C_{rss} Tested



SRFET™
 Soft Recovery MOSFET:
 Integrated Schottky Diode

Absolute Maximum Ratings $T_A=25^\circ\text{C}$ 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	I_{DSM}	$T_A=25^\circ\text{C}$	11
		$T_A=70^\circ\text{C}$	8.8
Pulsed Drain Current ^B	I_{DM}	60	
Power Dissipation	P_{DSM}	$T_A=25^\circ\text{C}$	3.0
		$T_A=70^\circ\text{C}$	1.9
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	$R_{\theta JA}$	$t \leq 10s$	32	42
		Steady-State	65	100
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	25	35	$^\circ\text{C/W}$

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	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$ $T_J=125^\circ\text{C}$		0.01 4	0.1 10	mA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 12\text{V}$			0.1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.5	1.9	2.4	V
$I_{D(ON)}$	On state drain current	$V_{GS}=4.5\text{V}$, $V_{DS}=5\text{V}$	60			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=11\text{A}$ $T_J=125^\circ\text{C}$ $V_{GS}=4.5\text{V}$, $I_D=10\text{A}$		12 19 15	14.5 24 18	m Ω
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}$, $I_D=11\text{A}$		64		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$, $V_{GS}=0\text{V}$		0.38	0.5	V
I_S	Maximum Body-Diode + Schottky Continuous Current				5.0	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1\text{MHz}$		1450	1885	pF
C_{oss}	Output Capacitance			224		pF
C_{rss}	Reverse Transfer Capacitance			92		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		1.6	3	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $I_D=11\text{A}$		24.0	31	
$Q_g(4.5\text{V})$	Total Gate Charge			12.0		nC
Q_{gs}	Gate Source Charge			3.9		nC
Q_{gd}	Gate Drain Charge			4.2		nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $R_L=1.4\Omega$, $R_{GEN}=3\Omega$		5.5		ns
t_r	Turn-On Rise Time			4.7		ns
$t_{D(off)}$	Turn-Off Delay Time			24.0		ns
t_f	Turn-Off Fall Time			4.0		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=11\text{A}$, $dI/dt=300\text{A}/\mu\text{s}$		10	12	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=11\text{A}$, $dI/dt=300\text{A}/\mu\text{s}$		6.8		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: Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$.

C: The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ 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 $T_A=25^\circ\text{C}$. The SOA curve provides a single pulse rating.

Rev0:Sept 2006

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

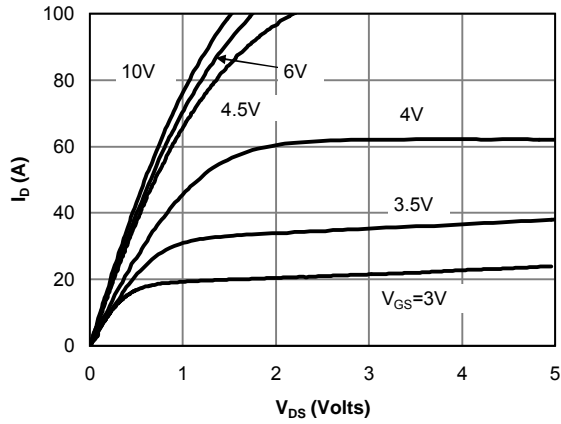


Figure 1: On-Region Characteristics

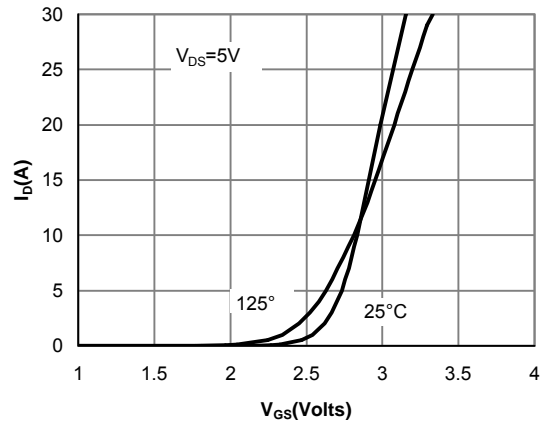


Figure 2: Transfer Characteristics

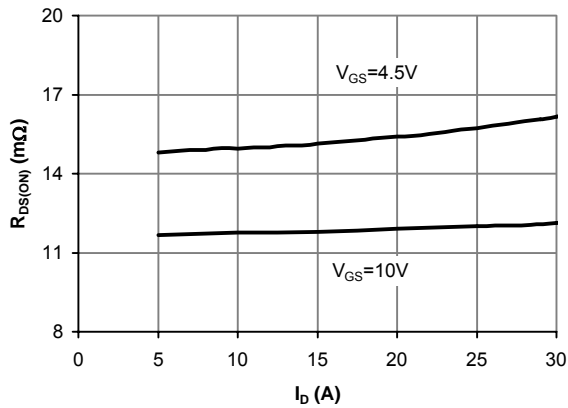


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

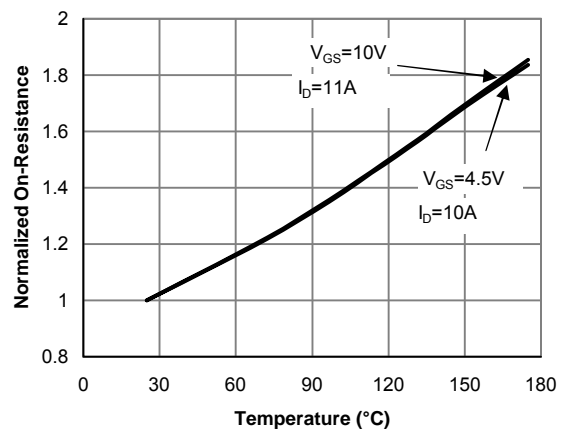


Figure 4: On-Resistance vs. Junction Temperature

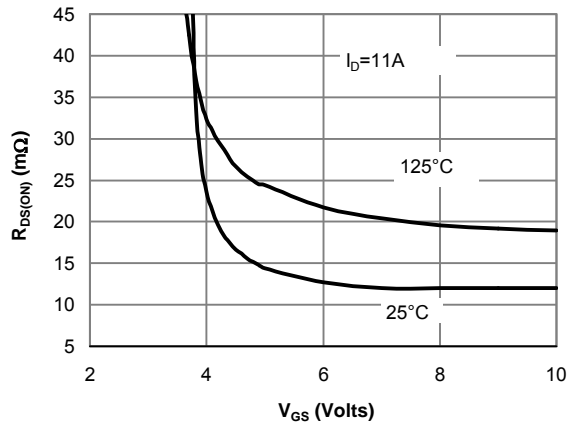


Figure 5: On-Resistance vs. Gate-Source Voltage

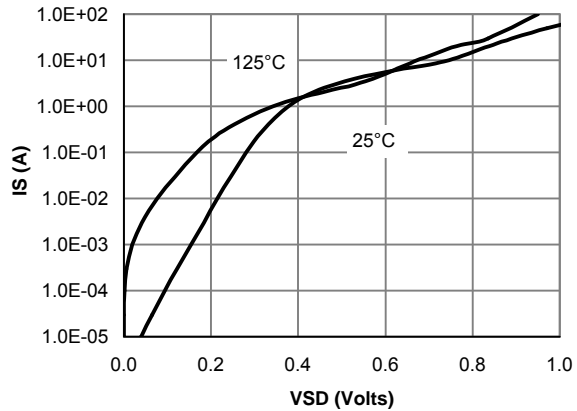


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

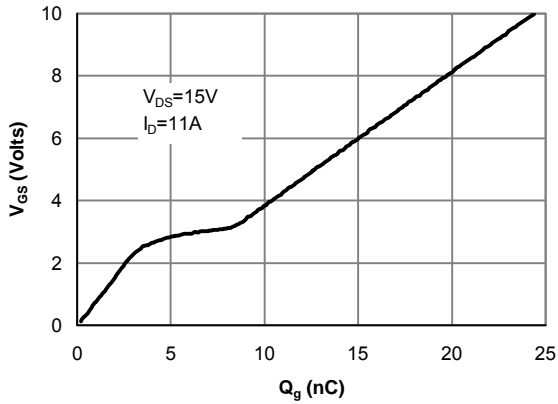


Figure 7: Gate-Charge Characteristics

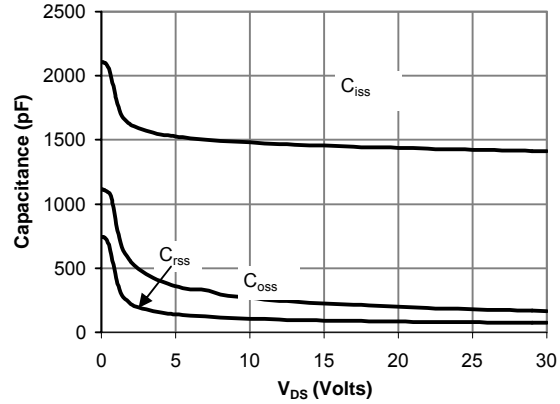


Figure 8: Capacitance Characteristics

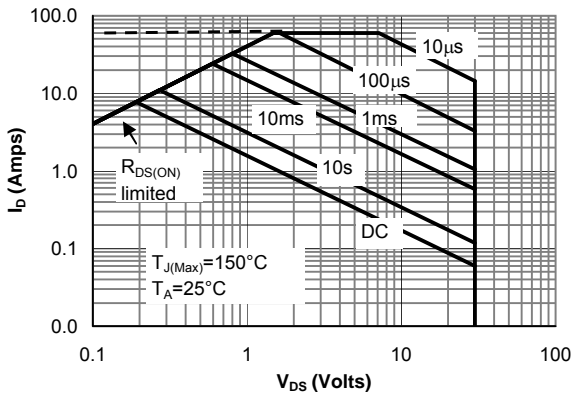


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

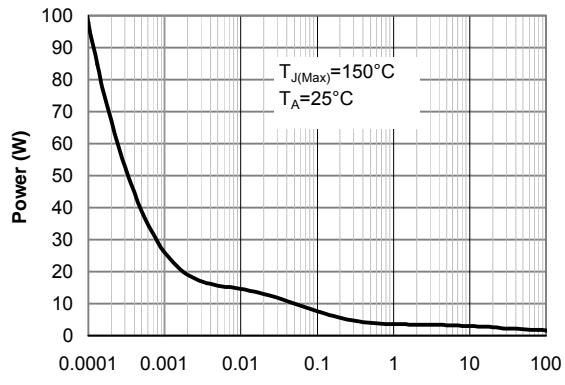


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

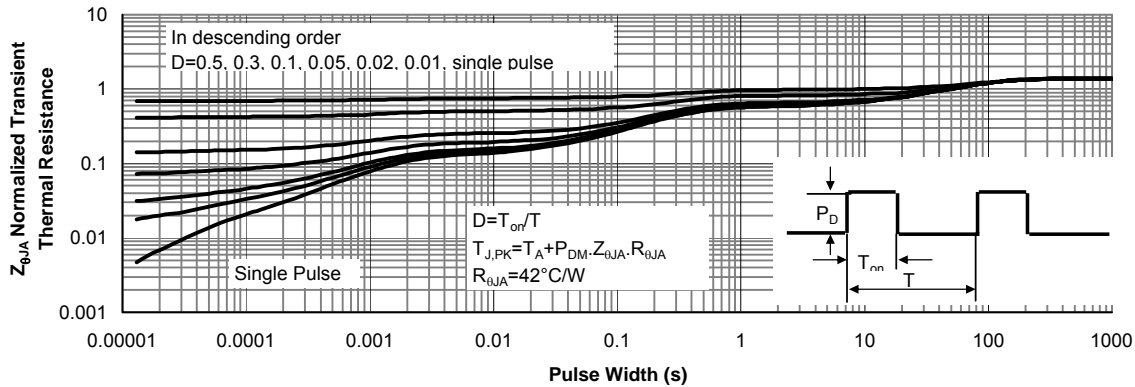


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

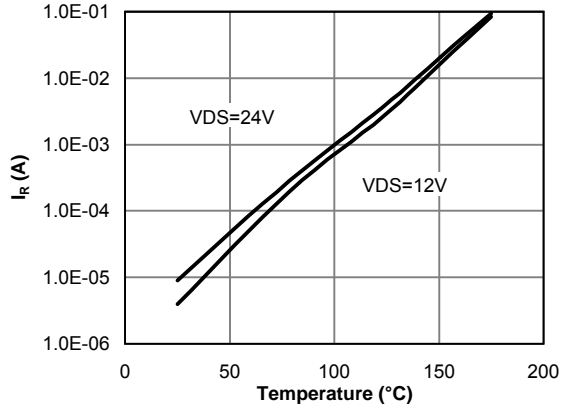


Figure 12: Diode Reverse Leakage Current vs. Junction Temperature

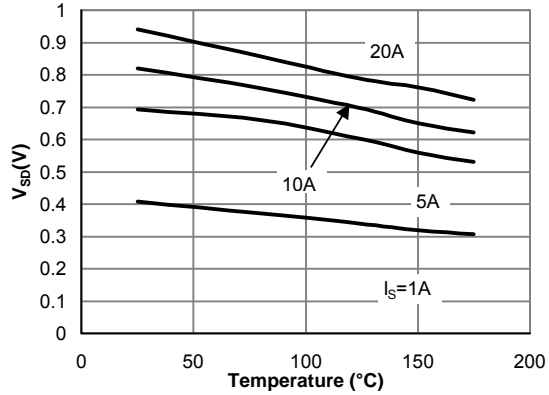


Figure 13: Diode Forward voltage vs. Junction Temperature

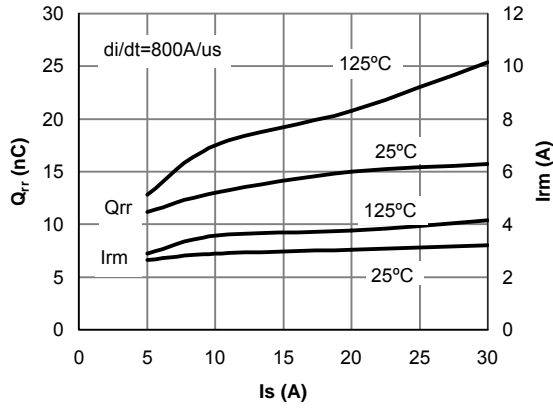


Figure 14: Diode Reverse Recovery Charge and Peak Current vs. Conduction Current

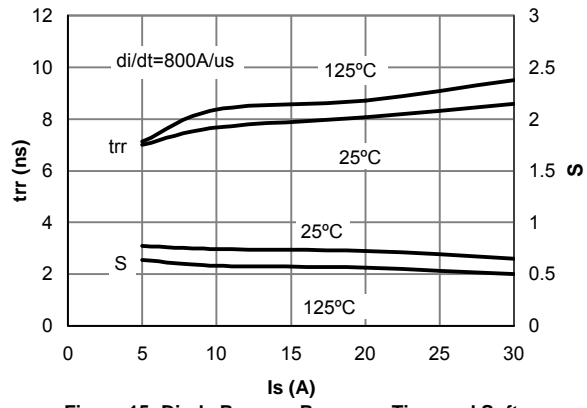


Figure 15: Diode Reverse Recovery Time and Soft Coefficient vs. Conduction Current

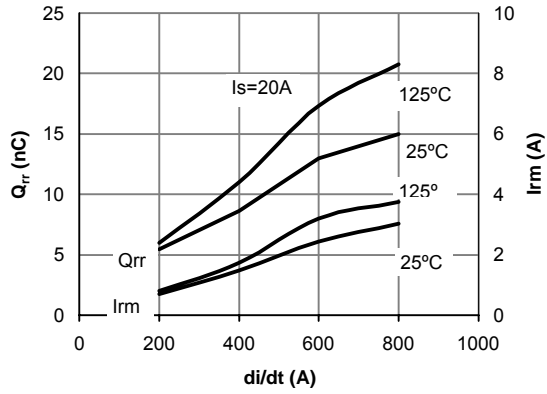


Figure 16: Diode Reverse Recovery Charge and Peak Current vs. di/dt

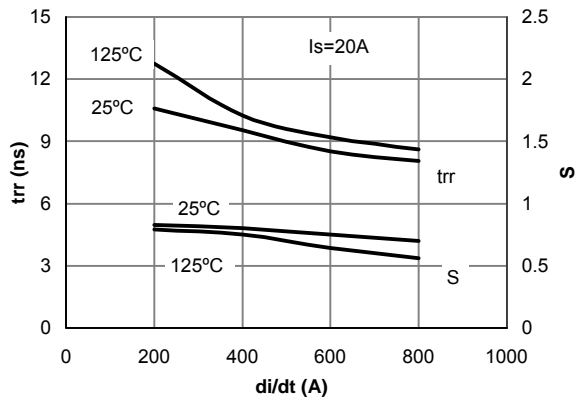


Figure 17: Diode Reverse Recovery Time and Soft Coefficient vs. di/dt