



ALPHA & OMEGA
SEMICONDUCTOR

AON7704

N-Channel Enhancement Mode Field Effect Transistor

SRFET™



General Description

SRFET™ AON7704/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

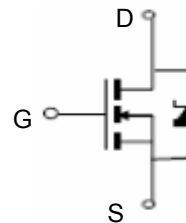
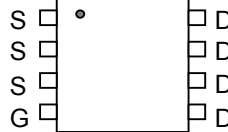
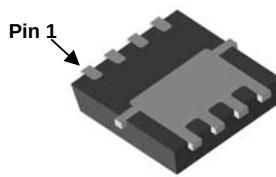
V_{DS} (V) = 30V

I_D = 10A (V_{GS} = 10V)

$R_{DS(ON)} < 20m\Omega$ (V_{GS} = 10V)

$R_{DS(ON)} < 31m\Omega$ (V_{GS} = 4.5V)

DFN 3x3
Top View Bottom View



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}	± 20	V
Continuous Drain Current ^{B,G}	I_D	14	A
$T_C=25^\circ\text{C}$		14	
$T_C=100^\circ\text{C}$	I_{DSM}	10	
Pulsed Drain Current ^C		7.5	
Continuous Drain Current ^B	P_D	35	W
$T_A=25^\circ\text{C}$		14	
$T_A=70^\circ\text{C}$	P_{DSM}	3.1	
Power Dissipation ^B		2	
Power Dissipation ^A			
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	$R_{\theta JA}$	30	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A		60	75	$^\circ\text{C/W}$
Maximum Junction-to-Case ^D	$R_{\theta JC}$	4.5	5.5	$^\circ\text{C/W}$

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	1.7	3	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	50			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =10A T _J =125°C		16 23	20 28	mΩ
		V _{GS} =4.5V, I _D =8A		25	31	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =10A		23		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.4	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		696	900	pF
C _{oss}	Output Capacitance			200		pF
C _{rss}	Reverse Transfer Capacitance			80		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	0.6	1.2	1.8	Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =10A		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 DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =1.5Ω, R _{GEN} =3Ω		2.6		ns
t _r	Turn-On Rise Time			6.8		ns
t _{D(off)}	Turn-Off DelayTime			17		ns
t _f	Turn-Off Fall Time			3.6		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =10A, dI/dt=100A/μs		20.2	26	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =10A, dI/dt=100A/μs		7.9		nC

A: The value of R_{θJA} is measured with the device mounted on 1in² 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 <300 μs pulses, duty cycle 0.5% max.

E: 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°C. The SOA curve provides a single pulse rating.

F: The current rating is based on the t ≤ 10s junction to ambient thermal resistance rating.

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

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

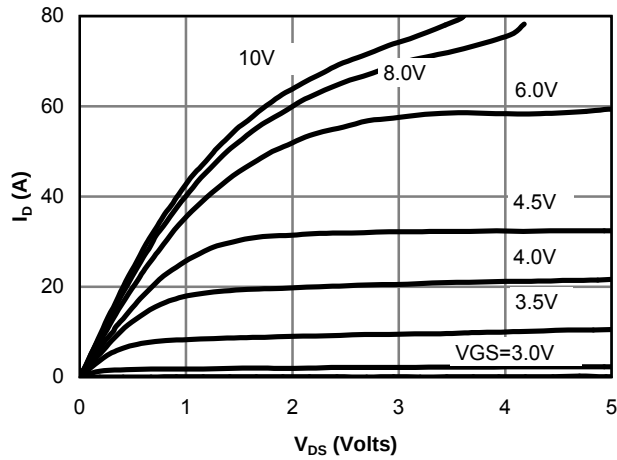


Figure 1: On-Region Characteristics

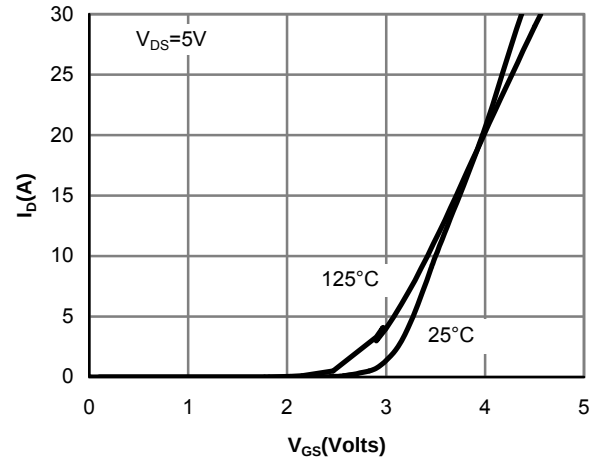


Figure 2: Transfer Characteristics

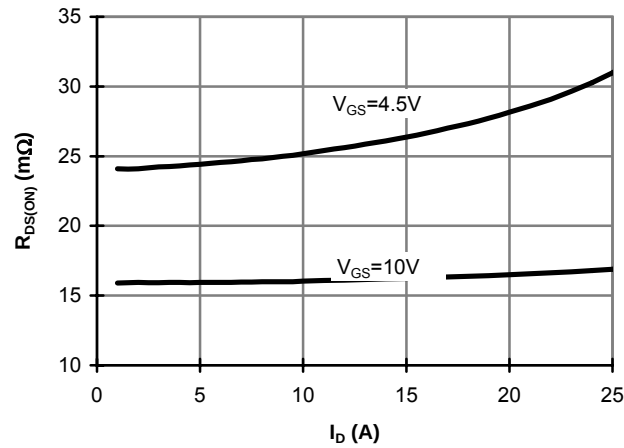


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

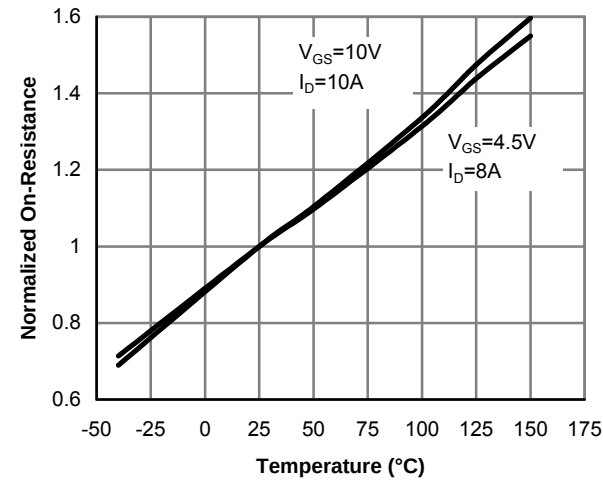


Figure 4: On-Resistance vs. Junction Temperature

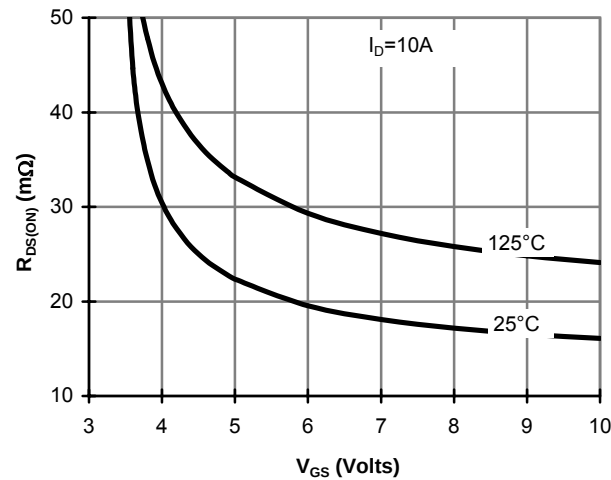


Figure 5: On-Resistance vs. Gate-Source Voltage

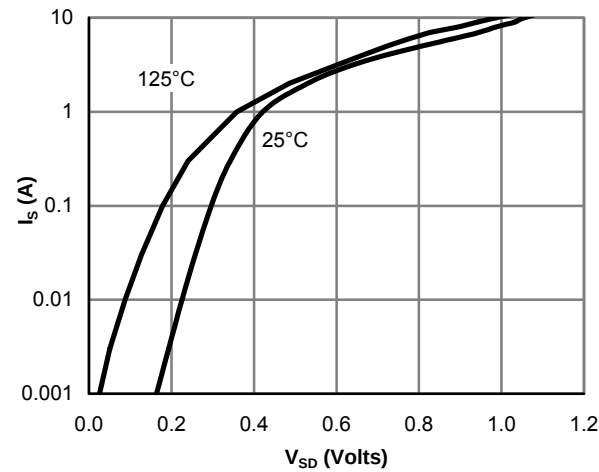


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

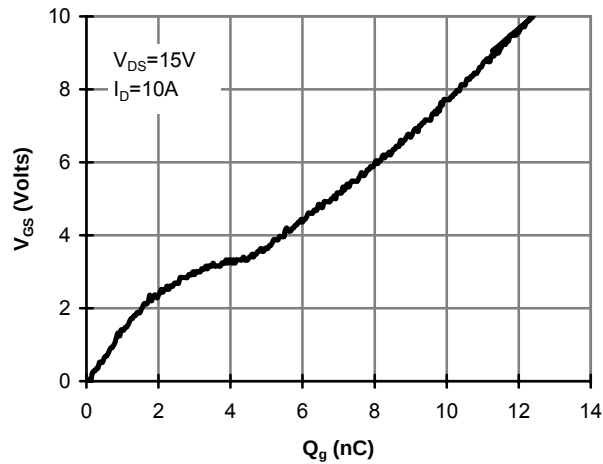


Figure 7: Gate-Charge Characteristics

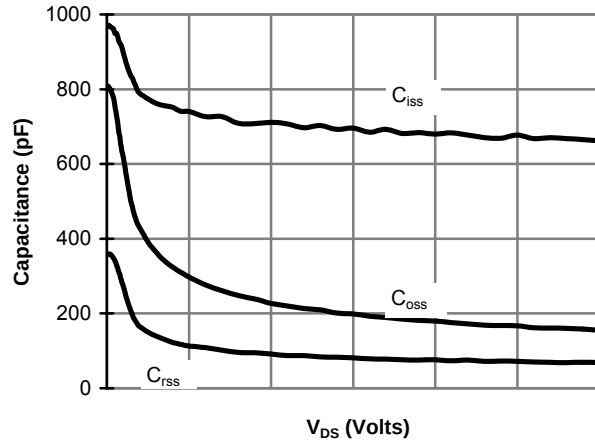


Figure 8: Capacitance Characteristics

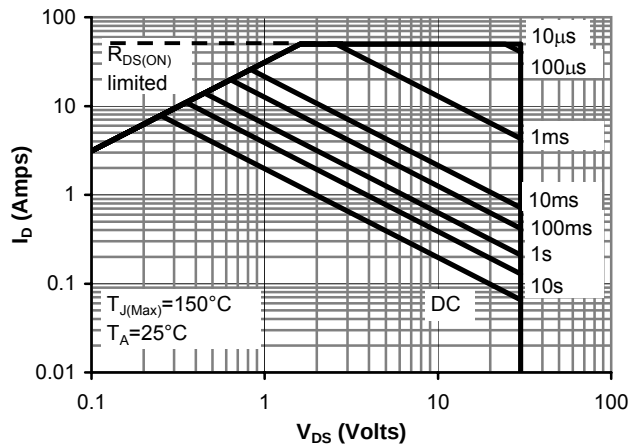


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

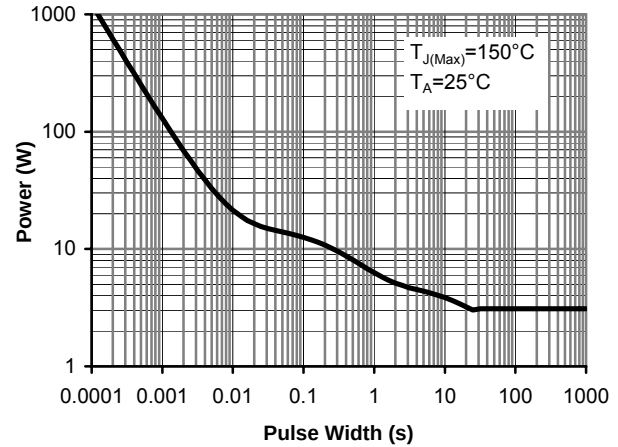


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

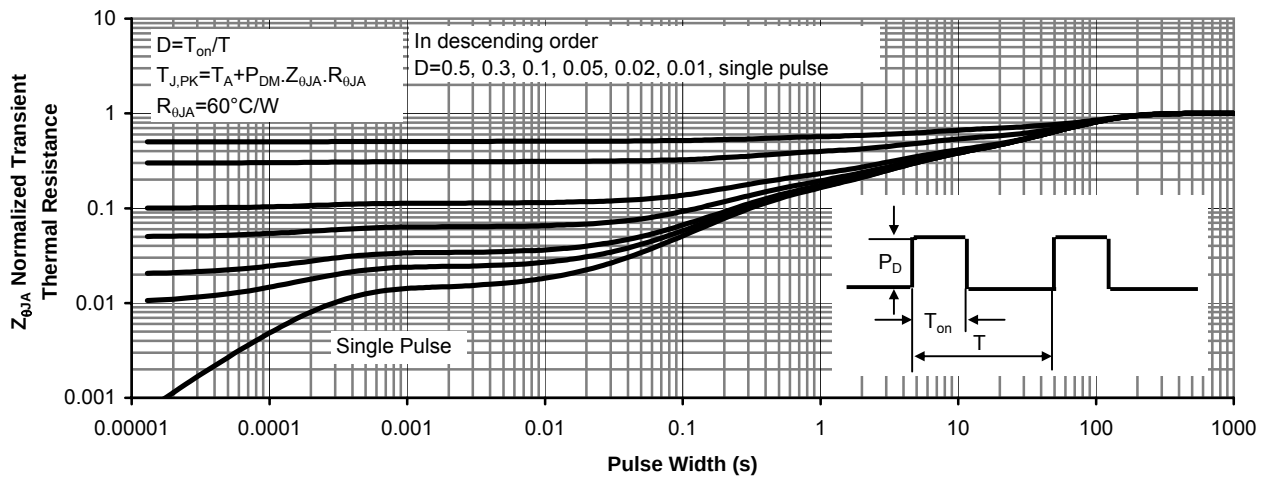


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)