



**ALPHA & OMEGA**  
SEMICONDUCTOR



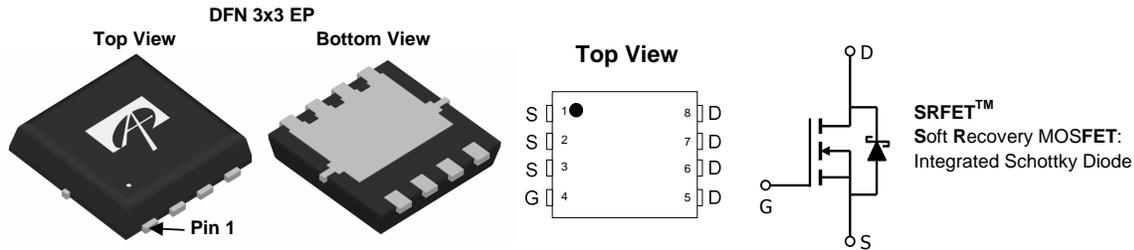
**AON7702**  
**30V N-Channel MOSFET**  
**SRFET™**

**General Description**

SRFET™ AON7702 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.

**Features**

$V_{DS}$  (V) = 30V  
 $I_D$  = 40A ( $V_{GS}$  = 10V)  
 $R_{DS(ON)}$  < 10m $\Omega$  ( $V_{GS}$  = 10V)  
 $R_{DS(ON)}$  < 14m $\Omega$  ( $V_{GS}$  = 4.5V)  
 100% UIS Tested  
 100% Rg Tested



**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	$V_{GS}$	$\pm 20$	V	
Continuous Drain Current <sup>B,G</sup>	$I_D$	$T_C=25^\circ\text{C}$	A	
		$T_C=100^\circ\text{C}$		31
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	80		
Continuous Drain Current <sup>B</sup>	$I_{DSM}$	$T_A=25^\circ\text{C}$		13.5
		$T_A=70^\circ\text{C}$	10	
Power Dissipation <sup>B</sup>	$P_D$	$T_C=25^\circ\text{C}$	W	
		$T_C=100^\circ\text{C}$		14
Power Dissipation <sup>A</sup>	$P_{DSM}$	$T_A=25^\circ\text{C}$		3.1
		$T_A=70^\circ\text{C}$		2
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 <sup>A</sup>	$R_{\theta JA}$	30	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient <sup>A</sup>		Steady-State	60	75
Maximum Junction-to-Case <sup>D</sup>	$R_{\theta JC}$	3.1	3.7	$^\circ\text{C/W}$

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	30			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			100 500	μA
I <sub>GSS</sub>	Gate-Body leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V			100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.3	1.6	3	V
I <sub>D(ON)</sub>	On state drain current	V <sub>GS</sub> =10V, V <sub>DS</sub> =5V	80			A
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =13.5A T <sub>J</sub> =125°C		8 12	10 15	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =11A		11	14	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =13.5A		21		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1A, V <sub>GS</sub> =0V		0.38	0.5	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current				6	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1MHz		2390	4250	pF
C <sub>oss</sub>	Output Capacitance			480		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			180		pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	0.5	1	1.5	Ω
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub> (10v)	Total Gate Charge	V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, I <sub>D</sub> =13.5A		37	48	nC
Q <sub>g</sub> (4.5v)	Total Gate Charge			16	21	nC
Q <sub>gs</sub>	Gate Source Charge			9.3		nC
Q <sub>gd</sub>	Gate Drain Charge			5.5		nC
t <sub>D(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, R <sub>L</sub> =1.1Ω, R <sub>GEN</sub> =3Ω		9		ns
t <sub>r</sub>	Turn-On Rise Time			14		ns
t <sub>D(off)</sub>	Turn-Off DelayTime			32		ns
t <sub>f</sub>	Turn-Off Fall Time			16		ns
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =13.5A, di/dt=100A/μs		29	38	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =13.5A, di/dt=100A/μs		15		nC

A: The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=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<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> 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<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=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

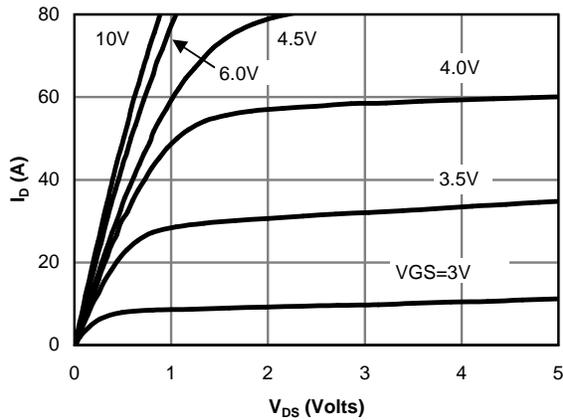


Figure 1: On-Region Characteristics

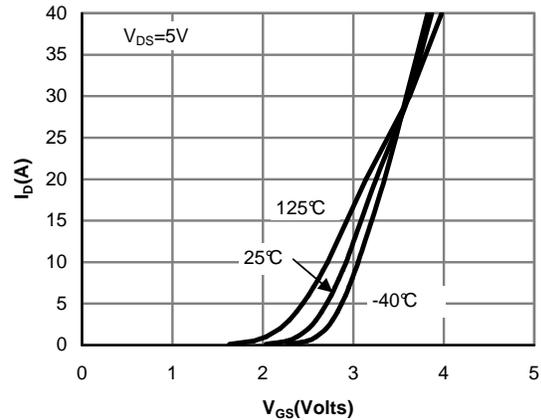


Figure 2: Transfer Characteristics

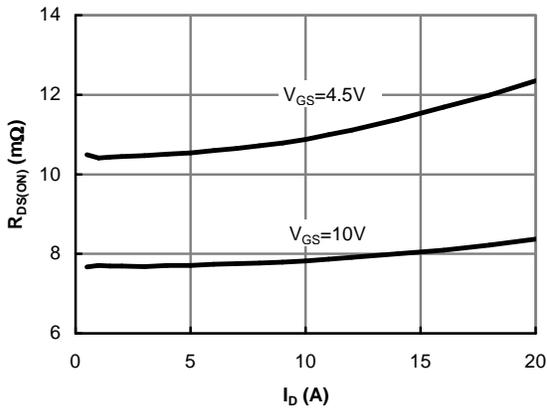


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

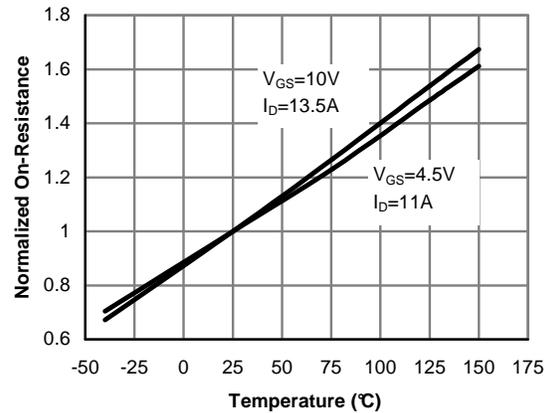


Figure 4: On-Resistance vs. Junction Temperature

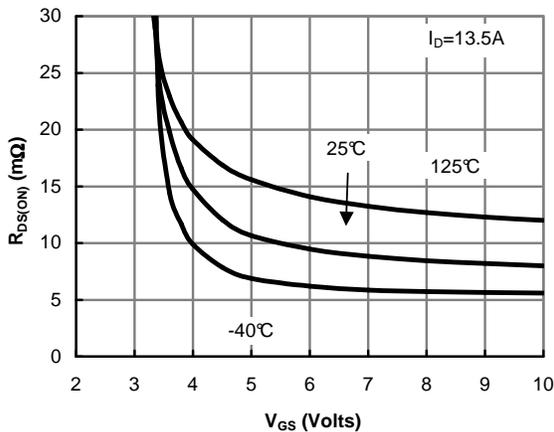


Figure 5: On-Resistance vs. Gate-Source Voltage

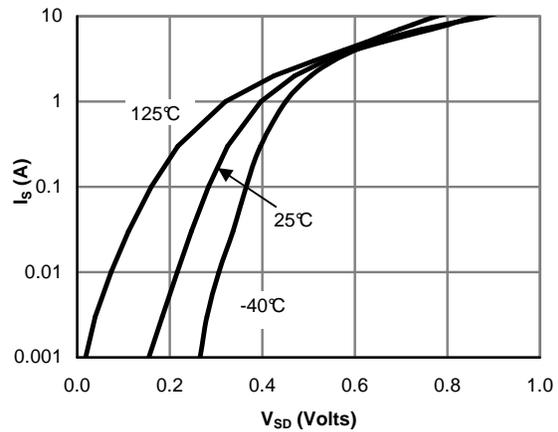


Figure 6: Body-Diode Characteristics

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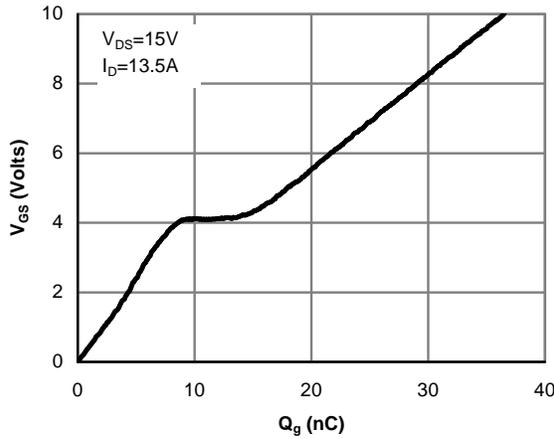


Figure 7: Gate-Charge Characteristics

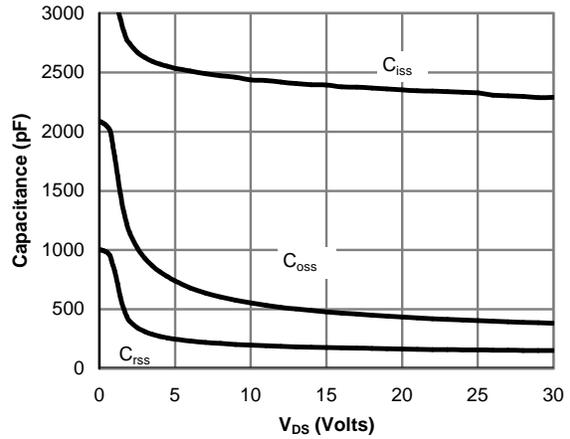


Figure 8: Capacitance Characteristics

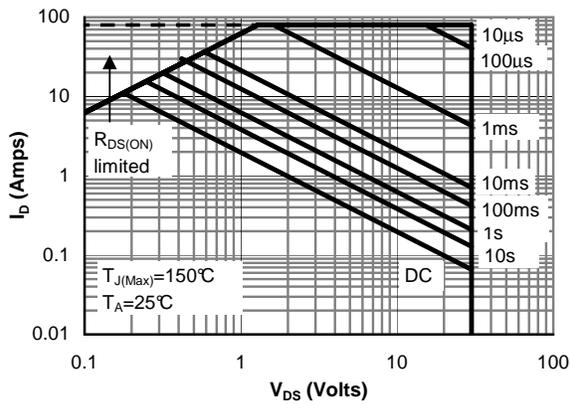


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

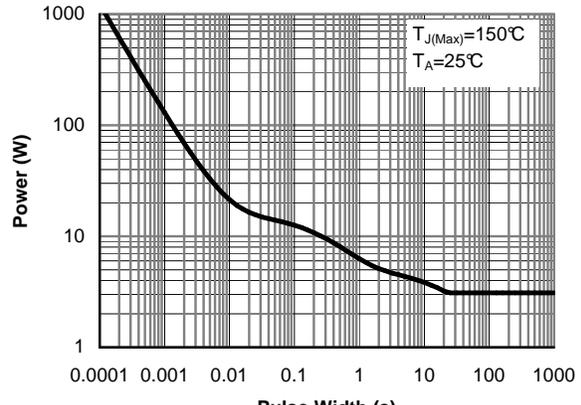


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

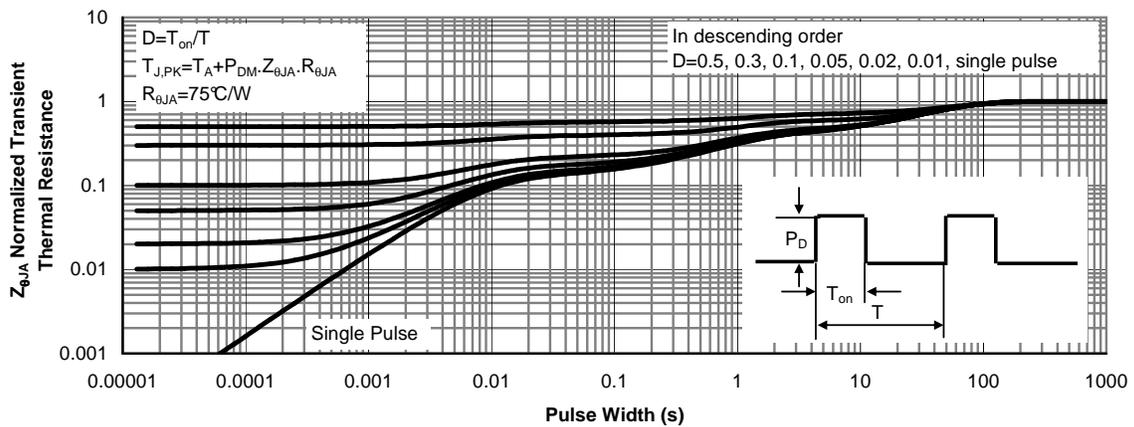
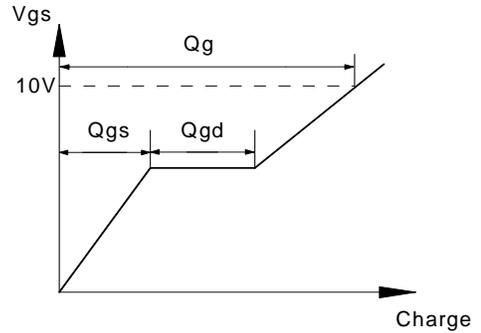
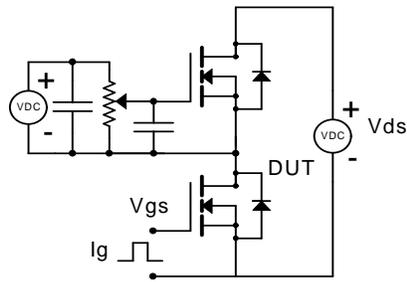
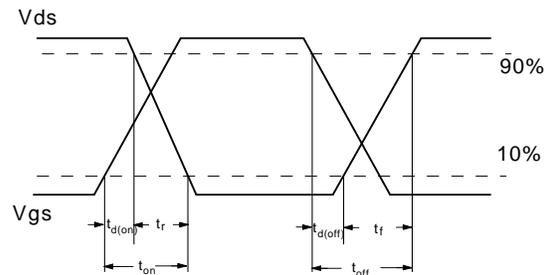
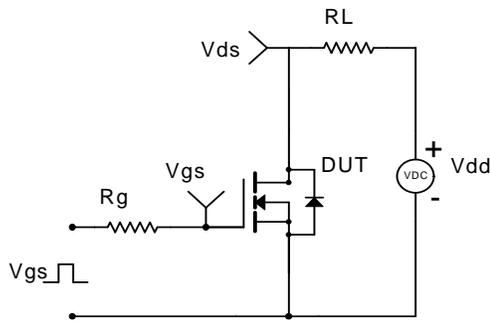


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

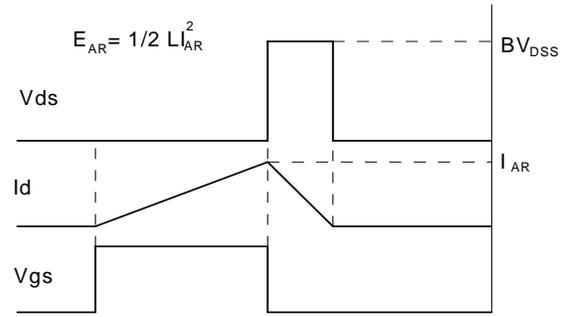
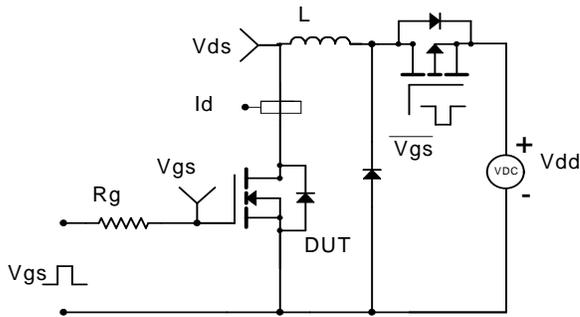
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

