



**AON7700**

**N-Channel Enhancement Mode Field Effect Transistor**

**SRFET™**

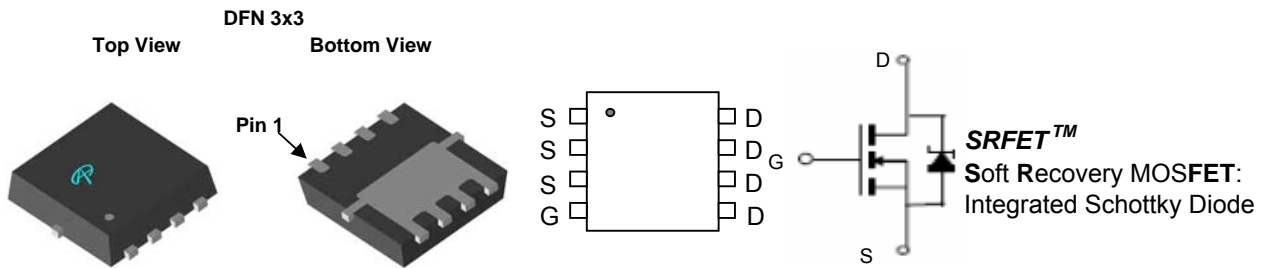


**General Description**

The AON7700 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. This device is suitable for use in SMPS and general purpose applications. *Standard Product AON7700 is Pb-free (meets ROHS & Sony 259 specifications).*

**Features**

$V_{DS}$  (V) = 30V  
 $I_D$  = 12A ( $V_{GS}$  = 10V)  
 $R_{DS(ON)} < 8.5m\Omega$  ( $V_{GS}$  = 10V)  
 $R_{DS(ON)} < 10m\Omega$  ( $V_{GS}$  = 4.5V)



**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	$V_{GS}$	$\pm 12$	V
Continuous Drain Current <sup>B,H</sup>	$T_C=25^\circ\text{C}$	20	A
	$T_C=100^\circ\text{C}$	20	
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	80	
Continuous Drain Current <sup>G</sup>	$T_A=25^\circ\text{C}$	12	
	$T_A=70^\circ\text{C}$	11	
Power Dissipation <sup>B</sup>	$T_C=25^\circ\text{C}$	33	W
	$T_C=100^\circ\text{C}$	13	
Power Dissipation <sup>A</sup>	$T_A=25^\circ\text{C}$	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>		60	75	$^\circ\text{C/W}$
Maximum Junction-to-Case <sup>D</sup>	$R_{\theta JC}$	3.1	3.7	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	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	$\mu\text{A}$
					500	
$I_{GSS}$	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	$V_{GS}=10\text{V}$ , $I_D=12\text{A}$ $T_J=125^\circ\text{C}$		6.7	8.5	m $\Omega$
			$V_{GS}=4.5\text{V}$ , $I_D=10\text{A}$		9	
$g_{FS}$	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
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	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	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g$	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 in<sup>2</sup> 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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

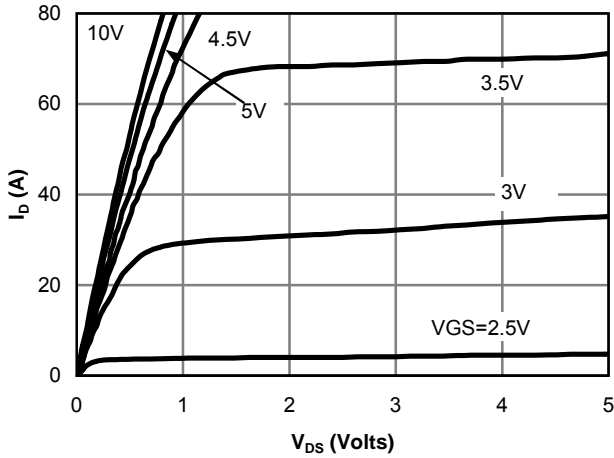


Figure 1: On-Region Characteristics

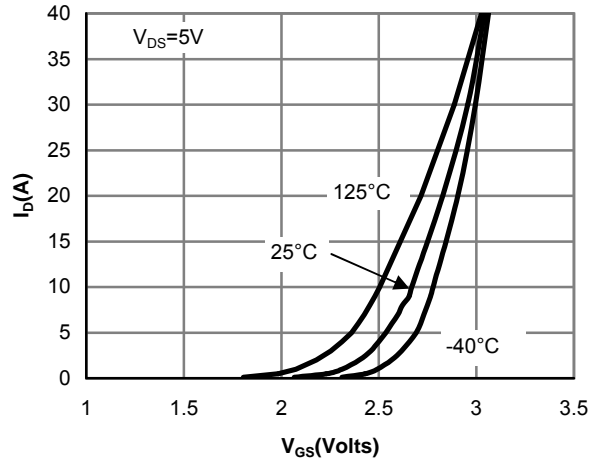


Figure 2: Transfer Characteristics

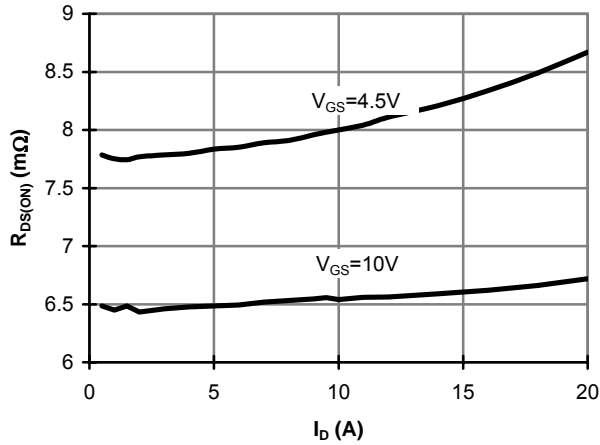


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

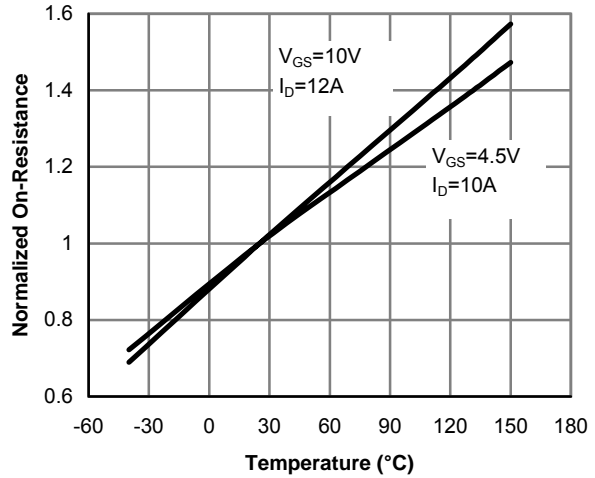


Figure 4: On-Resistance vs. Junction Temperature

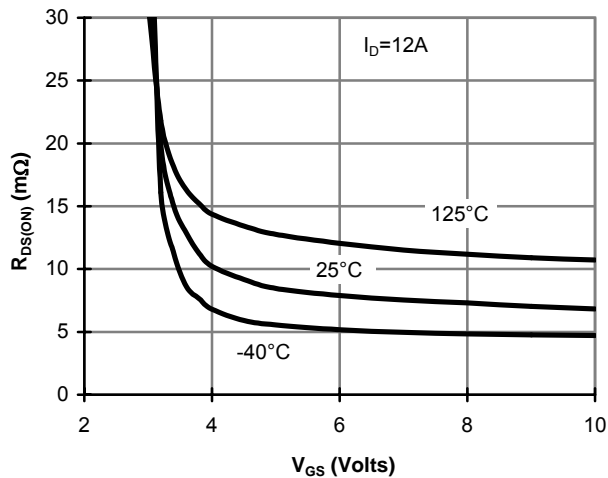


Figure 5: On-Resistance vs. Gate-Source Voltage

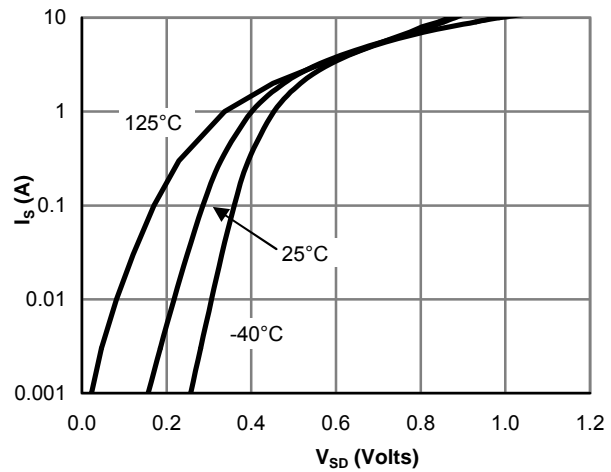


Figure 6: Body-Diode Characteristics

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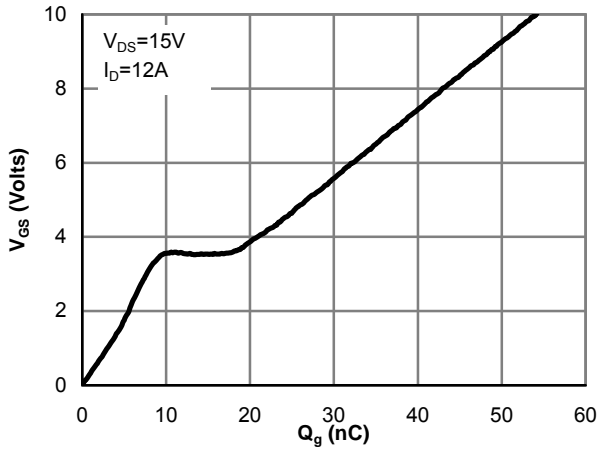


Figure 7: Gate-Charge Characteristics

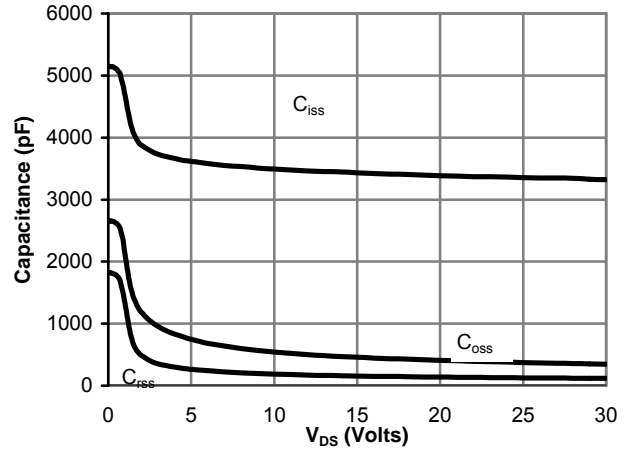


Figure 8: Capacitance Characteristics

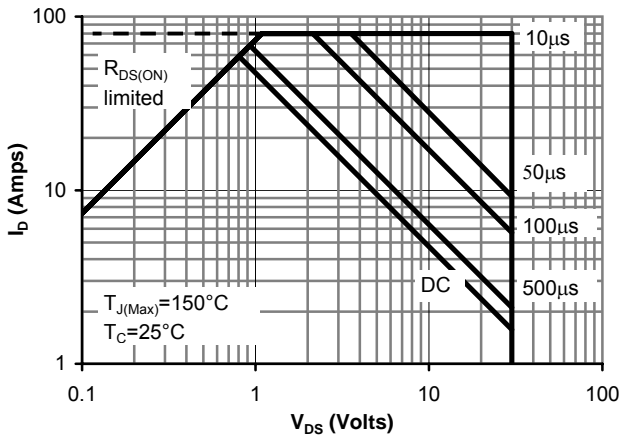


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

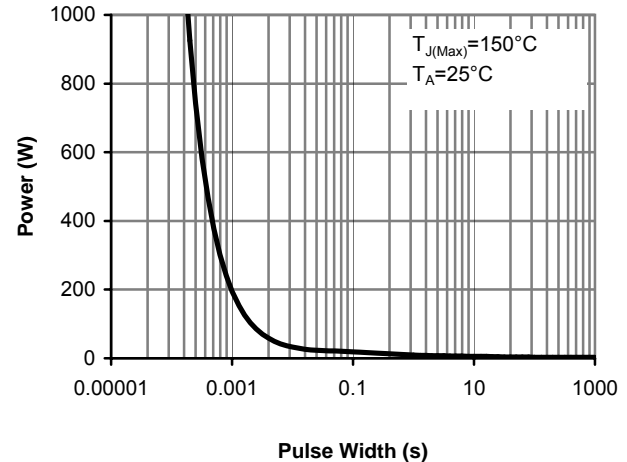


Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note G)

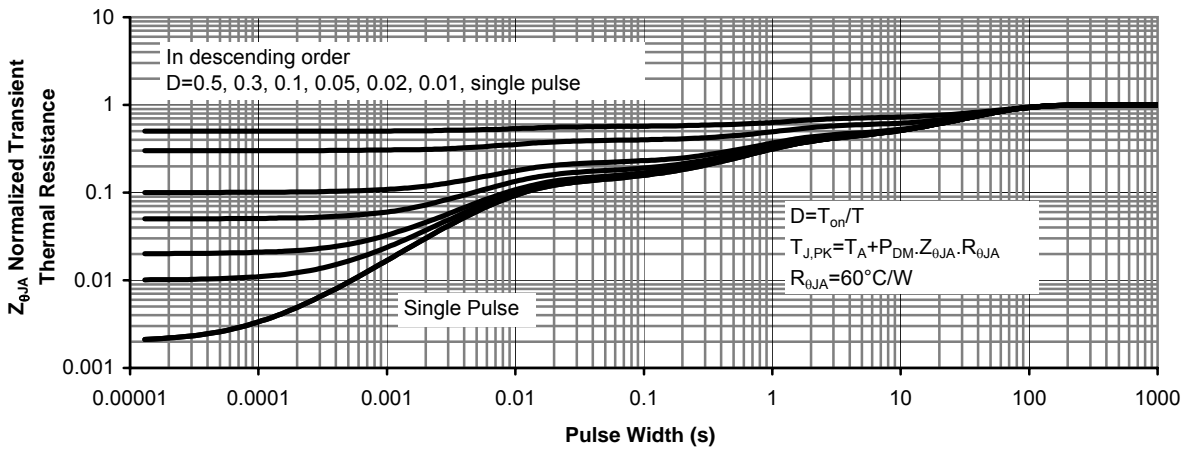


Figure 11: Normalized Maximum Transient Thermal Impedance (Note G)