AON4421

P-Channel Enhancement Mode Field Effect Transistor

General Description

The AON4421 uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use as a load switch.

-RoHS Compliant
-Halogen Free

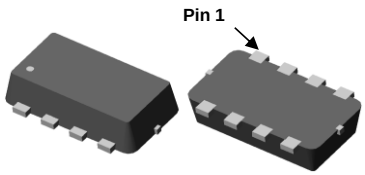
Product Summary

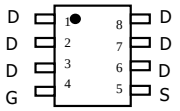
V_{DS}	-30V
I_D (at V_{GS}=-10V)	-8A
$R_{DS(ON)}$ (at V_{GS}=-10V)	< 26mΩ
$R_{DS(ON)}$ (at V_{GS}=-4.5V)	< 34mΩ

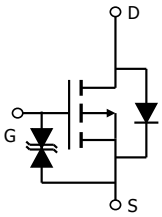
ESD Protected

DFN 3x2

Top View Bottom View







Absolute Maximum Ratings T_A=25°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	T_A=25°C	I_D	-8	A
	T_A=70°C		-6	
Pulsed Drain Current [C]		I_{DM}	-60	
Power Dissipation [B]	T_A=25°C	P_D	3.1	W
	T_A=70°C		2	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	30	40	°C/W
Maximum Junction-to-Ambient [A D]	Steady-State		55	70	°C/W
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	25	30	°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			-1	µA
		T_J=55°C			-5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±20V			±10	µA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=-250µA	-0.8	-1.3	-1.8	V
$I_{D(ON)}$	On state drain current	V_{GS}=-10V, V_{DS}=-5V	-60			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-8A		21	26	mΩ
		T_J=125°C		28	34	
		V_{GS}=-4.5V, I_D=-7A		27	34	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-8A		22		S
V_{SD}	Diode Forward Voltage	I_S=-1A,V_{GS}=0V		-0.74	-1	V
I_S	Maximum Body-Diode Continuous Current				-3	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, f=1MHz		930	1120	pF
C_{oss}	Output Capacitance			170		pF
C_{rss}	Reverse Transfer Capacitance			120		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		8		Ω
SWITCHING PARAMETERS						
Q_g(-10V)	Total Gate Charge	V_{GS}=-10V, V_{DS}=-15V, I_D=-8A		17.6	21	nC
Q_g(-4.5V)	Total Gate Charge			8.6	10	nC
Q_{gs}	Gate Source Charge			2		nC
Q_{gd}	Gate Drain Charge			3.4		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-10V, V_{DS}=-15V, R_L=1.9Ω, R_{GEN}=3Ω		6		ns
t_r	Turn-On Rise Time			7		ns
$t_{D(off)}$	Turn-Off DelayTime			40		ns
t_f	Turn-Off Fall Time			30		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-8A, dI/dt=500A/µs		18	22	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-8A, dI/dt=500A/µs		32		nC

A. The value of $R_{\theta JA}$ 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. The power dissipation P_D is based on $T_{J(MAX)}$=150° C, using ≤ 10s junction-to-ambient thermal resistance.
C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150° C. Ratings are based on low frequency and duty cycles to keep initialT_J=25° C.
D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300µs pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-ambient thermal impedence which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}$=150° C. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

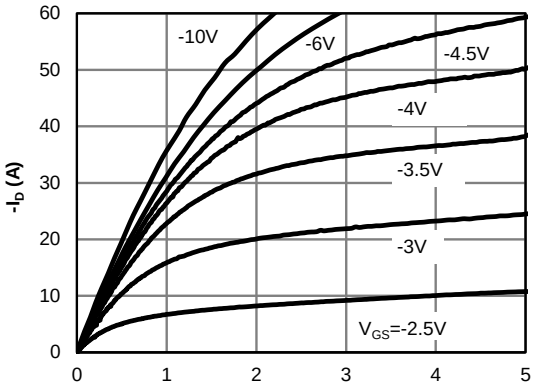


Figure 1: On-Region Characteristics (Note E)

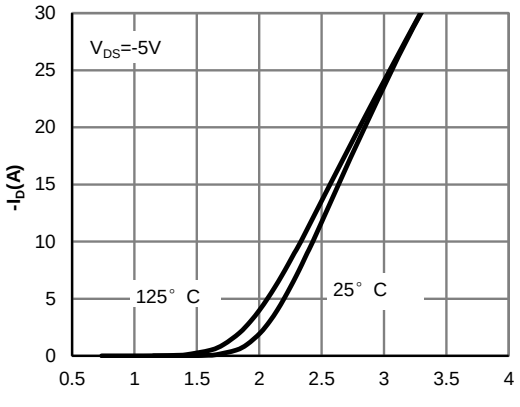


Figure 2: Transfer Characteristics (Note E)

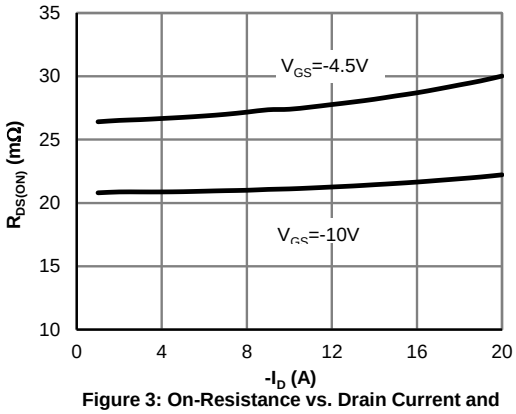


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

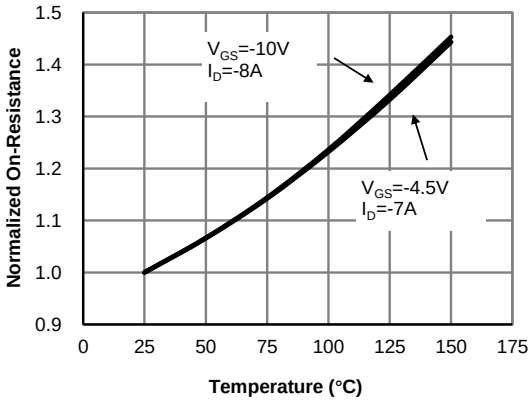


Figure 4: On-Resistance vs. Junction Temperature (Note E)

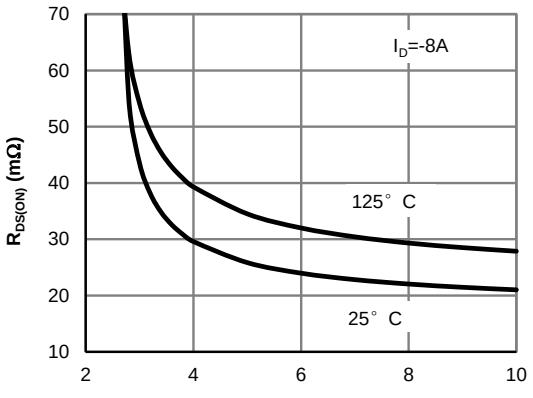


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

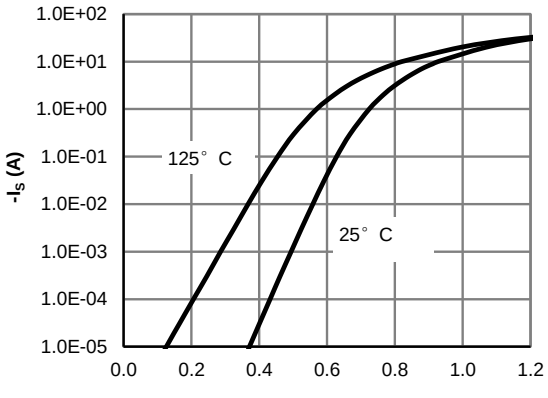


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

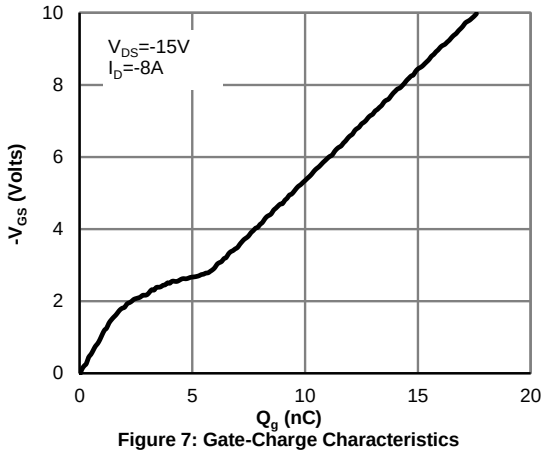


Figure 7: Gate-Charge Characteristics

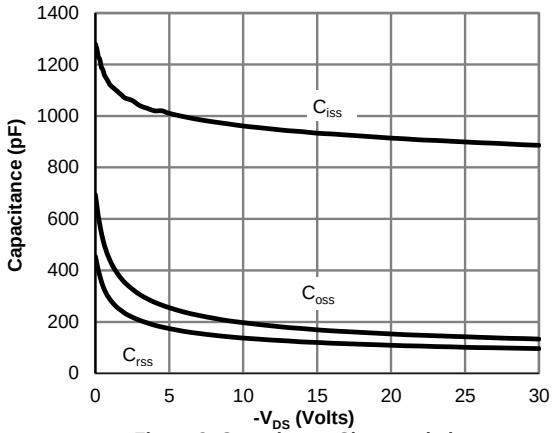


Figure 8: Capacitance Characteristics

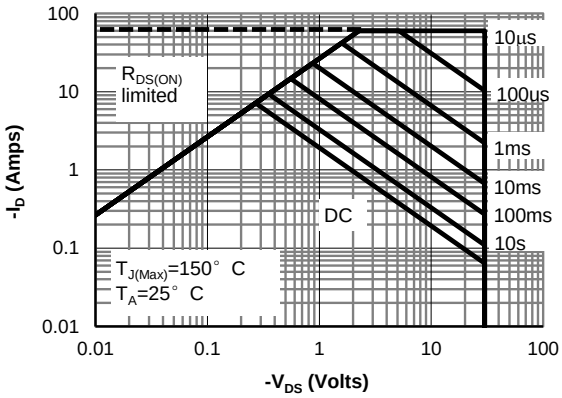


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

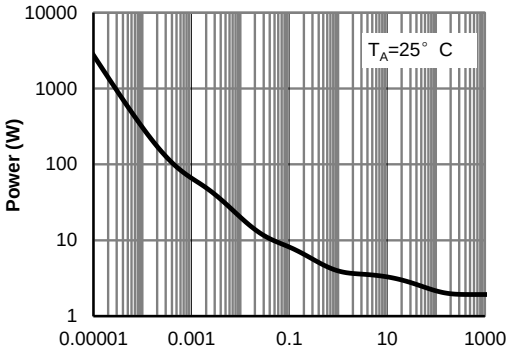


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

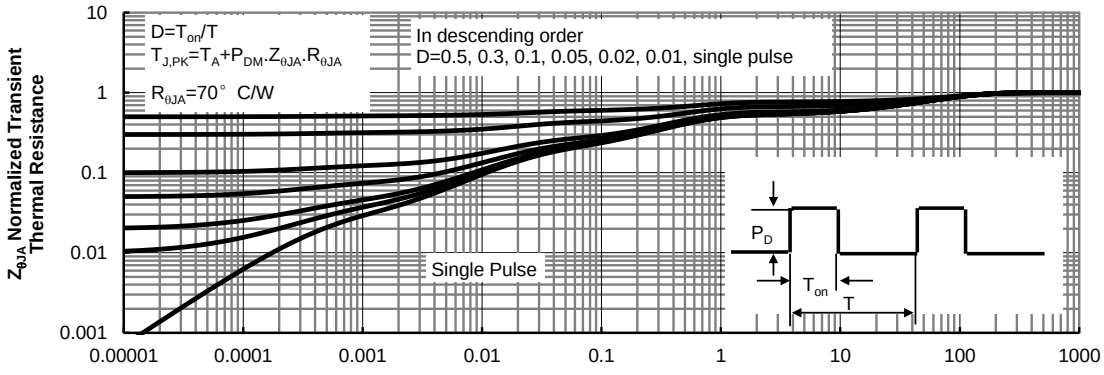
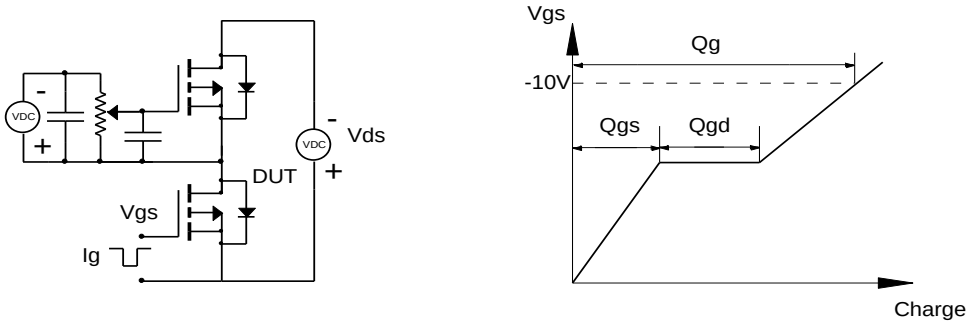
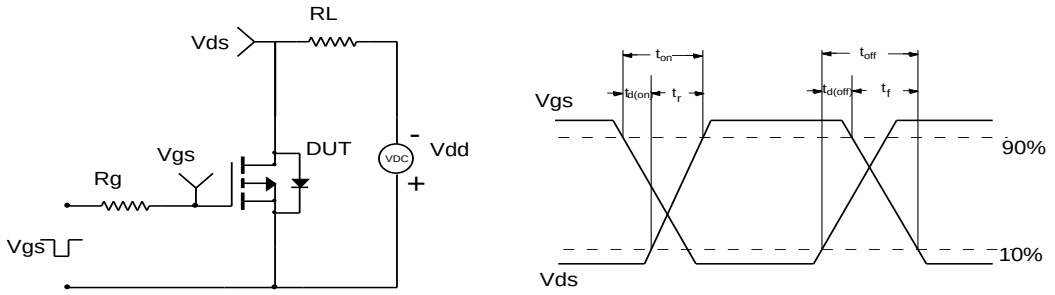


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

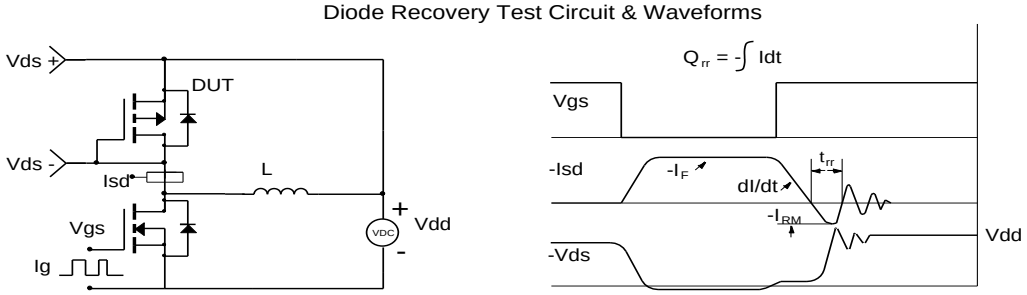
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