KERSEMI ELECTRONIC CO.,LTD.

AO3422

N-Channel Enhancement Mode Field Effect Transistor

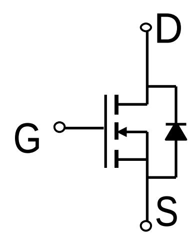
TO-236
(SOT-23)

Features

V_{DS} (V) = 55V
I_D = 2.1A (V_{GS} = 4.5V)
$R_{DS(ON)}$ < 160mΩ (V_{GS} = 4.5V)
$R_{DS(ON)}$ < 200mΩ (V_{GS} = 2.5V)

General Description

The AO3422 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It offers operation over a wide gate drive range from 2.5V to 12V. This device is suitable for use as a load switch. Standard product AO3422 is Pb-free (meets ROHS & Sony 259 specifications). AO3422L is a Green Product ordering option. AO3422 and AO3422L are electrically identical.



Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	55	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current [A]	T_A=25°C	I_D	2.1	A
	T_A=70°C		1.7	
Pulsed Drain Current [B]		I_{DM}	10	
Power Dissipation	T_A=25°C	P_D	1.25	W
	T_A=70°C		0.8	
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	$R_{\theta JA}$	75	100	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		115	150	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	48	60	°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=10mA, V_{GS}=0V		55			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=44V, V_{GS}=0V				1	µA
			T_J=55°C			5	
I_{GSS}	Gate-Source leakage current	V_{DS}=0V, V_{GS}=±12V				±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250µA		0.6	1.3	2	V
$I_{D(ON)}$	On state drain current	V_{GS}=4.5V, V_{DS}=5V		10			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=4.5V, I_D=2.1A			125	160	mΩ
			T_J=125°C		175	210	
		V_{GS}=2.5V, I_D=1.5A			157	200	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=2.1A			11		S
V_{SD}	Diode Forward Voltage	I_S=1A			0.78	1	V
I_S	Maximum Body-Diode Continuous Current					1	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz			214	300	pF
C_{oss}	Output Capacitance				31		pF
C_{rss}	Reverse Transfer Capacitance				12.6		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz			1.3	3	Ω
SWITCHING PARAMETERS							
Q_g	Total Gate Charge	V_{GS}=4.5V, V_{DS}=27.5V, I_D=2.1A			2.6	3.3	nC
Q_{gs}	Gate Source Charge				0.6		nC
Q_{gd}	Gate Drain Charge				0.8		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=27.5V, R_L=12Ω, R_{GEN}=3Ω			2.3		ns
t_r	Turn-On Rise Time				2.4		ns
$t_{D(off)}$	Turn-Off DelayTime				16.5		ns
t_f	Turn-Off Fall Time				2		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=2.1A, dI/dt=100A/µs			20	30	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=2.1A, dI/dt=100A/µs			17		nC

A: The value of RÿJA is measured with the device mounted on 1in
2
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. The current rating is based on the t ÿ 10s thermal resistance rating.
B: Repetitive rating, pulse width limited by junction temperature.
C. The R ÿJA is the sum of the thermal impedence from junction to lead RÿJL
and lead to ambient.
D. The static characteristics in Figures 1 to 6 are obtained using 80 ÿs 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°C. The SOA
curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

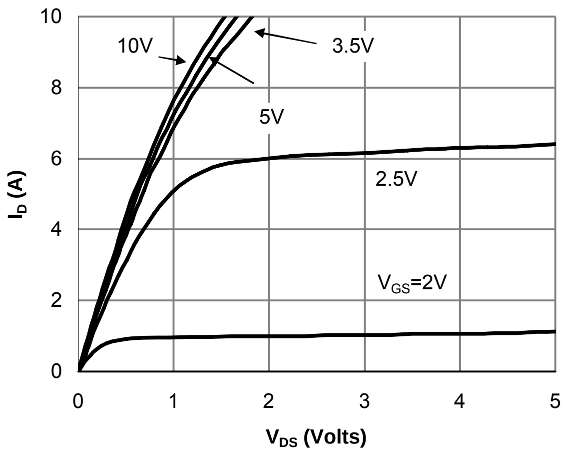


Fig 1: On-Region characteristics

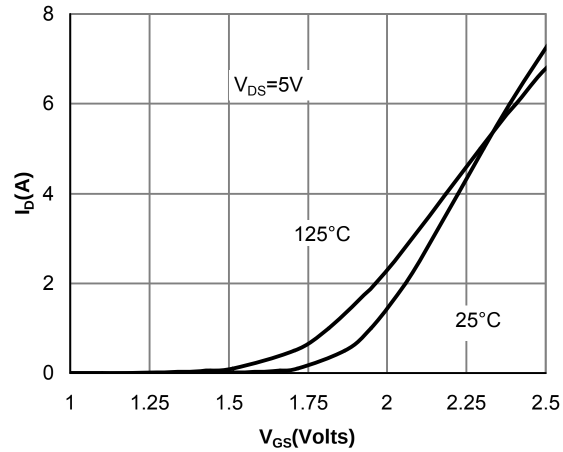


Figure 2: Transfer Characteristics

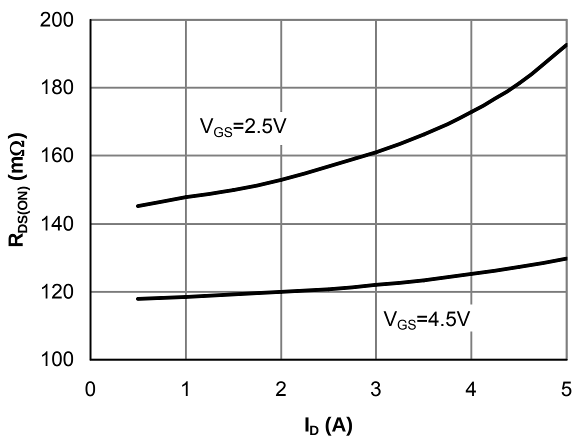


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

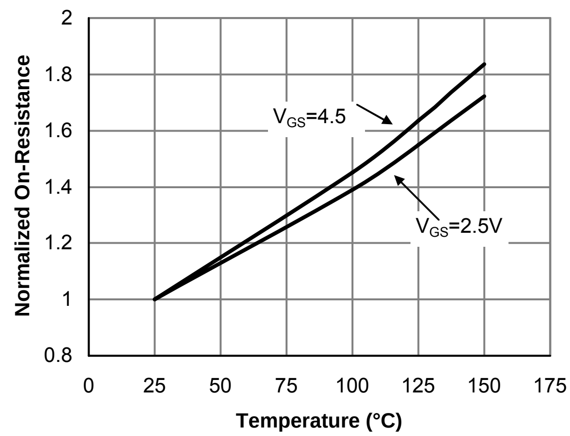


Figure 4: On-Resistance vs. Junction Temperature

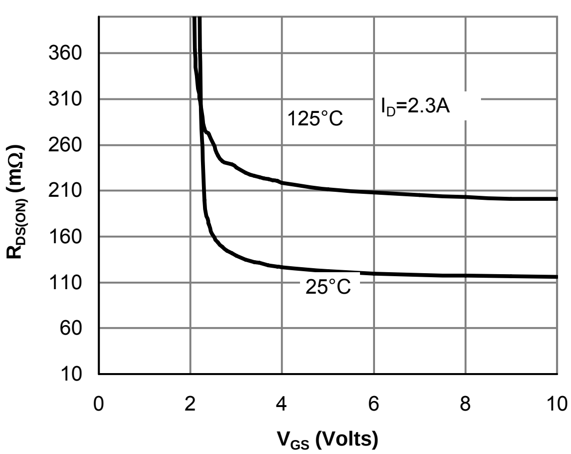


Figure 5: On-Resistance vs. Gate-Source Voltage

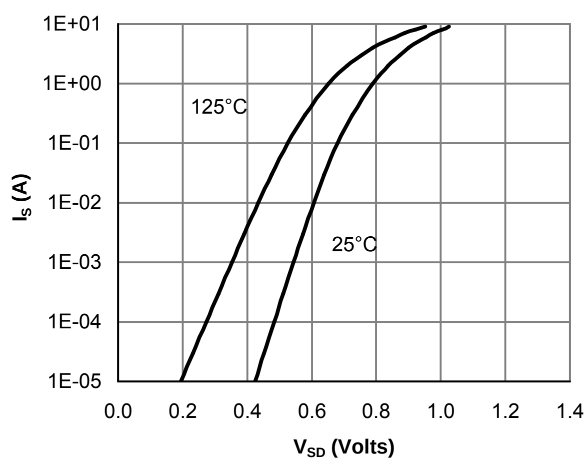


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

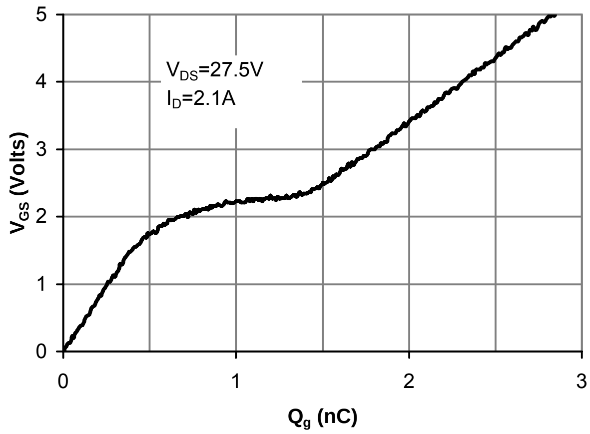


Figure 7: Gate-Charge Characteristics

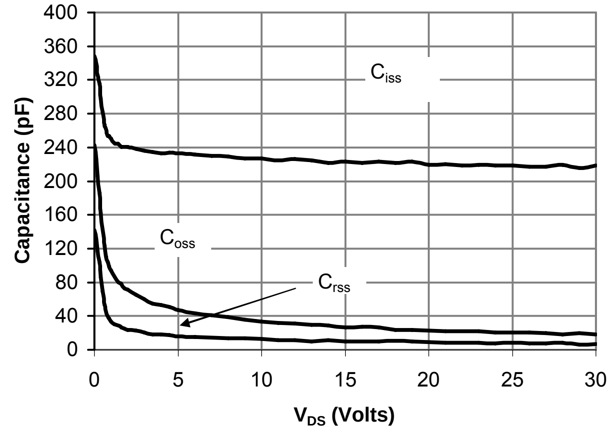


Figure 8: Capacitance Characteristics

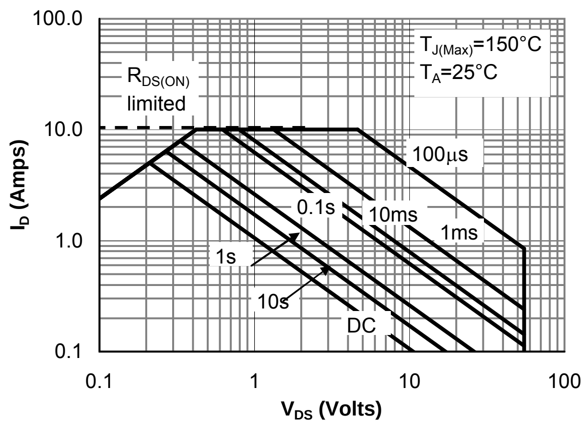


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

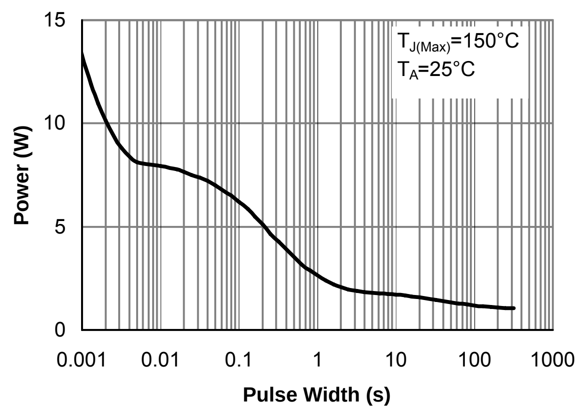


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

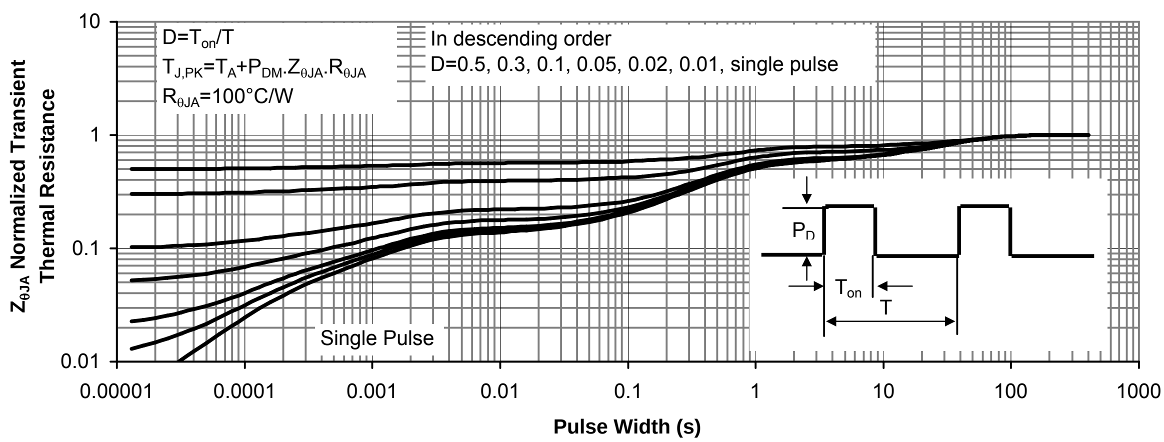


Figure 11: Normalized Maximum Transient Thermal Impedance