

AO4422A

N-Channel Enhancement Mode Field Effect Transistor



General Description

The AO4422A uses advanced trench technology to provide excellent $R_{\rm DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications. The source leads are separated to allow a Kelvin connection to the source, which may be used to bypass the source inductance. Standard Product AO4422A is Pb-free (meets ROHS & Sony 259 specifications). AO4422AL is a Green Product ordering option. AO4422A and AO4422AL are electrically identical.

Features

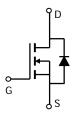
 $V_{DS}(V) = 30V$

 $I_D = 11A$ ($V_{GS} = 10V$)

 $R_{DS(ON)}$ < 15m Ω (V_{GS} = 10V)

 $R_{DS(ON)}$ < 24m Ω (V_{GS} = 4.5V)





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	T _A =25°C		11				
Current ^A	T _A =70°C	I _D	9.3	A			
Pulsed Drain Current ^B		I _{DM}	50	7			
	T _A =25°C	В	3	W			
Power Dissipation	pation $T_A=70^{\circ}C$		2.1	vv			
Junction and Storage Temperature Range		T _J , T _{STG}	-55 to 150	°C			

Thermal Characteristics								
Parameter	Symbol	Тур	Max	Units				
Maximum Junction-to-Ambient A	t ≤ 10s	$R_{\theta JA}$	31	40	°C/W			
Maximum Junction-to-Ambient A	Steady-State	$\kappa_{\theta JA}$	59	75	°C/W			
Maximum Junction-to-Lead ^C	Steady-State	$R_{\theta JL}$	16	24	°C/W			

Electrical Characteristics (T_J=25°C unless otherwise noted)

	Symbol	Parameter	Conditions	Min	Тур	Max	Units			
	STATIC PARAMETERS									
	BV _{DSS}	Drain-Source Breakdown Voltage	$I_D = 250 \mu A, V_{GS} = 0 V$	30			V			
	I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V		0.003	1	μΑ			
			T _J =55°C			5				
	I_{GSS}	Gate-Body leakage current	V_{DS} =0V, V_{GS} = ±20V			±100	nA			
	$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS} I_D=250\mu A$	1	1.7	3	V			
	$I_{D(ON)}$	On state drain current	V_{GS} =4.5V, V_{DS} =5V	30			Α			
	t4U.com R _{DS(ON)}		V _{GS} =10V, I _D =11A		11.7	15	mΩ			
		Static Drain-Source On-Resistance	T _J =125°C		18	22	11122			
			V_{GS} =4.5V, I_D =9A		18	24	mΩ			
	g _{FS}	Forward Transconductance	V_{DS} =5V, I_D =11A		19		S			
	V_{SD}	Diode Forward Voltage I _S =1A,V _{GS} =0V			0.76	1	V			
	I _S	Maximum Body-Diode Continuous Current				4.5	Α			
	DYNAMIC	PARAMETERS								
(C _{iss}	Input Capacitance	ce		955	1200	pF			
	Coss	Output Capacitance	V_{GS} =0V, V_{DS} =15V, f=1MHz		145		pF			
	C_{rss}	Reverse Transfer Capacitance			112		pF			
	R_g	Gate resistance	V_{GS} =0V, V_{DS} =0V, f=1MHz		0.5	0.85	Ω			
	SWITCHING PARAMETERS									
	Q _g (10V)	Total Gate Charge			17	24	nC			
	Q _g (4.5V)	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =11A		9	12	nC			
	Q_{gs}	Gate Source Charge	VGS-10V, VDS-10V, ID-117		3.4		nC			
	Q_{gd}	Gate Drain Charge			4.7		nC			
	t _{D(on)}	Turn-On DelayTime			5	6.5	ns			
	t _r Turn-On Rise Time		V_{GS} =10V, V_{DS} =15V, R_L =1.35 Ω ,		6	7.5	ns			
	$t_{D(off)}$	Turn-Off DelayTime	R_{GEN} =3 Ω		19	25	ns			
	t _f	Turn-Off Fall Time	<u> </u>		4.5	6	ns			
	t _{rr} Body Diode Reverse Recovery Time		I _F =11A, dI/dt=100A/μs		19	21	ns			
	Q_{rr}	Body Diode Reverse Recovery Charge	I _F =11A, dI/dt=100A/μs		9	12	nC			

A: The value of R $_{0JA}$ 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 a given application depends on the user's specific board design. The current rating is based on the t \leq 10s thermal resistance rating.

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B: Repetitive rating, pulse width limited by junction temperature.

C. The R $_{\theta JA}$ is the sum of the thermal impedence from junction to lead R $_{\theta JL}$ and lead to ambient.

D. The static characteristics in Figures 1 to 6 are obtained using 80 μs 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

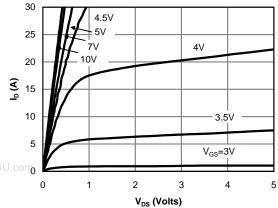


Fig 1: On-Region Characteristics

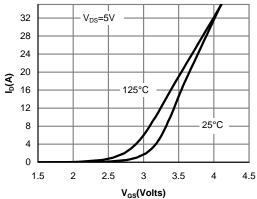


Figure 2: Transfer Characteristics

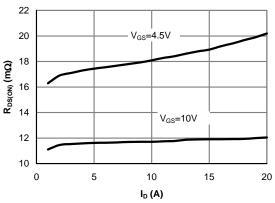


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

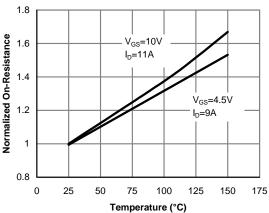


Figure 4: On-Resistance vs. Junction Temperature

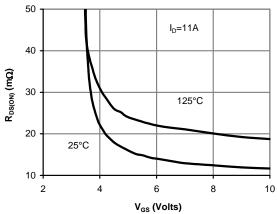


Figure 5: On-Resistance vs. Gate-Source Voltage

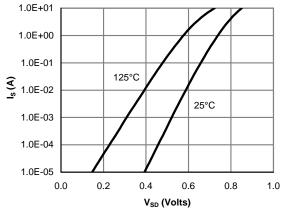


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

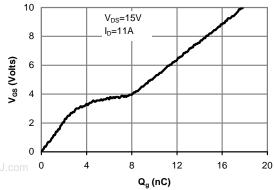


Figure 7: Gate-Charge Characteristics

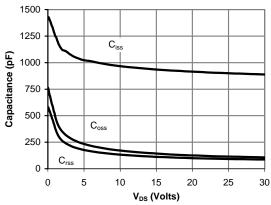


Figure 8: Capacitance Characteristics

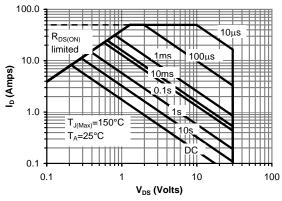


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

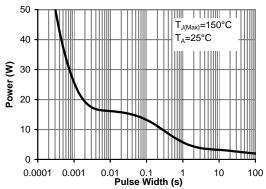


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

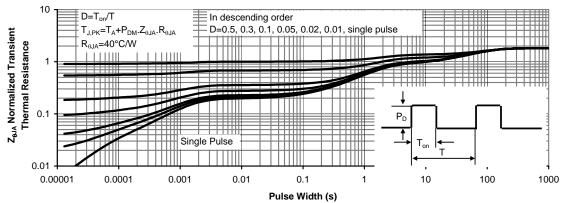


Figure 11: Normalized Maximum Transient Thermal Impedance