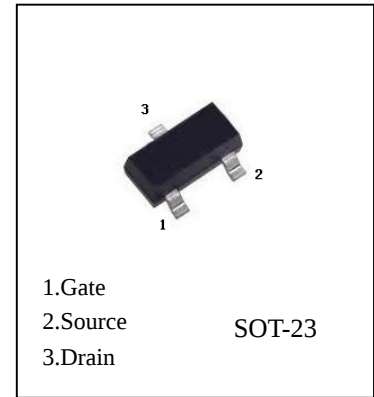
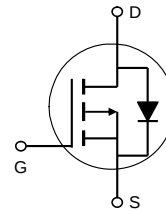


FEATURES

- The AO3409 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

AO3409

P-Channel MOSFET



Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$, unless otherwise noted)

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_A=25^{\circ}\text{C}$	I_D	-2.6	A
	$T_A=70^{\circ}\text{C}$		-2.2	
Pulsed Drain Current ^C		I_{DM}	-20	
Power Dissipation ^B	$T_A=25^{\circ}\text{C}$	P_D	1.4	W
	$T_A=70^{\circ}\text{C}$		1	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^{\circ}\text{C}$

Thermal Characteristics

Parameter		Symbol	Typ Max		Unit
Maximum Junction-to-Ambient ^A	$t \leq 10\text{s}$	$R_{\theta JA}$	70	90	$^{\circ}\text{C/W}$
Maximum Junction-to-Ambient ^{A,D}	Steady-State		100	125	$^{\circ}\text{C/W}$
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	63	80	$^{\circ}\text{C/W}$

AO3409

Electrical Characteristics (TA=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =-250 A, V _{GS} =0V	-30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V			-1	uA
		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 A	-1.4	-1.9	-2.4	V
I _{D(ON)}	On state drain current	V _{GS} =-10V, V _{DS} =-5V	-20			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-2.6A		77	110	mΩ
		T _J =125°C		100	140	
		V _{GS} =-4.5V, I _D =-2A		125	180	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-2.6A		5		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.8	-1	V
I _S	Maximum Body-Diode Continuous Current				-1.5	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz		197	240	pF
C _{oss}	Output Capacitance			42		pF
C _{rss}	Reverse Transfer Capacitance			26	37	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	3.5	7.2	11.0	Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-2.6A		4.3	5.2	nC
Q _g (4.5V)	Total Gate Charge			2.2	3	nC
Q _{gs}	Gate Source Charge			0.7		nC
Q _{gd}	Gate Drain Charge			1.1		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-10V, V _{DS} =-15V, R _L =5.8 Ω, R _{GEN} =3		7.5		ns
t _r	Turn-On Rise Time			4.1		ns
t _{D(off)}	Turn-Off DelayTime			11.8		ns
t _f	Turn-Off Fall Time			3.8		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-2.6A, dI/dt=100A/ us		11.3	14	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-2.6A, dI/dt=100A/ us		4.4		nC

A. The value of R_{θJA} is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with TA =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 initial T_J=25°C.

D. The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} 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 impedance 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.

AO3409 Typical Characteristics

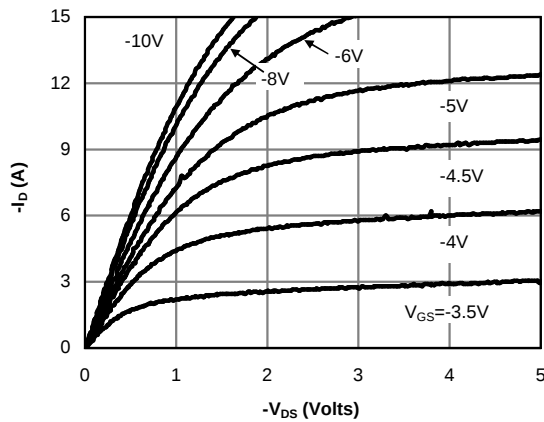


Fig 1: On-Region Characteristics (Note E)

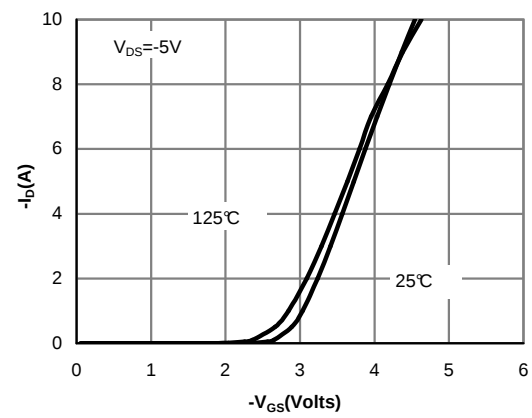


Figure 2: Transfer Characteristics (Note E)

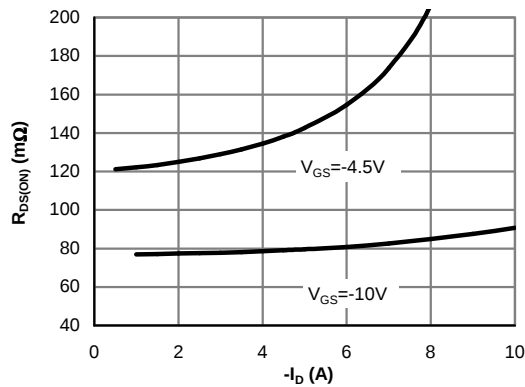


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

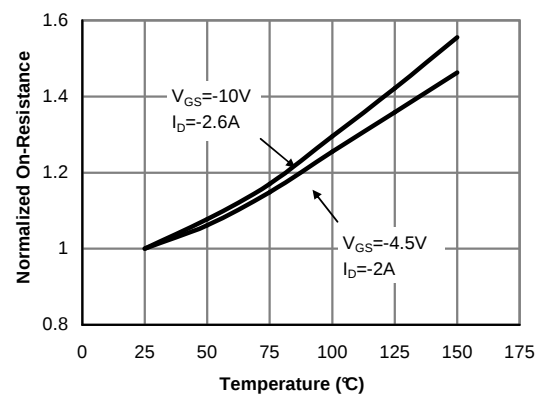


Figure 4: On-Resistance vs. Junction Temperature (Note E)

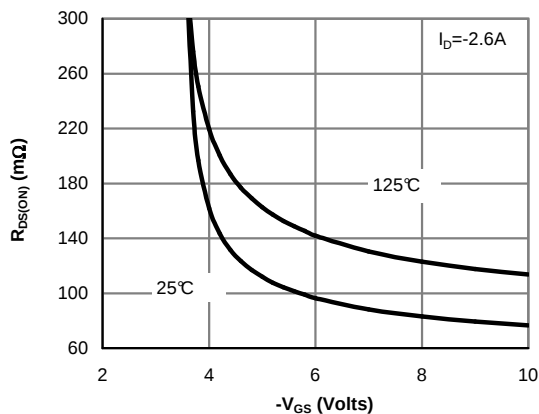


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

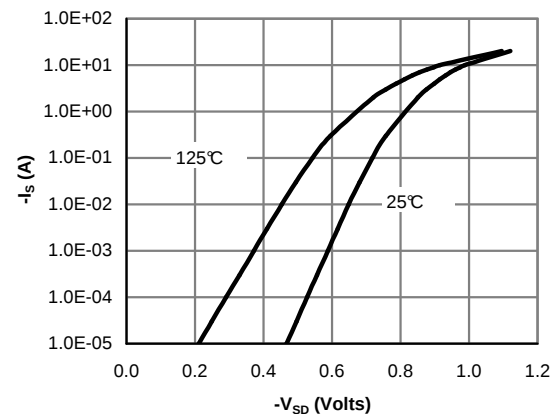


Figure 6: Body-Diode Characteristics (Note E)

AO3409 Typical Characteristics

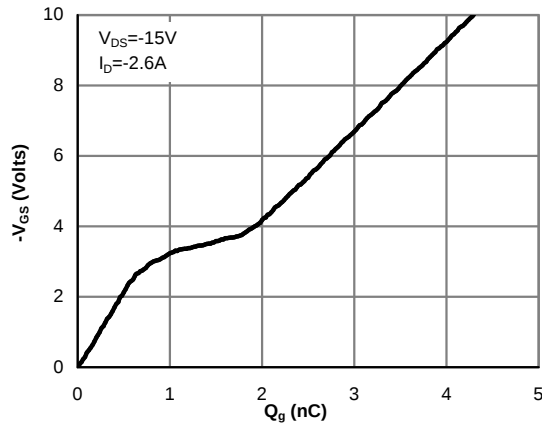


Figure 7: Gate-Charge Characteristics

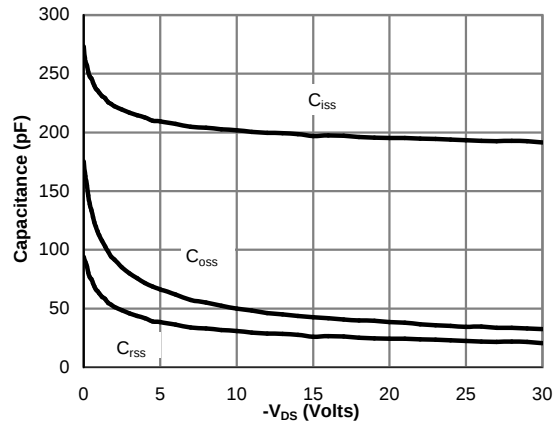


Figure 8: Capacitance Characteristics

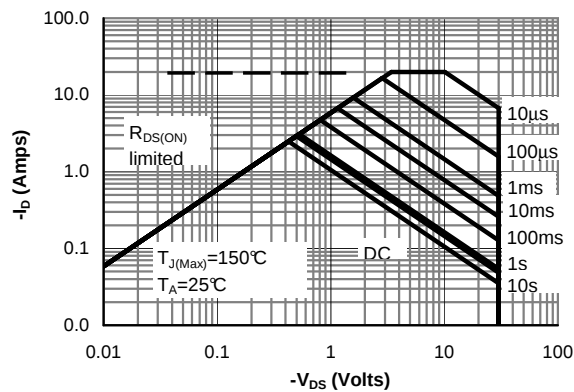


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

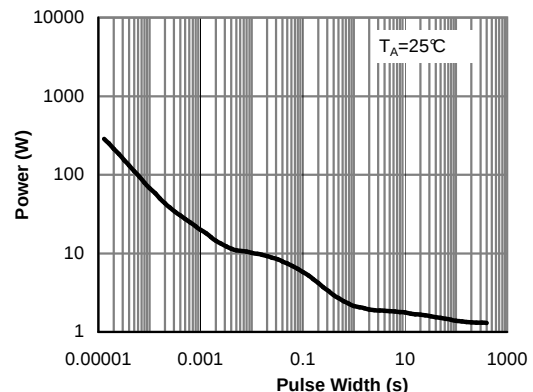


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

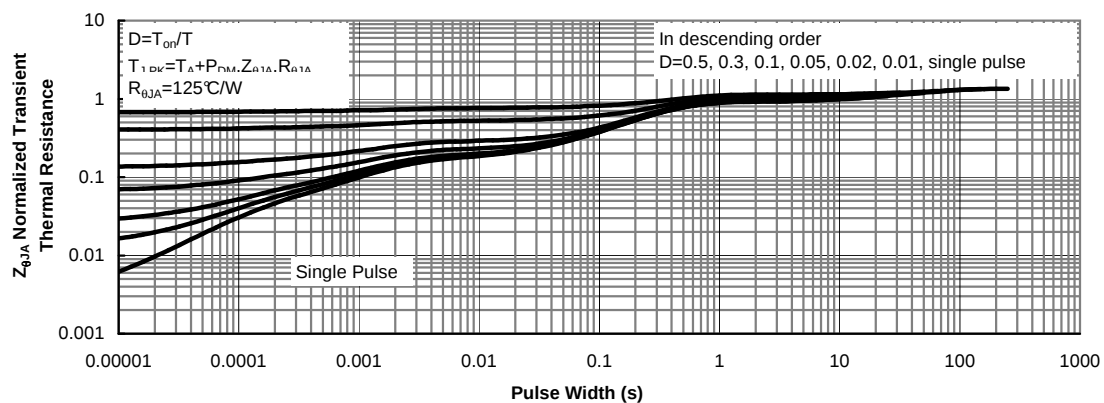


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)