

**AO3407****P-Channel Enhancement Mode Field Effect Transistor****General Description**

The AO3407 uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use as a load switch or in PWM applications. *Standard Product AO3407 is Pb-free (meets ROHS & Sony 259 specifications). AO3407 is a Green Product ordering option.*

Features

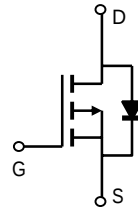
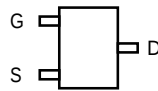
$$V_{DS} (V) = -30V$$

$$I_D = -4.1 A \quad (V_{GS} = -10V)$$

$$R_{DS(ON)} < 60m\Omega \quad (V_{GS} = -10V)$$

$$R_{DS(ON)} < 90m\Omega \quad (V_{GS} = -4.5V)$$

(SOT-23)
Top View

**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}	± 20	V
Continuous Drain Current ^A	I_D	-4.1	A
$T_A=25^\circ\text{C}$		-3.5	
$T_A=70^\circ\text{C}$			
Pulsed Drain Current ^B	I_{DM}	-20	
Power Dissipation ^A	P_D	1.4	W
$T_A=25^\circ\text{C}$		1	
$T_A=70^\circ\text{C}$			
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 ^A	$t \leq 10s$	$R_{\theta JA}$	65	90	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A	Steady-State		85	125	$^\circ\text{C/W}$
Maximum Junction-to-Lead ^C	Steady-State	$R_{\theta JL}$	43	60	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
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	$V_{DS}=-24\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^{\circ}\text{C}$			-1 -5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-1	-1.8	-3	V
$I_{D(ON)}$	On state drain current	$V_{GS}=-4.5\text{V}$, $V_{DS}=-5\text{V}$	-10			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10\text{V}$, $I_D=-4.1\text{A}$			60	$\text{m}\Omega$
		$V_{GS}=-4.5\text{V}$, $I_D=-3\text{A}$			90	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=-5\text{V}$, $I_D=-4\text{A}$	5.5	8.2		S
V_{SD}	Diode Forward Voltage	$I_S=-1\text{A}$, $V_{GS}=0\text{V}$		-0.77	-1	V
I_S	Maximum Body-Diode Continuous Current				-2.2	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=-15\text{V}$, $f=1\text{MHz}$		700	840	pF
C_{oss}	Output Capacitance			120		pF
C_{rss}	Reverse Transfer Capacitance			75		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		10	15	Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge (10V)	$V_{GS}=-4.5\text{V}$, $V_{DS}=-15\text{V}$, $I_D=-4\text{A}$		14.3	18	nC
Q_g	Total Gate Charge (4.5V)			7		nC
Q_{gs}	Gate Source Charge			3.1		nC
Q_{gd}	Gate Drain Charge			3		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $R_L=3.6\Omega$, $R_{GEN}=3\Omega$		8.6		ns
t_r	Turn-On Rise Time			5		ns
$t_{D(off)}$	Turn-Off DelayTime			28.2		ns
t_f	Turn-Off Fall Time			13.5		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=-4\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		27	36	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=-4\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		15		nC

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

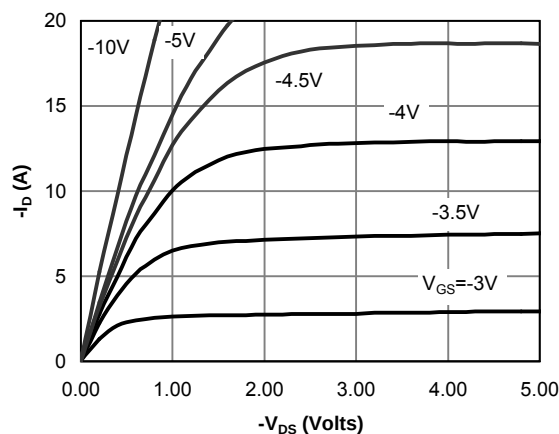


Figure 1: On-Region Characteristics

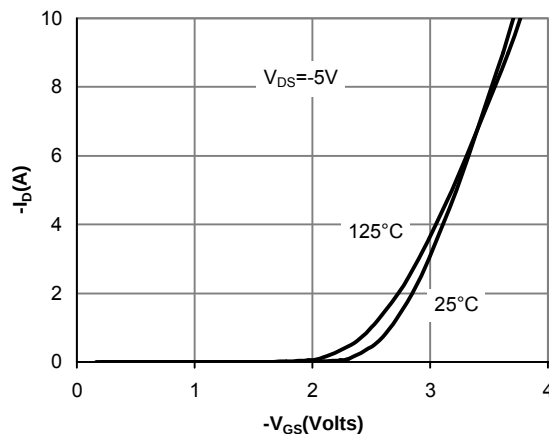


Figure 2: Transfer Characteristics

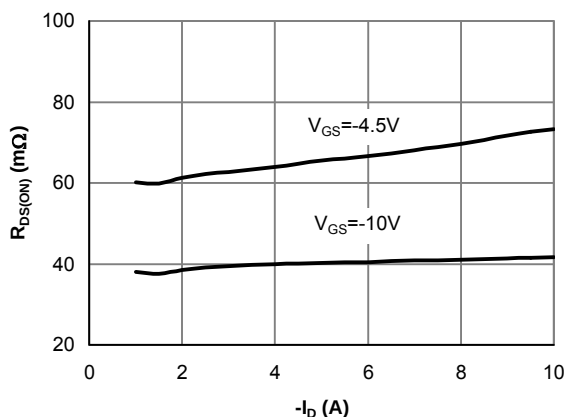


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

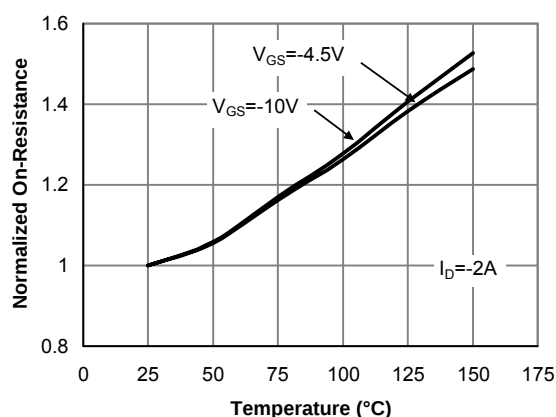


Figure 4: On-Resistance vs. Junction Temperature

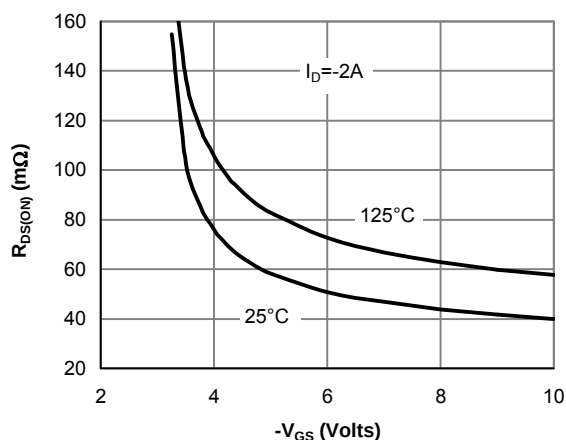


Figure 5: On-Resistance vs. Gate-Source Voltage

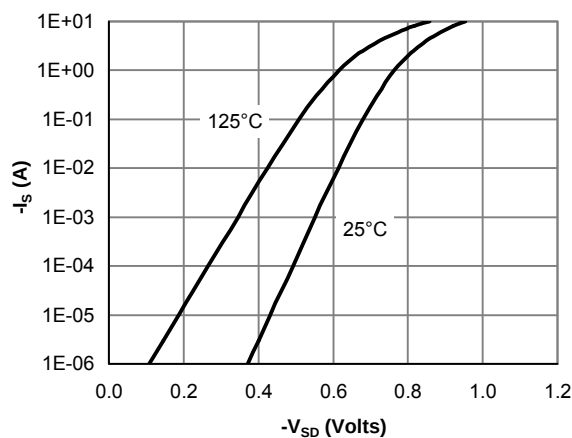


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

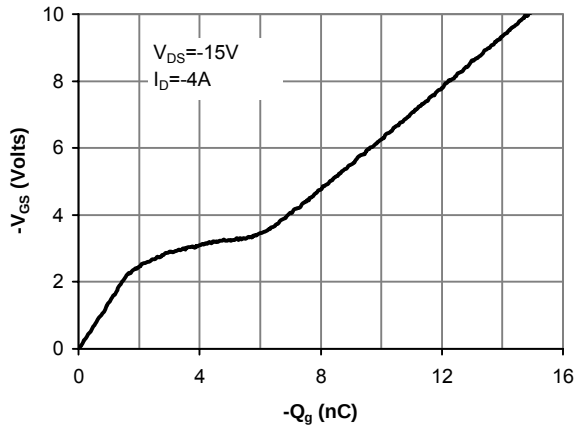


Figure 7: Gate-Charge Characteristics

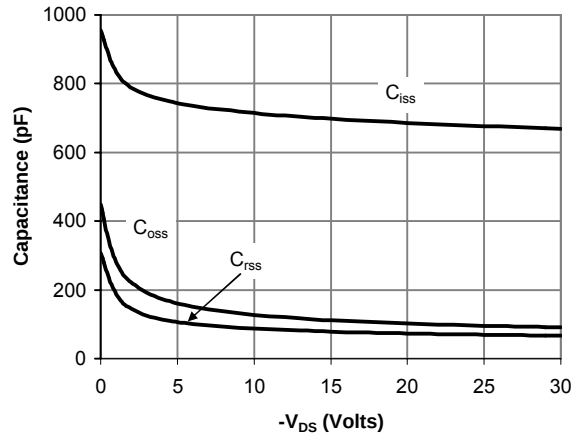


Figure 8: Capacitance Characteristics

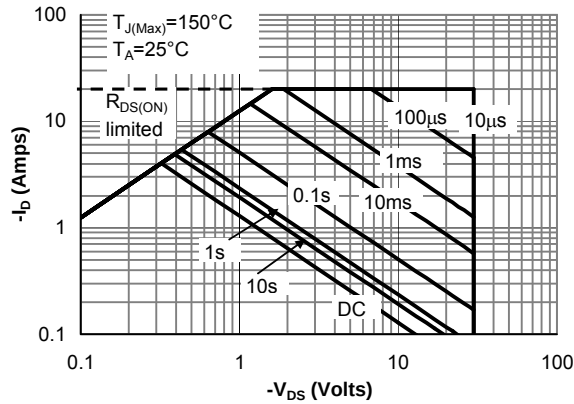


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

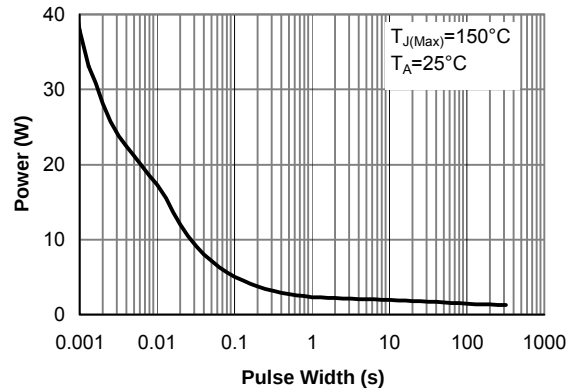


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

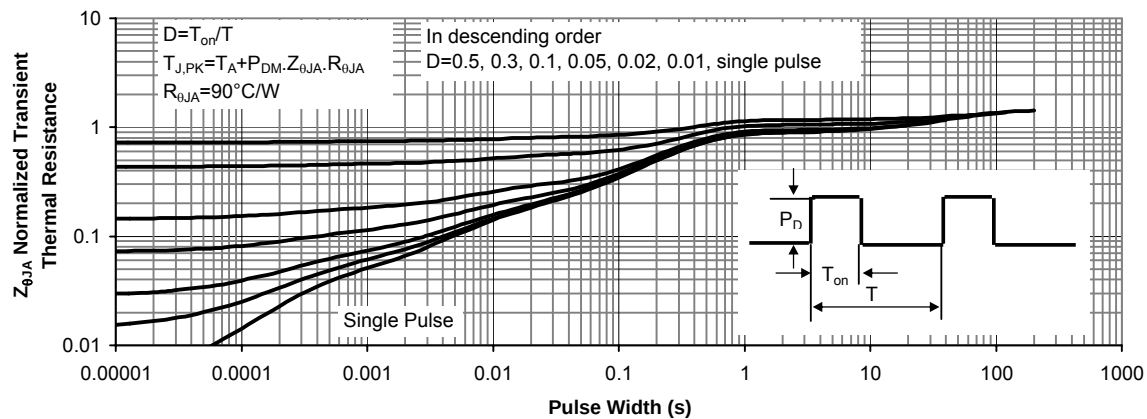


Figure 11: Normalized Maximum Transient Thermal Impedance