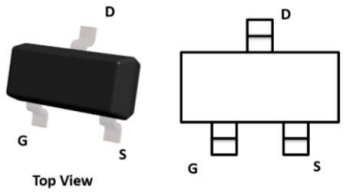
P-Channel Enhancement MOSFET

1 General Description

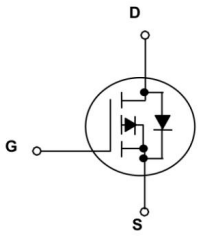
1.1 Features

- $V_{DS(V)}$=-30V
- I_D=-4.2A(V_{GS} =-10V)
- $R_{DS(ON)}$<50mΩ (V_{GS}=-10V)
- $R_{DS(ON)}$<65mΩ (V_{GS}=-4.5V)
- $R_{DS(ON)}$<120mΩ (V_{GS}=-2.5V)



1.2 Typical Applications

- Power supplies
- Load switching
- PWM applications



2 Package and Ordering Information

PACKAGE	DEVICE	PACKING	QUANTITY (pcs)
SOT-23	AO3401A	REEL	3000/REEL

3 Absolute Maximum Ratings(Ta=25℃ Unless otherwise specified)

PARAMETER		SYMBOL	Rating	UNIT
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current	Ta=25℃	I_D	-4.2	A
	Ta=70℃		-3.5	
Pulsed Drain Current		I_{DM}	-30	A
Power Dissipation	Ta=25℃	P_D	1.4	W
	Ta=70℃		1.0	
Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{STG}	-55 to +150	℃
Thermal Characteristics				
Thermal Resistance junction-Ambient (t≤10s)		$R_{\theta JA}$	90	℃/W
Thermal Resistance junction-Ambient		$R_{\theta JA}$	125	
Thermal Resistance junction-Case		$R_{\theta JC}$	60	℃/W

4 Electrical Characteristics(Ta=25℃ Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=-250μA	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V,V_{GS}=0V	-	-	-1	μA
		V_{DS}=-24V,V_{GS}=0V,T_J=55℃	-	-	-5	
Gate- Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-0.4	-	-1.3	V
On State Drain Current	$I_{D(on)}$	V_{GS}=-4.5V,V_{DS}=-5V	-25	-	-	A
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=-10V,I_D=-4.2A	-	-	50	mΩ
		V_{GS}=-4.5V,I_D=-4.0A	-	-	65	
		V_{GS}=-2.5V,I_D=-1.0A	-	-	120	
Forward Transconductance	gFS	V_{DS}=-5.0V,I_D=-5.0A	7	11	-	S
Input Capacitance	Ciss	V_{DS}=-15V,V_{GS}=0V f=1MHZ	-	954	-	pF
Output Capacitance	Coss		-	115	-	
Reverse Transfer Capacitance	Crss		-	77	-	
Gate Resistance	R_g	V_{DS}=0V,V_{GS}=0V,f=1MHZ	-	6	-	Ω
Total Gate Charge	Q_g	V_{DS}=-15V,V_{GS}=-4.5V I_D=-4.0A	-	9.4	-	nC
Gate-Source Charge	Q_{gs}		-	2.0	-	
Gate-Drain Charge	Q_{gd}		-	3.0	-	
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=-10V,V_{DS}=-15V, R_L=3.6Ω, R_{GEN}=6Ω,	-	6.3	-	ns
Rise Time	t_r		-	3.2	-	
Turn-off Delay Time	$t_{d(off)}$		-	38.3	-	
Fall Time	t_f		-	12	-	
Body Diode Reverse Recovery Time	t_{rr}	I_F=-4A,di/dt=100A/μs		20.2		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=5A,di/dt=100A/μs		11.2		nC
Maximum Body-Diode Continuous Current	I_S	-	-	-	-2.2	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=-1A	-	-0.75	-1	V

5 Characteristics Curves (Ta=25℃ Unless otherwise specified)

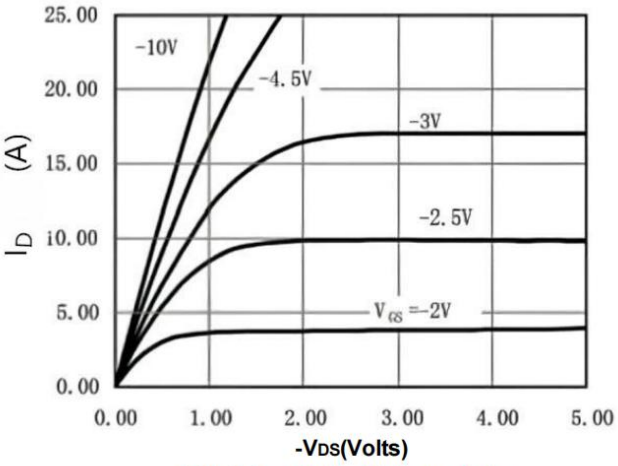


Fig 1:On-Region Characteristics

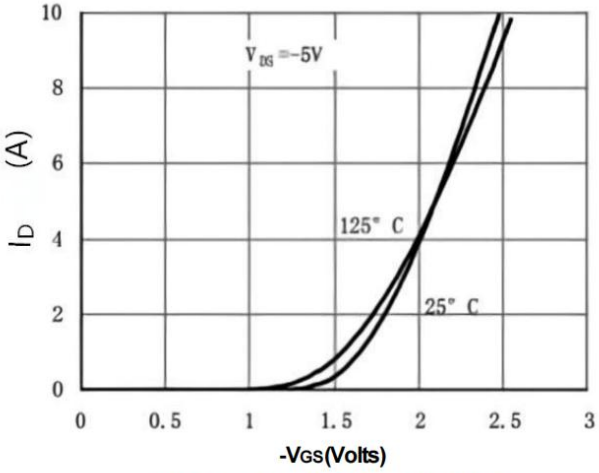


Figure 2:Transfer Characteristics

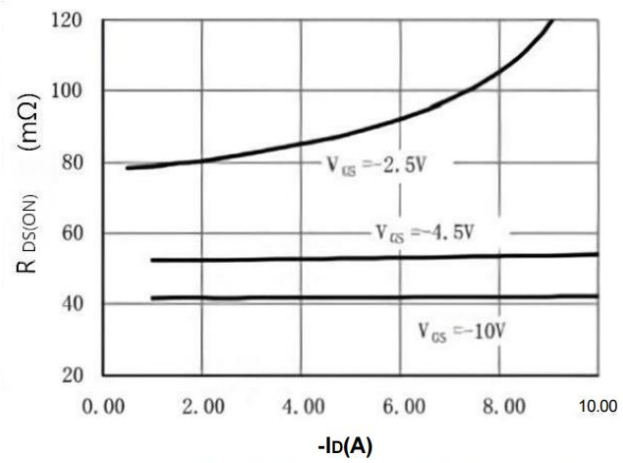


Figure 3:On-Resistance vs.Drain Current and Gate Voltage

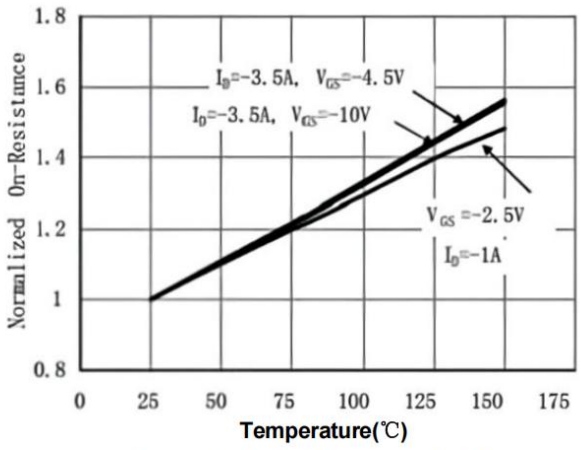


Figure 4:On-Resistance vs.Junction Temperature

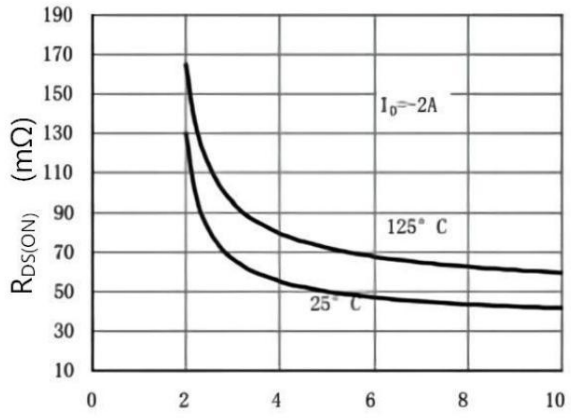


Figure 5:On-Resistance vs.Gate-Source Voltage

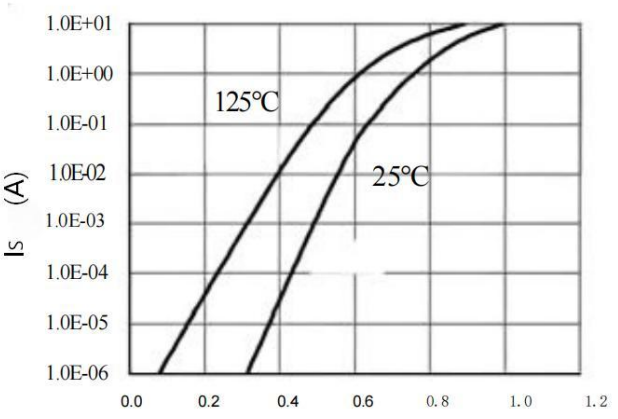


Figure 6:Body-Diode Characteristics

Characteristics Curves (Ta=25℃ Unless otherwise specified)

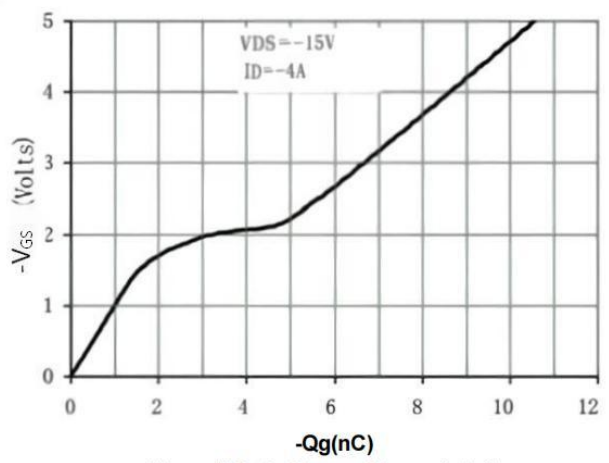


Figure 7:Gate-Charge Characteristics

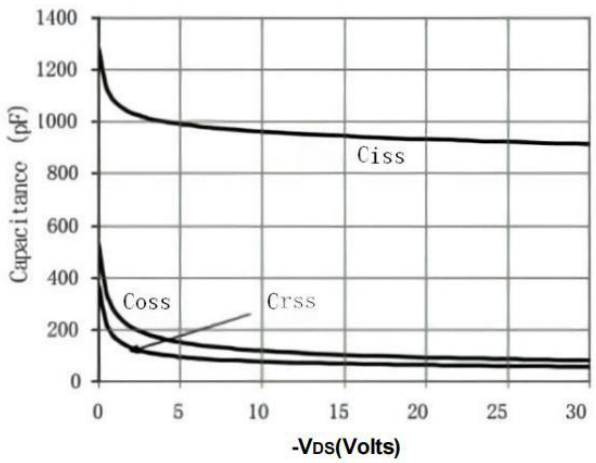


Figure 8:Capacitance Characteristics

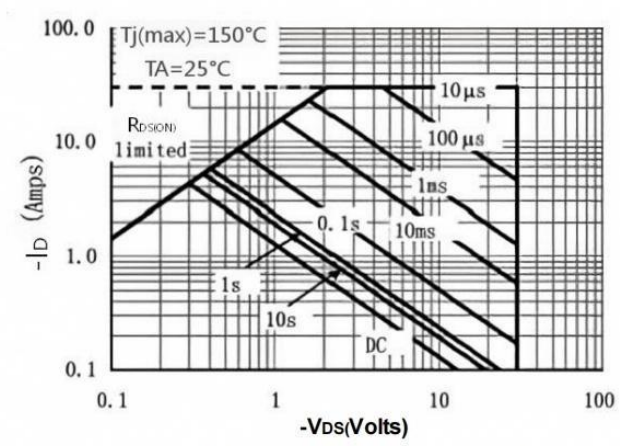


Figure 9:Maximum Forward Biased Safe Operating Area(Note E)

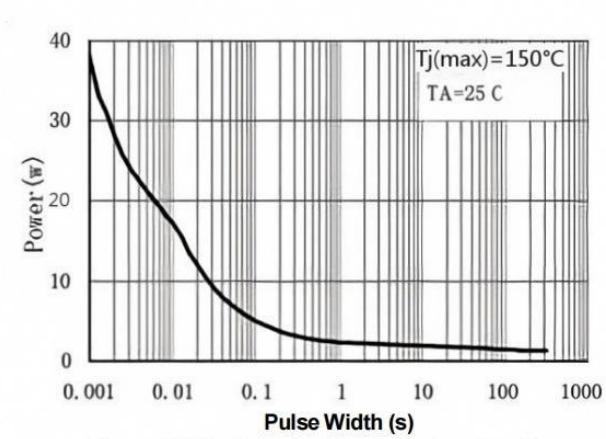


Figure 10:Single Pulse Power Rating Junction-to-Ambient(Note E)

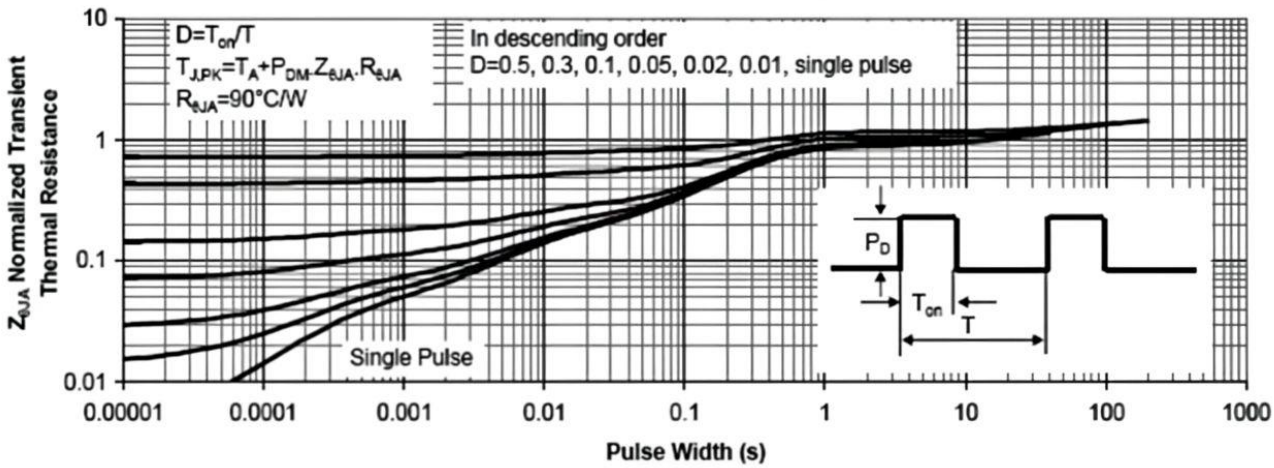
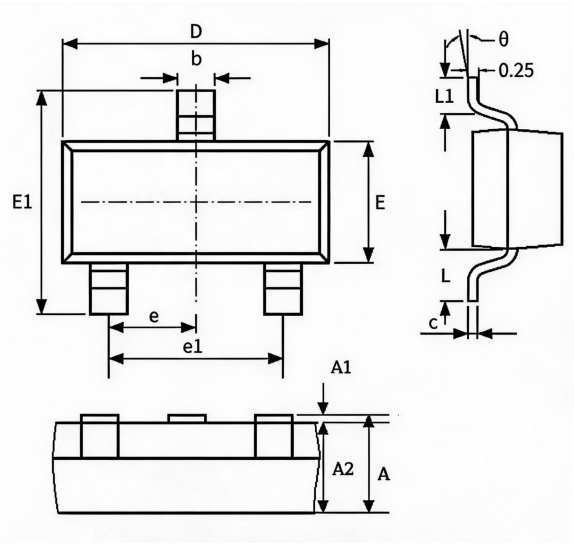


Figure 11: Normalized Maximum Transient Thermal Impedance

6 Package Outline Dimensions



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.15	0.035	0.04
A1	0	0.10	0	0.004
A2	0.90	1.05	0.035	0.041
b	0.30	0.50	0.012	0.020
c	0.08	0.15	0.003	0.006
D	2.80	3.00	0.110	0.118
E	1.20	1.40	0.047	0.055
E1	2.25	2.55	0.089	0.100
e	0.95 TYP.		0.037 TYP.	
e1	1.80	2.00	0.071	0.079
L	0.55REF.		0.022REF.	
L1	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°

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