GOODWORK

AO3400

30V N-Channel Trench Power MOSFET

General Description

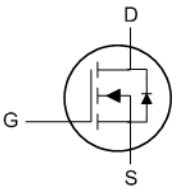
The AO3400 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a wide variety of applications.

Features

- Low Gate Charge
- High Power and current handing capability
- Lead free product is acquired

Application

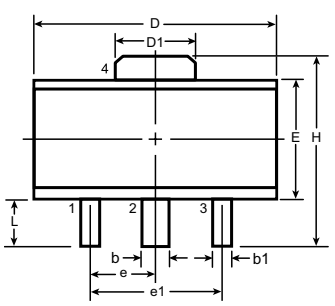
- PWM Applications
- Load Switch
- Power Management



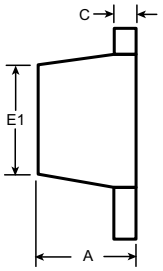
Key Performance Parametes

Parameter	Value	Unit
V_{DS}	30	V
$R_{DS(ON)\_TYP}$	20	mΩ
I_D	7	A
Q_G	8	nC

SOT-89 PACKAGE OUTLINE



Top View



Side View

Symbol		A	b	b1	C	D	D1	E	E1	e	e1	H	L
Dimensions (mm)	MIN	1.40	0.44	0.36	0.3	4.40	1.50	2.29	2.00f	1.50 BSC	3.00 BSC	3.94	0.89
	NOM	-	-	-	-	-	-	-	-			-	-
	MAX	1.60	0.56	0.48	0.5	4.60	1.75	2.60	2.29			4.25	1.20

Dimensions in mm

Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	30	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±12	V
I_D	Drain Current-Continuous(T_A=25℃)	7	A
	Drain Current-Continuous(T_A=100℃)	3.2	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	20.8	A
P_D	Maximum Power Dissipation(T_A=25℃)	1.1	W
	Maximum Power Dissipation(T_A=100℃)	0.4	W
E_{AS}	Avalanche energy (Note 2)	20	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃

AO3400

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V T_J=25℃			1	μA
		V_{DS}=30V, V_{GS}=0V T_J=125℃			100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±12V, V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	0.45		1.25	V
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=2A		6.6		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=1.5A T_J=25℃		20	25	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=4.5V, I_D=1A T_J=25℃		25	30	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=2.5V, I_D=1A T_J=25℃		35	40	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, f=1.0MHz		488		pF
C_{oss}	Output Capacitance			44		pF
C_{rss}	Reverse Transfer Capacitance			35		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		5.4		Ω
Switching Parameters						
$t_{d(on)}$	Turn-on Delay Time	V_{GS}=4.5V, V_{DS}=15V, R_L=7.5Ω, R_{GEN}=3Ω		5		nS
t_r	Turn-on Rise Time			12		nS
$t_{d(off)}$	Turn-Off Delay Time			24		nS
t_f	Turn-Off Fall Time			2		nS
Q_g	Total Gate Charge	V_{GS}=4.5V, V_{DS}=15V, I_D=2A		8		nC
Q_{gs}	Gate-Source Charge			1.6		nC
Q_{gd}	Gate-Drain Charge			1.6		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current (Body Diode)				7	A
V_{SD}	Forward on Voltage (Note 3)	V_{GS}=0V, I_S=2A			1.2	V
t_{rr}	Reverse Recovery Time	I_F=2A, dI/dt=100A/μs		8.5		ns
Q_{rr}	Reverse Recovery Charge	I_F=2A, dI/dt=100A/μs		3.4		nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
Notes 2.E_{AS} condition: T_J=25℃,V_{DD}=30V,V_G=10V, Rg=25Ω, L=0.5mH.
Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient		115	℃/W

RATING AND CHARACTERISTIC CURVES (AO3400)

Figure 1. Output Characteristics

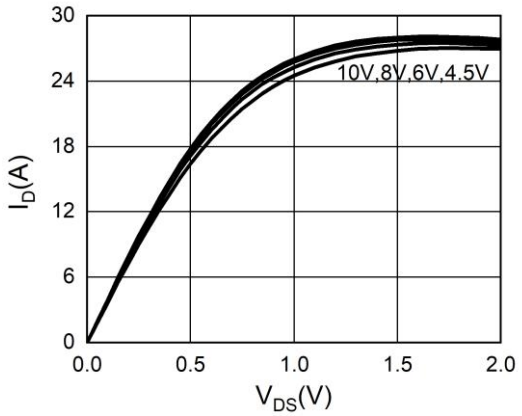


Figure 2. Transfer Characteristics

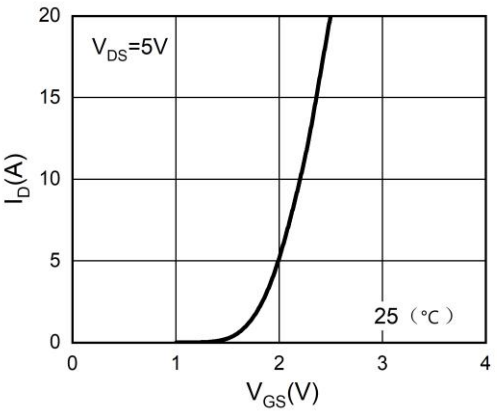


Figure 3. Power Dissipation

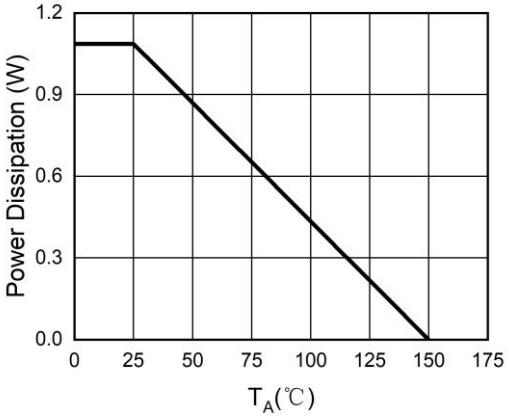


Figure 4. Drain Current

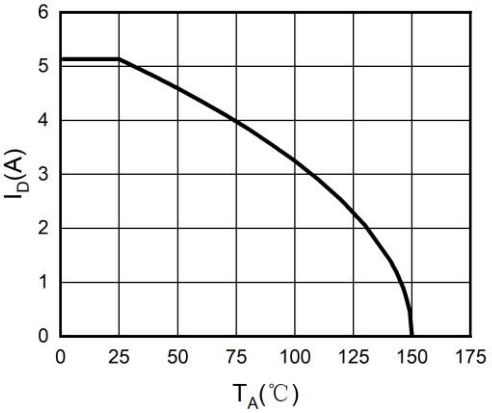


Figure 5. BV_{DSS} vs Junction Temperature

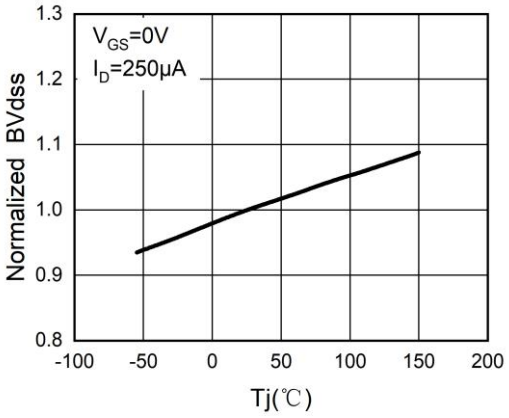
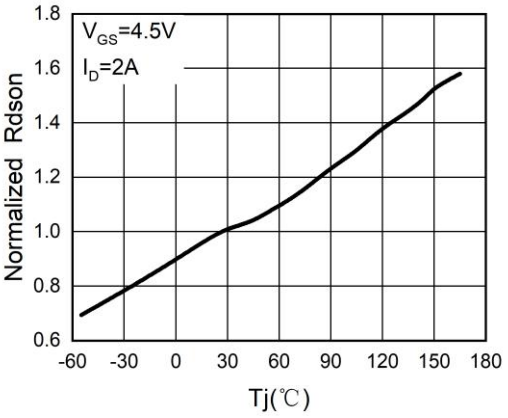


Figure 6. $R_{DS(ON)}$ vs Junction Temperature



RATING AND CHARACTERISTIC CURVES (AO3400)

Figure 7. Gate Charge Waveforms

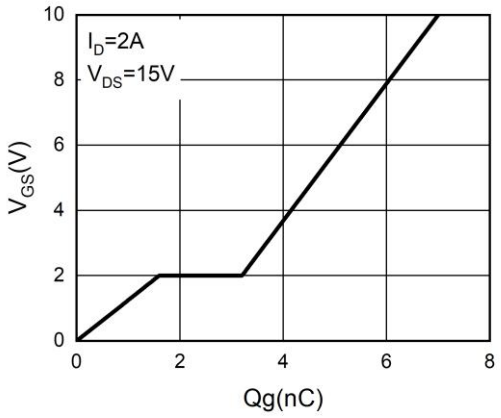


Figure 8. Capacitance

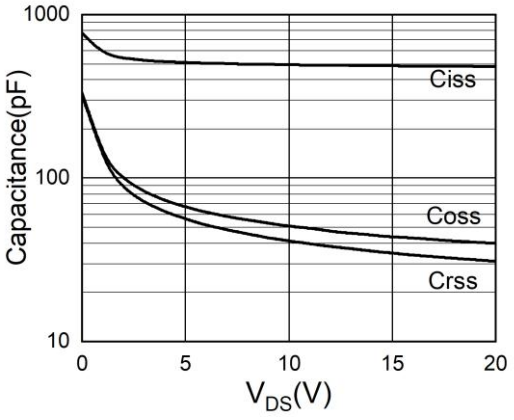


Figure 9. Body-Diode Characteristics

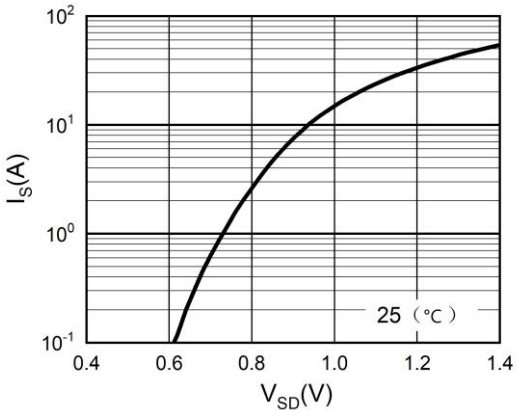


Figure 10. Maximum Safe Operating Area