



AO3400A

N-Channel Enhancement Mode Field Effect Transistor



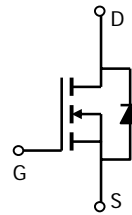
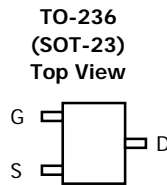
General Description

The AO3400A 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. *Standard Product AO3400A is Pb-free (meets ROHS & Sony 259 specifications).*

Features

- V_{DS} (V) = 30V
- I_D = 5.7A (V_{GS} = 10V)
- $R_{DS(ON)} < 26.5m\Omega$ (V_{GS} = 10V)
- $R_{DS(ON)} < 32m\Omega$ (V_{GS} = 4.5V)
- $R_{DS(ON)} < 48m\Omega$ (V_{GS} = 2.5V)

Rg, Ciss, Coss, Crss Tested



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}	± 12	V
Continuous Drain Current ^{AF}	$T_A=25^\circ\text{C}$	5.7	A
	$T_A=70^\circ\text{C}$	4.7	
Pulsed Drain Current ^B	I_{DM}	25	A
Power Dissipation	$T_A=25^\circ\text{C}$	1.4	W
	$T_A=70^\circ\text{C}$	0.9	
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	$R_{\theta JA}$	70	90	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A		Steady-State	100	125
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	63	80	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250uA, V _{GS} =0V	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V T _J =125°C			1 5	uA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} = ±12V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =250uA	0.7	1	1.5	V
I _{D(ON)}	On state drain current	V _{GS} =4.5V, V _{DS} =5V	25			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =5.7A T _J =125°C		22	26.5	mΩ
				31	38	
		V _{GS} =4.5V, I _D =5A		25.4	32	
		V _{GS} =2.5V, I _D =3A		34	48	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =5.7A		26		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.72	1.0	V
I _S	Maximum Body-Diode Continuous Current				2.0	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		900	1100	pF
C _{oss}	Output Capacitance			88		pF
C _{rss}	Reverse Transfer Capacitance			65		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		0.95	1.5	Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =15V, I _D =5.7A		10	13	nC
Q _{gs}	Gate Source Charge			1.8		nC
Q _{gd}	Gate Drain Charge			3.75		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =2.6Ω, R _{GEN} =3Ω		3.2		ns
t _r	Turn-On Rise Time			3.5		ns
t _{D(off)}	Turn-Off DelayTime			21.5		ns
t _f	Turn-Off Fall Time			2.7		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =5.7A, dI/dt=100A/us		16.8	20	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =5.7A, dI/dt=100A/us		8		nC

A: The value of R_{θJA} 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 given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using <300 us 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.

F: The current rating is based on the t ≤ 10s thermal resistance rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

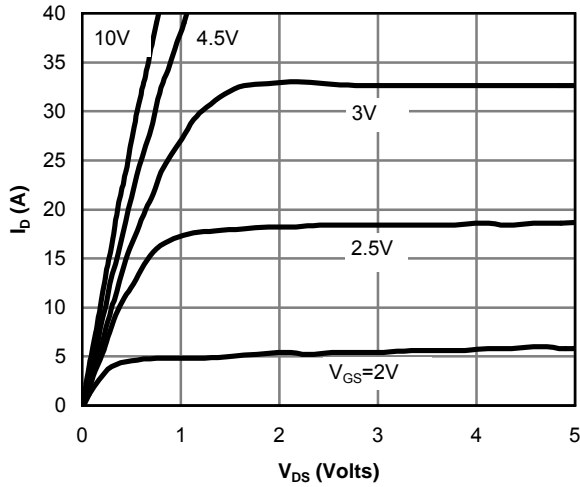


Figure 1: On-Region Characteristics

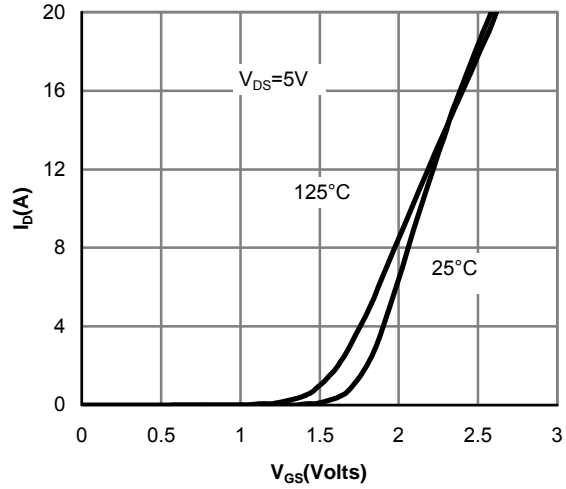


Figure 2: Transfer Characteristics

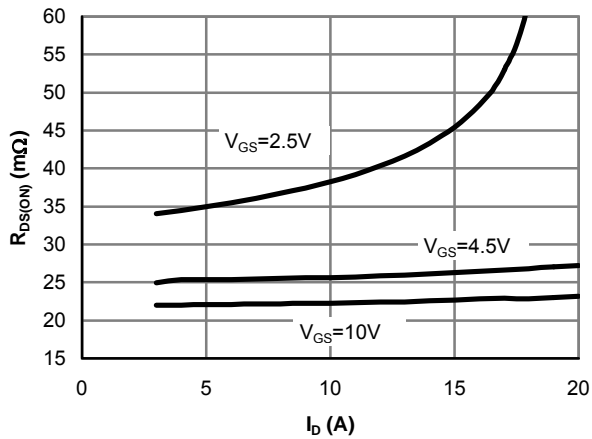


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

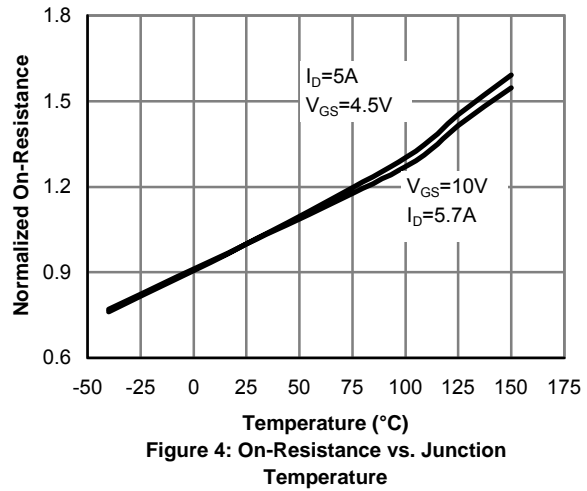


Figure 4: On-Resistance vs. Junction Temperature

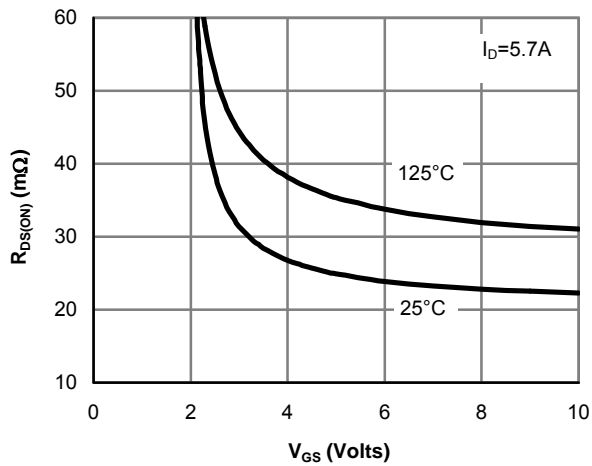


Figure 5: On-Resistance vs. Gate-Source Voltage

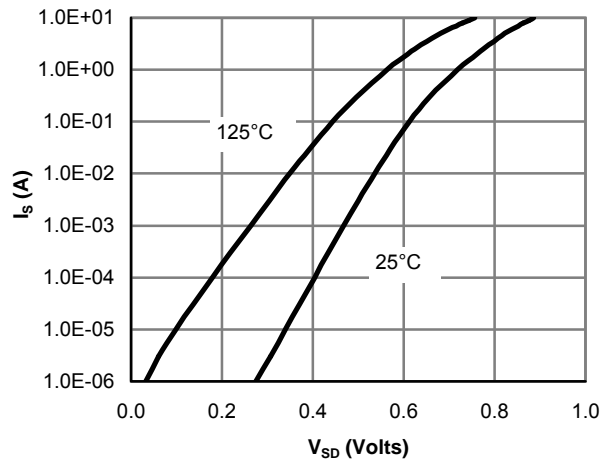


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

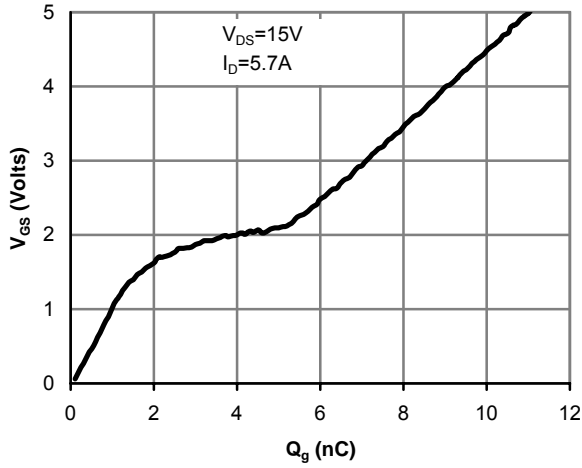


Figure 7: Gate-Charge Characteristics

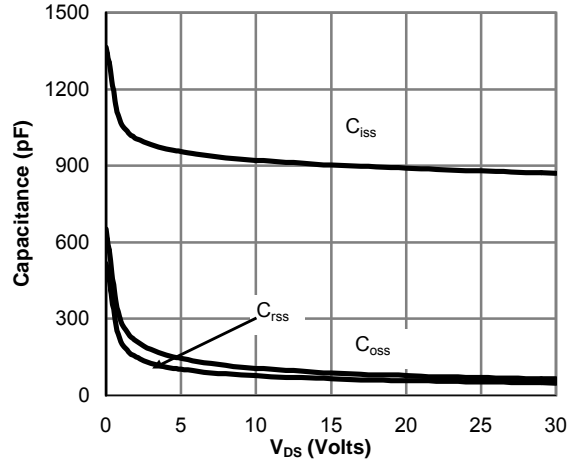


Figure 8: Capacitance Characteristics

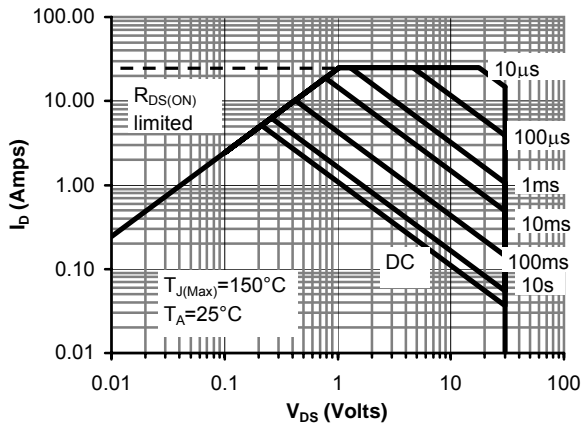


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

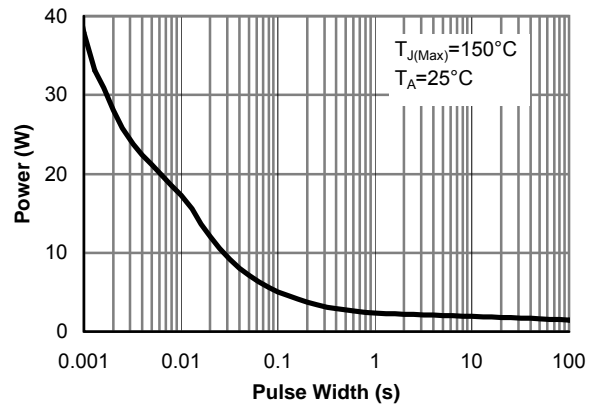


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

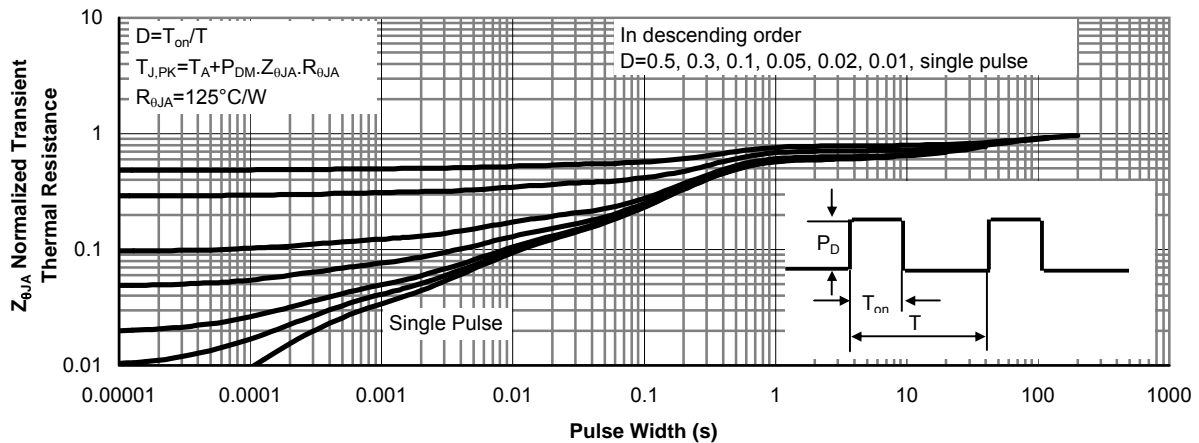


Figure 11: Normalized Maximum Transient Thermal Impedance