

AOU436

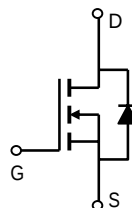
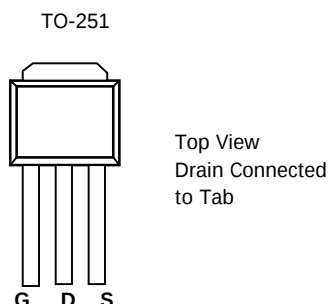
N-Channel Enhancement Mode Field Effect Transistor

General Description

The AOU436 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 AOU436 is Pb-free (meets ROHS & Sony 259 specifications). AOU436L is a Green Product ordering option. AOU436 and AOU436L are electrically identical.*

Features

$V_{DS} (V) = 30V$
 $I_D = 57A (V_{GS} = 10V)$
 $R_{DS(ON)} < 8.5m\Omega (V_{GS} = 10V)$
 $R_{DS(ON)} < 14m\Omega (V_{GS} = 4.5V)$



Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^B	I_D	57	A
	$T_C=25^\circ C$		
	$T_C=100^\circ C$	40	
Pulsed Drain Current	I_{DM}	100	
Avalanche Current ^C	I_{AR}	30	A
Repetitive avalanche energy $L=0.1mH$ ^C	E_{AR}	143	mJ
Power Dissipation ^B	P_D	50	W
	$T_C=25^\circ C$		
	$T_C=100^\circ C$	25	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	100	125	$^\circ C/W$
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	2	3	$^\circ C/W$

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 =250μA, V _{GS} =0V	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V T _J =55°C			1 5	μA
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 =250μA	1	1.8	3	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	85			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A T _J =125°C		5.4 8.1	8.5 9.7	mΩ
		V _{GS} =4.5V, I _D =20A		9.8	14	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		88		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.71	1	V
I _S	Maximum Body-Diode Continuous Current				85	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=100kHz		1520	1825	pF
C _{oss}	Output Capacitance			306		pF
C _{rss}	Reverse Transfer Capacitance			214		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		0.47	0.7	Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{GS} =4.5V, V _{DS} =15V, I _D =20A		31.9	39	nC
Q _g (4.5V)	Total Gate Charge			16.2	20	nC
Q _{gs}	Gate Source Charge			5		nC
Q _{gd}	Gate Drain Charge			9.6		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =0.75Ω, R _{GEN} =3Ω		7		ns
t _r	Turn-On Rise Time			11.6		ns
t _{D(off)}	Turn-Off DelayTime			24.2		ns
t _f	Turn-Off Fall Time			7.7		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =20A, dI/dt=100A/μs		23.8	30	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =20A, dI/dt=100A/μs		15.7		nC

A: The value of R_{θJA} is measured with the device in a still air environment with T_A=25°C.

B: The power dissipation P_D is based on T_{J(MAX)}=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C: Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=175°C.

D: The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.

E: The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

F: These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)}=175°C.

G: The maximum current rating is limited by bond-wires.

Rev3: August 2005

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

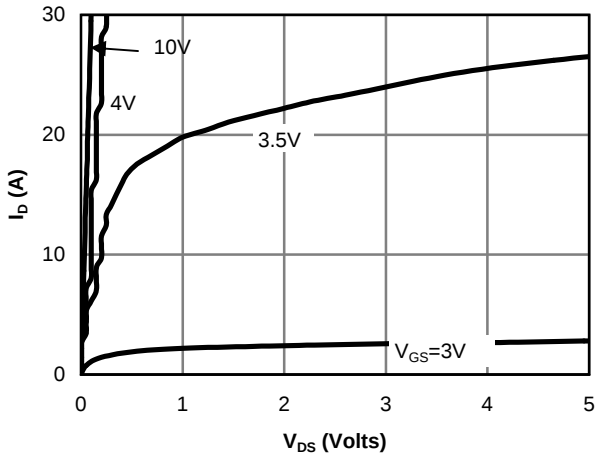


Fig 1: On-Region Characteristics

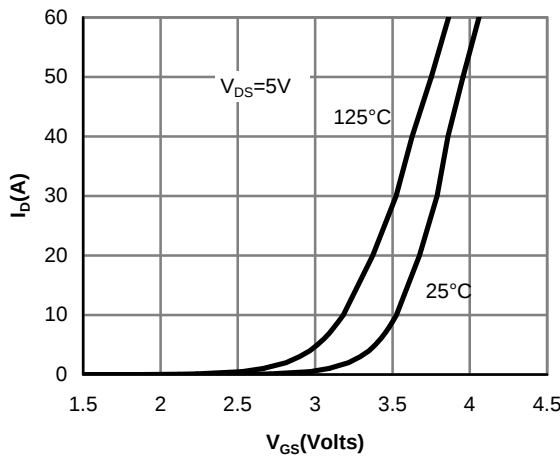


Figure 2: Transfer Characteristics

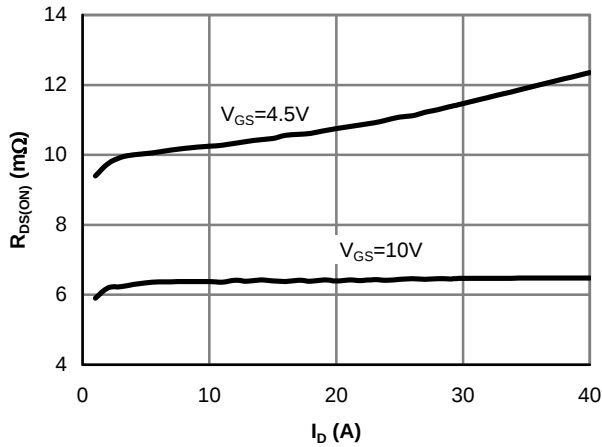


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

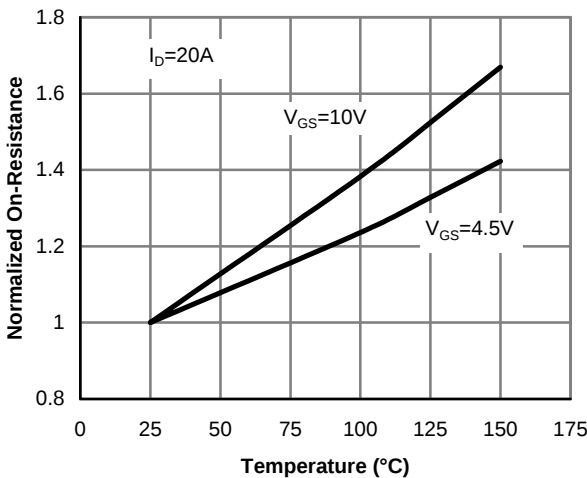


Figure 4: On-Resistance vs. Junction Temperature

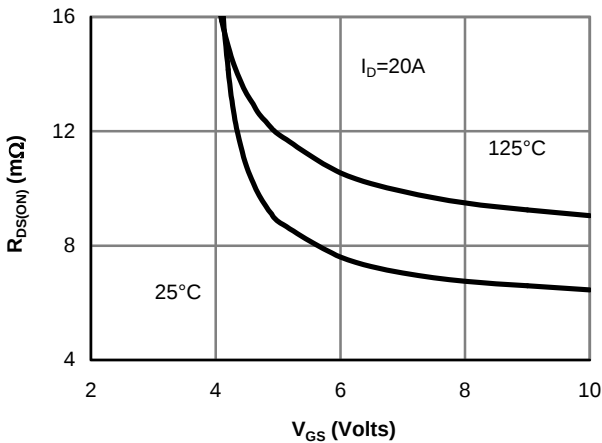


Figure 5: On-Resistance vs. Gate-Source Voltage

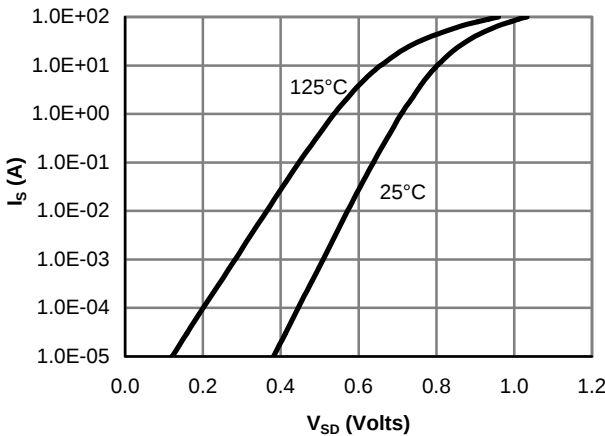


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

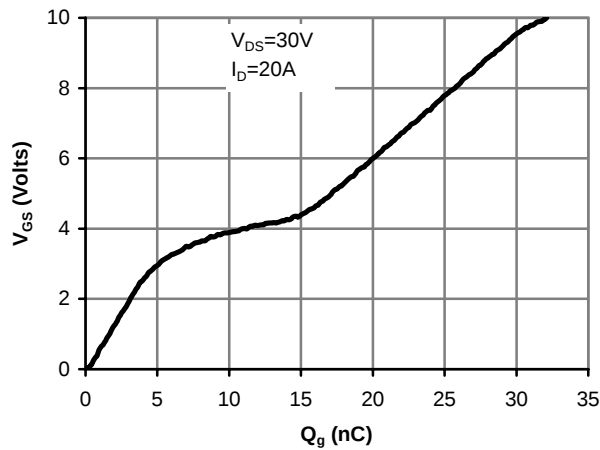


Figure 7: Gate-Charge Characteristics

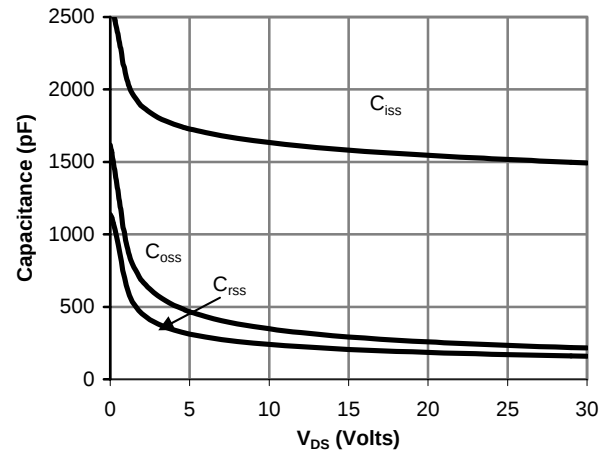


Figure 8: Capacitance Characteristics

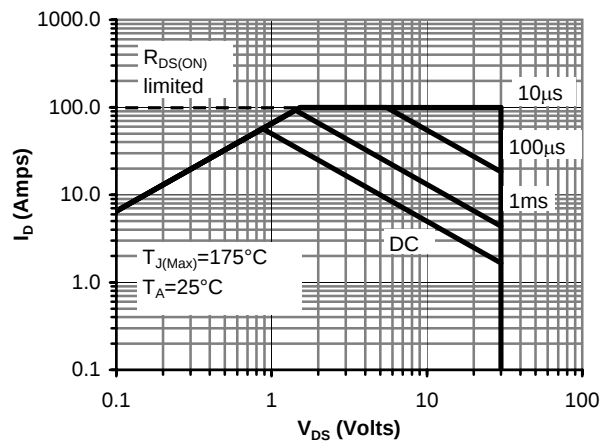


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

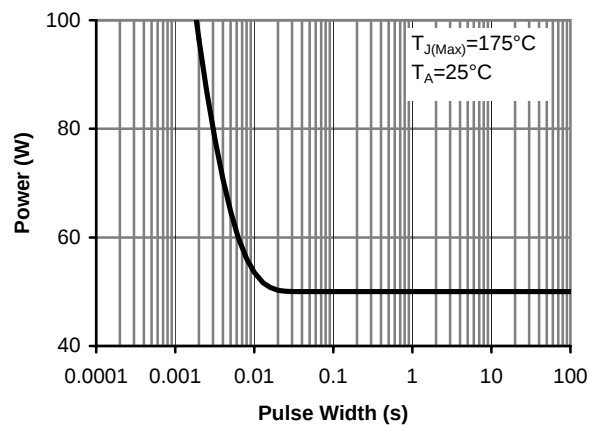


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

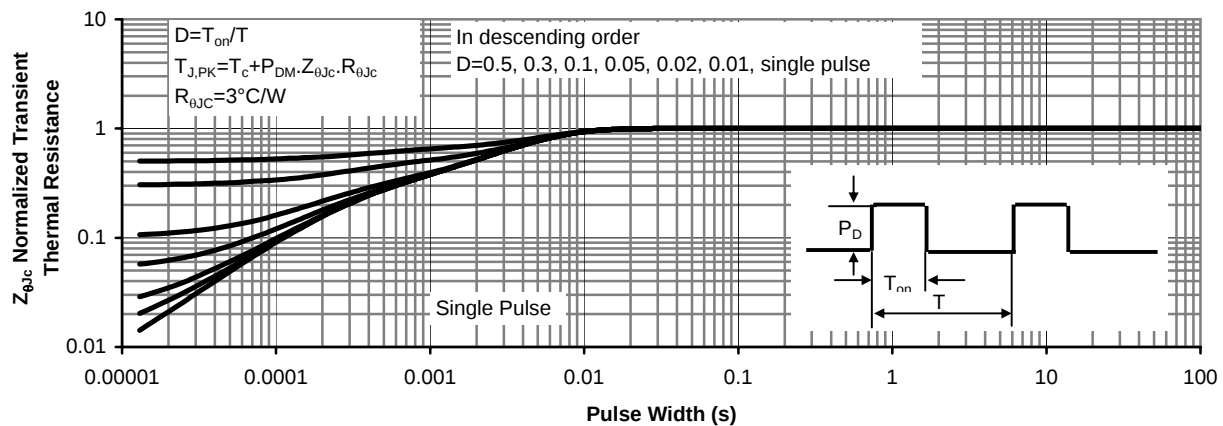


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

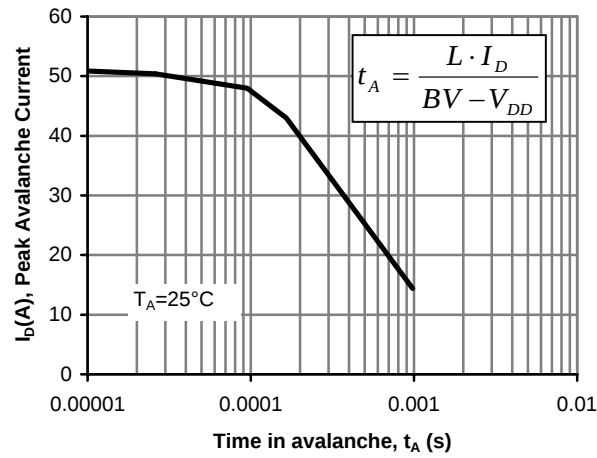


Figure 12: Single Pulse Avalanche capability

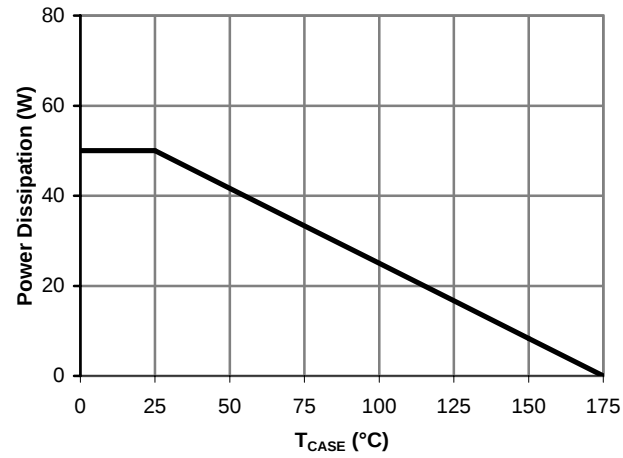


Figure 13: Power De-rating (Note B)

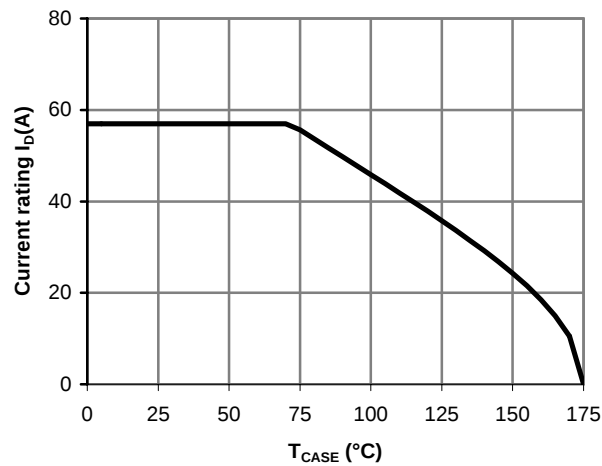


Figure 14: Current De-rating (Note B)