



AOT460 N-Channel Enhancement Mode Field Effect Transistor

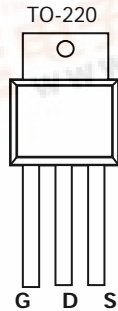
General Description

The AOT460 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in UPS, high current switching applications. *Standard Product AOT460 is Pb-free (meets ROHS & Sony 259 specifications).*

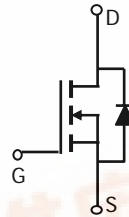
Features

V_{DS} (V) = 60V
 I_D = 85 A (V_{GS} = 10V)
 $R_{DS(ON)}$ < 7.5m Ω (V_{GS} = 10V)

UIS TESTED!



Top View
 Drain
 Connected to
 Tab



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^G	I_D	$T_C=25^\circ\text{C}$	A
		$T_C=100^\circ\text{C}$	
Pulsed Drain Current ^C	I_{DM}	250	A
Avalanche Current ^C	I_{AR}	80	A
Repetitive avalanche energy $L=0.1\text{mH}$ ^C	E_{AR}	320	mJ
Power Dissipation ^B	P_D	$T_C=25^\circ\text{C}$	W
		$T_C=100^\circ\text{C}$	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	45	60	$^\circ\text{C/W}$
Steady-State				
Maximum Junction-to-Case ^B	$R_{\theta JC}$	0.45	0.56	$^\circ\text{C/W}$
Steady-State				



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	60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V T _J =55°C			10 50	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	2	2.95	4	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	250			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =30A T _J =125°C		6.3 10.5	7.5 13	mΩ
g _{FS}	Transconductance	V _{DS} =5V, I _D =30A		90		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.7	1	V
I _S	Maximum Body-Diode Continuous Current ^G				85	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, f=1MHz		3800	4560	pF
C _{oss}	Output Capacitance			430		pF
C _{rss}	Reverse Transfer Capacitance			190		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.5	2.3	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =30A		68	88	nC
Q _{g(4.5V)}	Total Gate Charge			33		nC
Q _{gs}	Gate Source Charge			15		nC
Q _{gd}	Gate Drain Charge			19		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =30V, R _L =1Ω, R _{GEN} =3Ω		18		ns
t _r	Turn-On Rise Time			35		ns
t _{D(off)}	Turn-Off DelayTime			44		ns
t _f	Turn-Off Fall Time			23		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =30A, dI/dt=100A/μs		53	64	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =30A, dI/dt=100A/μs		98		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.

Rev0: Nov. 2007

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

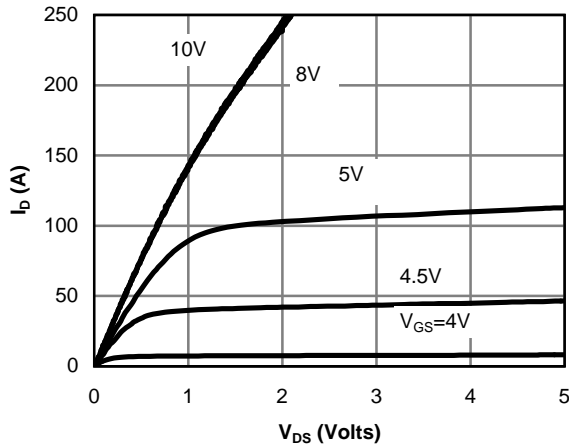


Figure 1: On-Region Characteristics

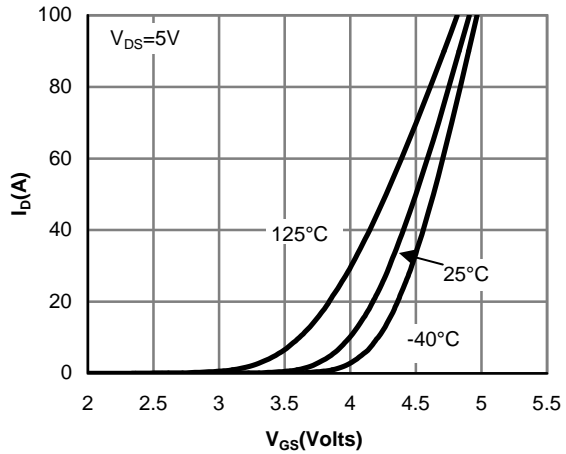


Figure 2: Transfer Characteristics

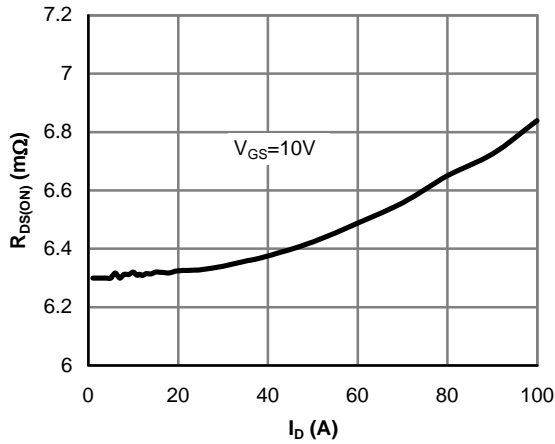


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

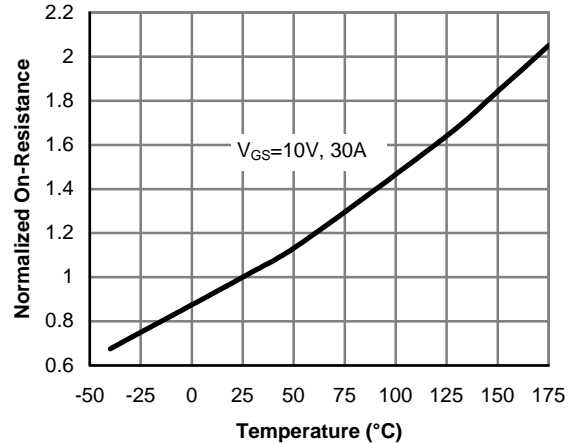


Figure 4: On-Resistance vs. Junction Temperature

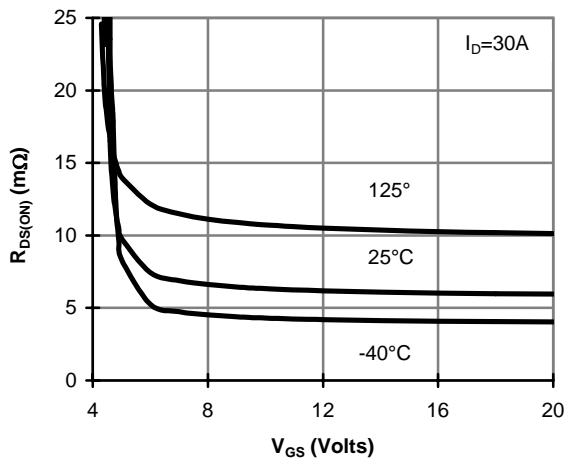


Figure 5: On-Resistance vs. Gate-Source Voltage

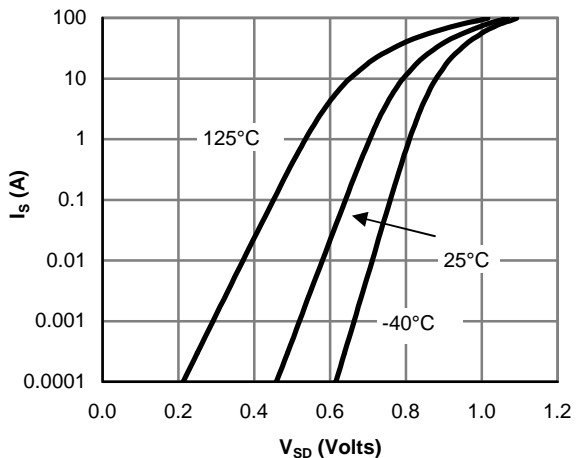


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

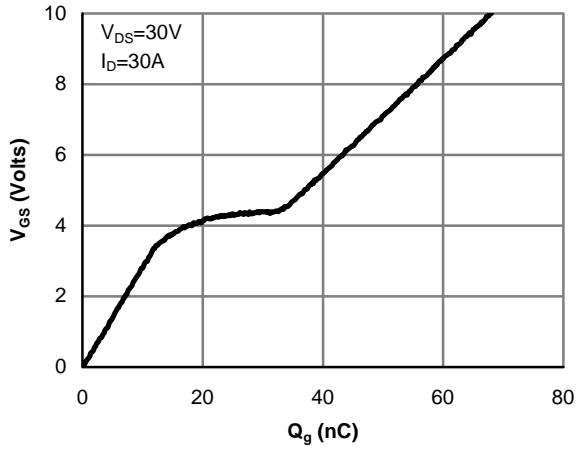


Figure 7: Gate-Charge Characteristics

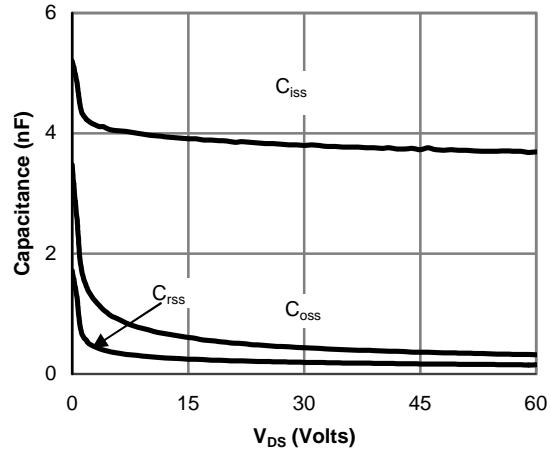


Figure 8: Capacitance Characteristics

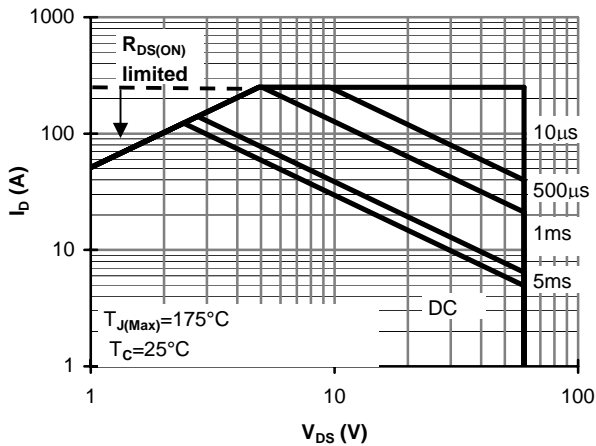


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

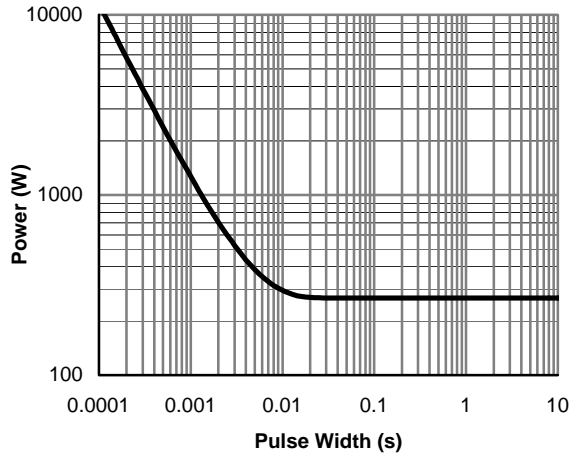


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

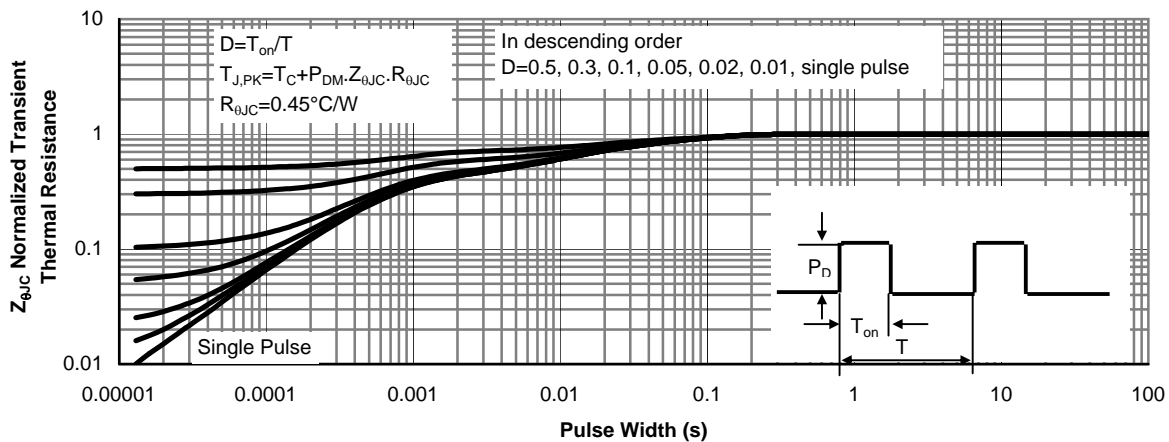


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

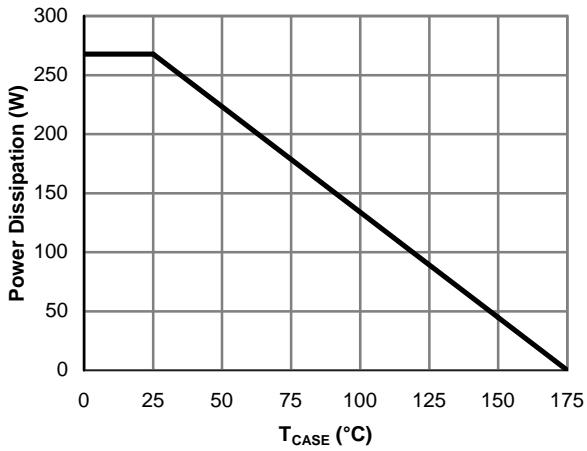


Figure 13: Power De-rating (Note B)

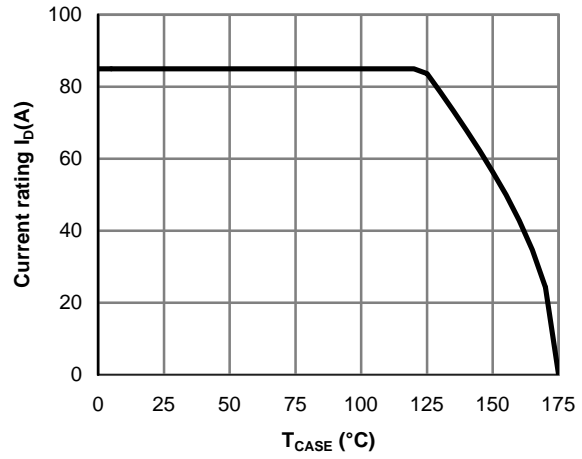


Figure 12: Current De-rating (Note B)

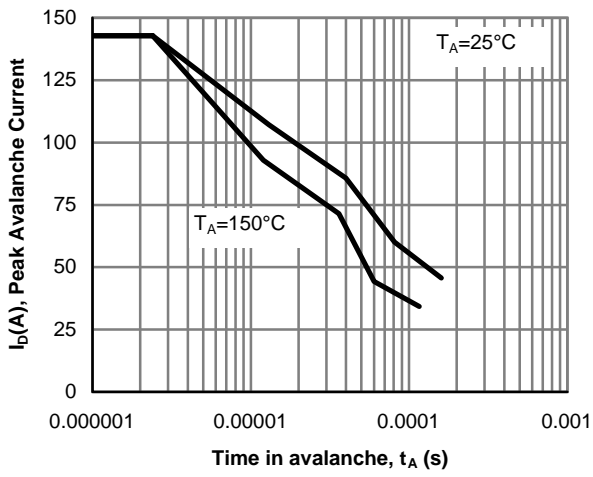


Figure 10: Single Pulse Avalanche capability