ALPHA & OMEGA SEMICONDUCTOR

AOT430

www.datasheet4u.com

N-Channel Enhancement Mode Field Effect Transistor

General Description

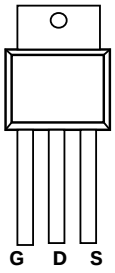
The AOT430 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications. *Standard Product AOT430 is Pb-free (meets ROHS & Sony 259 specifications).*

Features

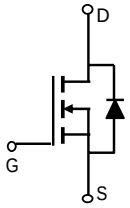
V_{DS} (V) = 75V
I_D = 80 A (V_{GS} = 10V)
$R_{DS(ON)}$ < 11.5mΩ (V_{GS} = 10V)

UIS TESTED!

TO-220



Top View
Drain Connected
to Tab



Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	75	V
Gate-Source Voltage		V_{GS}	±25	V
Continuous Drain Current	T_C=25°C G	I_D	80	A
	T_C=100°C		78	
Pulsed Drain Current C		I_{DM}	200	
Avalanche Current C		I_{AR}	45	A
Repetitive avalanche energy L=0.3mH C		E_{AR}	300	mJ
Power Dissipation B	T_C=25°C	P_D	268	W
	T_C=100°C		134	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C

Thermal Characteristics

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

www.DataSheet4U.com

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	75			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V, V_{GS}=0V			1	µA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±25V			1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250µA	2	2.7	4	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	200			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=30A		9.8	11.5	mΩ
		T_J=125°C		16.0	19.0	
g_{FS}	Transconductance	V_{DS}=5V, I_D=80A		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]				80	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, f=1MHz		4700		pF
C_{oss}	Output Capacitance			400		pF
C_{rss}	Reverse Transfer Capacitance			180		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		3		Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=30V, I_D=30A		114		nC
Q_{gs}	Gate Source Charge			33		nC
Q_{gd}	Gate Drain Charge			18		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=30V, R_L=1Ω, R_{GEN}=3Ω		21		ns
t_r	Turn-On Rise Time			39		ns
$t_{D(off)}$	Turn-Off DelayTime			70		ns
t_f	Turn-Off Fall Time			24		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=30A, dI/dt=100A/µs		53		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=30A, dI/dt=100A/µs		143		nC

A: The value of $R_{\theta JA}$ 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 $R_{\theta JA}$ is the sum of the thermal impedence from junction to case $R_{\theta JC}$ 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 impedence 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.

Rev2: Feb 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.

www.DataSheet4U.com

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

www.datasheet4u.com

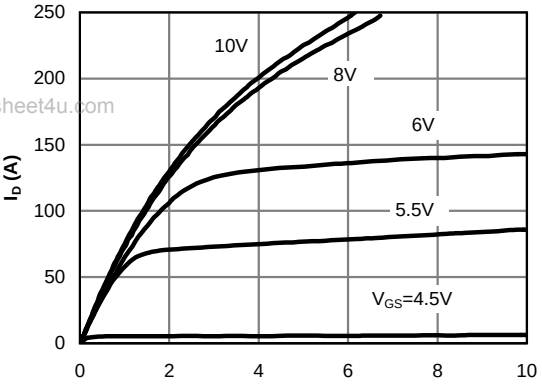


Figure 1: On-Region Characteristics

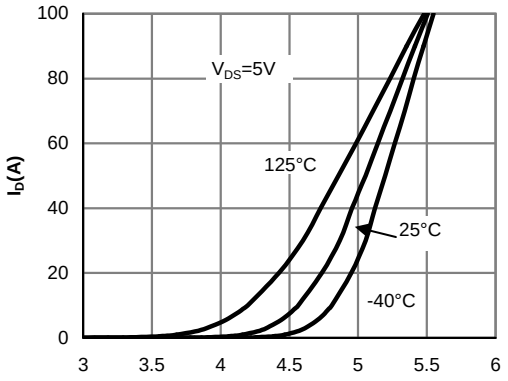


Figure 2: Transfer Characteristics

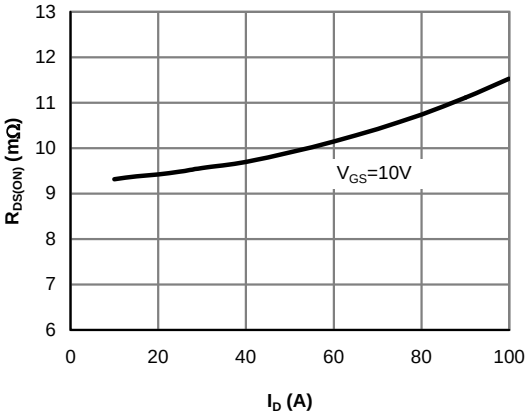


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

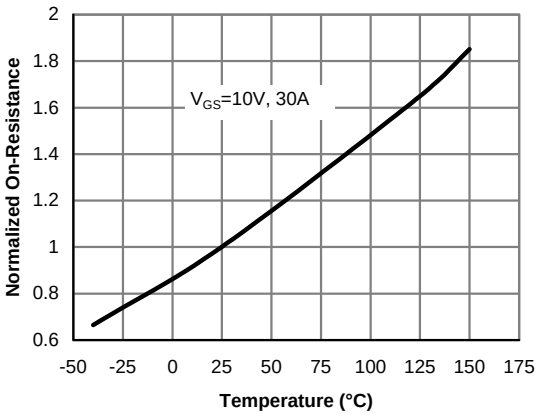


Figure 4: On-Resistance vs. Junction Temperature

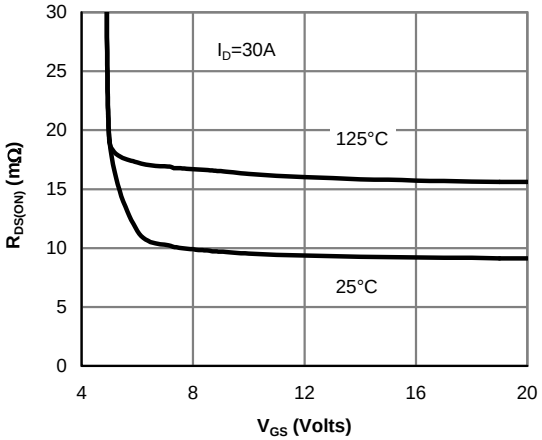


Figure 5: On-Resistance vs. Gate-Source Voltage

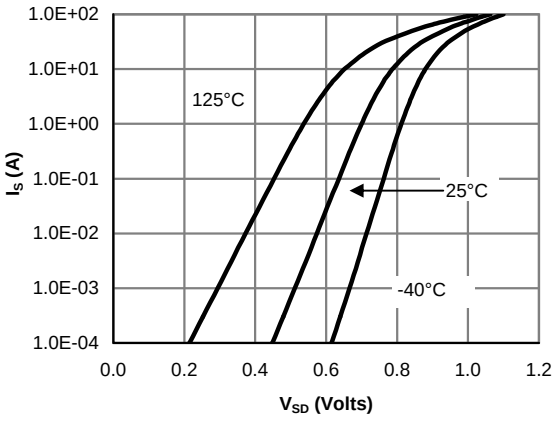


Figure 6: Body-Diode Characteristics

www.DataSheet4U.com

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

www.datasheet4u.com

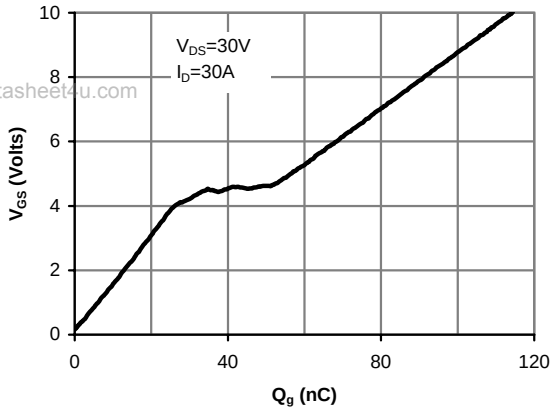


Figure 7: Gate-Charge Characteristics

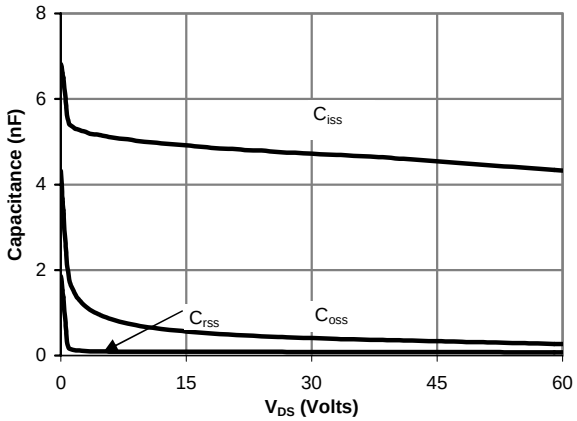


Figure 8: Capacitance Characteristics

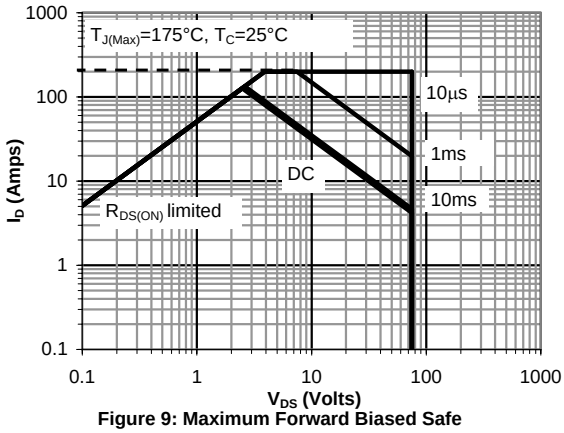


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

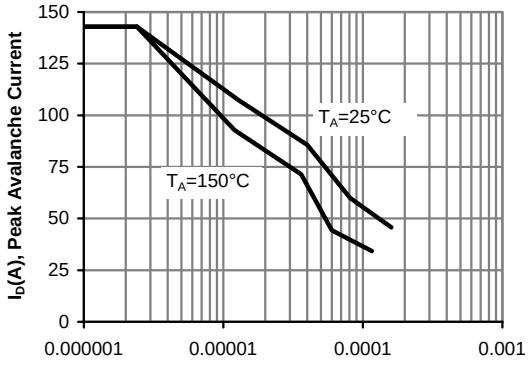


Figure 10: Single Pulse Avalanche capability

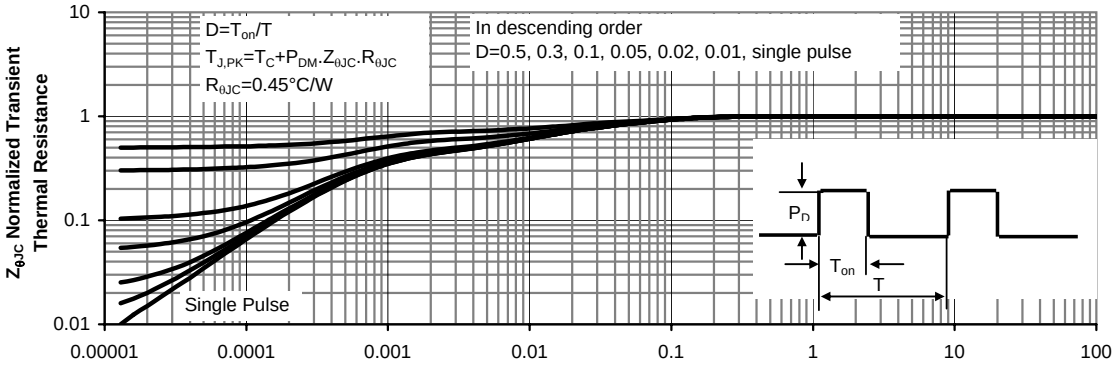


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

www.DataSheet4U.com

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

www.datasheet4u.com

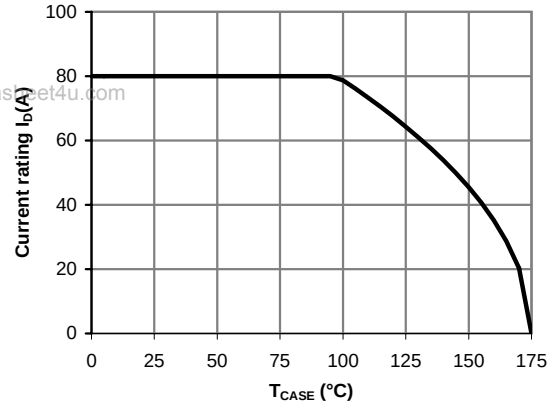


Figure 12: Current De-rating (Note B)

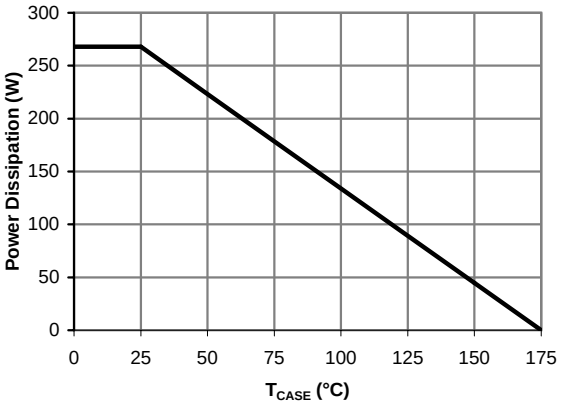


Figure 13: Power De-rating (Note B)

www.DataSheet4U.com