AOT11C60/AOB11C60/AOTF11C60

600V,11A N-Channel MOSFET

General Description

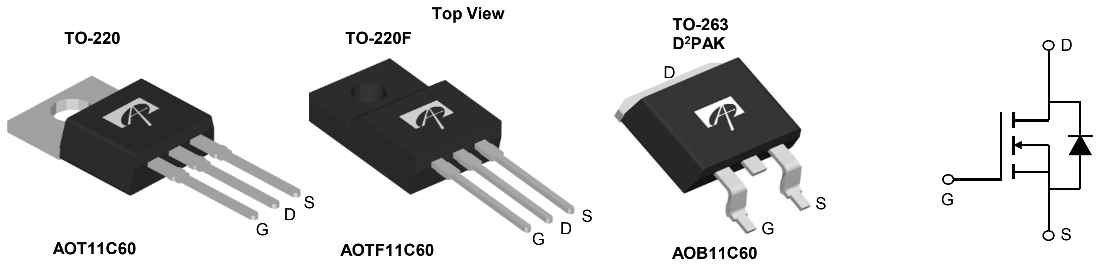
The AOT11C60 & AOB11C60 & AOTF11C60 are fabricated using an advanced high voltage MOSFET process that is designed to deliver high levels of performance and robustness in popular AC-DC applications.By providing low $R_{DS(on)}$, C_{iss} and C_{rss} along with guaranteed avalanche capability these parts can be adopted quickly into new and existing offline power supply designs.

For Halogen Free add "L" suffix to part number:
AOT11C60L & AOB11C60L & AOTF11C60L

Product Summary

V_{DS} @ $T_{j,max}$	700
I_{DM}	80A
$R_{DS(ON),max}$	< 0.44Ω
$Q_{g,typ}$	30nC
E_{oss} @ 400V	5.1µJ

100% UIS Tested
100% R_g Tested



Absolute Maximum Ratings T_A=25°C unless otherwise noted					
Parameter		**Symbol**	**AOT11C60/AOB11C60**	**AOTF11C60**	**Units**
Drain-Source Voltage		V_{DS}	600		V
Gate-Source Voltage		V_{GS}	±30		V
Continuous Drain Current	T_C=25°C	I_D	11	11*	A
	T_C=100°C		9	9*	
Pulsed Drain Current [C]		I_{DM}	80		
Avalanche Current [C,J]		I_{AR}	11		A
Repetitive avalanche energy [C,J]		E_{AR}	60		mJ
Single pulsed avalanche energy [G]		E_{AS}	750		mJ
MOSFET dv/dt ruggedness		dv/dt	100		V/ns
Peak diode recovery dv/dt			20		
Power Dissipation [B]	T_C=25°C	P_D	278	50	W
	Derate above 25°C		2.2	0.4	W/ °C
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150		°C
Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds		T_L	300		°C

Thermal Characteristics				
Parameter	**Symbol**	**AOT11C60/AOB11C60**	**AOTF11C60**	**Units**
Maximum Junction-to-Ambient [A,D]	$R_{\theta JA}$	65	65	°C/W
Maximum Case-to-sink [A]	$R_{\theta CS}$	0.5	--	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	0.45	2.5	°C/W

* Drain current limited by maximum junction temperature.

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, T_J=25°C	600			V
		I_D=250µA, V_{GS}=0V, T_J=150°C		700		
$BV_{DSS}/\Delta TJ$	Breakdown Voltage Temperature Coefficient	I_D=250µA, V_{GS}=0V		0.55		V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=600V, V_{GS}=0V			1	µA
		V_{DS}=480V, T_J=125°C			10	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±30V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=5V, I_D=250µA	3	4	5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=5.5A		0.36	0.44	Ω
g_{FS}	Forward Transconductance	V_{DS}=40V, I_D=5.5A		12		S
V_{SD}	Diode Forward Voltage	I_S=1A, V_{GS}=0V		0.7	1	V
I_S	Maximum Body-Diode Continuous Current				11	A
I_{SM}	Maximum Body-Diode Pulsed Current [C]				80	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=100V, f=1MHz		2000		pF
C_{oss}	Output Capacitance			84		pF
$C_{o(er)}$	Effective output capacitance, energy related [H]	V_{GS}=0V, V_{DS}=0 to 480V, f=1MHz		60		pF
$C_{o(tr)}$	Effective output capacitance, time related [I]			107		pF
C_{rss}	Reverse Transfer Capacitance	V_{GS}=0V, V_{DS}=100V, f=1MHz		2.8		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		3.5		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=480V, I_D=11A		30	42	nC
Q_{gs}	Gate Source Charge			14		nC
Q_{gd}	Gate Drain Charge			4		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=300V, I_D=11A, R_G=25Ω		50		ns
t_r	Turn-On Rise Time			50		ns
$t_{D(off)}$	Turn-Off DelayTime			70		ns
t_f	Turn-Off Fall Time			32		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=11A, dI/dt=100A/µs, V_{DS}=100V		485		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=11A, dI/dt=100A/µs, V_{DS}=100V		7.2		µC

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 $T_{J(MAX)}$=150°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 $T_{J(MAX)}$=150°C, Ratings are based on low frequency and duty cycles to keep initial T_J=25°C.
D. The $R_{\theta JA}$ is the sum of the thermal impedance 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 impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C. The SOA curve provides a single pulse rating.
G. L=60mH, I_{AS}=5A, V_{DD}=150V, R_G=25Ω, Starting T_J=25°C.
H. $C_{o(er)}$ is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 80% $V_{(BR)DSS}$.
I. $C_{o(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% $V_{(BR)DSS}$.
J. L=1.0mH, V_{DD}=150V, R_G=25Ω, Starting T_J=25°C.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

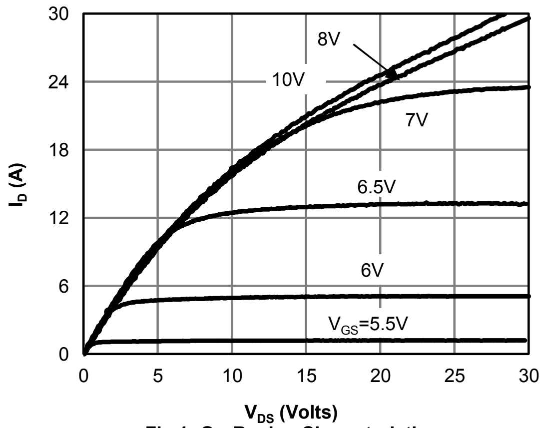


Fig 1: On-Region Characteristics

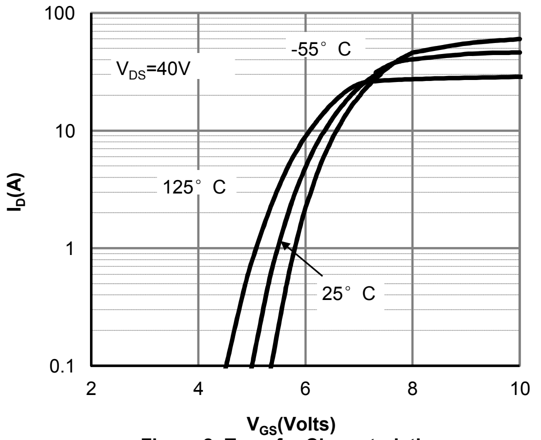


Figure 2: Transfer Characteristics

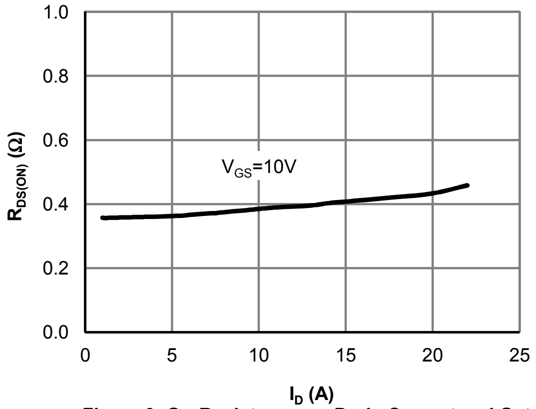


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

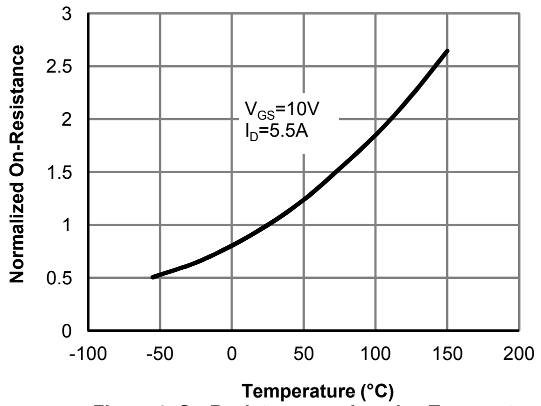


Figure 4: On-Resistance vs. Junction Temperature

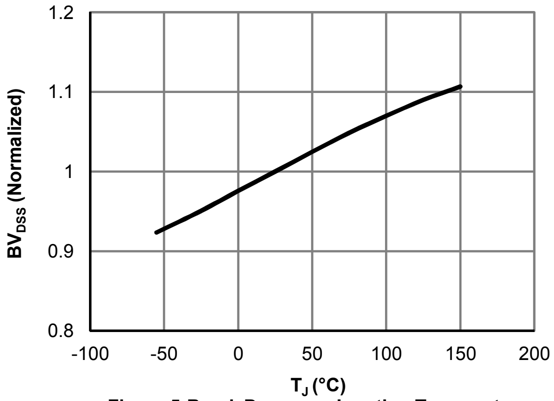


Figure 5:Break Down vs. Junction Temperature

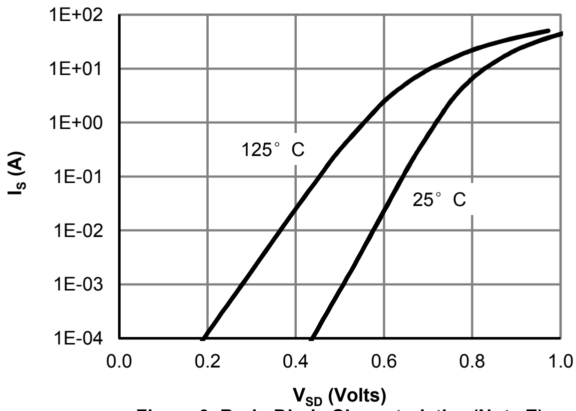


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

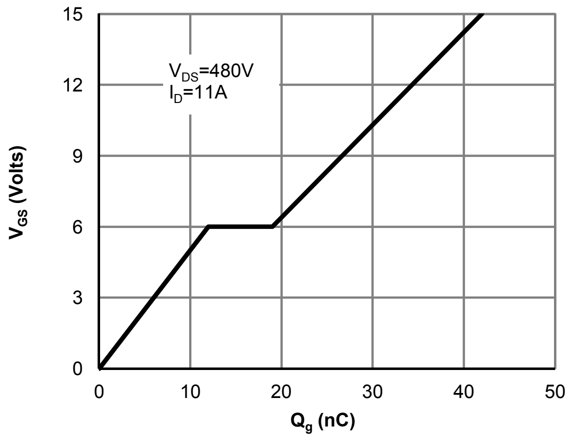


Figure 7: Gate-Charge Characteristics

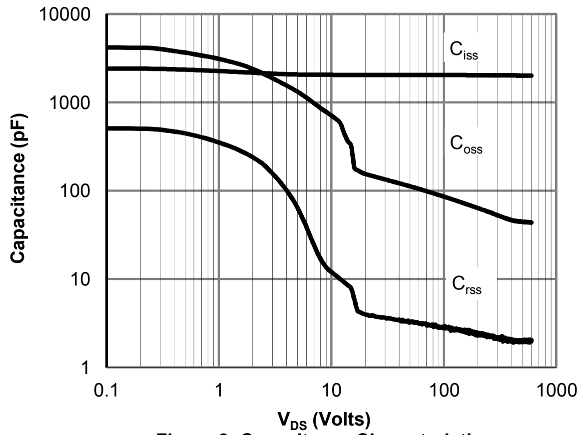


Figure 8: Capacitance Characteristics

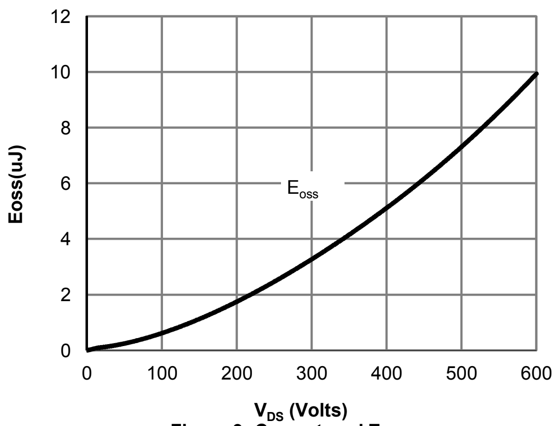


Figure 9: Coss stored Energy

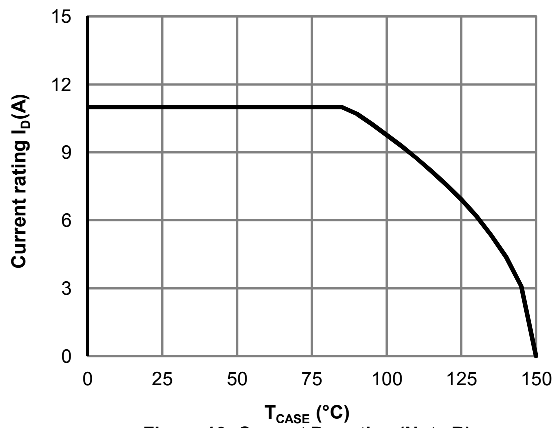


Figure 10: Current De-rating (Note B)

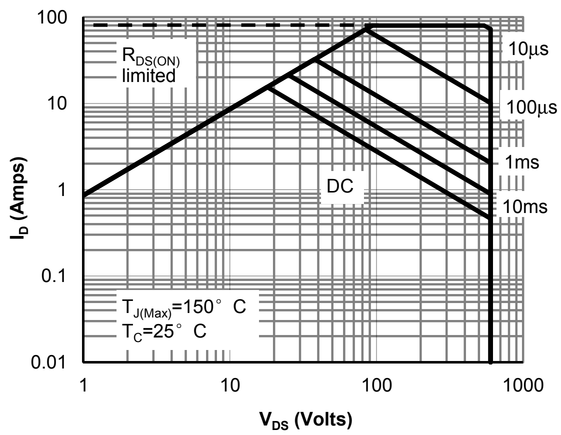


Figure 11: Maximum Forward Biased Safe Operating Area for AOT(B)11C60 (Note F)

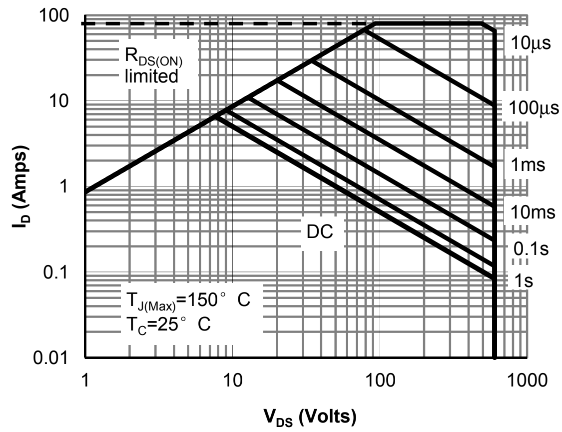


Figure 12: Maximum Forward Biased Safe Operating Area for AOTF11C60 (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

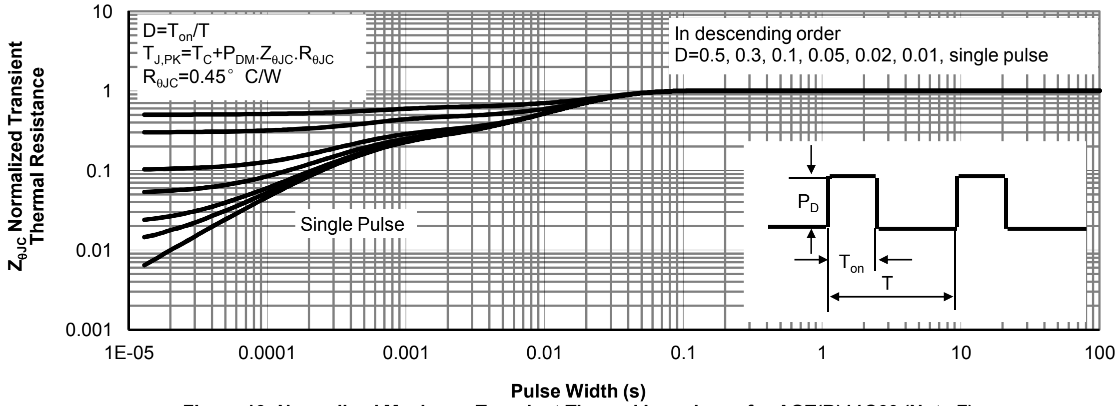


Figure 13: Normalized Maximum Transient Thermal Impedance for AOT(B)11C60 (Note F)

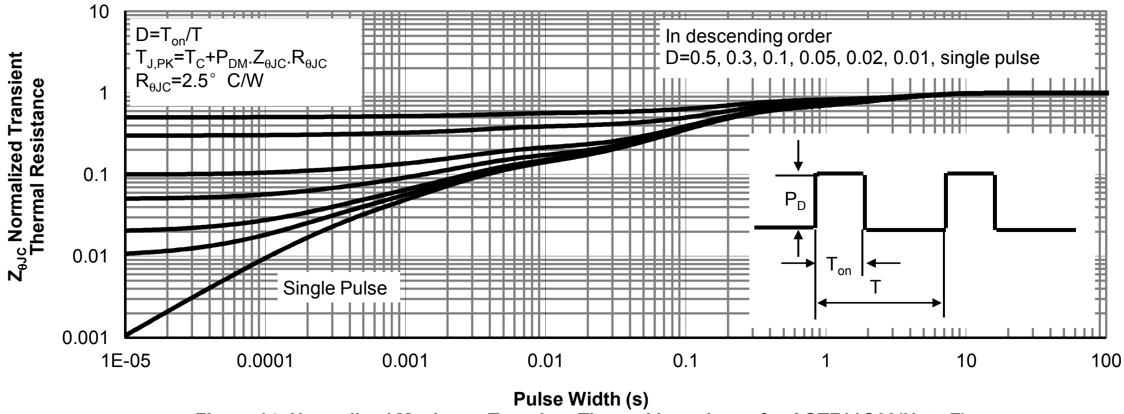
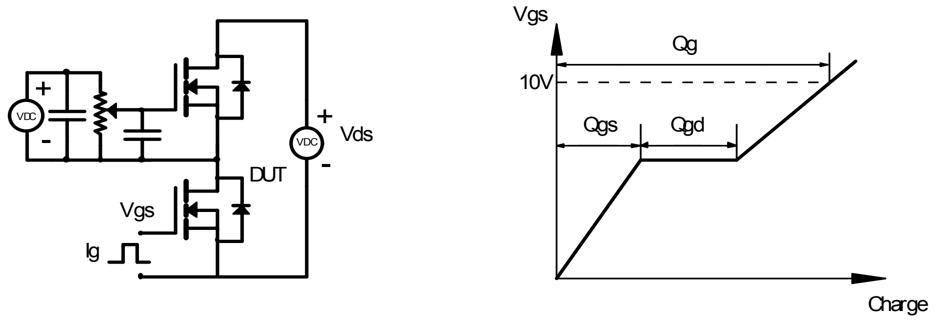
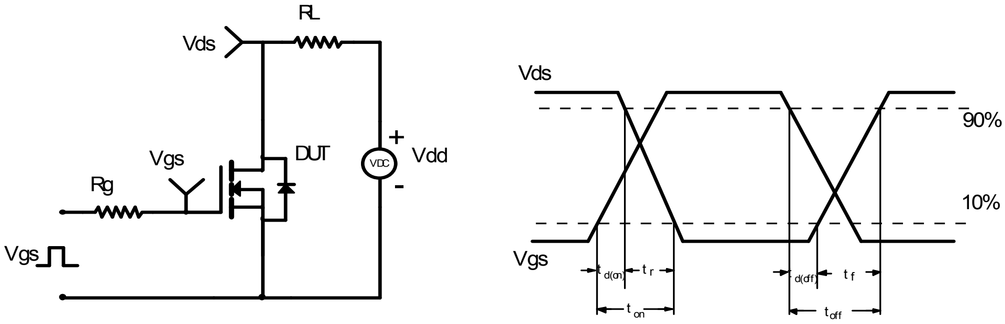


Figure 14: Normalized Maximum Transient Thermal Impedance for AOTF11C60(Note F)

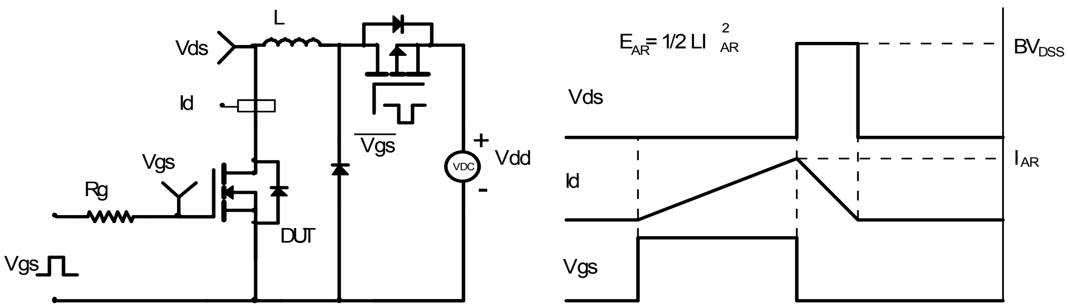
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms