

AOTF6N90 900V,6A N-Channel MOSFET

General Description			Product Summary				
The AOTF6N90 is 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 this parts can be adopted quickly into new and existing offline power supply designs.			V_{DS} I _D (at V _{GS} =10V) R _{DS(ON)} (at V _{GS} =10V)	1000V@150℃ 6A < 2.2Ω			
			100% UIS Tested 100% R _g Tested	Rohs			
Top View TO-220F G D S AOTF6N90							
~ ~	OTF6N90						
	otf6N90 Ratings T _A =25°C unles	s otherwise n	oted				
	01F6N90	ss otherwise n Symbol	oted AOTF6N90	Units			
Absolute Maximum F	01F6N90			Units V			
Absolute Maximum F Parameter	01F6N90	Symbol	AOTF6N90				
Absolute Maximum F Parameter Drain-Source Voltage	01F6N90	Symbol V _{DS} V _{GS}	AOTF6N90 900	V			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage	Ratings T _A =25°C unles	Symbol V _{DS}	AOTF6N90 900 ±30	V			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain	T _C =25°C unles T_{c} =25°C T_{c} =100°C	Symbol V _{DS} V _{GS}	AOTF6N90 900 ±30 6*	V V V			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current	T _C =25°C unles T_{c} =25°C T_{c} =100°C	Symbol V _{DS} V _{GS} I _D	AOTF6N90 900 ±30 6* 3.9*	V V V			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current Pulsed Drain Current	Ratings $T_A=25^{\circ}C$ unles $T_C=25^{\circ}C$ $T_C=100^{\circ}C$	Symbol V _{DS} V _{GS} I _D I _{DM} I _{AR}	AOTF6N90 900 ±30 6* 3.9* 24	V V A			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current Pulsed Drain Current Avalanche Current ^C Repetitive avalanche	Ratings $T_A=25$ °C unles $T_C=25$ °C $T_C=100$ °C c energy ^C	Symbol V _{DS} V _{GS} I _D I _{AR} E _{AR}	AOTF6N90 900 ±30 6* 3.9* 24 3.3	V V A A			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current Pulsed Drain Current ^C	Ratings $T_A=25$ °C unles $T_C=25$ °C $T_C=100$ °C energy ^C he energy ^G	Symbol V _{DS} V _{GS} I _D I _{DM} I _{AR}	AOTF6N90 900 ±30 6* 3.9* 24 3.3 80	V V A A A MJ			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current Pulsed Drain Current ^C Avalanche Current ^C Repetitive avalanche o Single plused avalance Peak diode recovery o	Ratings $T_A=25$ °C unles $T_C=25$ °C $T_C=100$ °C energy ^C he energy ^G	Symbol V_{DS} V_{GS} I_D I_{DM} I_{AR} E_{AR} E_{AS} dv/dt	AOTF6N90 900 ±30 6* 3.9* 24 3.3 80 160	V V A A MJ MJ mJ			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current Pulsed Drain Current Avalanche Current ^C Repetitive avalanche G Single plused avalance	Ratings $T_A=25^{\circ}C$ unles $T_C=25^{\circ}C$ $T_C=100^{\circ}C$ energy ^C he energy ^G dv/dt	Symbol V _{DS} V _{GS} 	AOTF6N90 900 ±30 6* 3.9* 24 3.3 80 160 5	V V A A M M M M V/ns			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current Pulsed Drain Current ^C Avalanche Current ^C Repetitive avalanche Single plused avalance Peak diode recovery of Power Dissipation ^B Junction and Storage	Ratings $T_A=25$ °C unles $T_C=25$ °C $T_C=100$ °C c energy ^C he energy ^G dv/dt $T_C=25$ °C Derate above 25°C Temperature Range	Symbol V_{DS} V_{GS} I_D I_{DM} I_{AR} E_{AR} E_{AS} dv/dt	AOTF6N90 900 ±30 6* 3.9* 24 3.3 80 160 5 50	V V A A MJ V/ns W			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current Pulsed Drain Current ^C Avalanche Current ^C Repetitive avalanche of Single plused avalance Peak diode recovery of Power Dissipation ^B Junction and Storage Maximum lead temper	T _c =25°C unles T _c =25°C T _c =100°C c energy ^C he energy ^G tv/dt T _c =25°C Derate above 25°C Temperature Range rature for soldering	Symbol V_{DS} V_{GS} I_D I_{DM} I_{AR} E_{AR} E_{AS} dv/dt P_D T_J, T_{STG}	AOTF6N90 900 ±30 6* 3.9* 24 3.3 80 160 5 50 0.4 -55 to 150	V V A A MJ MJ W/ns V/ns W/ °C C °C			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current Pulsed Drain Current ^C Avalanche Current ^C Repetitive avalanche of Single plused avalance Peak diode recovery of Power Dissipation ^B Junction and Storage Maximum lead temper purpose, 1/8" from cas	Ratings $T_A=25^{\circ}C$ unles $T_C=25^{\circ}C$ $T_C=100^{\circ}C$ c energy C he energy G $T_C=25^{\circ}C$ Derate above $25^{\circ}C$ Temperature Range rature for soldering se for 5 seconds	$\begin{tabular}{ c c c c } \hline Symbol & V_{DS} & V_{GS} & V_{GS} & \\ \hline & I_D & & I_{DM} & \\ \hline & I_{DM} & & I_{AR} & \\ \hline & I_{AR} & & E_{AR} & \\ \hline & E_{AS} & & dv/dt & \\ \hline & & P_D & \\ \hline \end{tabular}$	AOTF6N90 900 ±30 6* 3.9* 24 3.3 80 160 5 50 0.4	V V A A A M A M M M V/ns V/ns W V/°C			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current Pulsed Drain Current Avalanche Current Repetitive avalanche Single plused avalance Peak diode recovery of Power Dissipation Power Dissipation Bunction and Storage Maximum lead temper purpose, 1/8" from cast Thermal Characterist	Ratings $T_A=25$ °C unles $T_C=25$ °C $T_C=100$ °C $T_C=100$ °C $T_C=100$ °C $T_C=25$ °C Derate above 25°C Temperature Range rature for soldering se for 5 seconds tics	Symbol V _{DS} V _{GS} I _D I _{DM} I _{AR} E _{AR} E _{AS} dv/dt P _D T _J , T _{STG} T _L	AOTF6N90 900 ±30 6* 3.9* 24 3.3 80 160 5 50 0.4 -55 to 150 300	V V A A MJ MJ V/ns V/ns V/ns V/oC C C C			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current Pulsed Drain Current ^C Avalanche Current ^C Repetitive avalanche of Single plused avalance Peak diode recovery of Power Dissipation ^B Junction and Storage Maximum lead temper purpose, 1/8" from cas Thermal Characterist	T _c =25°C unles T _c =25°C T _c =100°C c energy ^C he energy ^G hv/dt T _c =25°C Derate above 25°C Temperature Range rature for soldering se for 5 seconds tics rameter	Symbol V _{DS} V _{GS} I _D I _D I _{AR} E _{AR} E _{AS} dv/dt P _D T _J , T _{STG} T _L	AOTF6N90 900 ±30 6* 3.9* 24 3.3 80 160 5 50 0.4 -55 to 150 300 AOTF6N90	V V A A MJ MJ V/ns W V/ns V/ns V/ns V/ns V/ns V/ns Units			
Absolute Maximum F Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current Pulsed Drain Current Avalanche Current Repetitive avalanche Single plused avalance Peak diode recovery of Power Dissipation Power Dissipation Bunction and Storage Maximum lead temper purpose, 1/8" from cast Thermal Characterist	T _C =25°C T _C =25°C T _C =100°C C energy ^C he energy ^C be energy ^C Derate above 25°C Temperature Range rature for soldering se for 5 seconds tics rameter Ambient ^{A,D}	Symbol V _{DS} V _{GS} I _D I _{DM} I _{AR} E _{AR} E _{AS} dv/dt P _D T _J , T _{STG} T _L	AOTF6N90 900 ±30 6* 3.9* 24 3.3 80 160 5 50 0.4 -55 to 150 300	V V A A MJ MJ V/ns W V/oc °C			

* Drain current limited by maximum junction temperature.



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

Symbol	Parameter	Conditions	Min	Тур	Max	Units
STATIC F	PARAMETERS					
BV _{DSS} I	Drain-Source Breakdown Voltage	I _D =250µA, V _{GS} =0V, T _J =25°C	900			
		I _D =250µA, V _{GS} =0V, T _J =150°C		1000		V
BV _{DSS} /∆TJ	Breakdown Voltage Temperature Coefficient	I _D =250μΑ, V _{GS} =0V		1		V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =900V, V _{GS} =0V V _{DS} =720V, T _J =125°C			1 10	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±30V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =5V Ι _D =250μΑ	3.4	4.1	4.5	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =3A		1.74	2.2	Ω
g _{FS}	Forward Transconductance	V _{DS} =40V, I _D =3A		8		S
V_{SD}	Diode Forward Voltage	I _S =1A,V _{GS} =0V		0.73	1	V
V _{SD}	Diode Forward Voltage	I _S =6A,V _{GS} =0V				V
I _S	Maximum Body-Diode Continuous Current				6	А
I _{SM}	Maximum Body-Diode Pulsed Current				24	А
DYNAMI	C PARAMETERS					
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1MHz	955	1196	1450	pF
C _{oss}	Output Capacitance		65	82	110	pF
C _{rss}	Reverse Transfer Capacitance		6	7.8	12	pF
R _g	Gate resistance	V_{GS} =0V, V_{DS} =0V, f=1MHz	1.7	3.4	5.1	Ω
SWITCHI	NG PARAMETERS					
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =720V, I _D =6A	23	29	35	nC
Q_{gs}	Gate Source Charge		5.5	7	8.5	nC
Q_{gd}	Gate Drain Charge		10	13	20	nC
t _{D(on)}	Turn-On DelayTime			30		ns
t _r	Turn-On Rise Time	V_{GS} =10V, V_{DS} =450V, I_{D} =6A,		58		ns
t _{D(off)}	Turn-Off DelayTime	$R_{G}=25\Omega$		70		ns
t _f	Turn-Off Fall Time			49		ns
t _{rr}	Body Diode Reverse Recovery Time	I_F =6A,dI/dt=100A/µs,V _{DS} =100V	230	286	343	ns
Q _{rr}	Body Diode Reverse Recovery Charge	e I _F =6A,dI/dt=100A/μs,V _{DS} =100V	4.5	5.6	6.7	μC

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

A. The value of R_{uJA} is measured with the device in a still air environment with $T_A = 25^{\circ}$ C. B. The power dissipation P_D is based on $T_{J(MAX)} = 150^{\circ}$ 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 $T_{J(MAX)} = 150^{\circ}$ C, Ratings are based on low frequency and duty cycles to keep initial $T_J = 25^{\circ}$ C. D. The R_{uJA} is the sum of the thermal impedence from junction to case R_{uJC} 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 $T_{J(MAX)} = 150^{\circ}$ C. The SOA curve provides a single pulse rating. G | = 30mH | L_v = 3 A_V_{av} = 150V_{av} R_{av} = 25^{\circ} C.

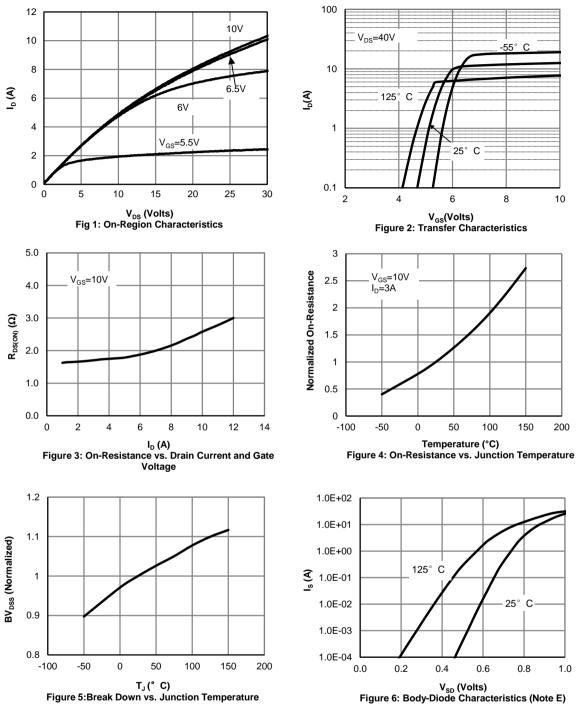
G. L=30mH, I_{AS} =3.3A, V_{DD} =150V, R_{G} =25 Ω , Starting T_{J} =25 $^{\circ}$ C

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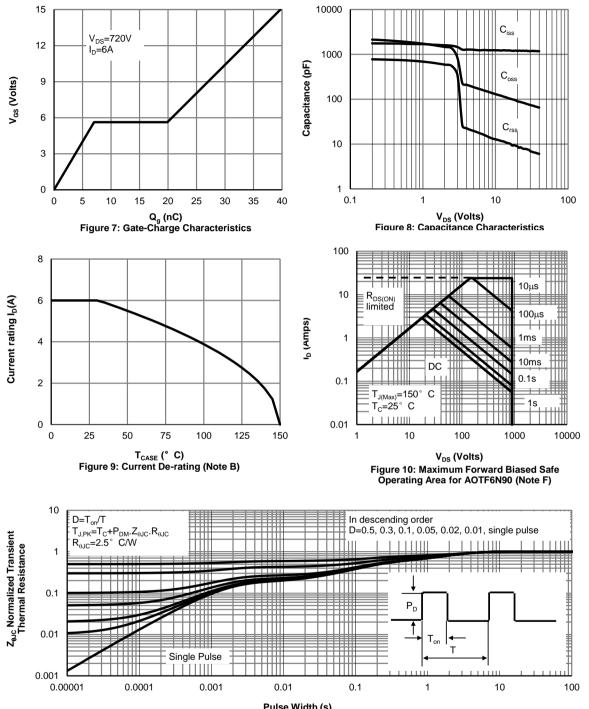


TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS





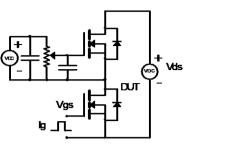
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

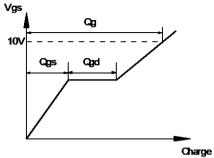


Pulse Width (s) Figure 11: Normalized Maximum Transient Thermal Impedance for AOTF6N90 (Note F)

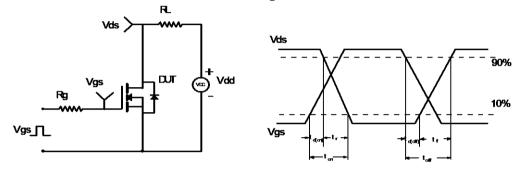


Gate Charge Test Circuit & Waveform

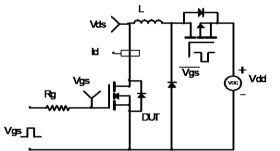


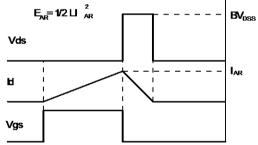


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms

