

AON7458 250V,5A N-Channel MOSFET

General Descript	tion		Product Summa	arv	
The AON7458 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 device can be adopted quickly into new and existing offline power supply designs.This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.			Froduct Summary		
			V _{DS} I _D (at V _{GS} =10V) R _{DS(ON)} (at V _{GS} =10V)		300V@150℃ 5A < 0.56Ω
			100% UIS Tested! 100% R _g Tested!		Green
Top View	DFN 3x3A_EP Bottom View		Ton View		٩D
			Top View		
		s S	d • þ	D	
		s s	d b	D	
			d 6	D	
		S G		0	-'' _J
Pi	n 1 🗸 🗸	e		D G	
Pin	n 1	C	ŢŢ	D	s
bsolute Maximum R	atings T ₄ =25°C unles		۲۲		J s
bsolute Maximum Ra	atings T _A =25°C unles		ed Maxim		Units
	atings T _A =25°C unles	s otherwise note		um	0.1
arameter	atings T _A =25°C unles	s otherwise note Symbol V _{DS}	Maxim	um	Units
Parameter Drain-Source Voltage	atings T _A =25°C unless	s otherwise note Symbol V _{DS} V _{GS}	Maxim 250	um	Units V
Parameter Prain-Source Voltage Bate-Source Voltage		s otherwise note Symbol V _{DS}	Maxim 250 ±30	um	Units V
Parameter Drain-Source Voltage Bate-Source Voltage Continuous Drain	T _c =25°C	s otherwise note Symbol V _{DS} V _{GS}	Maxim 250 ±30 5	um	Units V V
Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current ^B	T _c =25°C	s otherwise note Symbol V _{DS} V _{GS} I _D I _{DM}	Maxim 250 ±30 5 3.2	um	Units V V A
Parameter Drain-Source Voltage Bate-Source Voltage Continuous Drain Current ^B Pulsed Drain Current ^C	T _c =25°C T _c =100°C	s otherwise note Symbol V _{DS} V _{GS} I _D	Maxim 250 ±30 5 3.2 16	um	Units V V
Parameter Drain-Source Voltage Bate-Source Voltage Continuous Drain Current ^B Pulsed Drain Current ^C Continuous Drain Current	T _c =25°C T _c =100°C T _A =25°C	s otherwise note Symbol V _{DS} V _{GS} I _D I _{DM}	Maxim 250 ±30 5 3.2 16 1.5	um	Units V V A
Parameter Drain-Source Voltage Bate-Source Voltage Continuous Drain Current ^B Pulsed Drain Current ^C Continuous Drain	$ \begin{array}{r} T_{c}=25^{\circ}C \\ \hline T_{c}=100^{\circ}C \\ \hline T_{A}=25^{\circ}C \\ \hline T_{A}=70^{\circ}C \\ \end{array} $	s otherwise note Symbol V _{DS} V _{GS} I _D I _{DM} I _{DSM}	Maxim 250 ±30 5 3.2 16 1.5 1.2	um	Units V V A A
Parameter Prain-Source Voltage Sate-Source Voltage Continuous Drain Current ^B Pulsed Drain Current ^C Continuous Drain Current Valanche Current ^C	$T_{C}=25^{\circ}C$ $T_{C}=100^{\circ}C$ $T_{A}=25^{\circ}C$ $T_{A}=70^{\circ}C$ hergy ^C	s otherwise note Symbol V _{DS} V _{GS} I _D I _{DM} I _{DSM} I _{AR} E _{AR}	Maxim 250 ±30 5 3.2 16 1.5 1.2 2.1	um	Units V V A A A
Parameter Drain-Source Voltage Bate-Source Voltage Continuous Drain Current ^B Pulsed Drain Current ^C Continuous Drain Current Evalanche Current ^C Repetitive avalanche er	$T_{c}=25^{\circ}C$ $T_{c}=100^{\circ}C$ $T_{A}=25^{\circ}C$ $T_{A}=70^{\circ}C$ Therefore $T_{c}=0$	s otherwise note Symbol V _{DS} V _{GS} I _D I _D I _{DM} I _{DSM} I _{AR}	Maxim 250 ±30 5 3.2 16 1.5 1.2 2.1 66	um	Units V V A A A A mJ
Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current ^B Pulsed Drain Current ^C Continuous Drain Current Evalanche Current ^C Repetitive avalanche er Eingle pulsed avalanch	$T_{c}=25^{\circ}C$ $T_{c}=100^{\circ}C$ $T_{A}=25^{\circ}C$ $T_{A}=70^{\circ}C$ Therefore $T_{c}=0$	s otherwise note Symbol V _{DS} V _{GS} I _D I _D I _{DM} I _{DSM} I _{AR} E _{AR} E _{AR} E _{AS} dv/dt	Maxim 250 ±30 5 3.2 16 1.5 1.2 2.1 66 132	um	Units V V A A A M J mJ mJ
Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current ^B Pulsed Drain Current ^C Continuous Drain Current Evalanche Current ^C Repetitive avalanche er Eingle pulsed avalanch	$T_{C}=25^{\circ}C$ $T_{C}=100^{\circ}C$ $T_{A}=25^{\circ}C$ $T_{A}=70^{\circ}C$ hergy ^C e energy ^G /dt	s otherwise note Symbol V _{DS} V _{GS} I _D I _{DM} I _{DM} I _{DSM} I _{AR} E _{AR} E _{AS}	Maxim 250 ±30 5 3.2 16 1.5 1.2 2.1 66 132 5	um	Units V V A A A M J mJ V/ns
Parameter Drain-Source Voltage Bate-Source Voltage Continuous Drain Current ^B Pulsed Drain Current ^C Continuous Drain Current Evalanche Current ^C Repetitive avalanche er Single pulsed avalanch Pack diode recovery dv	$T_{c}=25^{\circ}C$ $T_{c}=100^{\circ}C$ $T_{A}=25^{\circ}C$ $T_{A}=70^{\circ}C$ hergy ^C e energy ^G /dt $T_{c}=25^{\circ}C$ $T_{c}=100^{\circ}C$	s otherwise note Symbol V_{DS} V_{GS} I_D I_{DM} I_{DSM} I_{AR} E_{AR} E_{AS} dv/dt P_D	Maxim 250 ±30 5 3.2 16 1.5 1.2 2.1 66 132 5 33 13	um	Units V V A A A M J M J V/ns W W
Parameter Drain-Source Voltage Gate-Source Voltage Continuous Drain Current ^B Pulsed Drain Current ^C Continuous Drain Current Evalanche Current ^C Repetitive avalanche er Single pulsed avalanch Peak diode recovery dv	$ \begin{array}{c} T_{c}=25^{\circ}C \\ \hline T_{c}=100^{\circ}C \\ \hline T_{A}=25^{\circ}C \\ \hline T_{A}=70^{\circ}C \\ \hline \end{array} \\ \hline e \ energy \ ^{G} \\ \hline /dt \\ \hline T_{c}=25^{\circ}C \\ \hline \hline T_{c}=100^{\circ}C \\ \hline \hline T_{A}=25^{\circ}C \\ \hline \end{array} $	s otherwise note Symbol V _{DS} V _{GS} I _D I _D I _{DM} I _{DSM} I _{AR} E _{AR} E _{AR} E _{AS} dv/dt	Maxim 250 ±30 5 3.2 16 1.5 1.2 2.1 66 132 5 33 33 13 3.1	um	Units V V A A A M J MJ V/ns W
Parameter Prain-Source Voltage Sate-Source Voltage Continuous Drain Current ^B Pulsed Drain Current ^C Continuous Drain Current Exalanche Current ^C Repetitive avalanche er Single pulsed avalanch er Pack diode recovery dw Power Dissipation ^B Power Dissipation ^A	$\begin{array}{c} T_{c}=25^{\circ}C \\ \hline T_{c}=100^{\circ}C \\ \hline T_{A}=25^{\circ}C \\ \hline T_{A}=70^{\circ}C \\ \hline \end{array}$ hergy ^C e energy ^G /dt $\begin{array}{c} T_{c}=25^{\circ}C \\ \hline T_{c}=100^{\circ}C \\ \hline \hline T_{A}=25^{\circ}C \\ \hline \hline T_{A}=70^{\circ}C \\ \hline \end{array}$	s otherwise note Symbol V_{DS} V_{GS} I_D I_{DM} I_{DSM} I_{AR} E_{AR} E_{AS} dv/dt P_D P_{DSM}	Maxim 250 ±30 5 3.2 16 1.5 1.2 2.1 66 132 5 33 13 3.1 2	um	Units V V A A A A MJ MJ V/ns W W W
arameter rain-Source Voltage Sate-Source Voltage Continuous Drain Current ^B rulsed Drain Current ^C Continuous Drain Current valanche Current ^C repetitive avalanche er ringle pulsed avalanch reak diode recovery dw Power Dissipation ^B Power Dissipation ^A	$\begin{array}{c} T_{c}=25^{\circ}C \\ \hline T_{c}=100^{\circ}C \\ \hline T_{A}=25^{\circ}C \\ \hline T_{A}=70^{\circ}C \\ \hline \end{array}$ hergy ^C e energy ^G /dt $\begin{array}{c} T_{c}=25^{\circ}C \\ \hline T_{c}=100^{\circ}C \\ \hline \hline T_{A}=25^{\circ}C \\ \hline \hline T_{A}=70^{\circ}C \\ \hline \end{array}$	s otherwise note Symbol V_{DS} V_{GS} I_D I_{DM} I_{DSM} I_{AR} E_{AR} E_{AS} dv/dt P_D	Maxim 250 ±30 5 3.2 16 1.5 1.2 2.1 66 132 5 33 33 13 3.1	um	Units V V A A A M J M J V/ns W W
arameter rrain-Source Voltage iate-Source Voltage continuous Drain current ^B ulsed Drain Current ^C continuous Drain current valanche Current ^C epetitive avalanche er ingle pulsed avalanch eak diode recovery dw ower Dissipation ^B ower Dissipation ^A unction and Storage T	$T_{c}=25^{\circ}C$ $T_{c}=100^{\circ}C$ $T_{A}=25^{\circ}C$ $T_{A}=70^{\circ}C$ Tenergy C e energy G /dt $T_{c}=25^{\circ}C$ $T_{c}=100^{\circ}C$ $T_{A}=25^{\circ}C$ $T_{A}=70^{\circ}C$ emperature Range	s otherwise note Symbol V_{DS} V_{GS} I_D I_{DM} I_{DSM} I_{AR} E_{AR} E_{AS} dv/dt P_D P_{DSM}	Maxim 250 ±30 5 3.2 16 1.5 1.2 2.1 66 132 5 33 13 3.1 2	um	Units V V A A A A MJ MJ V/ns W W W
Parameter Prain-Source Voltage Sate-Source Voltage Continuous Drain Current ^B Pulsed Drain Current ^C Continuous Drain Current Avalanche Current ^C Repetitive avalanche er Single pulsed avalanch Peak diode recovery dw Power Dissipation ^B Power Dissipation ^A unction and Storage T hermal Characteristi	$T_{c}=25^{\circ}C$ $T_{c}=100^{\circ}C$ $T_{A}=25^{\circ}C$ $T_{A}=70^{\circ}C$ Tenergy C e energy G /dt $T_{c}=25^{\circ}C$ $T_{c}=100^{\circ}C$ $T_{A}=25^{\circ}C$ $T_{A}=70^{\circ}C$ emperature Range	s otherwise note Symbol V_{DS} V_{GS} I_D I_{DM} I_{DSM} I_{AR} E_{AR} E_{AS} dv/dt P_D P_{DSM}	Maxim 250 ±30 5 3.2 16 1.5 1.2 2.1 66 132 5 33 13 3.1 2	um	Units V V A A A A MJ MJ V/ns W W W

Parameter	Symbol	Тур	Max	Units			
Maximum Junction-to-Ambient ^A	t ≤ 10s	D	30	40	°C/W		
Maximum Junction-to-Ambient AD	Steady-State	κ _{θJA}	60	75	°C/W		
Maximum Junction-to-Case	Steady-State	$R_{ ext{ heta}JC}$	3.1	3.7	°C/W		



Electrical Characteristics (T₁=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Тур	Max	Units
STATIC I	PARAMETERS					
	Drain Source Breekdown Voltage	I _D =250µA, V _{GS} =0V, T _J =25°C	250			
BV _{DSS}	V _{DSS} Drain-Source Breakdown Voltage	$I_D=250\mu A, V_{GS}=0V, T_J=150^{\circ}C$		300		V
BV _{DSS} /∆TJ	Zero Gate Voltage Drain Current	ID=250µA, VGS=0V		0.25		V/°C
 	ss Zero Gate Voltage Drain Current	V_{DS} =250V, V_{GS} =0V			1	μA
DSS		V _{DS} =200V, T _J =125°C	10		μΑ	
I _{GSS}	Gate-Body leakage current	$V_{DS}=0V, V_{GS}=\pm 30V$			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =5V, I _D =250μA	3.1	3.7	4.3	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =1.5A		0.46	0.56	Ω
g _{FS}	Forward Transconductance	V _{DS} =40V, I _D =1.5A		5		S
V _{SD}	Diode Forward Voltage	I _S =1A,V _{GS} =0V		0.77	1	V
I _S	Maximum Body-Diode Continuous Current				5	А
I _{SM}	Maximum Body-Diode Pulsed Current				16	А
DYNAMI	C PARAMETERS					
C _{iss}	Input Capacitance		240	306	370	pF
C _{oss}	Output Capacitance	V_{GS} =0V, V_{DS} =25V, f=1MHz	34	51	68	pF
C _{rss}	Reverse Transfer Capacitance			3.2		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	1.7	3.4	5.1	Ω
SWITCH	NG PARAMETERS					
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =200V, I _D =1.5A	4.8	6.0	7.2	nC
Q _{gs}	Gate Source Charge			2.0		nC
Q_{gd}	Gate Drain Charge			1.5		nC
t _{D(on)}	Turn-On DelayTime			14		ns
t _r	Turn-On Rise Time	V _{GS} =10V, V _{DS} =125V, I _D =1.5A,		12		ns
t _{D(off)}	Turn-Off DelayTime	$R_{G}=25\Omega$		23		ns
t _f	Turn-Off Fall Time	7		12		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =1.5A,dI/dt=100A/µs,V _{DS} =100V	60	77	93	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =1.5A,dl/dt=100A/μs,V _{DS} =100V	0.22	0.29	0.35	μC

A. The value of R_{aJA} is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The Power Dissipation P_{DSM} is based on R_{ala} t ≤ 10s value and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design.

B. The power dissipation PD 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 <300µs 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. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}$ C.

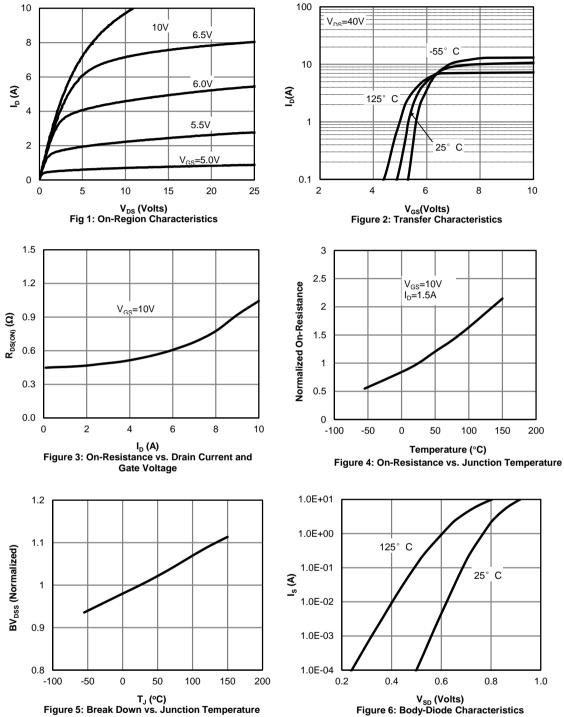
H. L=60mH, I_{AS}=2.1A, V_{DD}=150V, R_G=25 Ω , Starting T_J=25 $^{\circ}$ C.

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 MAKE CHANGES TO PRODUCT SPECIFICATIONS WITHOUT NOTICE. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO EVALUATE SUITABILITY OF THE PRODUCT FOR THEIR INTENDED APPLICATION. CUSTOMER SHALL COMPLY WITH APPLICABLE LEGAL REQUIREMENTS, INCLUDING ALL APPLICABLE EXPORT CONTROL RULES, REGULATIONS AND LIMITATIONS.

AOS' products are provided subject to AOS' terms and conditions of sale which are set forth at: http://www.aosmd.com/terms and conditions of sale

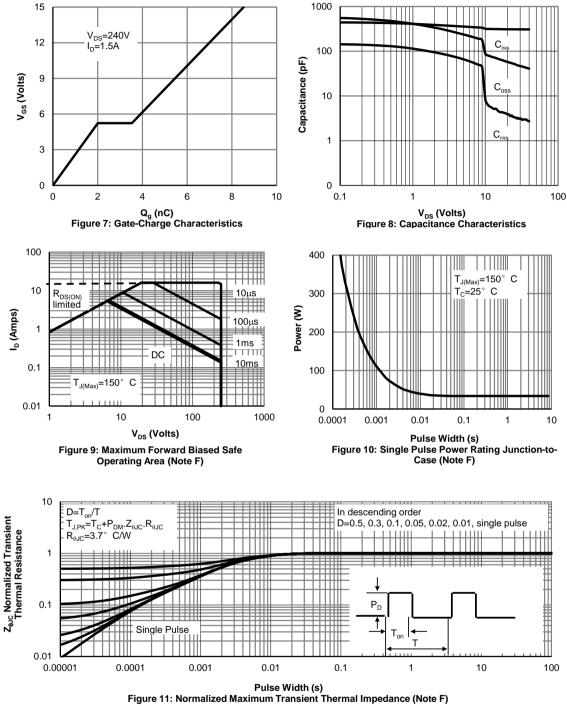


TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS





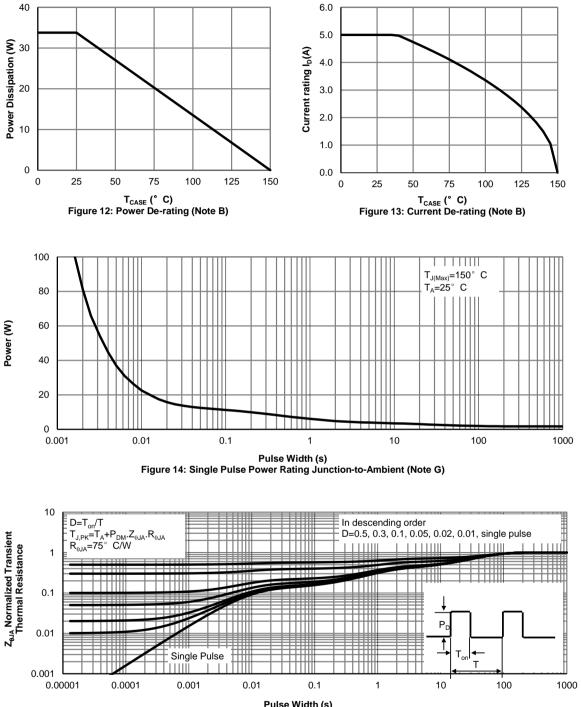
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS







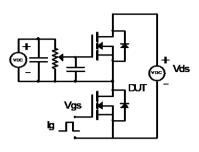
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

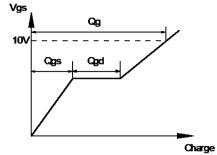


Pulse Width (s) Figure 15: Normalized Maximum Transient Thermal Impedance (Note G)

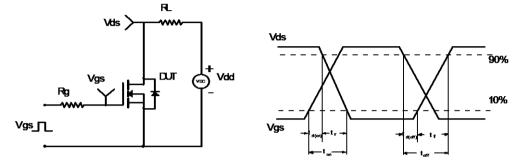


Gate Charge Test Circuit & Wave form

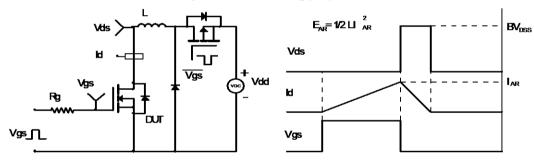




Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

