



ALPHA & OMEGA
SEMICONDUCTOR

AOH3106

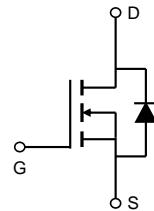
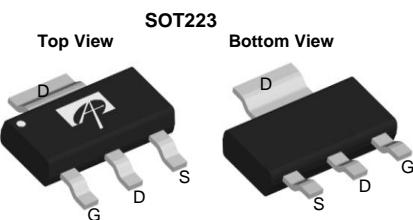
100V N-Channel MOSFET

General Description

The AOH3106 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

Product Summary

V_{DS}	100V
I_D (at $V_{GS}=10V$)	2A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 360mΩ
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 385mΩ



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^G	I_D	2	A
$T_A=70^\circ C$		1.5	
Pulsed Drain Current ^C	I_{DM}	7	
Avalanche Current ^C	I_{AS}	5	A
Avalanche energy $L=100\mu H$ ^C	E_{AS}	1.3	mJ
Power Dissipation ^B	P_D	3.1	W
$T_A=25^\circ C$		2	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	33	40	°C/W
Maximum Junction-to-Ambient ^{A,D}		60	75	°C/W
Maximum Junction-to-Lead	$R_{\theta JL}$	30	40	°C/W

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	100			V
$I_{\text{DS}}^{\text{SS}}$	Zero Gate Voltage Drain Current	$V_{DS}=100\text{V}, V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$			± 100	nA
$V_{GS(\text{th})}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0	1.5	2.0	V
$I_{D(\text{ON})}$	On state drain current	$V_{GS}=10\text{V}, V_{DS}=5\text{V}$	7			A
$R_{DS(\text{ON})}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=2\text{A}$ $T_J=125^\circ\text{C}$	295.5	360		$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=1.5\text{A}$	548	665		
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}, I_D=2\text{A}$		4.5		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$		0.78	1	V
I_S	Maximum Body-Diode Continuous Current ^G				2	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=50\text{V}, f=1\text{MHz}$		185		pF
C_{oss}	Output Capacitance			19		pF
C_{rss}	Reverse Transfer Capacitance			8		pF
R_g	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$	0.6	1.2	1.8	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}, V_{DS}=50\text{V}, I_D=2\text{A}$		4.8	10	nC
$Q_g(4.5\text{V})$	Total Gate Charge			2.5	6	nC
Q_{gs}	Gate Source Charge			0.5		nC
Q_{gd}	Gate Drain Charge			1.4		nC
$t_{D(\text{on})}$	Turn-On Delay Time	$V_{GS}=10\text{V}, V_{DS}=50\text{V}, R_L=25\Omega, R_{\text{GEN}}=3\Omega$		3.5		ns
t_r	Turn-On Rise Time			2.8		ns
$t_{D(\text{off})}$	Turn-Off Delay Time			16		ns
t_f	Turn-Off Fall Time			2.5		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=2\text{A}, dI/dt=100\text{A}/\mu\text{s}$		17		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=2\text{A}, dI/dt=100\text{A}/\mu\text{s}$		14.5		nC

A. The value of R_{JJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(\text{MAX})}=150^\circ\text{C}$, using $\leq 10\text{s}$ junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(\text{MAX})}=150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ\text{C}$.

D. The R_{JJA} is the sum of the thermal impedance from junction to lead R_{JUL} and lead to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ pulses, duty cycle 0.5% max.

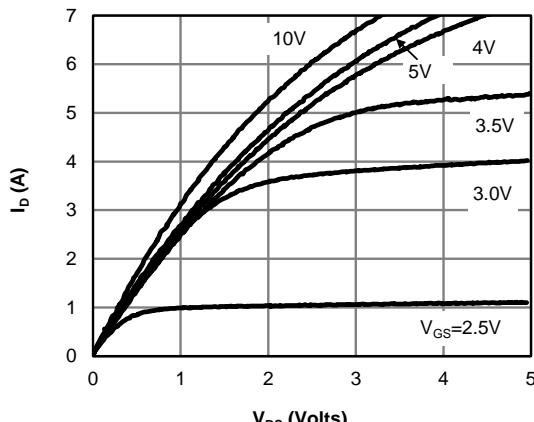
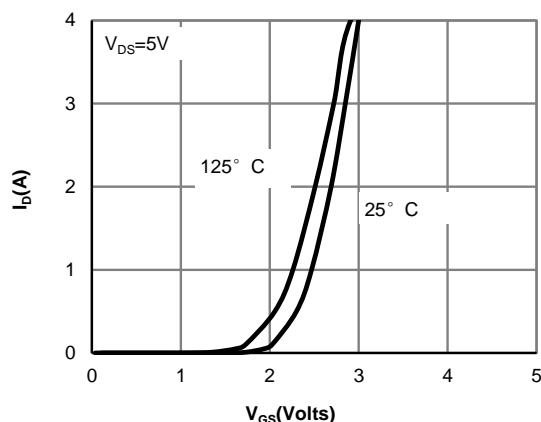
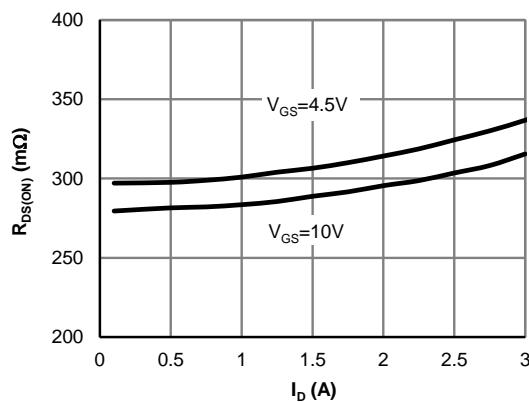
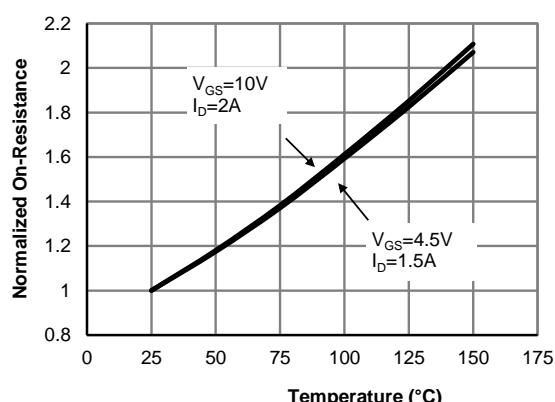
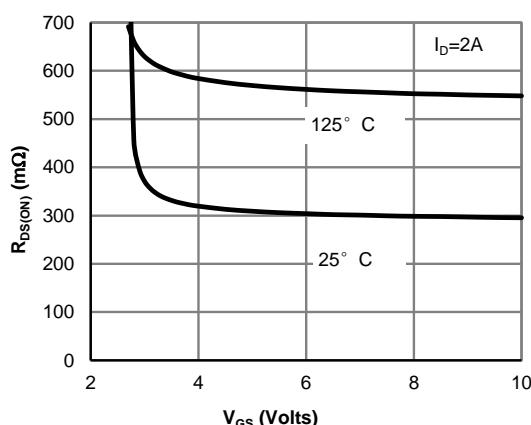
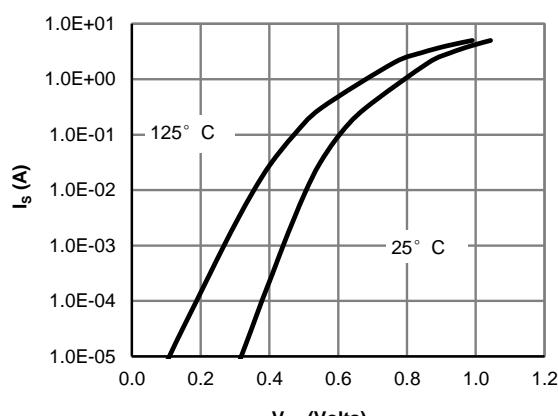
F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(\text{MAX})}=150^\circ\text{C}$. The SOA curve provides a single pulse rating

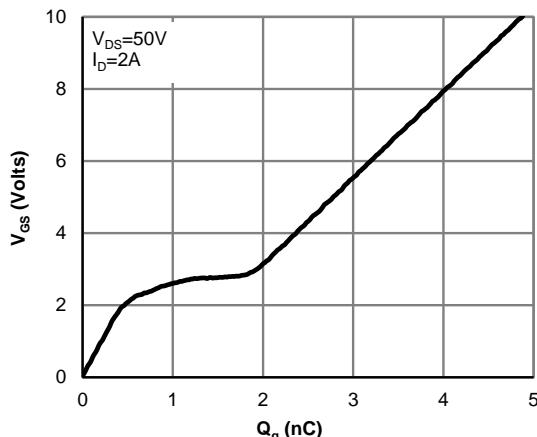
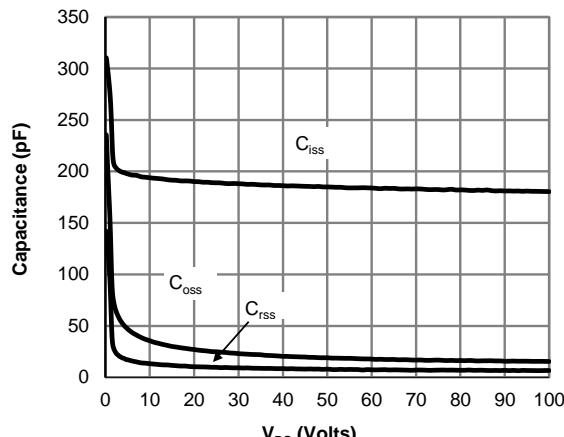
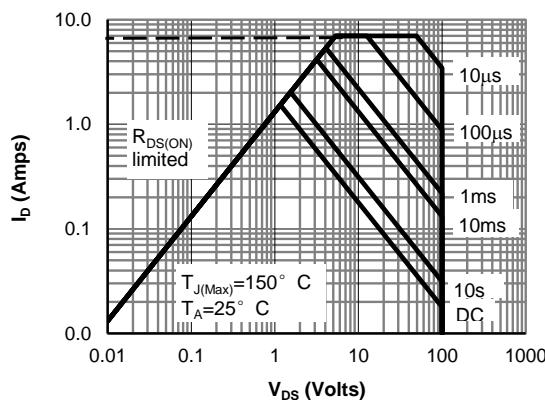
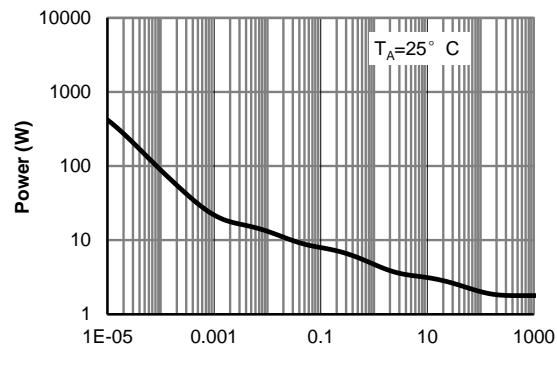
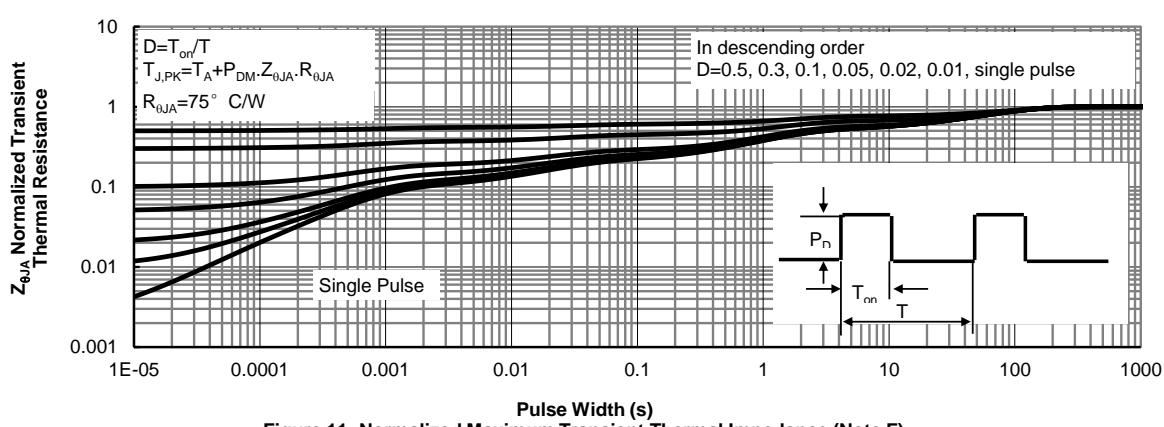
G. The maximum current rating is package limited.

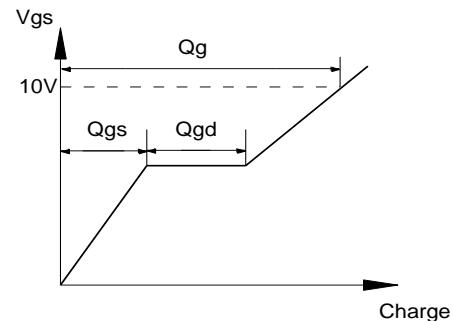
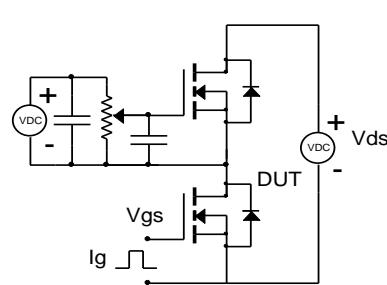
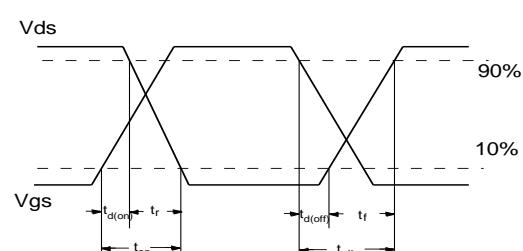
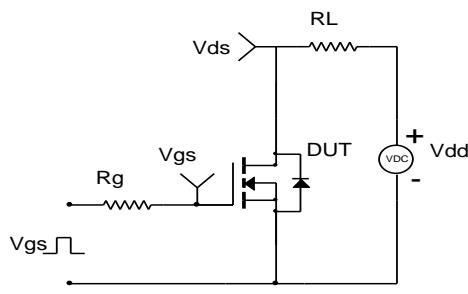
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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Fig 1: On-Region Characteristics (Note E)

Figure 2: Transfer Characteristics (Note E)

Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

Figure 4: On-Resistance vs. Junction Temperature (Note E)

Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

Figure 6: Body-Diode Characteristics (Note E)

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-Ambient (Note F)

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

Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Diode Recovery Test Circuit & Waveforms
