ALPHA & OMEGA SEMICONDUCTOR

AOC2421

8V P-Channel MOSFET

General Description

The AOC2421 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.2V while retaining a 5V $V_{GS(MAX)}$ rating.

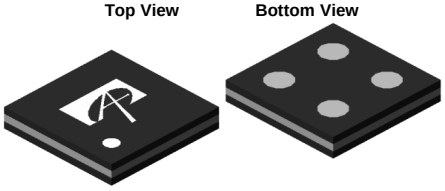
Product Summary

V_{DS}	-8V
I_D (at V_{GS}=-2.5V)	-2.5A
$R_{DS(ON)}$ (at V_{GS}=-2.5V)	< 60mΩ
$R_{DS(ON)}$ (at V_{GS}=-1.8V)	< 72mΩ
$R_{DS(ON)}$ (at V_{GS}=-1.5V)	< 85mΩ
$R_{DS(ON)}$ (at V_{GS}=-1.2V)	< 115mΩ
Typical ESD protection	**HBM Class 2**

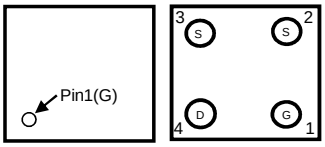
Green Product

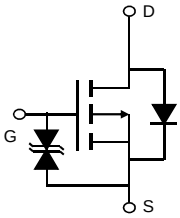
MCSP 0.97x0.97A_4

Top View **Bottom View**



Top View **Bottom View**





Absolute Maximum Ratings T_A=25℃ unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-8	V
Gate-Source Voltage		V_{GS}	±5	V
Source Current (DC) Note1	T_A=25℃	I_D	-2.5	A
Source Current (Pulse) Note2		I_{DM}	-25	
Power Dissipation Note1	T_A=25℃	P_D	0.6	W
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient A	t ≤ 10s	$R_{\theta JA}$	110	140	℃/W
Maximum Junction-to-Ambient A D	Steady-State		160	200	℃/W

Note 1. Mounted on minimum pad PCB

Note 2. PW <300 µs pulses, duty cycle 0.5% max

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	-8			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-8V, V_{GS}=0V			-1	µA
		T_J=55°C			-5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±5V			±10	µA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=-250µA	-0.2	-0.45	-0.7	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-2.5V, I_D=-1.5A		50	62	mΩ
		T_J=125°C		63.5	79	
		V_{GS}=-1.8V, I_D=-1A		57	72	mΩ
		V_{GS}=-1.5V, I_D=-1A		65	85	mΩ
		V_{GS}=-1.2V, I_D=-1A		83	115	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-1.5A		12		S
V_{SD}	Diode Forward Voltage	I_S=-1A,V_{GS}=0V		-0.6	-1	V
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-4V, f=1MHz		752		pF
C_{oss}	Output Capacitance			178		pF
C_{rss}	Reverse Transfer Capacitance			104		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		1.6		KΩ
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=-4.5V, V_{DS}=-4V, I_D=-1.5A		7.5	13	nC
Q_{gs}	Gate Source Charge			1.5		nC
Q_{gd}	Gate Drain Charge			1.0		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-2.5V, V_{DS}=-4V, R_L=2.67Ω, R_{GEN}=3Ω		285		ns
t_r	Turn-On Rise Time			465		ns
$t_{D(off)}$	Turn-Off DelayTime			1870		ns
t_f	Turn-Off Fall Time			1900		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-1.5A, dI/dt=100A/µs		12		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-1.5A, dI/dt=100A/µs		4		nC

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

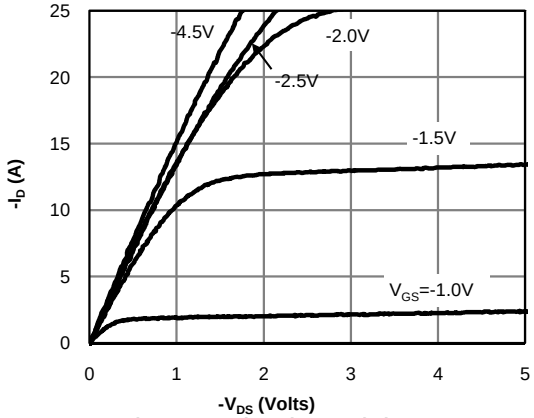


Fig 1: On-Region Characteristics

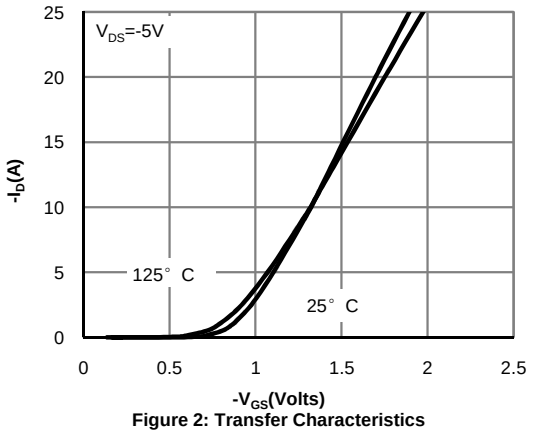


Figure 2: Transfer Characteristics

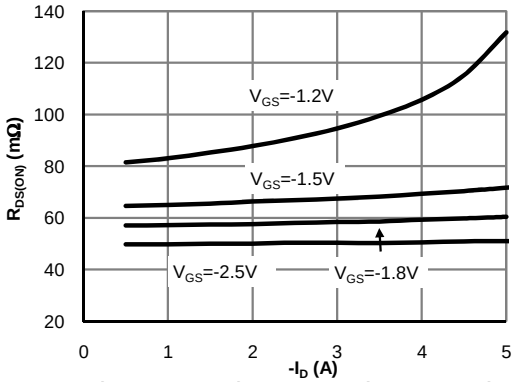


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

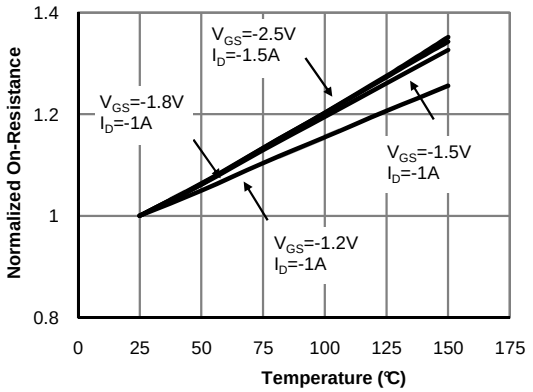


Figure 4: On-Resistance vs. Junction Temperature (Note E)

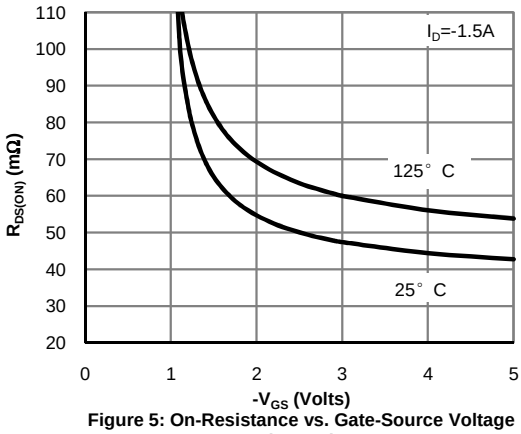


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

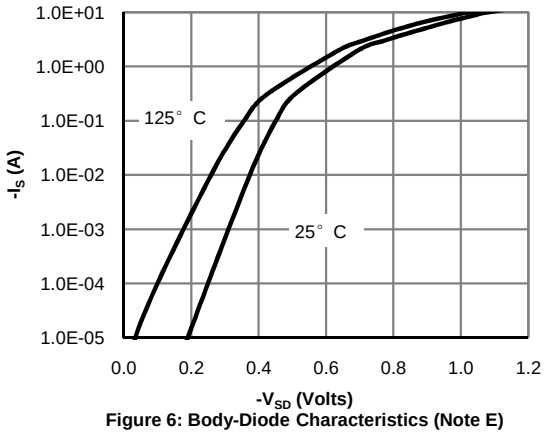


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

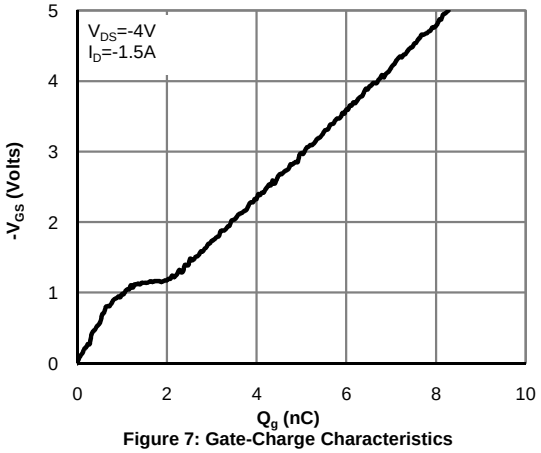


Figure 7: Gate-Charge Characteristics

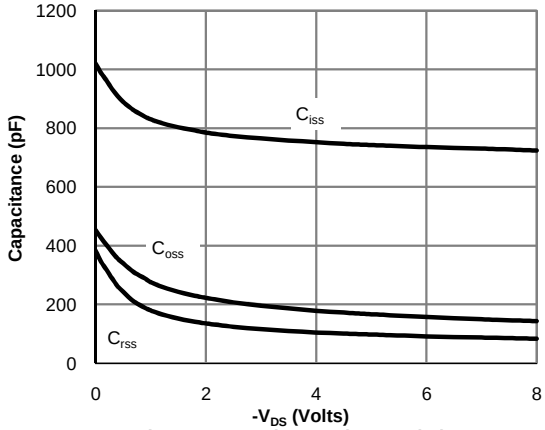


Figure 8: Capacitance Characteristics

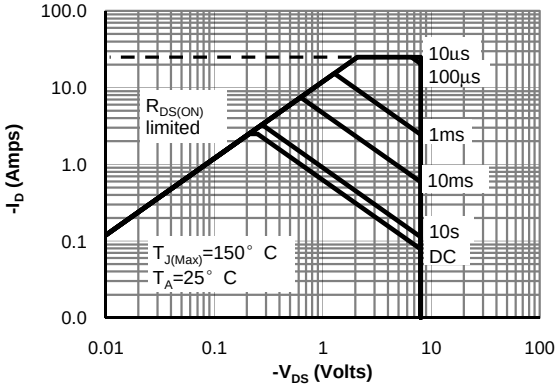


Figure 9: Maximum Forward Biased Safe Operating Area

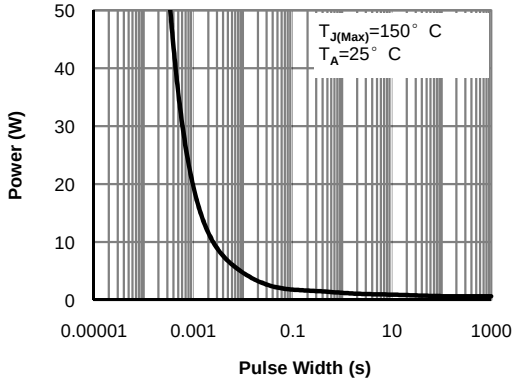


Figure 10: Single Pulse Power Rating Junction-to-Ambient

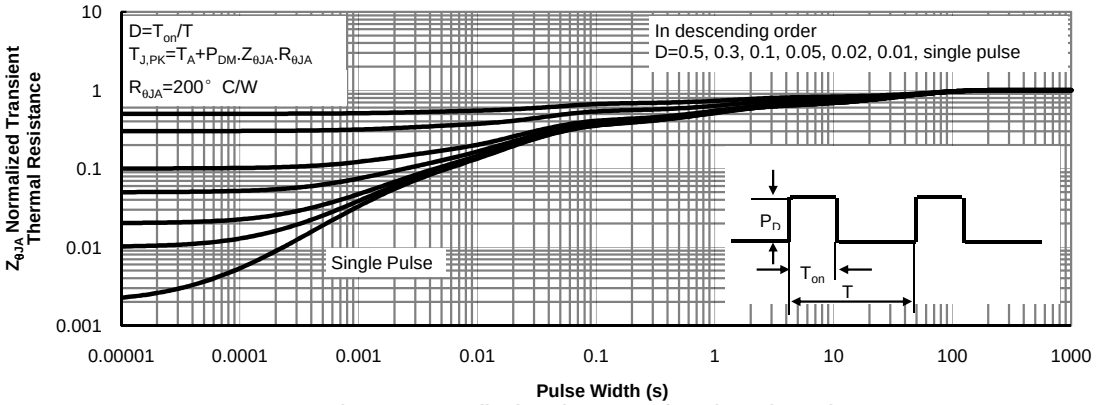
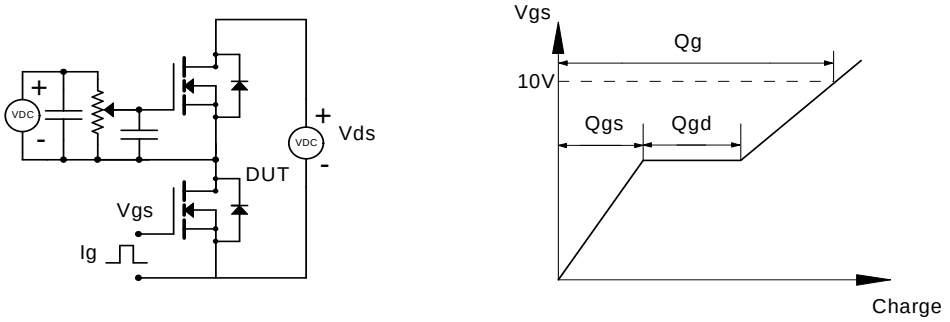
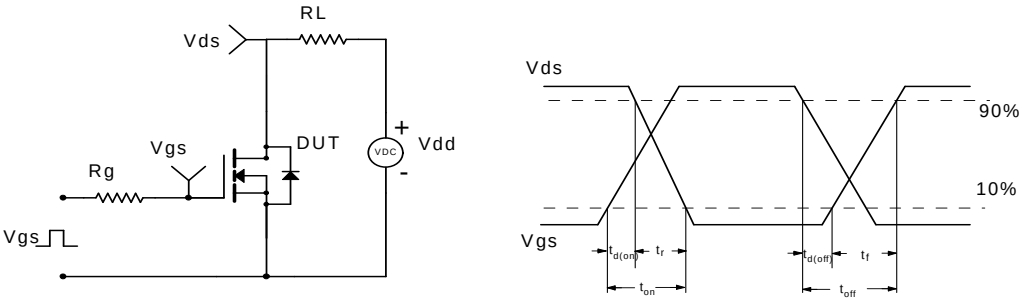
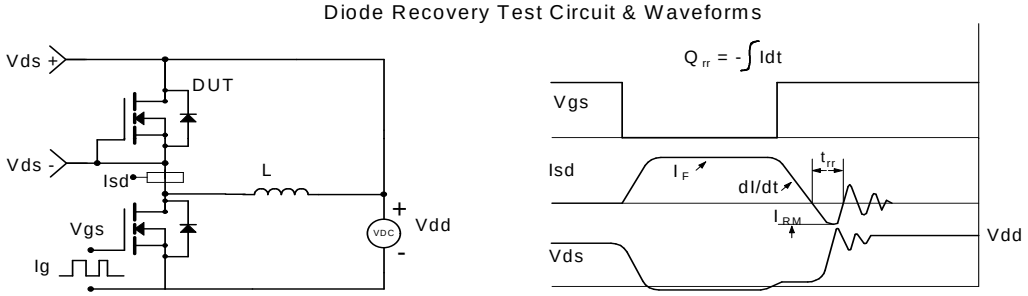


Figure 11: Normalized Maximum Transient Thermal Impedance

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms