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[Alpha & Omega Semiconductor Inc.](#)
[AOC2412](#)

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ALPHA & OMEGA
SEMICONDUCTOR

AOC2412

20V N-Channel MOSFET

General Description

The AOC2412 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V while retaining a 8V $V_{GS(MAX)}$ rating.

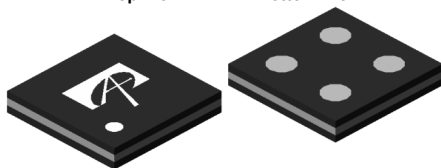
Product Summary

V_{DS}	20V
I_D (at $V_{GS}=4.5V$)	4.5A
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 23m Ω
$R_{DS(ON)}$ (at $V_{GS}=2.5V$)	< 26m Ω
$R_{DS(ON)}$ (at $V_{GS}=1.8V$)	< 30m Ω

Typical ESD protection HBM Class 3A

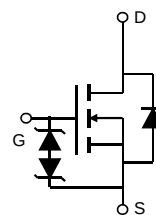
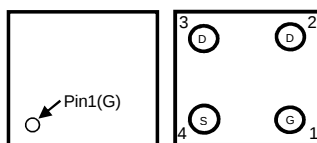


AlphaDFN 1.57x1.57_4
Top View Bottom View



Top View

Bottom View



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 8	V
Source Current (DC) ^{Note1}	I_D	4.5	A
Source Current (Pulse) ^{Note2}	I_{DM}	65	
Power Dissipation ^{Note1}	P_D	0.55	W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	140	170	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A D}		190	230	$^\circ\text{C/W}$

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	20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V T _J =55°C			1 5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±8V			±10	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.4	0.7	1.0	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =1.5A T _J =125°C		18 22.5	23 29	mΩ
		V _{GS} =2.5V, I _D =1A		20	26	mΩ
		V _{GS} =1.8V, I _D =1A		22	30	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =1.5A		30		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.65	1	V
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, f=1MHz		1842		pF
C _{oss}	Output Capacitance			245		pF
C _{rss}	Reverse Transfer Capacitance			70		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		2.7		KΩ
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =1.5A		21.5	32	nC
Q _{gs}	Gate Source Charge			10.5		nC
Q _{gd}	Gate Drain Charge			4.5		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =4.5V, V _{DS} =10V, R _L =6.67Ω, R _{GEN} =3Ω		2.5		μs
t _r	Turn-On Rise Time			4		μs
t _{D(off)}	Turn-Off DelayTime			5		μs
t _f	Turn-Off Fall Time			8		μs
t _{rr}	Body Diode Reverse Recovery Time	I _F =1.5A, dI/dt=100A/μs		20		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =1.5A, dI/dt=100A/μs		10		nC

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

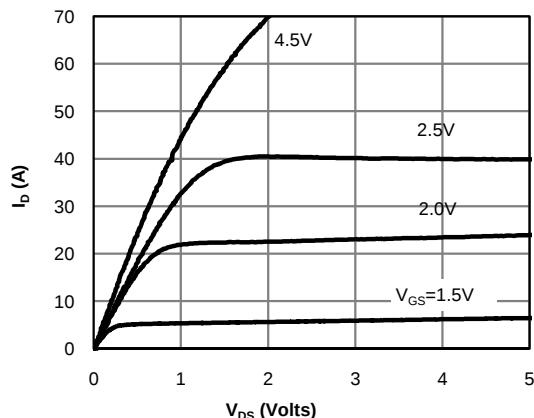


Fig 1: On-Region Characteristics

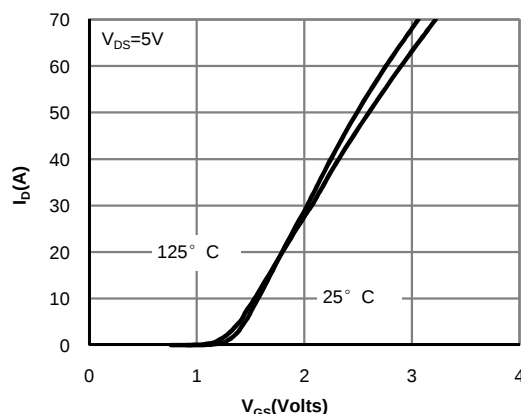


Figure 2: Transfer Characteristics

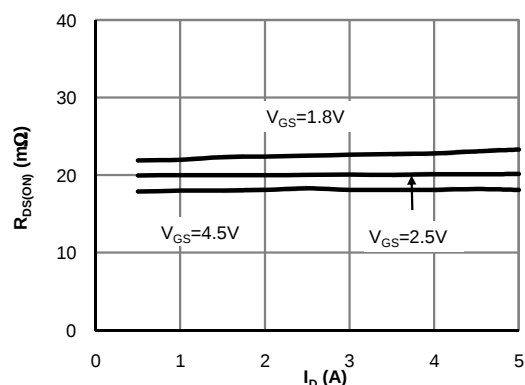


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

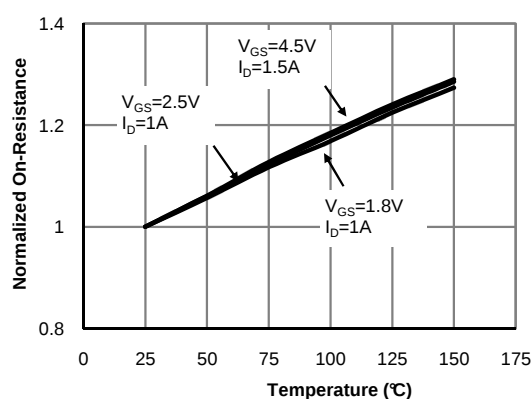


Figure 4: On-Resistance vs. Junction Temperature (Note E)

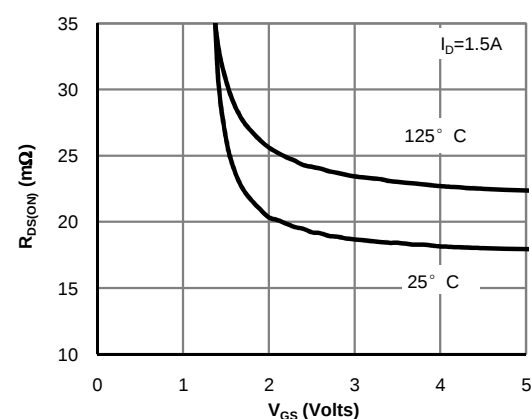


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

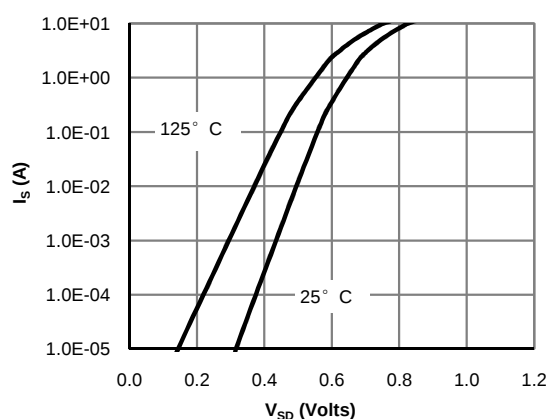


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

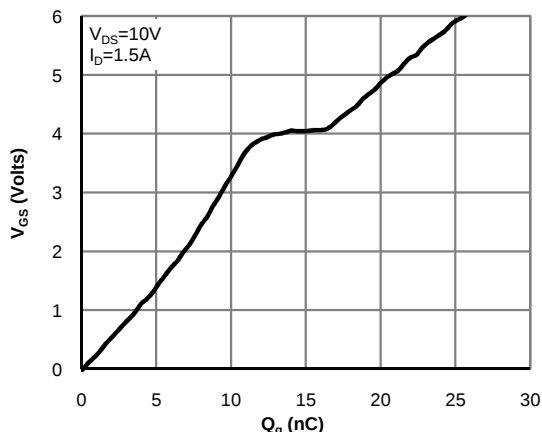


Figure 7: Gate-Charge Characteristics

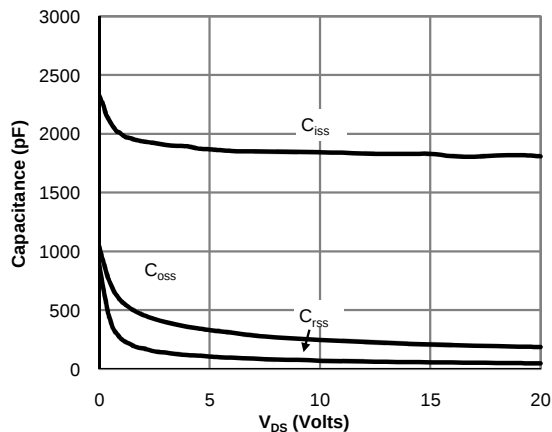


Figure 8: Capacitance Characteristics

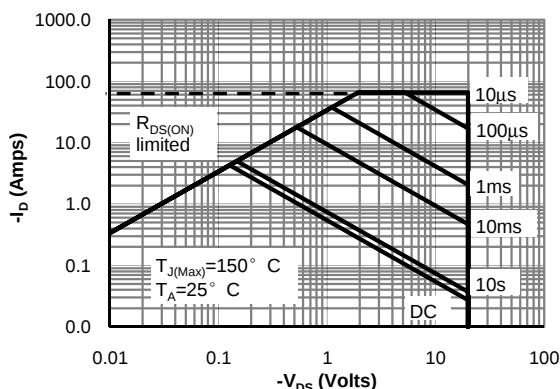


Figure 9: Maximum Forward Biased Safe Operating Area

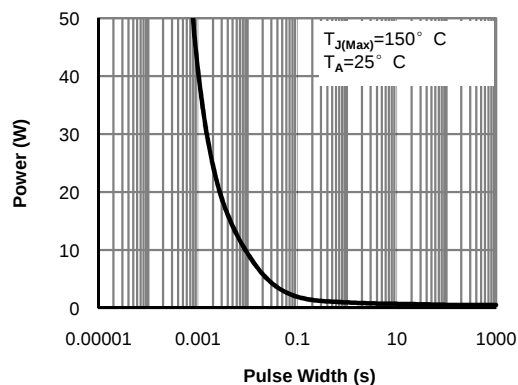


Figure 10: Single Pulse Power Rating Junction-to-Ambient

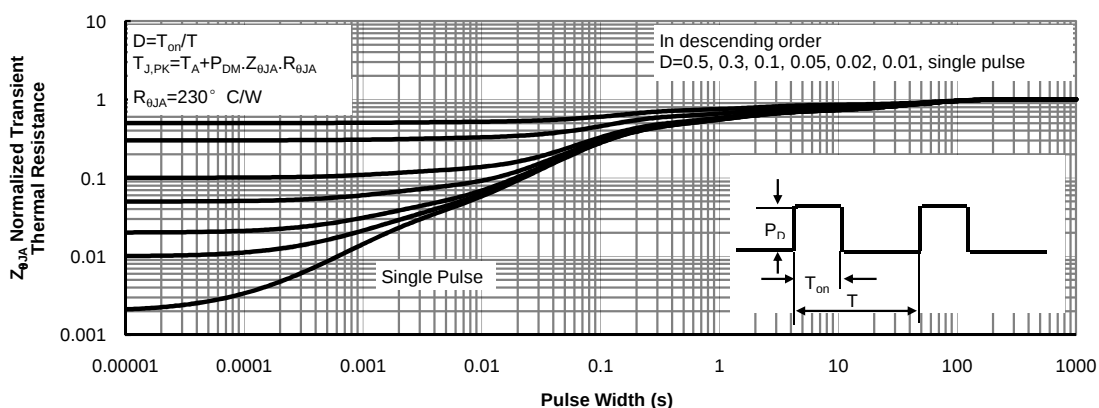
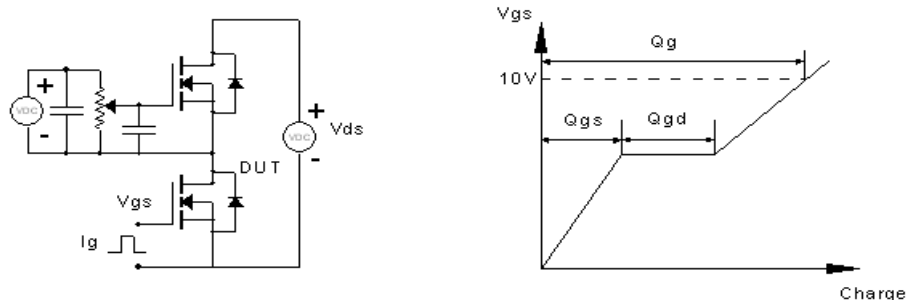
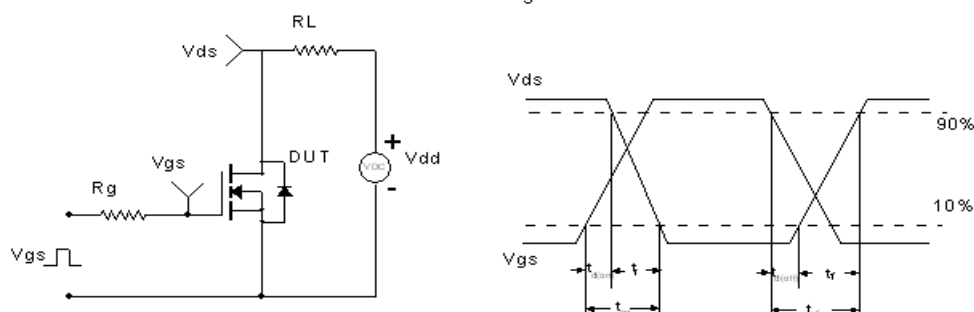


Figure 11: Normalized Maximum Transient Thermal Impedance

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

