



THE DATASHEET OF AOC2413



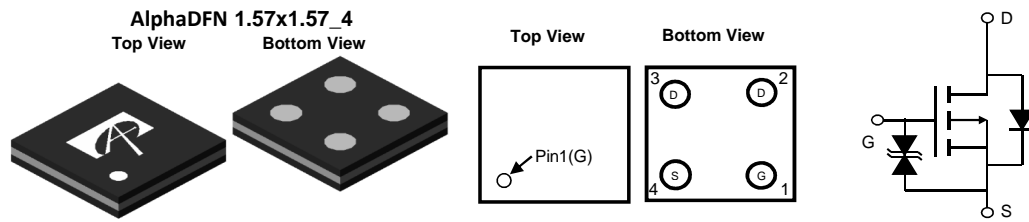
General Description

The AOC2413 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 $V_{GS}=-2.5V$)	-3.5A
$R_{DS(ON)}$ (at $V_{GS}=-2.5V$)	< 28m Ω
$R_{DS(ON)}$ (at $V_{GS}=-1.8V$)	< 32m Ω
$R_{DS(ON)}$ (at $V_{GS}=-1.5V$)	< 37m Ω
$R_{DS(ON)}$ (at $V_{GS}=-1.2V$)	< 47m Ω

Typical ESD protection **HBM Class 3A**



Absolute Maximum Ratings $T_A=25^\circ\text{C}$ 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}	I_D	-3.5	A
Source Current (Pulse) ^{Note2}	I_{DM}	-50	
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	

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 T _J =55°C			-1 -5	μA
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	-0.15	-0.42	-0.65	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-2.5V, I _D =-1.5A T _J =125°C		22.5	28	mΩ
				29.5	37	
		V _{GS} =-1.8V, I _D =-1A		25	32	mΩ
		V _{GS} =-1.5V, I _D =-1A		28	37	mΩ
		V _{GS} =-1.2V, I _D =-1A		34	47	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-1.5A		14		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.52	-1	V
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-4V, f=1MHz		1935		pF
C _{oss}	Output Capacitance			475		pF
C _{riss}	Reverse Transfer Capacitance			240		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.7		KΩ
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-4V, I _D =-1.5A		19	27	nC
Q _{gs}	Gate Source Charge			7.5		nC
Q _{gd}	Gate Drain Charge			3.5		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-2.5V, V _{DS} =-4V, R _L =2.67Ω, R _{GEN} =3Ω		1.6		μs
t _r	Turn-On Rise Time			2.8		μs
t _{D(off)}	Turn-Off DelayTime			2.7		μs
t _f	Turn-Off Fall Time			6.2		μs
t _{rr}	Body Diode Reverse Recovery Time	I _F =-1.5A, di/dt=100A/μs		17		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-1.5A, di/dt=100A/μs		9		nC

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

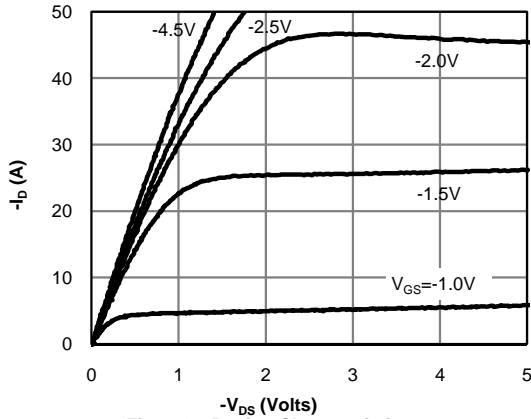


Fig 1: On-Region Characteristics

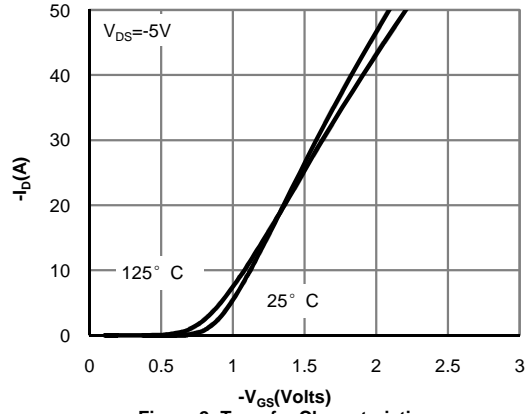


Figure 2: Transfer Characteristics

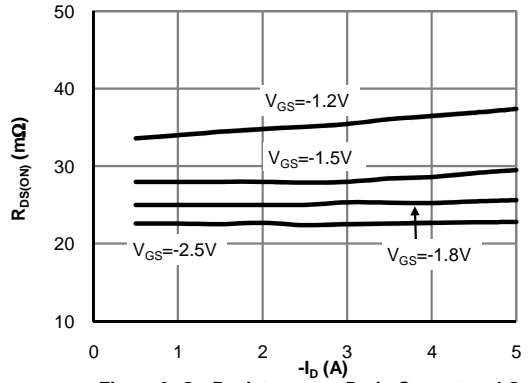


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

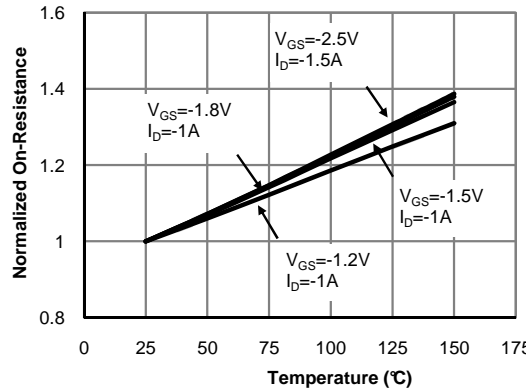


Figure 4: On-Resistance vs. Junction Temperature (Note E)

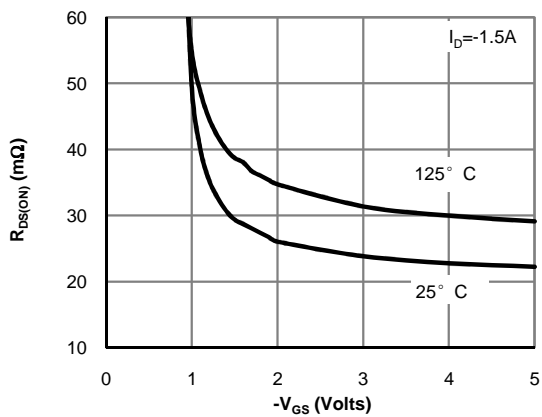


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

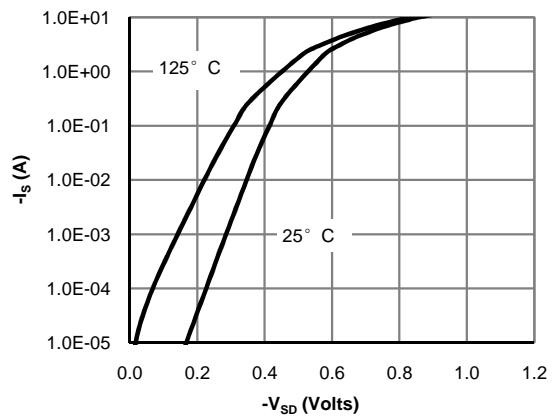


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

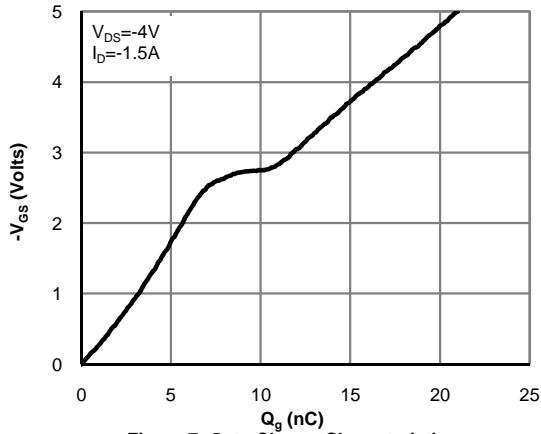


Figure 7: Gate-Charge Characteristics

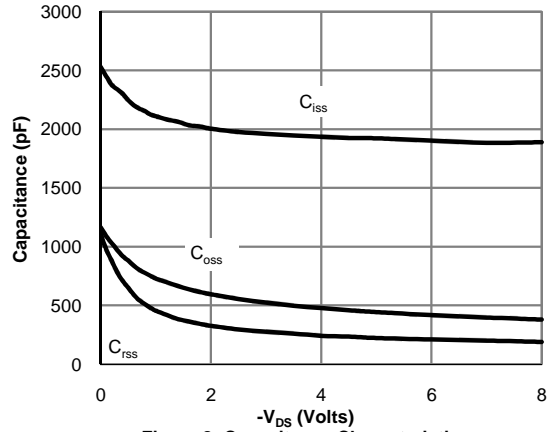


Figure 8: Capacitance Characteristics

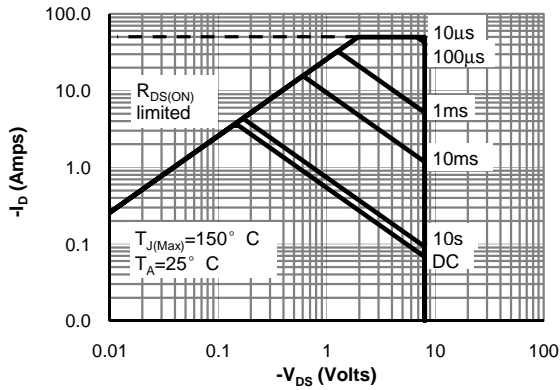


Figure 9: Maximum Forward Biased Safe Operating Area

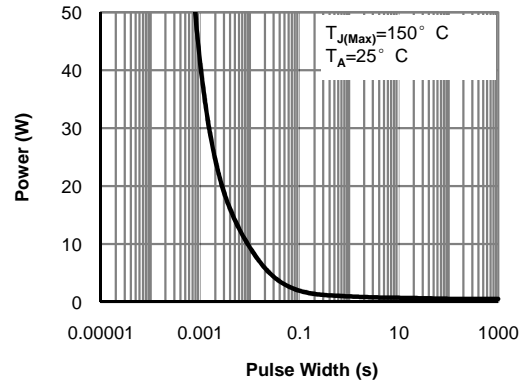


Figure 10: Single Pulse Power Rating Junction-to-Ambient

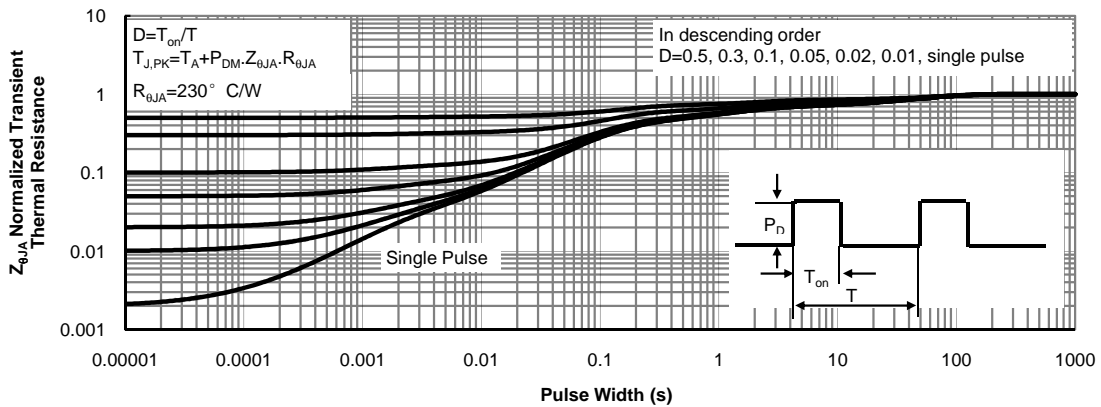
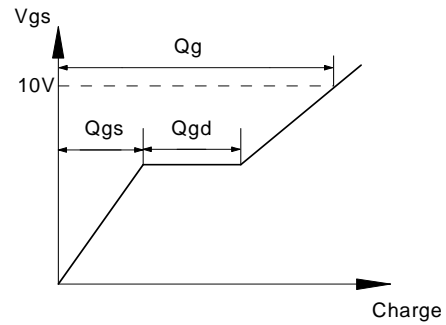
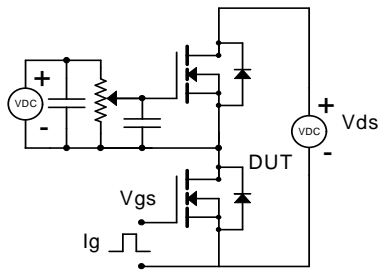
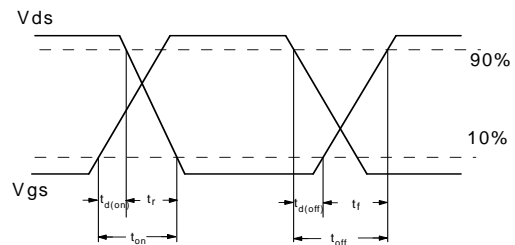
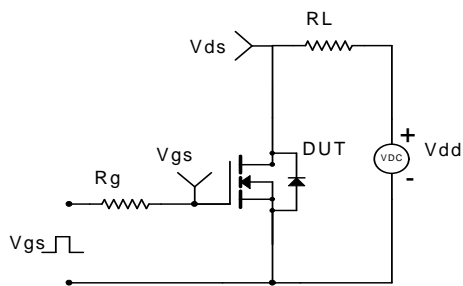


Figure 11: Normalized Maximum Transient Thermal Impedance

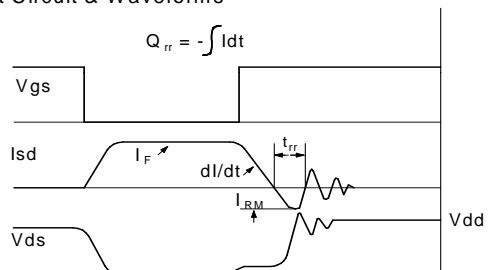
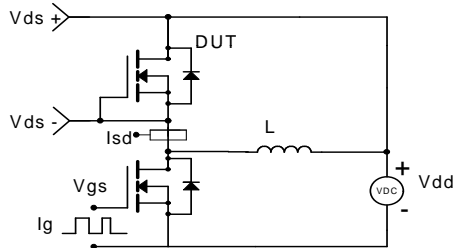
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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