

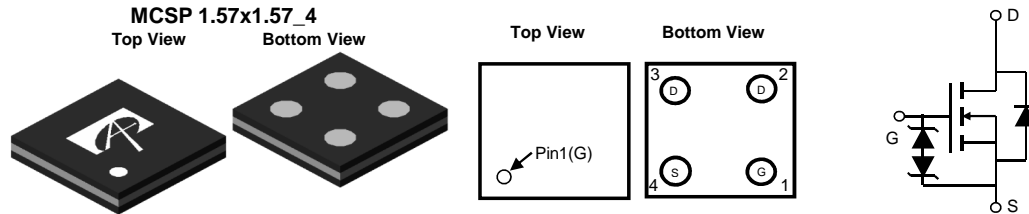
### General Description

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 $\Omega$
$R_{DS(ON)}$ (at $V_{GS}=2.5V$ )	< 26m $\Omega$
$R_{DS(ON)}$ (at $V_{GS}=1.8V$ )	< 30m $\Omega$

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	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V
Source Current (DC) <sup>Note1</sup>	$I_D$	4.5	A
$T_A=25^\circ\text{C}$			
Source Current (Pulse) <sup>Note2</sup>	$I_{DM}$	65	
Power Dissipation <sup>Note1</sup>	$P_D$	0.55	W
$T_A=25^\circ\text{C}$			
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 <sup>A</sup>	$R_{\theta JA}$	140	170	$^\circ\text{C/W}$
$t \leq 10\text{s}$				
Maximum Junction-to-Ambient <sup>A,D</sup>		190	230	$^\circ\text{C/W}$
Steady-State				

**Note 1.** Mounted on minimum pad PCB

**Note 2.** PW < 300  $\mu\text{s}$  pulses, duty cycle 0.5% max

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	20			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			1 5	μA
I <sub>GSS</sub>	Gate-Body leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±8V			±10	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.4	0.7	1.0	V
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =1.5A T <sub>J</sub> =125°C		18 22.5	23 29	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =1A		20	26	mΩ
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =1A		22	30	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =1.5A		30		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1A, V <sub>GS</sub> =0V		0.65	1	V
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =10V, f=1MHz		1842		pF
C <sub>oss</sub>	Output Capacitance			245		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			70		pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz		2.7		KΩ
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =10V, I <sub>D</sub> =1.5A		21.5	32	nC
Q <sub>gs</sub>	Gate Source Charge			10.5		nC
Q <sub>gd</sub>	Gate Drain Charge			4.5		nC
t <sub>D(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =10V, R <sub>L</sub> =6.67Ω, R <sub>GEN</sub> =3Ω		2.5		μs
t <sub>r</sub>	Turn-On Rise Time			4		μs
t <sub>D(off)</sub>	Turn-Off DelayTime			5		μs
t <sub>f</sub>	Turn-Off Fall Time			8		μs
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =1.5A, di/dt=100A/μs		20		ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =1.5A, di/dt=100A/μs		10		nC

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**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

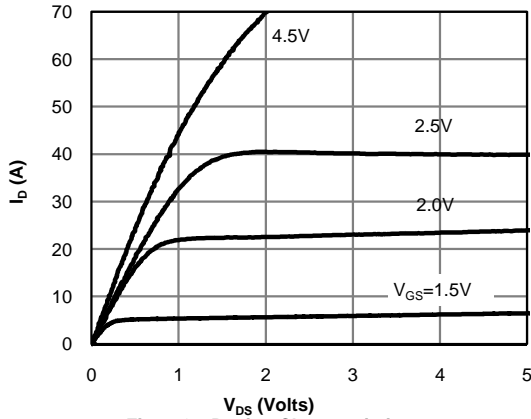


Fig 1: On-Region Characteristics

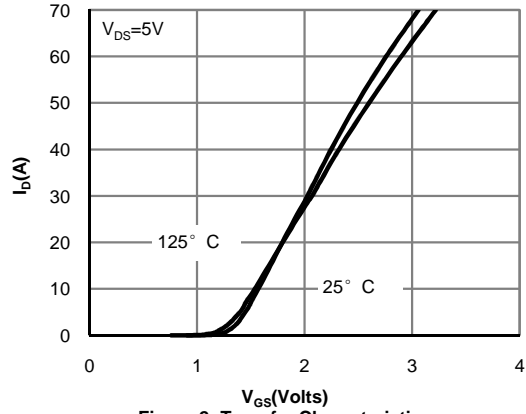


Figure 2: Transfer Characteristics

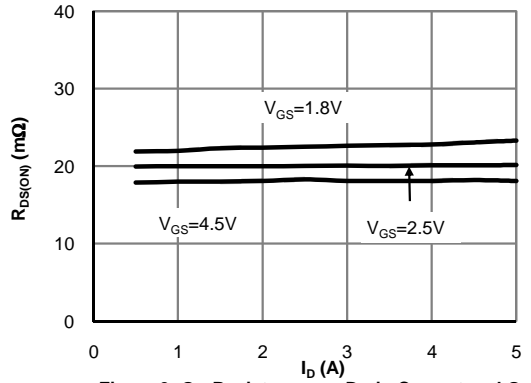


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

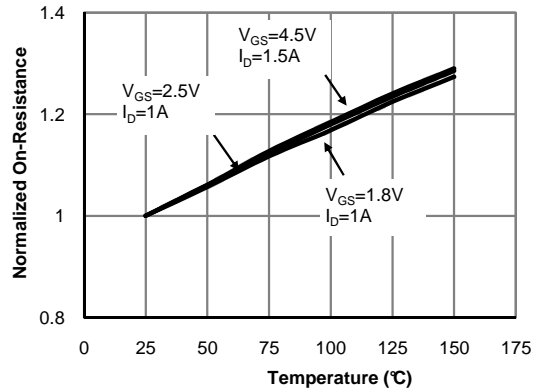


Figure 4: On-Resistance vs. Junction Temperature (Note E)

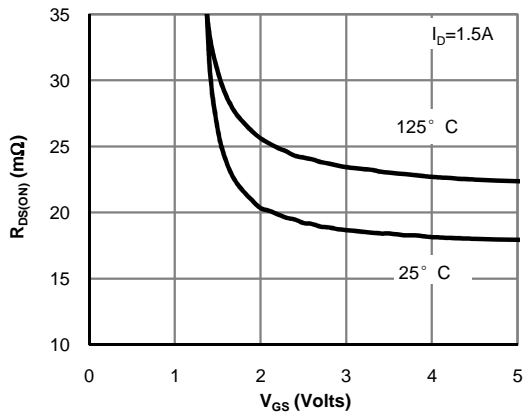


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

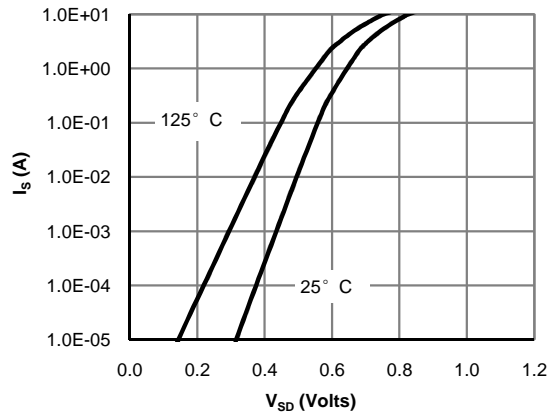


Figure 6: Body-Diode Characteristics (Note E)

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

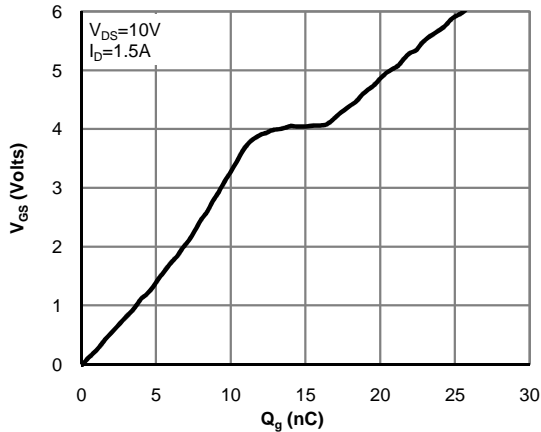


Figure 7: Gate-Charge Characteristics

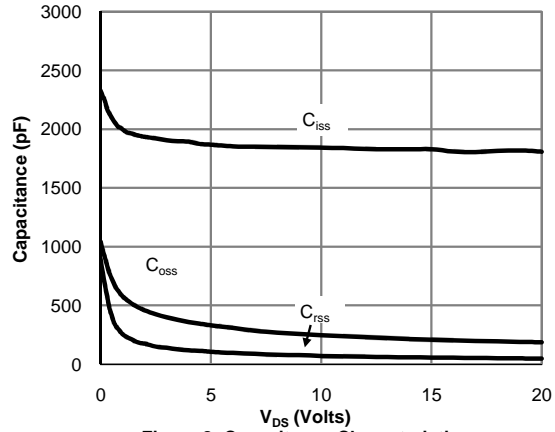


Figure 8: Capacitance Characteristics

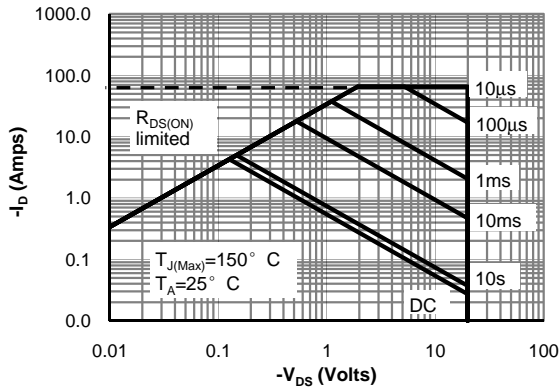


Figure 9: Maximum Forward Biased Safe Operating Area

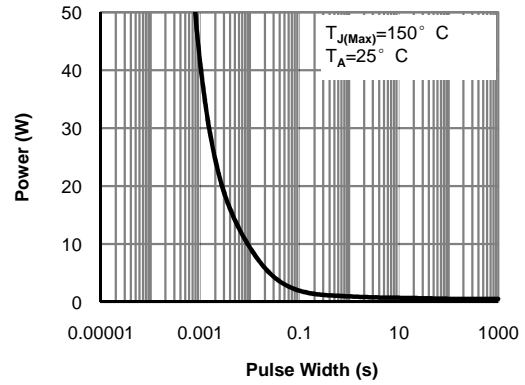


Figure 10: Single Pulse Power Rating Junction-to-Ambient

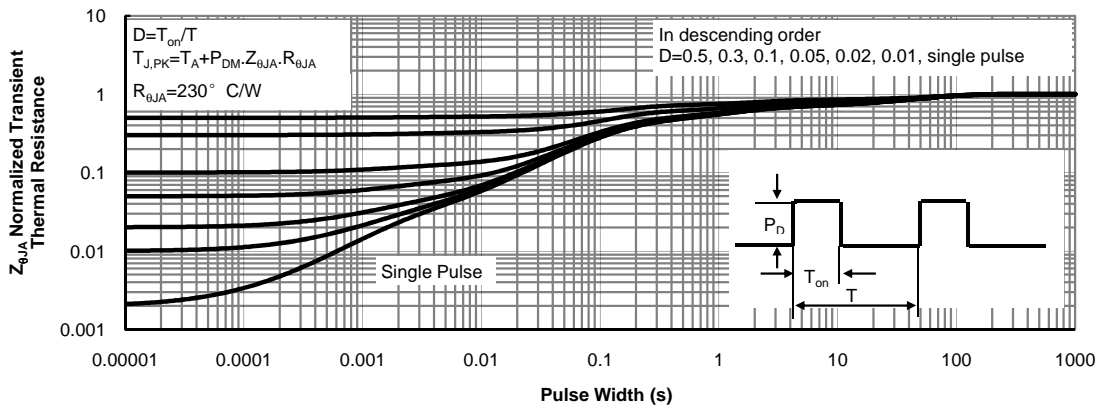
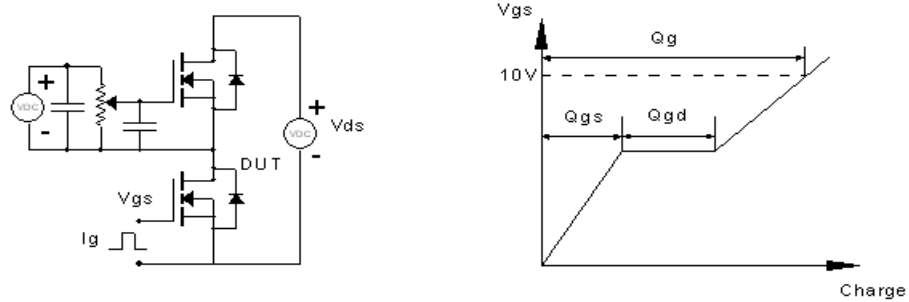
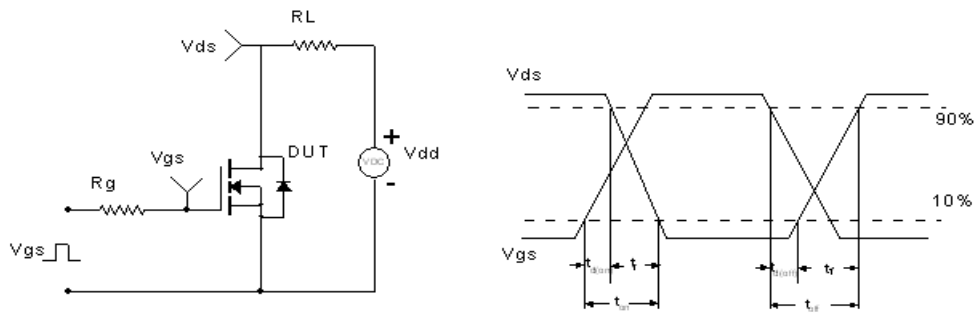


Figure 11: Normalized Maximum Transient Thermal Impedance

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

