ALPHA & OMEGA SEMICONDUCTOR

AOC2423

20V P-Channel MOSFET

General Description

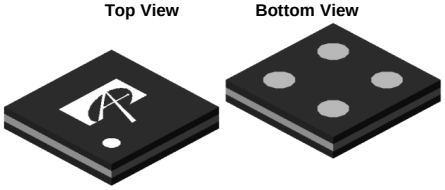
The AOC2423 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V while retaining a 12V $V_{GS(MAX)}$ rating.

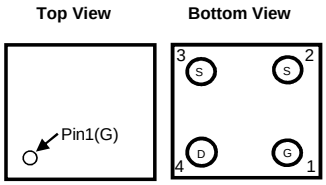
Product Summary

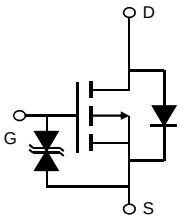
V_{DS}	-20V
I_D (at V_{GS}=-10V)	-2A
$R_{DS(ON)}$ (at V_{GS}=-10V)	< 80mΩ
$R_{DS(ON)}$ (at V_{GS}=-4.5V)	< 95mΩ
$R_{DS(ON)}$ (at V_{GS}=-2.5V)	< 120mΩ
Typical ESD protection	**HBM Class2**

Green Product

MCSP 0.97x0.97A_4







Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±12	V
Source Current (DC) Note1	T_A=25°C	I_D	-2	A
Source Current (Pulse) Note2		I_{DM}	-20	
Power Dissipation Note1	T_A=25°C	P_D	0.6	W
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	t ≤ 10s	$R_{\theta JA}$	110	140	°C/W
Maximum Junction-to-Ambient A D	Steady-State		160	200	°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			-1	µA
		T_J=55°C			-5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±12V			±10	µA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=-250µA	-0.5	-0.85	-1.2	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-1A		65	80	mΩ
		T_J=125°C		86.5	107	
		V_{GS}=-4.5V, I_D=-1A		74	95	mΩ
		V_{GS}=-2.5V, I_D=-1A		92	120	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-1A		6.5		S
V_{SD}	Diode Forward Voltage	I_S=-1A,V_{GS}=0V		-0.74	-1	V
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-10V, f=1MHz		470		pF
C_{oss}	Output Capacitance			92		pF
C_{rss}	Reverse Transfer Capacitance			60		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		12.5		Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=-10V, V_{DS}=-10V, I_D=-1A		10		nC
Q_g(4.5V)	Total Gate Charge			5		nC
Q_{gs}	Gate Source Charge			2		nC
Q_{gd}	Gate Drain Charge			0.5		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-10V, V_{DS}=-10V, R_L=10Ω, R_{GEN}=3Ω		7.5		ns
t_r	Turn-On Rise Time			10		ns
$t_{D(off)}$	Turn-Off DelayTime			50		ns
t_f	Turn-Off Fall Time			24		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-1A, dI/dt=100A/µs		8.5		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-1A, dI/dt=100A/µs		3		nC

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

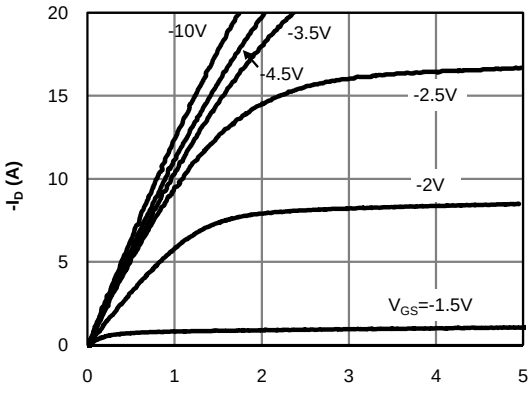


Fig 1: On-Region Characteristics

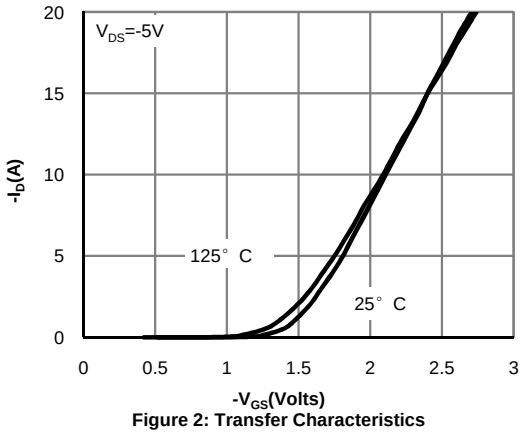


Figure 2: Transfer Characteristics

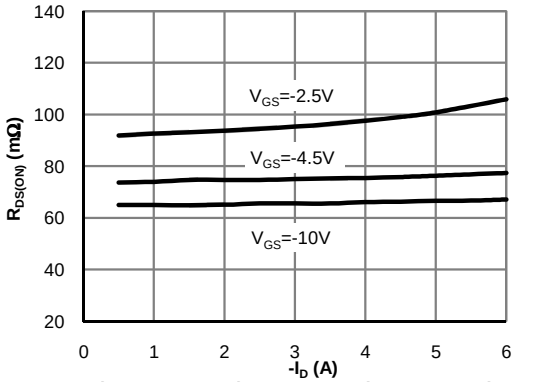


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

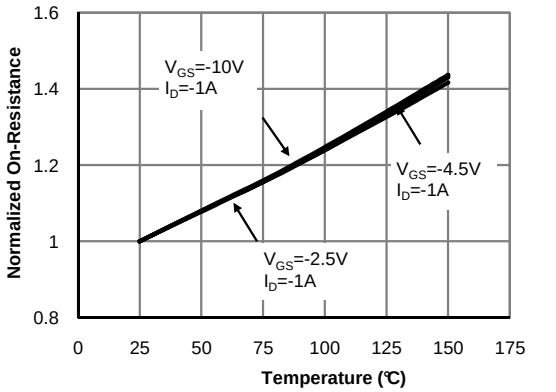


Figure 4: On-Resistance vs. Junction Temperature (Note E)

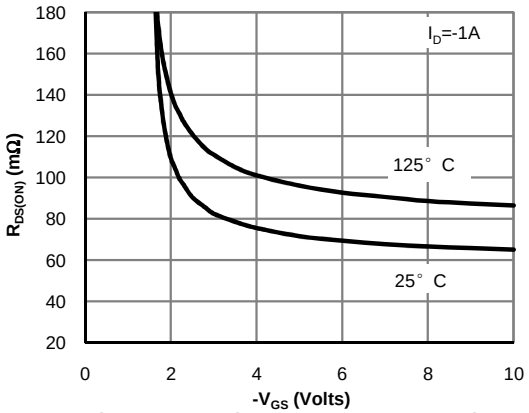


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

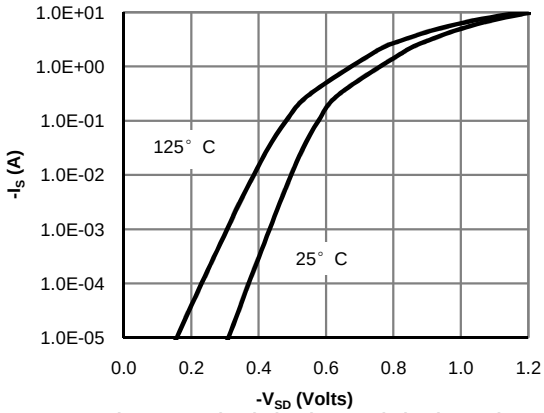


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

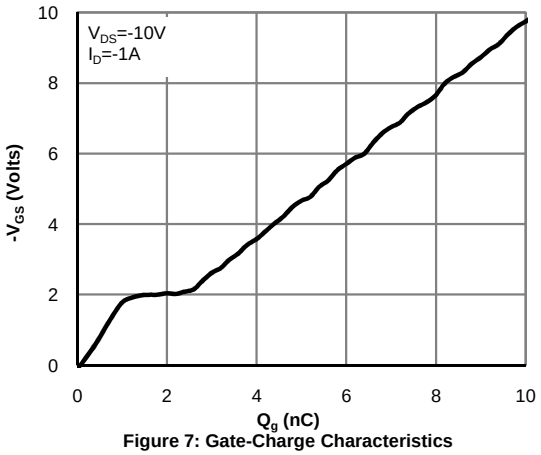


Figure 7: Gate-Charge Characteristics

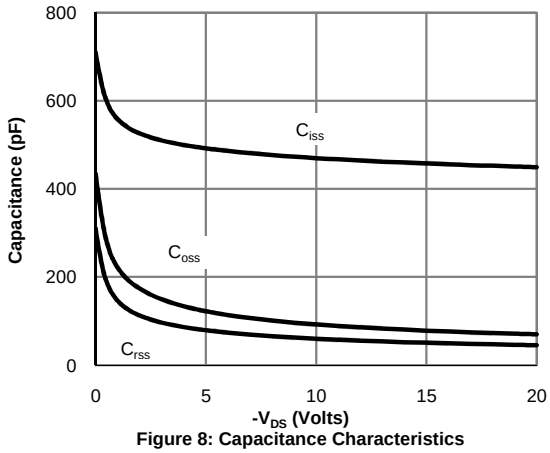


Figure 8: Capacitance Characteristics

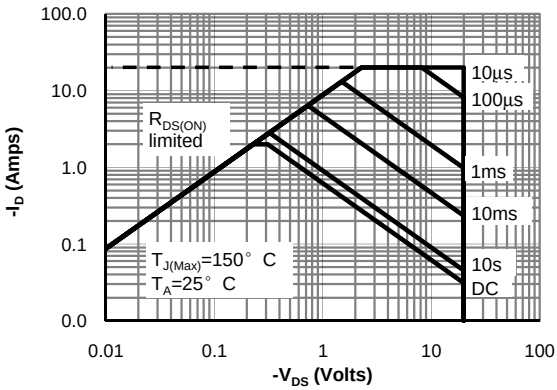


Figure 9: Maximum Forward Biased Safe Operating Area

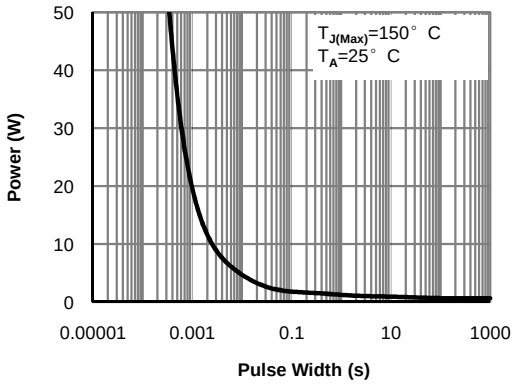


Figure 10: Single Pulse Power Rating Junction-to-Ambient

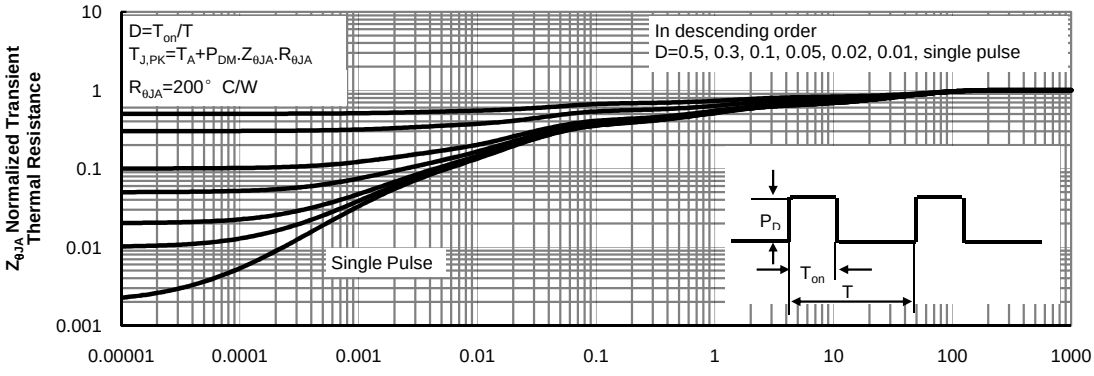
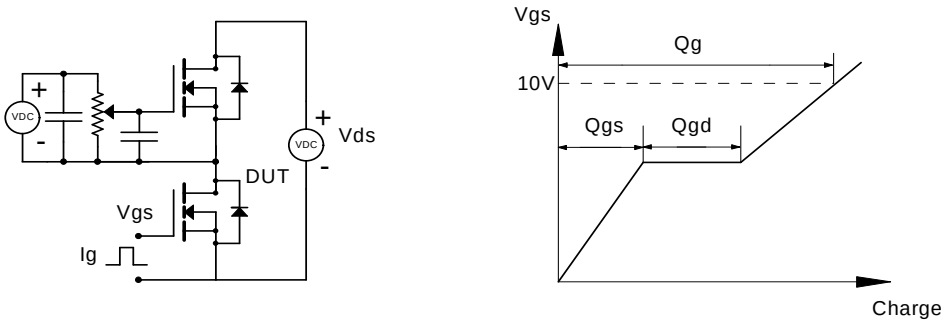
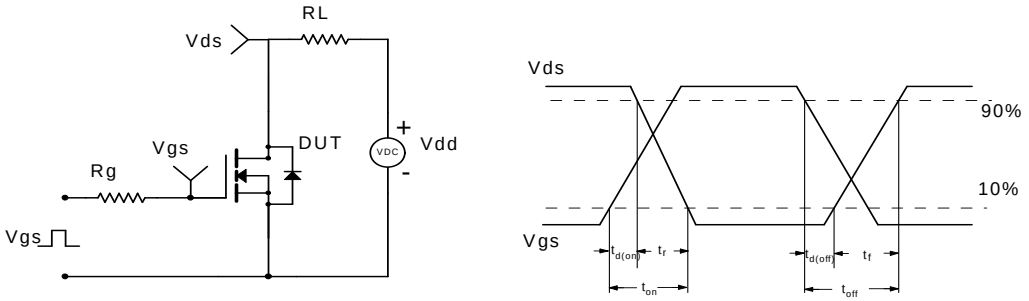


Figure 11: Normalized Maximum Transient Thermal Impedance

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

