ALPHA & OMEGA
SEMICONDUCTOR

AO6422

20V N-Channel MOSFET

General Description

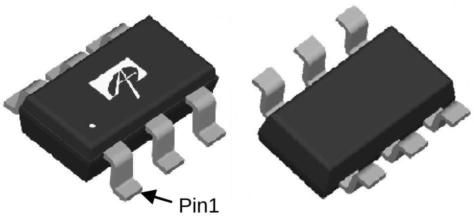
The AO6422 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for general purpose application.

Product Summary

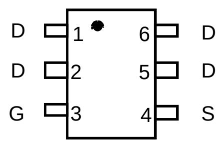
V_{DS} = 20V
I_D = 5A (${V_{GS}}$ = 4.5V)
$R_{DS(ON)}$ < 44mΩ (V_{GS} = 4.5V)
$R_{DS(ON)}$ < 55mΩ (V_{GS} = 2.5V)
$R_{DS(ON)}$ < 72mΩ (V_{GS} = 1.8V)

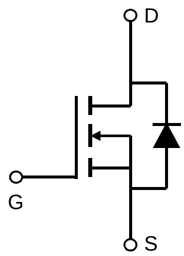
TSOP6

Top View Bottom View



Top View





Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	10 Sec	Steady State	Units
Drain-Source Voltage		V_{DS}	20		V
Gate-Source Voltage		V_{GS}	±8		V
Continuous Drain Current [A]	T_A=25°C	I_D	5	3.9	A
	T_A=70°C		4.2	3	
Pulsed Drain Current [B]		I_{DM}	30		
Power Dissipation [A]	T_A=25°C	P_D	2.0	1.1	W
	T_A=70°C		1.3	0.7	
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	$R_{\theta JA}$	47.5	62.5	°C/W
Maximum Junction-to-Ambient [A]	Steady State		74	110	°C/W
Maximum Junction-to-Lead [C]	Steady State	$R_{\theta JL}$	54	68	°C/W

Electrical Characteristics (T_J=25℃ 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℃			5	
I_{GSS}	Gate-Body leakage current	V_{DS} = 0V, V_{GS} = ±8V				±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS} I_D = 250µA		0.4	0.65	1	V
$I_{D(ON)}$	On state drain current	V_{GS} = 4.5V, V_{DS} = 5V		30			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 4.5V, I_D = 5.0A			35	44	mΩ
			T_J=125℃		48	60	
		V_{GS} = 2.5V, I_D = 4.5A			43	55	mΩ
		V_{GS} = 1.8V, I_D = 3.5A			55	72	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 5V, I_D = 5.0A			14		S
V_{SD}	Diode Forward Voltage	I_S = 1A,V_{GS} = 0V			0.8	1	V
I_S	Maximum Body-Diode Continuous Current					2	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=10V, f=1MHz			450	560	pF
C_{oss}	Output Capacitance				74		pF
C_{rss}	Reverse Transfer Capacitance				52		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz			4.9	7.5	Ω
SWITCHING PARAMETERS							
Q_g (4.5V)	Total Gate Charge	V_{GS}= 4.5V, V_{DS}= 10V, I_D= 5A			6.2	8.2	nC
Q_{gs}	Gate Source Charge				0.4		nC
Q_{gd}	Gate Drain Charge				1.3		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=4.5V, V_{DS}=10V, R_L=2Ω, R_{GEN}=3Ω			4.5		ns
t_r	Turn-On Rise Time				6		ns
$t_{D(off)}$	Turn-Off DelayTime				33		ns
t_f	Turn-Off Fall Time				7.1		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=5A, dI/dt=100A/µs			13	17	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=5A, dI/dt=100A/µs			3.3		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A = 25° C. in any given application depends on the user's specific board design. The current rating is based on the t ≤10s thermal resistance rating.
B: Repetitive rating, pulse width limited by junction temperature.
C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.
D. The static characteristics in Figures 1 to 6 are obtained using t ≤ 300µs pulses, duty cycle 0.5% max.
E. These tests are performed with the device mounted on 1 in ^{2} FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The SOA curve provides a single pulse rating.

Rev2: Feb. 2012

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

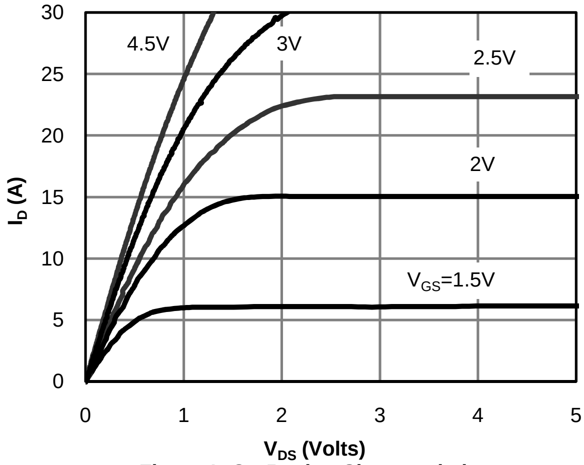


Figure 1: On-Region Characteristics

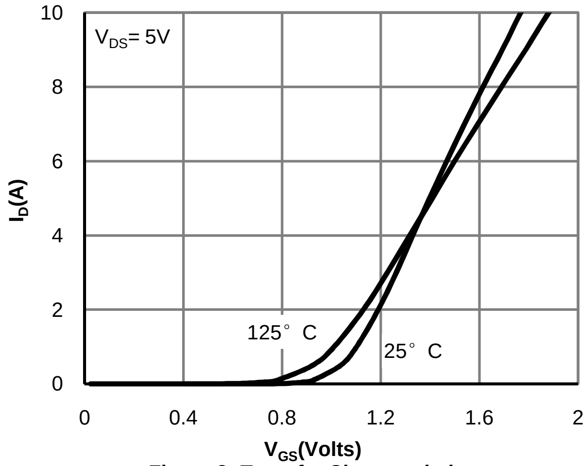


Figure 2: Transfer Characteristics

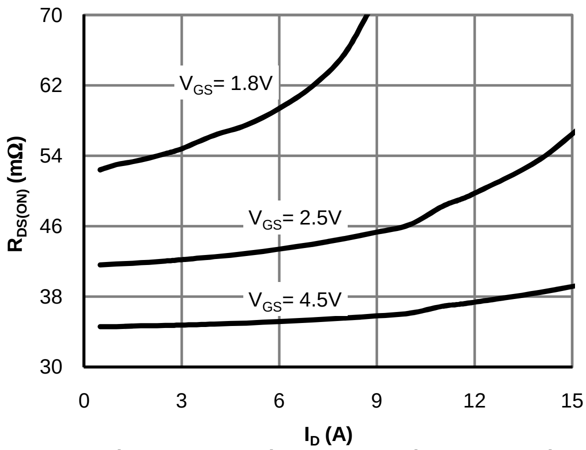


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

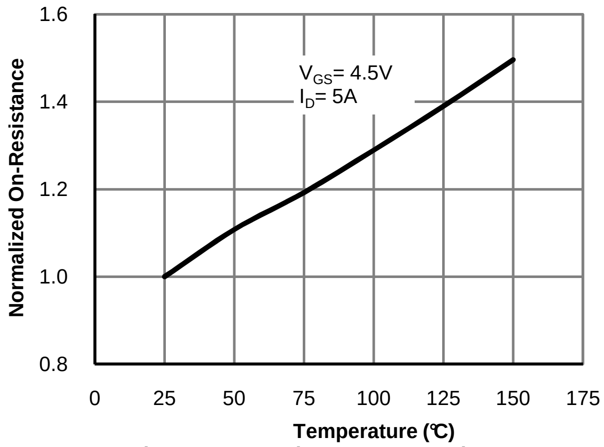


Figure 4: On-Resistance vs. Junction Temperature

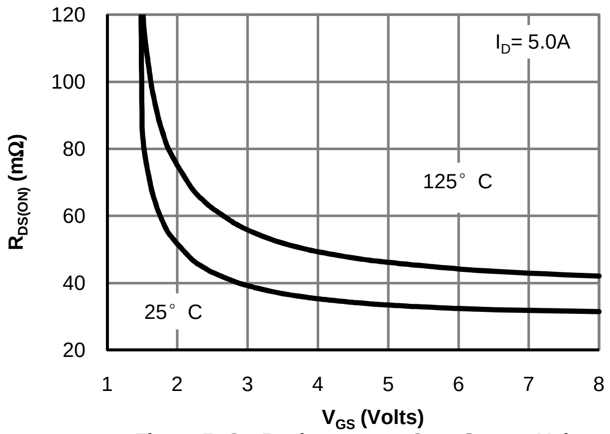


Figure 5: On-Resistance vs. Gate-Source Voltage

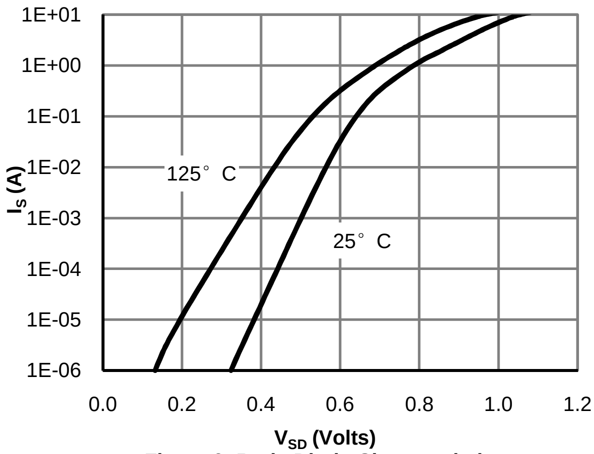


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

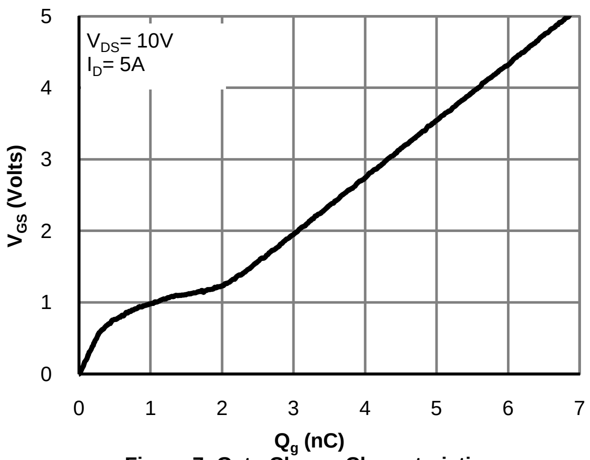


Figure 7: Gate-Charge Characteristics

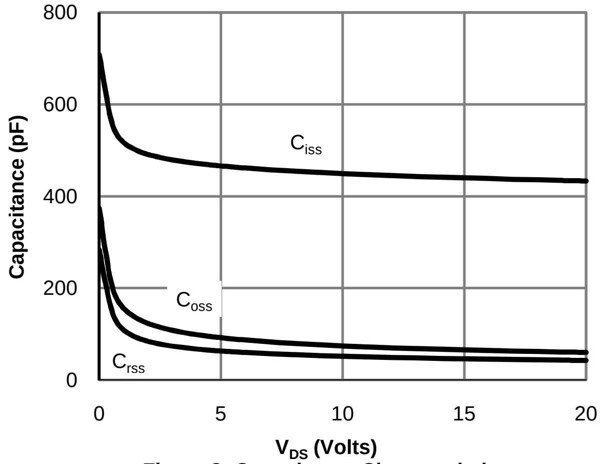


Figure 8: Capacitance Characteristics

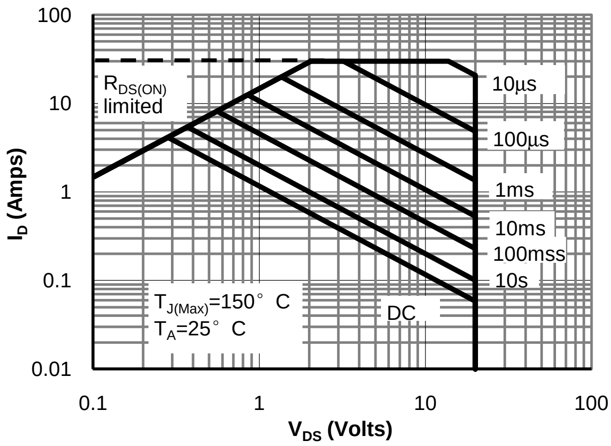


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

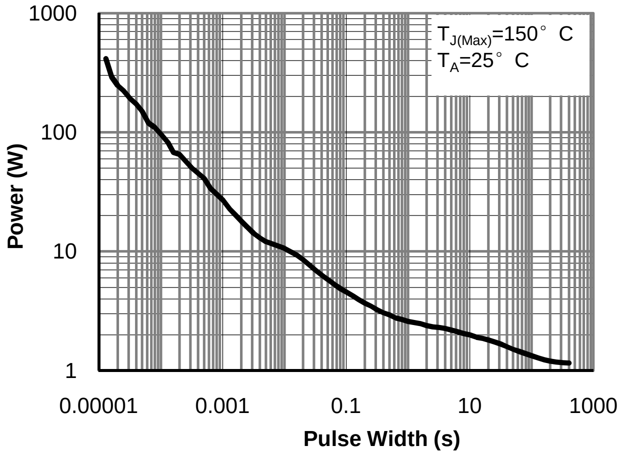


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

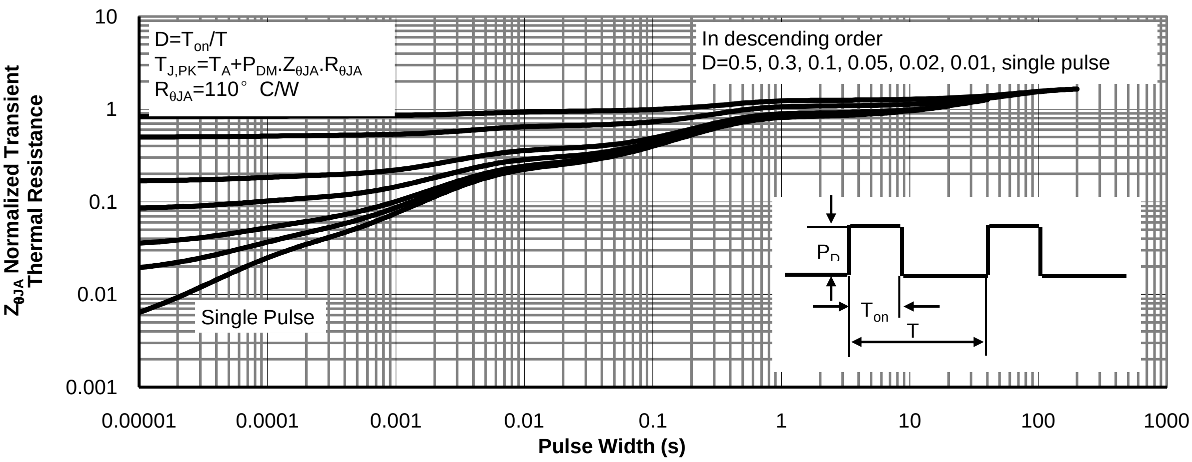


Figure 11: Normalized Maximum Transient Thermal Impedance(Note E)