



AO6806

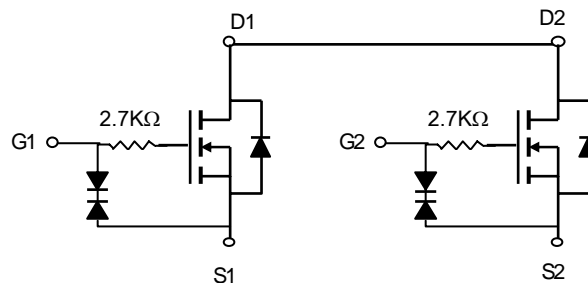
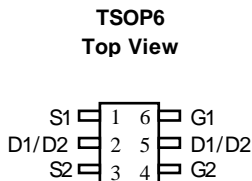
Dual N-Channel Enhancement Mode Field Effect Transistor

General Description

The AO6806 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications. AO6806 is Pb-free (meets ROHS & Sony 259 specifications).

Features

$V_{DS} = 20V$
 $I_D = 5.0A$ ($V_{GS} = 4.5V$)
 $R_{DS(ON)} < 33m\Omega$ ($V_{GS} = 4.5V$)
 $R_{DS(ON)} < 34m\Omega$ ($V_{GS} = 4.0V$)
 $R_{DS(ON)} < 36m\Omega$ ($V_{GS} = 3.1V$)
 $R_{DS(ON)} < 40m\Omega$ ($V_{GS} = 2.5V$)



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

Parameter	Symbol	10 Sec	Steady State	Units	
Drain-Source Voltage	V_{DS}	20		V	
Gate-Source Voltage	V_{GS}	± 12		V	
Continuous Drain Current ^A	I_D	$T_A=25^\circ C$	5	3.8	A
		$T_A=70^\circ C$	3.8	3	
Pulsed Drain Current ^B	I_{DM}	25			
Power Dissipation ^A	P_D	$T_A=25^\circ C$	1.3	0.8	W
		$T_A=70^\circ C$	0.8	0.5	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150		$^\circ C$	

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	76	95	$^\circ C/W$
Maximum Junction-to-Ambient ^A				
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	54	68	$^\circ C/W$

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} = ±10V			±10	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	0.5	0.7	1	V
I _{D(ON)}	On state drain current	V _{GS} = 4.5V, V _{DS} = 5V	25			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} = 4.5V, I _D = 5.0A T _J = 125°C	21 29	27 37	33 45	mΩ
		V _{GS} = 4.0V, I _D = 4.5A	22	28	34	
		V _{GS} = 3.1V, I _D = 4.5A	24	30	36	
		V _{GS} = 2.5V, I _D = 4.0A	26	33	40	
g _{FS}	Forward Transconductance	V _{DS} = 5V, I _D = 5.0A		18		S
V _{SD}	Diode Forward Voltage	I _S = 1A, V _{GS} = 0V		0.65	1	V
I _S	Maximum Body-Diode Continuous Current				1.3	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, f=1MHz		180	225	pF
C _{oss}	Output Capacitance			95		pF
C _{rss}	Reverse Transfer Capacitance			18		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		2.7	4	kΩ
SWITCHING PARAMETERS						
Q _g (4.5V)	Total Gate Charge	V _{GS} = 4.5V, V _{DS} = 10V, I _D = 5A		5.6	7.5	nC
Q _{gs}	Gate Source Charge			0.85		nC
Q _{gd}	Gate Drain Charge			1.7		nC
t _{D(on)}	Turn-On Delay Time	V _{GS} =10V, V _{DS} =10V, R _L =2.0Ω, R _{GEN} =3Ω		172		ns
t _r	Turn-On Rise Time			368		ns
t _{D(off)}	Turn-Off Delay Time			2.94		μs
t _f	Turn-Off Fall Time			2.5		μs
t _{rr}	Body Diode Reverse Recovery Time	I _F =5A, dI/dt=100A/μs		32	43	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =5A, dI/dt=100A/μs		3.2		nC

A: The value of R_{θJA} is measured with the device mounted on 1 in² 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_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using < 300 μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

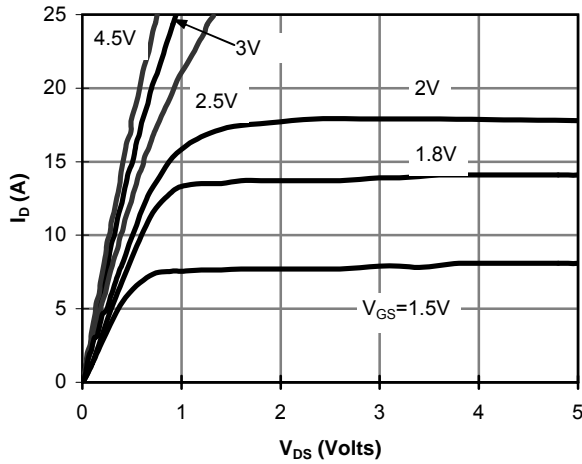


Figure 1: On-Region Characteristics

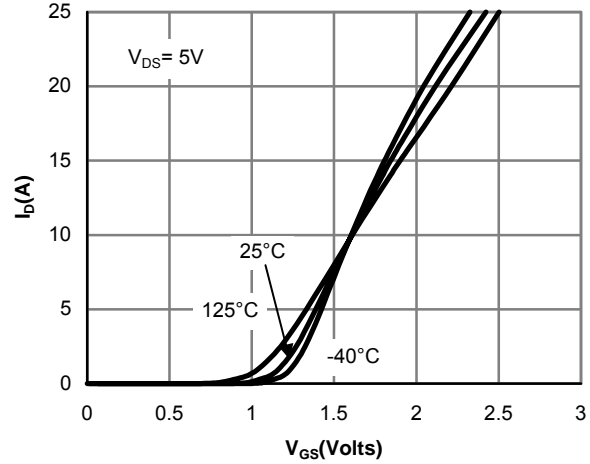


Figure 2: Transfer Characteristics

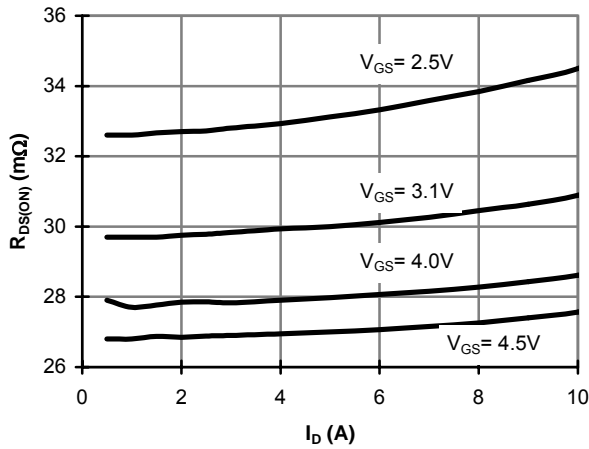


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

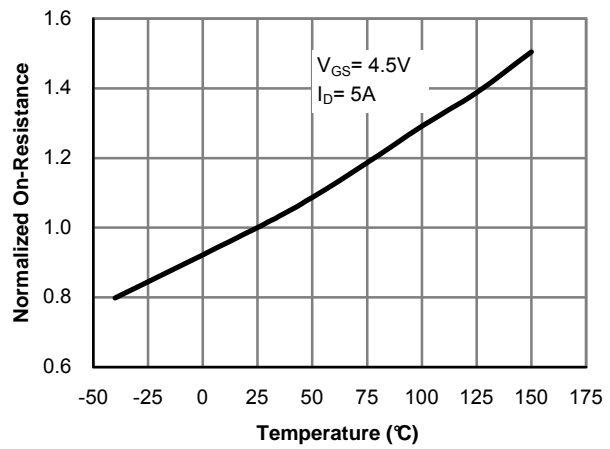


Figure 4: On-Resistance vs. Junction Temperature

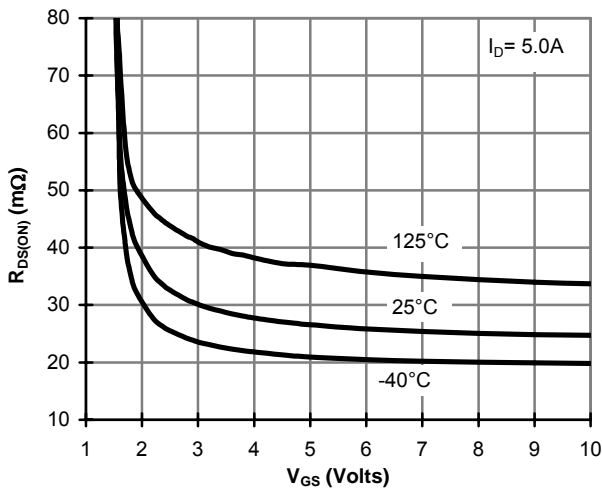


Figure 5: On-Resistance vs. Gate-Source Voltage

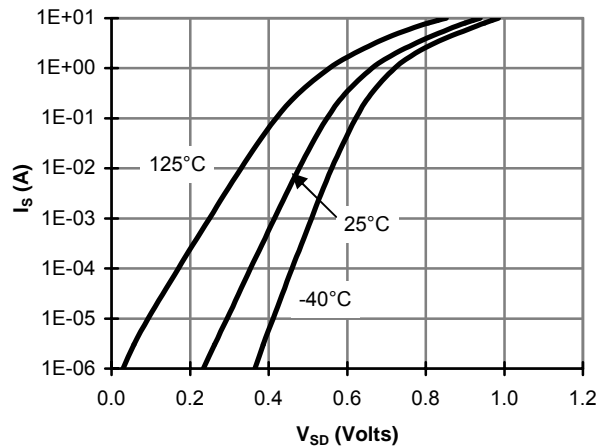


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

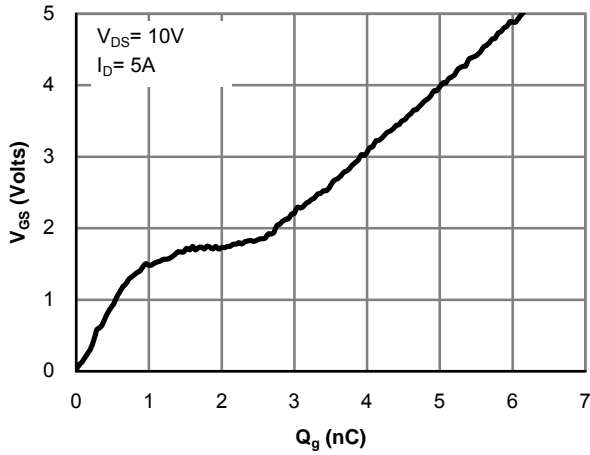


Figure 7: Gate-Charge Characteristics

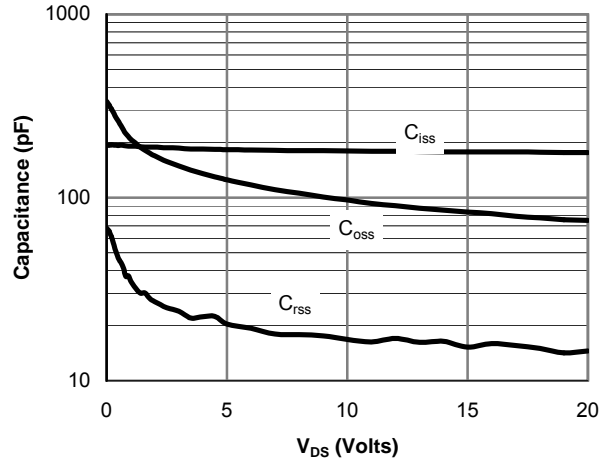


Figure 8: Capacitance Characteristics

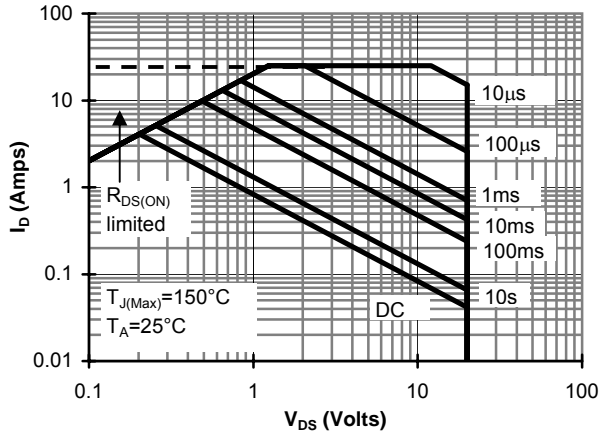


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

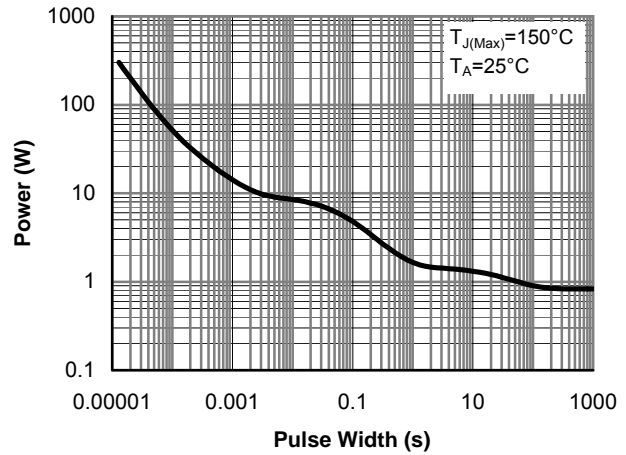


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

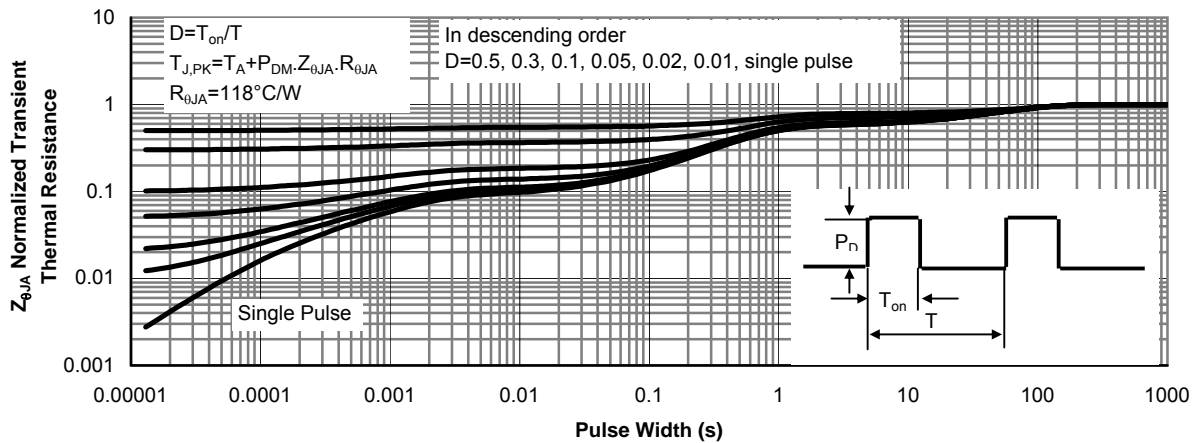


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)