ALPHA & OMEGA SEMICONDUCTOR

AO5800E
Dual N-Channel Enhancement Mode Field Effect Transistor

General Description

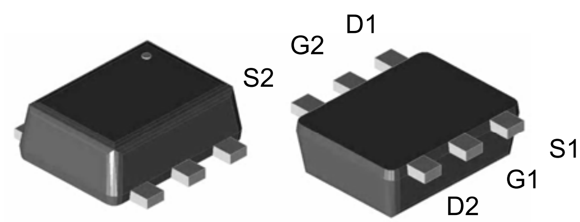
The AO5800E uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge, and operation with gate voltages as low as 4.5V, in the small SC89-6L footprint. It can be used for a wide variety of applications, including load switching, low current inverters and low current DC-DC converters. RoHS compliant

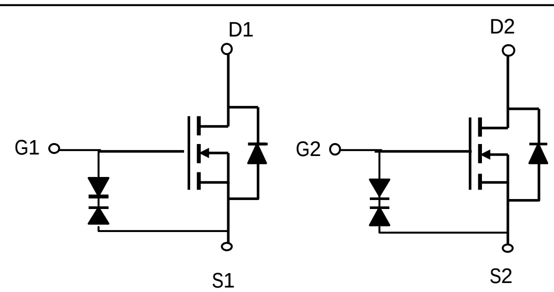
Features

V_{DS} (V) = 60V
I_D = 0.4A (V_{GS} = 10V)
$R_{DS(ON)}$ < 1.6Ω (V_{GS} = 10V)
$R_{DS(ON)}$ < 1.9Ω (V_{GS} = 4.5V)

ESD PROTECTED!

SC-89-6





Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [A, F]	T_A=25°C	I_D	0.4	A
	T_A=70°C		0.3	
Pulsed Drain Current [B]		I_{DM}	1.6	
Power Dissipation [A]	T_A=25°C	P_D	0.4	W
	T_A=70°C		0.24	
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	$R_{\theta JA}$	275	330	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		360	450	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	300	350	°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	60			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=48V, V_{GS}=0V			1	µA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=±10V			±1	µA
		V_{DS}=0V, V_{GS}=±4.5V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250µA	1	1.6	2.5	V
$I_{D(ON)}$	On state drain current	V_{GS}=10V, V_{DS}=5V	1.6			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=0.4A		1.3	1.6	Ω
		T_J=125°C		2.45	3	
		V_{GS}=4.5V, I_D=0.3A		1.5	1.9	Ω
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=0.4A		0.5		S
V_{SD}	Diode Forward Voltage	I_S=0.1A,V_{GS}=0V		0.8	1	V
I_S	Maximum Body-Diode Continuous Current				0.4	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, f=1MHz		41	50	pF
C_{oss}	Output Capacitance			9		pF
C_{rss}	Reverse Transfer Capacitance			6		pF
SWITCHING PARAMETERS						
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=30V, R_L=75Ω, R_{GEN}=3Ω		39.2		ns
t_r	Turn-On Rise Time			35.7		ns
$t_{D(off)}$	Turn-Off DelayTime			261		ns
t_f	Turn-Off Fall Time			79		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=0.4A, dI/dt=100A/µs, V_{GS}=-9V		11.3	14	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=0.4A, dI/dt=100A/µs, V_{GS}=-9V		7.5		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. The value in any given application depends on the user's specific board design.
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 <300 µs 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.
F. The current rating is based on the t ≤ 10s thermal resistance rating.
Rev 0: Aug 2007

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

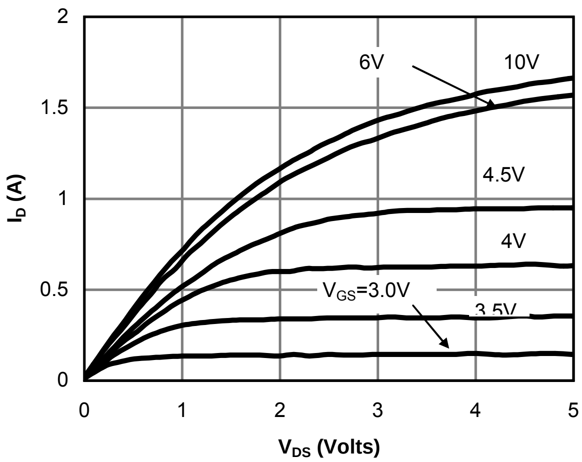


Figure 1: On-Region Characteristics

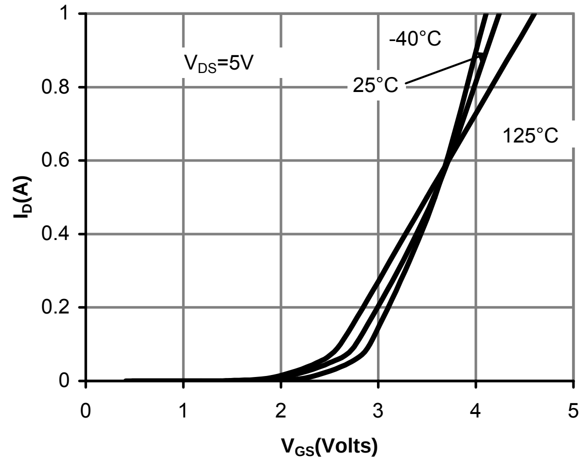


Figure 2: Transfer Characteristics

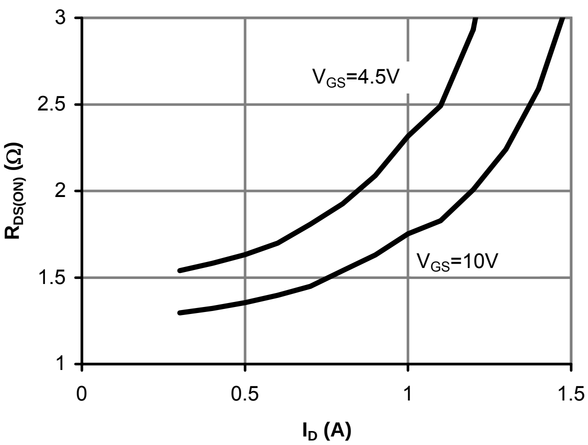


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

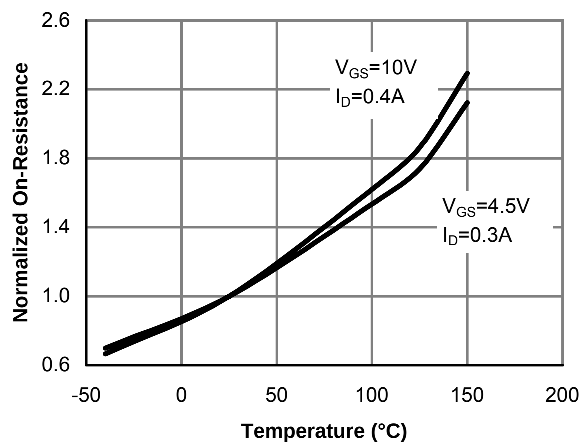


Figure 4: On-Resistance vs. Junction Temperature

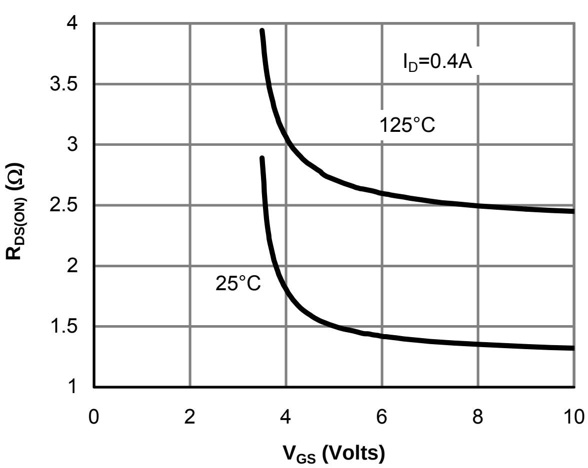


Figure 5: On-Resistance vs. Gate-Source Voltage

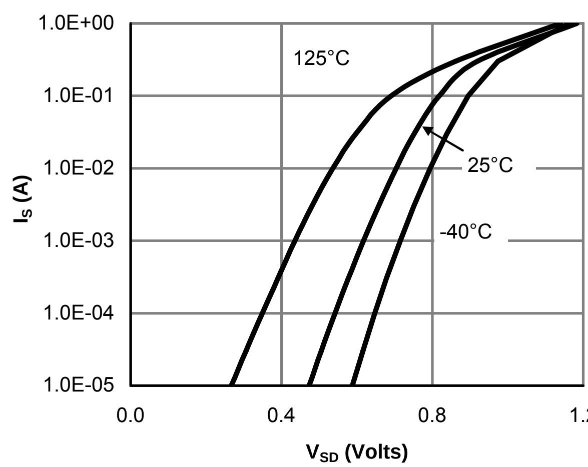


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

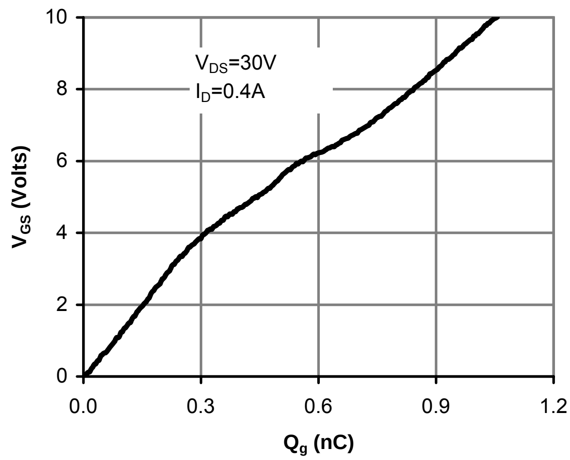


Figure 7: Gate-Charge Characteristics

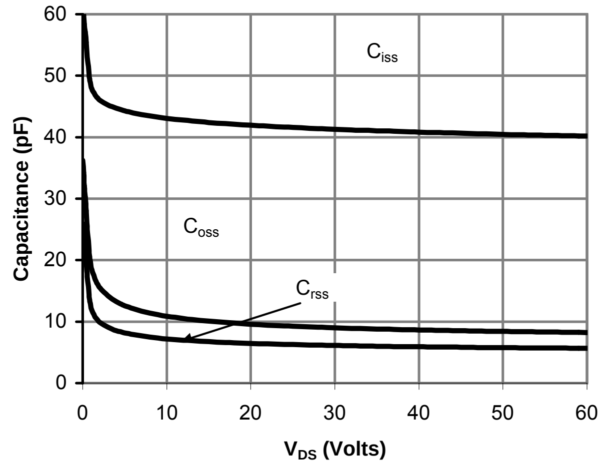


Figure 8: Capacitance Characteristics

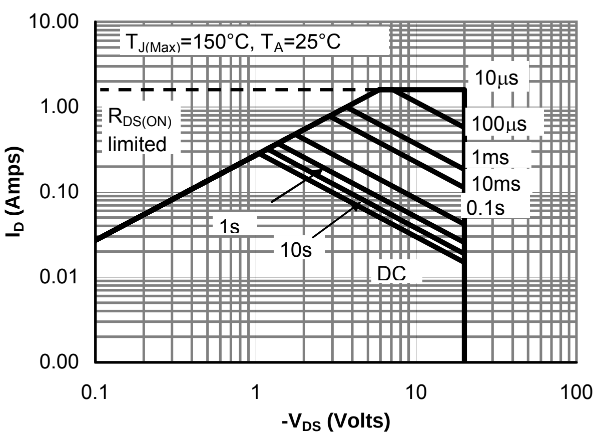


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

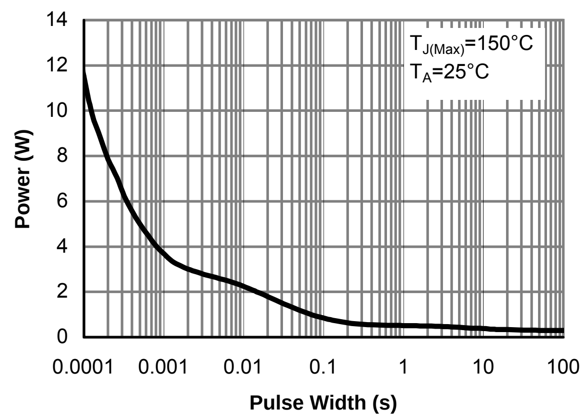


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

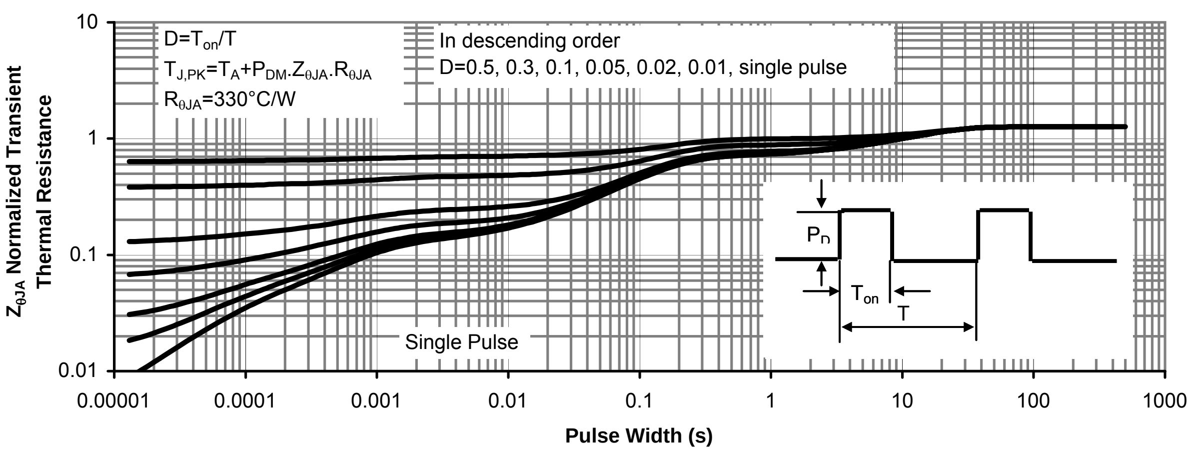


Figure 11: Normalized Maximum Transient Thermal Impedance