

Dual P-Channel Enhancement Mode Field Effect Transistor

General Description

The AON2801 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 use as a load switch or in PWM applications.

RoHS and Halogen-Free Compliant

Features

V_{DS} (V) = -20V

I_D = -3A (V_{GS} = -4.5V)

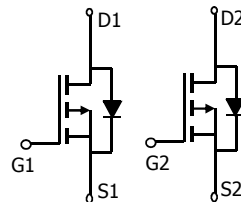
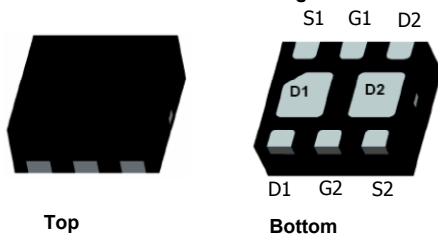
$R_{DS(ON)} < 120m\Omega$ (V_{GS} = -4.5V)

$R_{DS(ON)} < 160m\Omega$ (V_{GS} = -2.5V)

$R_{DS(ON)} < 200m\Omega$ (V_{GS} = -1.8V)



DFN 2x2 Package



Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current ^A	$T_A = 25^\circ\text{C}$	-3	A
	$T_A = 70^\circ\text{C}$	-2.3	
Pulsed Drain Current ^C	I_{DM}	-15	
Power Dissipation ^A	$T_A = 25^\circ\text{C}$	1.5	W
	$T_A = 70^\circ\text{C}$	0.95	
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 ^A	$R_{\theta JA}$	35	45	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A		65	85	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^B	$R_{\theta JA}$	120	155	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^B		175	235	$^\circ\text{C/W}$

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} =±8V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =-250μA	-0.3	-0.55	-1	V
I _{D(ON)}	On state drain current	V _{GS} =-4.5V, V _{DS} =-5V	-15			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-4.5V, I _D =-3A T _J =125°C		100 135	120 170	mΩ
		V _{GS} =-2.5V, I _D =-2.6A		128	160	mΩ
		V _{GS} =-1.8V, I _D =-1.5A		160	200	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-3A		6		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.76		V
I _S	Maximum Body-Diode Continuous Current				-1	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-10V, f=1MHz		540	700	pF
C _{oss}	Output Capacitance			90		pF
C _{rss}	Reverse Transfer Capacitance			63		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		9.5		Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-10V, I _D =-3A		5	6.5	nC
Q _{gs}	Gate Source Charge			1.2		nC
Q _{gd}	Gate Drain Charge			1		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-4.5V, V _{DS} =-10V, R _L =1.5Ω, R _{GEN} =3Ω		5		ns
t _r	Turn-On Rise Time			40		ns
t _{D(off)}	Turn-Off DelayTime			28.5		ns
t _f	Turn-Off Fall Time			46		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-3A, dI/dt=100A/μs		21	28	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-3A, dI/dt=100A/μs		9.1		nC

A: The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The Power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150° C may be used if the PCB allows it to.

B: The value of R_{θJA} is measured with the device mounted on a minimum pad board with 2oz. Copper, in a still air environment with T_A=25° C. The Power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150° C may be used if the PCB allows it to.

C: The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case 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.

*This device is guaranteed green after data code 7111 (Oct 15 2007).

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

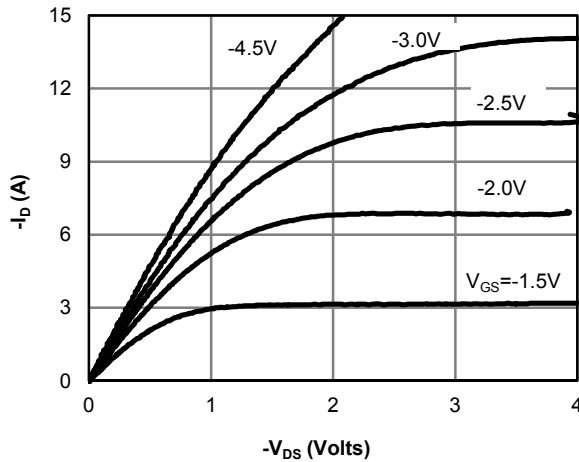


Figure 1: On-Region Characteristics

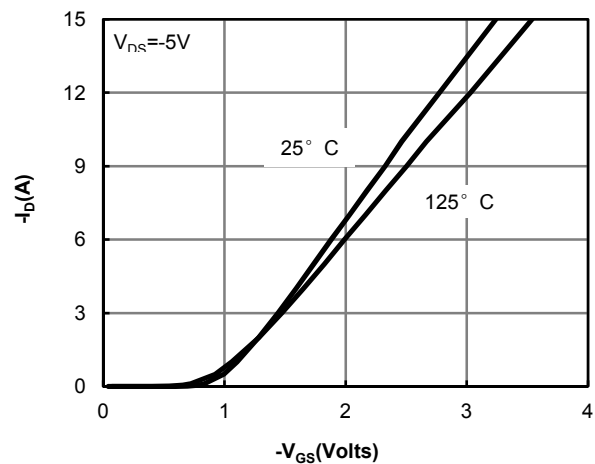


Figure 2: Transfer Characteristics

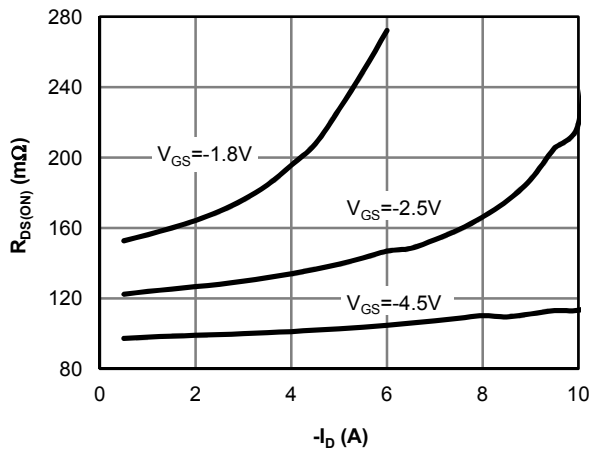


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

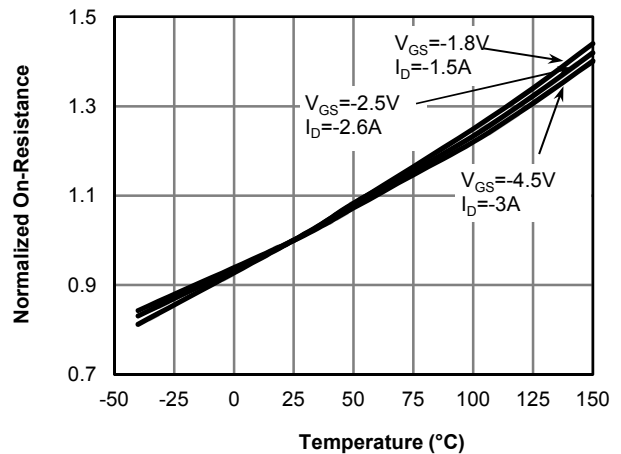


Figure 4: On-Resistance vs. Junction Temperature (Note E)

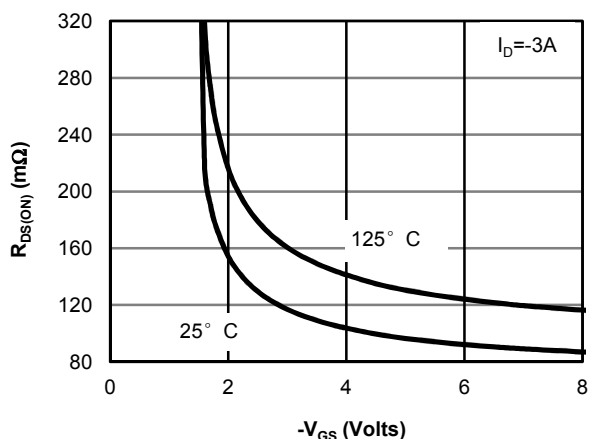


Figure 5: On-Resistance vs. Gate-Source Voltage

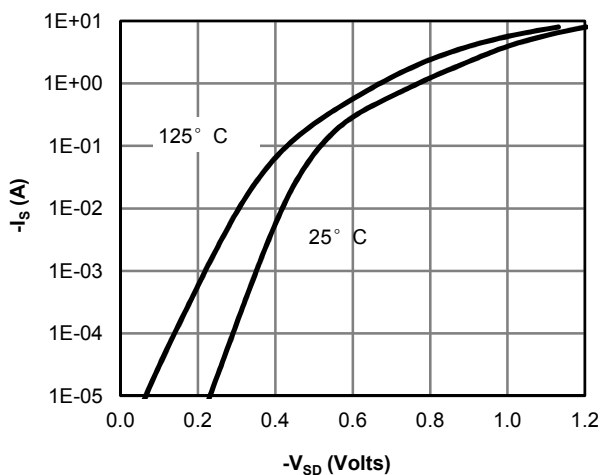


Figure 6: Body-Diode Characteristics



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

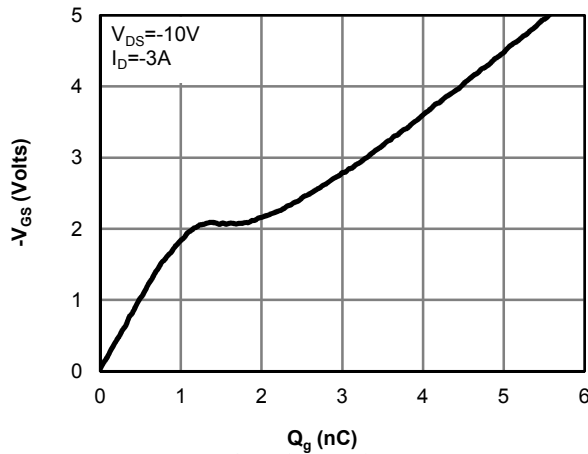


Figure 7: Gate-Charge Characteristics

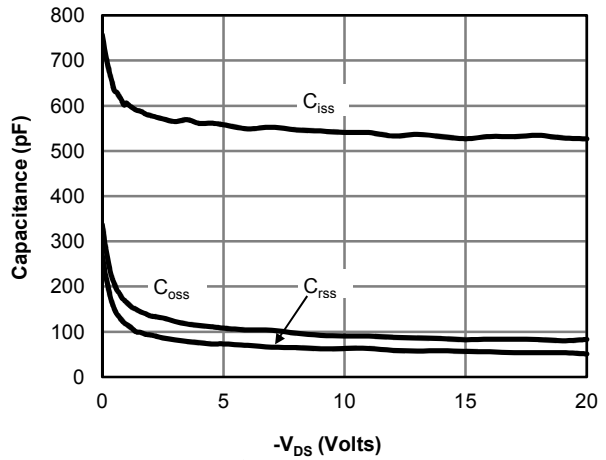


Figure 8: Capacitance Characteristics

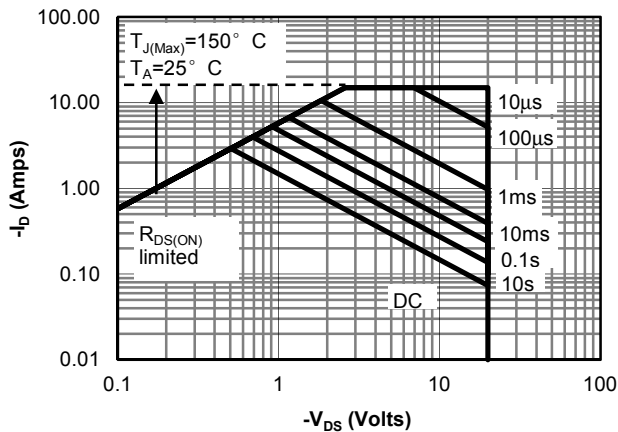


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

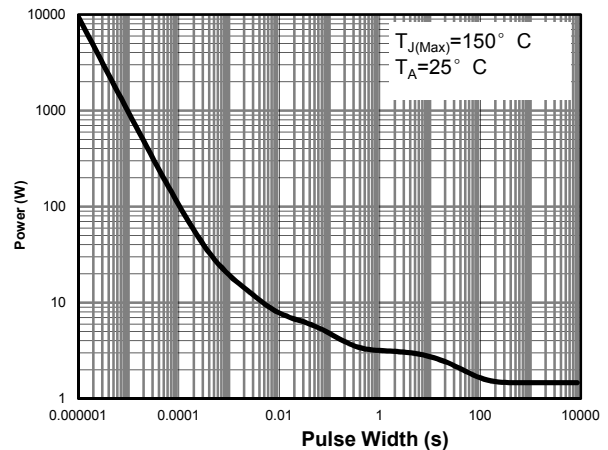


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

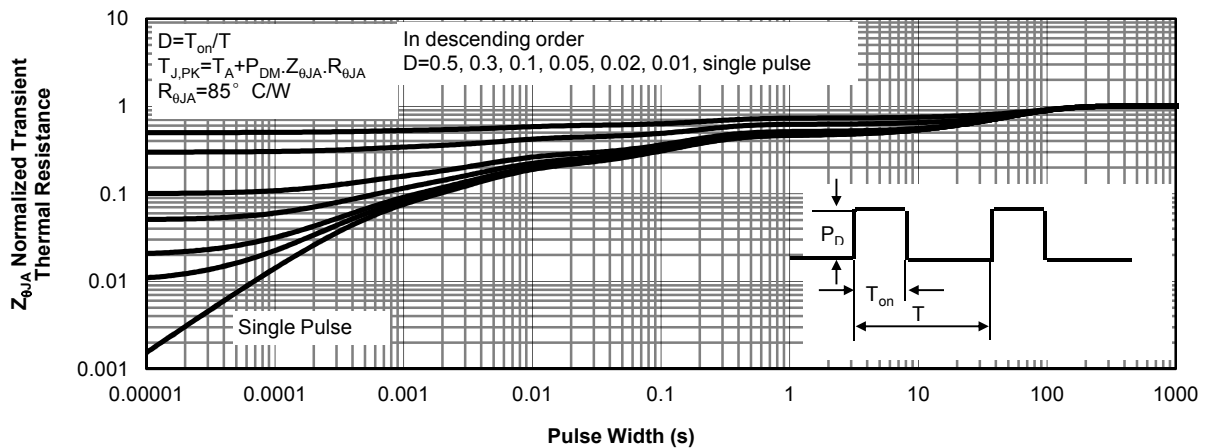
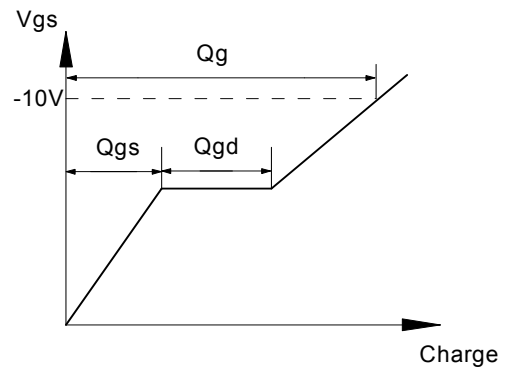
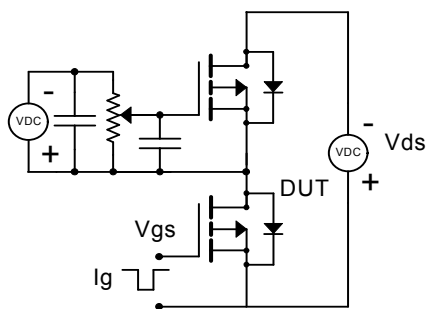
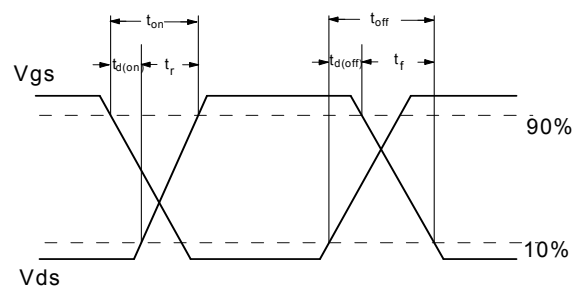
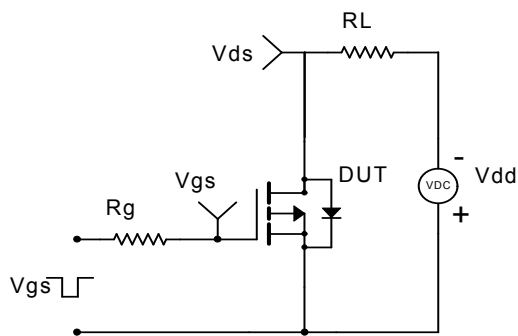


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

