



## AON2801

### Dual P-Channel Enhancement Mode Field Effect Transistor

#### General Description

The AON2801/L 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.

AON2801 and AON2801L are electrically identical.

-RoHS Compliant

-Halogen Free\*

#### Features

$V_{DS}$  (V) = -20V

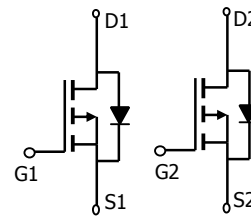
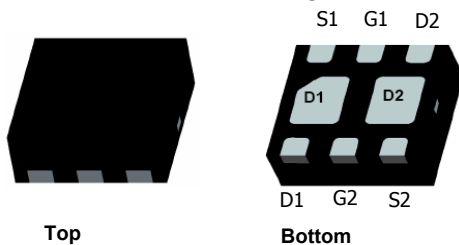
$I_D$  = -3A ( $V_{GS}$  = -4.5V)

$R_{DS(ON)} < 120m\Omega$  ( $V_{GS}$  = -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	$V_{GS}$	$\pm 8$	V
Continuous Drain Current <sup>A</sup>	$I_D$	$T_A=25^\circ C$	-3
		$T_A=70^\circ C$	-2.3
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	-15	A
Power Dissipation <sup>A</sup>	$P_{DSM}$	$T_A=25^\circ C$	1.5
		$T_A=70^\circ C$	0.95
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 <sup>A</sup>	$t \leq 10s$	$R_{\theta JA}$	35	45	$^\circ C/W$
	Steady-State		65	85	$^\circ C/W$
Maximum Junction-to-Ambient <sup>B</sup>	$t \leq 10s$	$R_{\theta JA}$	120	155	$^\circ C/W$
	Steady-State		175	235	$^\circ C/W$

Electrical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=-250\mu\text{A}$ , $V_{GS}=0\text{V}$	-20			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-20\text{V}$ , $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			-1 -5	$\mu\text{A}$
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 8\text{V}$			$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=-250\mu\text{A}$	-0.3	-0.55	-1	V
$I_{D(ON)}$	On state drain current	$V_{GS}=-4.5\text{V}$ , $V_{DS}=-5\text{V}$	-15			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-4.5\text{V}$ , $I_D=-3\text{A}$ $T_J=125^\circ\text{C}$		100 135	120 170	$\text{m}\Omega$
		$V_{GS}=-2.5\text{V}$ , $I_D=-2.6\text{A}$		128	160	$\text{m}\Omega$
		$V_{GS}=-1.8\text{V}$ , $I_D=-1.5\text{A}$		160	200	$\text{m}\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=-5\text{V}$ , $I_D=-3\text{A}$		6		S
$V_{SD}$	Diode Forward Voltage	$I_S=-1\text{A}$ , $V_{GS}=0\text{V}$		-0.76		V
$I_S$	Maximum Body-Diode Continuous Current				-1	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=-10\text{V}$ , $f=1\text{MHz}$		540	700	pF
$C_{oss}$	Output Capacitance			90		pF
$C_{rss}$	Reverse Transfer Capacitance			63		pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$		9.5		$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g$	Total Gate Charge	$V_{GS}=-4.5\text{V}$ , $V_{DS}=-10\text{V}$ , $I_D=-3\text{A}$		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	$V_{GS}=-4.5\text{V}$ , $V_{DS}=-10\text{V}$ , $R_L=1.5\Omega$ , $R_{GEN}=3\Omega$		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	$I_F=-3\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		21	28	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=-3\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		9.1		nC

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

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

C: The  $R_{\theta JA}$  is the sum of the thermal impedance from junction to case  $R_{\theta JC}$  and case to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using  $<300 \mu\text{s}$  pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . 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

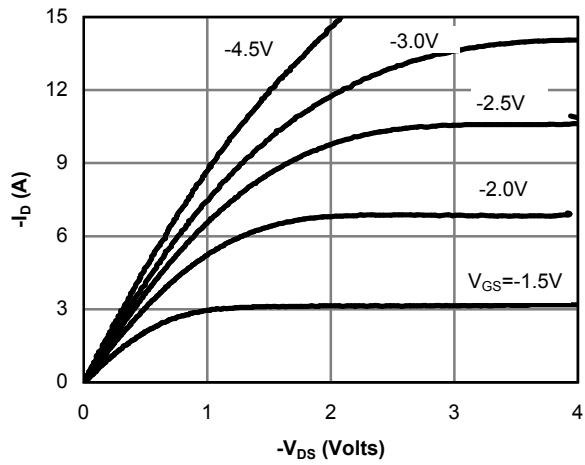


Figure 1: On-Region Characteristics

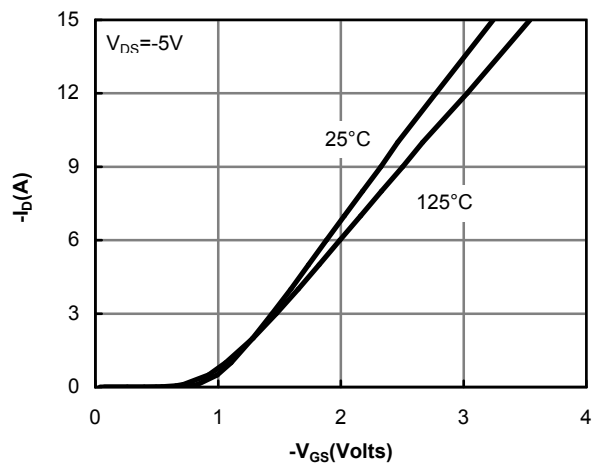


Figure 2: Transfer Characteristics

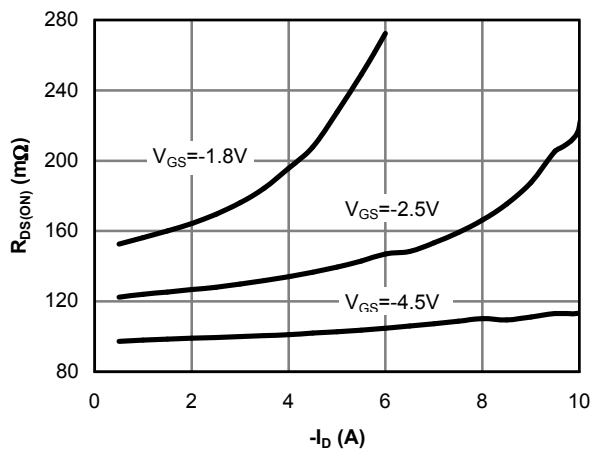


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

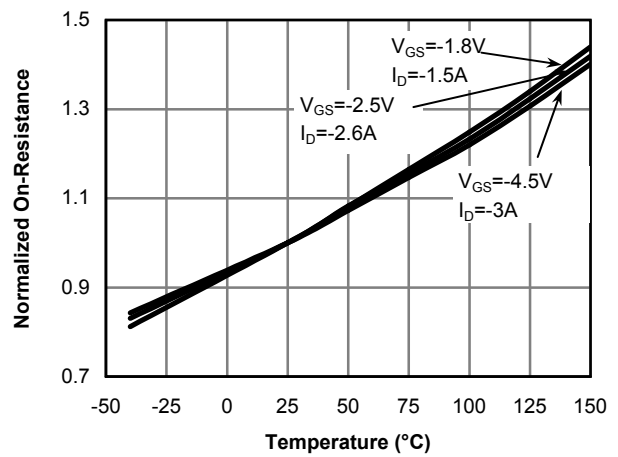


Figure 4: On-Resistance vs. Junction Temperature (Note E)

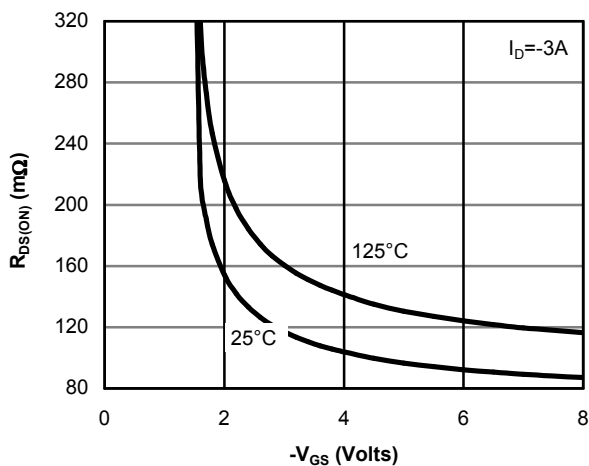


Figure 5: On-Resistance vs. Gate-Source Voltage

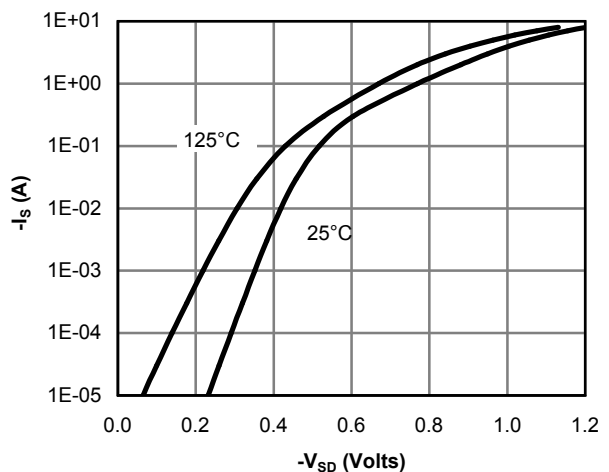


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

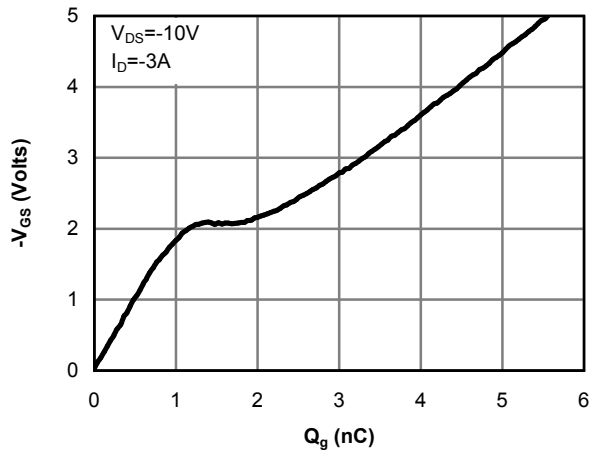


Figure 7: Gate-Charge Characteristics

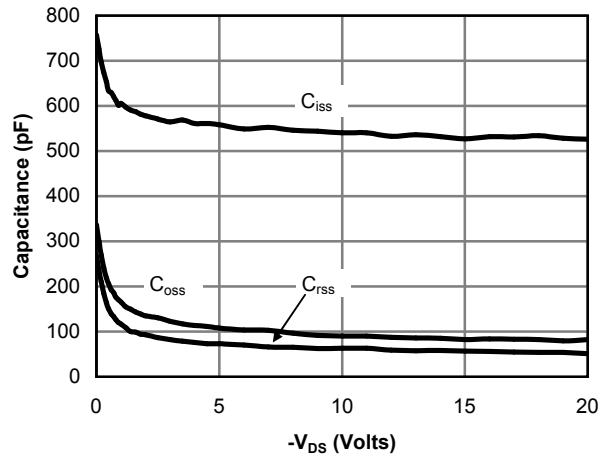


Figure 8: Capacitance Characteristics

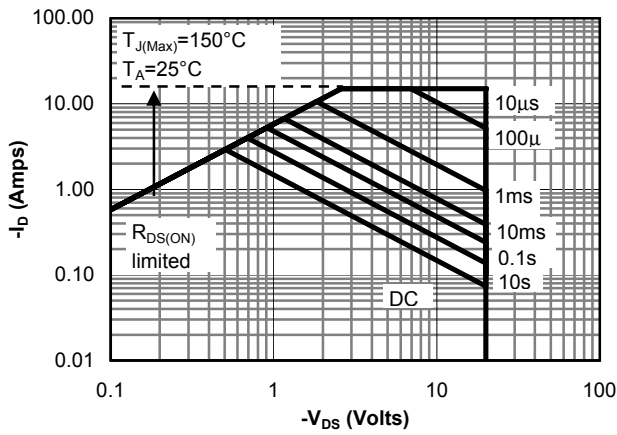


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

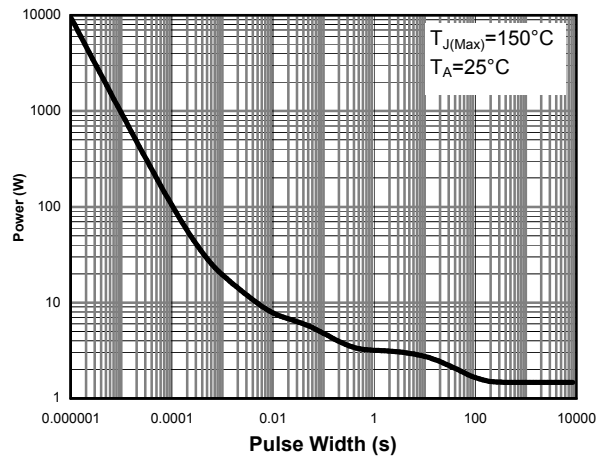


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

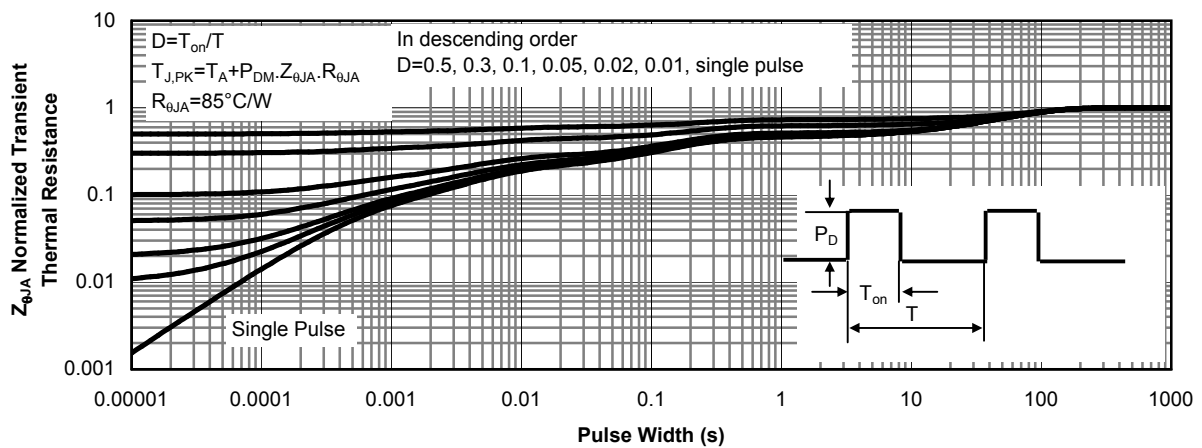
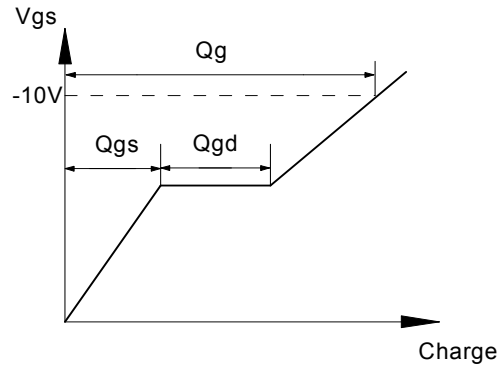
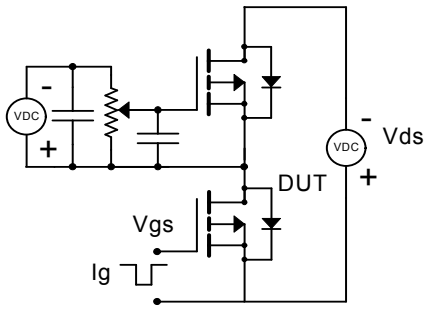
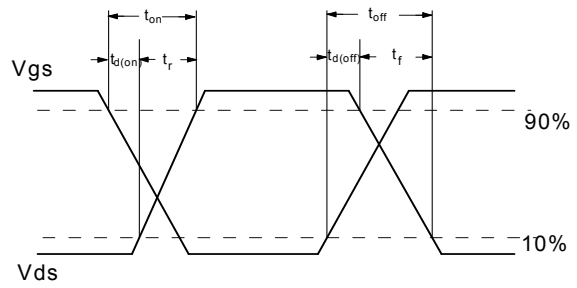
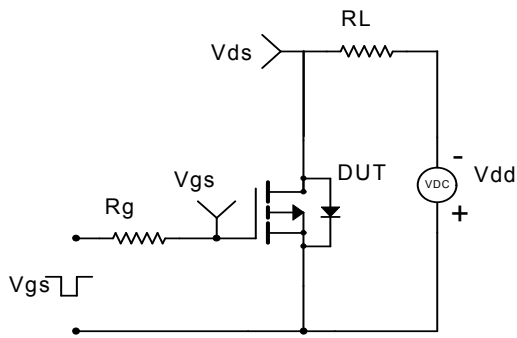


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

