AON7401

30V P-Channel MOSFET

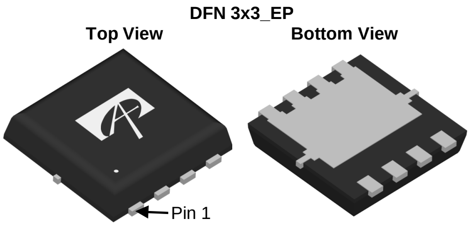
General Description

The AON7401 uses advanced trench technology to provide excellent $R_{DS(ON)}$, and ultra-low low gate charge with a 25V gate rating. This device is suitable for use as a load switch or in PWM applications.

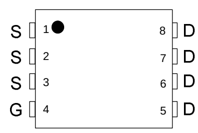
Product Summary

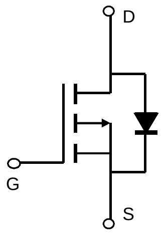
V_{DS}	-30V
I_D (at V_{GS}=-10V)	-35A
$R_{DS(ON)}$ (at V_{GS}=-10V)	< 14mΩ
$R_{DS(ON)}$ (at V_{GS}=-6V)	< 17mΩ

100% UIS Tested
100% R_g Tested



Top View





Absolute Maximum Ratings T_A=25℃ unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±25	V
Continuous Drain Current	T_C=25℃	I_D	-35	A
	T_C=100℃		-23	
Pulsed Drain Current [C]		I_{DM}	-80	
Continuous Drain Current	T_A=25℃	I_{DSM}	-12	A
	T_A=70℃		-9.7	
Power Dissipation [B]	T_C=25℃	P_D	29	W
	T_C=100℃		12	
Power Dissipation [A]	T_A=25℃	P_{DSM}	3.1	W
	T_A=70℃		2	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	30	40	℃/W
Maximum Junction-to-Ambient [A D]	Steady-State		60	75	℃/W
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	3.5	4.2	℃/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	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-30V, V_{GS}=0V			-1	µA
		T_J=55°C			-5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±25V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=-250µA	-1.7	-2.2	-3	V
$I_{D(ON)}$	On state drain current	V_{GS}=-10V, V_{DS}=-5V	-80			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-9A		11	14	mΩ
		T_J=125°C		16	19	
		V_{GS}=-6V, I_D=-7A		12.9	17	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-9A		27		S
V_{SD}	Diode Forward Voltage	I_S=-1A,V_{GS}=0V		-0.7	-1	V
I_S	Maximum Body-Diode Continuous Current				-25	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, f=1MHz		2060	2600	pF
C_{oss}	Output Capacitance			370		pF
C_{rss}	Reverse Transfer Capacitance			295		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		2.4	3.6	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=-10V, V_{DS}=-15V, I_D=-9A		30	39	nC
Q_{gs}	Gate Source Charge			4.6		nC
Q_{gd}	Gate Drain Charge			10		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-10V, V_{DS}=-15V, R_L=1.6Ω, R_{GEN}=3Ω		11		ns
t_r	Turn-On Rise Time			9.4		ns
$t_{D(off)}$	Turn-Off DelayTime			24		ns
t_f	Turn-Off Fall Time			12		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-9A, dI/dt=500A/µs		14	18	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-9A, dI/dt=500A/µs		35		nC

A. The value of RqJA is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with TA =25° C. The Power dissipation PDSM is based on R qJA t ≤ 10s value 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.
B. The power dissipation PD is based on TJ(MAX)=150° C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
C. Repetitive rating, pulse width limited by junction temperature TJ(MAX)=150° C. Ratings are based on low frequency and duty cycles to keep initial TJ =25° C.
D. The RqJA is the sum of the thermal impedence from junction to case RqJC and case to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300ms pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-case thermal impedence which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of TJ(MAX)=150° C. The SOA curve provides a single pulse rating.
G. The maximum current rating is package limited.
H. These tests are performed with the device mounted on 1 in2 FR-4 board with 2oz. Copper, in a still air environment with TA=25° C.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

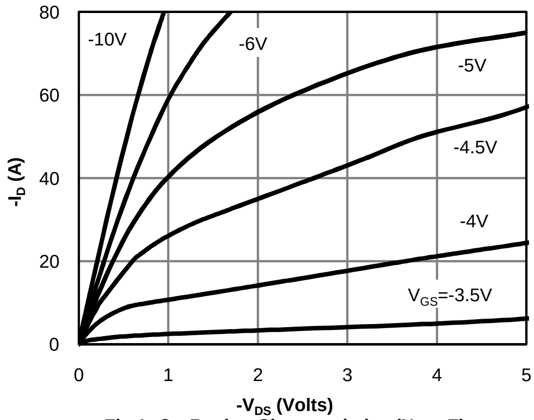


Fig 1: On-Region Characteristics (Note E)

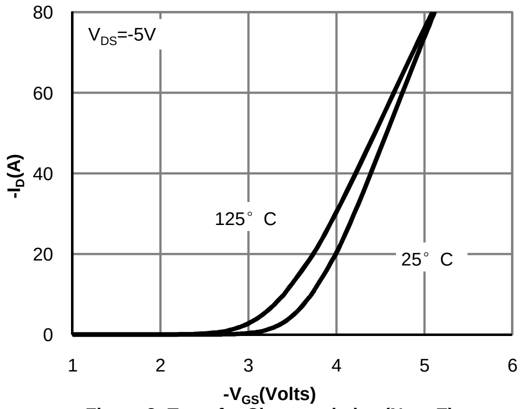


Figure 2: Transfer Characteristics (Note E)

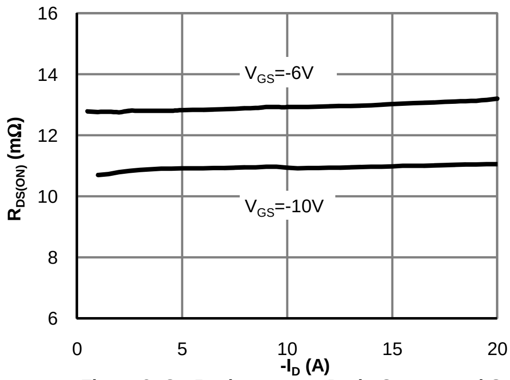


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

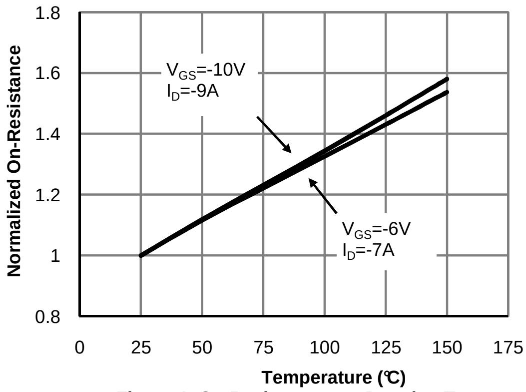


Figure 4: On-Resistance vs. Junction Temperature (Note E)

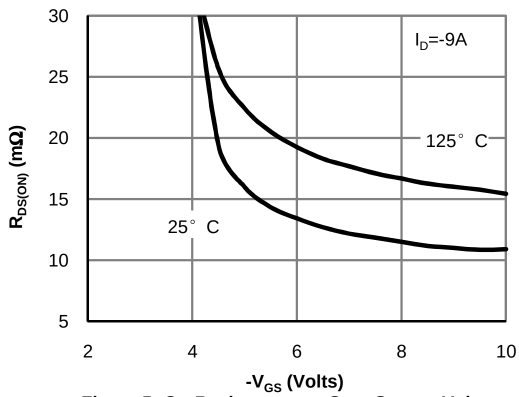


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

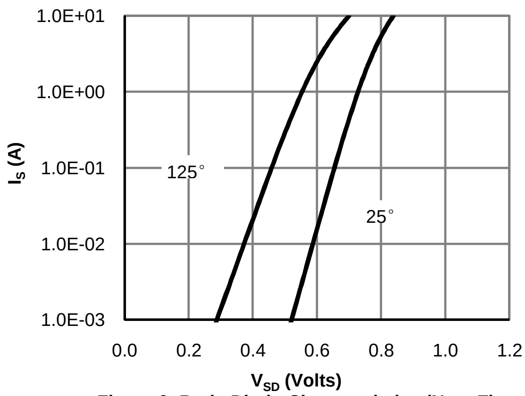


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

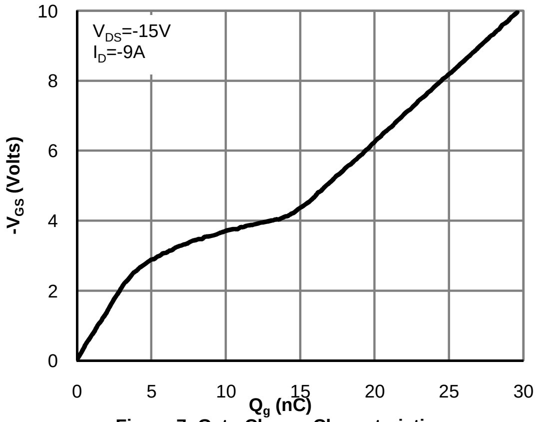


Figure 7: Gate-Charge Characteristics

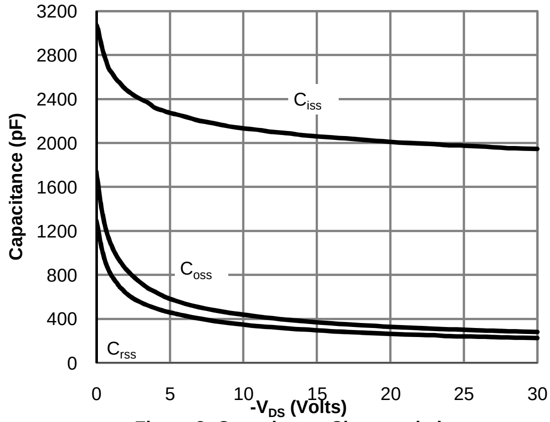


Figure 8: Capacitance Characteristics

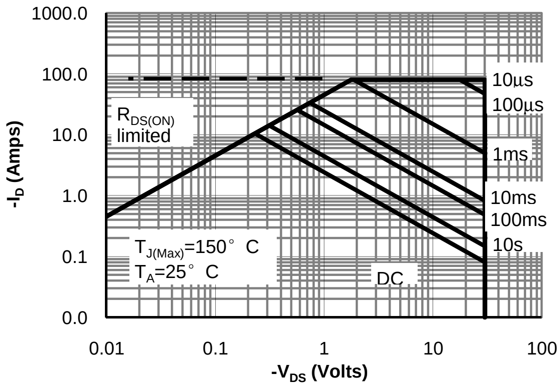


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

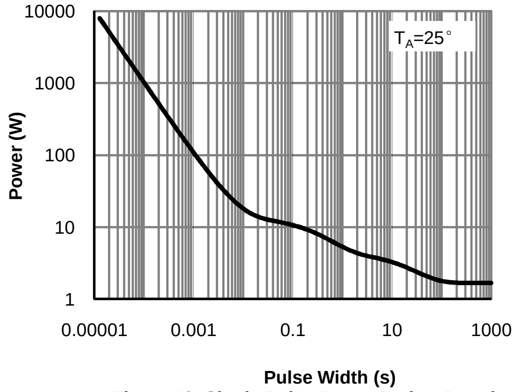


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

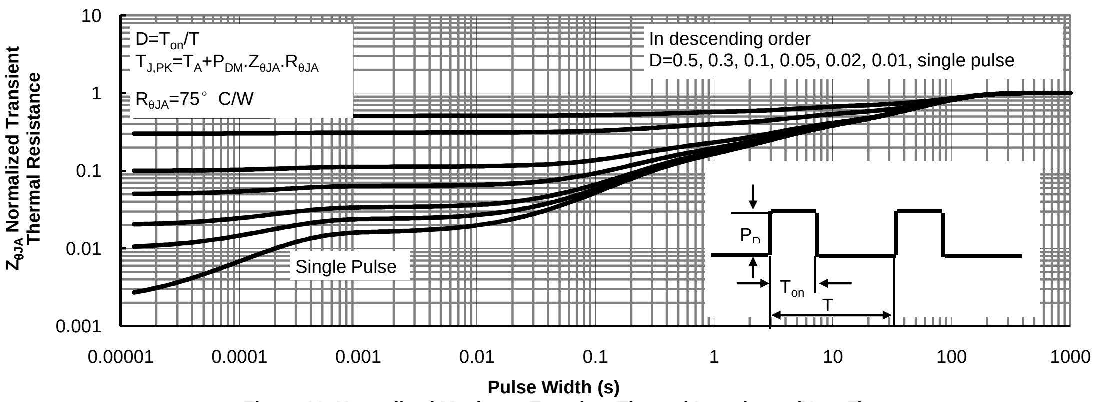
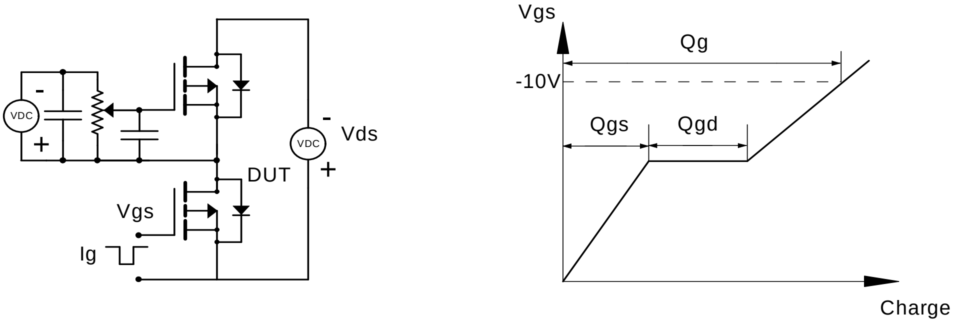
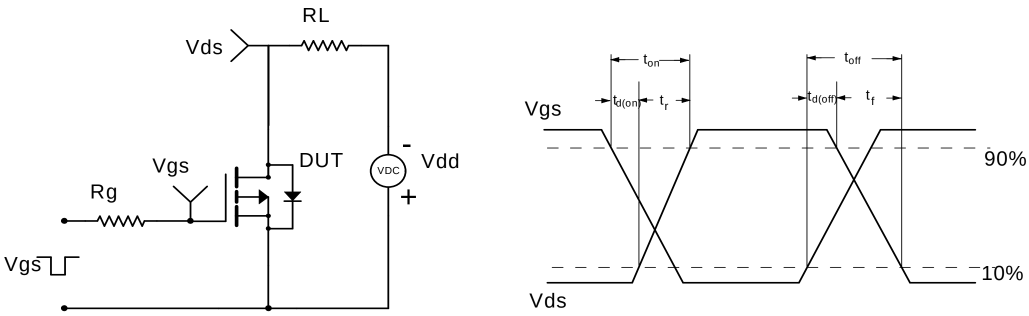


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

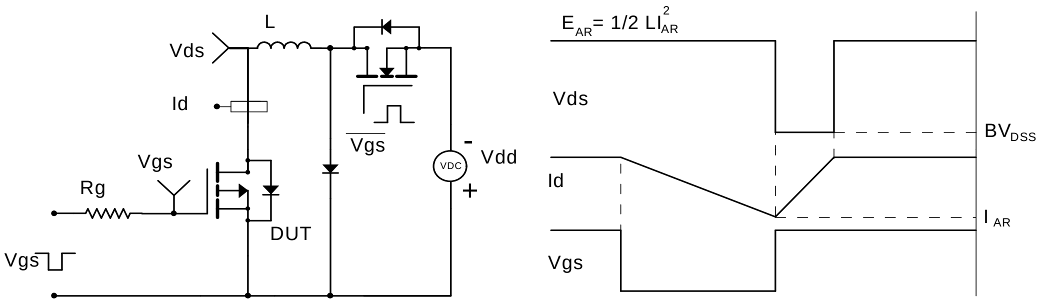
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms