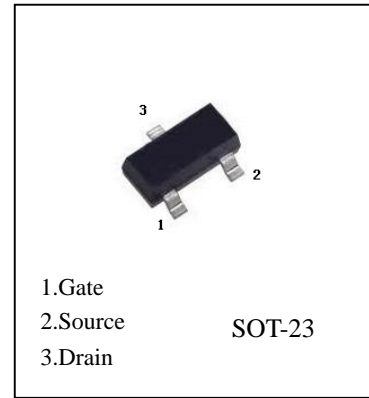
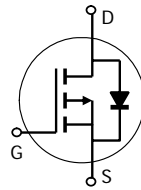


FEATURES

- The AO3401 uses advanced trench technology to provide excellent RDS(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.

**AO3401**

P-Channel MOSFET



Absolute Maximum Ratings (TA=25°C, unless otherwise noted)

Parameter	Symbol	Maximum	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	±12	V
Continuous Drain Current <sup>A</sup>	I	$T_A=25^\circ\text{C}$	-4.2
		$T = 70^\circ\text{C}$	-3.5
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	-30	A
Power Dissipation <sup>A</sup>	$P_D$	$T_A=25^\circ\text{C}$	1.4
		$T_A=70^\circ\text{C}$	1
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit	
Maximum Junction-to-Ambient <sup>A</sup>	$R_{JA}$	t 10s	65	90	°C/W
Maximum Junction-to-Ambient <sup>A</sup>		Steady-State	85	125	°C/W
Maximum Junction-to-Lead <sup>C</sup>	$R_{JL}$	Steady-State	43	60	°C/W

**AO3401**

Electrical Characteristics (TA=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=-250\mu A, V_{GS}=0V$	-30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-24V, V_{GS}=0V$ $T_J=55^\circ C$			-1	$\mu A$
					-5	
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0V, V_{GS}=\pm 12V$			$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.7	-1	-1.3	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	$V_{GS}=-10V, I_D=-4.2A$ $T_J=125^\circ C$		42	50	m
					75	
			$V_{GS}=-4.5V, I_D=-4A$		53	65
	$V_{GS}=-2.5V, I_D=-1A$		80	120	m	
$g_{FS}$	Forward Transconductance	$V_{DS}=-5V, I_D=-5A$	7	11		S
$V_{SD}$	Diode Forward Voltage	$I_S=-1A, V_{GS}=0V$		-0.75	-1	V
$I_S$	Maximum Body-Diode Continuous Current				-2.2	A
$I_{SM}$	Pulsed Body-Diode Current <sup>B</sup>				-30	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V, V_{DS}=-15V, f=1MHz$		954		pF
$C_{oss}$	Output Capacitance			115		pF
$C_{rss}$	Reverse Transfer Capacitance			77		pF
$R_g$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1MHz$		6		
<b>SWITCHING PARAMETERS</b>						
$Q_g$	Total Gate Charge	$V_{GS}=-4.5V, V_{DS}=-15V, I_D=-4A$		9.4		nC
$Q_{gs}$	Gate Source Charge			2		nC
$Q_{gd}$	Gate Drain Charge			3		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=-10V, V_{DS}=-15V, R_L=3.6 \Omega, R_{GEN}=6$		6.3		ns
$t_r$	Turn-On Rise Time			3.2		ns
$t_{D(off)}$	Turn-Off DelayTime			38.2		ns
$t_f$	Turn-Off Fall Time			12		ns
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=-4A, dI/dt=100A/\mu s$		20.2		ns
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=-4A, dI/dt=100A/\mu s$		11.2		nC

A: The value of  $R_{JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with TA=25°C. The value in any a given application depends on the user's specific board design. The current rating is based on the  $t \leq 10s$  thermal resistance rating

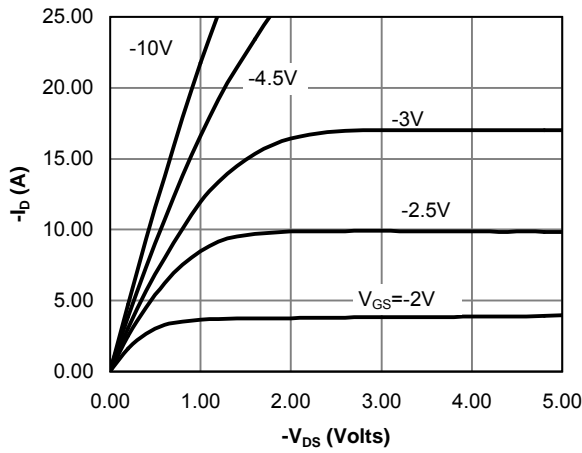
B: Repetitive rating, pulse width limited by junction temperature.

C. The  $R_{JA}$  is the sum of the thermal impedance from junction to lead  $R_{JL}$  and lead to ambient.

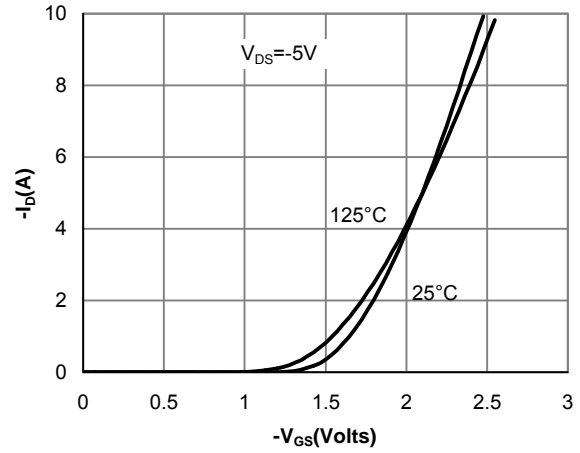
D. The static characteristics in Figures 1 to 6,12,14 are obtained using <300  $\mu s$  pulses, duty cycle 0.5% max.

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 TA=25°C. The SOA curve provides a single pulse rating

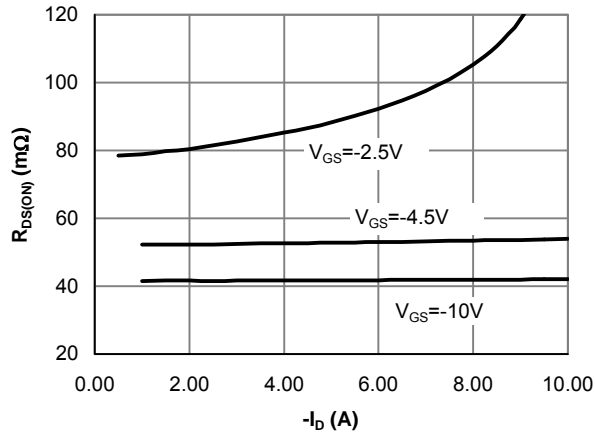
**AO3401** Typical Characteristics



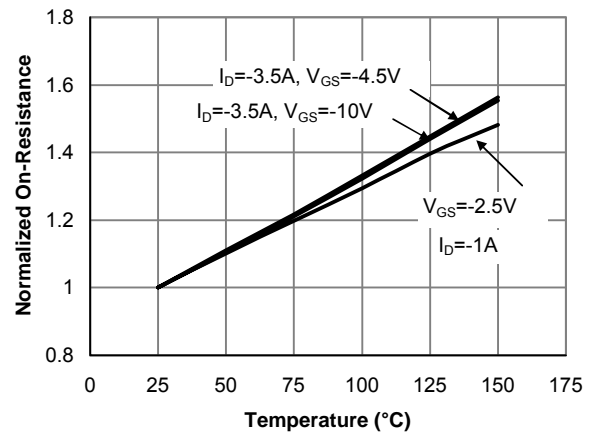
**Fig 1: On-Region Characteristics**



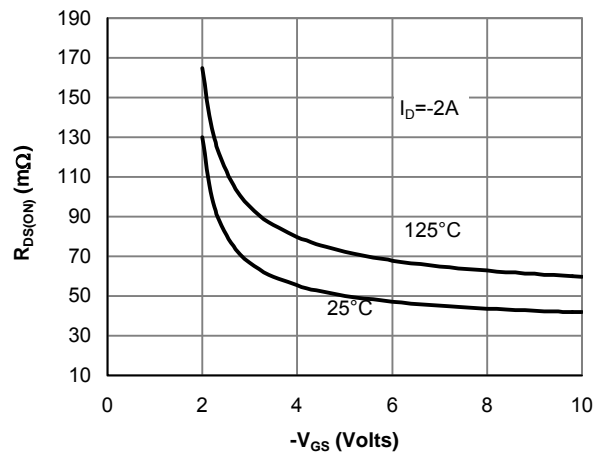
**Figure 2: Transfer Characteristics**



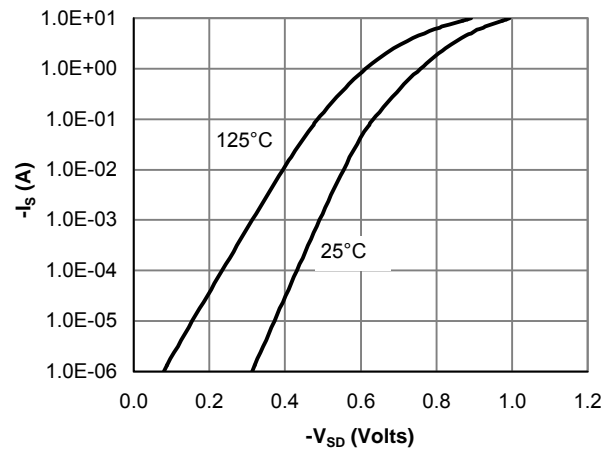
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**



**Figure 4: On-Resistance vs. Junction Temperature**



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



**Figure 6: Body-Diode Characteristics**

**AO3401** Typical Characteristics

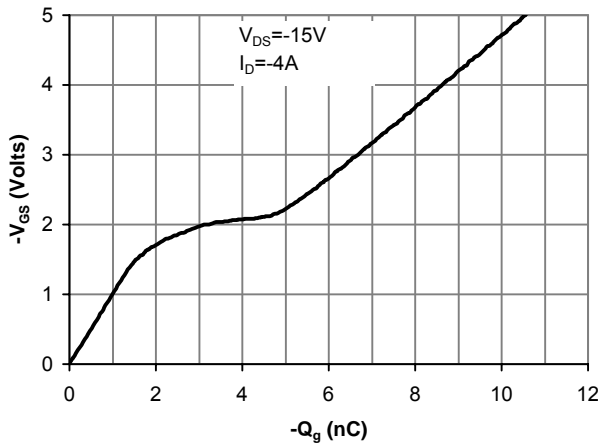


Figure 7: Gate-Charge Characteristics

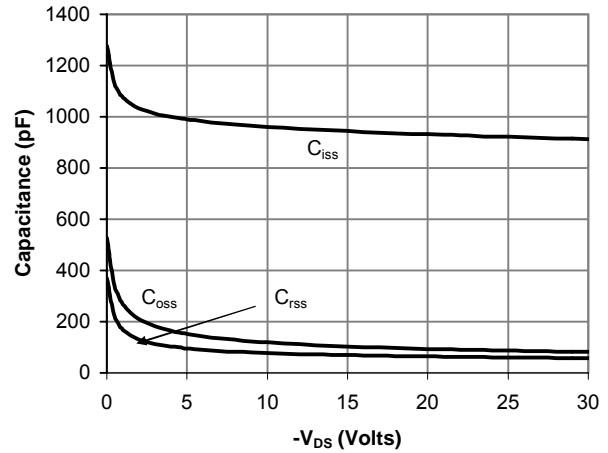


Figure 8: Capacitance Characteristics

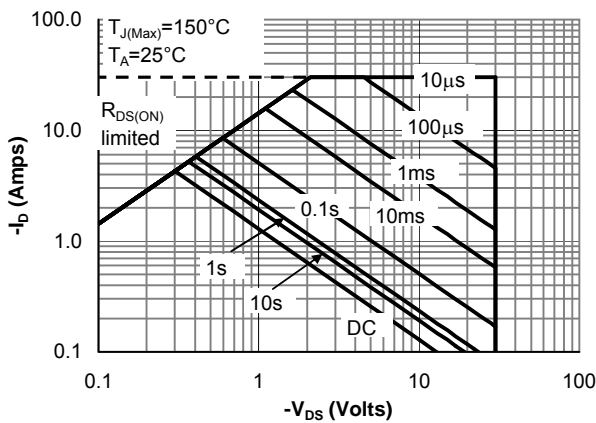


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

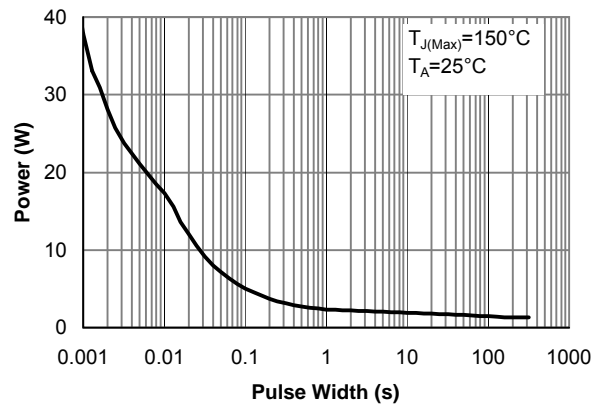


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

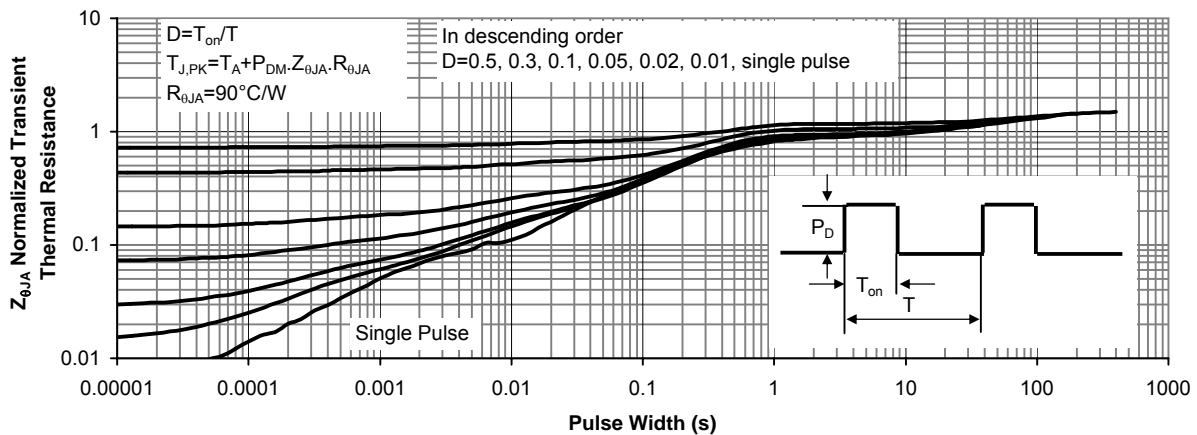


Figure 11: Normalized Maximum Transient Thermal Impedance