

## DESCRIPTION

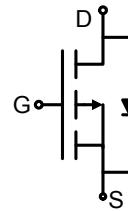
The AO3401 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications.

## GENERAL FEATURES

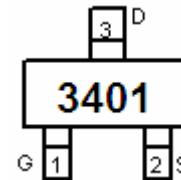
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

### Application

- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin Assignment



SOT-23

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous	$I_D$	-4.2	A
Drain Current-Pulsed (Note 1)	$I_{DM}$	-30	A
Maximum Power Dissipation	$P_D$	1.2	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C

## Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	104	°C/W
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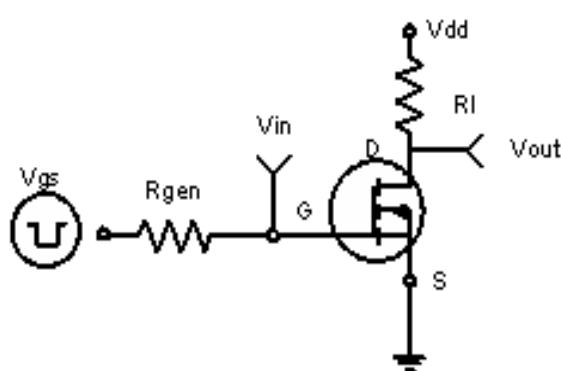
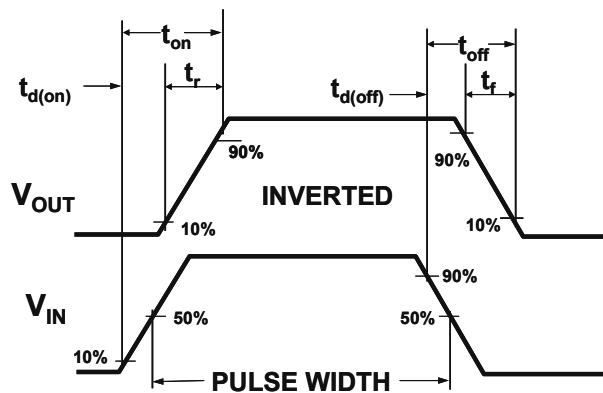
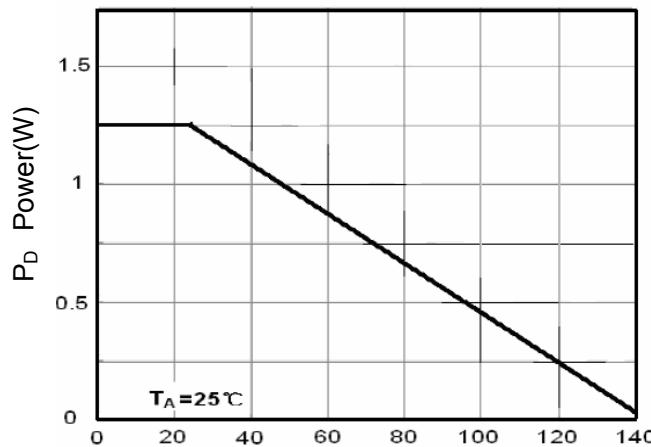
## Electrical Characteristics (TA=25°C unless otherwise noted)

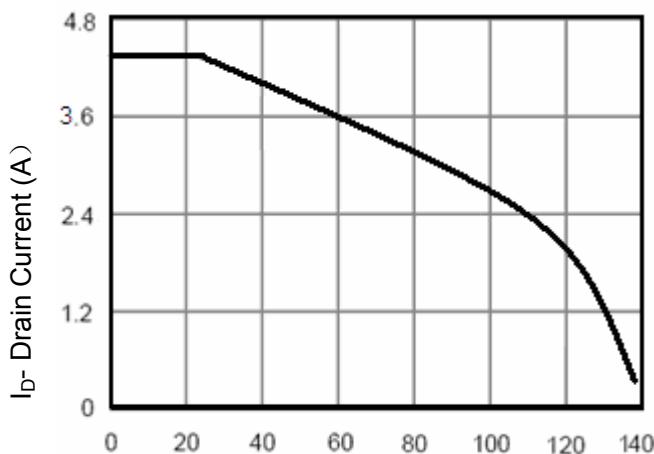
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V I_D=-250\mu A$	-30		-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-24V, V_{GS}=0V$	-	-	-1	$\mu A$

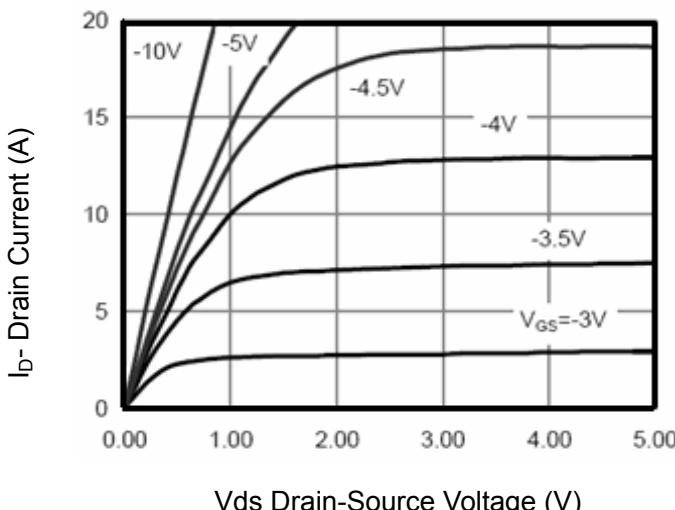
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.7	-1	-1.3	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-4.2A	-	50	55	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A	-	64	72	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-1A		95	120	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-4.2A	-	10	-	S
<b>Dynamic Characteristics (Note 4)</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, F=1.0MHz	-	950	-	PF
Output Capacitance	C <sub>oss</sub>		-	115	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	75	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-15V, I <sub>D</sub> =-3.2A V <sub>GS</sub> =-10V, R <sub>GEN</sub> =6Ω	-	7	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	3	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	30	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	12	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-4A, V <sub>GS</sub> =-4.5V	-	9.5	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	2	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	3	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A	-	-	-1.2	V

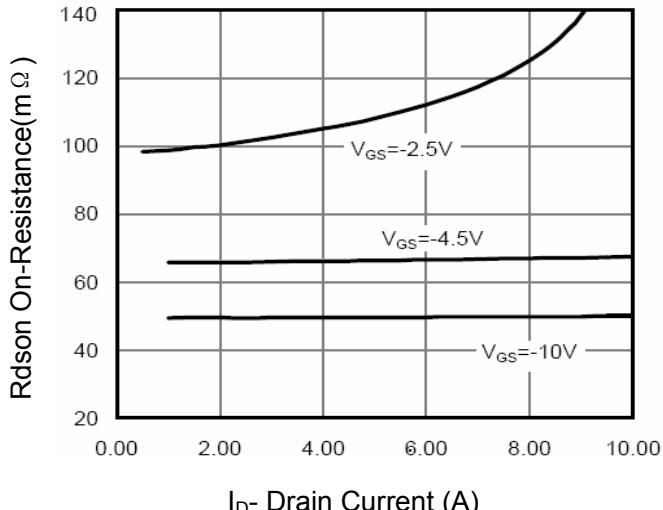
**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

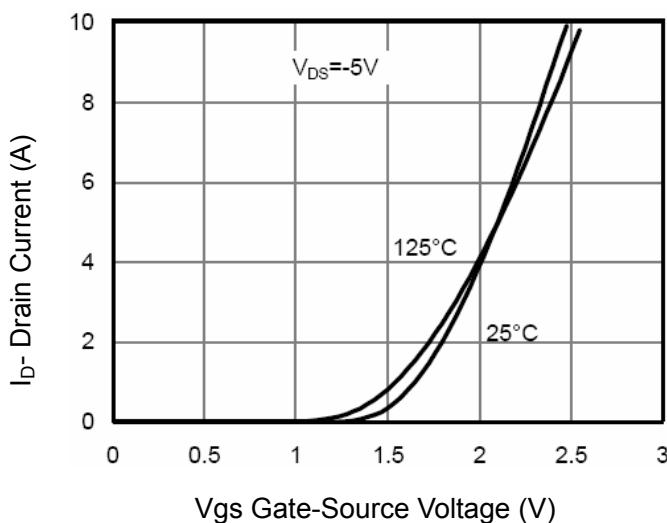
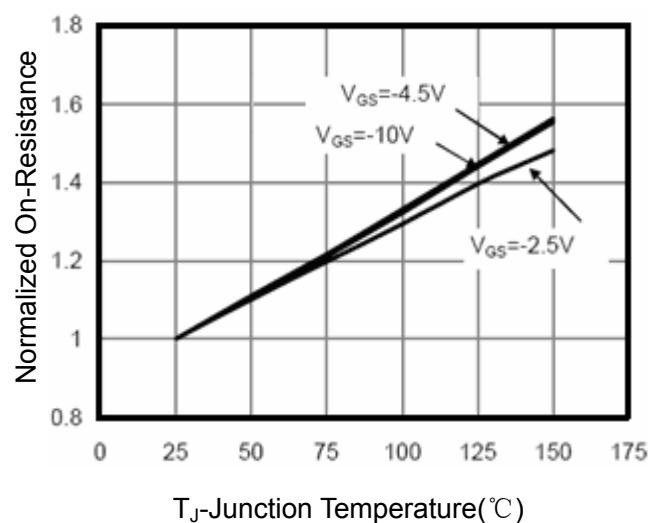
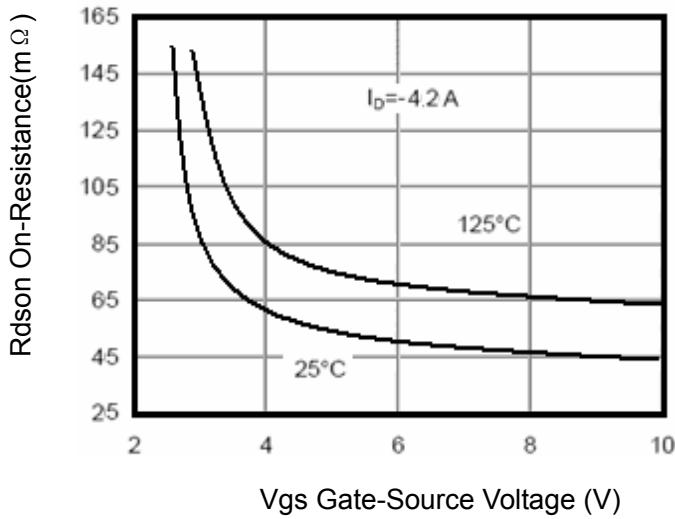
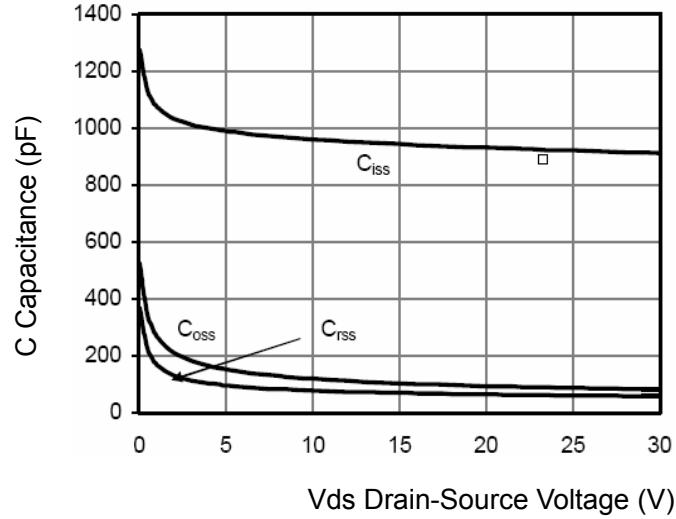
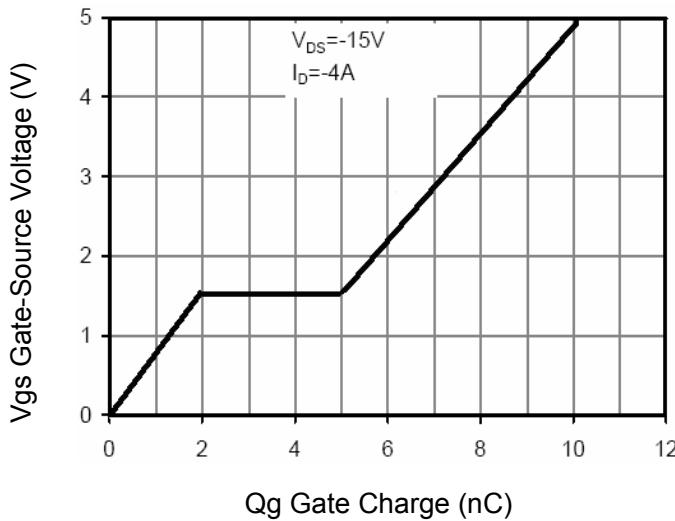
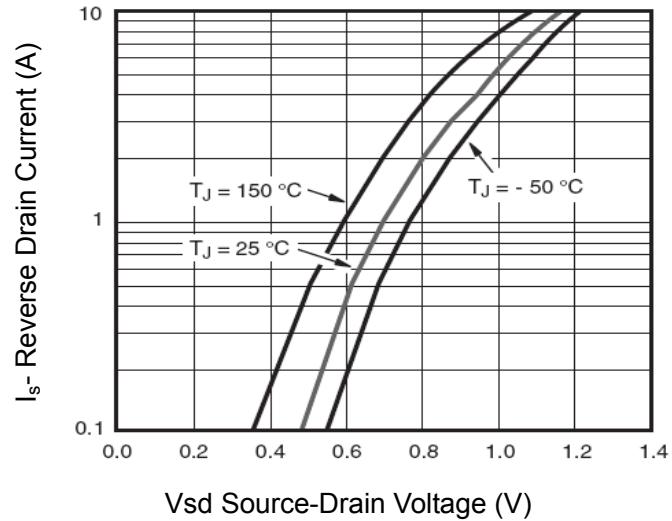
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

**Figure 1:Switching Test Circuit**

**Figure 2:Switching Waveforms**

T<sub>J</sub>-Junction Temperature(°C)

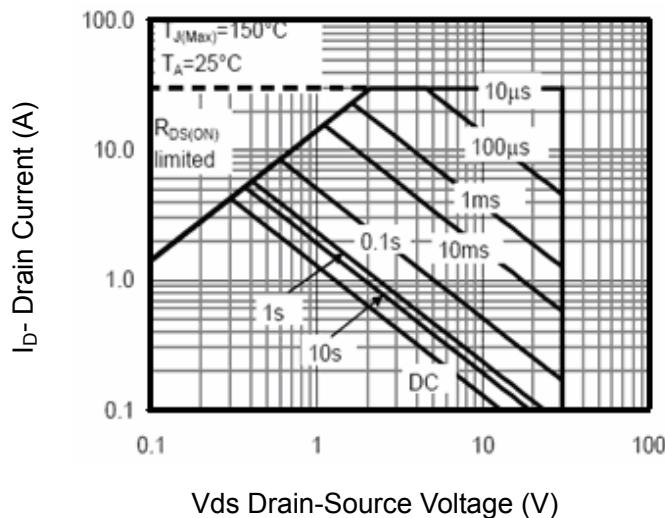
**Figure 3 Power Dissipation**

T<sub>J</sub>-Junction Temperature(°C)

**Figure 4 Drain Current**

V<sub>ds</sub>- Drain-Source Voltage (V)

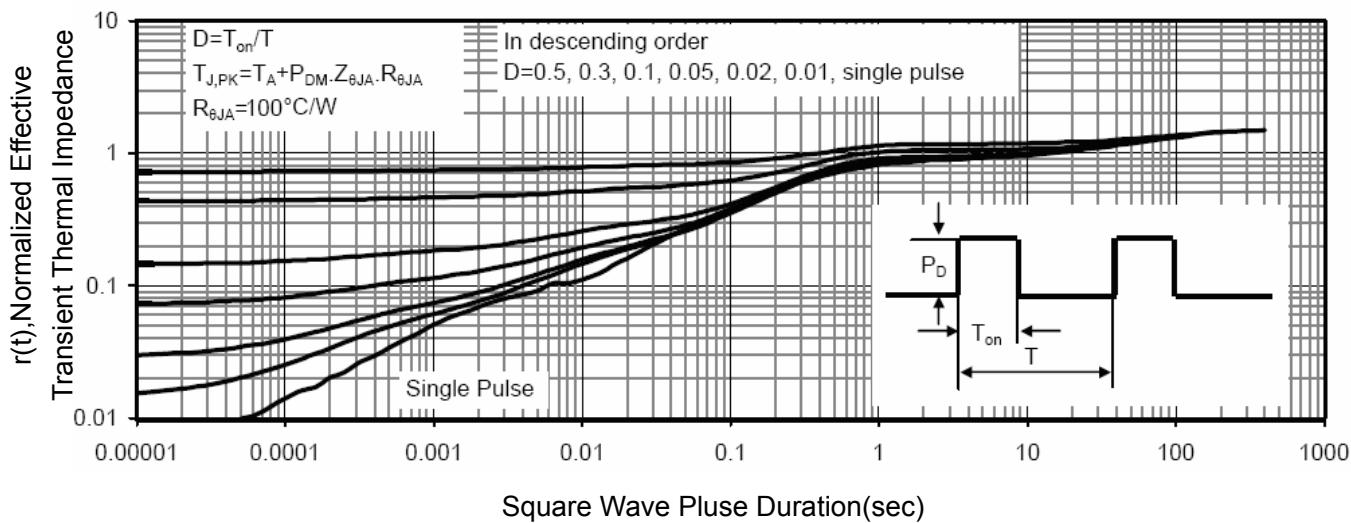
**Figure 5 Output CHARACTERISTICS**

I<sub>D</sub>- Drain Current (A)

**Figure 6 Drain-Source On-Resistance**

**Figure 7 Transfer Characteristics****Figure 8 Drain-Source On-Resistance****Figure 9  $R_{DSON}$  vs  $V_{GS}$** **Figure 10 Capacitance vs  $V_{DS}$** **Figure 11 Gate Charge****Figure 12 Source- Drain Diode Forward**



**Figure 13 Safe Operation Area**



**Figure 14 Normalized Maximum Transient Thermal Impedance**