RoHS COMPLIANT

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.
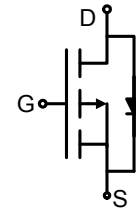
GENERAL FEATURES

●

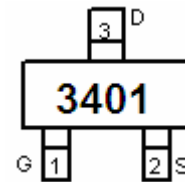| V_{DSS}	$R_{DS(ON)}$ @ 4.5V (Typ)	$R_{DS(ON)}$ @ 2.5V (Typ)	$R_{DS(ON)}$ @ 10V (Typ)	I_D
-30V	64 mΩ	95 mΩ	50 mΩ	-4.2A

● High Power and current handing capability

● Lead free product is acquired

● Surface Mount Package

Application

● PWM applications

● Load switch

● Power management

D

G

S

Schematic diagram

3 D

3401

G 1   2 S

Marking and pin Assignment

D   S

G

SOT-23

Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±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	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	104	℃/W

## Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250µA	-30		-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V,V_{GS}=0V	-	-	-1	µA

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Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm12V, V_{DS}=0V$	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.7	-1	-1.3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-4.2A$	-	50	55	mΩ
		$V_{GS}=-4.5V, I_D=-4A$	-	64	72	mΩ
		$V_{GS}=-2.5V, I_D=-1A$		95	120	mΩ
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-4.2A$	-	10	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{Iss}	$V_{DS}=-15V, V_{GS}=0V,$ F=1.0MHz	-	950	-	PF
Output Capacitance	C_{oss}		-	115	-	PF
Reverse Transfer Capacitance	C_{rss}		-	75	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, I_D=-3.2A$ $V_{GS}=-10V, R_{GEN}=6\Omega$	-	7	-	nS
Turn-on Rise Time	t_r		-	3	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	nS
Turn-Off Fall Time	t_f		-	12	-	nS
Total Gate Charge	Q_g	$V_{DS}=-15V, I_D=-4A, V_{GS}=-4.5V$	-	9.5	-	nC
Gate-Source Charge	Q_{gs}		-	2	-	nC
Gate-Drain Charge	Q_{gd}		-	3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=-1A$	-	-	-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

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS
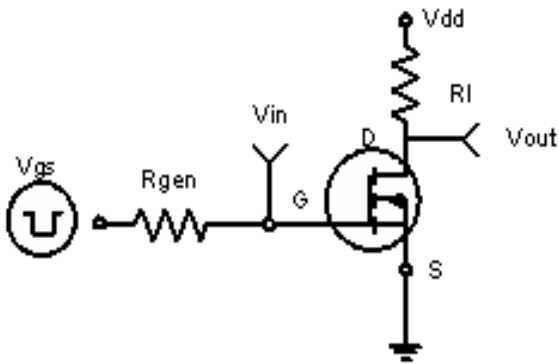
Figure 1:Switching Test Circuit
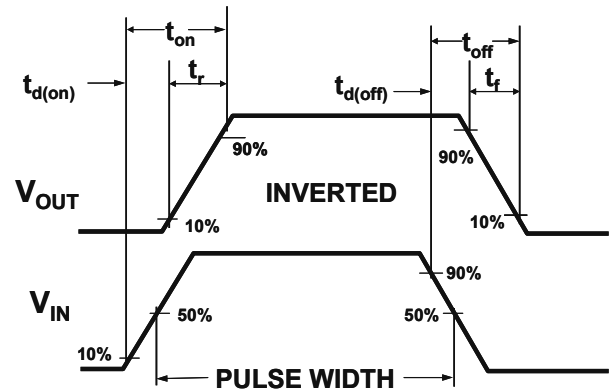
Figure 2:Switching Waveforms

T_J-Junction Temperature(℃)
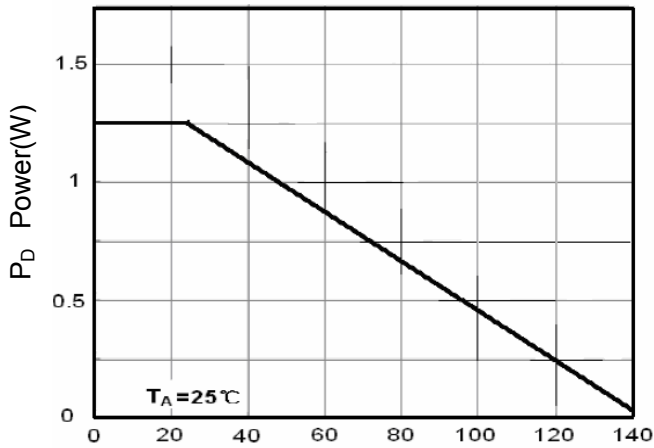
Figure 3 Power Dissipation

T_J-Junction Temperature(℃)

Figure 4 Drain Current

Vds Drain-Source Voltage (V)
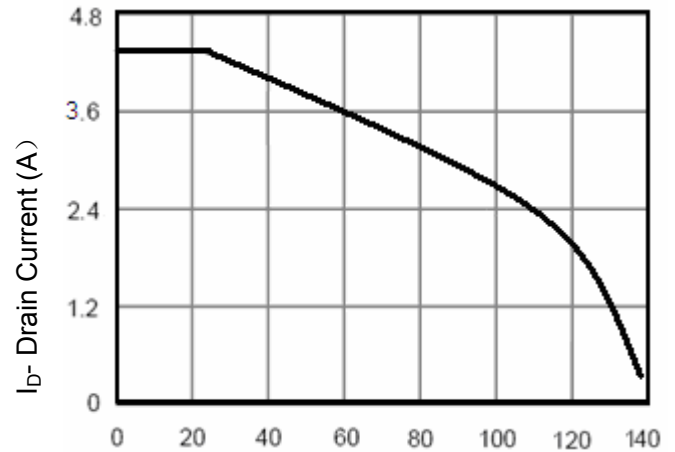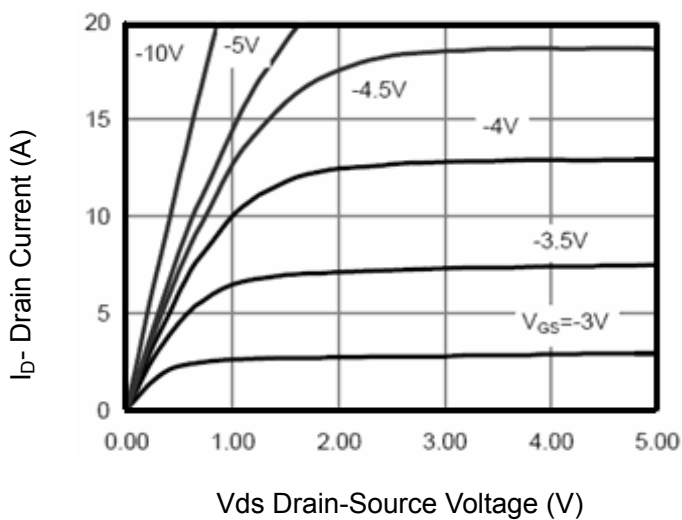
Figure 5 Output CHARACTERISTICS

I_D- Drain Current (A)
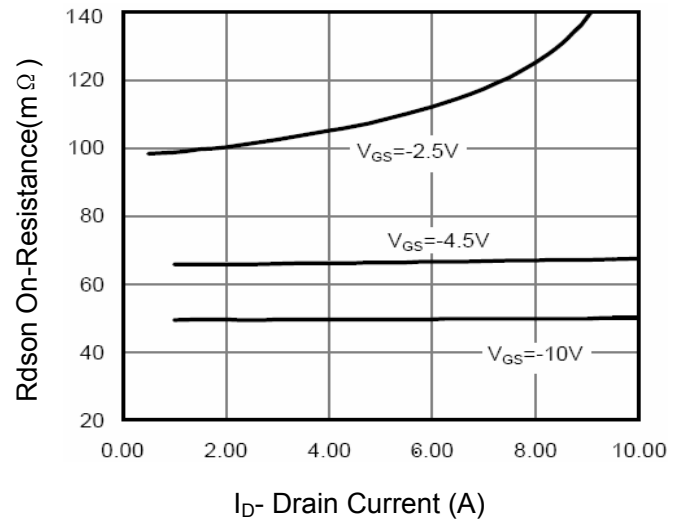
Figure 6 Drain-Source On-Resistance
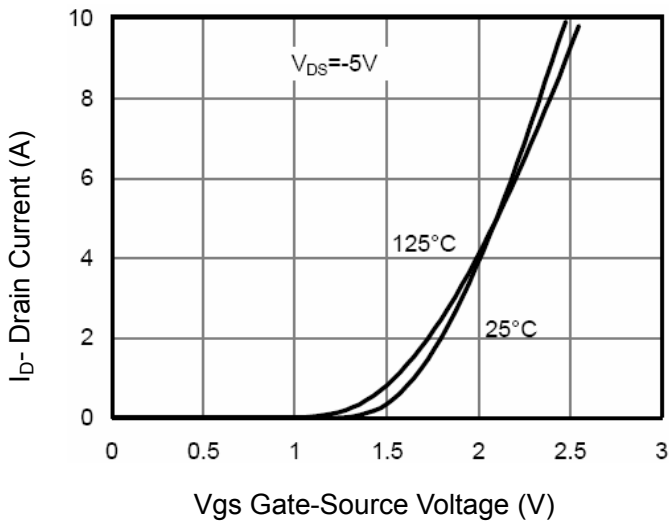
Figure 7 Transfer Characteristics
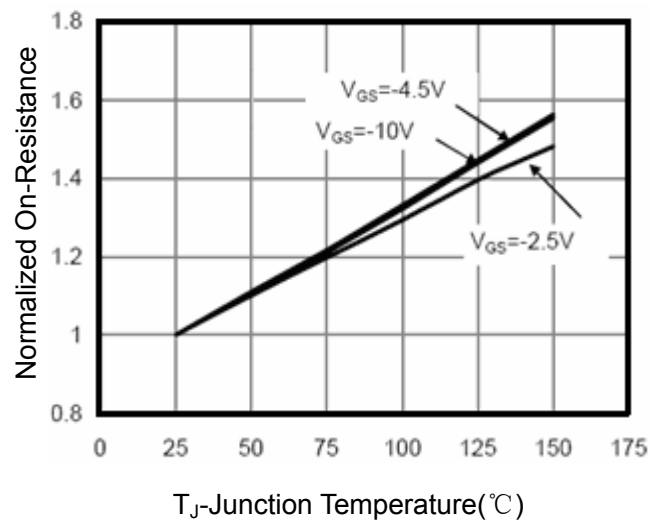
Figure 8 Drain-Source On-Resistance
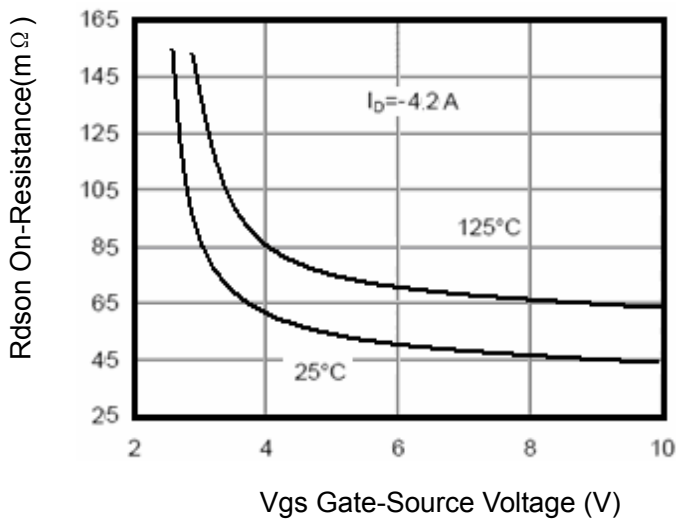
Figure 9 Rdson vs Vgs
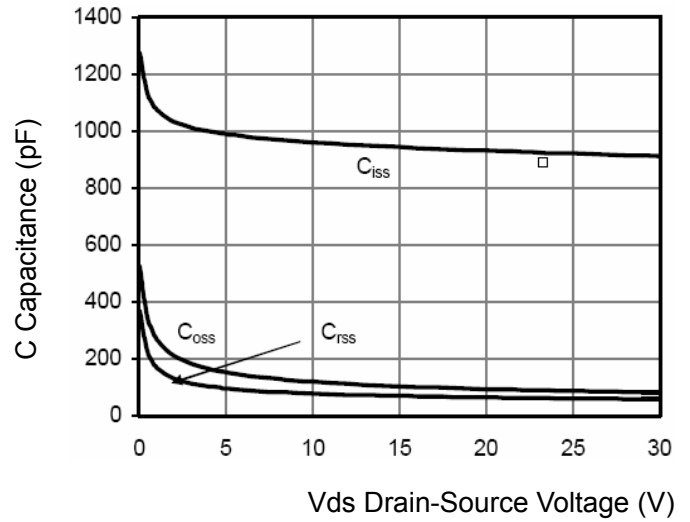
Figure 10 Capacitance vs Vds
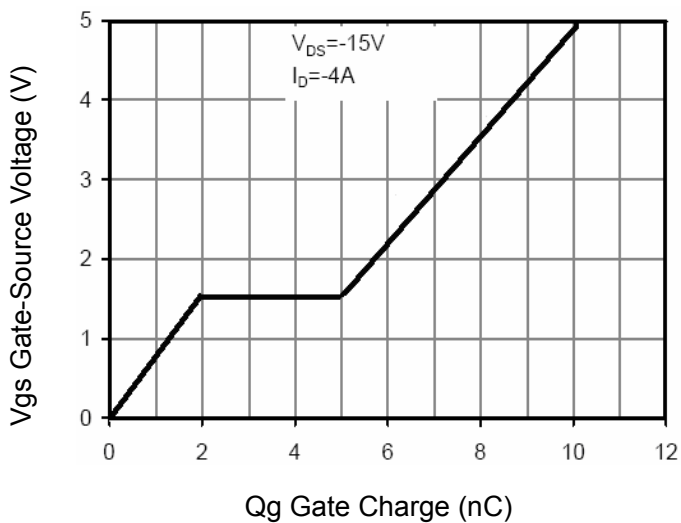
Figure 11 Gate Charge
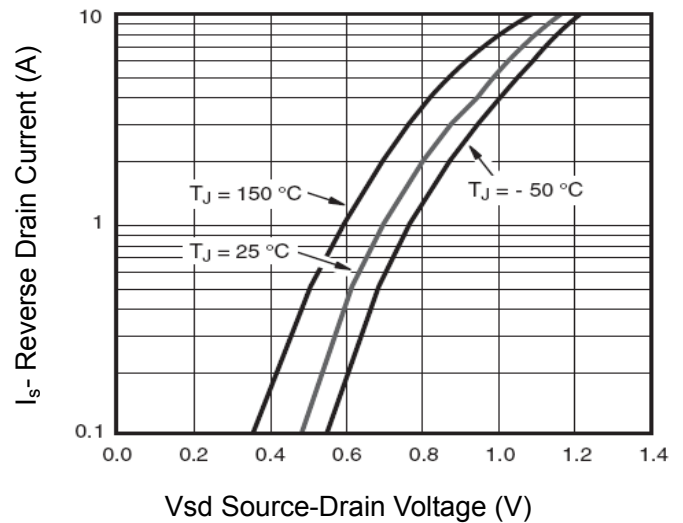
Figure 12 Source- Drain Diode Forward

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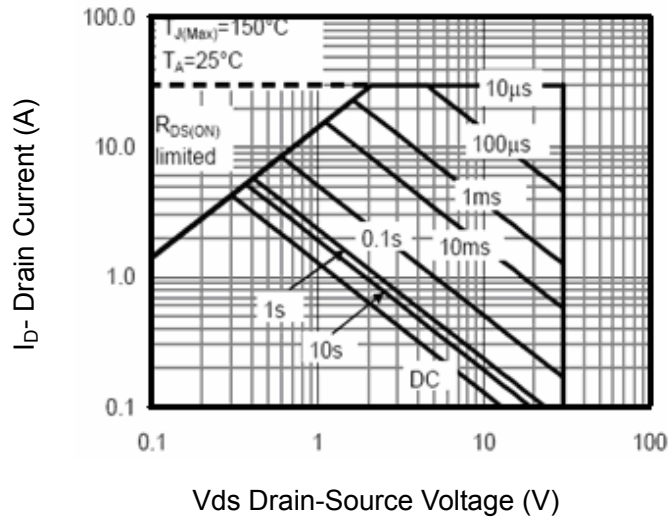
Figure 13   Safe Operation Area

Square Wave Pluse Duration(sec)
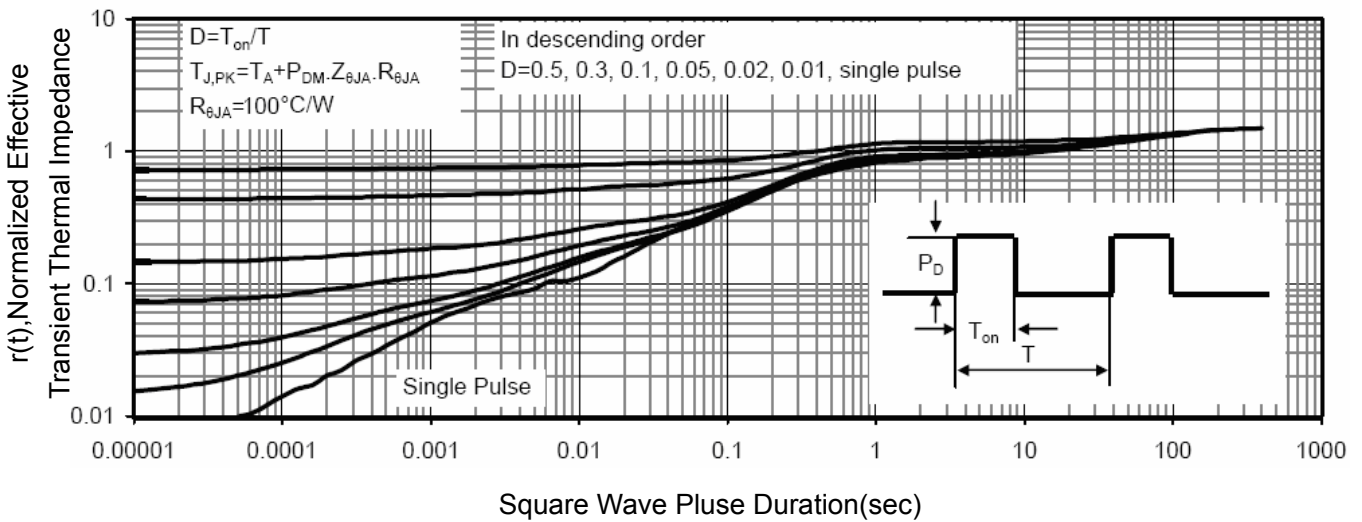
Figure 14 Normalized Maximum Transient Thermal Impedance

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