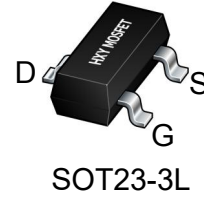




## Description

The AO3401-HXY 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 Battery protection or in other Switching application.

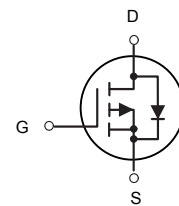


## General Features

$V_{DS} = -30V$   $I_D = -4.2A$   
 $R_{DS(ON)} < 54m\Omega @ V_{GS}=10V$   
 $R_{DS(ON)} < 77m\Omega @ V_{GS}=4.5V$

## Application

Battery protection  
 Load switch  
 Uninterruptible power supply



P-Channel MOSFET

## Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AO3401-HXY	SOT23-3L	X1KX	3000

## Absolute Maximum Ratings ( $T_A=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage	-30	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current-Continuous	-4.2	A
$I_{DM}$	Drain Current-Pulsed <sup>(Note 1)</sup>	-30	A
$P_D$	Maximum Power Dissipation	1.2	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient <sup>(Note 2)</sup>	104	$^\circ C/W$



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

Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-24\text{V}, V_{GS}=0\text{V}$	-	-	-1	$\mu\text{A}$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10\text{V}, V_{DS}=0\text{V}$	-	-	$\pm 100$	nA
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-0.7	-1	-1.3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10\text{V}, I_D=-4.2\text{A}$	-	46	54	$\text{m}\Omega$
		$V_{GS}=-4.5\text{V}, I_D=-4\text{A}$	-	58	77	$\text{m}\Omega$
		$V_{GS}=-2.5\text{V}, I_D=-1\text{A}$		74	130	$\text{m}\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-5\text{V}, I_D=-4.2\text{A}$	-	10	-	S
<b>Dynamic Characteristics</b> (Note 4)						
Input Capacitance	$C_{iss}$	$V_{DS}=-15\text{V}, V_{GS}=0\text{V},$ $F=1.0\text{MHz}$	-	880	-	PF
Output Capacitance	$C_{oss}$		-	105	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	65	-	PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15\text{V}, I_D=-4.2\text{A}$ $V_{GS}=-10\text{V}, R_{GEN}=6\Omega$	-	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	$Q_g$	$V_{DS}=-15\text{V}, I_D=-4.2\text{A}, V_{GS}=-4.5\text{V}$	-	8.5	-	nC
Gate-Source Charge	$Q_{gs}$		-	1.8	-	nC
Gate-Drain Charge	$Q_{gd}$		-	2.7	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0\text{V}, I_S=-4.2\text{A}$	-	-	-1.2	V

#### Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production



### Typical Electrical and Thermal Characteristics

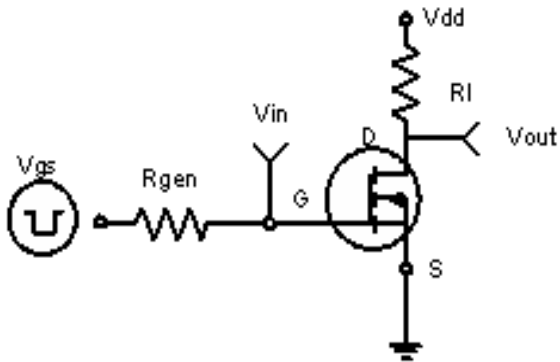


Figure 1: Switching Test Circuit

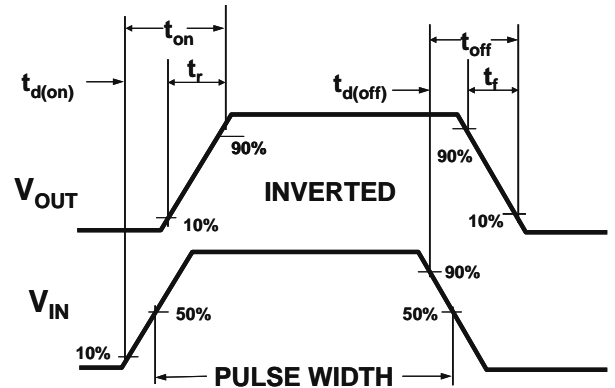
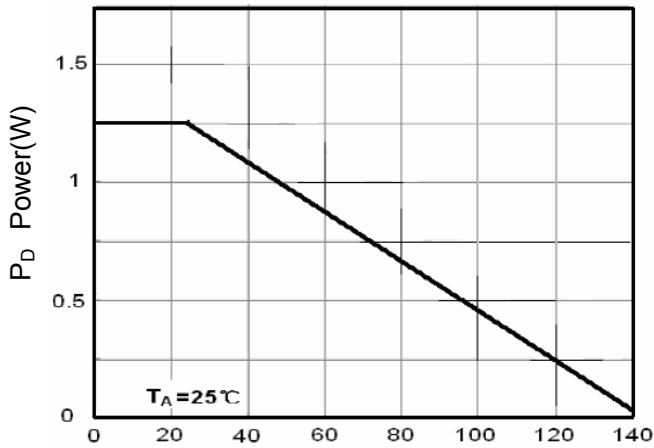
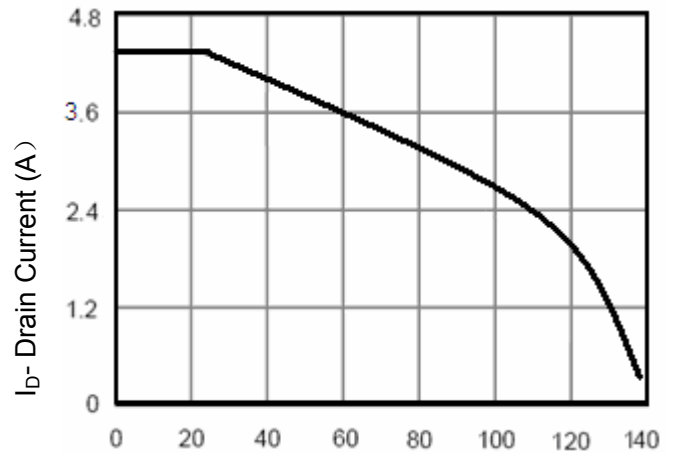


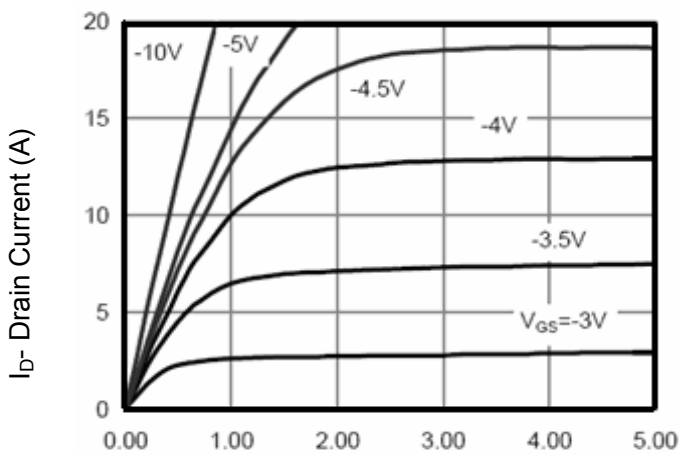
Figure 2: Switching Waveforms



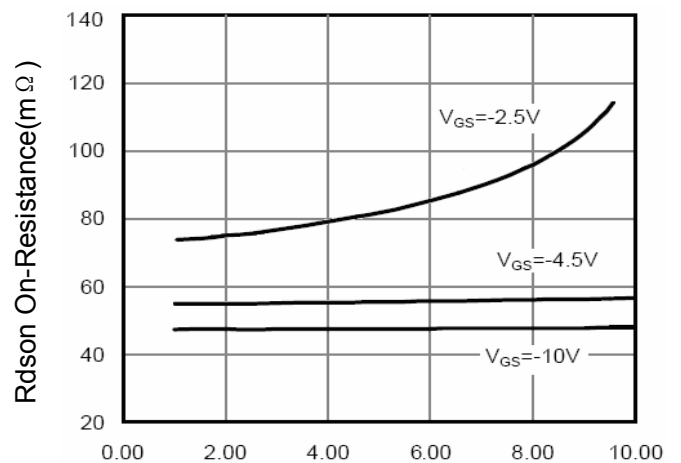
T<sub>J</sub>-Junction Temperature(°C)  
Figure 3 Power Dissipation



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

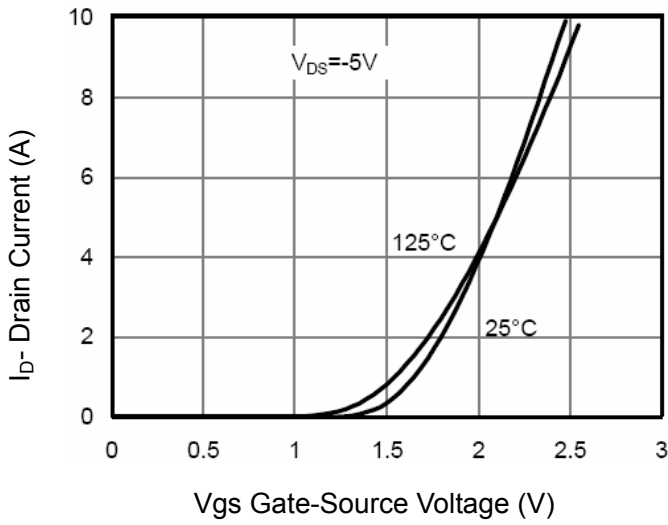


Figure 7 Transfer Characteristics

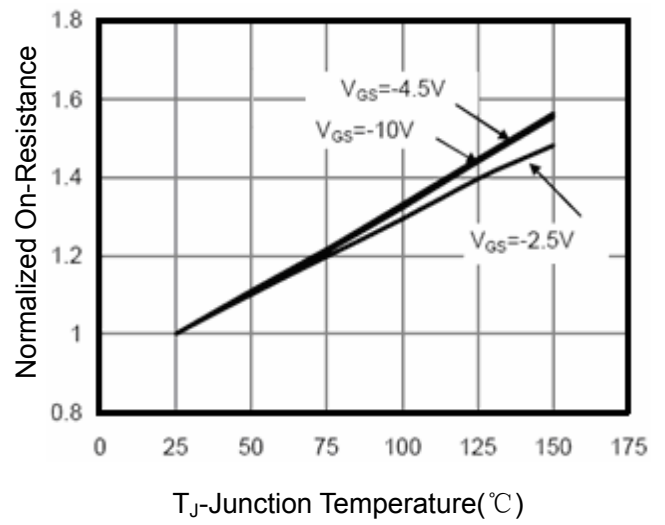


Figure 8 Drain-Source On-Resistance

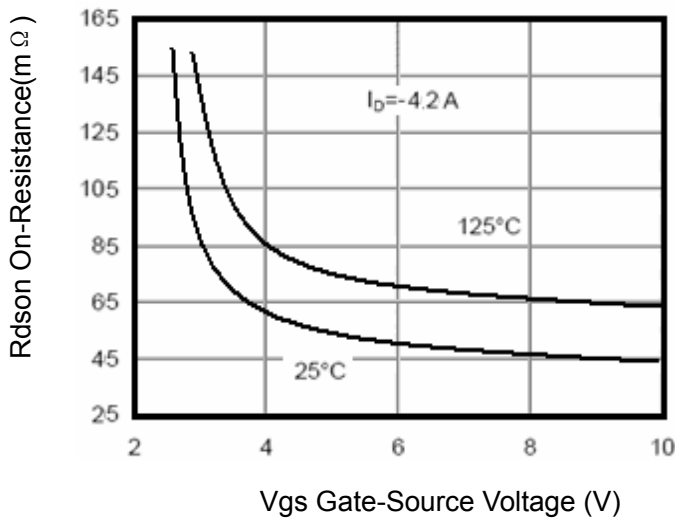


Figure 9 Rdson vs Vgs

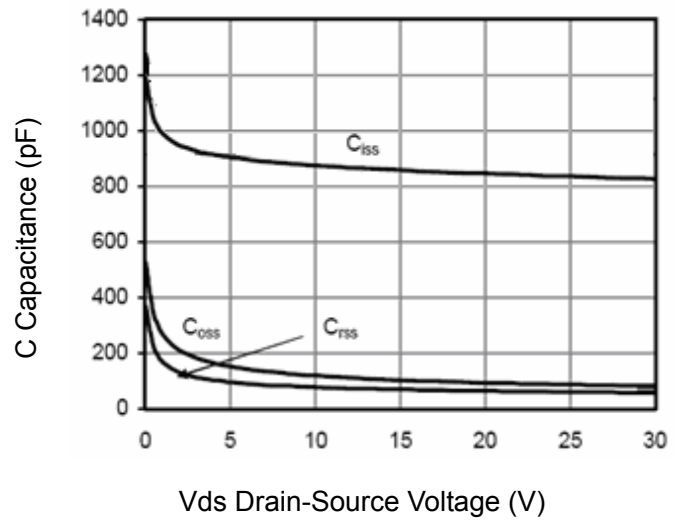


Figure 10 Capacitance vs Vds

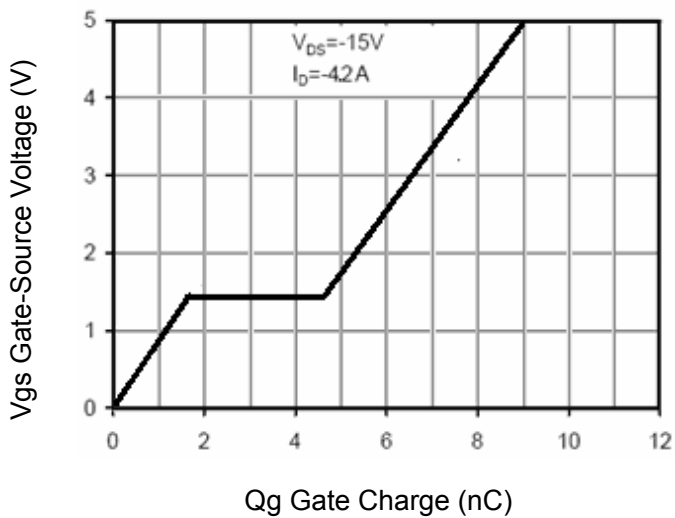


Figure 11 Gate Charge

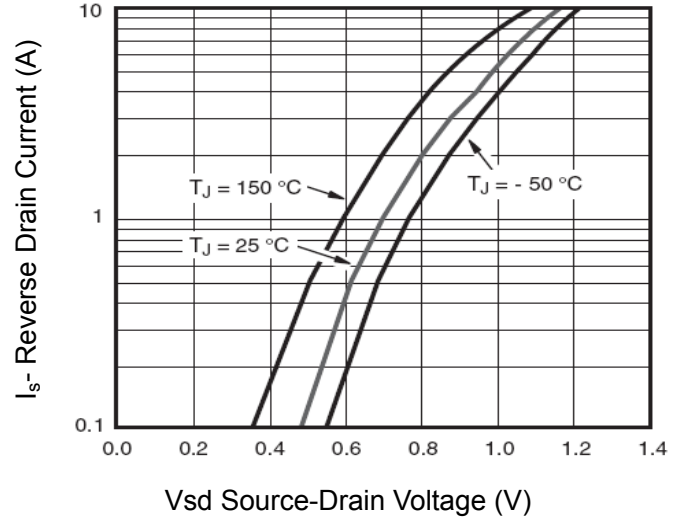
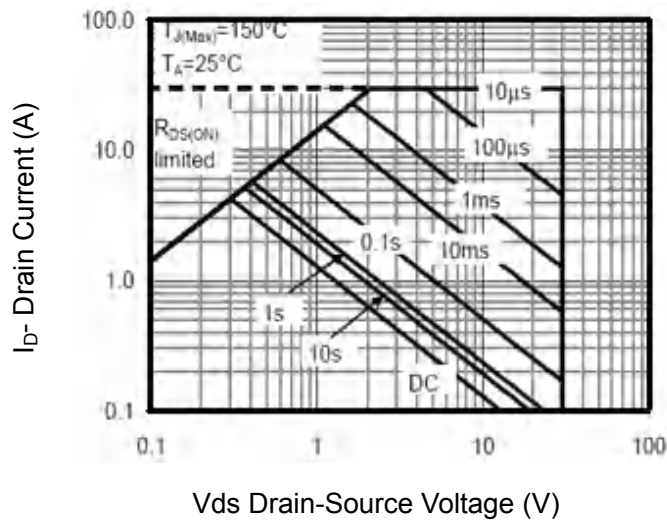
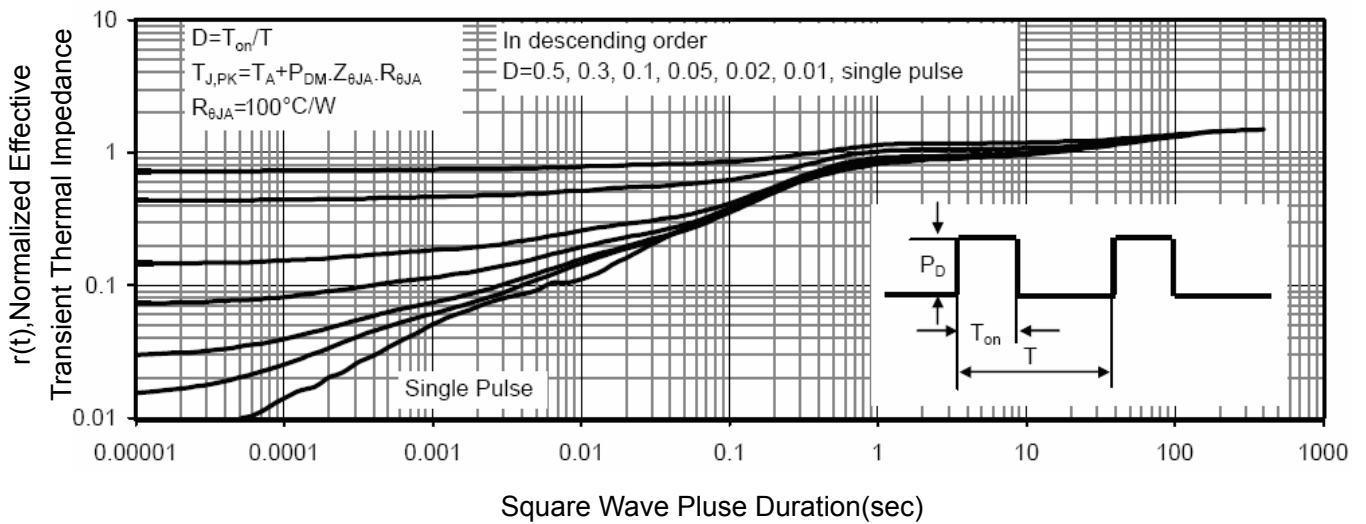


Figure 12 Source- Drain Diode Forward



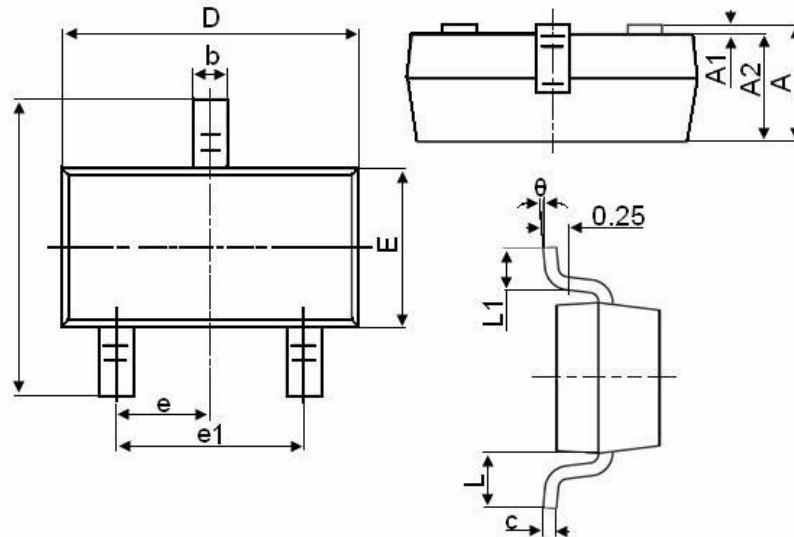
Vds Drain-Source Voltage (V)  
Figure 13 Safe Operation Area



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



### SOT23-3L Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.800	3.000
E	1.500	1.700
E1	2.650	2.950
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.600
θ	0°	8°



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