



## Description

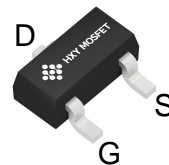
The AO3407-HXY uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

## General Features

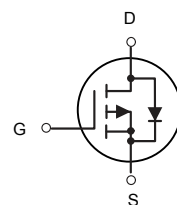
$V_{DS} = -30V, I_D = -4.1A$   
 $R_{DS(ON)} < 56m\Omega @ V_{GS}=10V$

## Application

High power and current handing capability  
Lead free product is acquired  
Surface mount package  
PWM applications  
Load switch  
Power management



SOT-23



P-Channel MOSFET

## Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AO3407-HXY	SOT-23	3407	3000PCS

## 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	$\pm 20$	V
$I_D$	Drain Current-Continuous	-4.1	A
$I_{DM}$	Drain Current-Pulsed (Note 1)	-13	A
$P_D$	Maximum Power Dissipation	1.32	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 2)	125	$^{\circ}C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V$ , $I_D=-250\mu A$	-30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=-1\text{mA}$	---	-0.02	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=-10V$ , $I_D=-3A$	---	48	56	$m\Omega$
		$V_{GS}=-4.5V$ , $I_D=-1.5A$	---	78	90	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$ , $I_D=-250\mu A$	-1.2	-1.5	-2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.32	---	$mV/^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=-24V$ , $V_{GS}=0V$ , $T_J=25^\circ\text{C}$	---	---	-1	$\mu A$
		$V_{DS}=-24V$ , $V_{GS}=0V$ , $T_J=55^\circ\text{C}$	---	---	-5	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V$ , $V_{DS}=0V$	---	---	$\pm 100$	nA
$g_{fs}$	Forward Transconductance	$V_{DS}=-5V$ , $I_D=-3A$	---	4.8	---	S
$R_g$	Gate Resistance	$V_{DS}=0V$ , $V_{GS}=0V$ , $f=1\text{MHz}$	---	24	48	$\Omega$
$Q_g$	Total Gate Charge (-4.5V)	$V_{DS}=-20V$ , $V_{GS}=-4.5V$ , $I_D=-3A$	---	5.22	7.3	nC
$Q_{gs}$	Gate-Source Charge		---	1.25	1.8	
$Q_{gd}$	Gate-Drain Charge		---	2.3	3.2	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15V$ , $V_{GS}=-10V$ , $R_G=3.3\Omega$ $I_D=-1A$	---	18.4	37	ns
$T_r$	Rise Time		---	11.4	21	
$T_{d(off)}$	Turn-Off Delay Time		---	39.4	79	
$T_f$	Fall Time		---	5.2	10.4	
$C_{iss}$	Input Capacitance	$V_{DS}=-15V$ , $V_{GS}=0V$ , $f=1\text{MHz}$	---	463	650	pF
$C_{oss}$	Output Capacitance		---	82	115	
$C_{rss}$	Reverse Transfer Capacitance		---	68	95	

### Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current <sup>1,4</sup>	$V_G=V_D=0V$ , Force Current	---	---	-3.2	A
$I_{SM}$	Pulsed Source Current <sup>2,4</sup>		---	---	-13	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V$ , $I_S=-1A$ , $T_J=25^\circ\text{C}$	---	---	-1	V

Note :

1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$

3.The power dissipation is limited by  $150^\circ\text{C}$  junction temperature

4.The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications , should be limited by total power dissipation.



## Typical Characteristics

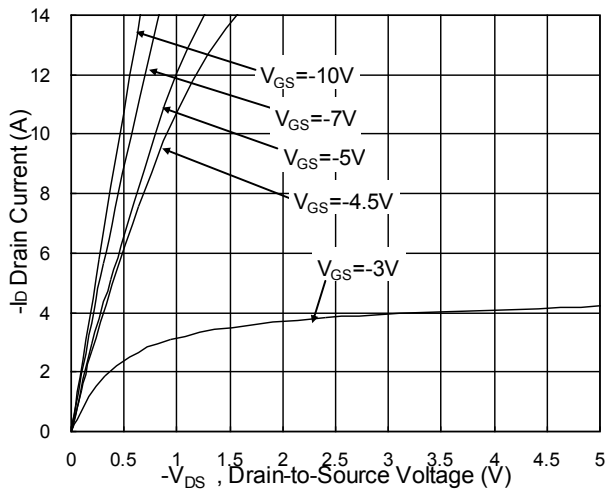


Fig.1 Typical Output Characteristics

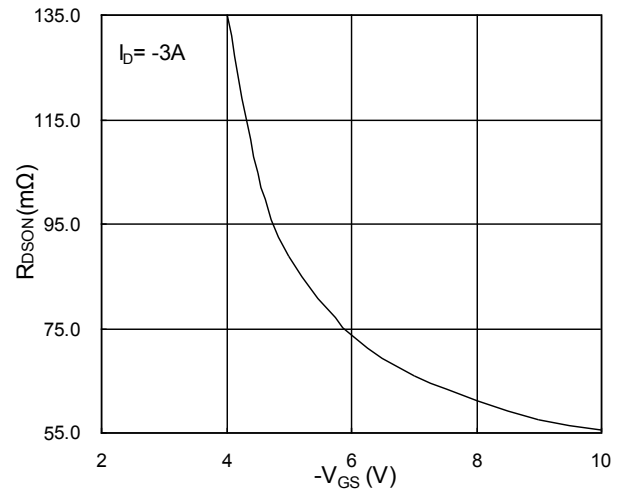


Fig.2 On-Resistance vs. G-S Voltage

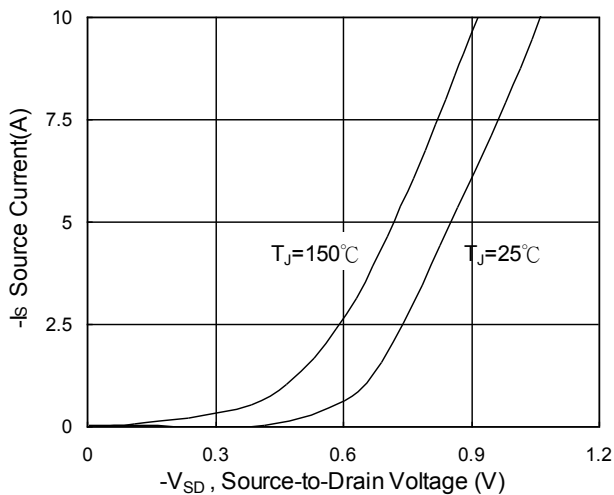


Fig.3 Source Drain Forward Characteristics

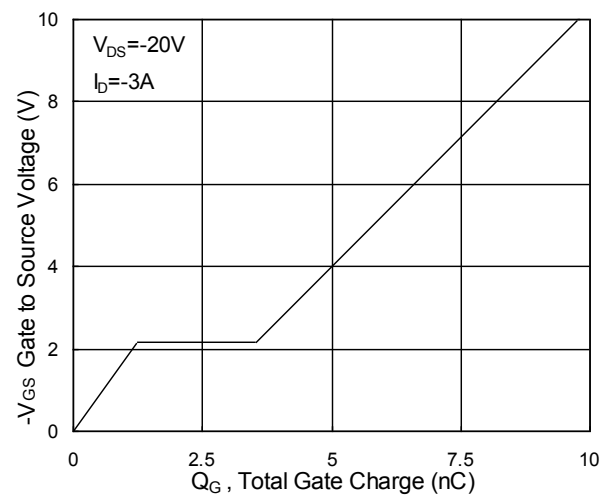


Fig.4 Gate-Charge Characteristics

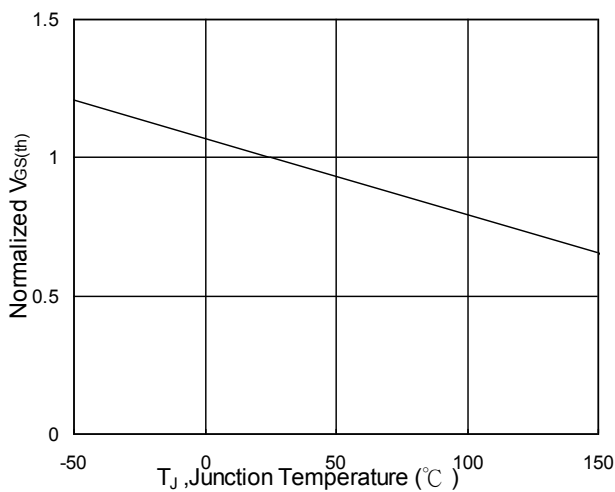


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

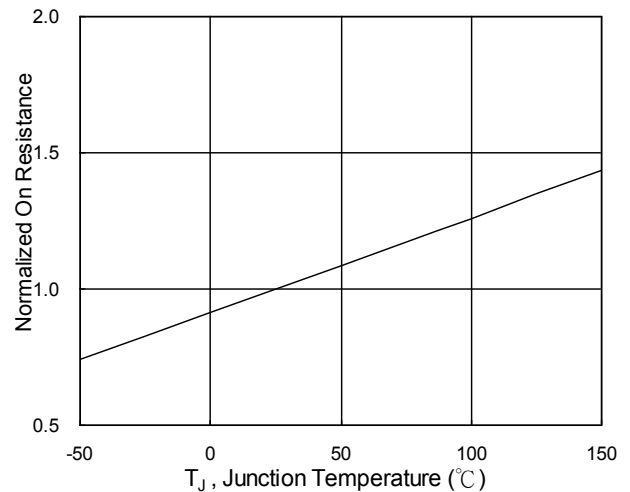


Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

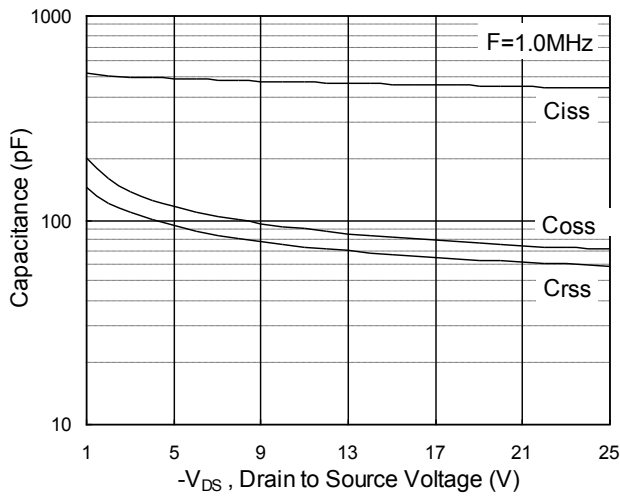


Fig.7 Capacitance

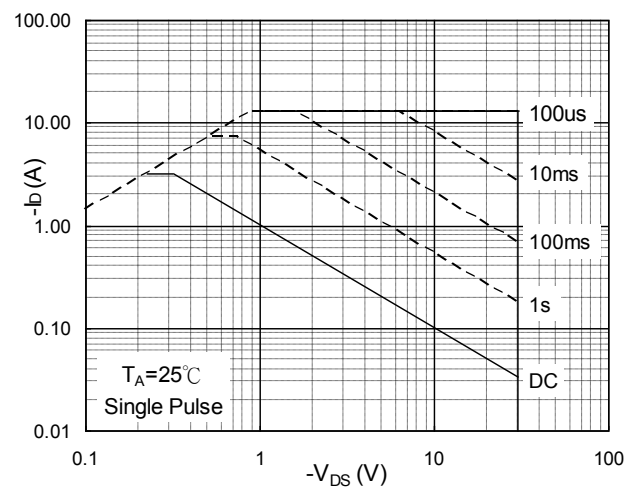


Fig.8 Safe Operating Area

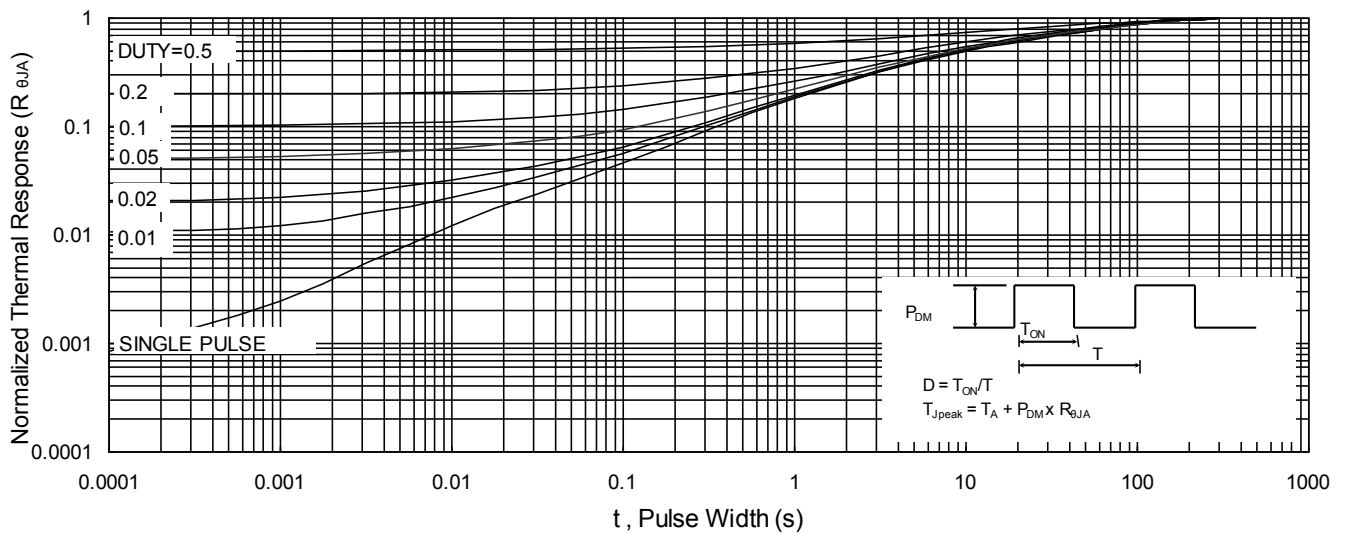


Fig.9 Normalized Maximum Transient Thermal Impedance

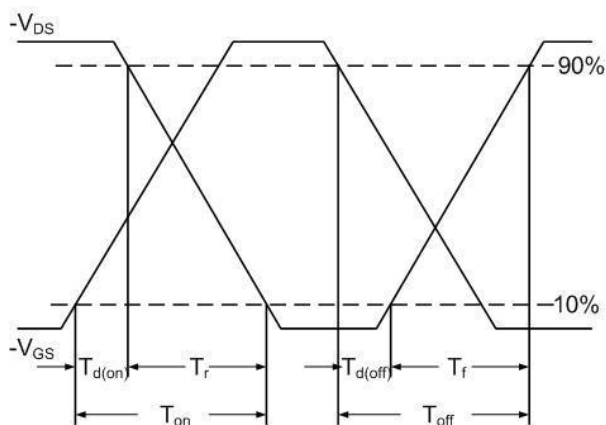


Fig.10 Switching Time Waveform

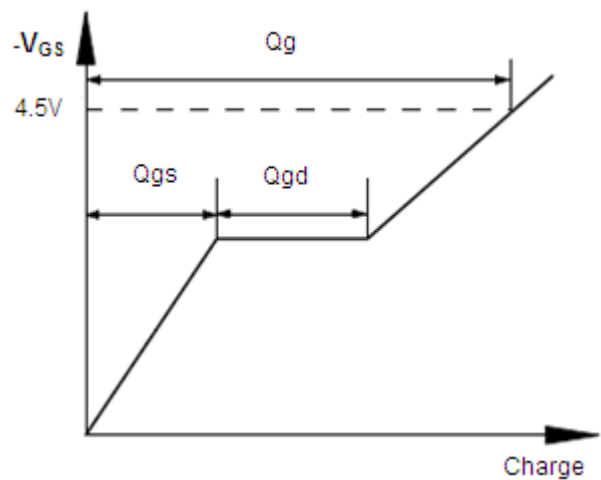
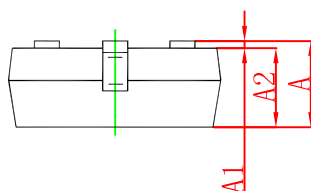
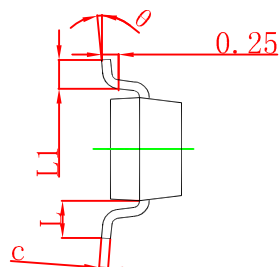
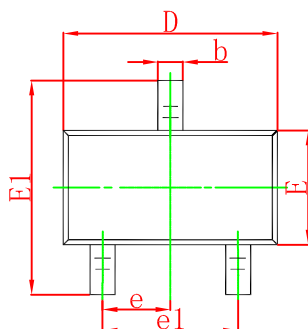


Fig.11 Gate Charge Waveform

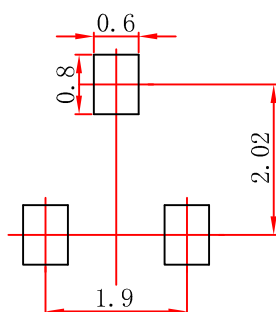


## SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

## SOT-23 Suggested Pad Layout



### Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.



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