



## Description

The AO3416A-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

$V_{DS} = 20V$   $I_D = 6.5A$

$R_{DS(ON)} < 22m\Omega @ V_{GS} = 4.5V$

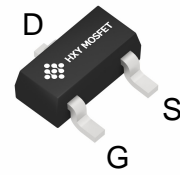
ESD=2500HBM

## Application

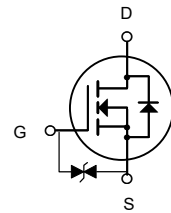
Battery protection

Load switch

Uninterruptible power supply



SOT-23-3L



N-Channel MOSFET

## Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AO3416A-HXY	SOT-23-3L	AGBV 1N	3000

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

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current-Continuous	6.5	A
$I_{DM}$	Drain Current-Pulsed (Note 1)	30	A
$P_D$	Maximum Power Dissipation	1.4	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)	89	$^\circ C/W$



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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	20		-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	$\pm 10$	$\mu A$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.45	0.7	1.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=6.5A$	-	14	22	m $\Omega$
		$V_{GS}=2.5V, I_D=5.5A$	-	17	26	m $\Omega$
		$V_{GS}=1.8V, I_D=5A$	-	28	40	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=6.5A$	8	-	-	S
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	660	-	PF
Output Capacitance	$C_{oss}$		-	160	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	87	-	PF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, R_L=1.5\Omega$ $V_{GS}=5V, R_{GEN}=3\Omega$	-	0.5		nS
Turn-on Rise Time	$t_r$		-	1		nS
Turn-Off Delay Time	$t_{d(off)}$		-	12		nS
Turn-Off Fall Time	$t_f$		-	4		nS
Total Gate Charge	$Q_g$		-	8		nC
Gate-Source Charge	$Q_{gs}$	$V_{DS}=10V, I_D=6.5A,$ $V_{GS}=4.5V$	-	2.5	-	nC
Gate-Drain Charge	$Q_{gd}$		-	3	-	nC
Diode Forward Voltage <sup>(Note 3)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=6.5A$	-	-	1.2	V
Diode Forward Current <sup>(Note 2)</sup>	$I_S$		-	-	6.5	A

**Notes:**

Repetitive Rating: Pulse width limited by maximum junction temperature.

Surface Mounted on FR4 Board,  $t \leq 10$  sec.

Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

Guaranteed by design, not subject to production



### Typical Characteristics

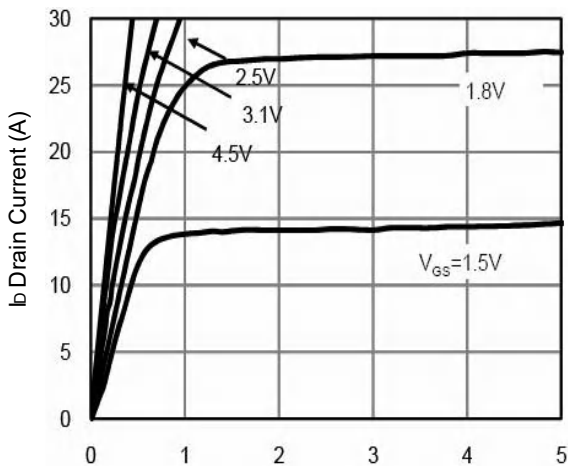


Fig.1 Typical Output Characteristics

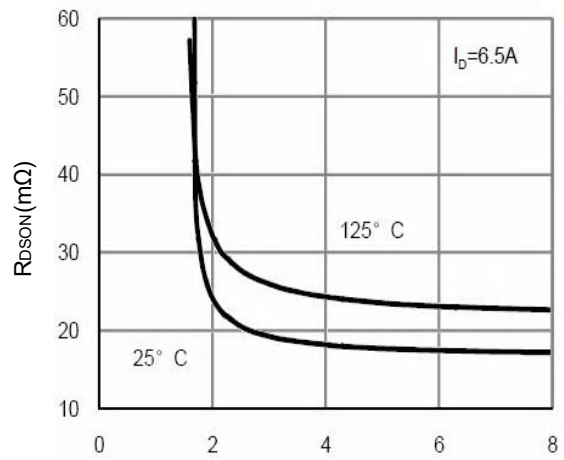


Fig.2 On-Resistance vs. Gate-Source

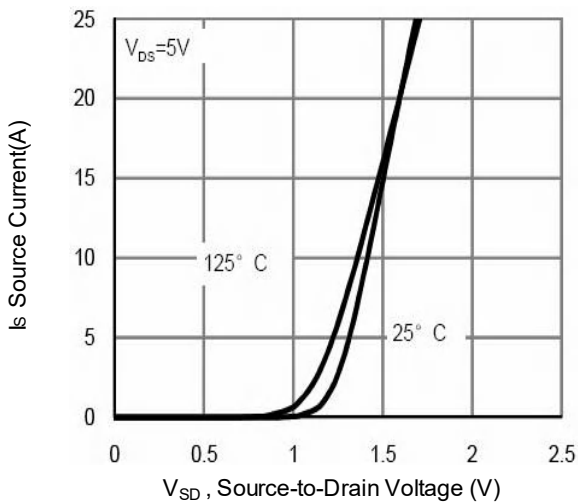


Fig.3 Forward Characteristics of Reverse

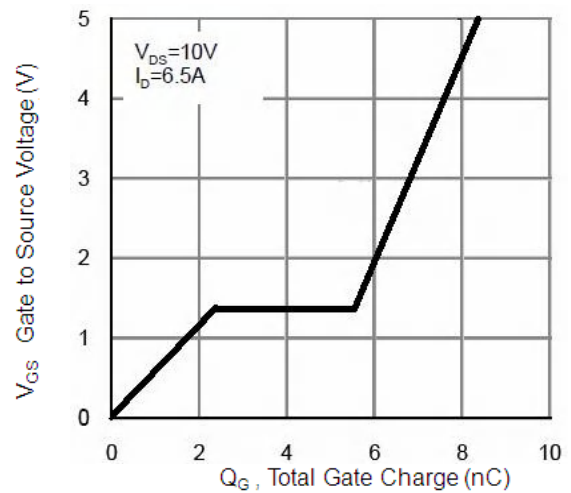


Fig.4 Gate-Charge Characteristics

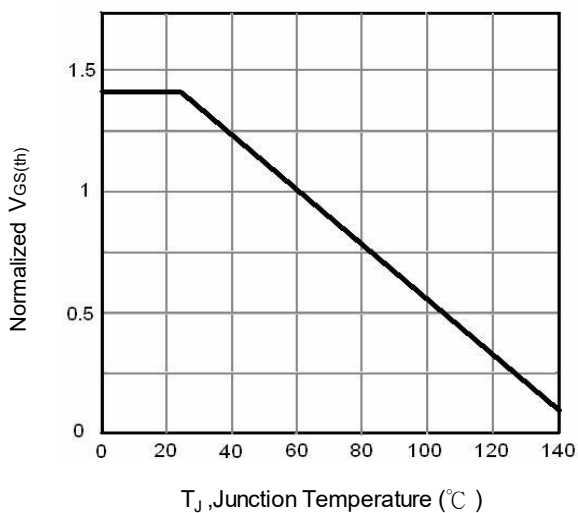


Fig.5 Normalized VGS(th) vs. Tj

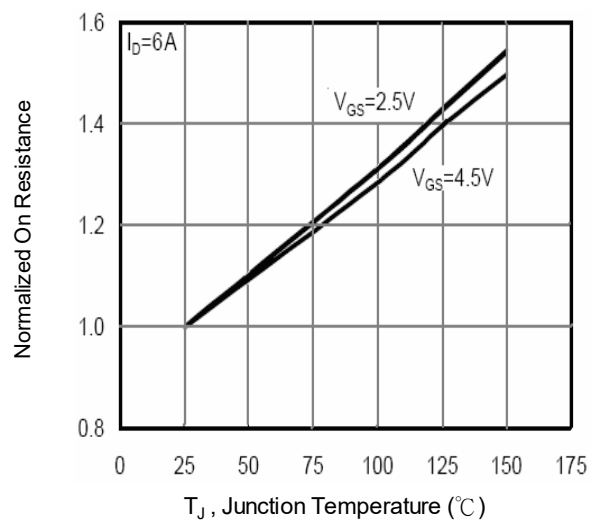


Fig.6 Normalized Rds(on) vs. Tj

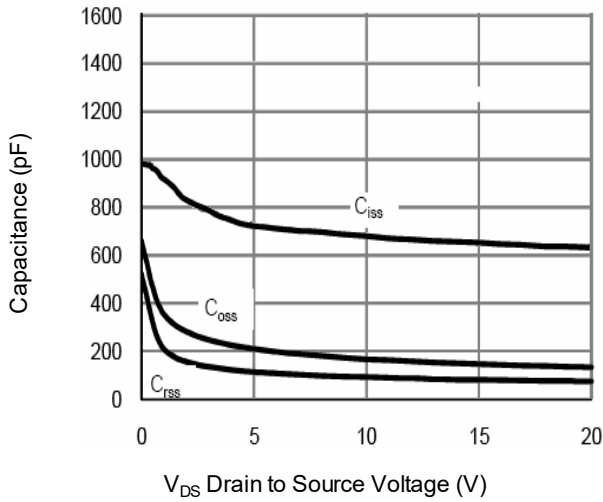


Fig.7 Capacitance

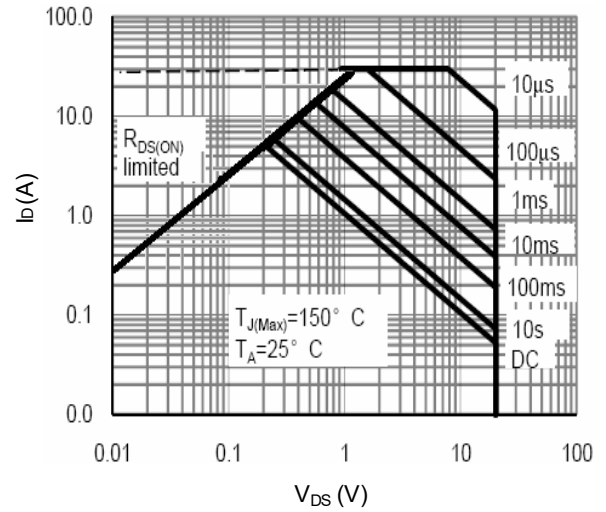


Fig.8 Safe Operating Area

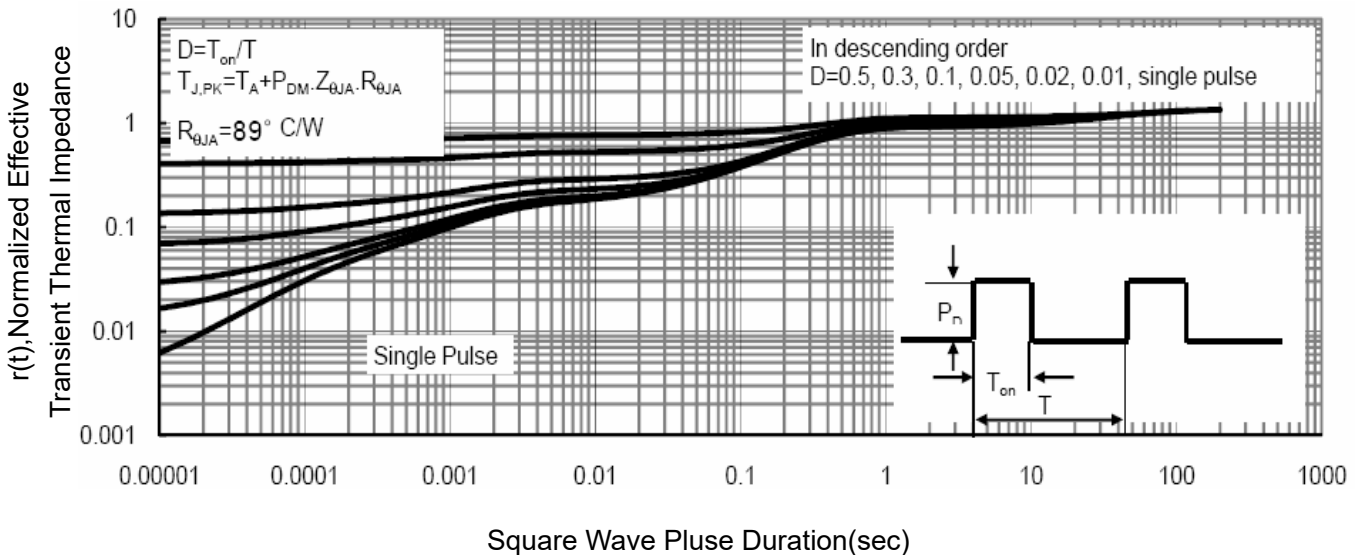


Fig.9 Normalized Maximum Transient Thermal Impedance

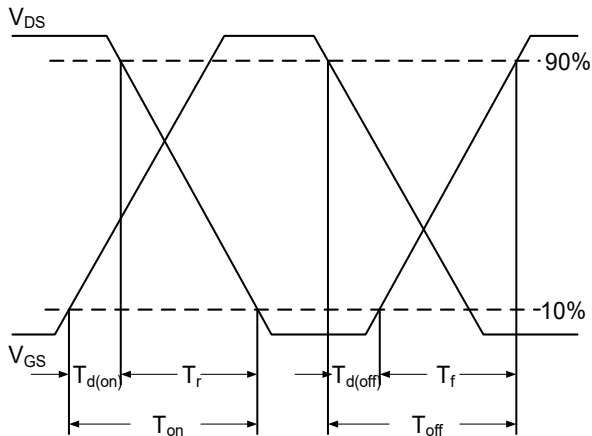


Fig.10 Switching Time Waveform

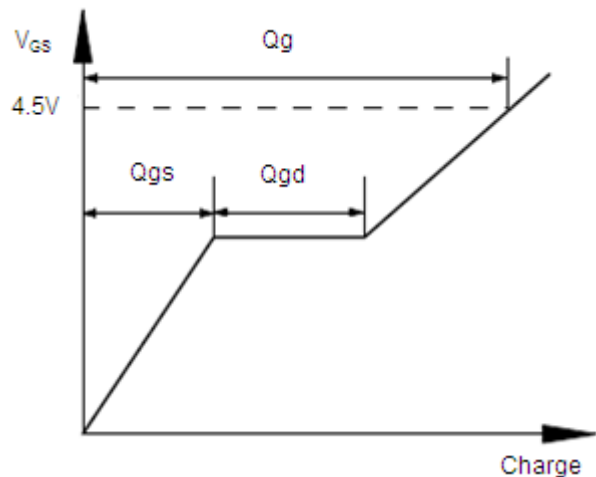
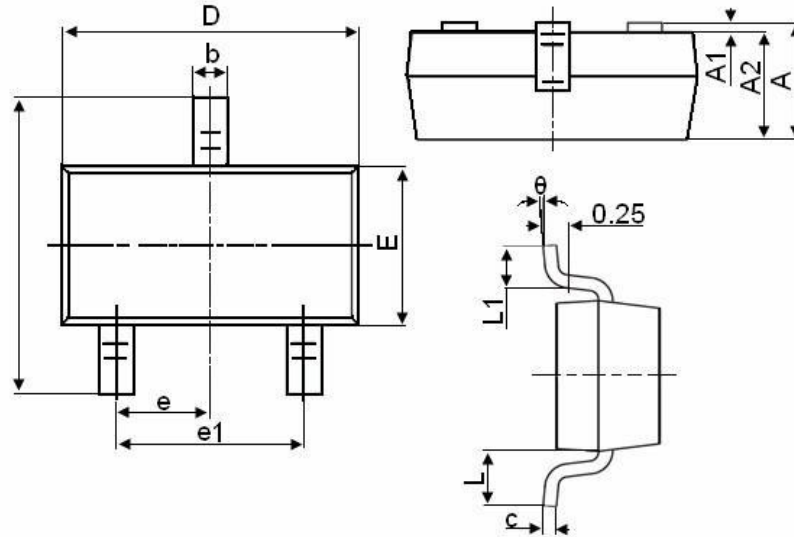


Fig.11 Gate Charge Waveform



### SOT-23-3L 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
$\theta$	0°	8°



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