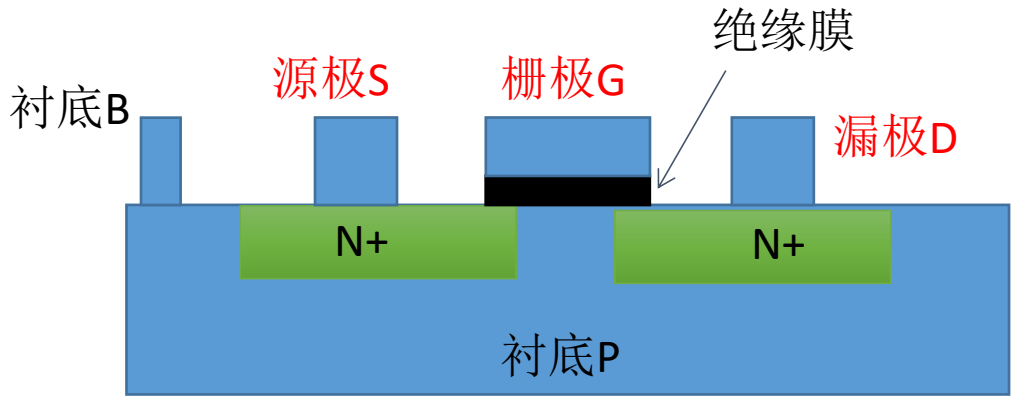
MOS管定义



增强型Nmos管

在低掺杂浓度的P型半导体上，通过扩散技术，做出两块高掺杂浓度的N型半导体

MOS管，是MOSFET的缩写。

英文全称：Metal-Oxide-Semiconductor Field-Effect Transistor。

M：Metal（金属）

O：Oxide（氧化物）

S：Semiconductor（半导体）

FE：Field-Effect（场效应）

T：Transistor（晶体管）

中文全称：金属氧化物半导体场效应晶体管，

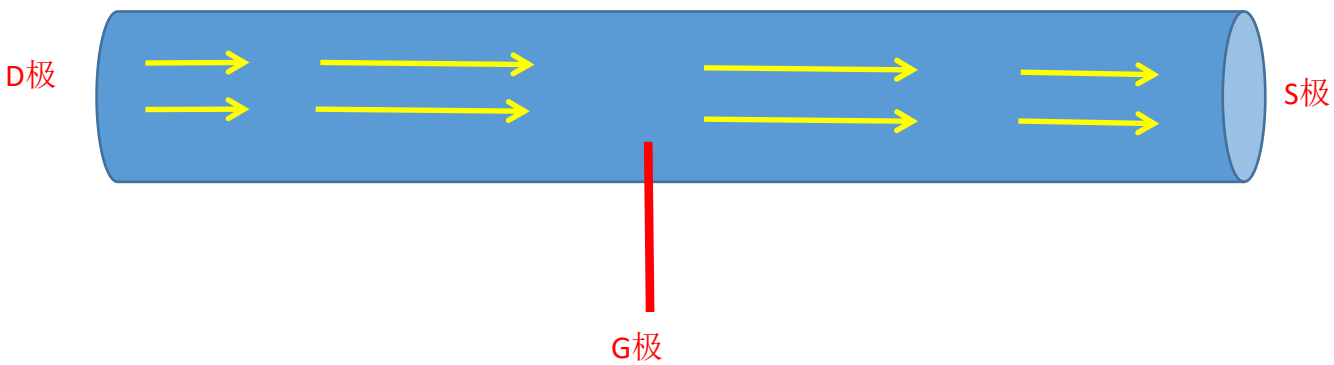
简称金氧半场效晶体管

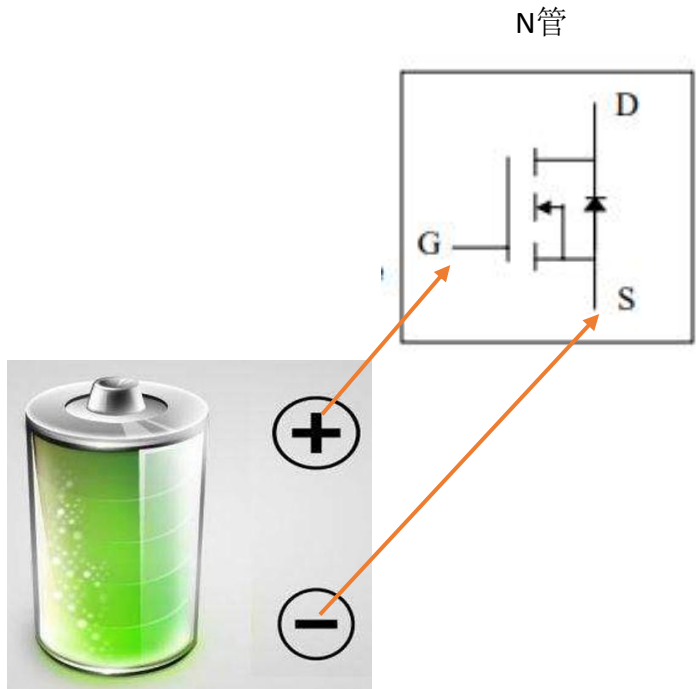
MOS管的工作原理

1、MOS管是什么东西？　　开关

2、是怎样的开关？　　可以实现高频开启和关闭，轻松就能达到10万次每秒

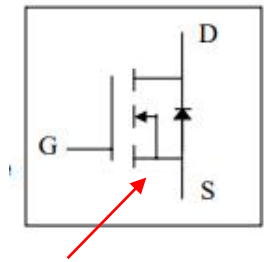
3、是怎么工作的？　　通过GS之间的电压，使DS开启和关闭。



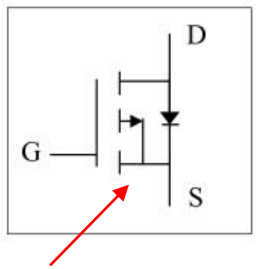


MOS管识别

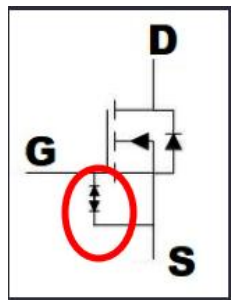
N 管



P 管



带ESD防静电



MOS管识别

SOT23(小23)

SOT23-3L(小23)

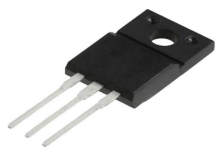
SOT89-3

SOP-8

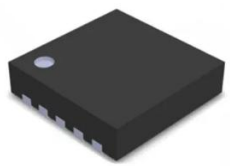
TSSOP-8

TO-252

TO-263



TO-220



DFN

TO-92

MOS管选型

ALPHA & OMEGA SEMICONDUCTOR

AO3400

30V N-Channel MOSFET

General Description

The AO3400 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is suitable for use as a load switch or in PWM applications.

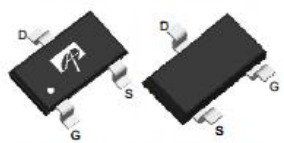
Product Summary

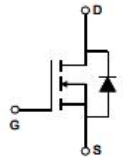
V_{DS}	30V
I_D (at V_{GS}=10V)	5.8A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 28mΩ
$R_{DS(ON)}$ (at V_{GS} = 4.5V)	< 33mΩ
$R_{DS(ON)}$ (at V_{GS} = 2.5V)	< 52mΩ

Green Product

SOT23

Top View Bottom View





Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current	T_A=25°C	I_D	5.8	A
	T_A=70°C		4.9	
Pulsed Drain Current [C]		I_{DM}	30	
Power Dissipation [B]	T_A=25°C	P_D	1.4	W
	T_A=70°C		0.9	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	70	90	°C/W
Maximum Junction-to-Ambient [A D]	Steady-State		100	125	°C/W
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	63	80	°C/W

ALPHA & OMEGA SEMICONDUCTOR

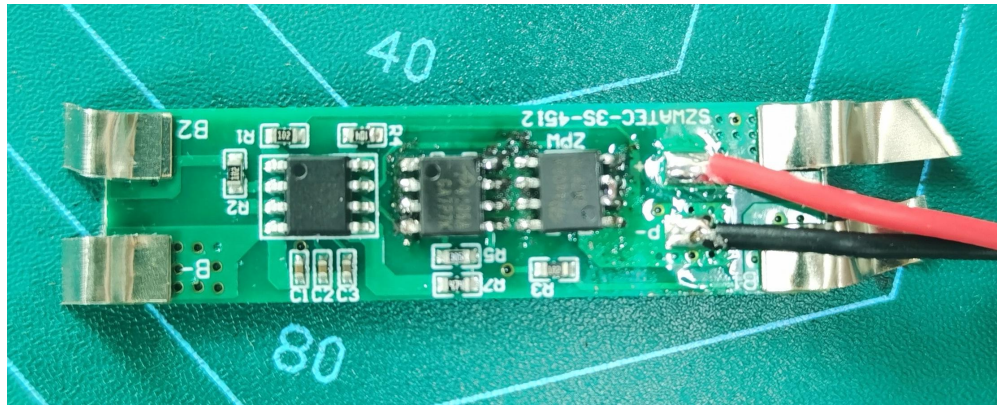
AO3400

Electrical Characteristics (T_J=25°C unless otherwise noted)

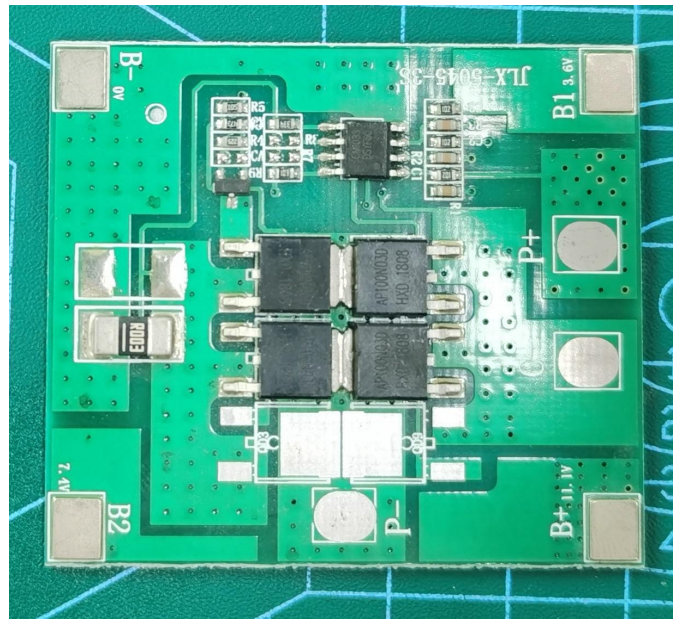
Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250µA, V_{GS}=0V	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V			1	µA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}= ±12V			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} I_D=250µA	0.65	1.05	1.45	V
$I_{D(ON)}$	On state drain current	V_{GS}=4.5V, V_{DS}=5V	30			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=5.8A		18	28	mΩ
		T_J=125°C		28	39	
		V_{GS}=4.5V, I_D=5A		19	33	mΩ
		V_{GS}=2.5V, I_D=4A		24	52	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=5.8A		33		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.7	1	V
I_S	Maximum Body-Diode Continuous Current				2	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		630		pF
C_{oss}	Output Capacitance			75		pF
C_{rss}	Reverse Transfer Capacitance			50		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	1.5	3	4.5	Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{GS}=4.5V, V_{DS}=15V, I_D=5.8A		6	7	nC
Q_{gs}	Gate Source Charge			1.3		nC
Q_{gd}	Gate Drain Charge			1.8		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=2.6Ω, R_{GEN}=3Ω		3		ns
t_r	Turn-On Rise Time			2.5		ns
$t_{D(off)}$	Turn-Off DelayTime			25		ns
t_f	Turn-Off Fall Time			4		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=5.8A, dI/dt=100A/µs		8.5		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=5.8A, dI/dt=100A/µs		2.6		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A =25° C. The value in any given application depends on the user's specific board design.
B. The power dissipation P_D is based on $T_{J(MAX)}$=150° C, using ≤ 10s junction-to-ambient thermal resistance.
C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150° C. Ratings are based on low frequency and duty cycles to keep initial T_J=25° C.
D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300µs pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-ambient thermal impedence which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}$=150° C. The SOA curve provides a single pulse rating.

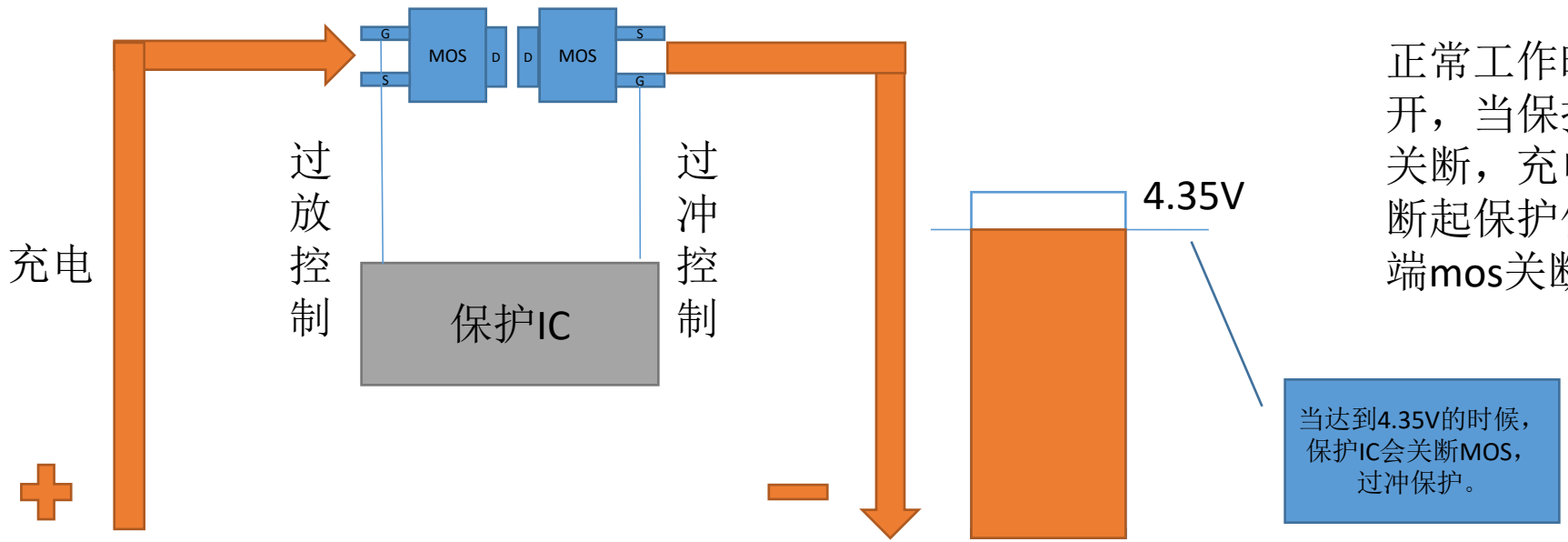
MOS管应用----锂电池保护板



锂电池充电、放电保护开关



MOS管应用----锂电池保护板



正常工作时，两个mos都打开，当保护时，两个mos都关断，充电时，后端mos关断起保护作用，放电时，前端mos关断起保护作用。

MOS管应用----锂电池保护板

产品选型要点要求：

VDS=串数乘4.35V乘120%

ID =实际过流*2*2,假设设定过流5A，那么要选用10A，余量选择20A的MOS

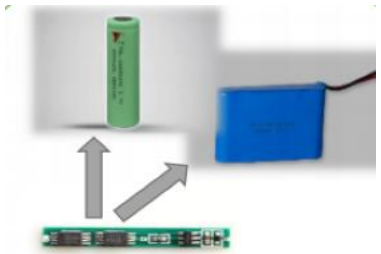
余量参数参考MOS参数EAS 雪崩电流

VGS=IC的工作电压，常规单节-两串锂电池的保护IC是10V工作电压，因此选型可以用VGS±12V，3串以上IC工作电压一般都是在12V，因此要求3串以上的使用VGS±20V/25V/30V

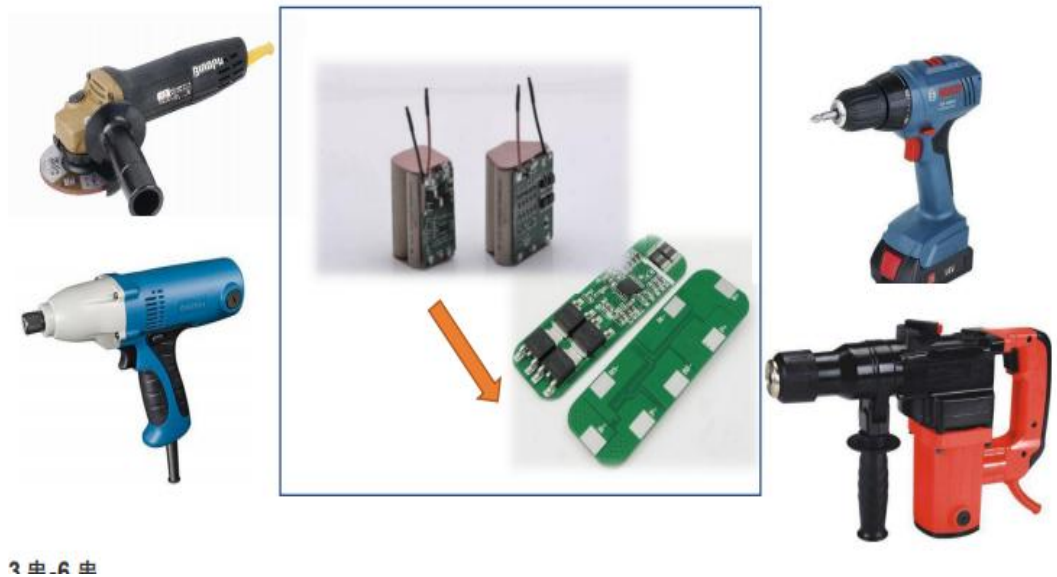
产品关键指标：EAS，GFS，RDS，VDS，CISS

MOS管应用----锂电池保护板

单双节

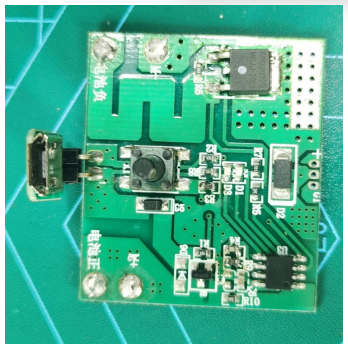


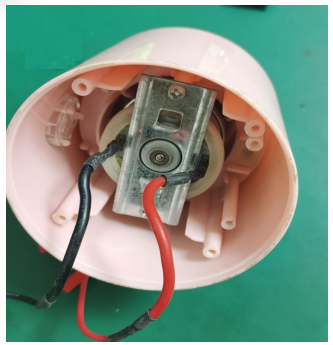
3-6串



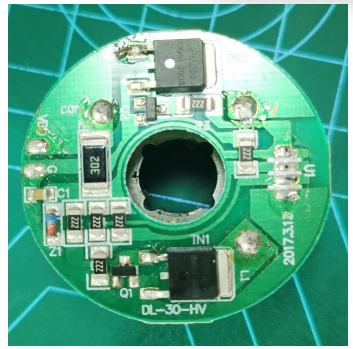
MOS管应用----电机

果汁杯



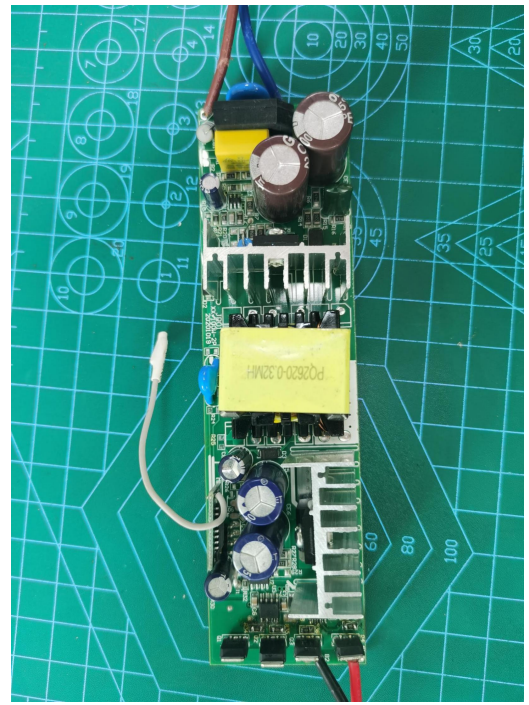


散热风扇



筋膜枪

MOS管应用----LED灯



谢谢观看