

MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

MSAP3019AKTR-G1

Product specification

概述

MSAP3019AKTR-G1 系列是一款固定频率、恒定电流的升压 DC/DC 控制器，主要用于手机、PDA 和数码相机等设备上的白光背光 LED 驱动。采用单节锂电池输入，可以支持到 2P6S 输出。芯片内置 22V 输出 OVP，确保当 LED 开路时，芯片安全工作。

MSAP3019AKTR-G1 的使能端支持高频 PWM 调光功能，最高频率可以支持到 100KHz，在高频 PWM 调光时，芯片具有良好的线性度，最小占空比可以支持到 2%。

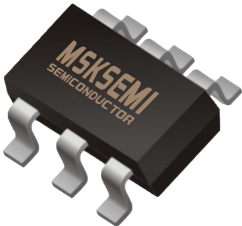
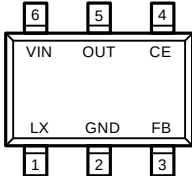
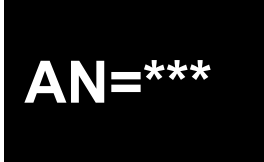
特性

- 输出耐压： 最大可以达到 22V
- 振荡频率： 1.5MHz±20%
- 效率： 88%
- 工作控制模式： PWM 控制的电流模工作模式
- 待机功耗： 最大 1.0μA
- PWM 调光： 最小调光 2%，调光频率 100KHZ

应用

- LED 背光驱动
- 护眼灯

引脚描述和标记

SOT-23-6	引脚排列	管体标记
		

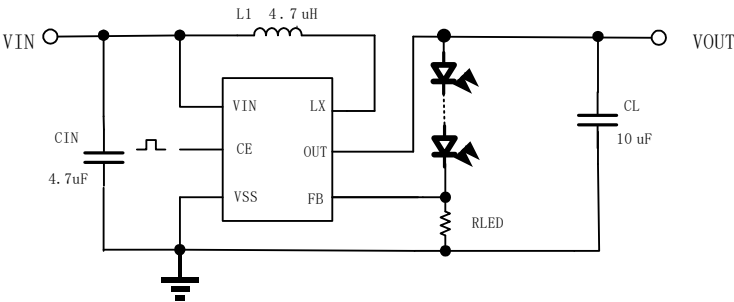
引脚定义

引脚号	引脚名	功能描述
1	LX	SWITCH端
2	GND	接地
3	FB	电压反馈端
4	CE	芯片使能端
5	OVP	过压保护
6	V _{IN}	电源输入

订货信息

料号	封装	包装
MSAP3019AKTR-G1	SOT-23-6	3000PCS

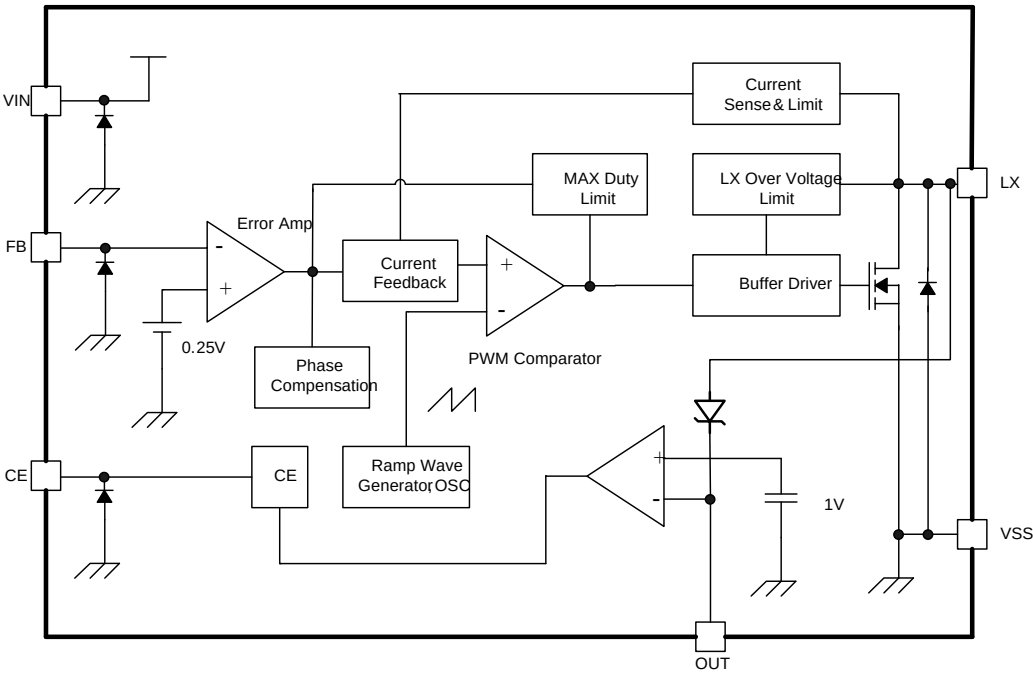
应用电路



MSAP3019AKTR-G1典型应用电路

注:电路中 $R_{LED}=V_{FB}/I_{LED}$, V_{FB} 为 FB 端输出电压, I_{LED} 为流过 LED 灯的电流。CL 必须使用 10uF 以上电容;

功能框图



MSAP3019AKTR-G1系统框图

绝对最大额定值

项目	符号		绝对最大额定值	单位
输入电压	V_{IN}		$V_{SS}-0.3 \sim V_{SS}+7$	V
LX电压	V_{LX}		$V_{SS}-0.3 \sim V_{SS}+28$	
FB端电压	V_{FB}		$V_{SS}-0.3 \sim V_{SS}+7$	V
CE端电压	V_{CE}		$V_{SS}-0.3 \sim V_{SS}+7$	V
LX端电流	I_{LX}		1000	mA
OUT端电压	V_{out}		$V_{SS}-0.3 \sim V_{SS}+28$	V
容许功耗	PD	SOT23-6	250	mW
工作环境温度	T_{opr}		$-40 \sim +85$	$^{\circ}C$
保存温度	T_{stg}		$-55 \sim +125$	

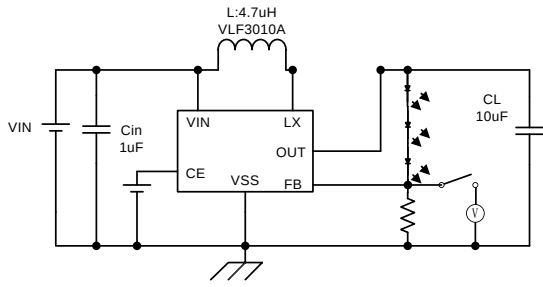
注意：绝对最大额定值是指在任何条件下都不能超过的额定值。万一超过此额定值，有可能造成产品劣化等物理性损伤。

电学特性参数

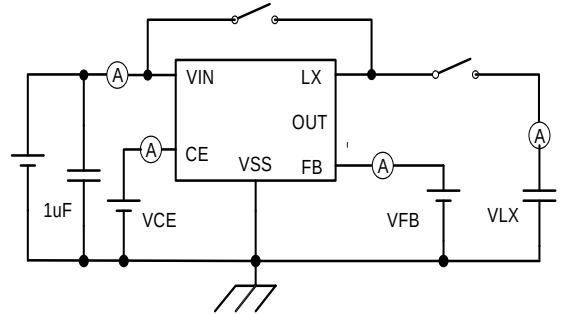
($T_A=25^{\circ}C$ unless otherwise noted)

项目	符号	条件	最小值	典型值	最大值	单位	测试电路
FB 控制电压(*1)	V_{FB}	-	0.24	0.25	0.26	V	1
工作电压	V_{IN}	-	2.5	-	6		
待机电流	ISTB	$V_{CE}=0V, V_{LX}=5V$	-	-	1	μA	3
消耗电流 1	IDD1	-	-	2550	-	μA	2
消耗电流 2	IDD2	$V_{IN}=V_{LX}, V_{FB}=0.4V$	-	150	-		3
振荡频率	FOSC	-	1.2	1.5	1.8	MHz	2
最大占空比	MAXDTY	$V_{CONT}=0.4V$	80	88	92	%	2
效率	EFFI	$V_{IN}=3.6V; R_{LED}=20\Omega$	-	88	-	%	1
电流限制	I_{LIM}	$V_{IN}=3.6$	-	800	-	mA	4
OVP 端过压保护	OVPL	-	20	22.5	25	V	2
LX 导通电阻	-	$V_{IN}=3.6V, V_{LX}=0.4V$	-	1.5	-	Ω	2
LX 端漏电	I_{LXL}	-	-	0	1	μA	3
CE 端高电压	V_{CEH}	-	1	-	-	V	2
CE 端低电压	V_{CEL}	-	-	-	0.6	V	2
CE 高电流	I_{CEH}	同 IDD2	-	-	0.1	μA	3
CE 低电流	I_{CEL}	同 ISTB	-	-	-0.1	μA	3
FB 高电流	I_{CEH}	同 IDD2	-	-	0.1	μA	3
FB 低电流	I_{CEL}	同 ISTB	-	-	-0.1	μA	3

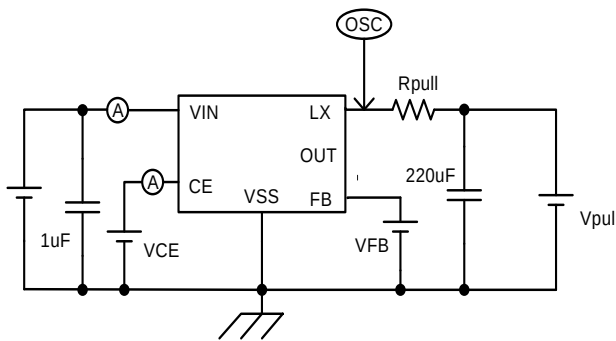
测试电路



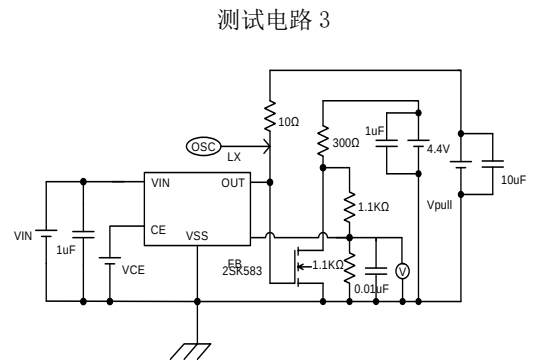
测试电路 1



测试电路 2



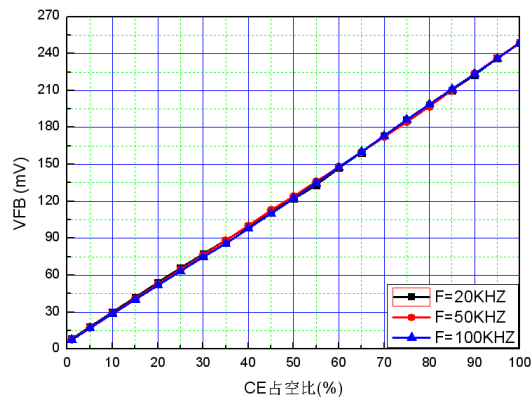
测试电路 3



测试电路 4

注：所有测试电路中 $R_{LED} = V_{FB} / I_{LED}$, V_{FB} 为 FB 端输出电压, $I_{LED} = 20mA$; 如 $V_{FB} = 0.25V$, 则 $R_{LED} = 12.5\Omega$

特性曲线



不同频率下 PWM 调光结果 ($V_{IN} = 3.8V$, $C_{IN} = 4.7\mu F$, $C_L = 10\mu F$, $L = 4.7\mu H$)

应用信息

- LED 电流设定

升压回路提供的电压可以保证 FB 电压与内部基准电压相等，因此当 R_{LED} 接到 FB 与 GND 上时，V_{OUT} 流过 LED 的电流和 R_{LED} 流到 GND 的电流可以由 R_{LED} 设定，电流计算公式如下：

$$I_{LED}=0.25/R_{LED}$$

- 调光控制

PWM 型号接 CE 脚调节方式

对于亮度，当 CE 脚接高电平时，芯片内部提供一个典型的 0.25V 的基准电压，可以使亮度达到最大。但是，也可以接一个 PWM 信号到 CE 脚，通过来调整 PWM 信号的占空比来调整这个基准电压，占空比和基准电压的关系根据以下公式计算：

$$V_{FB} = \text{Duty} \times 250\text{mV}$$

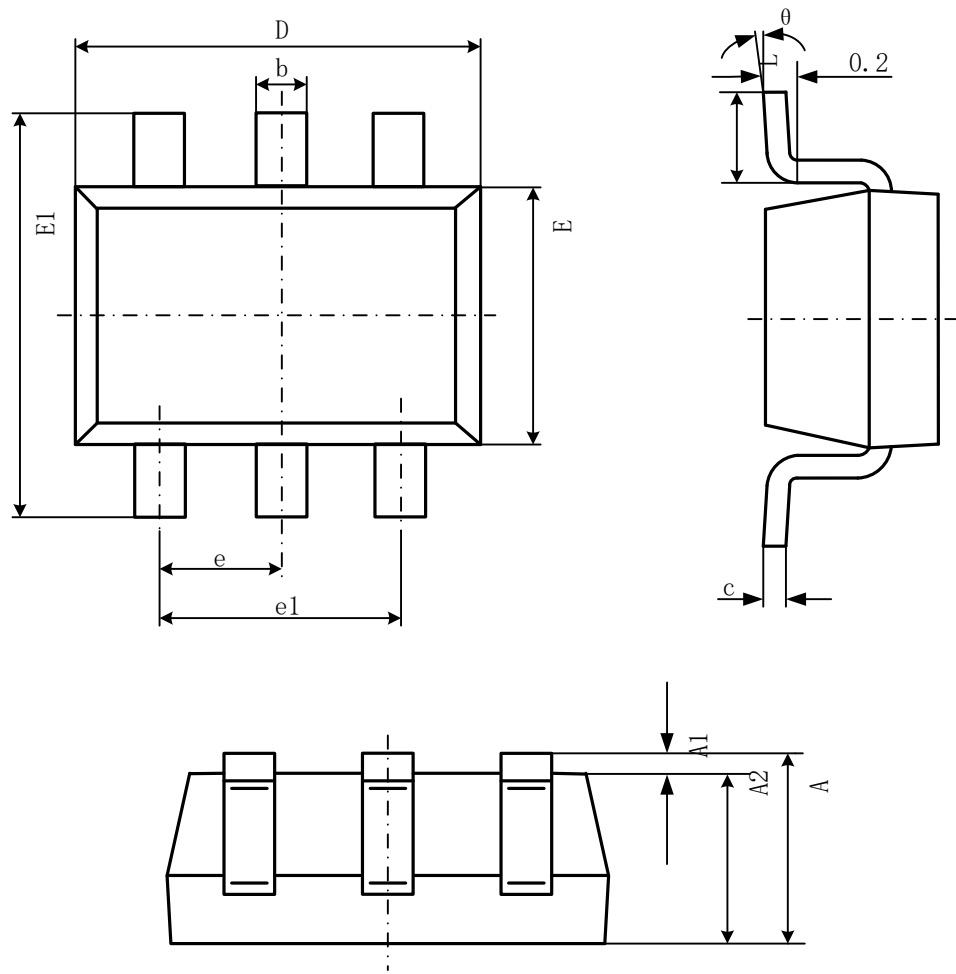
Duty 是占空比，250mV 是内部基准，调光频率最高可以支持到 100KHZ;

- 电容

输入采用 1uF 电容，输出电容要求大于 10uF，否则可能导致输出不稳定，输入和输出电容都要求靠近芯片端；

封装信息

- SOT23-6



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
Z	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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