AP1923 (Preliminary)

High Power Factor and High Current Accuracy LED Driver with MOS Built-in

Features

- **Accuracy constant current over global input voltage**
- **Boundary Conduction Mode control**
- **High Efficiency and Power Factor**
- **NMOS Switch Built-in**
- **Input & Output Over Voltage Protection**
- **Over Current Protection**
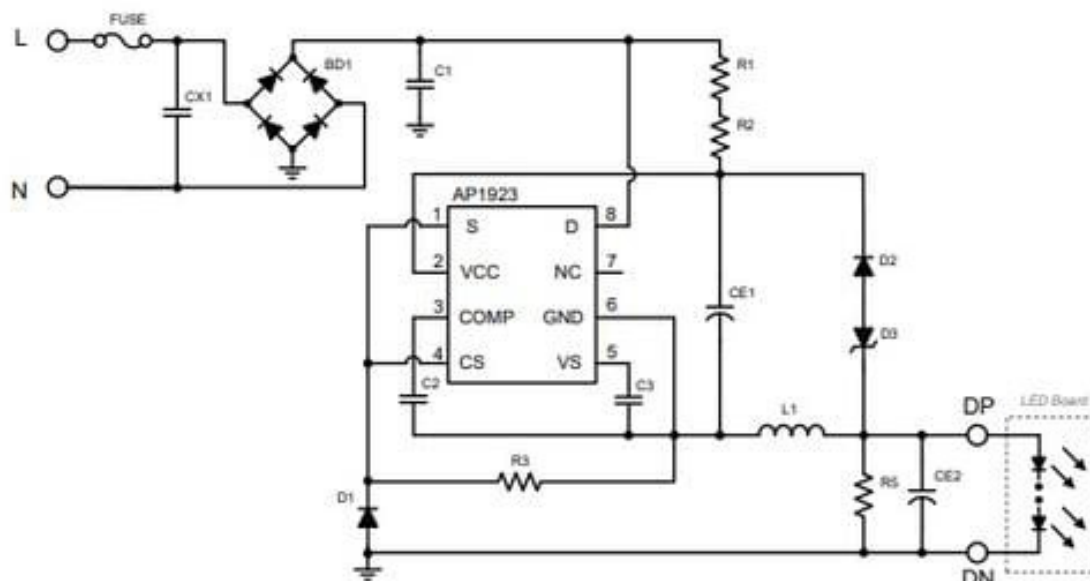- **Requires few external components**
- **SOIC-8 Package**

Applications

- LED driver applications
- General purpose constant current source
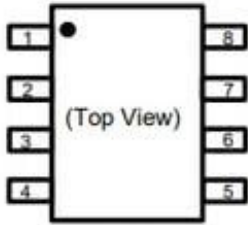- Non-isolation LED bulb

General Description

The AP1923 is a high-efficiency LED driver control IC with a 500V/3A NMOS switch built-in. It drives LEDs with accurate constant current and uses fewer components. The AP1923 is a close loop, current mode control IC, and operates under Boundary Conduction Mode. The AP1923 is recommended in buck LED driver applications and provided with input over voltage protection, and over current protection. AP1923 also has LED short protection and output over-voltage protection with proper system design (refer to Typical Application Circuit). The controller achieves high power factor, low THD, and excellent output current regulation.

Typical Application Circuit

Ordering Information

AP1923 – ☐ ☐

— Package Code
— Lead Free Code

Lead Free Code :

P : Commercial Standard, Lead (Pb) Free and Phosphorous (P) Free Package

G : Green (Halogen Free with Commercial Standard)

Package Code :

A : SOIC-8

Package Marking Information

SOIC-8
(Top View)

AP1923
①②③④

① **Represents Products Lead Free type**

Mark	Description
G	Green (Halogen Free)

② **Represents Package**

Mark	Description
A	SOIC-8

③,④ **Represents Products Series**

Description
Date code

Example :

AP1923
GAYR

Part No.:AP1923-GA
Year Code:2017
Week Code: 12th week
Green (Halogen Free)

Pin Description

Part No.	Pin	Symbol	Pin Description
(Top View) SOIC-8	1	S	Source pin of internal NMOS switch.
	2	VCC	Power supply input.
	3	COMP	Feedback loop compensation.
	4	CS	Current sense pin.
	5	VS	Current compensation. Connect a capacitor between VS and GND pin.
	6	GND	Ground pin.
	7	NC	Not connected.
	8	D	Drain pin of internal NMOS switch.

Absolute Maximum Ratings

Parameter (PIN)		Symbol	Ratings	Units
D to S		--	500	V
VCC to GND		--	40	V
VS, CS, COMP to GND		--	7	V
Junction Temperature		T_J	+150	°C
Power Dissipation	SOIC-8	P_D	630	mW
Thermal Resistance	SOIC-8	θ_{JA}	156.5	°C/W
Operating Ambient Temperature		T_{OPR}	-40 ~ +85	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C
Lead Temperature (soldering, 10sec)		--	+260	°C

Note :
* The power dissipation values are based on the condition that junction temperature T_J and ambient temperature T_A difference is 100°C.
* Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and function operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum -rated conditions for extended periods may affect device reliability.
*Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the recommended operating conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Electrical Characteristics

(VCC=20V, C_{COMP}=10pF , T_A=25℃, unless otherwise noted.)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
VCC_ON	Start Up Threshold Voltage	DC input voltage	12	15	18	V
VCC_MIN	Minimum Operating Voltage			7.5		V
ICC_ST	Start-up Current	VCC= VCC_ON -1V		15		uA
ICC_OP	Operating Current (no switching)	V_{CS}=0V, D floating		1	2	mA
VCC_OVP	VCC Over-Voltage Protection Level		27.5	30	32.5	V
TD_OVP	Over-Voltage Protection Debounce Time *			130		us
VCS	Current Sense Reference Voltage		195	200	205	mV
VCS_CL	Current Sense Clamp Voltage			2.04		V
TOFF_MIN	Minimum Switch Turn OFF Time		3.2	4.0	4.8	us
TON_MIN	Minimum Switch Turn ON Time		0.5	0.9	1.3	us
RDS(ON)	D-S Switch On Resistor *	I_D=1.5A		3		Ω

Note * : TD_OVP and RDS(ON) are guaranteed by designer.

AP1923 Function Block Diagram