Constant Voltage and Constant Current Controller

REV. 00

General Description

The LD8106 is built-in with a high-accuracy 1.212V reference voltage, two op-amps and a low-side current sensing circuit in a SOT-26 package. It provides a highly integrated solution for CV (constant voltage) and CC (constant current) dual control. The LD8106 is capable to operate under temperature ranging from -40°C to 105°C.

Features

- Internal Precision ±1% Voltage Reference
- Secondary-side Constant Voltage and Constant Current Control
- Low Quiescent consumption
- Wide VCC operating range 3V to 38V
- Max. 40V voltage rating
- Low external component count
- SOT-26 Package

Applications

- LED Lighting

Typical Application

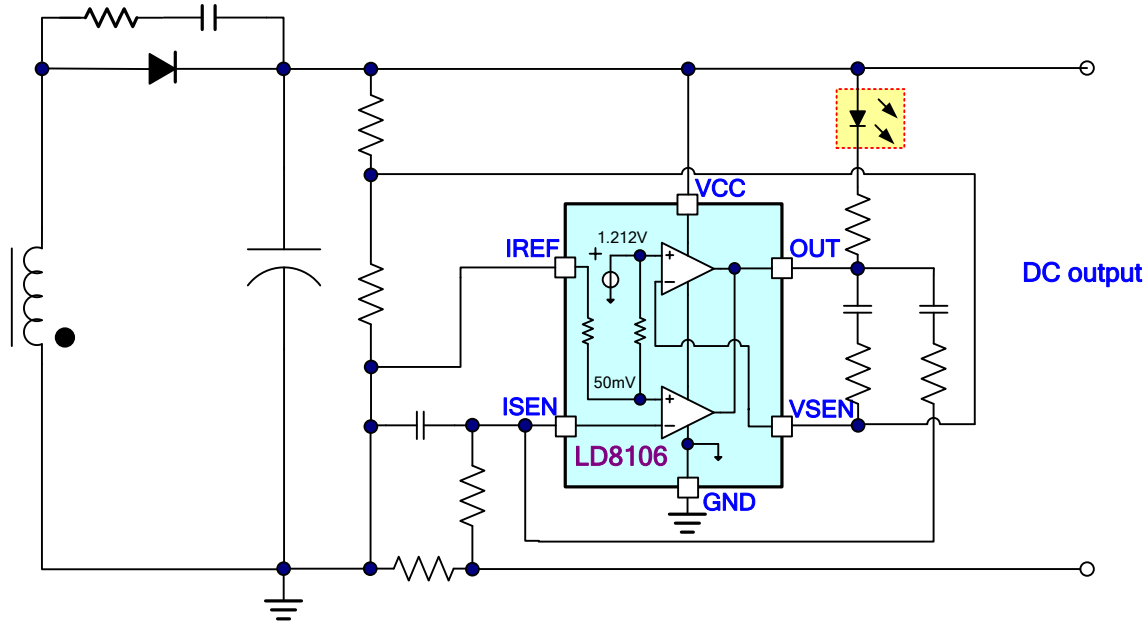


Fig. 1 Typical Application Circuit -1

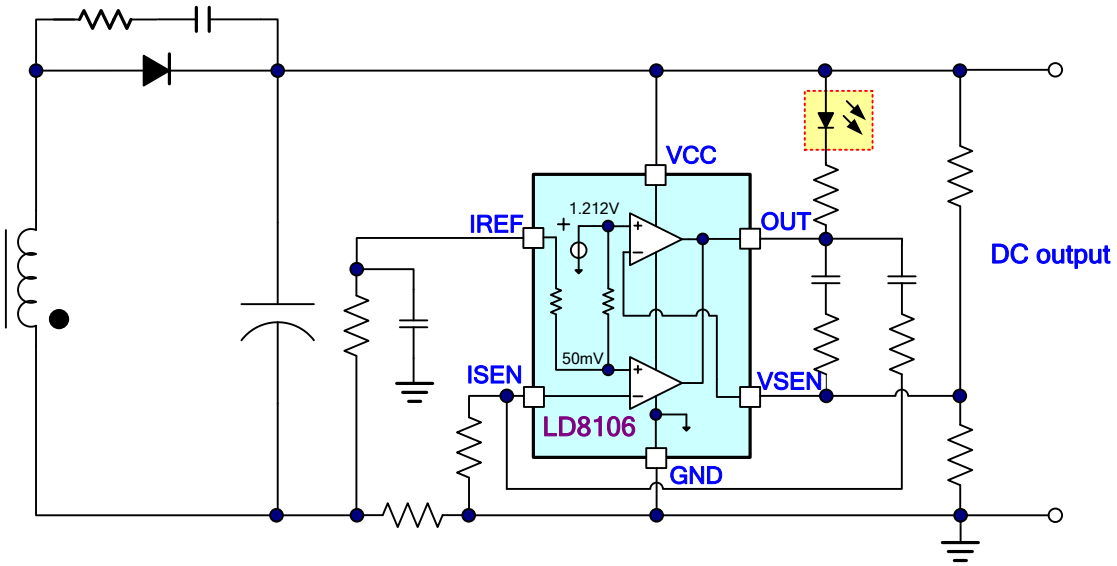
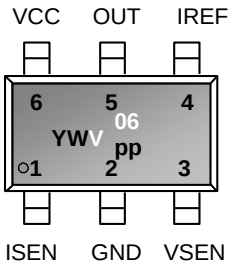


Fig. 2 Typical Application Circuit -2

Pin Configuration

SOT-26 (TOP VIEW)



Y : Year code (D: 2004, E: 2005…..)
W : Week code
PP : Production code
V06 : LD8106

Ordering Information

Part number	Package	TOP MARK	Shipping
LD8106GL	SOT-26	YWV/06	3000 /tape & reel

The LD8106 is ROHS compliant/Green packaged.

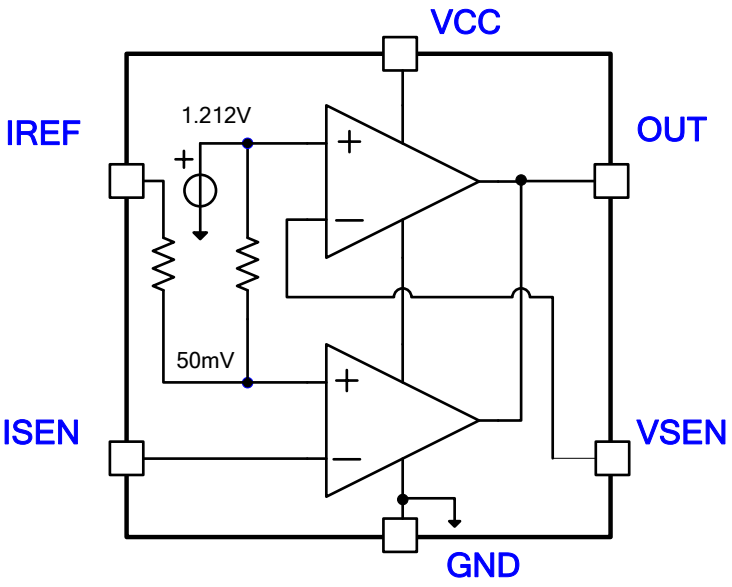
Protection Mode

Constant Current Loop	Constant Voltage Loop
Auto recovery	Auto recovery

Pin Descriptions

PIN	NAME	FUNCTION
1	ISEN	Current sense pin. The inverting input of the current loop op amp.
2	GND	Ground.
3	VSEN	Voltage sense pin. It can sense the output voltage if connected to the mid-point of the resistor divider.
4	IREF	The non-inverting input of the current loop op amp.
5	OUT	Common output pin of the two internal op amps.
6	VCC	Supply voltage pin. It is necessary to locate a 0.1μF bypass capacitor between VCC and GND.

Block Diagram



Absolute Maximum Ratings

Supply Voltage, Vcc	-0.3~40V
VSEN	-0.3~6V
ISEN	-0.3~6V
IREF	-0.6~6V
OUT	-0.3~Vcc
Maximum sinking current	20mA
Maximum Junction Temperature	150°C
Storage Temperature Range	-65°C to 150°C
Package Thermal Resistance (SOT-26, θ_{JA})	200°C/W
Power Dissipation (SOT-26, at Ambient Temperature = 85°C)	200mW
Lead temperature (Soldering, 10sec)	260°C
ESD Voltage Protection, Human Body Model	2 KV
ESD Voltage Protection, Machine Model	200 V

Caution:

Stresses beyond the ratings specified in “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Recommended Operating Conditions

Item	Min.	Max.	Unit
Supply Voltage Vcc	3	38	V
Operating Junction Temperature	-40	125	°C

Electrical Characteristics

(T_A = +25°C unless otherwise stated, V_{CC}=15.0V)

PARAMETER	CONDITIONS	Symbol	MIN	TYP	MAX	UNITS
Supply Voltage (Vcc Pin)						
Supply Voltage		VCC	3	--	38	V
Quiescent Current	ISEN = IREF = 0V, OUT = open	I_Q	--	--	150	μA
Voltage Control Loop (VSEN PIN)						
Voltage loop reference voltage, VSEN	I_{SEN} = I_{REF} = 0V	V_{SEN}	1.120	1.212	1.224	V
	I_{SEN} = I_{REF}= 0V, (T_A = -20°C ~125°C)		1.188		1.236	V
Voltage Loop Input Bias Current	V_{SEN} = 1.18V~1.24V	I_{CV_BIAS}	--	20	--	nA
Current Control Loop (IREF Pin)						
Current loop reference voltage	V_{SEN} = 1.21V	V_{ISEN}	48.5	50	51.5	mV
Current Loop Input Bias Current	I_{REF}= 45mV~55mV	I_{CC_BIAS}	--	4.8	--	μA
Output (Output Pin)						
Output Low Level	@2mA sink current	V_{OUTL}	--	200	400	mV

Typical Performance Characteristics

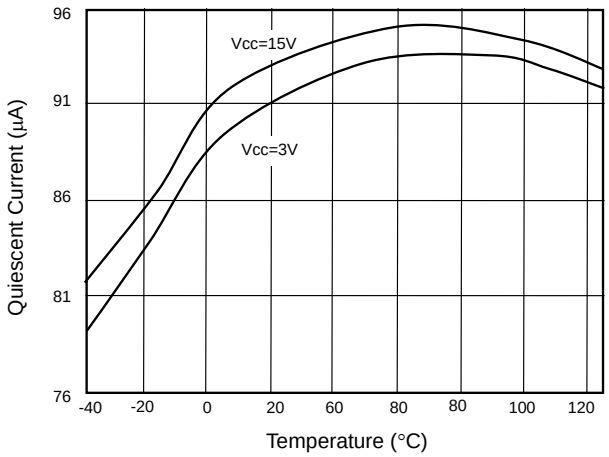


Fig. 1 Quiescent Current vs. Temperature

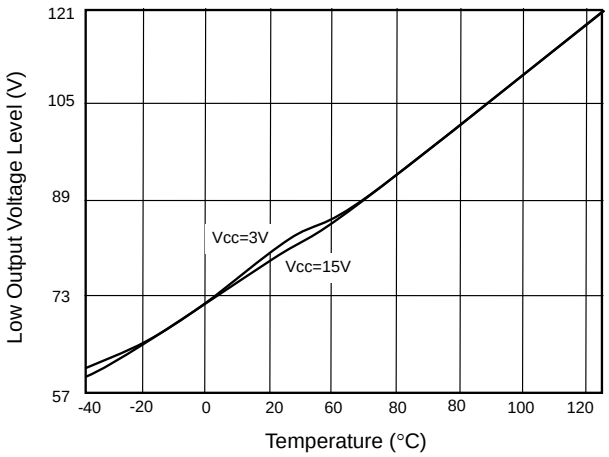


Fig. 2 Low Output Voltage Level vs. Temperature

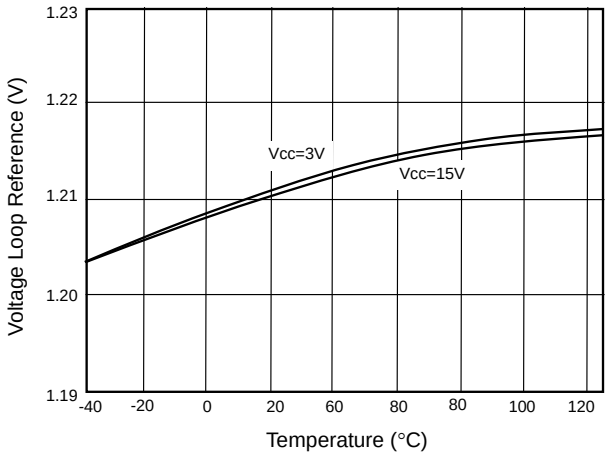


Fig. 3 Voltage Loop Reference vs. Temperature

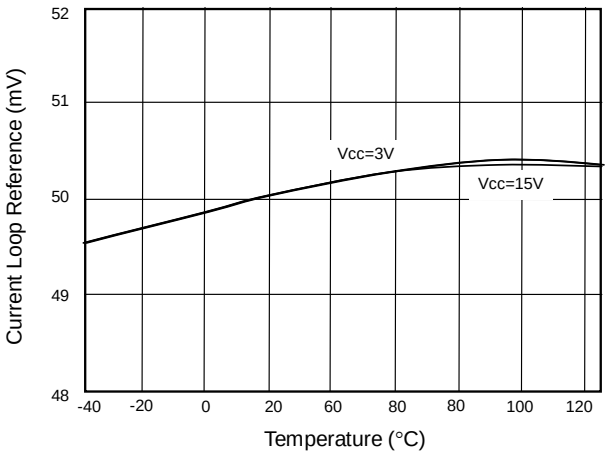


Fig. 4 Current Loop Reference vs. Temperature

Application Information

Basic Description

The LD8106 built two Op-Amps including high-accuracy reference voltage and dimmable function. The CV (Constant voltage) loop Op-Amp is designed for voltage control with it is non-inverting input internally connects to the output of the shunt regulator. The CC (Constant Current) loop Op-Amp is current control with a low-side sense resistor. The sense resistor determines the current regulation value. And the external R-C components can compensate the two control loops.

Maximum Output Voltage Setting

The main of the voltage control loop are an Op-amp and high-accuracy reference voltage. The VSEN pin is inverting input of the internal Op-amp. It connected to the mid-point of a resistor divider that senses the senses the output voltage. The internal precision reference is 1.21V. The OUT pin is connected Photo-coupler with limit resistor to error signal to primary side for output voltage regulation. The maximum output voltage is determined by following relationship:

$$V_{OUT\_MAX} = V_{VSEN} \times (1 + \frac{R_A}{R_B})$$

Where R_A and R_B are top and bottom feedback resistor values

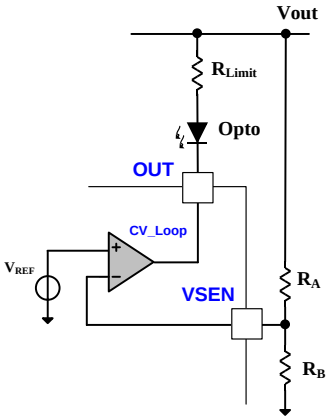


Fig. 5

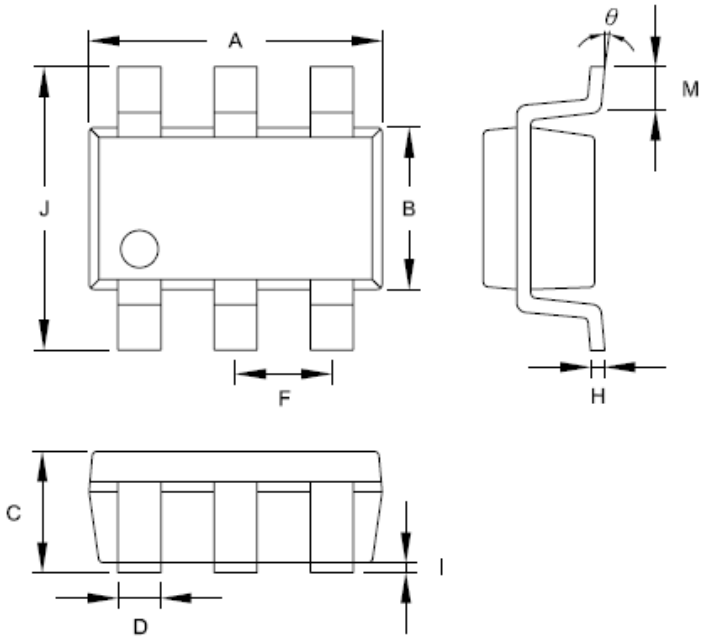
Constant Current Control Loop

The Constant current loop includes an Op-amp and the current sensing resistor. The ISEN pin is inverting input of the current loop op amp. This pin is tied to the end of the current sense resistor through a decoupling resistor and the threshold voltage is 50mV. The maximum current can be obtained from below.

$$I_{OUT} = \frac{50mV}{R_{SEN}}$$

Package Information

SOT-26



Symbol	Dimension in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	2.692	3.099	0.106	0.122
B	1.397	1.803	0.055	0.071
C	-------	1.450	-------	0.057
D	0.300	0.500	0.012	0.020
F	0.95 TYP		0.037 TYP	
H	0.080	0.254	0.003	0.010
I	0.050	0.150	0.002	0.006
J	2.600	3.000	0.102	0.118
M	0.300	0.600	0.012	0.024
θ	0°	10°	0°	10°

Important Notice

Leadtrend Technology Corp. reserves the right to make changes or corrections to its products at any time without notice. Customers should verify the datasheets are current and complete before placing order.

Revision History

REV.	Date	Change Notice
00	05/03//2017	Original Specification