

## Primary Feedback PWM Controller for Flyback Application

### Features

- Primary Feedback Control without Secondary Feedback Signal
- Constant-Voltage(CV) and Constant-Current(CC) Regulation
- Pulse by Pulse Current Limiting
- Low Start-Up Current (6uA)
- Fixed 40KHz Switching Frequency for Driving BJT
- Built-In Soft Start
- Wide VCC Operation Range
- VCC Over-Voltage Protection
- Output Over-Voltage Protection
- Cable Compensation for CV Regulation
- SOT-26 Package, with Few External Components Needed

### Description

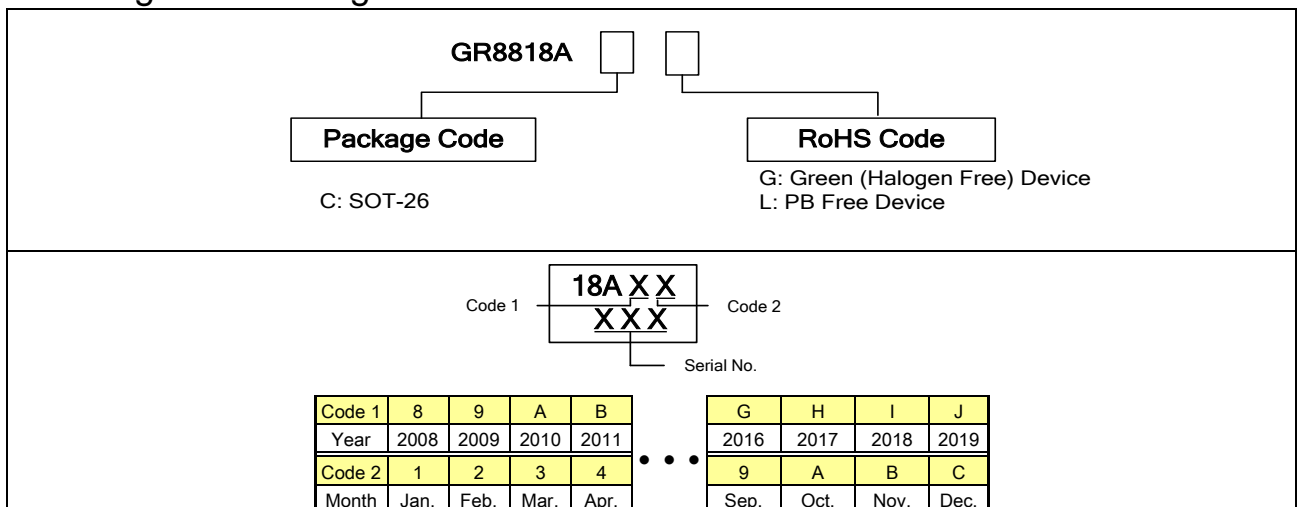
The GR8818A is an excellent primary side feedback controller. It's integrated constant voltage (CV) and constant current (CC) regulation functions. While it operates on CV mode, it's built-in the cable compensation to compensate the voltage drop of the DC output cable to improve the load regulation. It minimizes the components counts and is available in a tiny SOT-26 package. Those make it an ideal design for low cost applications.

It provides functions of low startup current, green-mode power-saving operation,. Also, the GR8818A is built-in the VCC over-voltage protection and FB pin to prevent the circuit being damaged from the abnormal conditions.

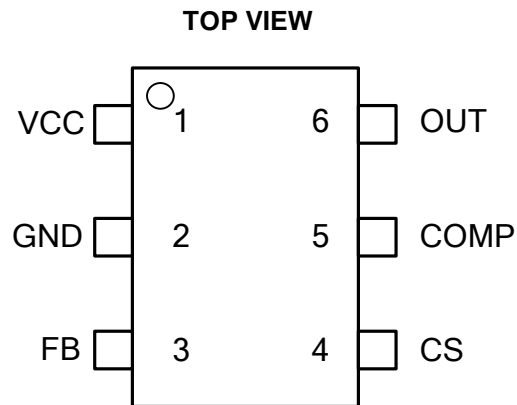
### Application

- Low Power Adapter
- Cell Phone Charger
- Replacement for Linear Adapter

### Ordering and Marking Information



Greenergy OPTO Inc. reserves the right to make changes to improve reliability or manufacture ability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

**Pin Configuration**

**Pin Description**

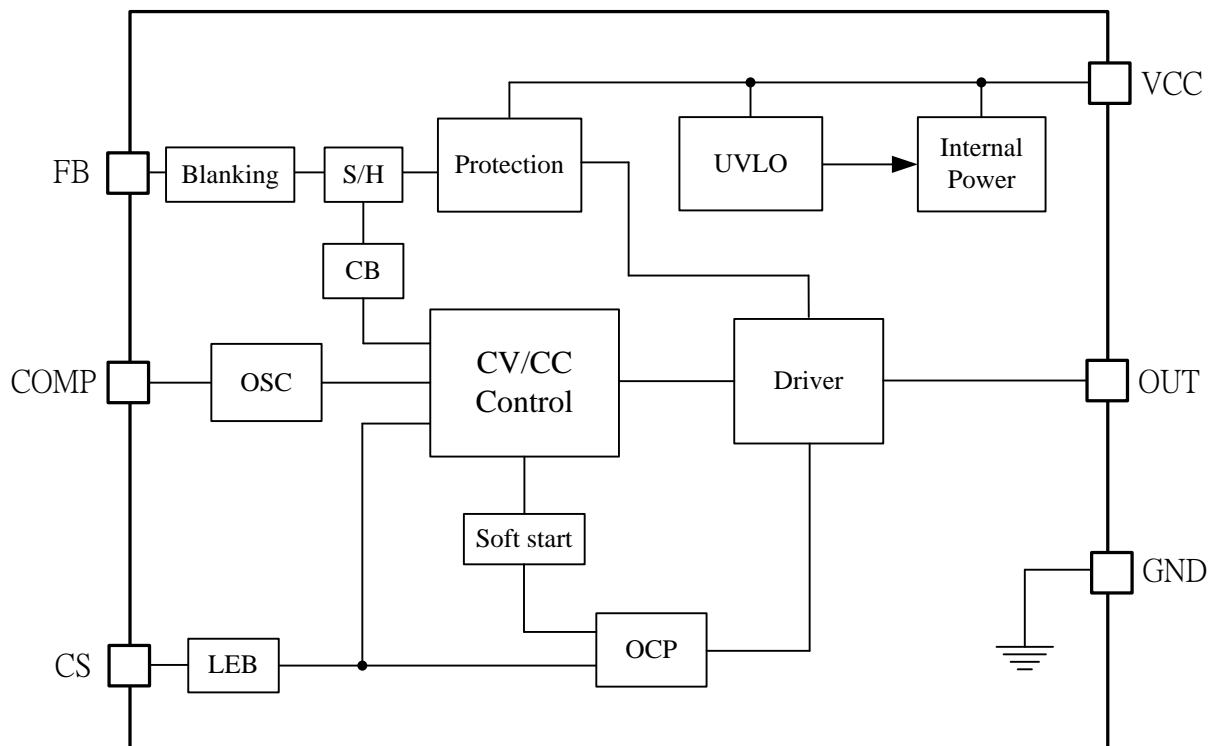
Pin No.	Name	Function
1	VCC	Power supply pin
2	GND	Ground
3	FB	Connecting to a resistor divider from aux. winding to ground, the resistor divider ratio determines the aux. winding and secondary output voltage
4	CS	Current sense pin, connect to sense the power transistor current
5	COMP	Voltage loop Gm error amplifier output, by connecting an R series with C to GND to stabilize the control loop
6	OUT	The output driver for driving the external power transistor

**Absolute Maximum Ratings**

Supply Voltage VCC	28V
COMP, FB, CS	-0.3 ~ 7V
OUT	-0.3~4.0V
Junction temperature	150°C
Operating ambient temperature	-20°C to 85°C
Storage temperature range	-65°C to 150°C
Package thermal resistance (SOT-26)	250°C/W
Power dissipation (SOT-26, at ambient temperature = 85°C)	250mW
Lead temperature (Soldering, 10sec)	260°C
ESD voltage protection, human body model	3.0 KV
ESD voltage protection, machine model	300 V

**Recommended Operating Conditions**

Item	Min.	Max.	Unit
Supply Voltage VCC	7	20	V

**Block Diagram**


**Electrical Characteristics** (VCC = 15V, TA = 25°C, unless otherwise specified.)

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
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**VCC SECTION**

Continuously Operating Voltage		V <sub>OP</sub>			25	V
On Threshold Voltage		V <sub>TH-ON</sub>	10.0	11.0	12.0	V
Off Threshold Voltage		V <sub>TH-OFF</sub>	4.5	5.5	6.5	V
Start-Up Current	VCC = 9.5V before UVLO start	I <sub>CC-ST</sub>	2	6	10	uA
Operating Supply Current	VCC = 15V, F <sub>S</sub> = F <sub>OSC</sub> , C <sub>L</sub> = 1nF	I <sub>CC-OP</sub>	0.8	1.5	2.0	mA
VCC OVP		V <sub>OVP</sub>	27	28	29.5	V

**OSCILLATOR SECTION**

Normal PWM Frequency		F <sub>OSC</sub>	38	40	42	KHz
Minimum Frequency at No-Load		F <sub>OSC-N-MIN</sub>		500		Hz
Jitter Range				+/-3		%

**ERROR AMPLIFIER**

Output Source Current				40		uA
Output Sink Current				40		uA
Minimum Output Voltage				0.5		V
Green Mode Start Voltage	F <sub>OSC</sub> - 1KHz			1.8		V

**CURRENT-SENSE SECTION**

Input Impedance		Z <sub>CS</sub>	1			MΩ
Peak Current Limitation		V <sub>CSTH</sub>	1.0	1.1	1.2	V
Propagation Delay				150		nS
Leading-edge blanking time				500		nS

**FB PIN**

Feedback Input Voltage		V <sub>FB</sub>	1.97	2	2.03	V
V <sub>FB</sub> Variation versus VCC Deviation				1		%
Input Bias Current		I <sub>BVS</sub>		-0.3	-2	uA
FB OVP		V <sub>FB-OVP</sub>	2.4	2.5	2.6	V

**OUT SECTION**

Minimum Base Driving Current		I <sub>bmin</sub>		10		mA
Maximum Base Driving Current		I <sub>bmax</sub>		30		mA
R <sub>dson</sub> Pull Low	I <sub>sink</sub> =5mA	R <sub>ds</sub>		1		Ω
Soft Start		T <sub>SS</sub>		4		mS

## Application Information

The GR8818A is a primary feedback PWM controller for flyback converter application. It is suitable for low output wattage below 5W and small size AC/DC converter. It is required only

very few external components to achieve application. The typical application circuit is shown in below Fig.1.

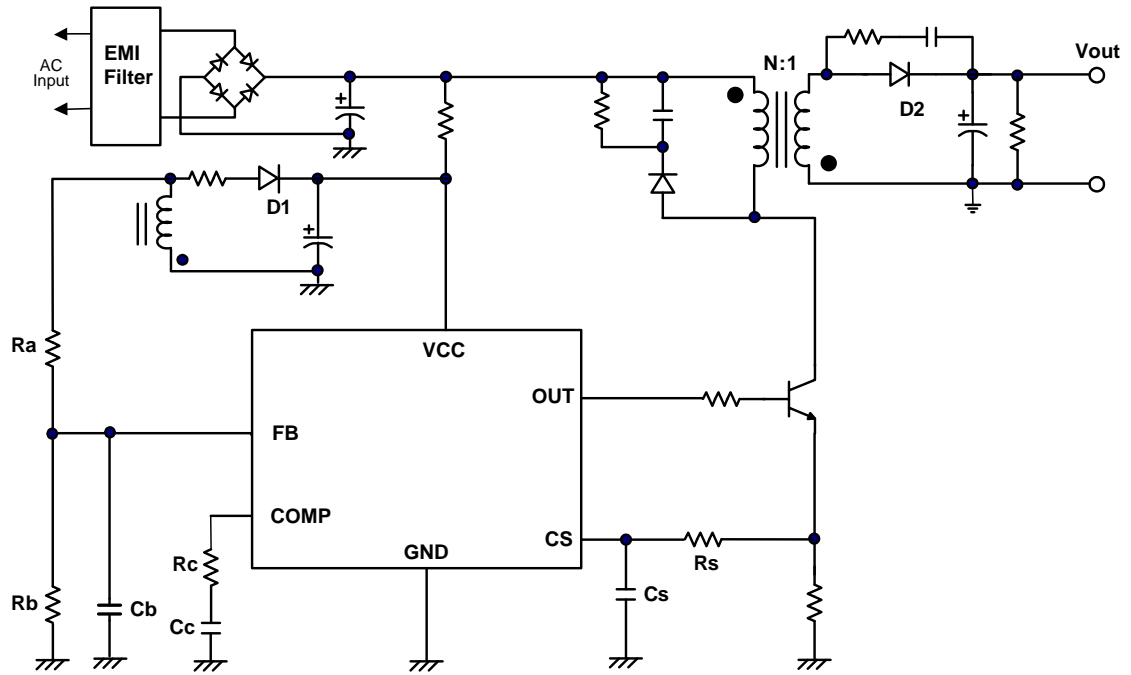
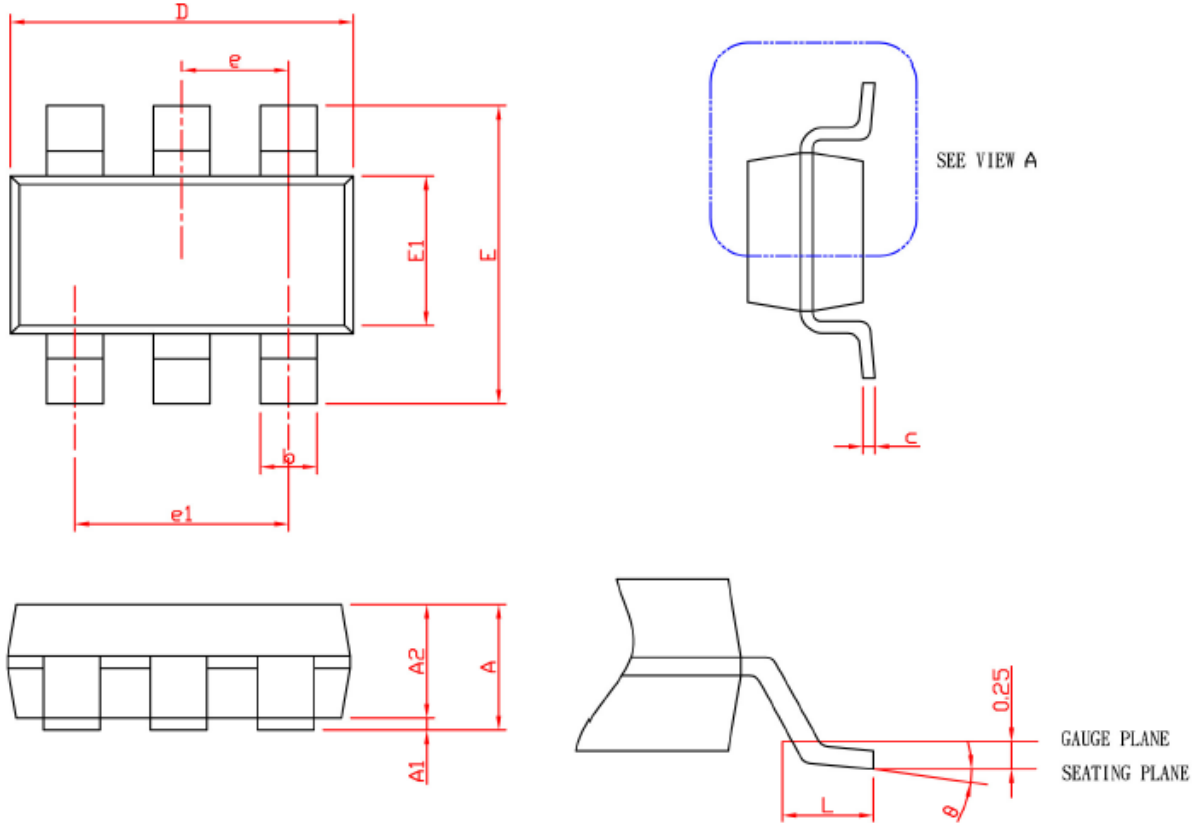


Fig.1.

## Package Information

### SOT-26



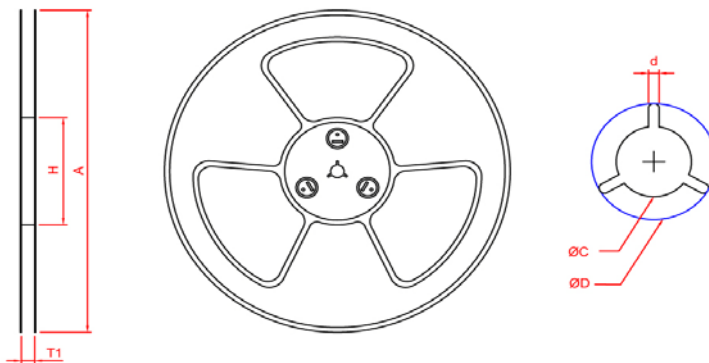
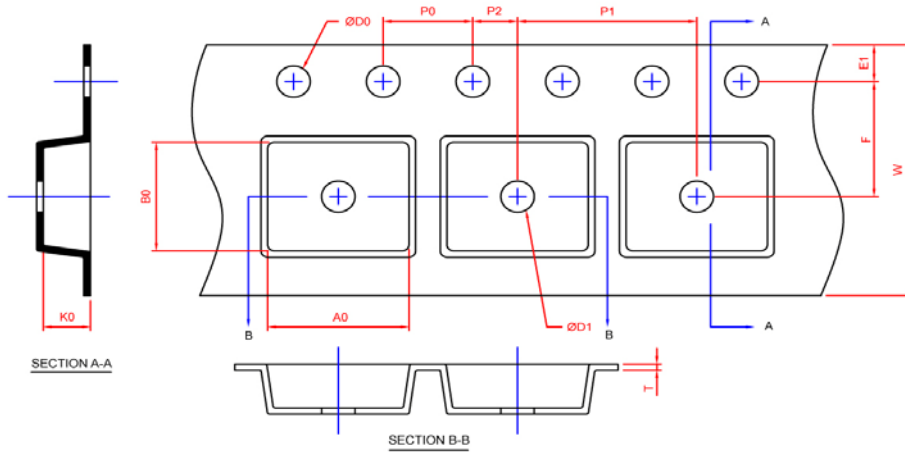
SYMBOL	SOT-26			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A		1.45		0.057
A1	0.00	0.15	0.000	0.006
A2	0.90	1.30	0.035	0.051
b	0.30	0.50	0.012	0.020
c	0.08	0.22	0.003	0.009
D	2.70	3.10	0.106	0.122
E	2.60	3.00	0.102	0.118
E1	1.40	1.80	0.055	0.071
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.30	0.60	0.012	0.024
$\theta$	0°	8°	0°	8°

Note: 1. Followed from JEDEC TO-178 AB.

2. Dimension D and E1 do not include mold flash, protrusions or gate burrs. Mold flash, protrusions or gate burrs shall not exceed 10 mil per side

## Carrier Tape & Reel Dimensions

SOT-26



Application	A	H	T1	C	d	D	W	E1	F
<b>SOT-26</b>	178.0±2.00	50 MIN.	8.4+2.00 -0.00	13.0+0.50 -0.20	1.5 MIN.	20.2 MIN.	8.0±0.30	1.75±0.10	3.5±0.05
	<b>P0</b>	<b>P1</b>	<b>P2</b>	<b>D0</b>	<b>D1</b>	<b>T</b>	<b>A0</b>	<b>B0</b>	<b>K0</b>
	4.0±0.10	4.0±0.10	2.0±0.05	1.5+0.10 -0.00	1.0 MIN.	0.6+0.00 -0.40	3.20±0.20	3.10±0.20	1.50±0.20

Application	Carrier Width	Cover Tape Width	Devices Per Reel
<b>SOT -26</b>	8	5.3	3000

## Tape and Specification Reel

**SOT 26**