Description

The ACE714 PFM step-up Converter drives white LEDs with a constant current to provide backlight in cell phones, PDAs, and other handheld devices. It features allowing series connection of the white LEDs so that the LED currents are identical for uniform brightness. An enable input can be pulsed repeatedly to adjust LEDs brightness. The fast 500HKz to 2MHz operation frequency allows for smaller capacitor and inductor. Fault condition protection uses cycle-by cycle current limiting to sense maximum inductor current and over-voltage protection. The 0.2V low reference voltage minimized the power loss across the current sense resistor.

The converter can operate from 2V to 6V, and capable of delivering maximum 200mA output current at 4-LEDs application with 3V input voltage is as low as 120uA. All of these features make ACE714 be suitable for the portable devices, which are supplied by a single battery.

ACE714 is available in SOT-23-6 package that is PB free.

Features

- Up to 24V Output Voltage
- Wide Operation Range: 2V to 6V
- Maximum 2MHz Operating Frequency
- PWM Dimming Control
- Shutdown Current <1uA
- Current Limit Cycle-by-Cycle
- Low Current Sense Threshold: 200mV
- 24V Over Output Voltage Protection
- Compact SOT-23-6 Package

Application

- Compact Back Light Module
- Power Source for LED
- Constant Current Source

Typical Application

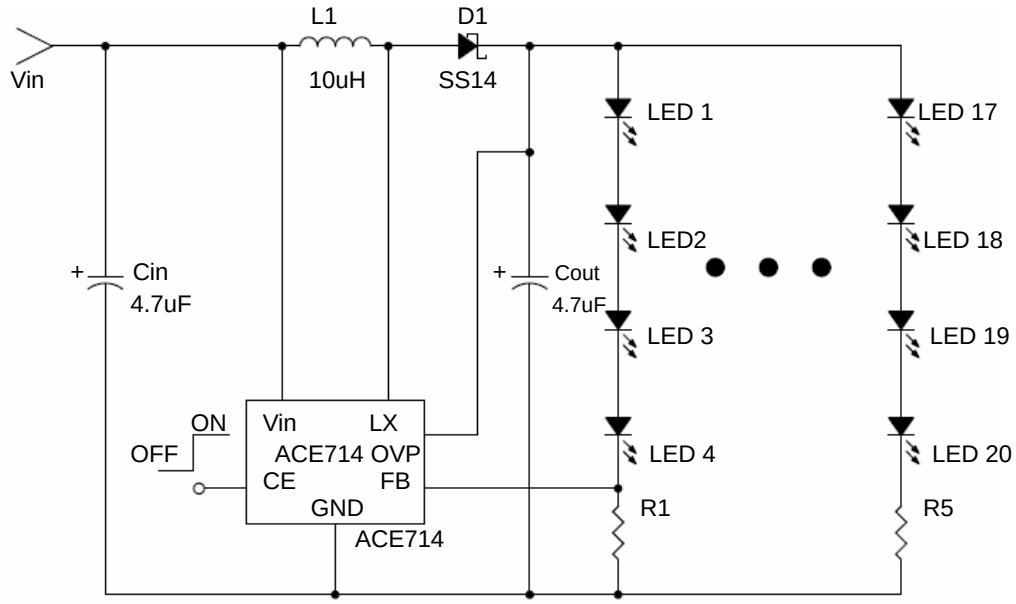


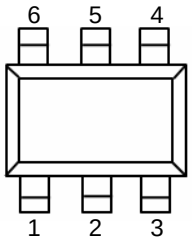
Figure 1. ACE714 Typical Application Circuit

Absolute Maximum Ratings

Parameter	Max
Input voltage	-0.3 to 8
CE Pin Voltage	-0.3 to (Vin+0.3V)
Lx Pin Output Current	1.6A
Lx Pin Voltage	24V
Operating Junction Temperature (T_J)	125℃
Ambient Temperature (T_A)	-40℃ to 85℃
Power Dissipation SOT-23-6	250mW
Storage Temperature (Ts)	-40℃ to 150℃

Packaging Type

SOT-23-6



Pin	SOT-23-6	Function
LX	1	Switching Pin
GND	2	Ground Pin
FB	3	Pin for Feedback Voltage
CE	4	Chip Enable Pin (Active with “H”)
OVP	5	Over Voltage Protection
VIN	6	Power Supply Pin

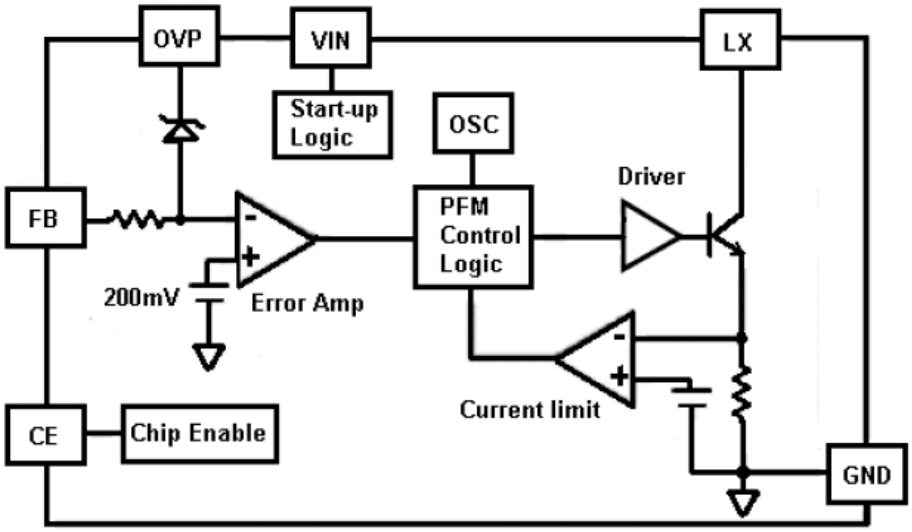
Ordering Information

Selection Guide

ACE714 XX + H

- Halogen - free
- Pb - free
- GM : SOT-23-6

Block Diagram

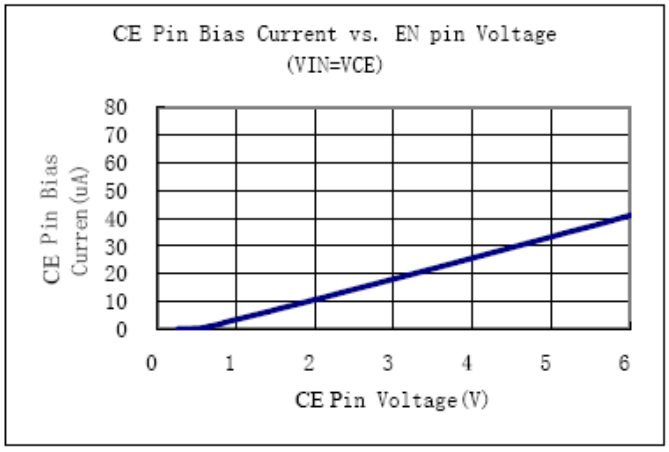


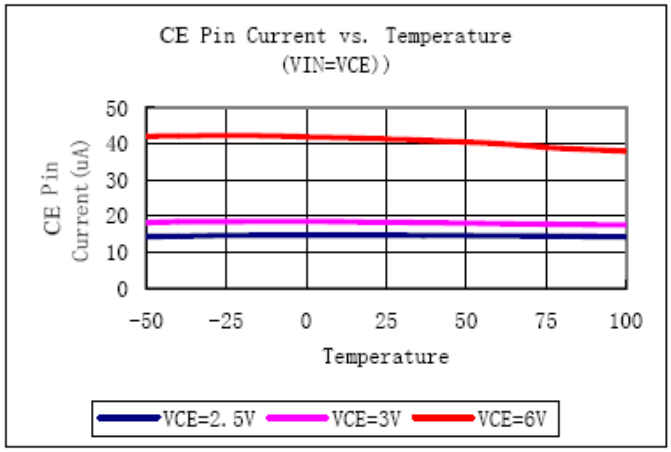
Electrical Characteristics

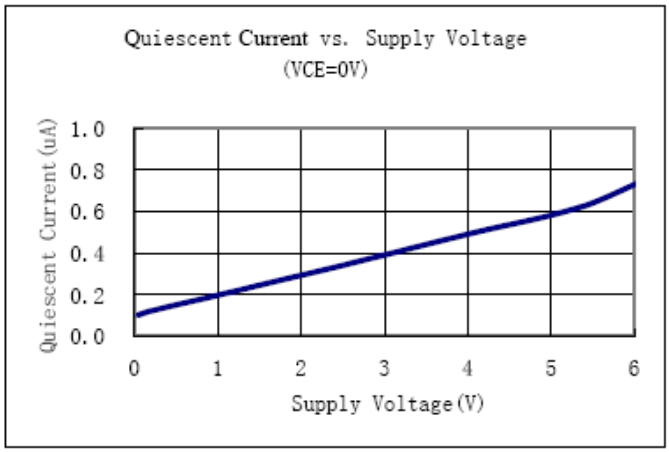
(T_A=25℃, Vin=3V, VCE=3V, unless otherwise noted)

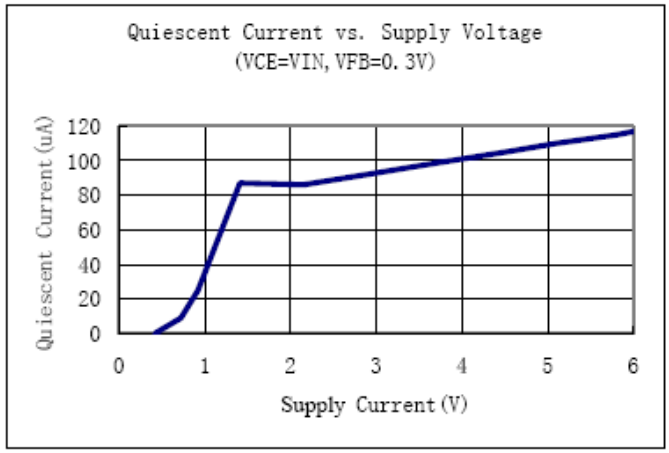
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Operating Input Voltage	Vin		2		6	V
Feedback Voltage	VFB		0.19	0.20	0.21	V
FB Pin Bias Current	IFB		10	45	100	nA
Quiescent Current	IQ	VFB=0.3V		93	120	uA
		VCE=0V		0.4	1.0	uA
Maximum switching Frequency	FOSC_MAX	VFB=0V		2		MHz
Switching Current Limit	ILimit			1.6		A
Switch VCESAT	VCESAT	ILX=300mA		260		mV
Switching pin Leak Current	ILX	VLX=5V		0.11		uA
CE Voltage High	VCEH	VCE=0 to 3V		0.65		V
CE Voltage Low	VCEL	VCE=3 to 0V		0.61		V
CE Pin Bias Current	ICE			18		uA
Over Voltage Protection	VOVP			24		V

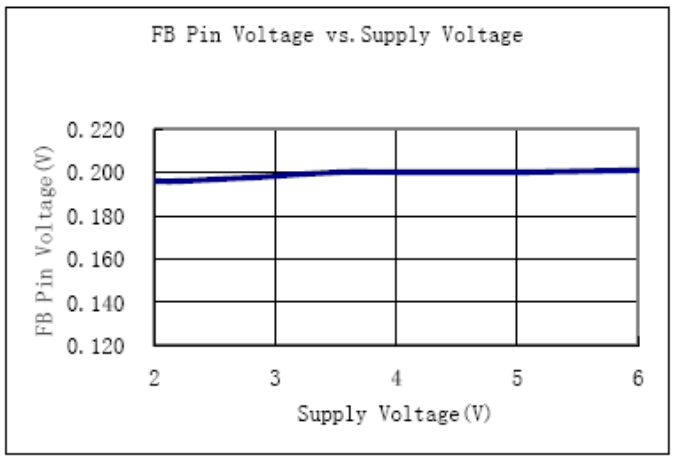
Typical Performance Characteristics

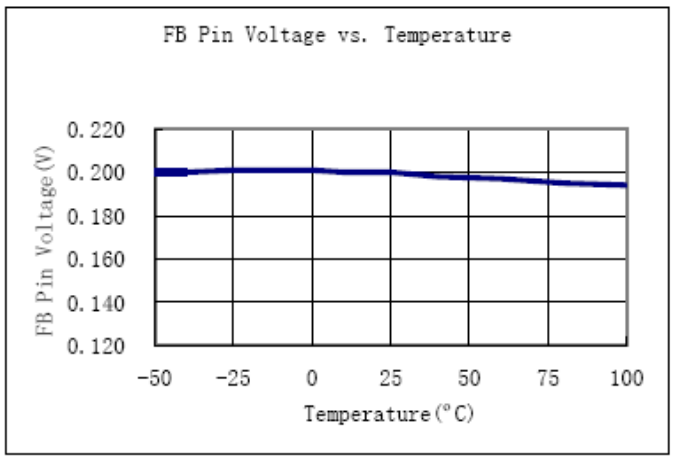


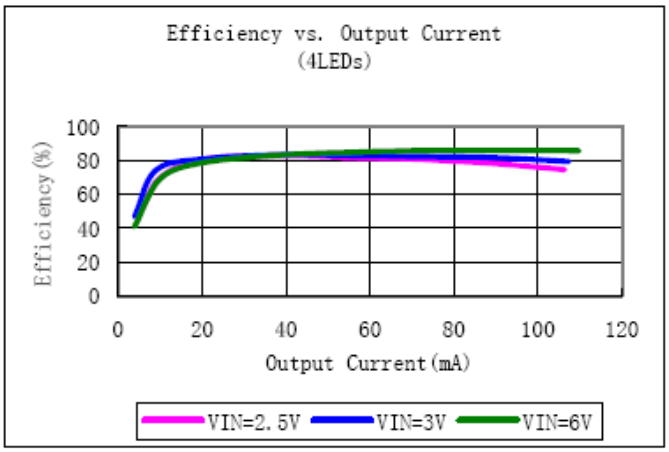


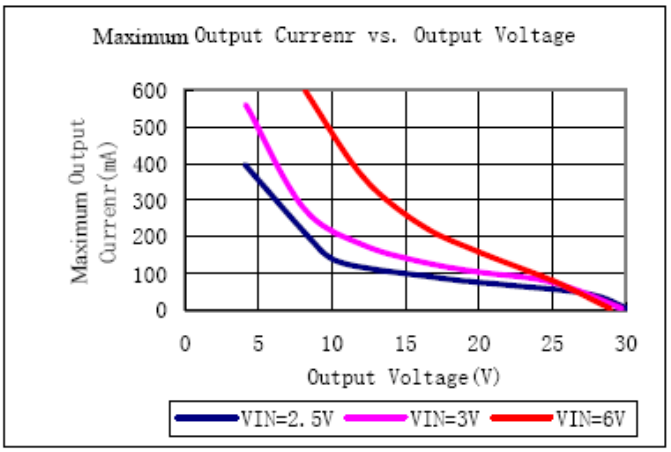


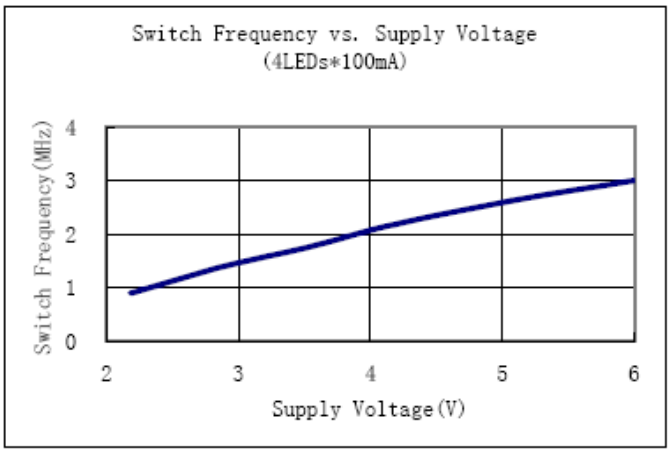


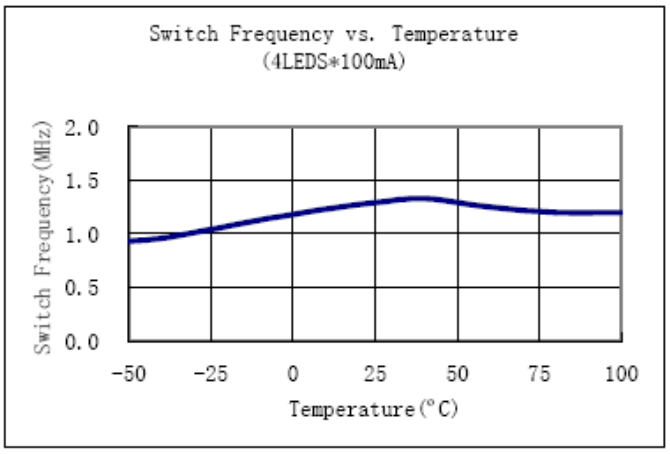












Application Information

Dimming Control

1. Using a PWM Signal to CE Pin

When adding the PWM signal to CE pin, the ACE714 is turned on or off by the PWM signal, so the LEDs operate at either zero or full current. The average LED current increase proportionally with the duty cycle of the PWM signal. The frequency range of the PWM signal is from 1 kHz to 300KHz.

2. Using a DC Voltage

From the Figure 2, we can add a DC voltage to FB pin, we adjust the LED current by changing the DC voltage, which control the brightness, DC voltage range is from 0V to 2V.

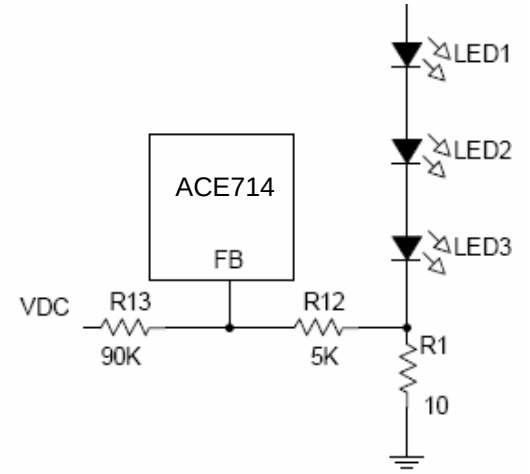


Figure 2. Dimming Control Using a DV Voltage

3. Using a Filtered PWM Signal

The filtered PWM signal can be considered as an adjustable DC voltage. It can be used to replace the variable DC voltage source in dimming control. The circuit is shown in Figure 3.

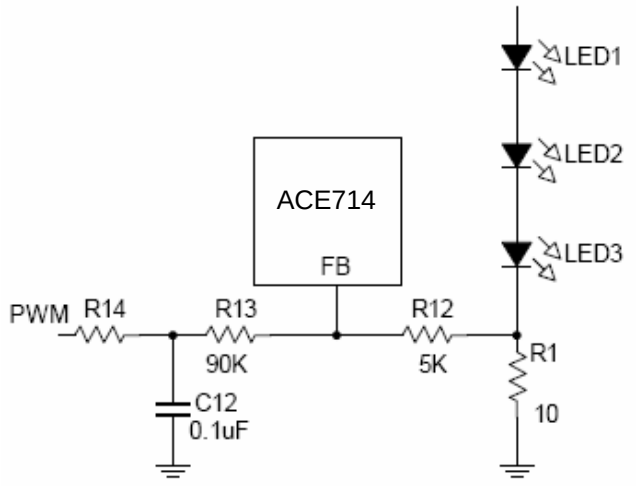
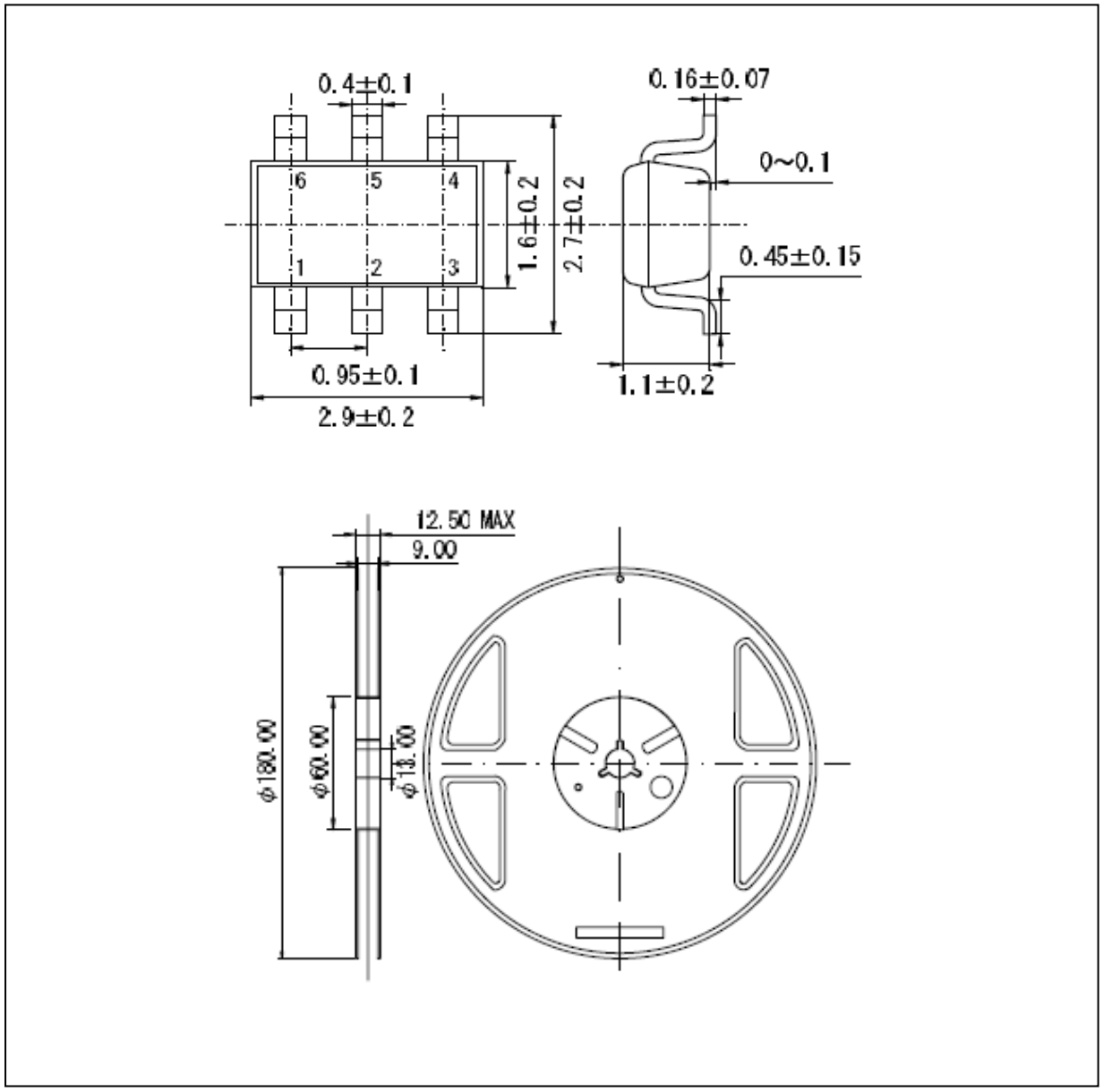


Figure 3. Dimming Control Using a Filtered PWM Signal

Packing Information

SOT-23-6



Notes

ACE does not assume any responsibility for use as critical components in life support devices or systems without the express written approval of the president and general counsel of ACE Electronics Co., LTD. As sued herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and shoes failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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