

DIO84512

TRIAC Dimmable, High Efficiency Flickerless Constant current Linear Driver

Features

- Integrated 500V Bleeder and HV MOSFET
- Compatible with TRIAC Dimmer
- Patented technology for low current dress and high reliability of the system
- Power Factor >0.8 @ $120V_{AC}$
- Current ripple $< \pm 1\%$
- High Efficiency technology
- Good Line Regulation $< \pm 2\%$
- Good Load Regulation $< \pm 2\%$
- Good EMI performance
- Reliable thermal compensation Regulation
- Low BOM for system design
- Compact package: EP-SOIC8

Descriptions

The DIO84512 is a TRIAC dimmable linear & Flickerless LED driver with integrated 500V MOSFET.

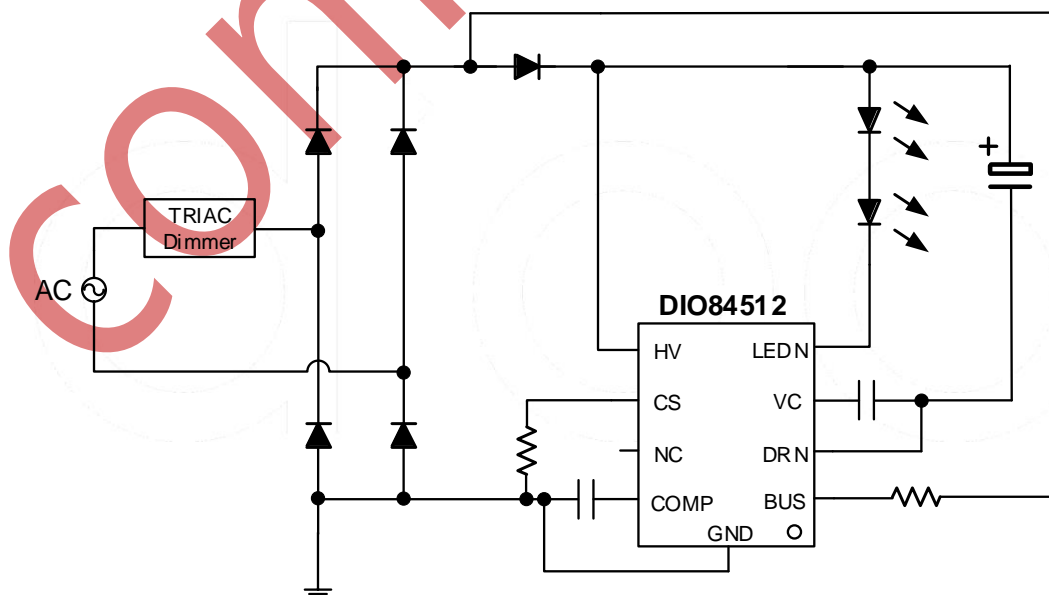
The DIO84512 is a high compatibility constant current linear driver without switching circuit for low cost, and drives TRIAC dimmable linear LED lighting with patented technology to achieve lower current dress and higher reliability of the system.

This chip adopts special design to achieve high efficiency and reliable protection for safety requirement. The DIO84512 provides reliable thermal compensation Regulation.

Applications

- Dimming & Flickerless filament lamp

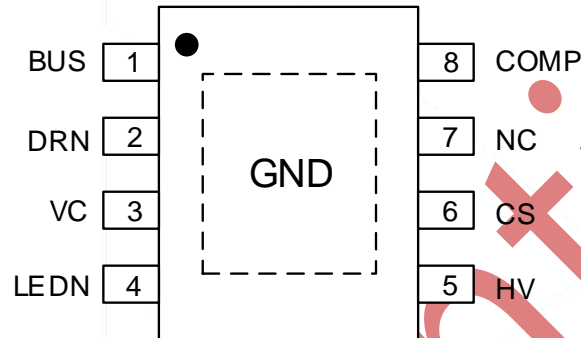
Typical Application



Ordering Information

Order Part Number	Top Marking		T _A	Package	
DIO84512XS8	DIO84512	Green	-40 to 85°C	EP-SOIC8	Tape & Reel, 2500

Pin Assignments



EP-SOIC8

Figure 1 Pin Assignment (Top View)

Pin Definitions

Pin Name	Description
BUS	BUS input pin. Bleeder current and TRIAC angle detection.
DRN	Power MOSFET Drain Pin. The Drain pin is connected to negative of output electrolytic capacitor.
VC	LED Current Ripple Programming
LEDN	The pin is connected to cathode of LED string.
HV	Power supply pin. This pin supplies current to the internal circuit.
CS	Current sense pin
NC	PIN is floating.
COMP	Loop compensation pin. Compensation for internal error amplifier. Connect a capacitor between the pin and GND to compensate the internal feedback loop.

Absolute Maximum Ratings

Stresses beyond those listed under “Absolute Maximum Rating” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Parameter		Rating	Unit
BUS, HV, DRN, LEDN		-0.3 to 500	V
CS, COMP, VC		-0.3 to 5	V
Supply current I _{HV}		10	mA
Power Dissipation, @ TA = 25°C		3.3	W
Package Thermal Resistance	Θ _{JA}	30	°C/W
	Θ _{JC}	10	
Temperature Range		-40 to 150	°C
Lead Temperature		260	°C
Storage Temperature Range		-65 to 150	°C

Recommend Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended Operating conditions are specified to ensure optimal performance to the datasheet specifications. DIOO does not Recommend exceeding them or designing to Absolute Maximum Ratings.

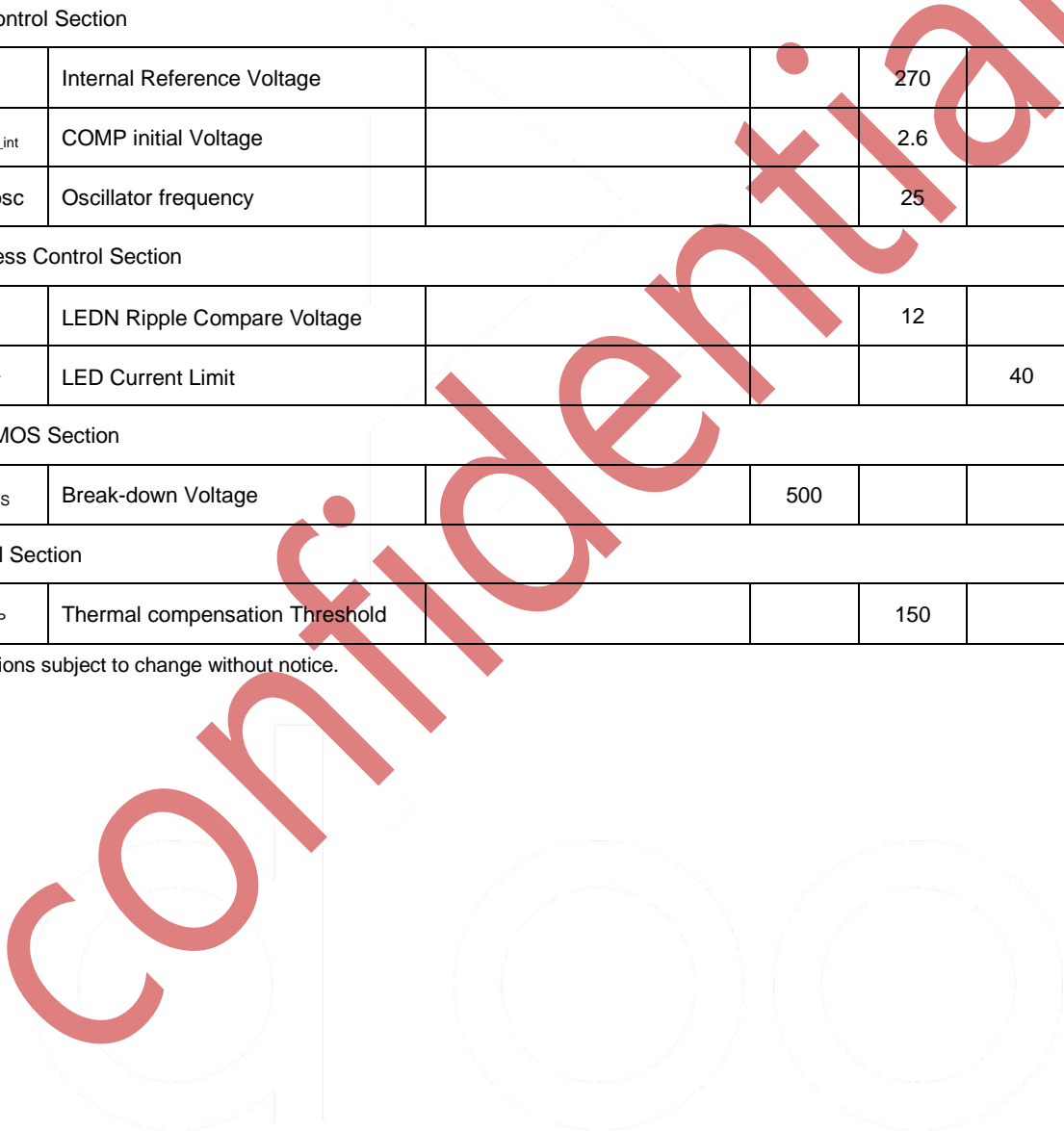
Parameter	Rating	Unit
HV, DRN, BUS	<400	V
Operating Junction Temperature (T _J)	-40 to 125	°C

Electrical Characteristics

$V_{IN} = 15V$, $T_A = 25^{\circ}C$, unless otherwise specified.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
HV Supply Section						
V_{HV}	Input Voltage Range		30		500	V
I_Q	Quiescent Current			240		μA
I_{BUS}	Bleeder Current			40		mA
Loop Control Section						
V_{REF}	Internal Reference Voltage			270		mV
V_{COMP_int}	COMP initial Voltage			2.6		V
Freq_osc	Oscillator frequency			25		kHz
Flickerless Control Section						
V_{LRC}	LEDN Ripple Compare Voltage			12		V
I_{CLMT}	LED Current Limit				40	mA
Power MOS Section						
V_{BVDSS}	Break-down Voltage		500			V
Thermal Section						
T_{COMP}	Thermal compensation Threshold			150		$^{\circ}C$

Specifications subject to change without notice.



Block Diagram

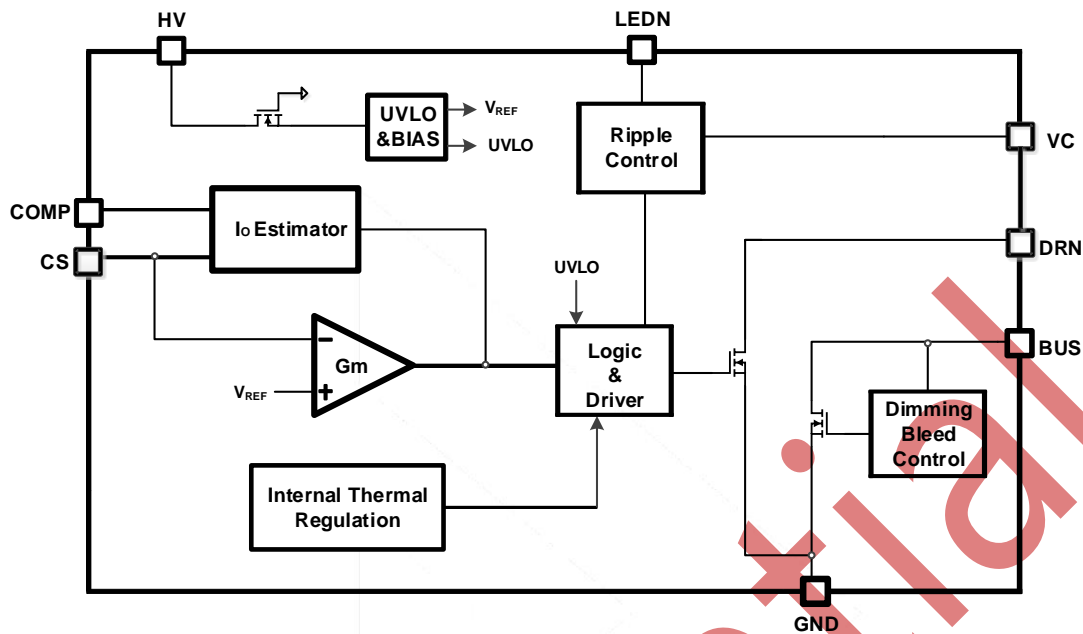


Figure 2 IC Block Diagram

Functional Description

The DIO84512 is a constant current linear driver without switching circuit for low cost, and drives TRIAC dimmable linear LED lighting with patented technology to achieve lower current stress and higher reliability of the system.

The DIO84512 is also designed for removing the 100/120Hz LED current ripple and regulates LED current via negative feedback control.

Start up

After AC or DC supply is powered on, the internal power supply of the chip is supplied by BUS voltage through a HV JEFT. Once the internal power supply rises up to the ON threshold voltage, the internal blocks start to work.

Shut down

After AC supply or DC BUS is powered off, the BUS can't supply enough energy to HV pin, the internal power supply will drop down. Once the internal power supply is below the OFF threshold voltage, the IC will stop working and V_{COMP} will be discharged to zero.

Loop Compensation

An error amplifier is applied to the output current feedback loop with a capacitor connected to the COMP pin. A capacitor of 1uF connected to COMP pin is recommended to ensure the trade-off performance.

Constant Current Control

The DIO84512 regulates the output current from the current sensing resistor voltage. The output LED RMS current can be calculated as:

$$I_{LED} = V_{REF} / R_S$$

Where

V_{REF} —The internal reference voltage;

R_S —The sensing resistor connected between CS and GND.

Bleeding Control Operation

DIO84512 works in the smart bleeding control mode with patented technology. When the TRIAC dimming angle is regulated, bleeder MOS would output an enough holding current for the leading edge dimmer.

Current Ripple Removing

The capacitor C_C between VC and DRN is an integral capacitor. DIO84512 transform the voltage on C_C to a reference voltage. The current regulator regulates LED current via negative feedback control.

C_C should be large enough in order to remove the current ripple of the LED string. However, too large capacitor may slow down the dynamic response.

Patented technology for anti-jitter, non-visible flicker at low current condition during TRIAC dimming.

Thermal compensation Regulation

As the driver temperature is higher than the threshold temperature, it reduces the output current and then a balance is achieved between output power and temperature, thereby improve system reliability.

Confidential

CONTACT US

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For additional product information, or full datasheet, please contact with our Sales Department or Representatives.

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