


SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

LV5026M — Bi-CMOS IC LED Driver IC

Overview

LV5026M is a High Voltage LED drive controller which drives LED current up to 3A with external MOSFET. LV5026M is realized very simple LED circuits with a few external parts. It corresponds to various wide dimming controls including the TRIAC dimming control.

Functions

- High Voltage LED Controller
- Various Dimming Control
 - TRIAC & Analog Input & PWM Input
- Soft Start function
- Built-in TRIAC stabilized function
- Built-in circuit of detection of overvoltage of CS pin.
- Selectable Switching frequency [50 kHz or 70 kHz, open: 50 kHz]
- Short Protection Circuit
- Selectable reference Voltage
 - Internal 0.605V & External Input Voltage
- Low noise switching system
 - 5 stages skip mode Frequency
 - Soft driving

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Input voltage	V _{IN} max		-0.3 to 42	V
REF_OUT, REF_IN, RT, CS, PWM_D, ACS			-0.3 to 7	V
OUT1 pin	V _{OUT_abs}		-0.3 to 42	V
OUT2 pin	V _{OUT2_abs}		-0.3 to 42	V
Allowable power dissipation	P _d max	With specified board*	1.0	W
Junction temperature	T _j		150	°C
Operating temperature	T _{opr}		-30 to +125	°C
Storage temperature	T _{stg}		-40 to +150	°C

*Specified board: 58.0×54.0×1.6mm (glass epoxy board)

- Any and all SANYO Semiconductor Co., Ltd. products described or contained herein are, with regard to "standard application", intended for the use as general electronics equipment (home appliances, AV equipment, communication device, office equipment, industrial equipment etc.). The products mentioned herein shall not be intended for use for any "special application" (medical equipment whose purpose is to sustain life, aerospace instrument, nuclear control device, burning appliances, transportation machine, traffic signal system, safety equipment etc.) that shall require extremely high level of reliability and can directly threaten human lives in case of failure or malfunction of the product or may cause harm to human bodies, nor shall they grant any guarantee thereof. If you should intend to use our products for applications outside the standard applications of our customer who is considering such use and/or outside the scope of our intended standard applications, please consult with us prior to the intended use. If there is no consultation or inquiry before the intended use, our customer shall be solely responsible for the use.
- Specifications of any and all SANYO Semiconductor Co., Ltd. products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

SANYO Semiconductor Co., Ltd.
<http://semicon.sanyo.com/en/network>

LV5026M

Recommended Operating Conditions at Ta = 25°C

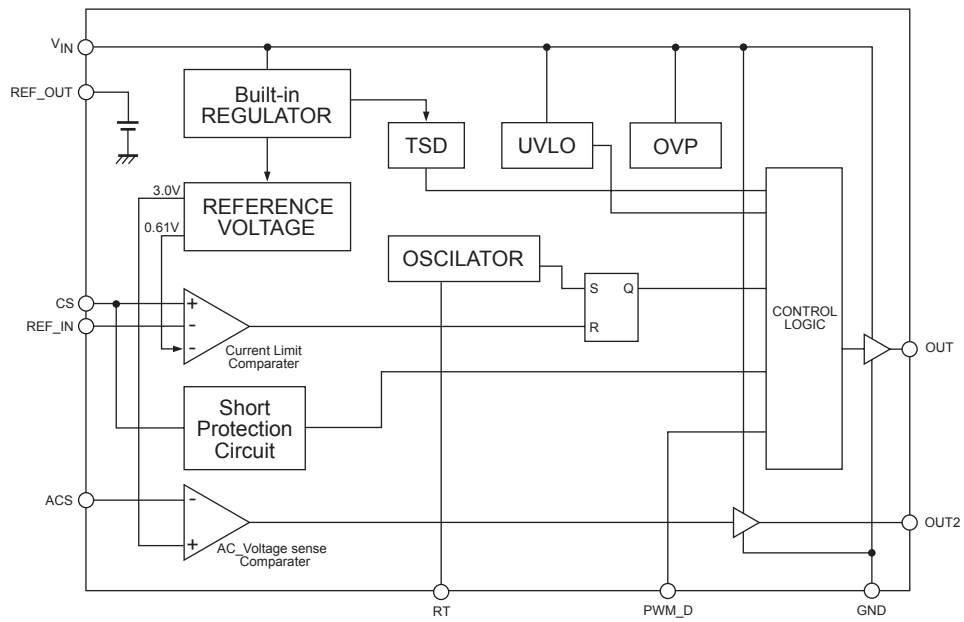
Parameter	Symbol	Conditions	Ratings	Unit
Input voltage	V _{IN}		8.5 to 42	V

Electrical Characteristics at Ta = 25°C, V_{IN} = 12V, unless otherwise specified.

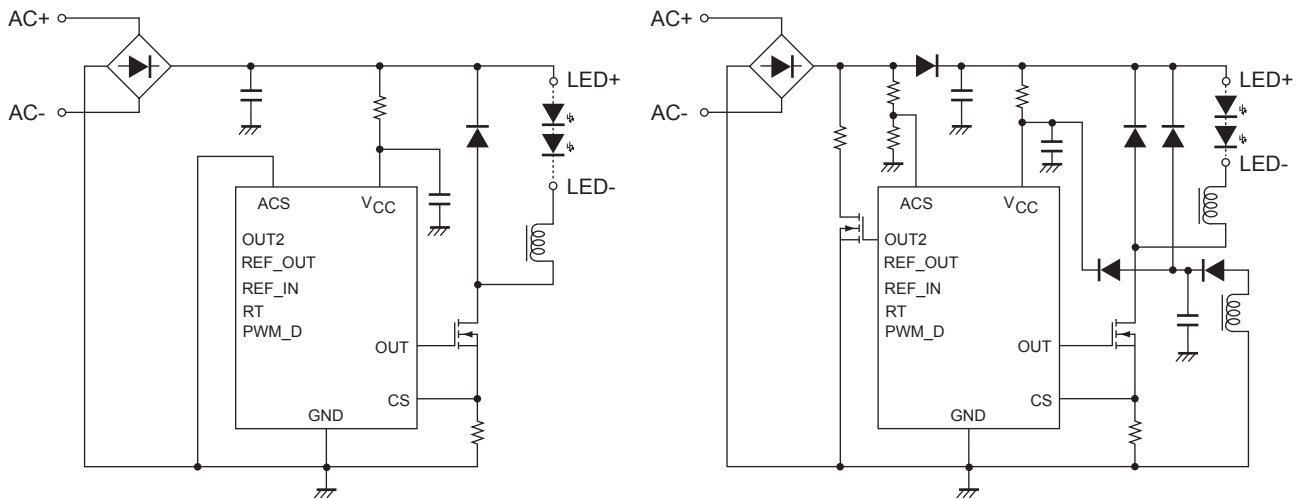
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Reference Voltage block						
Built-in Reference Voltage	VREF		0.585	0.605	0.625	V
VREF VIN regulation	VREF_LN	VIN = 8.5 to 24V		±0.5		%
Reference Output Voltage	REFOUT	IREFOUT = 0.5mA		3.0		V
- Maximum load	REFOUT_MAX		0.5			mA
- equivalent output impedance	REFOUT_RO			10		Ω
Under Voltage Lockout						
Operation Start Input Voltage	UVLOON		8	9	10	V
Operation Stop Input Voltage	UVLOOFF		6.3	7.3	8.3	V
Hysterisys Voltage	UVLOH			1.7		V
Oscillation						
Frequency	FOSC1	RT = OPEN	40	50	60	kHz
	FOSC2	RT=REF_OUT	55	70	85	kHz
FOSC1 Switch voltage	VOSC1		2		5	V
FOSC2 Switch voltage	VOSC2				0.5	V
Maximum Duty	MAXDuty			93		%
Comparator						
Input offset Voltage (Between CS and VREF)	VIQ_VR			1	10	mV
Input offset Voltage (Between CS and REFOUT)	VIQ_RI			1	10	mV
Input current	IIOCS			160		nA
	IIOREF			80		nA
CS pin max voltage	VOM				1	V
malfunction prevention mask time	TMSK			150		ns
PWM_D Circuit						
OFF voltage	VOFF		2		5	V
ON voltage	VON		0		0.6	V
Thermal protection Circuit						
Thermal shutdown temperature	TSD	*Design guarantee		165		°C
Thermal shutdown hysteresis	ΔTSD	*Design guarantee		30		°C
Drive Circuit						
OUT sink current	IOI		500	1000		mA
OUT source current	IOO			120		mA
Minimum On time	TMIN			200	300	ns
TRIAC Stabilization Circuit						
Threshold of OUT2	VACS	OUT2=High [less than right record]	2.8	3.0	3.2	V
OUT2 sink current	IO2I	VIN=12V, OUT2=6V		0.6		mA
OUT2 source current	IO2O	VIN=12V, OUT2=6V		0.6		mA
VCC current						
UVLO mode VIN current	ICCOFF	VIN<UVLOON		80	120	μA
Normal mode VIN current	ICCON	VIN>UVLOON, OUT = OPEN		0.6		mA
VIN Over Voltage Protection Circuit						
VIN over voltage protection voltage	VINOVP		24	27	30	V
VIN Current at OVP	IINOVP	VIN=30V	0.7	1.0	1.5	mA
CS terminal abnormal sensing circuit						
Abnormal sensing voltage	CSOCP			1.9		V

*: Design guarantee (value guaranteed by design and not tested before shipment)

Block Diagram



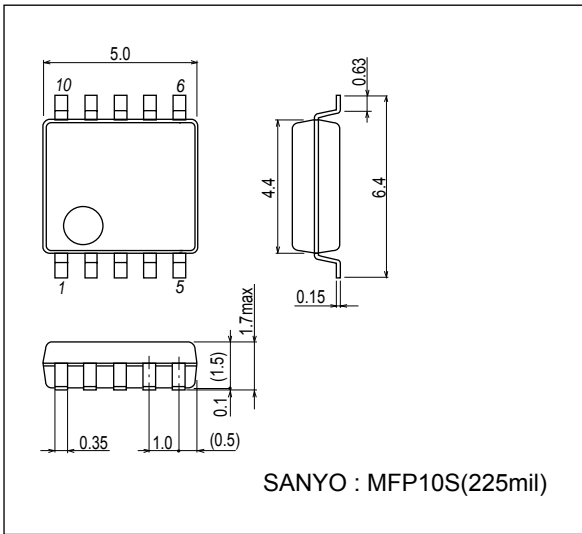
Sample Application Circuit



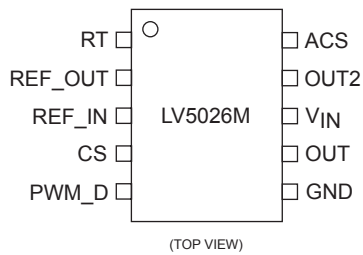
Package Dimensions

unit : mm (typ)

3086B



Pin Assignment

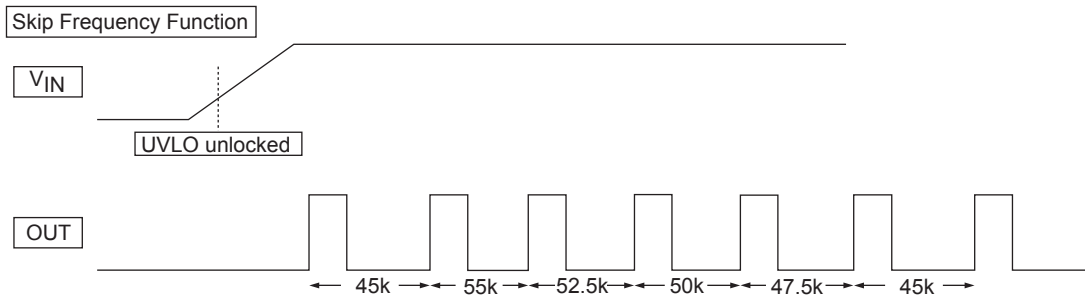


Pin Function

Pin No.	Pin name	Function
1	RT	Switching Frequency selection Pin. [L or Open : 50kHz Switching / H(2V – 5V) : 70 kHz Switching]
2	REF_OUT	Built-in 3V Regulate out Pin. [If this function isn't used, please connect GND or no connection.]
3	REF_IN	External LED current Limit Setting Pin. If less than VREF (0.605V) voltage is input, Peak current value is used at the input voltage. If more than Vref voltage is input, it is done at VREF voltage. [If this function isn't used, please connect nothing.]
4	CS	LED current sensing pin. When this pin voltage exceeds VREF (or REF_IN), external FET is OFF. And if the voltage of the pin exceeds 1.9V, LV5026M turns to latch-off mode.
5	PWM_D	PWM DIMMING pin. [L or open :normal operation, H: Stop operation]
6	GND	GND pin
7	OUT	Driving the external FET Gate pin.
8	V _{IN}	Power supply pin. Operation: V _{IN} > UVLOON Stop: V _{IN} < UVLOOFF Switching Stop: V _{IN} > V _{IN} OVP
9	OUT2	This terminal is driving the FET which is stabilized the TRIAC application. If ACS is less than 3V, OUT2 outputs VIN. [If this function isn't used, please connect nothing.]
10	ACS	This terminal is sensing the AC Voltage. [If this function isn't used, please connect GND.]

Skip frequency function

LV5026M contains the skip frequency function for reduction of the peak value of conduction noise. This function changes the frequency as follows.



Switching frequency is changed as follows.
 $\dots \times 0.9 \rightarrow \times 1.1 \rightarrow \times 1.05 \rightarrow \times 1 \rightarrow \times 0.95 \rightarrow \times 0.9 \rightarrow \times 1.1 \dots$
 It's repeated by this loop.

CS pin abnormal stop function

If the voltage of the pin exceeds 1.9V, LV5026M turns to latch-off mode and switching is stopping.

- SANYO Semiconductor Co.,Ltd. assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO Semiconductor Co.,Ltd. products described or contained herein.
- SANYO Semiconductor Co.,Ltd. strives to supply high-quality high-reliability products, however, any and all semiconductor products fail or malfunction with some probability. It is possible that these probabilistic failures or malfunction could give rise to accidents or events that could endanger human lives, trouble that could give rise to smoke or fire, or accidents that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO Semiconductor Co.,Ltd. products described or contained herein are controlled under any of applicable local export control laws and regulations, such products may require the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written consent of SANYO Semiconductor Co.,Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO Semiconductor Co.,Ltd. product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production.
- Upon using the technical information or products described herein, neither warranty nor license shall be granted with regard to intellectual property rights or any other rights of SANYO Semiconductor Co.,Ltd. or any third party. SANYO Semiconductor Co.,Ltd. shall not be liable for any claim or suits with regard to a third party's intellectual property rights which has resulted from the use of the technical information and products mentioned above.

This catalog provides information as of April, 2011. Specifications and information herein are subject to change without notice.