



# LV5027M — Bi-CMOS IC LED Driver IC

## Overview

LV5027M is a High Voltage LED drive controller which drives LED current up to 3A with external MOSFET.

LV5027M is realized very simple LED circuits with a few external parts.

## Functions

- High Voltage LED Controller
- Low noise switching system
  - 5 stages skip mode Frequency
  - Soft driving
- Built-in Reference Voltage circuit (Internal 0.605V)
- Short Protection Circuit

## Specifications

### Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Input voltage	$V_{IN\ max}$		-0.3 to 42	V
CS	$V_{CS\_abs}$		-0.3 to 7	V
OUT pin	$V_{OUT\_abs}$		-0.3 to 42	V
Allowable power dissipation	$Pd\ max$		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

### Recommended Operating Conditions at Ta = 25°C

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

■ 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.

# LV5027M

**Electrical Characteristics** at Ta = 25°C, V<sub>IN</sub> = 12V, unless otherwise specified.

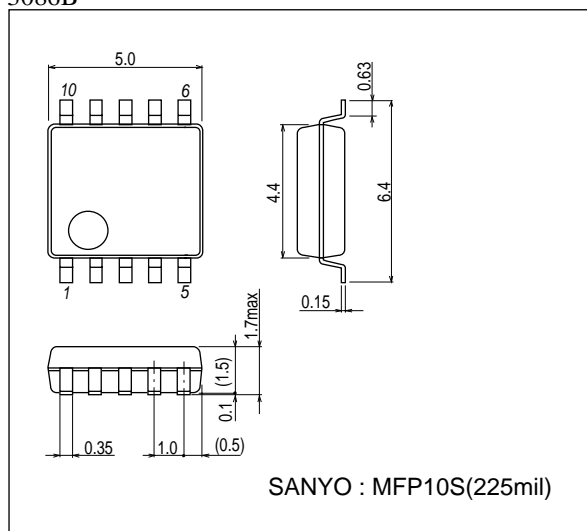
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
<b>Reference Voltage block</b>						
Built-in Reference Voltage	VREF		0.585	0.605	0.625	V
VREF V <sub>IN</sub> regulation	VREF_LN	V <sub>IN</sub> = 8.5 to 24V		±0.5		%
<b>Under Voltage Lockout</b>						
Operation Start Input Voltage	UVLOON		8	9	10	V
Operation Stop Input Voltage	UVLOOFF		6.3	7.3	8.3	V
Hysterisys Voltage	UVLOH			1.7		V
<b>Oscillation</b>						
Frequency	FOSC	RT = OPEN		50		kHz
Maximum Duty	MAXDuty			93		%
<b>Comparator</b>						
Input offset Voltage (Between CS and VREF)	VIO_VR			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
<b>Thermal protection Circuit</b>						
Thermal shutdown temperature	TSD	*Design guarantee		165		°C
Thermal shutdown hysteresis	ΔTSD	*Design guarantee		30		°C
<b>Drive Circuit</b>						
OUT sink current	I <sub>O</sub> I		500	1000		mA
OUT source current	I <sub>O</sub> O			120		mA
Minimum On time	TMIN			200	300	ns
<b>V<sub>CC</sub> current</b>						
UVLO mode V <sub>IN</sub> current	I <sub>CC</sub> OFF	V <sub>IN</sub> <UVLOON		80	120	μA
Normal mode V <sub>IN</sub> current	I <sub>CC</sub> ON	V <sub>IN</sub> >UVLOON, OUT = OPEN		0.6		mA
<b>V<sub>IN</sub> Over Voltage Protection Circuit</b>						
V <sub>IN</sub> over voltage protection voltage	V <sub>IN</sub> OVP		24	27	30	V
<b>CS terminal abnormal sensing circuit</b>						
Abnormal sensing voltage	CSOCP			1.9		V

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

## Package Dimensions

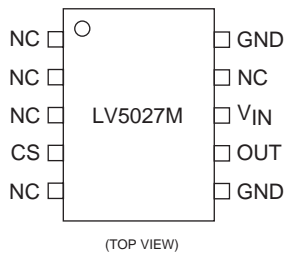
unit : mm (typ)

3086B



# LV5027M

## Pin Assignment

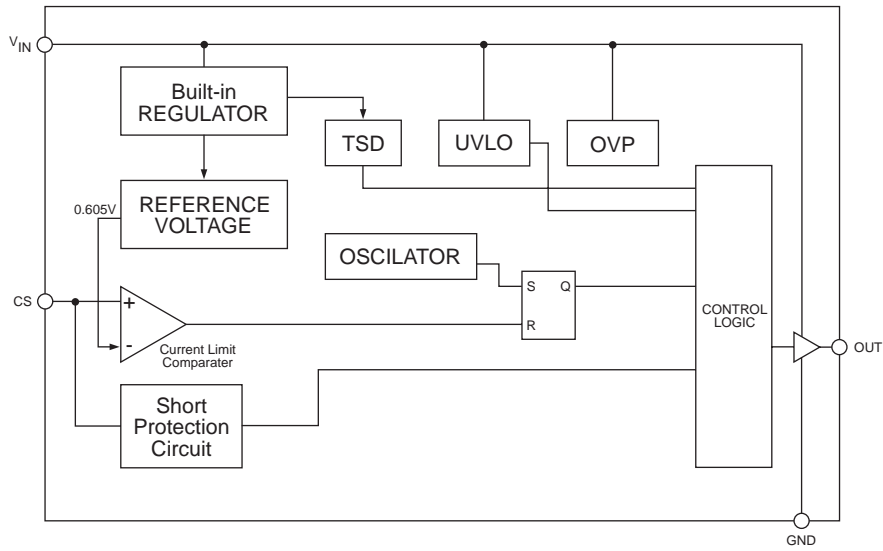


## Pin Function

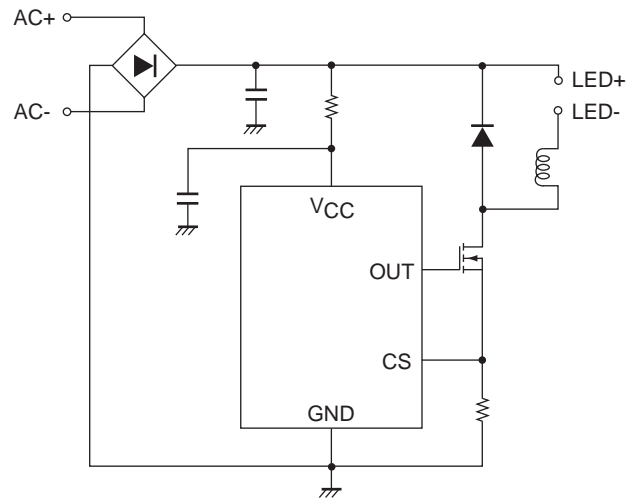
Pin No.	Pin name	Function
1	NC	No connection
2	NC	No connection
3	NC	No connection
4	CS	LED current sensing pin. When this pin voltage exceeds VREF (or REF_IN), external FET is OFF. And if the voltage of the pin exceeds 1.9V, LV5027M turns to latch-off mode.
5	NC	No connection
6	GND	GND pin
7	OUT	Driving the external FET Gate pin.
8	V <sub>IN</sub>	Power supply pin. Operation: V <sub>IN</sub> > UVLOON Stop: V <sub>IN</sub> < UVLOOFF Switching Stop: V <sub>IN</sub> > V <sub>IN</sub> OVP
9	NC	No connection
10	GND	GND pin

# LV5027M

## Block Diagram

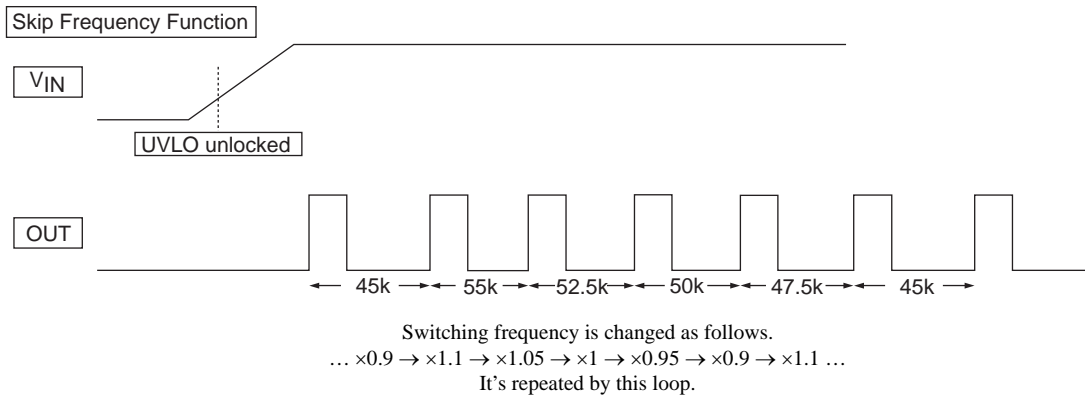


## Sample Application Circuit



## Skip frequency function

LV5027M contains the skip frequency function for reduction of the peak value of conduction noise. This function changes the frequency as follows.



## CS pin abnormal stop function

If the voltage of the pin exceeds 1.9V, LV5027M 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 March, 2011. Specifications and information herein are subject to change without notice.