Ordering number : ENA1933

SANYO Semiconductors
DATA SHEET

Bi-CMOS IC

LV5027M — 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	Tj		150	°C
Operating temperature	Topr		-30 to +125	°C
Storage temperature	Tstg		-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

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

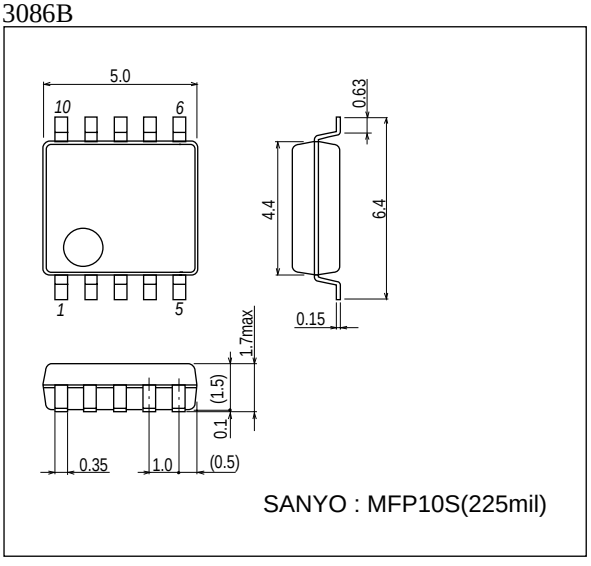
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Reference Voltage block						
Built-in Reference Voltage	VREF		0.585	0.605	0.625	V
VREF V_{IN} regulation	VREF_LN	V_{IN} = 8.5 to 24V		±0.5		%
Under Voltage Lockout						
Operation Start Input Voltage	UVLOON		8	9	10	V
Operation Stop Input Voltage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

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

Package Dimensions

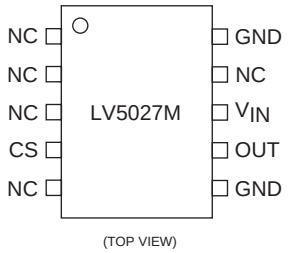
unit : mm (typ)

3086B



SANYO : MFP10S(225mil)

Pin Assignment

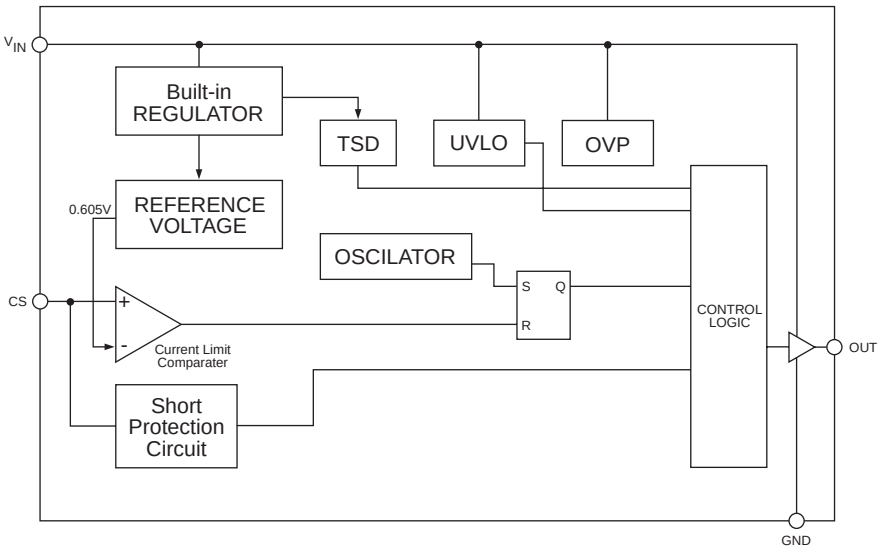


(TOP VIEW)

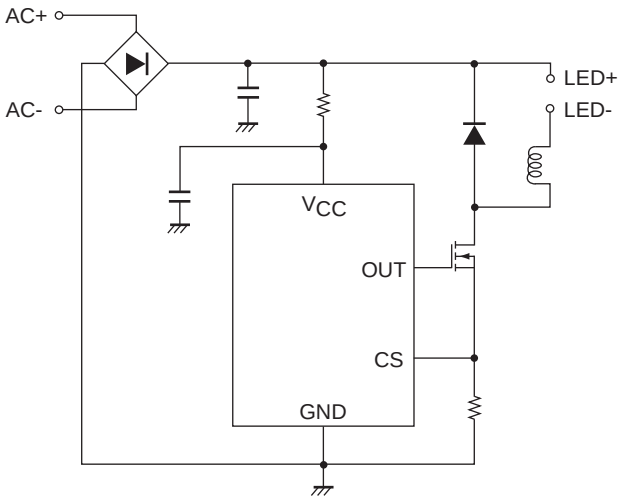
Pin Function

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_{IN}	Power supply pin. Operation: V_{IN} > UVLOON Stop: V_{IN} < UVLOOFF Switching Stop: V_{IN} > V_{IN}OVP
9	NC	No connection
10	GND	GND pin

Block Diagram

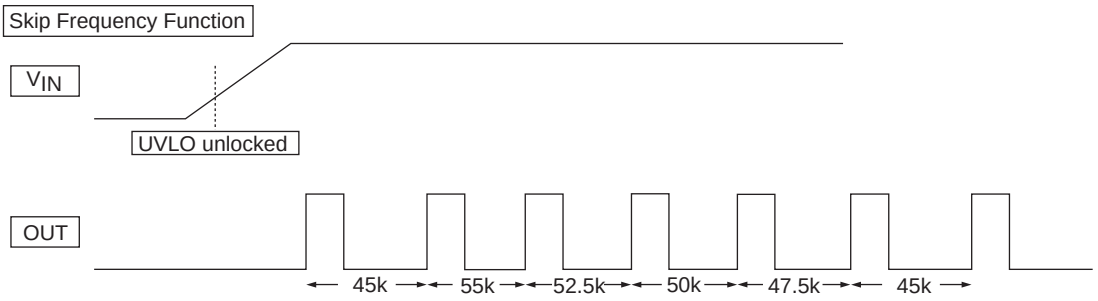


Sample Application Circuit



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.



Switching frequency is changed as follows.
… ×0.9 → ×1.1 → ×1.05 → ×1 → ×0.95 → ×0.9 → ×1.1 …
It's repeated by this loop.

CS pin abnormal stop function

If the voltage of the pin exceeds 1.9V, LV5027M turns to latch-off mode and switching is stopping.