MEGAWIN
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MG39136/MG39137

3 Taps, Linear LED driver

MG39136/MG39137 Datasheet

Version: V1.1

Contents

Features

- I_{LED} current is programmable with only one external resistor, Iout typical ~ 150mA
- Simple application, very few external components
- No inductor, electrolytic capacitor
- PF>0.95
- THD_i < 20%
- High power efficiency, 80%~90%
- Power stabilization control, ILED error < +/-5% for VACin +/-10% variation
- Force driver into off state when weak power presents
- LED TRIAC support
- Temperature compensated
- TRIAC application and power stabilization control is selected by factory trim.
- 8Pin e-SOP Package

1 Description

The MG39136/MG39137 is a high precision linear LED driver. It is designed to drive a 3 -taps LED string directly form AC line input. Electrolytic capacitor is not required; so long operating life is possible to achieve. EMI filter and PF correction circuits are not required.

The LED string is configured into 3 segments. With state -of-art control scheme, each segment is sequentially turned on and off by tracking the on/off state of others segments. Voltage applied on IC is minimized when conducting, providing high efficiency. The AC voltage and line - input current could be tuned in phase, so the high PF is possible. There is no PWM switching control in the chip, also the line - in current waveform is tracking with the AC input voltage with three step levels, the THD_i is low. The I_{LED} current is programmed by only one external resister to fulfill various types of power requirement. The maximum supported wattage is 12W.

The IC's TRIAC application and power stabilization control is selected by factory trim. The MG39136 is trimmed to the TRIAC application, and the MG39137 is trimmed to the power stabilization control application.

For the power stabilization control circuit in the chip, it greatly improves the output error to below +/-5% when AC input's variation is +/-10%. For traditional multi-taps driver, the output error is around +/-15% for the same input condition,

The device is available in e-SOP8 package or dice form.

2 Order Information

Function / Package	Triac	Power Stabilization	
		AC 110V	AC220V
Dice	MG39136AH	MG39137AH1	MG39137AH2
e-SOP8	MG39136AS	MG39137AS1	MG39137AS2

3 Application Field

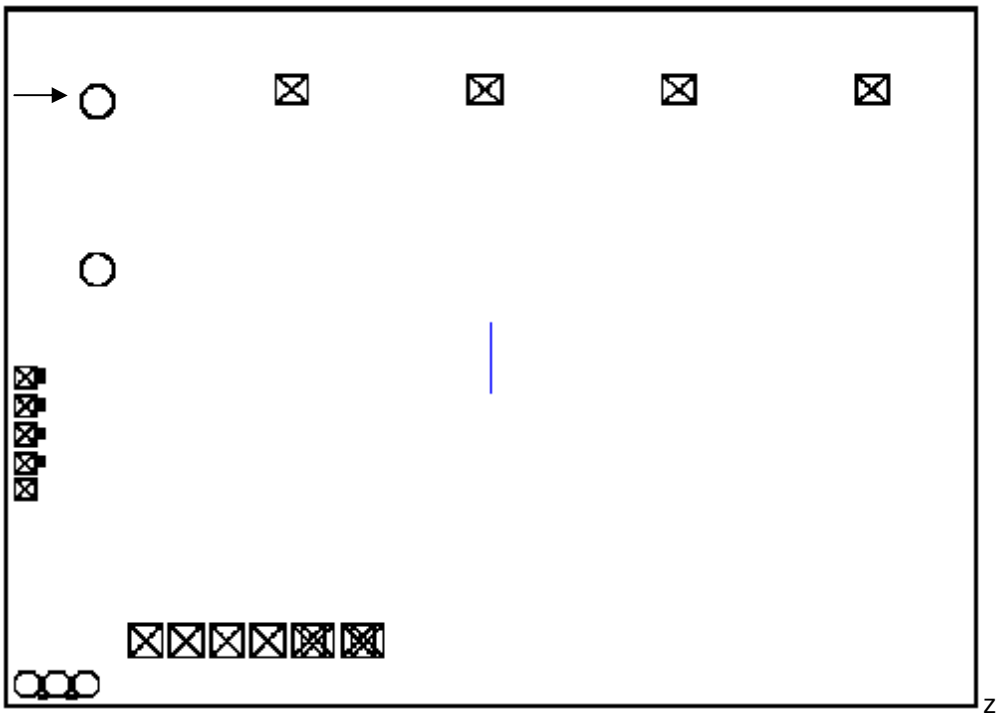
Incandescent and Fluorescent lamp/tube replacement
Outdoor lighting

4 Pin Description

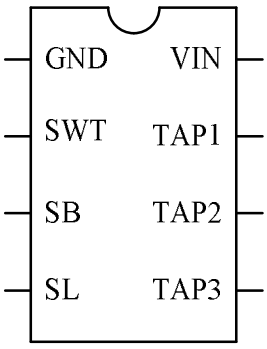
4.1 Pin Definition

SOP8 Pin	COB	Pin Name	I/O	Description
8	1	VIN	P	High voltage input pin, connect to rectified AC
8	2	VIN	P	High voltage input pin, connect to rectified AC
	3	TP4	I	Fuse pad
	4	TP5	I	Fuse pad
	5	TP6	I	Fuse pad
	6	TP7	I	Fuse pad
	7	GND	G	GND for Fuse pad
	8	TP3	I	Fuse pad
	9	TP2	I	Fuse pad
	10	TP1	I	Fuse pad
	11	VDD7	P	7V LDO output
1	12	GND	G	Ground pin
	13	S	I	Select COB-pin14's function, floating or bonded to GND
2	14	SWT/SNS	I	S=1, SWT: power compensation control S=0, SNS: Bleeder On/Off control threshold
3	15	SB	IO	Output current control for bleeder
4	16	SL	IO	Output current control for TAP1, TAP2 and TAP3
5	17	TAP3	I	Current regulator 3 output
6	18	TAP2	I	Current regulator 2 output
7	19	TAP1	I	Current regulator 1 output
8	20	VB	I	Bleeder input

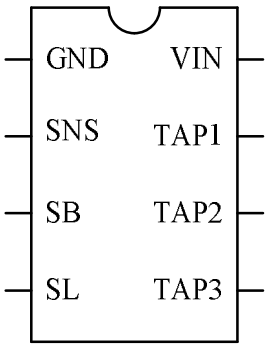
4.2 Pin Configuration



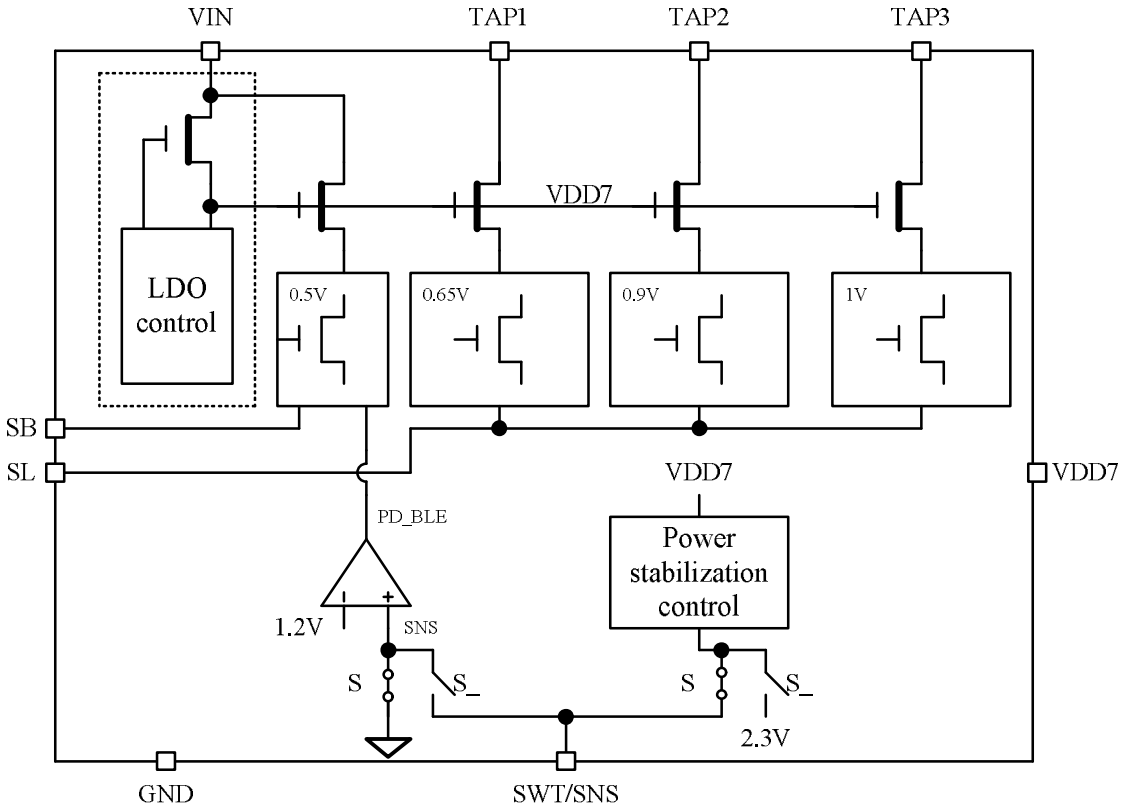
W/o TRIAC
Power stablization



With TRIAC



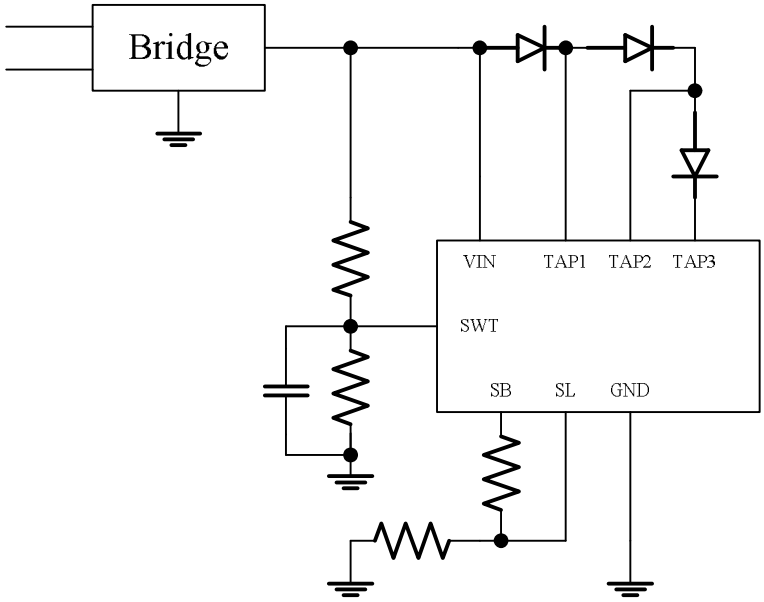
5 Block Diagram



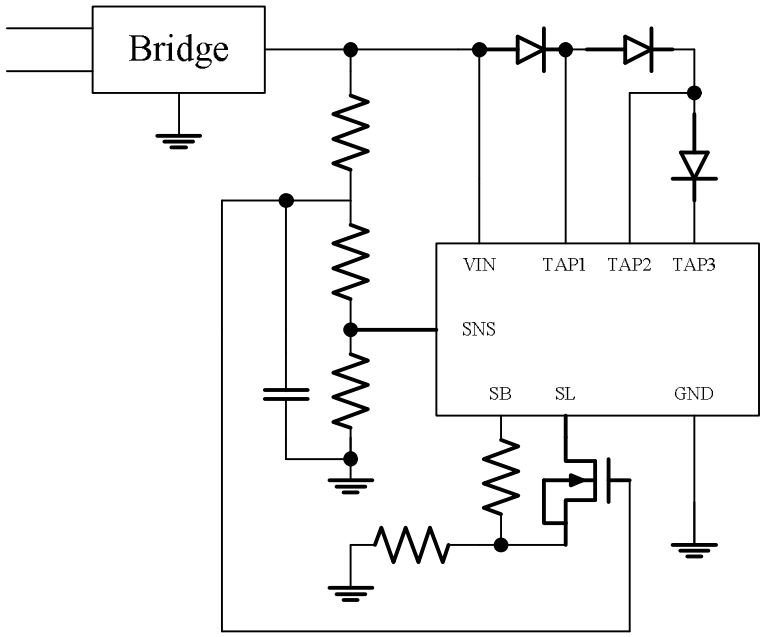
SWT/SNS: use bonding option, default SWT

6 Application Circuit

General application, no TRIAC, auto power stabilization control



TRIAC application



7 Absolute Maximum Rating

Parameter	Rating	Unit
VIN Supply Voltage	-0.5 to +530	V
VDD to GND	9V	V
All I/O pins to GND	-0.3 to (VDD+0.3)	V
Operating temperature	-40 ~ 125	°C
Storage temperature	-55 ~ 155	°C
Temperature Resistance (Θ_{JA}), eSOP8	150	℃/W
Temperature Resistance (Θ_{JA}), eSOP16	100	℃/W

Note: Operating temperature is strongly related to the power consumption of IC.

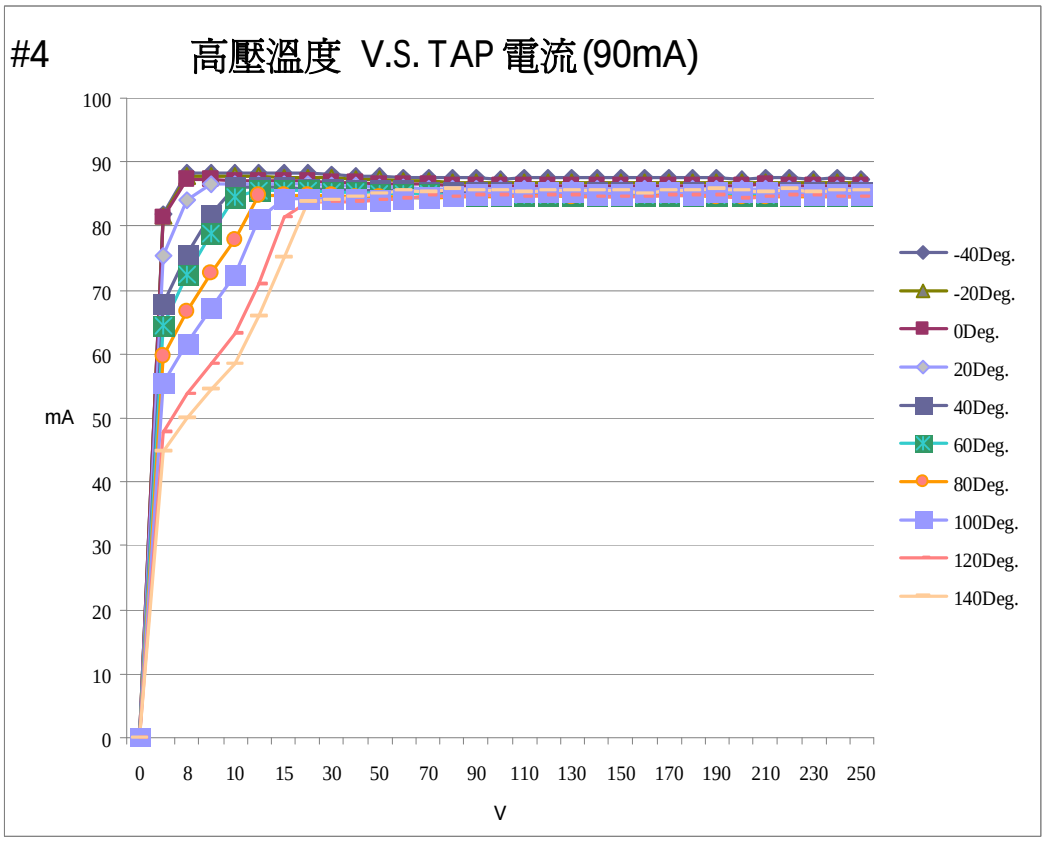
8 Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Voltage	V_{IN}	V_{VIN} - V_{GND}	7.5	-	500	V
V_{IN} Start-up Voltage	V_{START}	V_{VIN} - V_{GND}	-	7.5	-	V
V_{IN} UVLO Voltage	V_{UVLO}	V_{VIN} - V_{GND}	-	6.5	-	V
Input Current	I_{IN}	All input range	-	500	750-	uA
Input Current at UVLO	I_{UVLO}	All input range	-	400	-	uA
SL compare level	V_{SL1}	TAP1, 100% LED output	-	0.65	-	V
	V_{SL2}	TAP2, 100% LED output	-	0.9	-	V
	V_{SL3}	TAP3, 100% LED output	-	1	-	V
SB Compare Level	V_{SB}	All input range	-	0.5	-	V
SL/SB Compare Level Temperature Coefficient	$\triangle V_{SL/B}/\triangle T$	Junction Temperature (T_J): -40℃ ~ +125℃	-	0.03	-	%/℃
TAPx Current (*1)	I_{TAP1}	V_{TAP} =10V, T_J = 125 ℃	-	150	180	mA
	I_{TAP2-}	V_{TAP} =10V, T_J = 125 ℃	-	150	180	mA
	I_{TAP3}	V_{TAP} =10V, T_J = 125 ℃	-	150	180	mA
Applied Voltage on TAP	V_{TAP1-3}	TAP1-3, Non-conducting *2	-	-	500	V
SNS detect voltage (force bleeder off)	V_{SNS}	All input range		1.2		V
SWT nominal voltage	V_{SWT}	Vdivider value. VAC=115 or VAC=230		2.3		V

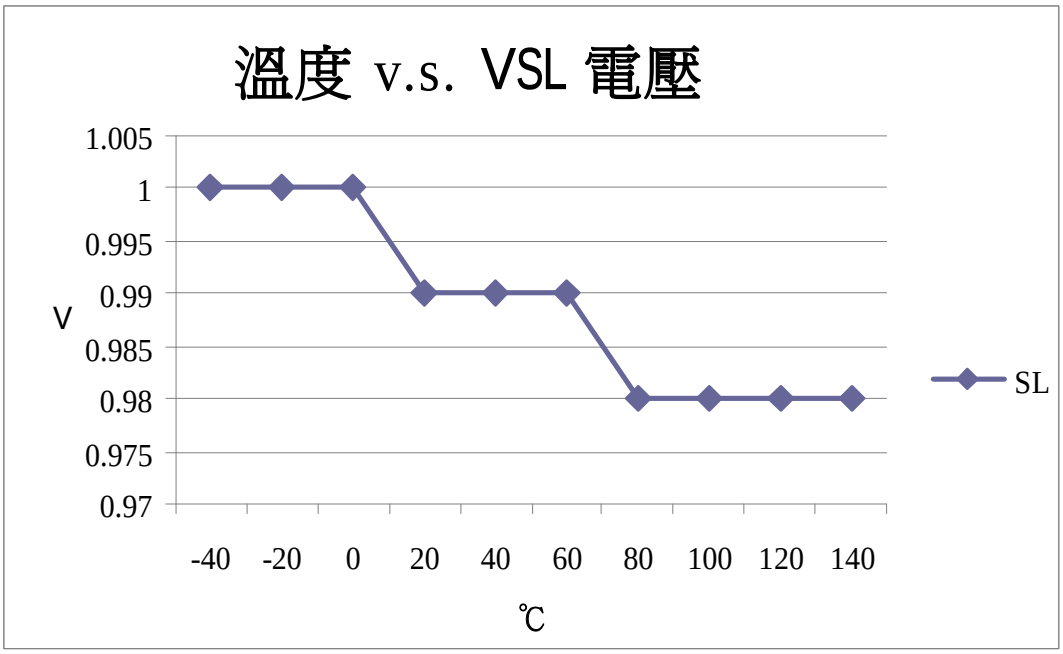
Note:
*1, Preset TAP current ratio, I_{TAP3}: I_{TAP2}: I_{TAP1} = 1x : 0.9x :0.65x
*2, Applied voltage is determined by power dissipation.

9 Typical Performance Characteristics

I_{TAP} Current vs. Vin Voltage / Temperature
Current set to around 86mA



SL pin (when TAP3 is on)voltage vs. temperature

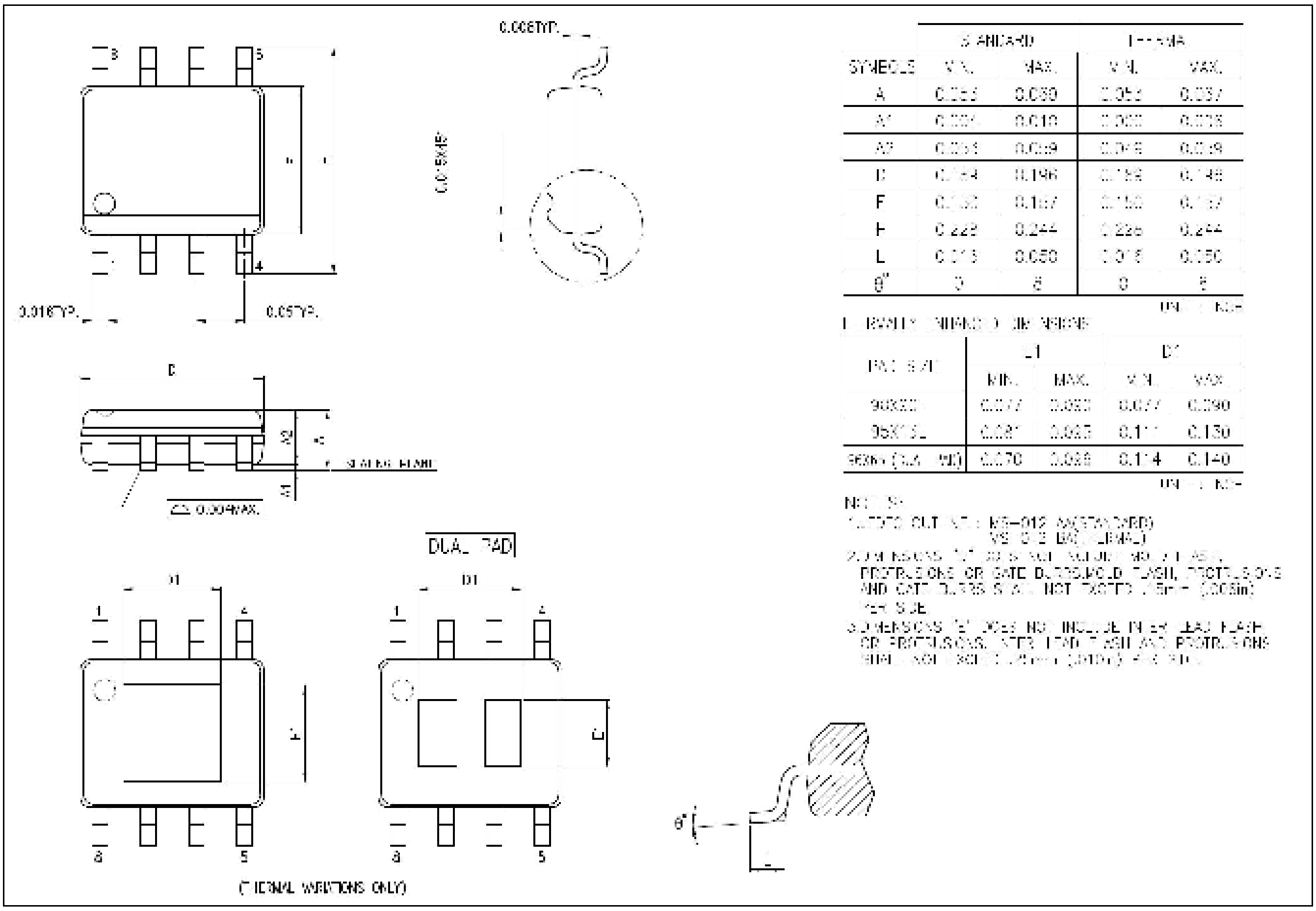


10 Application information

Please refer to `mg39136_39137_design_assistant_file_vx.xls` for patameter selection.

11 Package Dimension

11.1 e-SOP Package Dimension



12 Revision History

Rev	Descriptions	Date
V1.0	Initial release.	2015/08/18
V1.1	Revise application circuit and add characteristic diagram	2015/10/12