

General Description

HM9928 is a LED driver designed for Emergency Lighting., The HM9928 employs patent protected main line detecting methodology to control and drive the emergency lighting system, without any peripheral components. The HM9928 can drive an LED load directly or to enable a boost circuitry, while the AC input main line could be 85-265Vac.

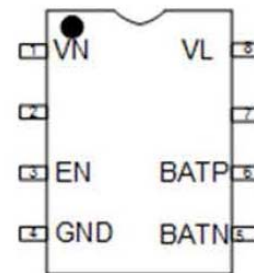
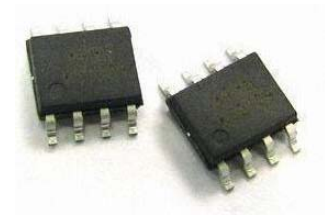
HM9928 integrates a precise single lithium ion /polymer battery management functional blocks to protect the lithium-ion/polymer battery, including Over Current Protection, Over Charge Protection, Over Discharge Protection, Battery Reverse Protection and Short Circuit Protection.

HM9928 can deliver as large as 2A output current. HM9928 is available in SOP 8 package.

Features

- Simplified application circuitry
- AC main line detecting directly
- 85-265Vac
- EN PIN 2A output current
- Integrated single lithium-ion/polymer battery management and protection

Package Reference

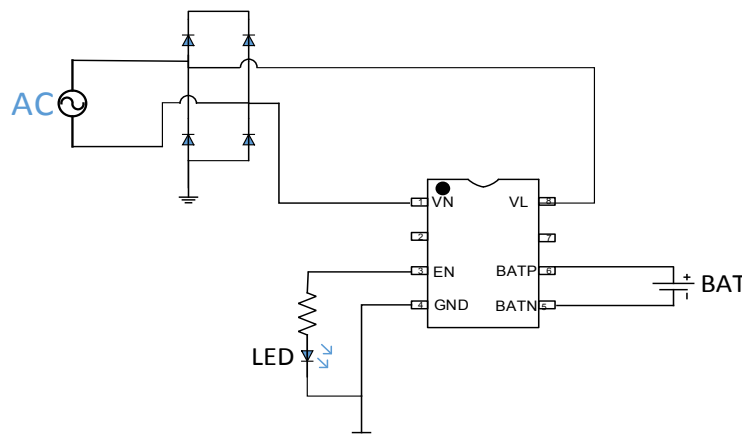


(Top View) SOP-8

Application

- Emergency lighting
- Stand-by Lighting

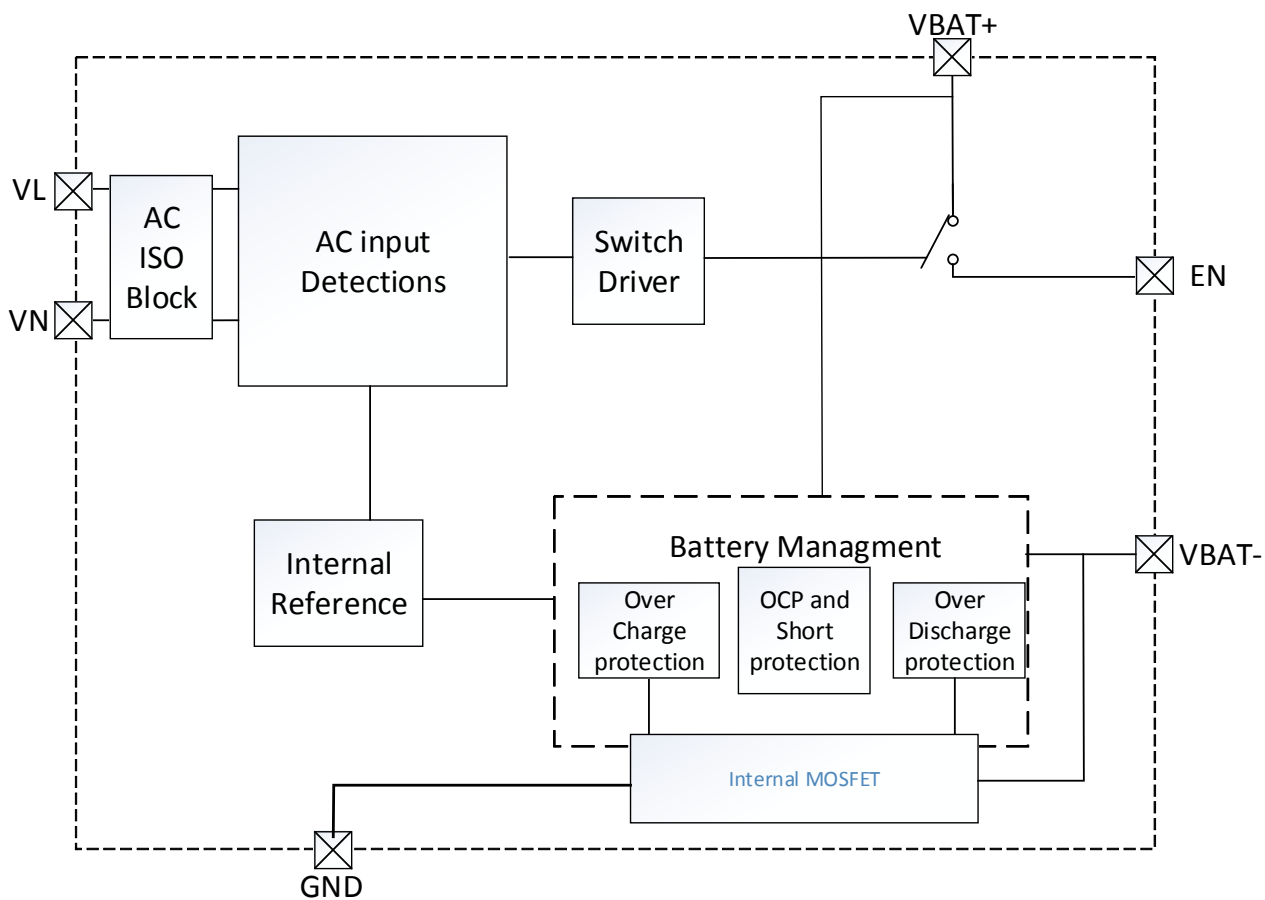
Typical Application



PIN FUNCTIONS

PIN#	PIN Name	Description
1	VN	Neutral Line
2	NC	
3	EN	Enable output
4	GND	GND PIN
5	BATN	Battery negative
6	BATP	Battery positive
7	NC	
8	VL	Live Line

FUNCTION DIAGRAM



ABSOLUTE MAXIMUM RATINGS (@T_A= +25°C, unless otherwise specified. Note 4)

Parameter	Symbol	Value	Units
V_BATP	V _{cc}	-0.3 to GND+10V	V
V_EN	VD	-0.3 to BATP +10V	V
VL, VN	VL, Vn	400V	V
Junction Temperature	TJ	+150	°C
Storage Temperature	TSTG	-65 to +150	°C
Thermal Resistance(Note 5)	θJA	66	°C/W
Lead Temperature (Soldering, 10sec)	TLEAD	+300	°C
ESD (Machine Model)	-	200	v
ESD (Human Body Model))	-	2000	v

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
T _A		-40	+105	°C

Electrical Characteristics (@T_A= +25°C, unless otherwise specified. Note 6)

Parameter	Symbol	Condition	Min	Typical	Max	Unit
Standby current Section						
Standby current	I _{cc}	V _{cc} =3.3V		70	-	uA
MOSFET Switch Section						
MOS On resistance	R _{DS(on)}	-	-	0.2	-	Ω
AC detect Section						
Enable threshold resistance				800		KΩ
Battery management Section						
Over Charge voltage		-	4.0	4.2	4.4	V
Over Charge Release voltage			3.8	4.0	4.2	V
Over Discharge voltage		-	2.6	2.8	3.0	V
Over Discharge Release voltage			2.8	3.0	3.2	V
Over Charge delay				80	200	mS
Over Discharge delay				20	60	mS
Over Current delay				10	20	mS
Short current delay				5	50	uS
Charging detect voltage			-1.2	-0.7	-0.2	V

Operation

1、AC main line detection

HM9928 is an ASIC for LED emergency lighting. The output PIN EN switch is turned on if the resistance between VL and VN is less than the threshold resistance, while there is no AC power signal. If the AC power is detected or the resistance between VL and VN is larger than the threshold, the EN PIN is high impedance state.

AC input	EN	NOTE
AC power	High impedance	
AC open	High impedance	
AC short	High level(battery voltage)	Resistance is less than threshold

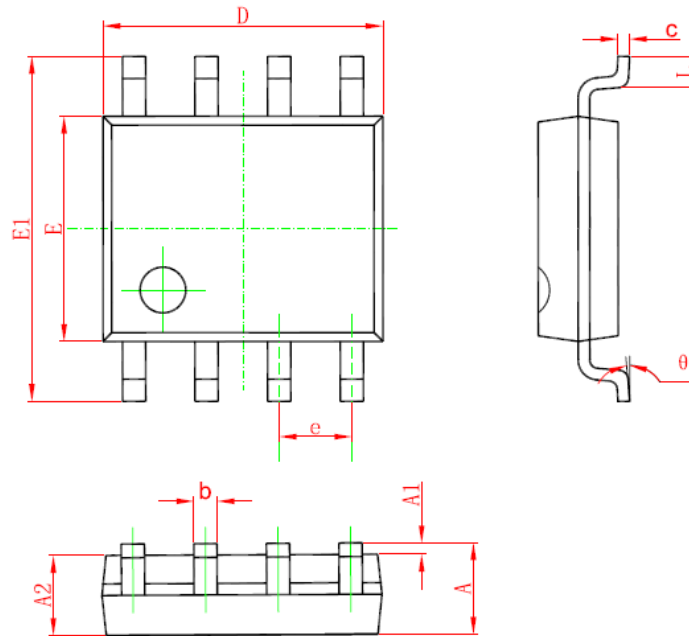
2、Battery Management

HM9928 integrates battery protection including to protect lithium ion/polymer battery from damage or degrading the lifetime due to overcharge, over discharge, battery reverse protection and overcurrent for one-cell lithium-ion/polymer battery.

3、Output current

In order to set the LED current, a ballast resistor could be added between EN PIN and LED load. The internal MOSFET resistance is 200mohm.

Package



symbol	UNIT (mm)		UNIT (mm)	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°