

Description

BP5353H is a high precision multiple segments linear constant current LED driver, which integrates rectifier bridge, 700V MOSFET and HV power supply circuit. It is mainly used to drive high voltage LED chips supplied by mains. Without electrolytic capacitors and magnetic components, the LED driver can achieve small size, long life and meet EMI requirements.

BP5353H can precisely set the current of LED through external resistor, and THD<20% can be easily achieved by optimizing the CS reference.

BP5353H has thermal fold back function. When the IC's temperature is too high, the LED current will be reduced.

BP5353H integrates input voltage compensation function. When the input voltage is too high, BP5353H will reduce the output current according to the external compensation resistance to ensure that the input power does not change a lot.

Features

- THD<20%
- Simple BOM and compact size
- Built-in rectifier bridge
- No E-cap and magnetic components
- Integrate 700V MOSFET for each segment
- Save jumper resistor in multi-chip parallel connection
- Can work under $\pm 20\%$ line voltage variation
- Fast start up
- $\pm 5\%$ output current accuracy
- LED current set by external resistor
- Input voltage compensation
- Integrate adjustable thermal fold back
- SOP8-EP package

Application

- LED retrofit
- LED downlight
- Others

Typical Application

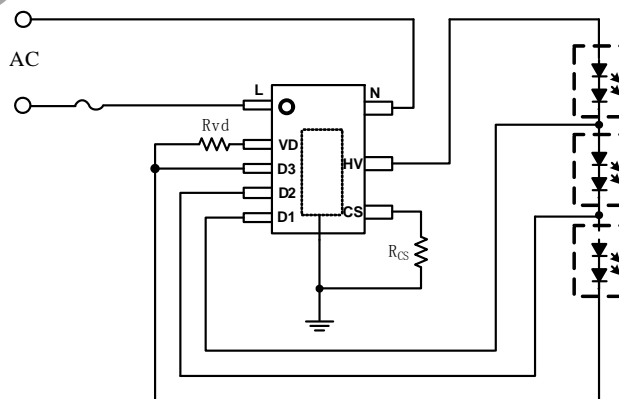


Fig.1 BP5353H Typical Application

Ordering Information

Part Number	Package	Tape & Reel	Marking
BP5353H	SOP8-EP	Tape 5,000 pcs/reel	BP5353 XXXXXX WXYH

Pin Configuration

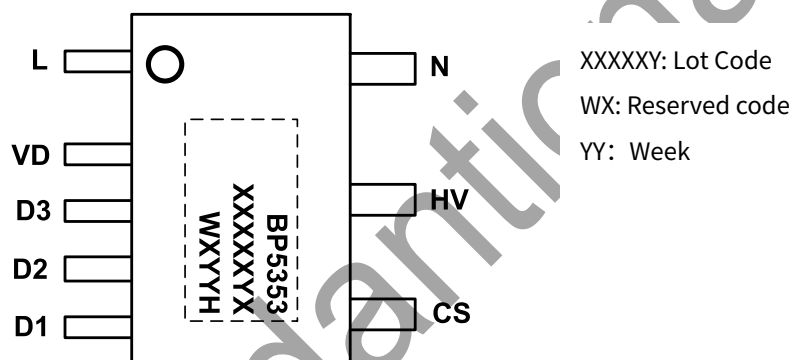


Fig.2 Pin Configuration

Pin Definition

Pin Number	Pin Name	Description
1	L	AC input
2	VD	Voltage compensation, connect resistor to D3
3	D3	Drain of LED string 3
4	D2	Drain of LED string 2
5	D1	Drain of LED string 1
6	CS	Current sense, need to connect resistor to GND
7	HV	High voltage output
8	N	AC input
E-pad	GND	IC ground

Absolute Maximum Ratings (Note1)

Symbol	Parameters	Range	Units
L,N	Rectifier bridge reverse voltage	-0.3~800	V
D1, D2, D3	Internal MOSFET drain voltage	-0.3~700	V
HV	High voltage	-0.3~600	V
CS, VD	Low voltage interface	-0.3~6	V
I _{D1_MAX}	D1 Max saturation current@ T _{J_max}	70	mA
I _{D2_MAX}	D2 Max saturation current@ T _{J_max}	80	mA
I _{D3_MAX}	D3 Max saturation current@ T _{J_max}	100	mA
T _J	Operating junction temperature	-40 to 150	°C
T _{STG}	Storage temperature range	-55 to 150	°C
	ESD (Note2)	2	KV

Note 1: Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. Under “recommended operating conditions” the device operation is assured, but some particular parameter may not be achieved. The electrical characteristics table defines the operation range of the device, the electrical characteristics is assured on DC and AC voltage by test program. For the parameters without minimum and maximum value in the EC table, the typical value defines the operation range, the accuracy is not guaranteed by spec.

Note 2: Human Body mode, 100pF capacitor discharge on 1.5KΩ resistor

Electrical Characteristics (note 3,4)(unless specified, otherwise TA=25°C)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
Operation Current						
I _{CC}	Operation current	D1=30V, CS=2V		160	260	uA
Current Sense						
V _{REFL_POST}	Ref. for string 1 @D1=10V	D1=10V, Rcs=1kΩ		473		mV
V _{REFH_POST}	Ref. for string 1 @D1=45V	D1=40V, Rcs=1kΩ		546		mV
V _{REFdelta_POST}	△Ref. of string 1	Rcs=1kΩ		73		mV
Thermal Regulation						
T _{REG}	Thermal regulation			150		°C

Note 3: production of the chip is performed at 25°C.

Note 4: the maximum and minimum specified are guaranteed by test, the typical value are guaranteed by design, characterization and statistical analysis.

Internal Block Diagram

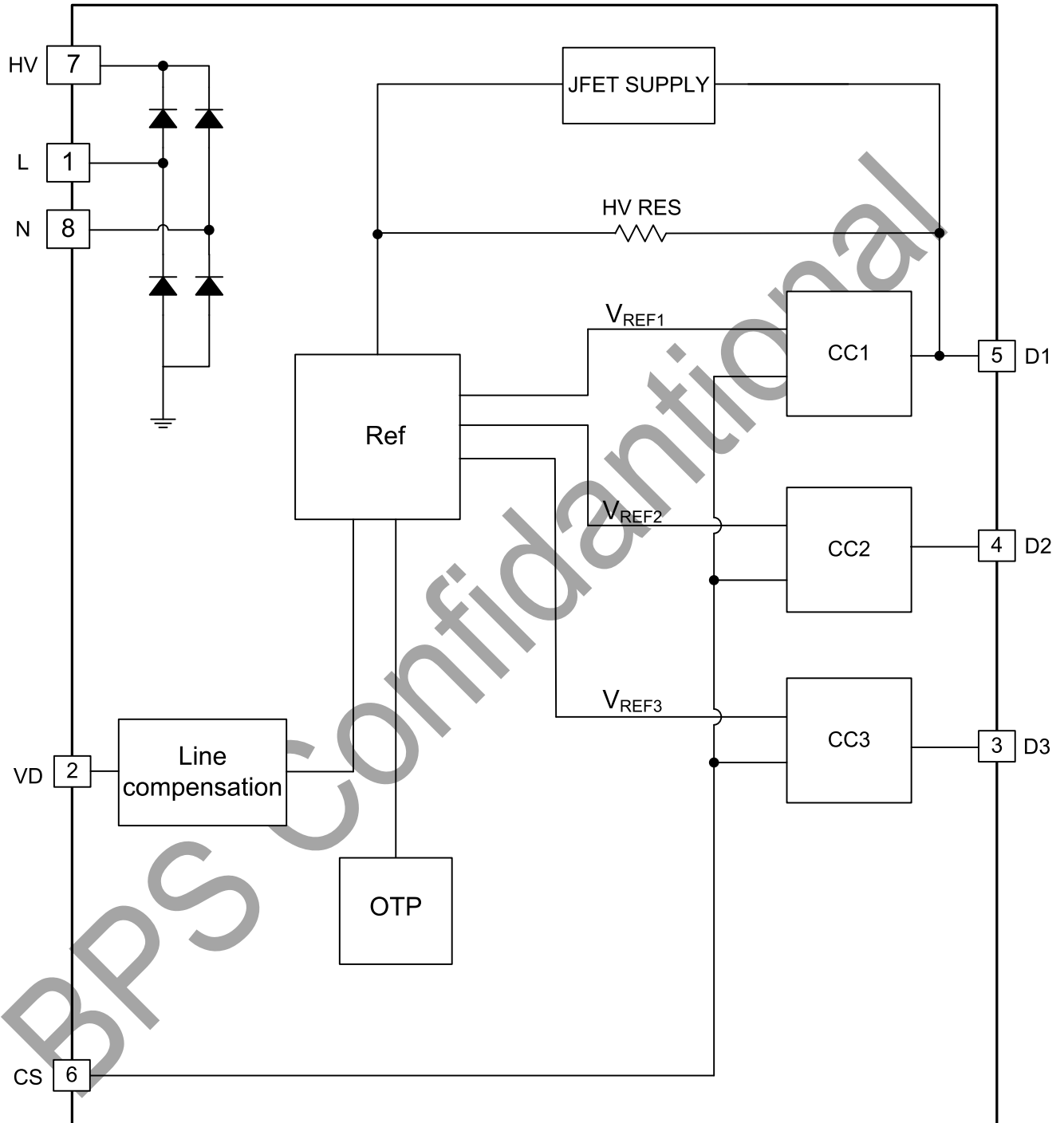


Fig.3 Internal Block Diagram

Application Information

BP5353H is a high precision multiple segments linear constant current LED driver, which integrates 700V MOSFET and HV power supply circuit. It is mainly used to drive high voltage LED chips supplied by mains. Without electrolytic capacitors and magnetic components, the LED driver can achieve small size, long life and meet EMI requirements.

1 Supply

After power on, the chip is supplied by JEFT through D1, starting work once voltage on D1 above 10V.

2 Operation principle

BP5353H automatically lights the LED strings one by one according to line voltage and extends the LED working strings in every main cycles with purpose of output lumen maintenance and LED utilization improvement. BP5353H can automatically work under different LED string's voltage, no need to set switch point outside. For different application, the forward voltage of all strings should match the input voltage, like 110V and 220V respectively.

3 Current Configuration

BP5353H supports high precision LED current set by external resistors.

Current for each string defined as:

$$I_{LEDn} = \frac{Vref_n}{Rcs}$$

where , n=1,2,3 refers to the different Reference Voltage for each string.

4 Thermal Regulation

BP5353H has thermal regulation available to balance the power delivering and temperature increasing. To improve the system reliability, the output current to be regulated lower down refer to the junction temperature.

5 Input Voltage Compensation

When LED string 3 on, in order to save the power loss, the system will decrease the LED current following voltage on D3 pin.

PCB Layout Suggestion

Suggestion for BP5353H PCB layout:

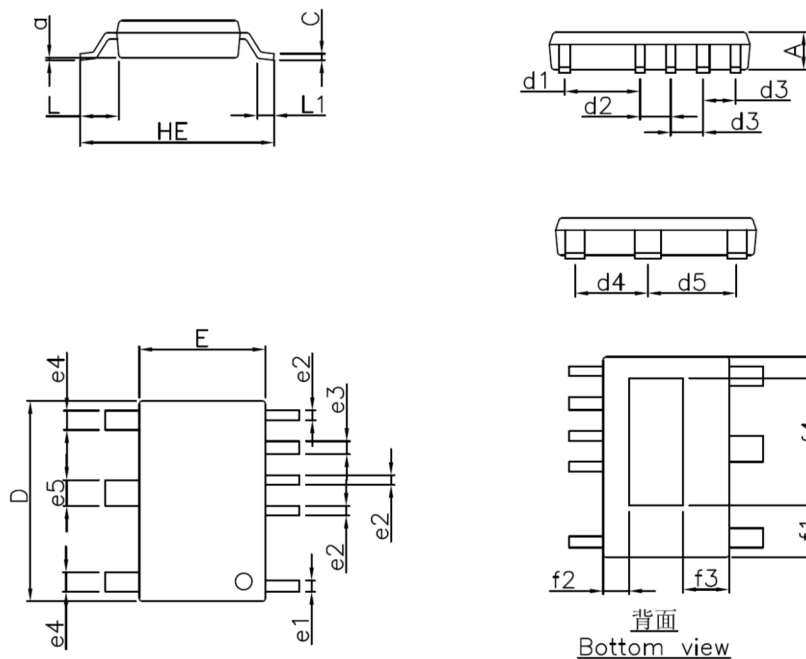
GND

Use the trace for current sense resistor as short as possible. Extend the copper area for each Drain Pin to improve good thermal condition.

Heat sinking

BP5353H adopts HSOP8 package to strengthen the thermal dissipation, so that connect E-pad to GND to decrease thermal resistance.

Physical Dimensions



Unit	mm			Unit	mm		
/	min	typ	max	/	min	typ	max
A	1.05	1.15	1.25	e2	0.25	0.30	0.35
C	0.15	0.20	0.22	e3	0.35	0.40	0.45
D	6.0	6.2	6.4	e4	0.55	0.60	0.65
E	3.70	3.9	4.1	e5	0.75	0.80	0.85
HE	5.9	6.0	6.1	L	0.95	1.05	1.15
d1	2.28	2.33	2.38	L1	0.40	/	0.80
d2	0.90	0.95	1.00	f1	1.55	1.60	1.65
d3	0.95	1.00	1.05	f2	0.75	0.80	0.85
d4	2.20	2.25	2.30	f3	1.38	1.43	1.48
d5	2.70	2.75	2.80	f4	0.61	0.66	0.71
e1	0.30	0.35	0.40	a	0.2 (ref)		

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