

BP5113JA

High Voltage Linear Power Supply

Description

The BP5113JA is a high current accuracy linear power supply, integrated with high voltage regulation MOSFET, specially designed for high voltage input and low current power supply.

The BP5113JA can drive precision constant current set by an external resistor.

The BP5113JA integrates thermal regulation function to improve system reliability.

The BP5113JA is available in SOT23-3 Package



SOT23-3 Package

Features

- Simple external circuit
- Small size
- Integrated with 500V HV MOSFET
- Fast startup
- Output current set by external resistors with $\pm 3\%$ accuracy.
- On-chip thermal regulation.
- In SOT23-3 package

Applications

- IC power supply
- Light indicator

Typical Application

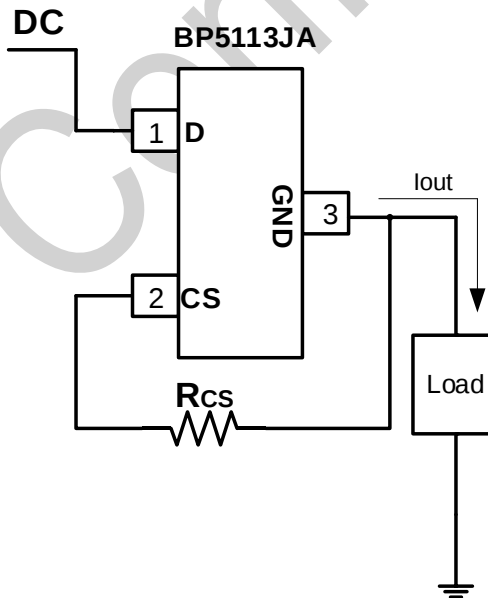


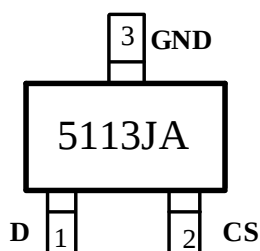
Figure 1 Typical Application of the BP5113JA

Note: The circuit and parameters are for reference only and tests are needed to fully verify its application.

Ordering Information

Part Number	Package	Package Method	Marking
BP5113JA	SOT23-3	Tape 3,000pcs/Reel	5113JA

Pin Configuration and Marking Information



BP5113JA: Part Number
JA: SOT23-3

Figure 2 Pin Configuration

Pin Definition

Pin No.	Name	Parameter
1	D	Drain of internal HV MOSFET
2	CS	Current sense, connect the current sense resistor to GND
3	GND	IC ground

Absolute Maximum Ratings^(Note 1)

Symbol	Parameters	Range	Units
D	500V HV interface	-0.3~500	V
I _{D_MAX}	Saturation current @T _{J_MAX}	10	mA
CS	Voltage of CS pin	-0.3~6	V
P _{DMAX}	Power dissipation (Note 2)	0.3	W
θ _{JA}	Thermal resistance of Junction to Ambient (Note 3)	220	°C/W
T _J	Operating junction temperature	-40~150	°C
T _{STG}	Storage temperature range	-55~150	°C
ESD	HBM (Note 4)	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: The maximum power dissipation decrease if temperature rise, it is decided by T_{J_MAX}, θ_{JA}, and environment temperature (T_A). The maximum power dissipation is the lower one between $P_{DMAX} = (T_{J_MAX} - T_A) / \theta_{JA}$ and the number listed in the maximum table.

Note 3: Tested on 1 in.² double-sided board according to JEDEC standard.

Note 4: Tested According to JEDEC standard, 100pF capacitor discharge on 1.5kΩ resistor.

Electrical Characteristics(Note 5) (Unless otherwise specified, $T_A = 25^\circ\text{C}$)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Power Supply (VCC)						
I_{CC}	Quiescent current	$V_D = 30\text{V}$		90	160	μA
Current Sensing (CS)						
V_{REF}	Current reference	$V_D = 30\text{V}, R_{CS} = 120\Omega$	582	600	618	mV
Thermal Regulation						
T_{REG}	Thermal regulation			140		$^\circ\text{C}$

Note 5: The maximum and minimum parameters specified are guaranteed by test, the typical value are guaranteed by design, characterization and statistical analysis.

Internal Block Diagram

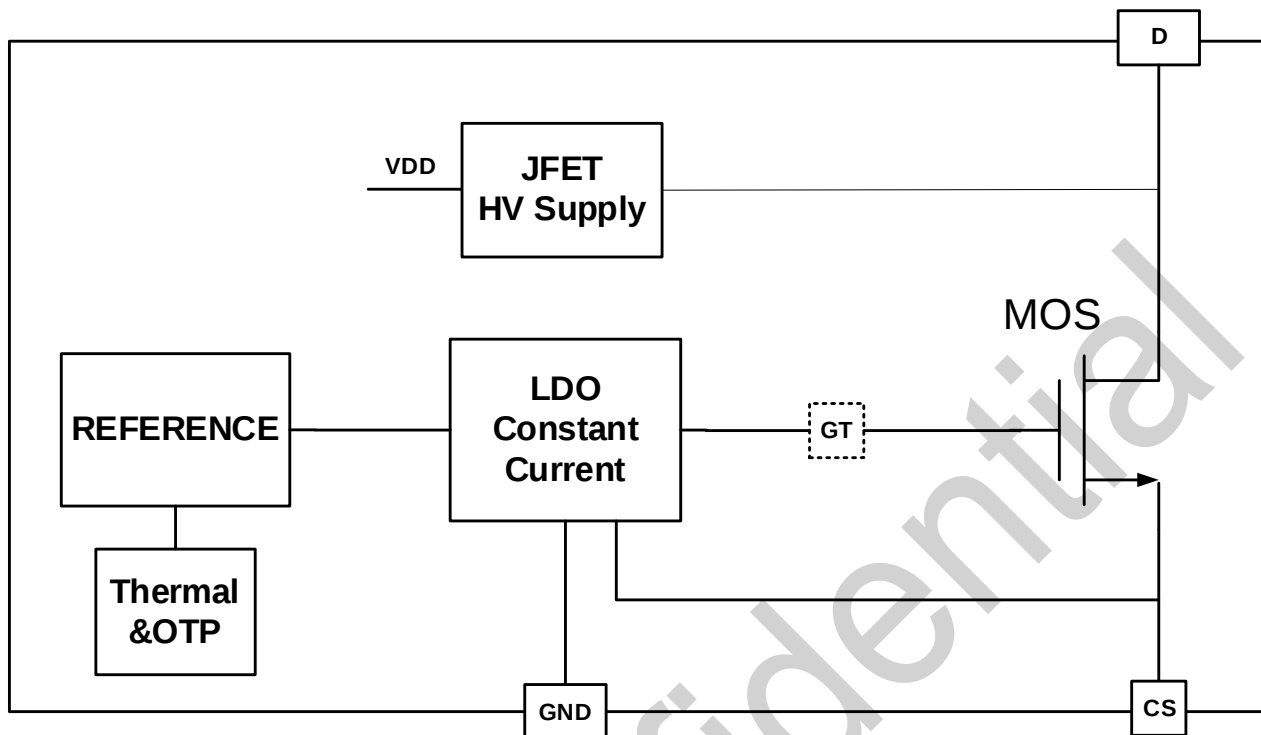


Figure 3 Internal Block Diagram of the BP5113JA

Application Information

The BP5113JA is a linear current source with high current accuracy designed for IC power supply.

IC Power Supply

After system power on, the chip is supplied by JEFT through D, and the chip starts to work once voltage on D is above 10V.

Current Configuration

The BP5113JA supports high-precision output current set by external resistors.

The output current is defined as:

$$I_{out} = \frac{V_{ref}}{R_{cs}}$$

Thermal Regulation

The BP5113JA has thermal regulation available on the chip to balance the power delivering and temperature increasing. To improve the system reliability, the output current is reduced once the junction is above the thermal regulation temperature.

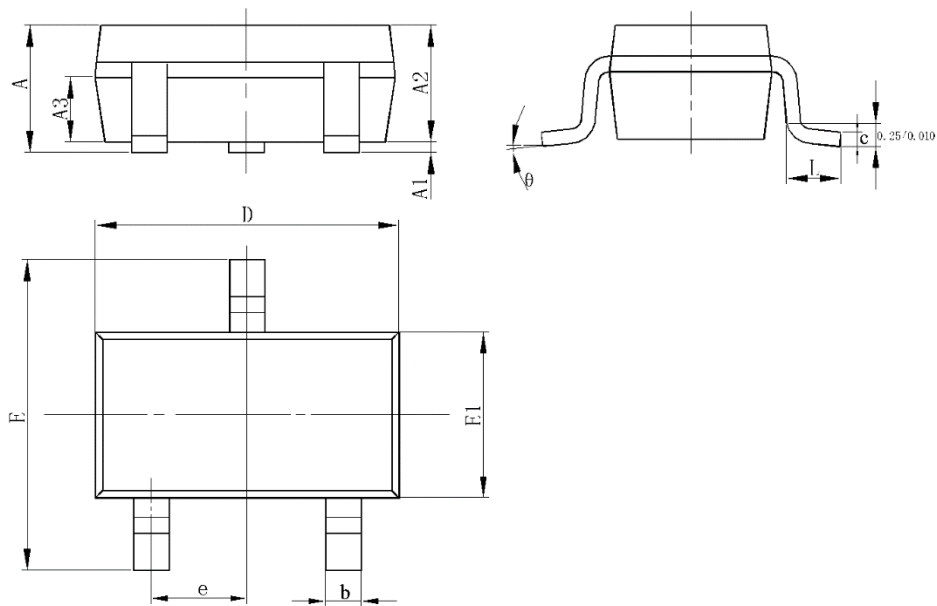
PCB Layouts

The following rules should be followed in the PCB layout of BP5113JA:

- 1) Use the trace for current sensing resistor as short as possible.
- 2) Extend the copper area for D Pin to improve thermal condition.

Physical Dimensions

SOT23-3 Package Outline Dimensions



SYMBOL	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	—	1.250	—	0.049
A1	0.040	0.100	0.002	0.004
A2	1.000	1.200	0.039	0.047
A3	0.550	0.750	0.022	0.030
b	0.380	0.480	0.015	0.019
c	0.110	0.210	0.004	0.008
D	2.720	3.120	0.107	0.123
E	2.600	3.000	0.102	0.118
E1	1.400	1.800	0.055	0.071
e	0.95BSC		0.037BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Revision Information

Revision Information	Date	Notes
Rev.1.0	2018.06	First release
Rev.1.1	2024.05	Update to new document template. Update pin definition table.

Disclaimer

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