

BPC Series Power Resistors



Non-inductive Planar
Thick Film Power
Resistors

- Planar thick film
- Low inductance
- High frequency operation
- Vertical mount
- Low board level temperature
- 20x rated power surge



A subsidiary of TT electronics plc



BI Technologies

BI Technologies offer the BPC series of non-inductive planar thick film power resistors for current limiting, power supply circuits and snubber circuits. Manufactured using 96% Alumina substrates with Ruthenium oxide resistors the BPC series power resistors are capable of withstanding a 20x overload for 8ms and offer excellent performance and high reliability. BPC series power resistors are available in 3, 5, 7.5 and 10 watt power ratings as shown below.

Size	BPC3	BPC5	BPC7	BPC10
Power rating	3W	5W	7.5W	10W
Dimensions (length, width, thickness)	27.7 x 10.2 x 2.54mm	27.7 x 12.7 x 2.54mm	27.7 x 19.1 x 2.54mm	27.7 x 25.4 x 2.54mm
Range	1Ω to 200kΩ			
Standard Tolerance %	±10 (optional 1, 2, 5)			
Operating Temperature Range	-55°C to +125°C			
Operating Voltage Maximum	300 VAC, 500 VDC			
Temperature Coefficient of Resistance	±100 maximum ppm/°C (± 250 for values below 1ohm)			

Why Use BI Technologies BPC Series Power Resistors?

- **Planar Thick Film Cermet Resistor - Very low inductance for high frequency operation.**
- **20x Rated power surge capability.**
- **Low operating temperature at board surface means high temperature solder is not required.**
- **Large surface area to thickness ratio - maximises power dissipation, minimises hot spots.**
- **Vertical mounting. Power is dissipated above the circuit board. Enhances board cooling due to natural convection flow.**
- **Minimises required board area. Uses only a third board area versus a typical wirewound resistor.**

1. Inrush current suppression

The BPC may be used to limit inrush current when a power supply is switched on. Figure 1 shows a typical PFC circuit in which two BPC10 resistors in series function in an inrush current suppression circuit which operates principally at switch-on.

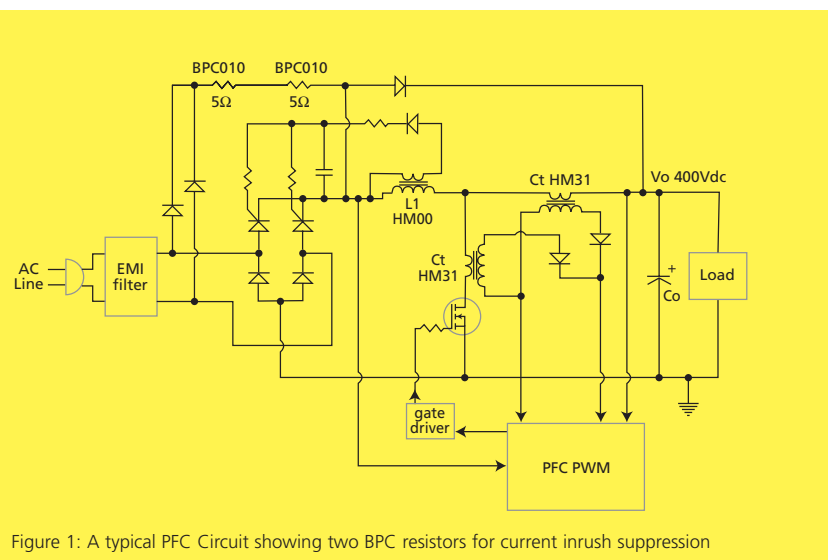


Figure 1: A typical PFC Circuit showing two BPC resistors for current inrush suppression

2. Snubber circuits and Start-up Circuits

The BPC may be used in series with a capacitor in a snubber circuit to filter spikes in the rising and falling edges of square waves.

In Figure 2 BPC3 500Ω is used.

Figure 2 also includes a start-up circuit that provides 18 Volts to the PWM while the power supply is turning on. In this case a 50kΩ, BPC5 is utilised.

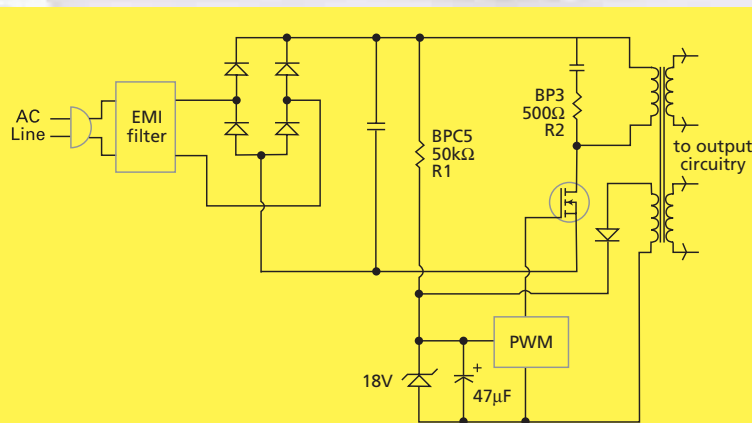


Figure 2: Circuit showing BPC Resistors in Start-up (R1) and Snubber (R2) Applications

3. Inrush current limiting

This resistor limits the amount of current allowed to surge into the system at turn-on. Power resistors in this circuit must be able to withstand a 20x nominal surge for 8msec. This is typically a 15Ω, 7-10 Watt, 10% resistor. A typical location of this resistor is shown in Figure 3. This resistor carries the main current load.

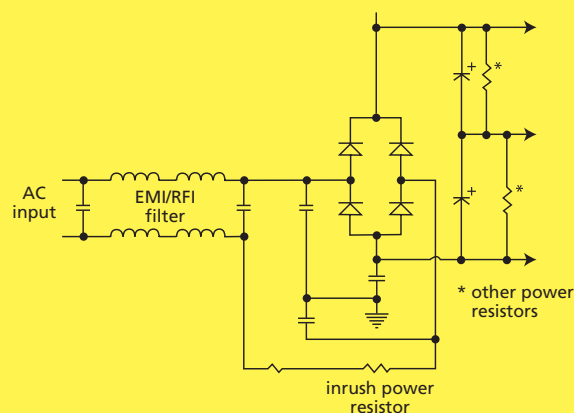


Figure 3: Circuit showing a BPC Resistor in an Inrush Application

4. Other Snubber Circuits

In these applications the power resistor bleeds current of the magnetics to prevent inductive spikes. This resistor will experience voltage spikes at 2x the switchmode switching frequency. This is typically a 500Ω to 1kΩ, 3W to 5W, 2% to 5% resistor. Circuit configurations are found in Figure 4.

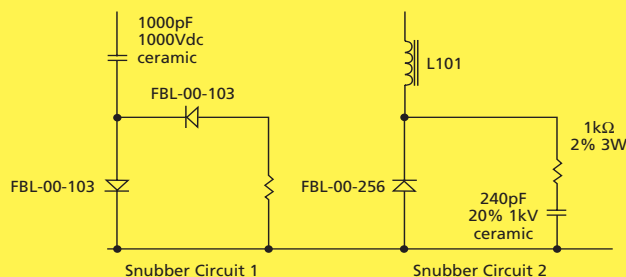


Figure 4: Snubber circuits found in power supplies

5. Biasing (Current conditioning)

These resistors do not experience surges or spikes. This is a steady state application. In these applications the resistor values vary considerably from 200Ω to $20k\Omega$, $3W$ to $5W$, 2% to 5% . An example is shown in Figure 5.

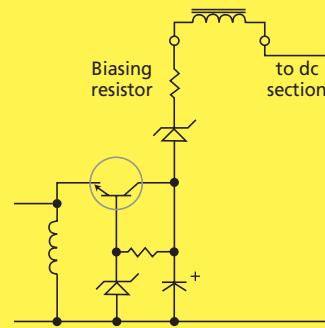


Figure 5: Circuit from a high-current power supply which uses a BPC resistor for Biasing

6. Preloading (1)

This resistor experiences a steady state condition. The typical resistor is 3Ω to $1k\Omega$ with 10% tolerance. The preloading is usually a function of the circuit. An example is shown in Figure 6.

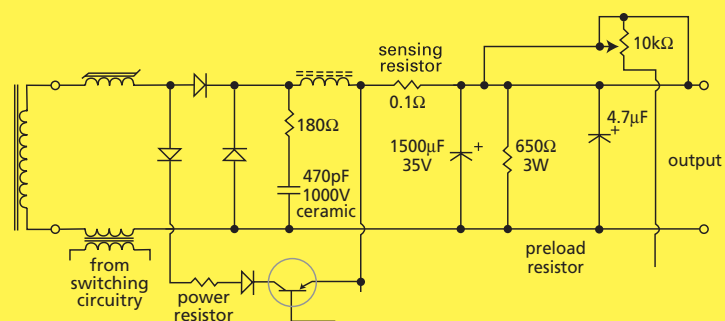


Figure 6: Part of proprietary power supply showing two power resistors

7. Current Limiting

BPC resistors have uses as current limiters in high-voltage power supplies. An example of a high voltage power supply, which is used to drive a laser, is shown in Figure 7 and the BPC resistor is highlighted.

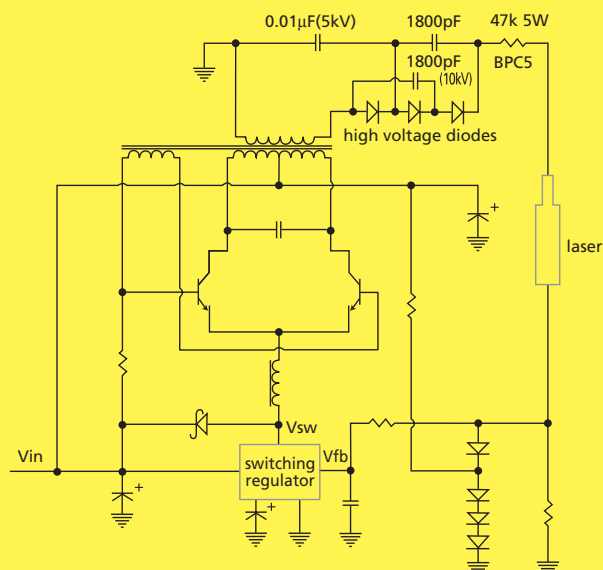


Figure 7: Laser power supply showing a BPC5 for current limiting

8. Preloading (2)

Another example of preloading is in a Battery Charger circuit as shown in Figure 8 where a resistor is used as a dummy load to prevent overcharging the battery.

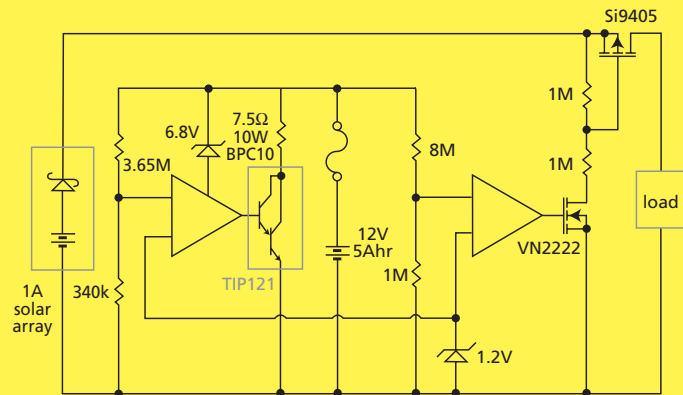


Figure 8: Shunt battery charger which uses a BPC10

Model BPC

Vertical mounting

Enhances board cooling due to natural convection airflow

Large surface

Maximises power dissipation and minimises hot spot

Low operating temperature

At board surface high temperature solder not required

Planar, Thick Film Cermet Resistor

Non inductive

Automated laser trimming

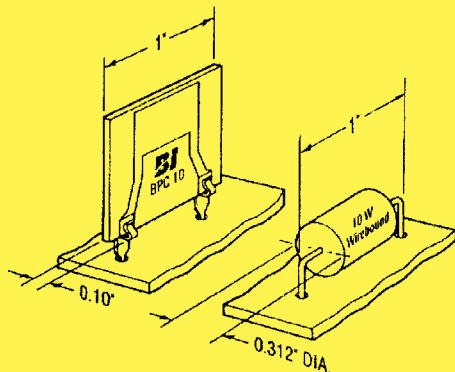
Accurate and stable resistance values

Leads soldered on both sides

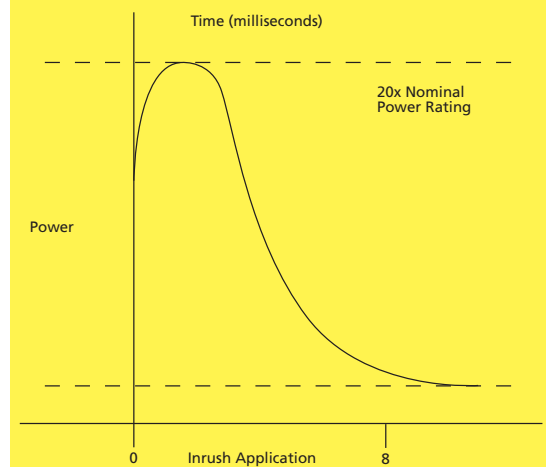
Built-in stand off

Vertical mounting

Minimises board area



Inrush Application



BI Technologies - SMT

Company Profile

BI Technologies, SMT Division is a World Class manufacturer of thick film Passive Components. The company was established in 1958 in Glenrothes, Scotland. BI Technologies have earned a great reputation as a high quality, high volume, cost effective and responsive supplier of thick film passive components for telecommunications, computer, automotive, medical and industrial applications.



Product Range

- Packaged SIL, DIL and Surface Mount Resistor Networks
- Chip Resistor Arrays
- Chip Resistor - Capacitor Arrays
- Planar Power Resistors
- Surge Resistors
- Thick Film Substrates
- Custom Thick Film products
- High Voltage Resistors and Networks

BI Technologies - ECD

Company Profile

BI Technologies has been an innovator and leader in electronic components for more than 50 years manufacturing products for communication, computer, industrial and automotive applications.

BI Technologies serves a global customer base with manufacturing locations in the United States, Mexico, Scotland, Japan, China and Malaysia.



Product Range

- Trimming and Precision Potentiometers
- Position Sensors
- Chip Resistor Arrays
- Resistor Networks
- Integrated Passive Networks
- Inductors
- Transformers
- Turns Counting Dials
- Hybrid Microelectronics and Custom Integration Products

BI Technologies - MCD

Company Profile

BI Technologies, Magnetic Component Division, headquartered in Fullerton, California, with a manufacturing base in Kuantan, Malaysia, is a world leader in miniature surface mount high power inductors. The magnetic material and manufacturing expertise of various inductors, choke coils, transformers and assemblies has expanded the customer and market base into automotive, medical, computer, data communication and industrial in addition to other specialized magnetic assembly applications.



Product Range

- Transformers both surface mount and through hole
- Surface Mount high powered inductors
- Toroidal inductors (through hole and surface mount)
- High power specialty laminate transformers
- Data communication modules, filters, and transformers for ethernet and DSL
- Common mode filters and chokes
- Planar transformer solutions

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