APPLICATION NOTE AN-100

Powered by CITA technologies

System Power Architecture

Keywords: **Bias, System, Auxiliary, Main, Architecture, Application**

Specifications Reference: **None**

Scope: **BPSX, BPWX and BPH Modules**

Reference Application Notes: **None**

Introduction:

Bias Power modules represent a new approach to providing AC/DC power conversion in under 5 watt applications. Developed with a system-level view, these modules add a degree of performance and application flexibility that is completely unique in the market. Small size, both physically and output power, constant power instead of current limit, double insulated, PCB mounting, component recognition, FCC and RF transceiver compatibility, dual-output capability, all in a ready-to-use form factor make them ideal solutions for time-to-market efficiency and low life-cycle cost.

Applications:

Bias Power AC/DC power supplies are designed to be applied in two major categories of applications.
First is auxiliary, where the Bias supply is one of two or more supplies and provides power for standby, housekeeping, biasing or other requirements. In some cases a small amount of Vo power is used, but generally these applications are at the low end of the power range and supply 3.3V or 5.0V requirements from the Vr output.
Second is as a main or utility supply where Bias is the only supply and provides all power necessary for the product or system. Typically, these supplies range cover the complete power and voltage output range. Both Vr and Vo supplies are often utilized for optimum system performance.
The characteristics of the Vo and Vr outputs are different and each has application-specific benefits which can provide high value to the system designer. Some specific characteristics and benefits:
Vo is a voltage-regulated output which has a constant power mode instead of a conventional current limit. This output is best suited to drive mechanical relays, solenoids, SSRs, capacitive loads, indicating lights, LEDs, op-amp drivers, zero-crossing detection and as a source for isolated DC utility power which may be used directly or post-regulated with either a linear regulator, LDO or DC/DC converter.
Vo is self protecting, cannot be overloaded and can be shorted indefinitely.
The graceful transition from voltage regulation to constant power and the wide range of product ratings can allow the designer to select a supply tightly matched to design load. **Unlike design-your-own, or partially complete modules where significant design margin is required to stay far away from current limit, there is no need to oversize the Bias supply**.
Vr is also a voltage-regulated output and is thermally protected from overload. It has very low output ripple capable of driving microprocessors , logic, sensors and other elements which require a low-noise, tightly-regulated supply. In addition, Vr is supplied internally by Vo. This means that any capacitance added to Vo can increase the hold-up time of Vr as well.

Figure 1 : Voltage/Current curve of a typical Bias power supply

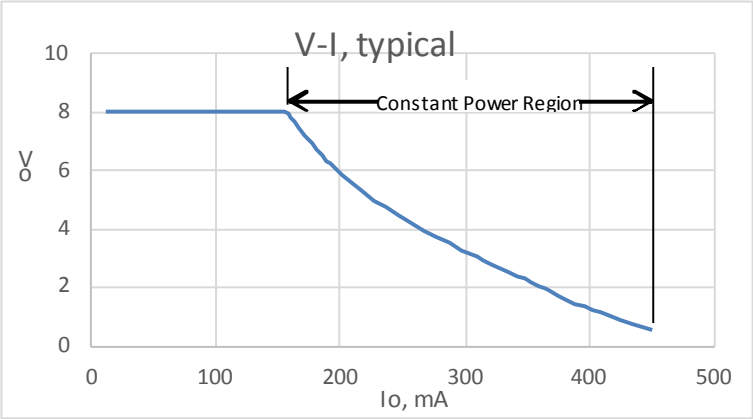

Figure 1

Notes to Figure 1:
This V-I curve is typical for Vo output of a BPSX 1 Watt, 8 Volt supply.
As can be seen by the graph, where a current limit condition (a nearly vertical line) would be expected to start at some current above the rated current (in this case 1 Watt divided by 8 volts = 125mA) a slightly non-linear, nearly constant power curve exists. As the breakpoint occurs slightly above 125mA, the curve begins above the nominal 1 Watt rating. A few data points: 300mA - 0.96 Watts, 400mA - 0.48 Watts. Any point on this curve represents a continuous operating point.
This characteristic allows several application specific capabilities.

1. **Designs do not need to avoid current limit.** This means the power supply need not be oversized and a supply much closer to the design maximum can be selected. The space, efficiency and cost effectiveness are thereby significantly improved.
2. Highly capacitive loads may be used. This can be in the form of super-capacitors or any electrolytic, film or other technology. The purpose can be for increased hold-up time, as an alternative to batteries or to provide current for short-term, peak power loads. Such short-term loads are likely in powerline carrier (such as Echelon, Watteco and others) and RF applications where transmit power significantly exceeds average power requirements.
3. Parallel configurations for redundancy, design flexibility or A/B power source applications.

Restrictions:

1. This application note is only applicable to the Bias Power power supplies identified in Scope and the unique characteristics of the Bias Power Vo output, no applicability or suitability with other power supplies is expressed or implied.
2. Results not guaranteed, testing has confirmed this circuit, your results may differ, testing for conformance still required. Variations in test methods, layout, adjacent components and devices may alter results.