

**Proven  
Reliability**

# CB SERIES

MINIATURE, REGULATED HIGH VOLTAGE DC TO DC CONVERTERS

100V to 10kV at 1 Watt



## PRODUCT SELECTION TABLE

MODEL	OUTPUT VOLTAGE	OUTPUT CURRENT*1	RIPPLE
CB101	0 to +10kV	0 to 100 $\mu$ A	<0.1%
CB101N	0 to -10kV	0 to 100 $\mu$ A	<0.1%

## PRODUCT DESCRIPTION

The CB Series is new line of miniature, well regulated high voltage power supplies providing clean and reliable high voltage in a shielded, PC-mount package. Offering precision 0 to 100% programmability and very low ripple and EMI/ RFI, these cost-effective power supplies are ideal for integration into compact, sensitive equipment. The CB Series features current and voltage monitoring, built-in protection against programming overvoltage, and thermal shutdown. These modules come in a positive or negative output voltage of 10kV. For voltages ranging from 100V to 8kV, see the C series.

## FEATURES

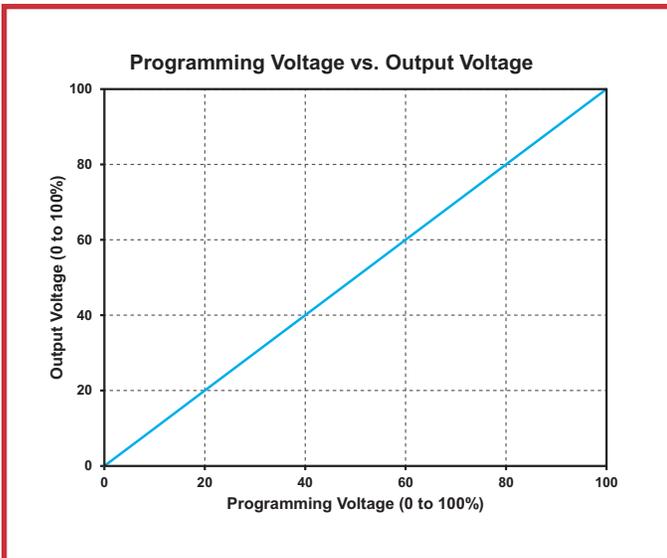
- Regulated
- Low Noise, Quasi-Sinewave Oscillator
- Miniature Size
- 0 to 100% Programmable Output
- High Stability
- Wide Input Voltage Range, 11.5 to 16V
- Very Low EMI/RFI
- High Reliability: MTBF >2.6 Million Hours per Bellcore TR-332
- Plated Steel Case with Isolated Case Ground
- Sealed to Withstand Immersion Cleaning Process
- External Gain Adjust for Calibration
- Built-in Programming Voltage Overvoltage Protection
- Built-in 5V Reference Voltage
- Built-in Thermal Shutdown
- Voltage Monitor: 0 – 5V = 0 – 100% Vout
- Current Monitor: 0 – 5V = 0 – 100% Iout
- UL Certified Encapsulant, Meets 94V-0 Flammability
- RoHS Compliant

## OPTIONS

- Extended Operating Temperature - Consult Factory

## APPLICATIONS

- Electrophoresis
- Capacitor Charging
- Field Generation
- Spectrometry
- Deflection Plates
- Test Instrumentation
- Image Intensifier



ISO 9001:2008  
CERTIFIED

ISO 14001:2004  
CERTIFIED

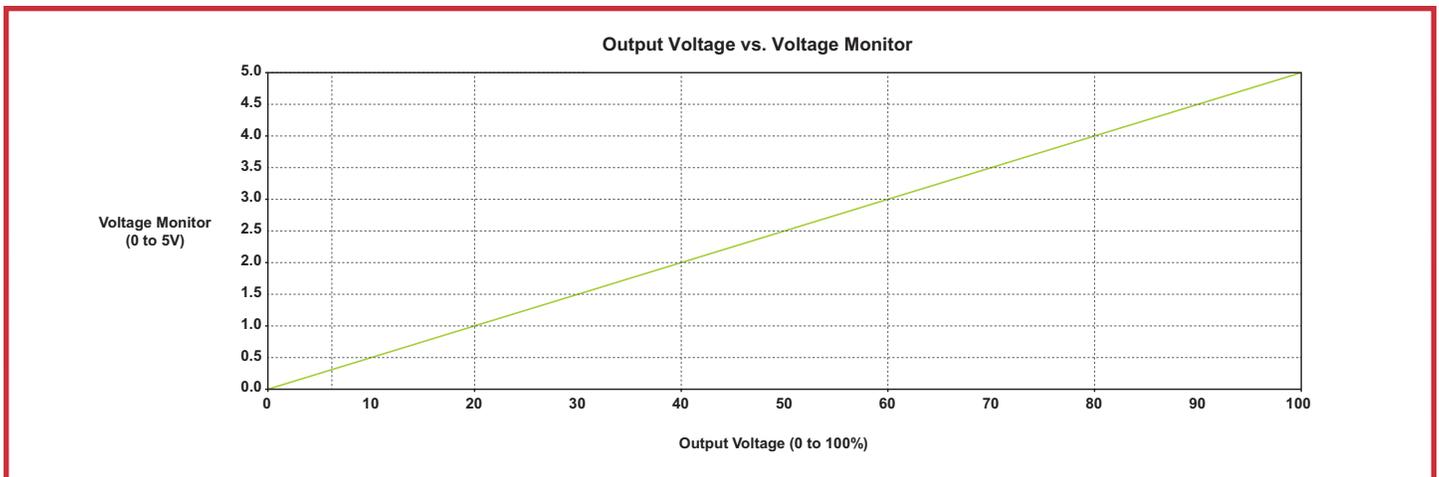
RoHS  
COMPLIANT

IPC  
Certified J-STD-001  
Application Specialist

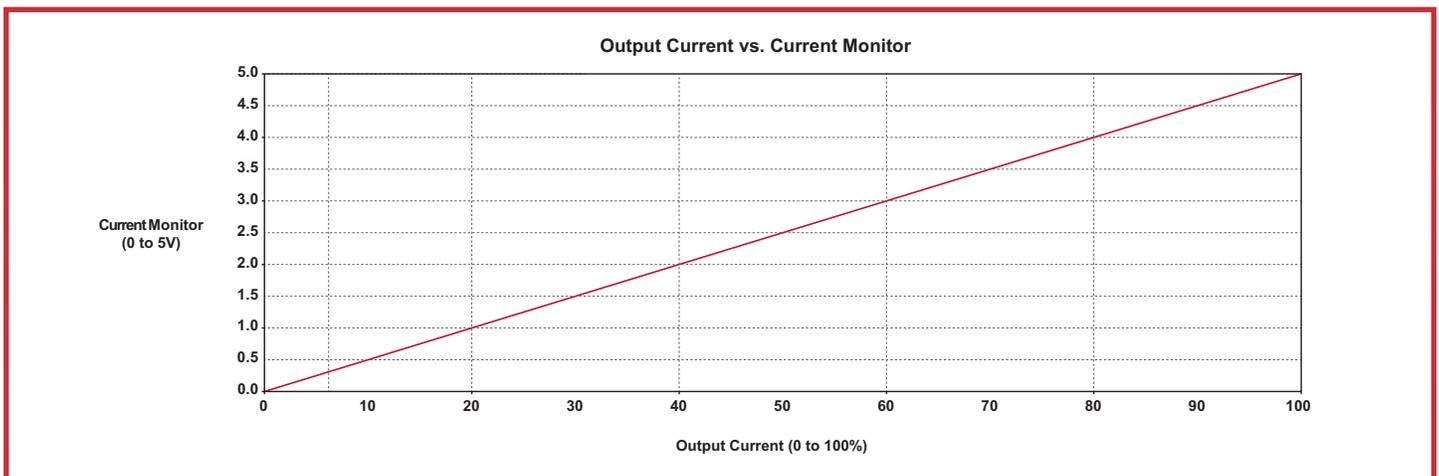
ELECTRICAL SPECIFICATIONS\*2 CB101 (10,000V)

OUTPUT VOLTAGE	MODEL	OUTPUT CURRENT*1	RIPPLE P-P FULL-LOAD*3	REGULATION		FREQUENCY*3
				LOAD 0 TO 100%*3	LINE 11.5 TO 16.0V*3	
0 to +10kV	CB101	0 to 100 $\mu$ A	<0.1%	<0.1%	<0.1%	100 - 150kHz
0 to -10kV	CB101N	0 to 100 $\mu$ A	<0.1%	<0.1%	<0.1%	100 - 150kHz

OUTPUT VOLTAGE VS VOLTAGE MONITOR



OUTPUT CURRENT VS CURRENT MONITOR



**ELECTRICAL SPECIFICATIONS\*2 CB101 (10,000V)**

PARAMETER	VALUE
INPUT VOLTAGE	+11.5 to +16 VDC
INPUT CURRENT	<100 mA, No Load
	<225 mA, Full Load
INPUT CAPACITANCE	440 uF low ESR
PROGRAMMING VOLTAGE	0 to +5VDC, <100uA
PROGRAMMING VOLTAGE OVERVOLTAGE	<5.25VDC
REFERENCE VOLTAGE	5VDC, 2mA
CURRENT MONITOR	0 to +5VDC (Load current 0 to 100%), Error <0.5% <sup>6</sup>
VOLTAGE MONITOR	0 to +5VDC (Load voltage 0 to 100%), Error <0.5% <sup>6</sup>
RESPONSE TIME	<250msec (Full Load, full scale response) (10–90%)
SETPOINT ACCURACY <sup>7</sup>	Adjustable +/- 1% (using gain adjust)
LINEARITY <sup>7</sup>	<1 % (20% to 100% Vout)
STABILITY	<0.01%/hr/8hrs
TEMPCO	<50 ppm/°C <sup>3</sup>
THERMAL SHOCK LIMIT	1°C /10 seconds
OPERATING TEMPERATURE	-10 to +60°C <sup>5</sup> (CASE) (For wider range consult factory)
STORAGE TEMPERATURE	-20 to +100°C
THERMAL SHUTDOWN	> 85°C (CASE)

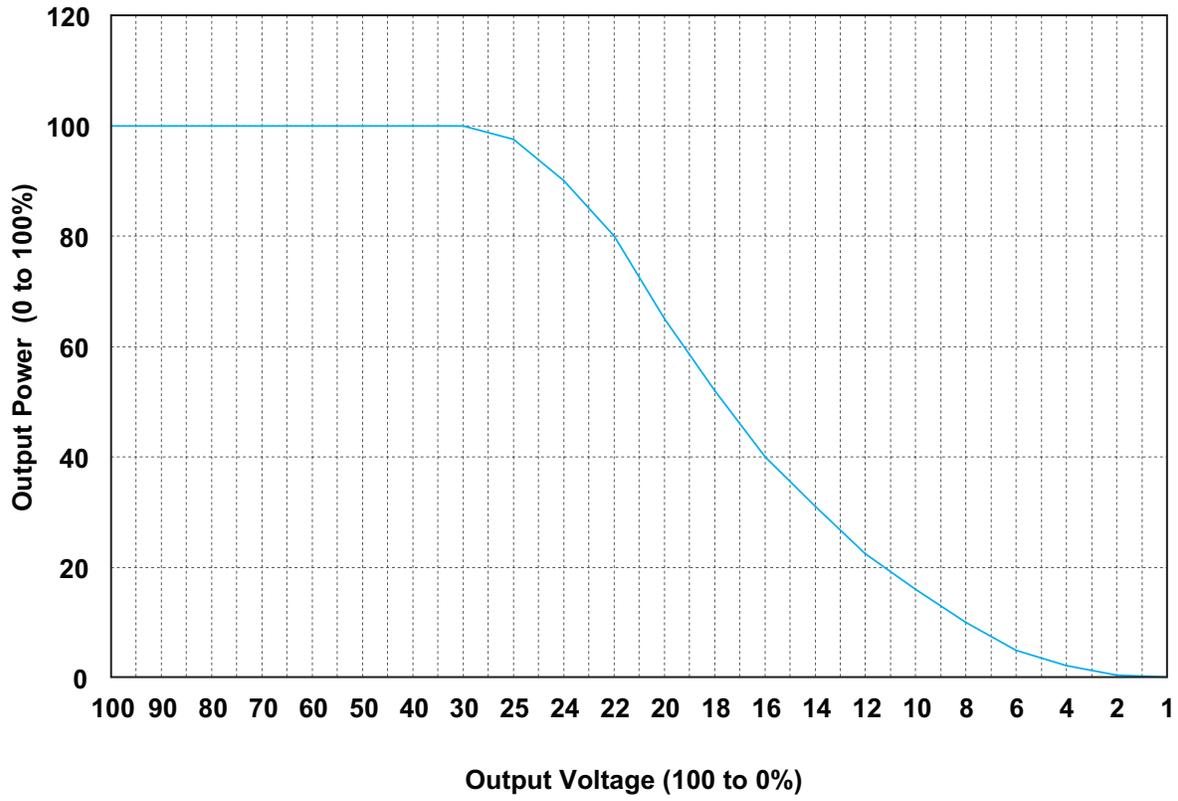
**DETAILED PRODUCT DESCRIPTION**

The CB Series is new line of miniature, well-regulated high voltage power supplies. The modules are programmed from 0 to 100% of rated output via a 0 to +5 volt DAC compatible high impedance programming input voltage. The CB Series features current and voltage monitoring, built-in protection against programming overvoltage, and thermal shutdown. Temperature drift is typically less than 50 PPM/°C. A built-in reference voltage source can be used in lieu of the programming voltage. The CB Series exhibits very low ripple, noise,

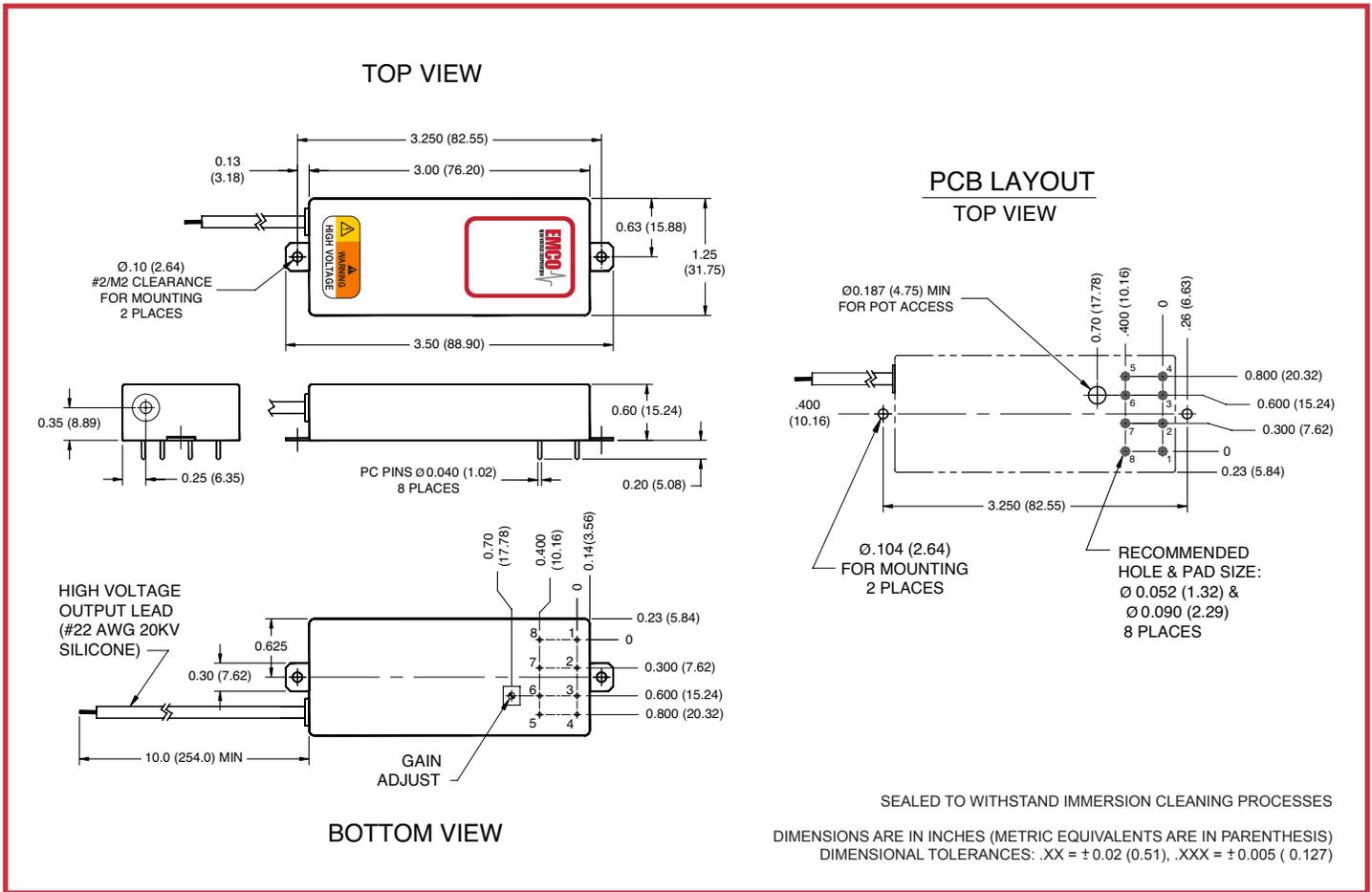
and EMI/RFI by utilizing a quasi-sinewave oscillator, shielded transformer, excellent filtering techniques, and an isolated steel enclosure featuring a separate grounding pin. An externally accessible potentiometer provides adjustable gain trim, allowing for individual calibration of units. A proprietary encapsulation process and high performance formula are used to achieve excellent high voltage and thermal properties. Positive and negative outputs are offered.

POWER DERATING CURVE

Output Voltage vs. Output Power Derating Curve



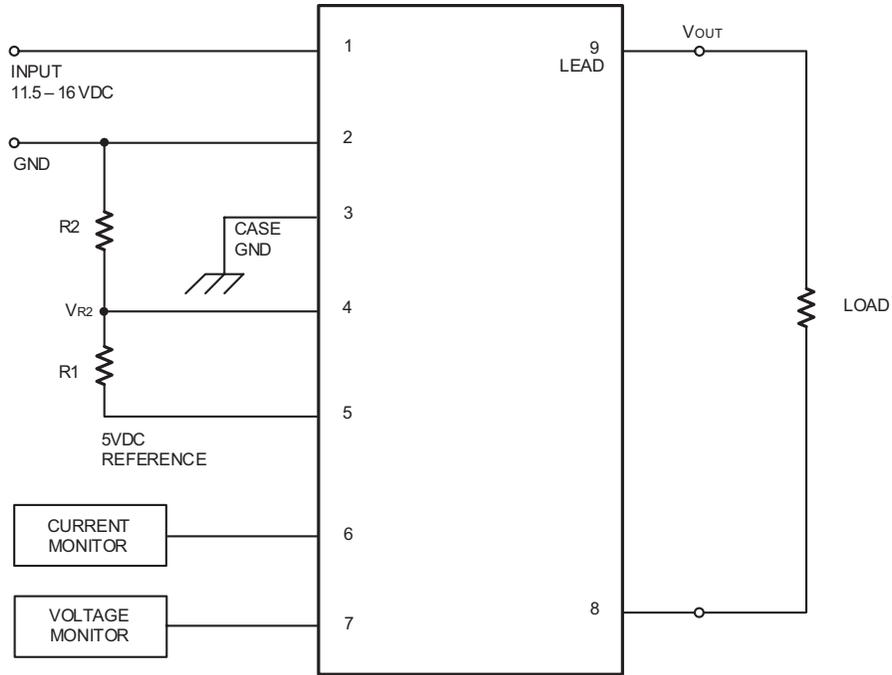
MECHANICAL SPECIFICATIONS CB101 (10,000V)



PARAMETER	VALUE
WEIGHT	3 oz (85 grams)
VOLUME	2.25 IN <sup>3</sup> (36.87 CM <sup>3</sup> )
DIMENSIONS	3.00 L(76.2L) x 1.25W (31.75W) x 0.60H (15.24H)
CASE MATERIAL	ZINC PLATED STEEL

PIN #	FUNCTION
1	(+) INPUT
2	GND
3	CASE GND <sup>4</sup>
4	PROGRAMING VOLTAGE
5	5VDC REFERENCE VOLTAGE
6	CURRENT MONITOR
7	VOLTAGE MONITOR
8	HV RTN
LEAD	HV OUT

APPLICATION NOTES



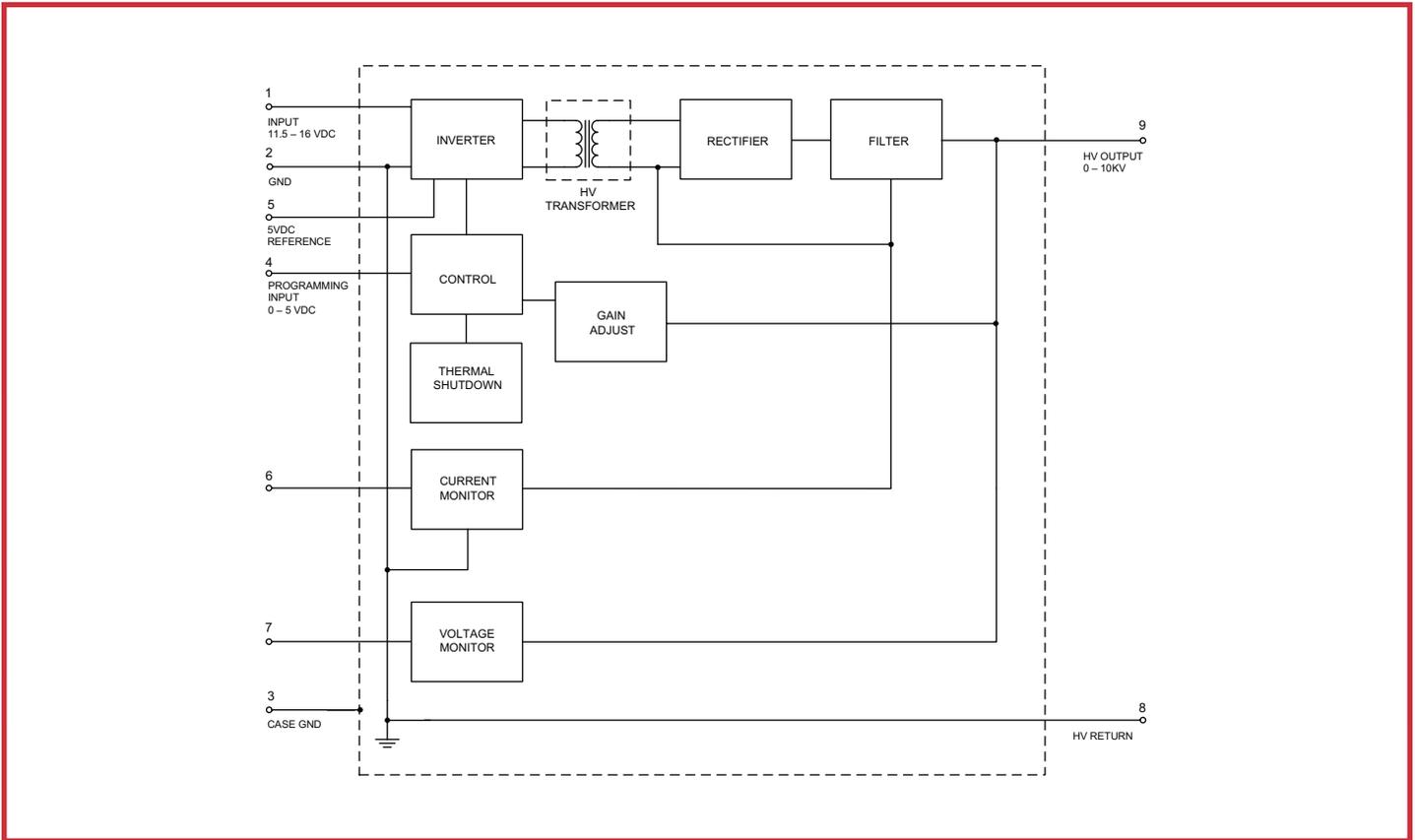
Operate with 5VDC Reference Voltage  
Variable output

$$V_{R2} = \frac{R1}{R1 + R2} (5)$$

$$V_{OUT} = \frac{R1}{R1 + R2} (10000)$$

R1 can be replaced with a potentiometer

BLOCK DIAGRAM



HOW TO ORDER

PART NUMBER SELECTOR:

Model Number:

**CB 101 N**

Model \_\_\_\_\_  
 Output Voltage (See table) \_\_\_\_\_ Polarity Designator (**Blank or N**)

- \* Notes:
1. At Maximum Rated Output Voltage.
  2. Specifications after 1 hour warm-up, full load, at 25°C unless other wise indicated.
  3. Typical Performance.
  4. All grounds internally connected, except case. There should not be more than 50 volts potential between the case ground (pin 3) and the circuit ground (pins 2 and 8). Isolated case assists low noise design efforts. Case pin must be connected to ground for proper operation.
  5. Proper thermal management techniques are required to maintain safe case temperature at maximum power output.
  6. 20–100%.
  7. SET POINT ACCURACY refers to the ability of the unit to accurately deliver the voltage intended by the applied programming. The resultant output voltage will be within +/-1% of that programmed. LINEARITY refers to how much the transfer function can deviate from a straight line in the absence of any set point error. GAIN ADJUSTMENT refers to the ability to alter the gain of the circuit to bring the resultant output voltage to the programmed setpoint. This is intended to allow compensation for set point accuracy error.

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