

## DGP12 SERIES SINGLE OUTPUT

### DESCRIPTION

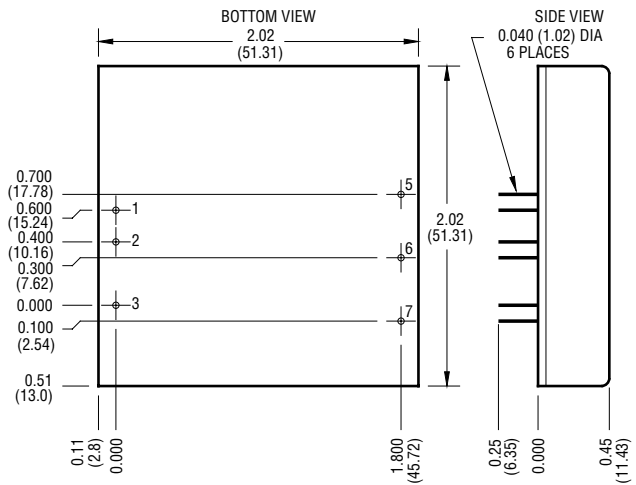
Providing outputs from 5 volts to 15 volts, the DGP12 series delivers up to 12 watts with power densities up to 7 watts per cubic inch (0.43 watts per cm<sup>3</sup>). Designed to operate on ultra-wide input voltages from 3.5 to 16 volts, and with remote ON/OFF capability, the DGP12 supplies power from battery or system sources. The output of the converter is electrically isolated, thereby allowing the output to be configured as a positive or negative output voltage. The fully isolated, shielded case allows precise operation in sensitive environments.

### FEATURES

- Up to 12 Watts Output Power
- Five-Side Shielded Isolated Copper Case
- Ultra-Wide 3.5 to 16 Volt Input Range
- Efficiencies to 82%
- Fully Isolated and Filtered
- 700V Isolation
- Remote ON/OFF and TRIM

Selection Chart				
Model	Input Range VDC (6)		Output VDC	Output mA
	Min	Max		
DGP12U5S5	3.5	16	5	2000
DGP12U5S12	3.5	16	12	1000
DGP12U5S15	3.5	16	15	800

General Specifications (1)				
All Models				Units
<b>ON/OFF Function (2)</b>				
OFF Logic Level	MAX	<0.4	VDC	
Open Circuit On Level Voltage	TYP	1.4	VDC	
Input Resistance	TYP	2	Kohms	
Converter Idle Current ON/OFF Pin Low	TYP	6	mA	
<b>Isolation (3)</b>				
Breakdown Voltage Input to Output 10 µA Leakage	MIN	700	VDC	
Input to Output Capacitance	TYP	375	pF	
<b>Output Trim Function</b>				
Trim Range	MIN	±10	%	
Input Resistance	MIN	10	Kohms	
Open Circuit Voltage	TYP	2.5	VDC	
<b>Environmental</b>				
Case Functional Range, Tc No Derating	MIN	-40	° C	
	MAX	85		
Case Functional Range (4)	MIN	-50	° C	
	MAX	100		
Storage Range	MIN	-55	° C	
	MAX	105		
Thermal Shutdown Case Temperature	TYP	105	° C	
Thermal Impedance (5)	TYP	9.5	° C/Watt	
<b>General</b>				
MTBF (Calculated)	TYP	800,000	HRS	
Unit Weight	TYP	2.3/65	oz/gm	
Chassis Mounting Kit	CM2B2			



Mechanical tolerances unless otherwise noted:  
 X.XX dimensions: ±0.020 inches  
 X.XXX dimensions: ±0.005 inches

Pin	Function
1	+INPUT
2	-INPUT
3	ON/OFF
4	NO PIN
5	+OUT
6	-OUT
7	TRIM

### NOTES

- (1) All parameters measured at Tc = 25°C, nominal input voltage and full rated load unless otherwise noted. Refer to the Technical Reference Section for the definition of terms, measurement circuits and other information.
- (2) See DGP12 Series Application Notes for more information regarding the ON/OFF function.
- (3) The Case is tied to the -Output pin.
- (4) The functional temperature range is intended to give an additional data point for use in evaluating this power supply. At the low functional temperature the power supply will function with no side effects, however, sustained operation at the high functional temperature will reduce expected operational life. The data sheet specifications are not guaranteed beyond the case operating range.
- (5) The case thermal impedance is specified as the case temperature rise over ambient per package watt dissipated.
- (6) Reduced output power is available at 3.5V input. Full power is available above 4.6 volts.

## DGP12 SERIES – SINGLE OUTPUT

Input Parameters (1)					
Model		DGP12U5S5	DGP12U5S12	DGP12U5S15	Units
Voltage Range (1)	MIN MAX	3.5 16			VDC
Input Current	Full Load	2880	3500	3470	mA
	No Load	10	16	20	
Switching Frequency	TYP	60			kHz
Maximum Input Overvoltage, 100ms Maximum	MAX	20			VDC
Turn-on Time, 1% Output Error	TYP	10			ms

Output Parameters (1)					
Model		DGP12U5S5	DGP12U5S12	DGP12U5S15	Units
Output Voltage		5	12	15	VDC
Output Voltage Accuracy	MIN	4.95	11.90	14.90	VDC
	TYP	5.00	12.00	15.00	
	MAX	5.05	12.10	15.10	
Rated Load Range (5)	MIN	0.0	0.0	0.0	A
	MAX	2.0	1.0	0.8	
Load Regulation 25% Max Load - Max Load	TYP	0.3	0.1		%
	MAX	0.7	0.5		
Line Regulation Vin = Min-Max VDC	TYP	0.1			%
	MAX	0.2			
Short Term Stability (4)	TYP	< 0.05			%/24Hrs
Long Term Stability	TYP	< 0.1			%/kHrs
Noise, Peak - Peak (3)	TYP	50			mV <sub>PP</sub>
RMS Noise	TYP	10			mV <sub>rms</sub>
Temperature Coefficient	TYP	50			ppm/°C
	MAX	150			
Short Circuit Protection +OUT to -OUT (6)		Short Term Current Limit			

### NOTES

- (1) All parameters measured at Tc=25°C, nominal input voltage and full rated load unless otherwise noted. Refer to the Technical Reference Section for the definition of terms, measurement circuits and other information.
- (2) Reduced output power available at 3.5V input. Full output power is available above 4.6V input.
- (3) Noise is measured per Technical Reference Section. Measurement bandwidth is 0-20 MHz for peak-peak measurements, 10 kHz to 1 MHz for RMS measurements. Output noise is measured with a 0.01µF ceramic in parallel with a 1µF/35V Tantalum capacitor located 1" away from the converter to simulate your PCB's standard decoupling.
- (4) Short term stability is specified after a 30 minute warmup at full load, constant line and recording the drift over a 24 hour period.
- (5) No minimum load required for operation. Dynamic regulation may degrade when run with less than 5% load.
- (6) Less than 30 seconds.

### DGP12 SERIES APPLICATION NOTES:

#### External Capacitance Requirements

No external capacitance is required for operation of the DGP12 Series. To meet the reflected ripple requirements of the converter, an input impedance of less than 0.05 Ohms from DC to 120KHz is required. If a capacitive input source is farther than 1" from the converter, an additional capacitor may be required at the input pins for proper operation. External output capacitance is not required for operation, however it is recommended that 1µF to 10µF of tantalum and 0.001 to 0.1µF ceramic capacitance be selected for reduced system noise. Additional output capacitance may be added for increased filtering, but should not exceed 400µF.

#### Output Power

The available output power of the DGP12 Series is reduced when operating below 4.6 volts. See Input Voltage Derating curve. Below 4.6 volts the output power is linearly derated from 100% at 4.6 volts to 50% at 3.5 volts.

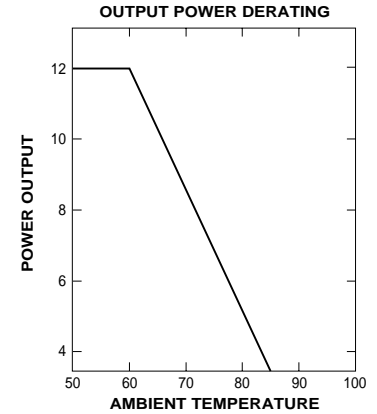
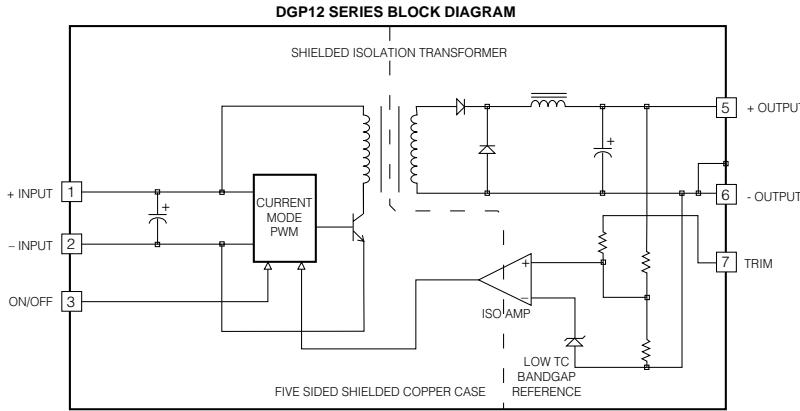
(continued next page)



**NUCLEAR AND MEDICAL APPLICATIONS** Power-One products are not authorized for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems without the express written consent of the President of Power-One, Inc.

**TECHNICAL REVISIONS** The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.

**DGP12 SERIES – SINGLE OUTPUT**



**APPLICATION NOTES (cont'd):**

Typical Performance: (T<sub>c</sub>=25°C, V<sub>in</sub>=Nom VDC, Rated Load)

**Negative Outputs**

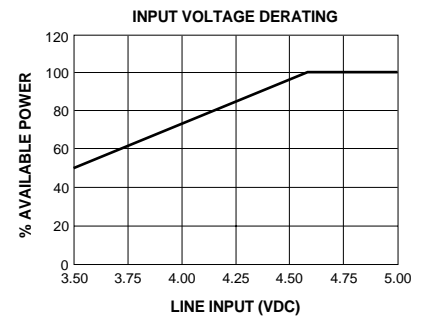
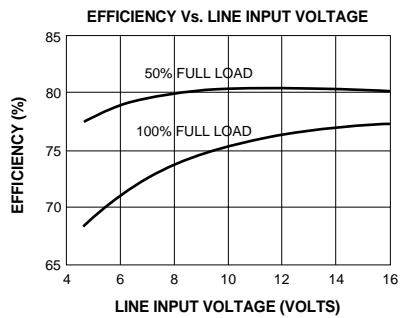
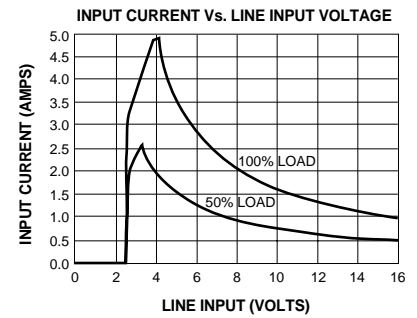
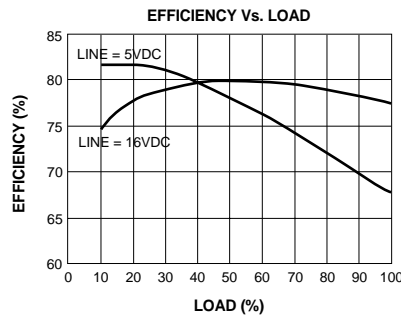
A negative output voltage may be obtained by connecting the +OUT to circuit ground and connecting -OUT as the negative output.

**Remote ON/OFF Operation**

The remote ON/OFF pin may be left floating if this function is not used. It is recommended to drive this pin with an open collector/drain or a relay contact. When the ON/OFF pin is pulled low with respect to the -INPUT, the converter is placed in a low power drain state. The input capacitors are kept fully charged in the OFF mode. For proper operation, do not drive this input from a logic gate directly. The ON/OFF pin must be left floating for proper operation. Be aware that this input may be noise sensitive; use proper PCB design guidelines. The ON/Off pin should never be pulled more than 0.3 volts below -INPUT or have a voltage greater than 2 volts applied.

**Output TRIM**

The TRIM pin may be used to adjust the output  $\pm 10\%$  from the nominal setting. This function allows adjustment for voltage drops in the system wiring, as well 5.2 volt outputs for ECL applications. Figure 1 shows the proper connections to use this function. A trimpot value of 10K $\Omega$  should be used for 5 volt outputs. A trimpot value of 20K $\Omega$  should be used for 12 and 15 volt outputs. If the TRIM function is not required the pin may be left floating.



**NOTES ON USING THE CURVES**

- 1) The input currents are for 12 watts of input power. For 5 volt output models the current is approximately 16% less.
- 2) The efficiency curves are for 12 volt output. To use the curves for other models adjust as follows:  
5 volt models subtract approximately 2%.  
15 volt models subtract approximately 1%.

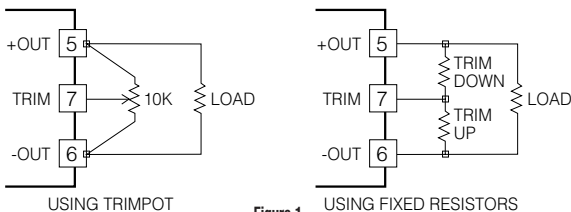


Figure 1.