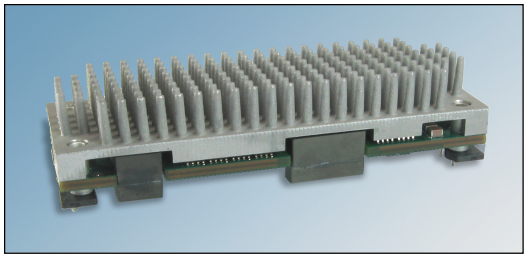
GALAXY POWER Incorporated

SIRIUS

48V Input, 9.6VDC, 47A Output



The Sirius can be used to replace a bus converter with the added benefit of a regulated output and wide-range telecom input voltage range (36-75V).

GALW9V647 Features

48V Input
9.6VDC, 47A Output

High Efficiency

93.5% at 9.6V, 47.0A
94.5% at 9.6V, 23.5A

The Sirius is a 450W "stretched" quarter-brick in Galaxy Power's CoolConverter™ line of high-efficiency DC/DC converters.

- Very Low Common-mode Noise for a Commercial DC/DC Converter
- Two-stage Input Filter
- Constant Switching Frequency
- Single Board Design, Very Low Parts Count
- "Stretched" quarter-brick 1.45"x4.25"x0.95" including integrated heatsink
- Two Year Warranty

CONTROL FUNCTIONS

- Patented Power Supply Control and Architecture
- Microprocessor Controlled
- Primary-side Enable, Choice of Logic

PROTECTION FEATURES

- Over Temperature Protection
- Over Voltage Protection
- Over Current Protection
- Over/Under Input Voltage Protection

TYPICAL CHARACTERISTICS

- Output Setpoint Accuracy: ± 5%
- Load Regulation: ± 2%
- Line Regulation: ± 0.2%
- Regulation over Line, Load, and Temperature: ± 10%
- Low Output Ripple
- Output Trim

ISO 9001 CERTIFIED ORGANISATION

URS UKAS QUALITY MANAGEMENT 043-A

Certified to ISO 9001:2000

Galaxy Power Inc. ◆ 155 Flanders Road ◆ Westborough, MA 01581 ◆ Telephone: 508-870-9775 ◆ Fax: 508-870-9796 ◆ e-mail: info@galaxypwr.com

GENERAL SPECIFICATIONS

V_{IN} = 48V_{DC}, T_A@25°C, 300 LFM Airflow, V_{OUT}=9.6V, I_{OUT} = Full Load unless otherwise noted.
Available output power depends on ambient temperature and good thermal management. (See application graphs for limits.)

Input Characteristics				
Parameter	***Min***	***Typ***	***Max***	***Units***
Operating Input Voltage	36		75	V_{DC}
Input Current, Low Line			13.5	A
Input Capacitance		8		μF
Input Hysteresis, Low Line		2		V_{DC}
Output Characteristics				
Output Voltage	9.2	9.6	10	V
Output Power			450	W
Over Voltage Protection, Latching	11.04	11.52	12.48	V
Operating Output Current Range	0		47	A
Output Current Limit	50		65	A
Efficiency, Full Load[1]	93			%
Features				
Overtemperature Protection, Thermal Sensor, Latching[2]			125	° C
Switching Frequency, Fixed		250		kHz
Trim Range	8.64		10.56	V

Notes:
1. For temperatre rise design calculation.
2. PCB less than 130° C.

GENERAL SPECIFICATIONS

Operating Temperature		–40° C to + 100° C
Storage Temperature		–55° C to + 125° C
Relative Humidity		10% to 95% RH, Non-condensing
Vibration		2 to 9Hz, 3mm disp., 9 to 200Hz, 1g
Material Flammability		UL V-0
Weight		TBD
MTBF	Telcordia (Bellcore)	TBD

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COOLCONVERTER™

Galaxy's proprietary CoolConverter™ provides:

- Patented single-stage power conversion architecture, control, and magnetic design allow unprecedented power density and efficiency in an isolated power supply.
- An advanced microcontroller reduces parts count while adding features, performance, and flexibility in the design.

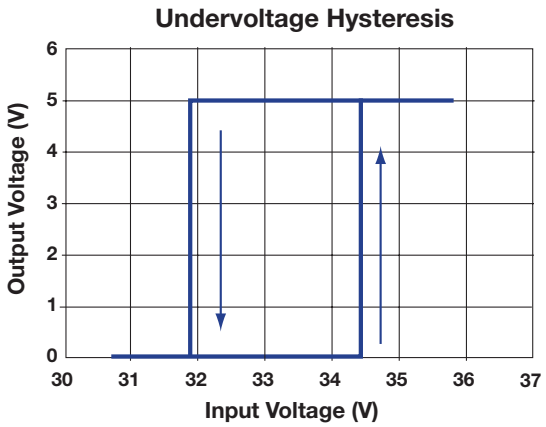
PROTECTION AND CONTROL

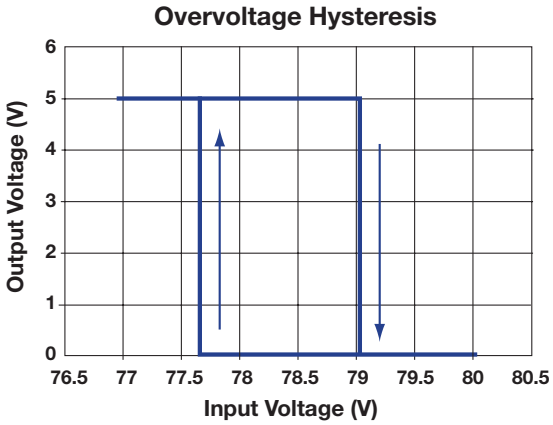
Valid Input Voltage Range:

The converter measures the input voltage and will not allow operation outside of the input voltage specification. As shown by the graphs, hysteresis is added to both the high and low voltage to prevent the converter from turning on and off repeatedly when the voltage is held near either voltage extreme. At low line this assures the maximum input current is not exceeded; at high line this assures the semiconductor devices in the converter are not damaged by excessive voltage stress.

ON/OFF Logic Option:

The ON/OFF control logic can be either Positive (standard) or Negative to enable the converter. For Negative logic, bring the ON/OFF pin to less than 1.0V with respect to the –INPUT pin to enable the converter. The pull-down must be able to sink 100μA. For Positive logic, bring the ON/OFF pin to greater than 4.0V with respect to the –INPUT pin and be limited to less than 10V. The ON/OFF pin has a built-in pull up resistor of approximately 100kΩ to + 5V.





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Output Over Voltage Protection:

The output voltage is constantly monitored by the microprocessor with a redundant secondary-side measurement circuit that both shuts down the duty cycle and triggers the microprocessor to shut down. If the output voltage exceeds the over-voltage specification, the microprocessor will latch the converter off. To turn the converter on requires either cycling the ON/OFF pin or power to the converter. This advanced feature prevents the converter from damaging the load if there is a converter failure or application error. If non-latching is required, consult factory.

Thermal Shutdown:

The printed circuit board temperature is measured using a semiconductor sensor. If the maximum rated temperature is exceeded, the converter is latched off. To re-enable the converter requires cycling the ON/OFF pin or power to the converter. If non-latching is required, consult factory.

Control Options:

As the behavior of the circuit is determined by firmware in the microcontroller, specific customer requirements such as:

- non-latching thermal protection
- custom valid input voltage range
- controlled delay from initiating an ON/OFF signal for power sequencing

can be accomplished with no change to hardware.

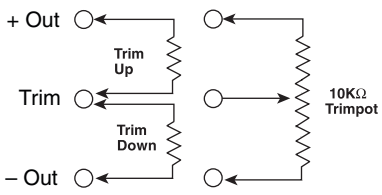
The standard behavior was chosen based on system design experience but we understand that customers often have their own requirements.

Please consult Galaxy Power for your special needs.

Safety:

An external input fuse must always be used to meet these safety requirements.

External Output Trimming



Trim:

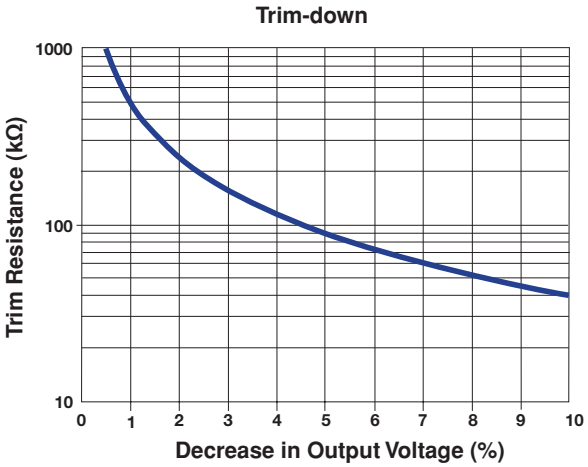
To trim the output voltage higher, connect the required trim resistor from the Trim pin to the + Out pin. To trim the output voltage lower, connect the required trim resistor from the Trim pin to the –Out pin.

Trim-up:

$$R_{TRIM\text{-}UP} = \left\{ \frac{Vo\ (100 + \Delta\%)}{1.225\Delta\%} - \frac{(100 + 2\Delta\%)}{\Delta\%} \right\} 5.11k\Omega$$

Trim-down:

$$R_{TRIM\text{-}DOWN} = \left\{ \frac{100}{\Delta\%} - 2 \right\} 5.11k\Omega$$



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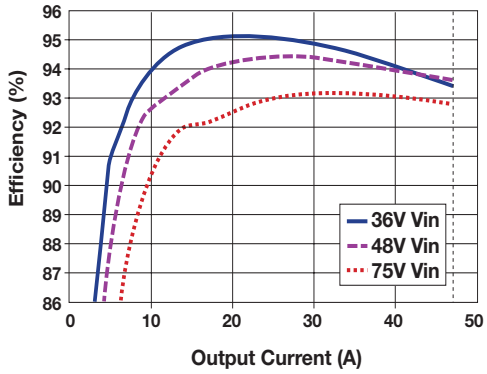
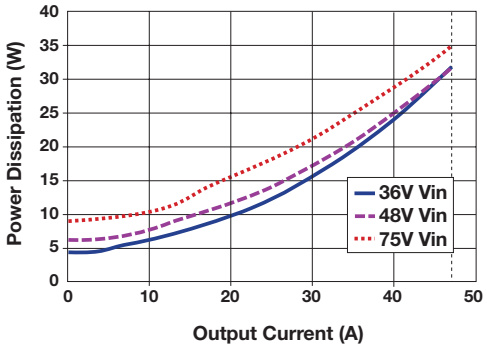
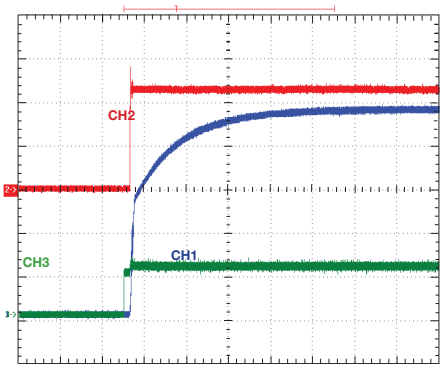
Efficiency



Power Dissipation

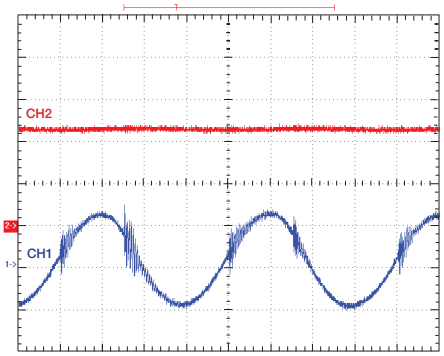


Start Up



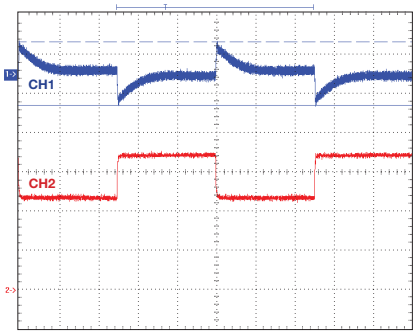
1) Vout 2V/div 10mS/div
2) Iout 10A/div
3) Enable 5V/div

Voltage Ripple



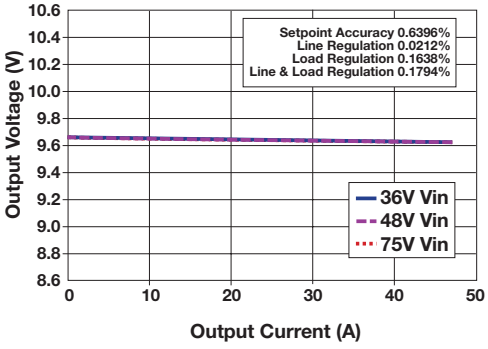
1) Vout 50mV/div 1μS/div
2) Iout 10A/dif

Transient Response



1) Vout 500mV/div 400μS/div
2) Iout 10A/div

Line/Load Regulation



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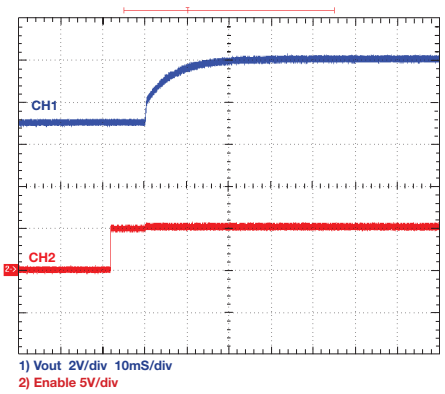
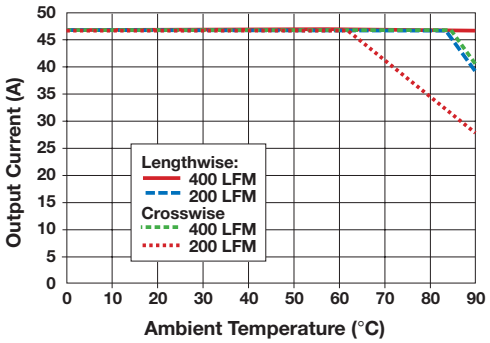
Back Bias

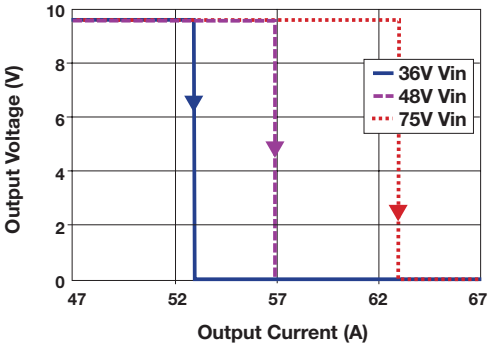


Thermal Derating

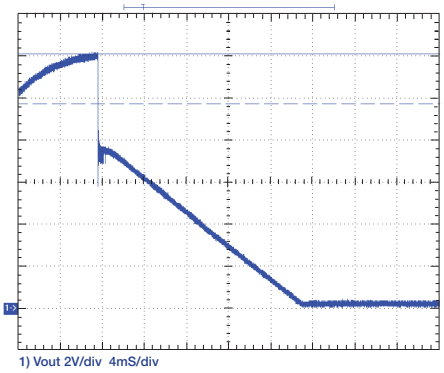


Over-current Protection

Note: Over-current protection is blip-mode (aka hiccup).



Over Voltage Protection



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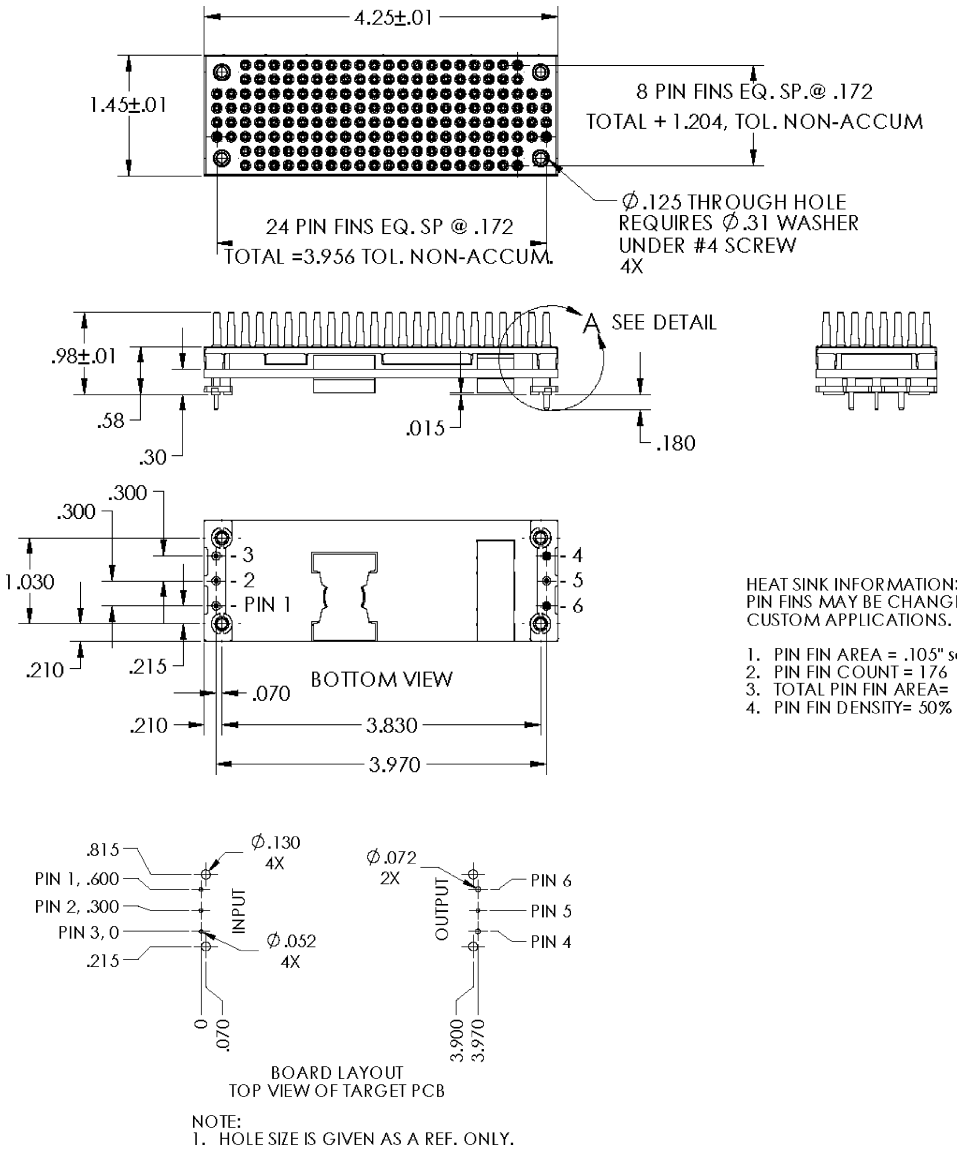
PACKAGE DETAIL



NOTE:
1. HOLE SIZE IS GIVEN AS A REF. ONLY.

ORDERING INFORMATION

Standard Model Number	*Input Voltage*	*Output Voltage*	*Max Current*
GALW9V647E*	48V	9.6V	47A

** Options: E = 0.18" pins (± 0.01")*
Note: Standard unit is positive logic and requires 2000µF of output load capacitance for stability.

Pin Configuration —Bottom View

Pin	*Function*	*Pin Dia. (in.)*
1	+ Input	0.040
2	On/Off	0.040
3	– Input	0.040
4	– Output	0.060
5	Trim	0.040
6	+ Output	0.060

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