

*The Aries Series are very high efficiency
non-isolated DC/DC Converters with:*

- Horizontal or Vertical Mount
- Very High Efficiency
- 2.5V or 3.3V Output @ up to 24A
- Fixed Frequency Operation
- Trimmable Over Voltage Protection
- Output Voltage Trim
- Two Year Warranty

CONTROL FUNCTIONS

- Remote Sense
- Output Enable

PROTECTION FEATURES

- Over Temperature Protection
- Over Voltage Protection
- Over Current Protection

TYPICAL CHARACTERISTICS

- Output Setpoint Accuracy: $\pm 1\%$
- Load & Line Regulation: $\pm 0.5\%$
- Noise & Ripple: 90mVp-p
- Total Regulation: $\pm 5\%$
- Output Trim

GENERAL SPECIFICATIONS

Operating Air Temperature from 0°C to +45°C with 500 LFM.

3.3V Output Unit						
Input Characteristics						
Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Operating Input Range	V_I	$I_O = 24A$	4.5	—	5.5	V
No Load Input Power	P_{IL}	$V_I = V_{Inom}$	—	—	2	W
Input Current	I_I	$V_I = 5V, I_O = 24A, V_O = 3.3V$	—	—	20	A
Efficiency	η	$V_I = 5V, I_O = 24A, V_O = 3.3V$	88	—	—	%
Reflected Input Ripple (Note 1)	dI_I	$V_I = 5V, I_O = 24A$	—	—	5.2	A_{P-P}
Switching Frequency	F_S		—	250	—	kHz
Output Characteristics (Over the complete baseplate temperature and input voltage ranges.)						
Output Voltage Set Point	V_O	$V_I = 5V, I_O = 12A$	3.267	3.300	3.333	V
Rated Output Current	I_O	$V_O = V_{Onom}$ (externally)	—	24	—	A
Load & Line Regulation		$V_I = 4.5-5.5V, I_O = 0-24A$	—	—	15	mV
Noise and Ripple		$V_I = 5.0V, I_O = 24A$	—	60	90	mV_{P-P}
Load Range			0	—	24	A
Total Regulation (Load, Line, Temp, Drift)		$V_I = 4.5-5.5V, I_O = 0-24A$	3.135	3.300	3.465	V
Remote Sense Compensation (Round Trip)		$V_I = 4.5-5.5V, I_O = 24A$	—	—	100	mV
Output Overvoltage Protection (Nom) See Note 3, Latching		$V_I = 5V, I_O = 12A, V_O = 3.3V$	3.8	—	4.2	V
Output Voltage Protection Response Time	t_{OVP}	$V_I = 5V, I_O = 12A, V_O = 3.3V$	—	—	150	μs
Current Limit (Nom)	I_L	$V_I = 5V, V_O = 3.3V$	25	—	30	A
Short Circuit Output Voltage Compliance	V_{SC}	$V_I = 5V, I_O = 42A$	—	—	0.6	V_O
Load Transient Response, V_O Deviation from Steady State	V_{OPK}	$I_O = 9-14A @ 0.05A/\mu s (di/dt)$, pos or neg step	—	—	80	mV
Settling Time		$V_O = 3.3V$	—	—	1200	μs
Turn on Time	t_{ON}	$V_I = 4.5-5.5V, I_O = 0-24A$ per figures 3, 4, & 5	—	—	10	ms
External Load Capacitance (Note 2)			1000	—	9900	μf

- Notes: 1. Input filter capacitor $C_{in} = 1000\mu F$ (330 μF , ESR 60m Ω , 3 capacitors in parallel) Provide 3" loop between positive terminal of C_{in} and V_{in} of the converter to measure reflected input ripple current.
2. The converter output voltage shall be stable when (30) 330 μF (9900 μF total) tantalum (ESR $\leq 60m\Omega$) capacitors are connected across the output of the converter.
3. Adjustment pins J2-18 & 19 are normally left open; see Output Voltage Setting Table on page 5 if using OVP and output voltage trim adjustment.

General Specifications

Operating Temperature	0°C to +45°C Ambient Air Temp.
Storage Temperature	-40°C to +100°C
Relative Humidity	10% to 95% RH, Non-condensing
Vibration	10-500Hz, 0.75g peak
Material Flammability	UL94V-0
Weight	100 grams typ. with heatsink
MTBF	MIL-HDBK-217E 1,200,000 hours*

*Note: 50% load; 45°C ambient, 500LFM; calculated MTBF

GENERAL SPECIFICATIONS

Operating Air Temperature from 0°C to +45°C with 200 LFM.

2.5V Output Unit						
Input Characteristics						
Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Operating Input Range (See note 1)	V_I	$I_O = 24A$	3.2	—	5.5	V
No Load Input Power	P_{IL}	$V_I = V_{Inom}$	—	—	2	W
Input Current	I_I	$V_I = 3.43V, I_O = 24A, V_O = 2.5V$	—	—	21.5	A
	I_I	$V_I = 5V, I_O = 24A, V_O = 2.5V$	—	—	15	A
Efficiency	N	$V_I = 3.43V, I_O = 24A, V_O = 2.5V$	86	—	—	%
	N	$V_I = 5V, I_O = 24A, V_O = 2.5V$	83.5	—	—	%
Reflected Input Ripple	dI_I	$V_I = 3.43V, I_O = 24A$	—	—	3.0	A_{P-P}
(See note 2)	dI_I	$V_I = 5V, I_O = 24A$	—	—	5.2	A_{P-P}
Searching Frequency	F_S		—	250	—	kHz
Output Characteristics						
Output Voltage Set Point	V_O	$V_I = 5V, I_O = 12A$	2.470	2.495	2.520	V
Rated Output Current	I_O	$V_O = V_{Onom}$ (externally)	—	24	—	A
Load & Line Regulation		$V_I = 3.2-5.5V, I_O = 0-24A$	—	—	15	mV
Noise and Ripple		$V_I = 5.0V, I_O = 24A$	—	60	90	mV_{P-P}
Load Range			0	—	24	A
Total Regulation (Load, Line, Temp, Drift)		$V_I = 3.2-5.5V, I_O = 0-24A$	2.370	2.495	2.620	V
Remote Sense Compensation (Round Trip)		$V_I = 3.2-5.5V, I_O = 24A$	—	—	100	mV
Output Overvoltage Protection (Nom) See note 4, Latching		$V_I = 3.43V, I_O = 12A, V_O = 2.5V$	2.76	—	2.94	V
Output Voltage Protection Response Time	t_{OVP}	$V_I = 3.43V, I_O = 12A, V_O = 2.5V$	—	—	150	μs
Current Limit	I_L	$V_I = 5V, V_O = 2.5V$	25	—	30	A
Short Circuit Output Voltage Compliance	V_{SC}	$V_I = 5V, I_O = 42A$	—	—	0.6	V_O
Load Transient Response, V_O Deviation from Steady State Settling Time	V_{OPK}	$I_O = 9-14A @ 0.05A/\mu s(di/dt)$, pos or neg step $V_O = 2.5V$	—	—	60	mV
Turn on Time	t_{ON}	$V_I = 3.19-5.5V, I_O = 0-24A$ per figures 3, 4, & 5	—	—	10	ms
External Load Capacitance (note 3)			150	—	9,900	μf

- Notes: 1. Connector J1 pins 1, 2, 3, and 5 are all connected together. Connector J1 pin 4 is always connected to 3.3V rail.
2. Input filter capacitor $C_{in} = 1000\mu F$ (330 μF , ESR = 60m Ω , 3 capacitors in parallel) Provide 3" loop between positive terminal of C_{in} and V_{in} of the converter; to measure reflected input ripple current.
3. The converter output voltage shall be stable when (30) 330 μf (9900 μF total) tantalum (ESR $\leq 60m\Omega$) capacitors are connected across the output of the converter.
4. Adjustment pins J2-18 & 19 are normally left open; see Table IV if using OVP and output voltage trim adjustment.

GENERAL SPECIFICATIONS

Output Voltage Setting & Typical Output Voltage DC_OK_H Threshold — 3.3V Output Unit

Trimmed Vout			VOVP Trip			R1	R2	Output Voltage
-1.2%	Typ Vo	+1.2%	-1.2%	Typ	+1.2%	TRIM	OVP	DC_OK_H Threshold
2.662	2.694	2.727	3.642	3.687	3.731	2.26K	10.6K	2.809 ±6%
2.919	2.954	2.989	3.660	3.705	3.749	4.32K	11.4K	2.823 ±6%
3.031	3.068	3.105	3.723	3.768	3.814	6.65K	15.4K	2.871 ±6%
3.154	3.192	3.231	3.819	3.865	3.912	14.7K	31.6K	2.945 ±6%
3.264	3.303	3.343	3.915	3.962	4.010	OPEN	OPEN	3.019 ±6%

- Notes: 1. R1 and R2 are external to the converter and shall be 0.1% tolerance.
 2. Connect R1 from connector J2 pin 18 to J2 pin 16 to adjust output.
 Connect R2 from connector J2 pin 19 to J2 pin 16 to adjust OVP level.
 3. Output Voltage Setting tolerance $\pm 1.2\%$ at $V_1 = 5.0V$ & $I_O = 12A$

Output Voltage Setting & Typical Output Voltage DC_OK_H Threshold — 2.5V Output Unit

Output	VOVP Trip			R1	R2	Output Voltage
Voltage	Min	Typ	Max			DC_OK_H Threshold
2.000	2.40	2.50	2.60	2.26K	10.6K	1.755 ±6%
2.200	2.46	2.52	2.64	4.32K	11.4K	1.775 ±6%
2.300	2.56	2.60	2.74	6.65K	15.4K	1.800 ±6%
2.400	2.66	2.70	2.84	14.7K	31.6K	1.895 ±6%
2.500	2.76	2.80	2.94	OPEN	OPEN	1.965 ±6%

- Notes: 1. R1 and R2 are external to the converter and shall be 0.1% tolerance.
 2. Connect R1 from connector J2 pin 18 to J2 pin 16 to adjust output.
 Connect R2 from connector J2 pin 19 to J2 pin 1 to adjust OVP level.
 3. Output Voltage Setting tolerance $\pm 1.0\%$ at $V_1 = 3.43V$ & $I_O = 12A$

APPLICATION NOTES

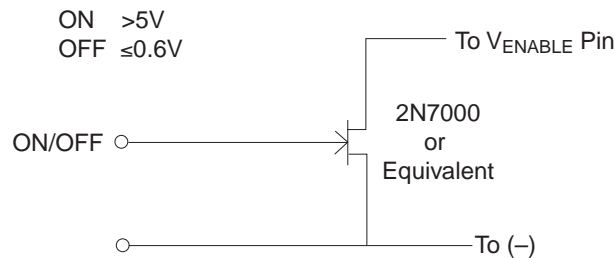
Control Signal Characteristics

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Enable_L		$V_I = 5V, I_O = 24A$				
Enable_L Source Current			—	—	1.0	mA
Enable_L Voltage Low			—	—	0.8	V
Enable_L Voltage High			2.6	—	—	V
Enable_L Low (Turn On Delay)			—	—	10	ms
Enable_L Low (Output Voltage)			2.458	2.495	2.532	V
Bias Current (12 Volt)	I_{bias}	$V_I = 5V, I_O = 24A$	—	70	100	mA
DC_OK_H High		$V_I = 3.43V, I_O = 24A, V_O = \geq 2.1V$	3.3	—	—	V
DC_OK_H Low		$V_I = 3.43V, I_O = 24A, V_O = \leq 1.8V$	—	—	0.8	V
Fault_H High (OVP latched)		$V_I = 3.43V, I_O = 24A$	3.3	—	5	V
Fault_H Low			—	—	0.8	V
Fault_H Source Current (OVP latched)			10	—	—	mA

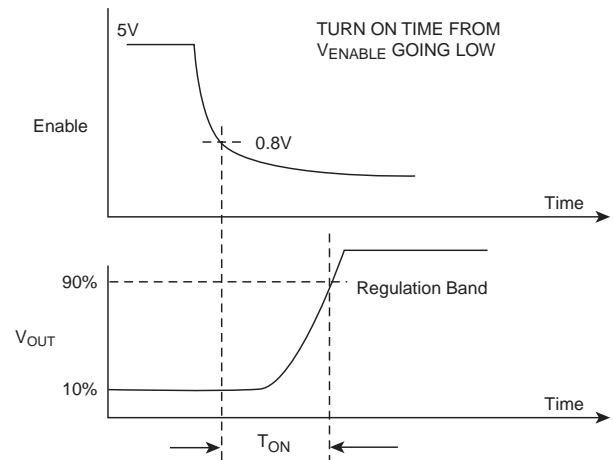
Note: Fault-H occurs when the output voltage level is over the OVP threshold, pass transistor in the converter is shorted when input voltage is applied, or when a difference between input to output voltage exceeds 2.4 volts with the input voltage only at 3.3V nominal and not at 5V nominal.

Enable L: This input signal is used to enable the output of the converter when activated (active Low). The signal is referenced to output side (-Sense) or GND.

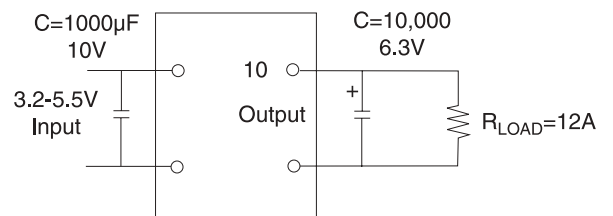
Enable Circuit Turn-On Time



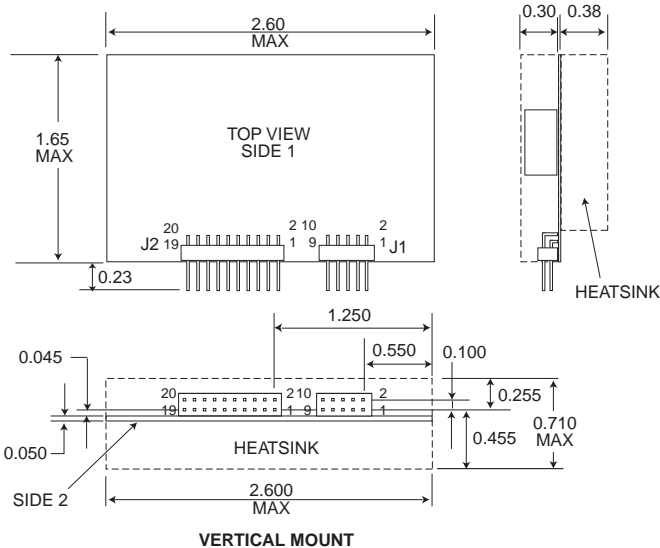
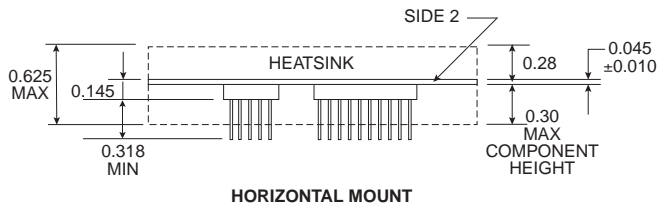
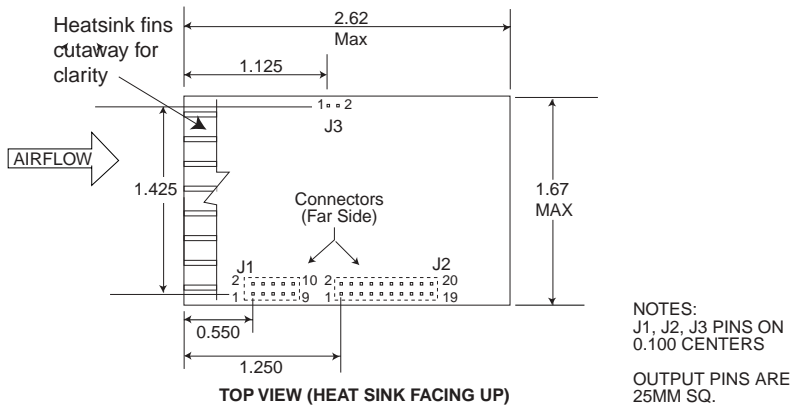
Turn-On Time



Output Load Conditions



PACKAGE DETAIL



J1			
Pin	Designation	Pin	Designation
1	VIN	2	VIN
3	VIN	4	NC
5	VIN	6	VIN RTN
7	VIN RTN	8	VIN RTN
9	VIN RTN	10	NC
J2			
Pin	Designation	Pin	Designation
1	VOUT RTN	2	FAULT_H
3	VOUT RTN	4	DC_OK_H
5	VOUT RTN	6	VOUT RTN
7	VOUT RTN	8	VOUT
9	VOUT	10	VOUT
11	VOUT	12	VOUT
13	VOUT	14	VOUT
15	+SENSE	16	-SENSE
17	ENABLE_L	18	TRIM
19	OVP_ADJ	20	+12V
J3			
Horizontal mount. Mechanical support only.			

ORDERING INFORMATION

Standard Model Number	Input Voltage	Output Voltage	Max Current	Efficiency Typ @ max load
GPA3V0-24H or V	3.2-5.0V	3.3V	24A	89.5%
GPA3V0-16H or V	3.2-5.0V	3.3V	16A	83%
GPA2V5-24H or V	5.0V	2.5V	24A	87%

Example:

GPA3V0-24 H

Part Number

Option:

Package Style

H = Horizontal

or

V = Vertical

Galaxy Power Inc. warrants to the original purchaser that the products conform to this data sheet and are free from material and workmanship defects for a period of two (2) years from the date of manufacture, if this product is used within specified conditions. Galaxy Power Inc. reserves the right to make changes to the product(s) or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such products or information. For additional details on this limited warranty consult the factory.



**GALAXY
POWER**

155 Flanders Road ♦ Westborough, MA 01581
508-870-9775 ♦ Fax: 508-870-9796
e-mail: galaxy@galaxypwr.com
website: <http://www.galaxypwr.com>