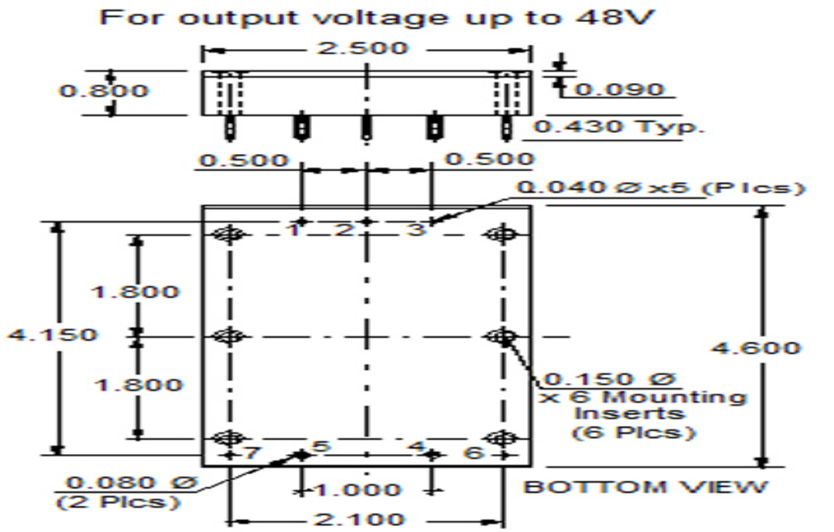
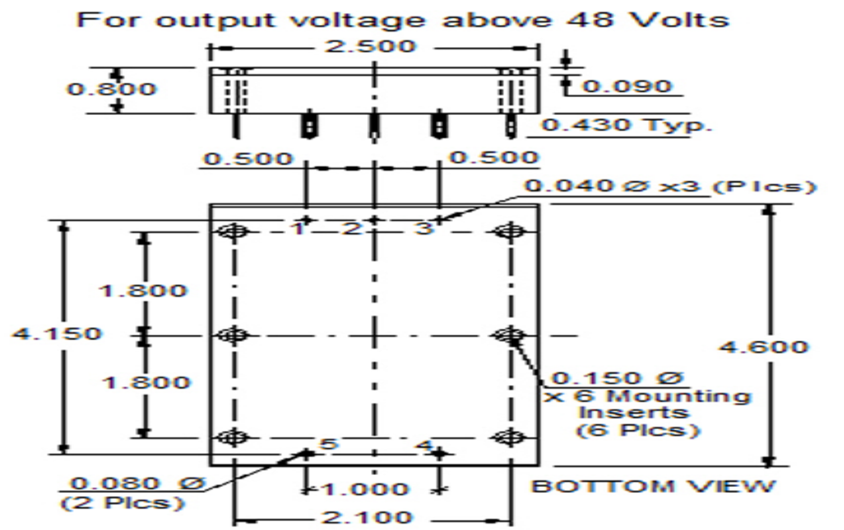
Series DC2A

HIGH POWER DC-DC CONVERTER
Hi Input Voltage Range: 350 - 700 VDC
Output Voltages: 5 VDC to 300 VDC Standard
Hi Reliability Isolated Regulated
Fixed Operating Frequency: 100Khz
DC-DC Converter to 300 Watts

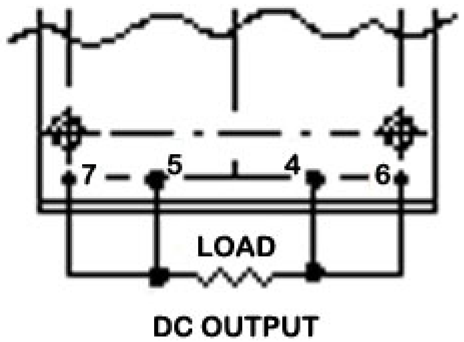
INPUT VOLTAGE: 350 - 700 VDC (Input is reverse polarity protected.)
Special Output Voltages Available: Consult Factory
Regulated Output Voltage: 5 VDC to 300 VDC Standard
Fully Encapsulated
Made in USA
TYPICAL FEATURES/ELECTRICAL CHARACTERISTICS
Input Voltage: 350 - 700 Vdc
Output Power: 150 to 300 watts (See Chart)
Output Voltage Ripple: 75-500 mV (See Chart)
Operating Temperature: 0°C to 85°C case temperature. See application notes for proper thermal considerations. Available with -20°C and -40°C operating temperature range - Consult Factory
Isolation:
From Input to DC Output: 4242 VDC
From Input or DC Output to Case: 2121VDC
Current Limit Setpoint: 130% of full load rating (Typical)
Overtemperature Shutdown
Operating Frequency: 100 Khz Fixed
UNDERVOLTAGE SETPOINT IS 320VDC (TYP)
OVERVOLTAGE SETPOINT IS 720VDC (TYP)



Weight: 340 Grams Typical
All dimensions are in Inches
NOTE: The torque for mounting screws must be 6 to 9 In-Lbs.



Weight: 340 Grams Typical
All dimensions are in Inches
NOTE: The torque for mounting screws must be 6 to 9 In-Lbs.



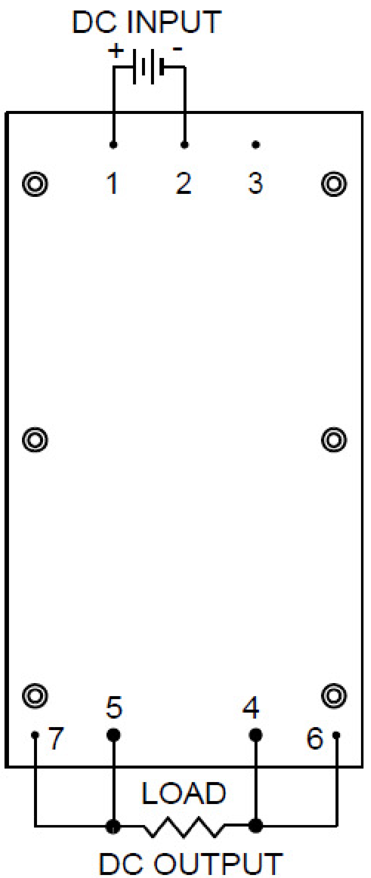
Note: Pins 6 and 7 are for models with output voltages up to and including 48 Volts. They are not on the higher voltage models (greater that 48 Volts)

PIN NO.	FUNCTION
1	DC IN +
2	DC IN -
3	No Connection
4	-V Out
5	+ V Out
6	- Sense (See Note)
7	+ Sense (See Note

Pico Part No.	Output Voltage VDC	Max. Load Current (A) **	Max. Output Power (watts) **	EFF @ Full Load (%)*	Output Ripple Full Load 1-1 MHz BW mv p-p*	Output Voltage Toler-ance (±%)*	V Ld. Reg 10-100% Load (±%)*	Line Regu-lation (±%)*	Price (US $) 1-49 pcs
DC2A-5S	**5**	**30**	**150**	**76**	**100**	**1.0**	**1.5**	**0.2**	**263.89**
DC2A-9S	**9**	**27.8**	**250**	**78**	**100**	**1.0**	**1.5**	**0.2**	**263.89**
DC2A-12S	**12**	**25**	**300**	**80**	**150**	**0.5**	**1.5**	**0.2**	**263.89**
DC2A-15S	**15**	**20**	**300**	**80**	**150**	**0.5**	**1.5**	**0.2**	**263.89**
DC2A-24S	**24**	**12.5**	**300**	**81**	**250**	**0.5**	**1.0**	**0.2**	**263.89**
DC2A-28S	**28**	**10.71**	**300**	**82**	**300**	**0.5**	**1.0**	**0.2**	**263.89**
DC2A-48S	**48**	**6.25**	**300**	**82**	**500**	**0.5**	**1.0**	**0.2**	**317.96**
DC2A-100S	**100**	**2.50**	**250**	**85**	**250**	**1.0**	**1.0**	**0.2**	**363.61**

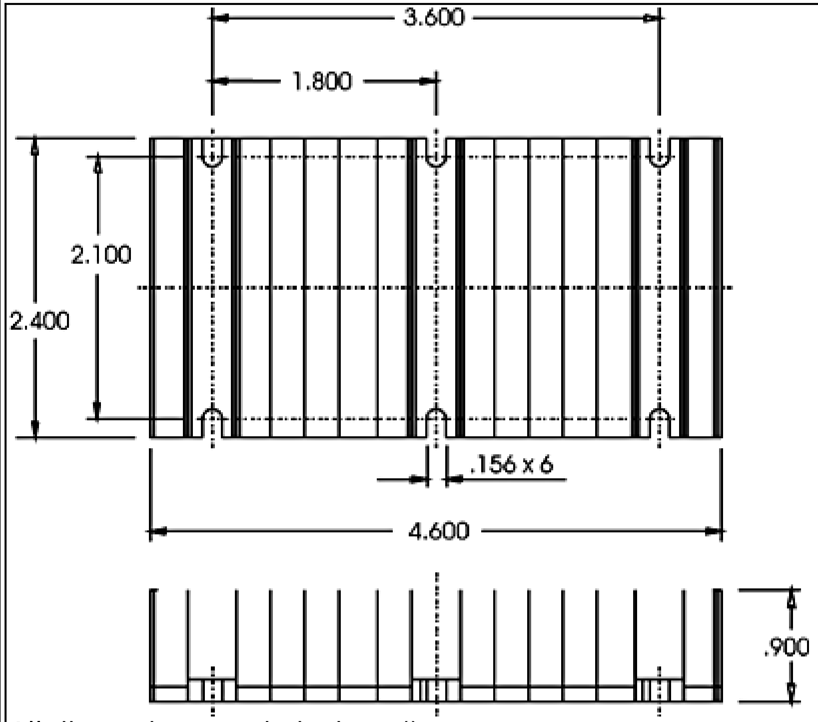
DC2A-125S	**125**	**2.00**	**250**	**85**	**250**	**1.0**	**1.0**	**0.2**	**363.61**
DC2A-150S	**150**	**1.67**	**250**	**85**	**350**	**1.0**	**1.0**	**0.2**	**363.61**
DC2A-175S	**175**	**1.43**	**250**	**85**	**350**	**1.0**	**1.0**	**0.2**	**363.61**
DC2A-200S	**200**	**1.25**	**250**	**85**	**400**	**1.0**	**1.0**	**0.2**	**454.51**
DC2A-225S	**225**	**1.11**	**250**	**85**	**400**	**1.0**	**1.0**	**0.2**	**454.51**
DC2A-250S	**250**	**1.00**	**250**	**85**	**500**	**1.0**	**1.0**	**0.2**	**454.51**
DC2A-275S	**275**	**0.91**	**250**	**85**	**500**	**1.0**	**1.0**	**0.2**	**454.51**
DC2A-300S	**300**	**0.83**	**250**	**85**	**500**	**1.0**	**1.0**	**0.2**	**454.51**

*** All specifications are typical at nominal (500Vdc) input, full load and 25°C baseplate temperature unless otherwise stated.**
**** Using proper thermal considerations as outlined in the application notes.**

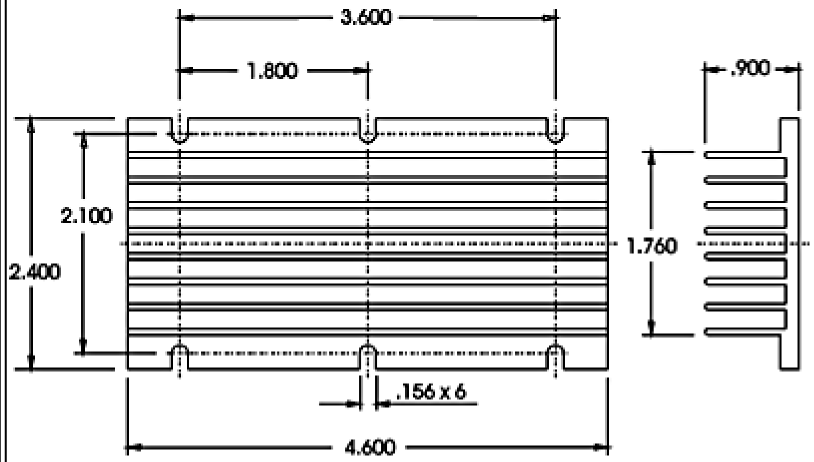


Notes: Pins 6 and 7 for remote sense, not on models with Vout > 48 V

CH HEATSINK	CV HEATSINK



All dimensions are in inches ()=mm
Approx. weight = 145 grams



NOTE: Additional Heatsink options, consult factory
Approx. Weight = 145 grams

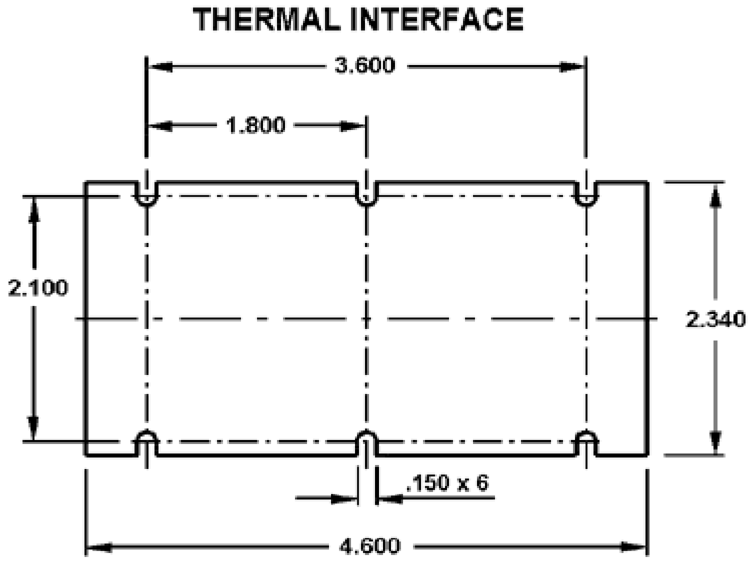
TYPE CH	$26.40
TYPE CV	$26.40
TYPE TI	$3.30

THERMAL INTERFACE

PART TI

Alloy Aluminum Substrate

Thermal Conductivity, (BTU-in/hr ft^2 °F) ----1530
Coefficient of Thermal Expansion (25-100°C, 10^{-6} in./in. °F ---13.1
Hardness, Brinnell B ----23
Endurance Limit, psi. ----5000
Standard Thickness (inches) ---.002



Thermal Considerations

	DC2A Series		
.	Baseplate	Heatsink CV	Heatsink CH
Free Air	4.8	3.3	2.8
200 LFM	2.6	1.6	0.9
400 LFM	1.6	1.0	0.6
600 LFM	1.3	0.7	0.5

800 LFM	1.1	0.6	0.4
1000 LFM	0.9	0.5	0.35

EXAMPLE 1:

An DC2A-24S module has an efficiency of 81%. What is themaximum ambient temperature if 100 Watts of power is needed?

A) In free air:

From Table 1: $T_{rca} = 4.8$

Using relation (2)

$$\Delta T = 4.8\,(100)\left[\frac{1}{.81} - 1\right] = 112.6^{\circ}C$$

$$T_a = 85 - 112.6 = -27^{\circ}C$$

B) In free air with heatsink (CV):

$T_{rca} = 3.3$

$$\Delta T = 3.3\,(100)\left[\frac{1}{.81} - 1\right] = 77.4^{\circ}C$$

$$T_a = 85 - 77.4 = 7.6^{\circ}C$$

C) With 400 LFM of air flow:

$T_{rca} = 1.6$

$$\Delta T = 1.6\,(100)\left[\frac{1}{.81} - 1\right] = 37.5^{\circ}C$$

$$T_a = 85 - 37.5 = 47.5^{\circ}C$$

EXAMPLE 2:

What would be the maximum output power
for an DC2A-24S module at an ambient temperature of 50°C with an efficiency of 81%?

A) If the module is used in free air.

From Table 1: $T_{rca} = 4.8$

Using Relation (2):

$$85 - 50 = 4.8\,P_{out}\left[\frac{1}{.81} - 1\right]$$

$$P_{out} = \frac{35}{4.8\,[.23]} = 31.1 \text{ Watts}$$

B) If the module is used in an area with forced air at 200 LFM with no heatsink.

$T_{rca} = 2.6$

$$P_{out} = \frac{35}{2.6\,[2.3]} = 58.5 \text{ Watts}$$

C) If the module with heatsink (CV) is used in free air.

$T_{rca} = 3.3$

$$P_{out} = \frac{35}{3.3\,[.23]} = 46.1 \text{ Watts}$$

EXAMPLE 3:

At a maximum ambient temperature of 50°C and an efficiency of 81%, how could an DC2A-24S module be used if 200 Watts of output power is required?

Using relation (2), we first find the maximum thermal resistance from case to air.

$$\Delta T = T_{rca}\,(200)\left[\frac{1}{.81} - 1\right]$$

$$85 - 50 = T_{rca}\,(46)$$

$$T_{rca} = .76$$

A) If no heatsink is used:

From Table 1, more than 1,000 LFM of airflow is required.

B) If a (CV) heatsink is used:

600 LFM of airflow is required.

C) If a (CH) heatsink is used:

400 LFM of airflow is required.

APPLICATION NOTES

<u>Remote Sense terminals (only on models with output voltages of 48V and below):</u>

Remote Sense terminals must be connected for the unit to operate properly. When connected in local sense (+S connected to +V output terminal and -S connected to -V output terminal), the output voltage is regulated at the output terminals.

If your load is connected more than a few inches away from the unit and you want to regulate the output voltage ON the load, remote sense is required. This means connecting the +S connection at the end of the +V wire (at the load), and the -S connection at the end of the -V wire (at the load). Since the load wires have current flowing through them and they have a certain resistance, there will be a voltage drop in them so that the output voltage at the load will be lower than the output voltage of the unit. Remote sense will prevent this be compensating for up to 1V of drop in the load wires. This means the output voltage of the unit will be up to 1V higher than the nominal value, so that at the load, the voltage will be the nominal value.

Example of local and remote sense connections, using the DC2A-12S with a 0.2V drop in the wires connecting the +V and -V output terminals to the load.

Vout = Voltage on the output voltage terminals of the unit.

Vload = Voltage on the load where the wires are connected.

Vout = Vload + Vwire1 + Vwire2

So, Vload = Vout - Vwire1 - Vwire2

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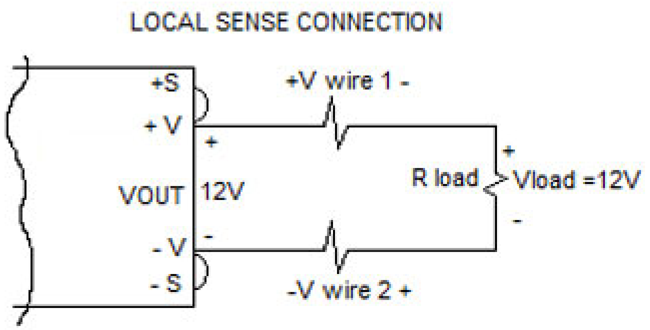

With local sense, Vout is regulated at 12V
So, Vout = 12V
Vload = Vout -Vwire1 - Vwire2
Vload = 12V - .2V - .2V
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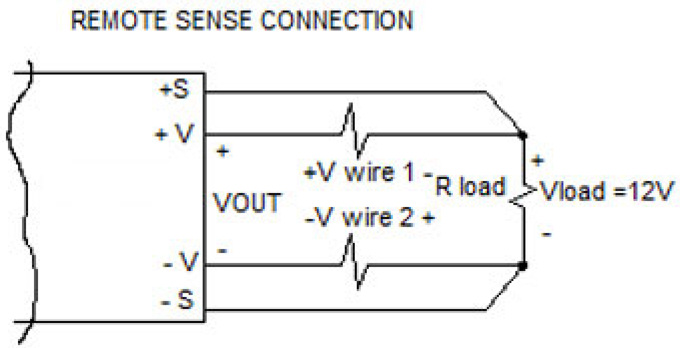

With remote sense, Vload is regulated at 12V
So, Vload = 12 V
Vout = Vload + Vwire + Vwire2
Vout = 12V +.2V + .2V = 12.4 Volts
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<tr>
<td colspan="2">The voltage drops in the wires connecting the +V and -V output terminals of the unit and the load depend on the size of the wire)or pcboard trace) and the current flowing through them.</td>
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</table>

For immediate engineering assistance or to place an order:
Call Toll Free: 800-431-1064

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