

Series AC

300W Isolated Regulated Power Factor Corrected Modules

PRODUCT OVERVIEW

The AC series are isolated AC to DC power supplies with integrated power factor correction. The space saving 4.6" x 2.5" x 0.8" full brick can power up to 300W. Output voltage models ranges from 5V to 300V. The combination of front end PFC module and isolated low voltage output saves space - one module instead of two modules.



FEATURES

- 0.99 (AC1) or 0.95 (AC3) Power Factor
- Single or three phase input
- Meets EN/IEC 610000-3-2
- 300W output power in a full brick size
- Input/output isolation
- Regulated 5V to 300V output models
- Output sense feature
- Fixed operating frequency

Contact Pico for part number of available options:

- Expanded operating temp: -40°C to +85°C
- Select screening per MIL-STD-883:
 - Stabilization Bake
 - Temperature Cycle
 - Burn-In
- Special Input Voltage, Output Voltage, or Output Power
- 360-800Hz input frequency

AC	3	-150S
SERIES NAME	INPUT VOLTAGE	NOM. OUTPUT VOLTAGE

AC

1 = SINGLE PHASE

3 = THREE PHASE

-5S = 5V

-9S = 9V

-12S = 12V

-15S = 15V

-24S = 24V

-28S = 28V

-48S = 48V

-100S = 100V *

-125S = 125V *

-150S = 150V *

-175S = 175V *

-200S = 200V *

-225S = 225V *

-250S = 250V *

-275S = 275V *

-300S = 300V *

*AC3, Three Phase input only. See Series **UAC** for Single Phase input and $\geq 100V$ output models

MODEL LIST**SINGLE PHASE INPUT MODELS**

Pico Part Number	Output Voltage [VDC]	Output Current		Output Power [W]	Efficiency ⁽¹⁾ [%] typ.	Load Regulation 10-100% [±%] max	Output Ripple @ 1MHz BW [mVp-p] max	Output Voltage Tolerance ⁽¹⁾ [±%]
		Min. [A]	Max. [A]					
AC1-5S	5	0	30	150	76	1.5	100	1
AC1-9S	9		27.8	250	78	1.5	100	1
AC1-12S	12		25	300	80	1.5	150	0.5
AC1-15S	15		20	300	80	1.5	150	0.5
AC1-24S	24		12.5	300	81	1	250	0.5
AC1-28S	28		10.71	300	81	1	300	0.5
AC1-48S	48		6.25	300	82	1	500	0.5

THREE PHASE INPUT MODELS

Pico Part Number	Output Voltage [VDC]	Output Current		Output Power [W]	Efficiency ⁽¹⁾ [%] typ.	Load Regulation 10-100% [±%] max	Output Ripple @ 1MHz BW [mVp-p] max	Output Voltage Tolerance ⁽¹⁾ [±%]
		Min. [A]	Max. [A]					
AC3-5S	5	0	30	150	76	1.5	100	1
AC3-9S	9		27.8	250	78	1.5	100	1
AC3-12S	12		25	300	80	1.5	150	0.5
AC3-15S	15		20	300	80	1.5	150	0.5
AC3-24S	24		12.5	300	81	1	250	0.5
AC3-28S	28		10.71	300	82	1	300	0.5
AC3-48S	48		6.25	300	82	1	500	0.5
AC3-100S	100		2.5	250	85	1	250	1
AC3-125S	125		2				250	
AC3-150S	150		1.67				350	
AC3-175S	175		1.43				350	
AC3-200S	200		1.25				400	
AC3-225S	225		1.11				400	
AC3-250S	250		1				500	
AC3-275S	275		0.91				500	
AC3-300S	300		0.83				500	

Note 1: Tested at nominal input voltage and full output load.

SPECIFICATIONS (Nominal V_{IN} , Full Load, $T_A = +25^{\circ}\text{C}$, 1 hour warm up unless otherwise specified)
INPUT

Parameter	Condition	Min.	Typ.	Max.	Units	
Input Voltage Range	AC1 - Single Phase input, Refer to Output Power	85	115	265	VAC	
	AC3 - Three Phase input	166	208	250	VAC	
Input Frequency		47	60	440	Hz	
Inrush Current	AC1 models	115VAC input	-	33	-	A
		220VAC input	-	63	-	A
	AC3 models	208VAC input	-	59	-	A
Input Fuse Recommendation	AC1 models	5A, Rated Voltage \geq Input Voltage				
	AC3 models	3A on each input line, Rated Voltage \geq Input Voltage				

OUTPUT

Parameter	Condition	Min.	Typ.	Max.	Units	
Line Regulation		-	0.2	-	$\pm\%$	
Output Power	AC1, $\leq 5\text{V}$ Output Models	85-95VAC input	-	-	150	W
	AC1, $\geq 12\text{V}$ Output Models		-	-	200	
	All other models		See Model List			

ENVIRONMENTAL

Parameter	Condition	Min.	Typ.	Max.	Units
Operating Temperature Range	Baseplate	0	-	+85	$^{\circ}\text{C}$
Storage Temperature Range	Baseplate	-55	-	+105	$^{\circ}\text{C}$
Cooling	Conduction through baseplate				

GENERAL

Parameter	Condition	Min.	Typ.	Max.	Units	
Power Factor	50 to 100% load, 47 to 60Hz Input	AC1 models	0.99	-	-	-
		AC3 models	0.95	-	-	
Operating Frequency		-	100	-	kHz	
Isolation Voltage	Input to output	4242	-	-	VDC	
	Input/output to baseplate	2121	-	-		
	Input to 380V BUS	None				
Size	L x W x H	4.6 x 2.5 x 0.8 (116.9 x 63.5 x 20.32)			inches (mm)	
Weight		-	340	-	grams	
Case	Aluminum baseplate and Glass Reinforced Polymer					
Potting	Vacuum Impregnated Epoxy					
Box Packaging (W x L x H)	8 x 7.5 x 1.5 (203.2 x 190.5 x 38.1) or 12 x 9 x 1.5 (304.8 x 228.6 x 38.1)				inches (mm)	

PROTECTIONS & FEATURES

Parameter	Condition	Min.	Typ.	Max.	Units
Output Current Limit	Set Point	-	130	-	$\%$
Short circuit	Continuous, auto-recovery				
Overtemperature	Baseplate	90	-	100	$^{\circ}\text{C}$
Remote sense compensation		-	-	1	VDC

SPECIFICATIONS (Nominal V_{IN} , Full Load, $T_A = +25^\circ\text{C}$, 1 hour warm up unless otherwise specified)

DESIGNED TO MEET

Test	Referenced Standard	Description
Vibration	MIL-STD-202	Method 204, Vibration, High Frequency, Condition D
Shock	MIL-STD-202	Method 213, Shock (Specified Pulse), Condition I
Humidity	MIL-STD-202	Method 106, Moisture Resistance
Altitude	MIL-STD-202	Method 105, Barometric Pressure (Reduced), Condition D

OPTIONS AVAILABLE - CONTACT PICO FOR PART NUMBER

Parameter	Referenced Standard	Description
Stabilization Bake	MIL-STD-883	Referenced Method 1008 Non-operating maximum storage temperature for 24 hours
Temperature Cycle	MIL-STD-883	Referenced Method 1010 Non-operating at temperature extremes, 15 mins/temp, 10 cycles
Burn-In	MIL-STD-883	Referenced Method 1015 Max operating temperature for 160 hours
Expanded Operating Temperature Range		-55°C to +85°C

THERMAL RESISTANCE

$$P_{OUT} = \frac{T_C - T_A}{T_{RCA} \times (1 / \eta - 1)}$$

P_{OUT} = Output Power in Watts

η = Efficiency

T_C = Case temperature in °C

T_A = Ambient temperature in °C

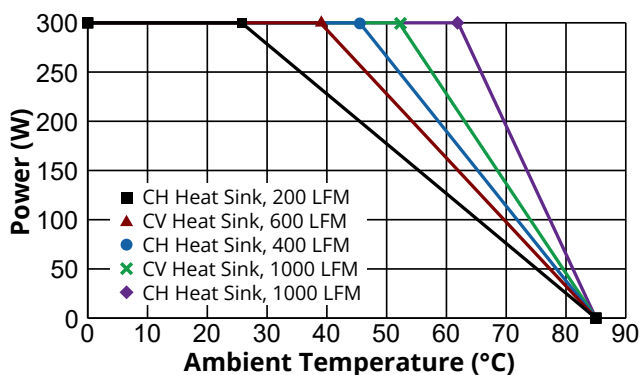
T_{RCA} = Thermal resistance of case to air in °C / W

Thermal resistance of case (T_{RCA})

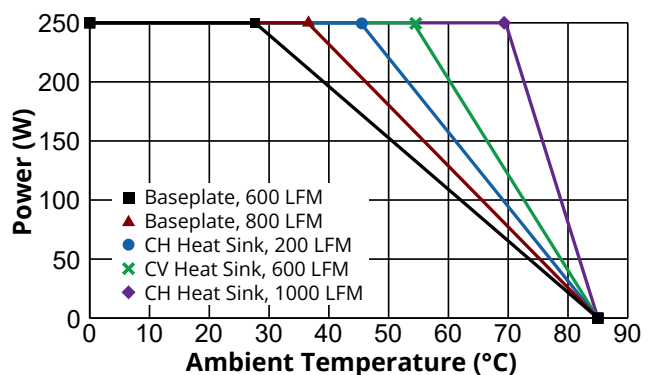
Airflow	Baseplate only	CV Heat Sink	CH Heat Sink	Units
Free Air	4.8	3.3	2.8	°C / W
200 LFM	2.6	1.6	0.9	
400 LFM	1.6	1	0.6	
600 LFM	1.3	0.7	0.5	
800 LFM	1.1	0.6	0.4	
1000 LFM	0.9	0.5	0.35	

DERATING GRAPHS (Nominal V_{IN} , Full Load, Efficiency @ Full Load)

Models with Max. Output Power = 300W & Efficiency at full load = 82%



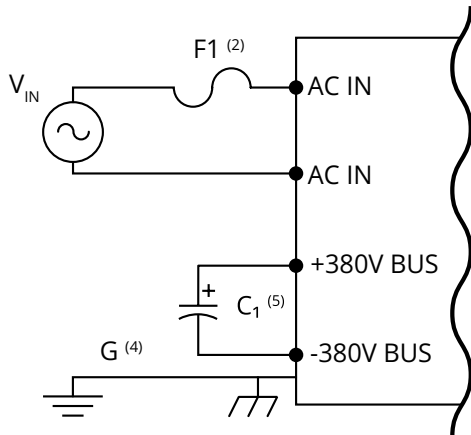
Models with Max. Output Power = 250W & Efficiency at full load = 85%



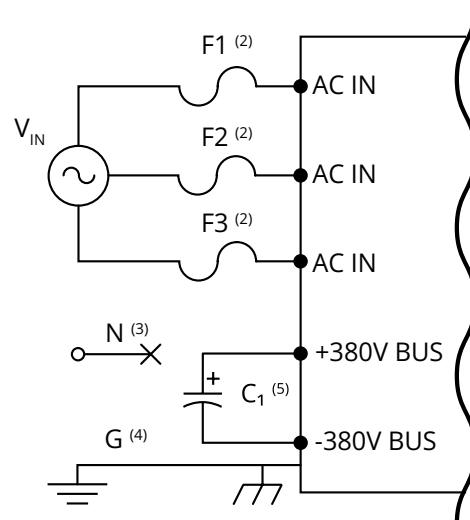
TYPICAL CONNECTION CIRCUIT

INPUT

SINGLE PHASE INPUT



3 PHASE INPUT



Note 2: Required - See Input Fuse Recommendation.

Note 3: Neutral Connection - Not connected.

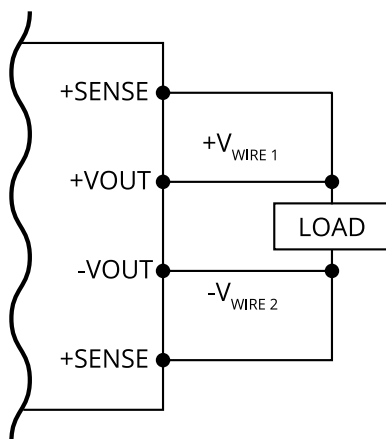
Note 4: Physical Earth/Ground may be connected to baseplate/chassis or not connected.

Note 5: A minimum 220µF, 450V high quality aluminium electrolytic capacitor is required.

Please note: The external hold up capacitor must be installed prior to operation. It cannot be connected to physical earth or ground.

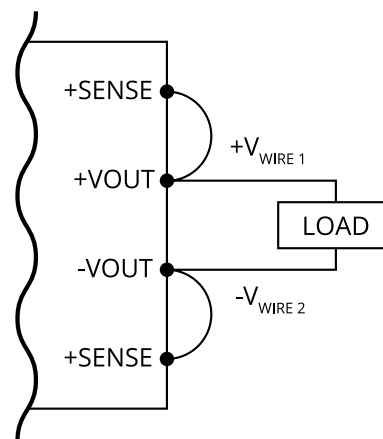
SENSE - AC1 & AC3 ≤ 48V OUTPUT MODELS

REMOTE SENSE



$$V_{OUT} = V_{LOAD} + V_{WIRE 1} + V_{WIRE 2}$$

LOCAL SENSE



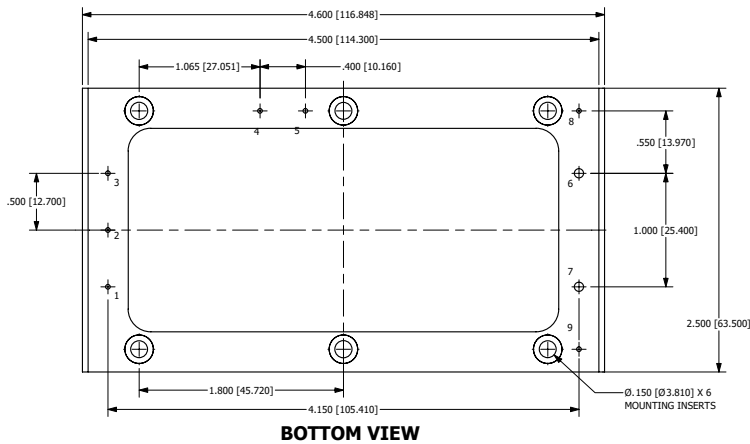
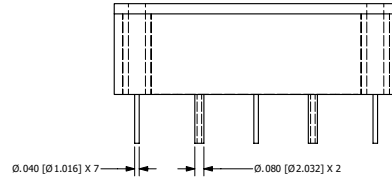
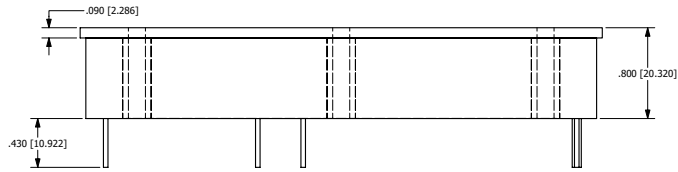
$$V_{LOAD} = V_{OUT} - V_{WIRE 1} - V_{WIRE 2}$$

The positive remote sense (+SENSE) should be connected to the positive output (+VOUT) at the physical load location. The negative remote sense (-SENSE) should be connected to the negative output (-VOUT) at the physical load location. VOUT may compensate up to 1V of drop in the load wires. Voltage will be regulated at the load.

Alternatively, for local sense, +SENSE should be connected to +VOUT and -SENSE should be connected to -VOUT at the output terminals. Voltage will be regulated at the output terminals.

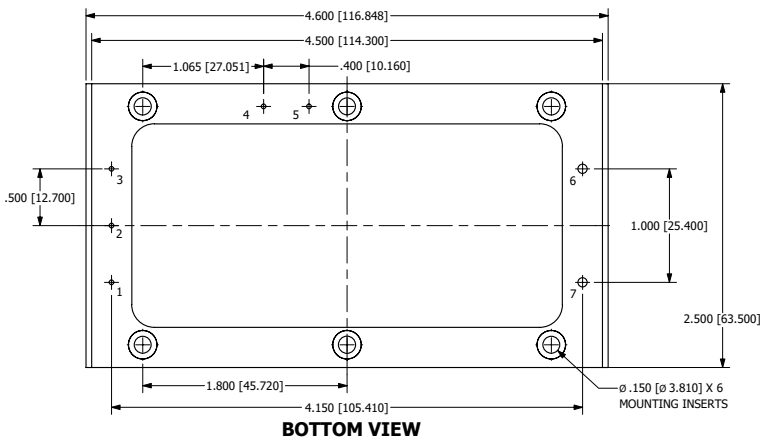
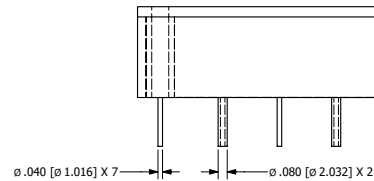
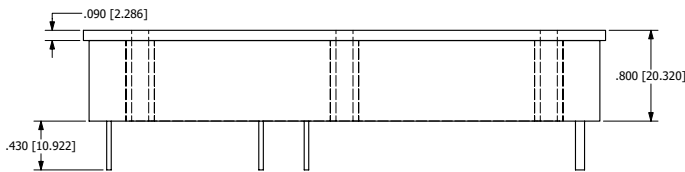
MECHANICAL DRAWINGS

SERIES AC1 & AC3 ≤ 48V OUTPUT MODELS



PIN	FUNCTION	PIN DIAMETER
1	AC IN	.040 [1.016]
2	AC IN	.040 [1.016]
3	AC IN	.040 [1.016]
4	+380V BUS	.040 [1.016]
5	-380V BUS	.040 [1.016]
6	-VOUT	.080 [2.032]
7	+VOUT	.080 [2.032]
8	-SENSE	.040 [1.016]
9	+SENSE	.040 [1.016]

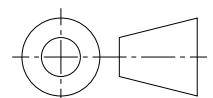
SERIES AC3 ≥ 100V OUTPUT MODELS



PIN	FUNCTION	PIN DIAMETER
1	AC IN	.040 [1.016]
2	AC IN	.040 [1.016]
3	AC IN	.040 [1.016]
4	+380V BUS	.040 [1.016]
5	-380V BUS	.040 [1.016]
6	-VOUT	.080 [2.032]
7	+VOUT	.080 [2.032]

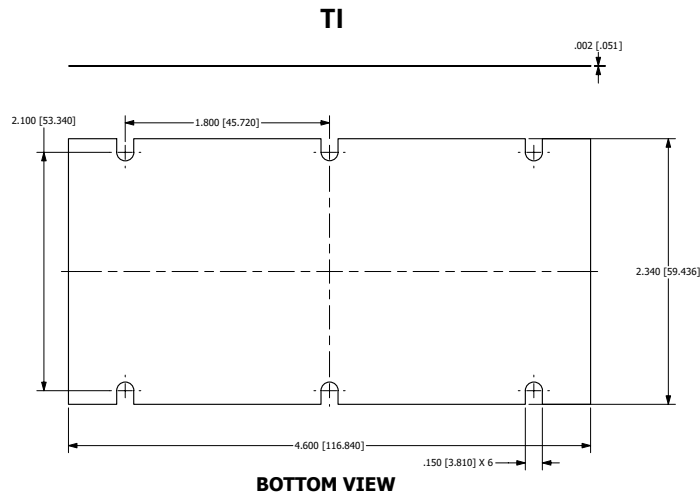
NOTES

- a. ALL DIMENSIONS ARE IN INCHES, [] = MM
- b. RECOMMENDED TORQUE FOR MOUNTING SCREWS: 6-9 INCH-LBS
- c. EXTERNAL CAPACITOR REQUIRED ACROSS TERMINALS 4 AND 5



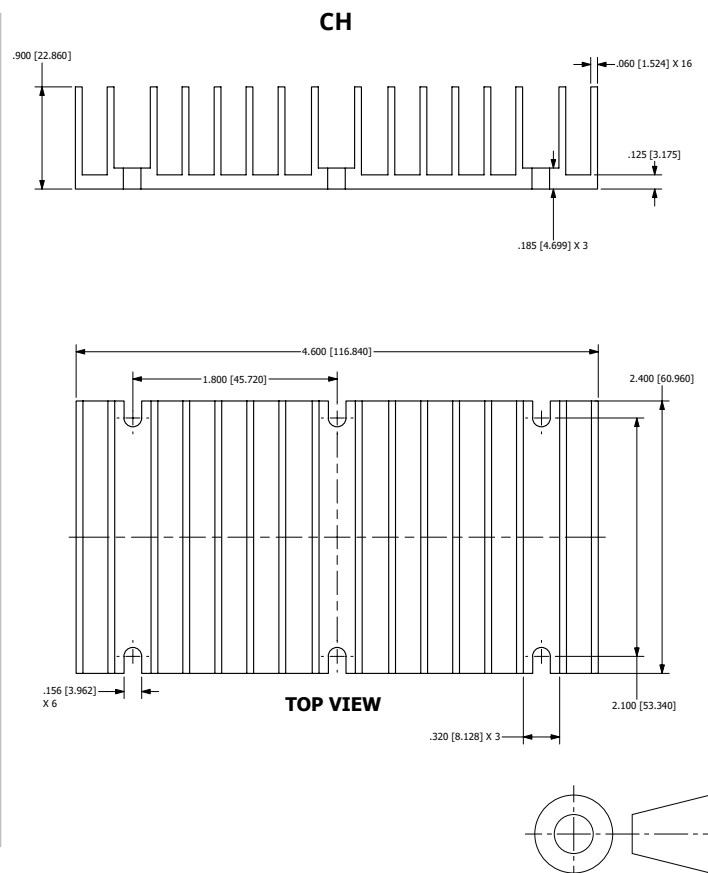
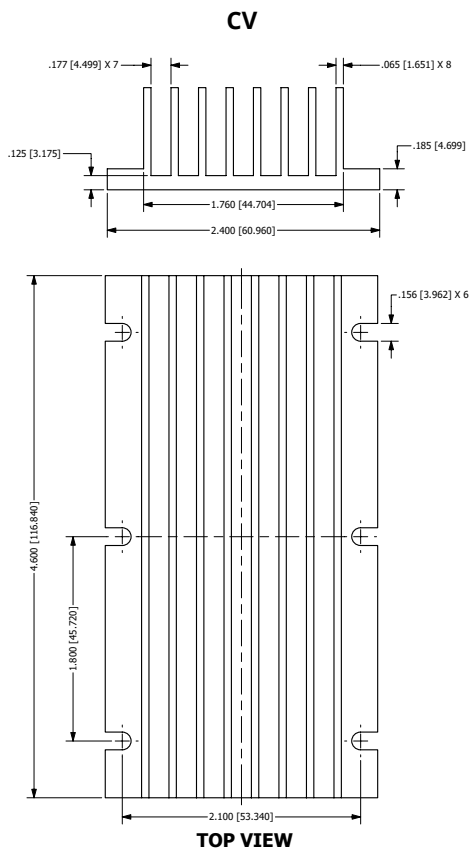
MECHANICAL DRAWINGS

THERMAL INTERFACE



Material	Alloy Aluminum Substrate
Thermal Conductivity	1530 BTU-in/hr sq.ft °F
Coefficient of Thermal Expansion, (25-100°C)	13.1 10 ⁻⁶ in-in/°F
Brinell Hardness	23 HB
Endurance Limit	5000 PSI
Standard Thickness	0.002 inches

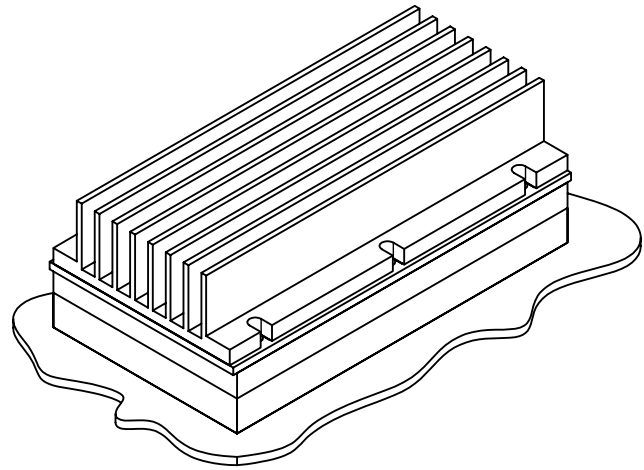
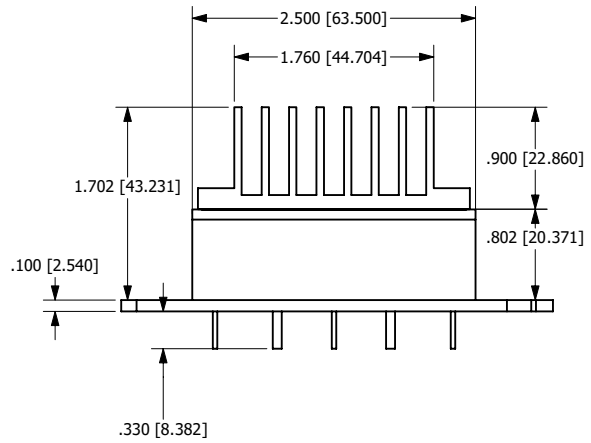
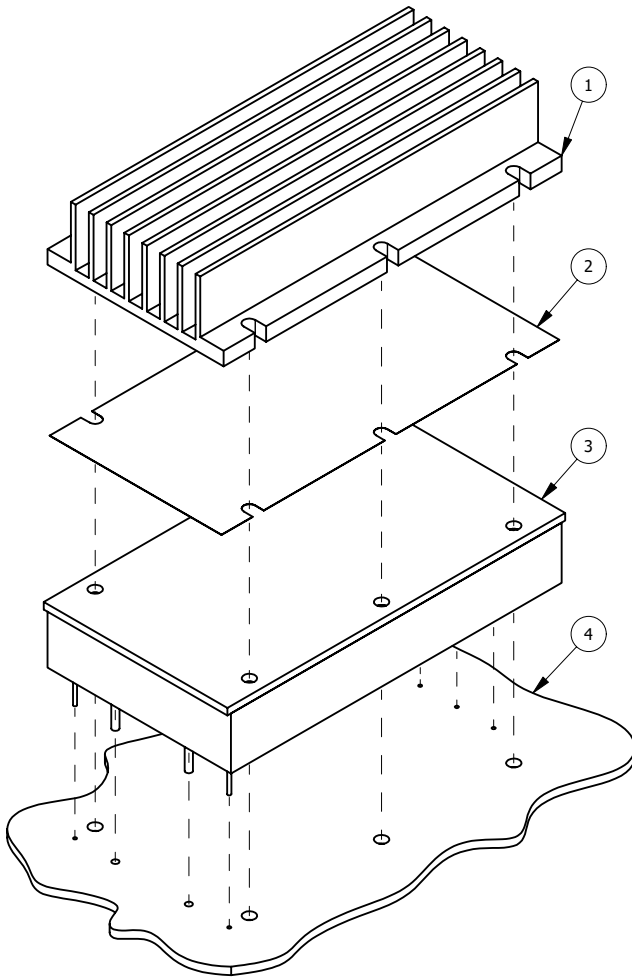
HEAT SINKS



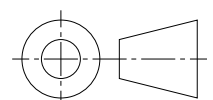
Weight: 145 grams typical

MECHANICAL DRAWINGS

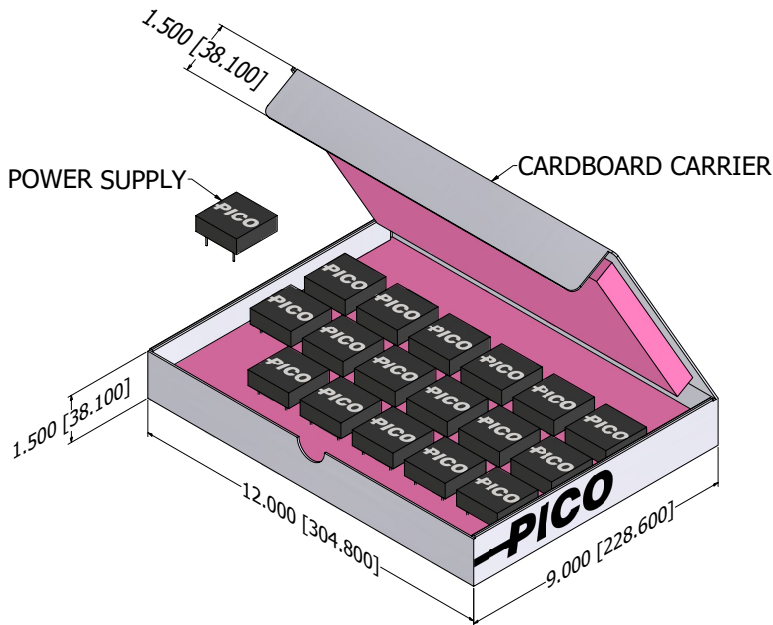
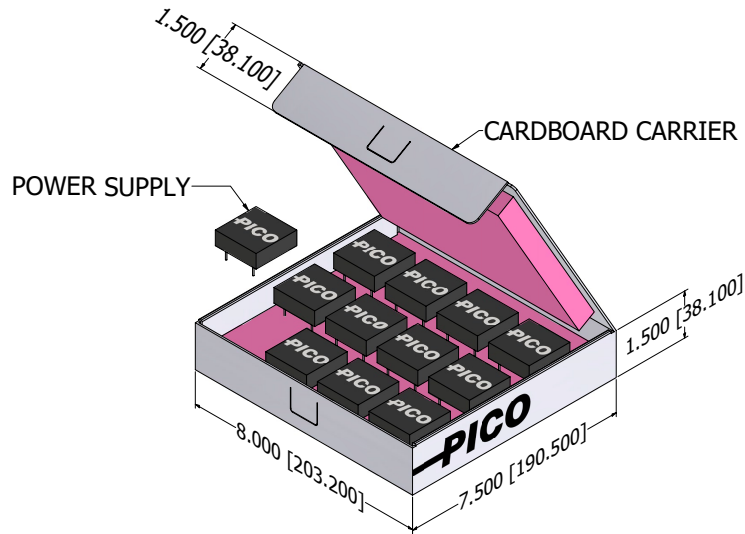
HEAT SINK ASSEMBLY



ITEM	QTY	DESCRIPTION
1	1	CH OR CV HEAT SINK
2	1	TI THERMAL INTERFACE
3	1	AC MODULE
4	1	PCB



BOX PACKAGING - BULK



Pico warrants each product manufactured by us and sold by us or an authorized representative, to be free from defects in material and workmanship. If properly used, it will perform within its applicable specifications for a period of one year after original shipment. Pico's obligation under this guarantee is limited to repairing or replacing our product to the original purchaser. This warranty is in lieu of all other warranties, express or implied and constitutes fulfillment of our obligations to the purchaser. We do not guarantee that the products can be used for a particular purpose other than those solely covered by the product's specifications. Pico must be notified if the product must meet particular certifications and/or standards. We assume no liability, in any event, for consequential damages, for anticipated or lost profits, incidental damages or loss of time or other losses incurred by the purchaser or any third party in connection with products covered by this warranty or otherwise. The purchaser will indemnify and hold Pico harmless for any damages, losses, costs, etc. from usage not within the product's specifications. Pico must be consulted before usage of its products in a nuclear, radioactive or space environment.

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