

Series DC1 · DC2A & DC2B

300W Isolated Regulated High Power DC-DC Converter

PICO
Electronics, Inc.

PRODUCT OVERVIEW

The DC1, DC2A & DC2B series are isolated DC-DC converters with a wide selection of input voltage ranges from 120V to 1200V and output power up to 300W. These modules have sense feature to accurately regulate the voltage at a remote load. Input is protected against reverse polarity.

The full brick case size has threaded inserts to mount securely for high vibration and shock applications. Conduction cooling is available through the baseplate or compatible heat sink.



FEATURES

- 120V to 1200V input range models
- 5V to 300V output models
- Up to 300W output
- Input/output isolation
- Parallel operation option
- Remote Sense feature
- Input reverse polarity protection
- Fixed operating frequency
- No external components required

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, Isolation Voltage or Output Power

DC1	-28S
INPUT VOLTAGE RANGE	NOMINAL OUTPUT VOLTAGE

DC1 = 120 - 370V
DC2A = 350 - 700V
DC2B = 700 - 1200V

-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

MODEL LIST

Pico Part Number			Output Voltage [VDC]	Output Current		Output Power [W]	Efficiency ⁽¹⁾ [%] typ.	Output Ripple @ 1MHz BW [mVp-p] max	Output Voltage Tolerance ⁽¹⁾ [±%]
120-370V Input	350-700V Input	700-1200V Input		Min. [A]	Max. [A]				
DC1-5S	DC2A-5S	DC2B-5S	5	0	30	150	76	100	1
DC1-9S	DC2A-9S	DC2B-9S	9		27.8	250	78	100	1
DC1-12S	DC2A-12S	DC2B-12S	12		25	300	80	150	0.5
DC1-15S	DC2A-15S	DC2B-15S	15		20	300	80	150	0.5
DC1-24S	DC2A-24S	DC2B-24S	24		12.5	300	81	250	0.5
DC1-28S	DC2A-28S	DC2B-28S	28		10.71	300	82	300	0.5
DC1-48S	DC2A-48S	DC2B-48S	48		6.25	300	82	500	0.5
DC1-100S	DC2A-100S	DC2B-100S	100		2.5	250	85	250	1
DC1-125S	DC2A-125S	DC2B-125S	125		2			250	1
DC1-150S	DC2A-150S	DC2B-150S	150		1.67			350	1
DC1-175S	DC2A-175S	DC2B-175S	175		1.43			350	1
DC1-200S	DC2A-200S	DC2B-200S	200		1.25			400	1
DC1-225S	DC2A-225S	DC2B-225S	225		1.11			400	1
DC1-250S	DC2A-250S	DC2B-250S	250		1			500	1
DC1-275S	DC2A-275S	DC2B-275S	275		0.91			500	1
DC1-300S	DC2A-300S	DC2B-300S	300		0.83			500	1

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	Series DC1	120	200	370	VDC
	Series DC2A	350	500	700	
	Series DC2B	700	900	1200	

OUTPUT

Parameter	Condition	Min.	Typ.	Max.	Units
Line Regulation	≤48V Output Models	-	0.5	-	±%
	≥100V Output Models	-	1	-	
Load Regulation	10-100% load	≤15V Output Models	-	1.5	±%
		≥24V Output Models	-	1	

ENVIRONMENTAL

Parameter	Condition	Min.	Typ.	Max.	Units
Operating Temperature Range	Baseplate	0	-	+85	°C
Storage Temperature Range		-55	-	+105	°C
Cooling	Conduction through baseplate				

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

GENERAL

Parameter	Condition	Min.	Typ.	Max.	Units
Operating Frequency		-	100	-	kHz
Isolation Voltage	Input to output	4242	-	-	VDC
	Input/output to baseplate	2121	-	-	
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, self-recovery	Shutdown	-	95	-	°C
		Restart	-	50	-	
Input Under Voltage	Non-latched shutdown Self-recovery	Series DC2A	Shutdown	-	314	VDC
			Restart	-	320	
		Series DC2B	Shutdown	-	657	
			Restart	-	670	
Input Over Voltage	Non-latched shutdown Self-recovery	Series DC2A	Shutdown	-	720	VDC
			Restart	-	705	
		Series DC2B	Shutdown	-	1230	
			Restart	-	1206	
Remote Sense Compensation		-	-	1	VDC	

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		-40°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

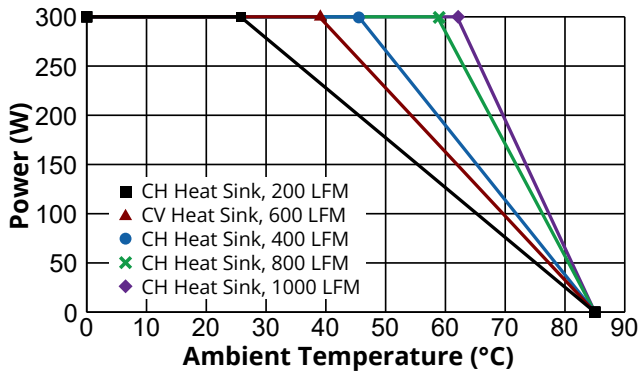
T_{RCA} = Thermal resistance of case to air in °C/W

Thermal resistance of case (T_{RCA})

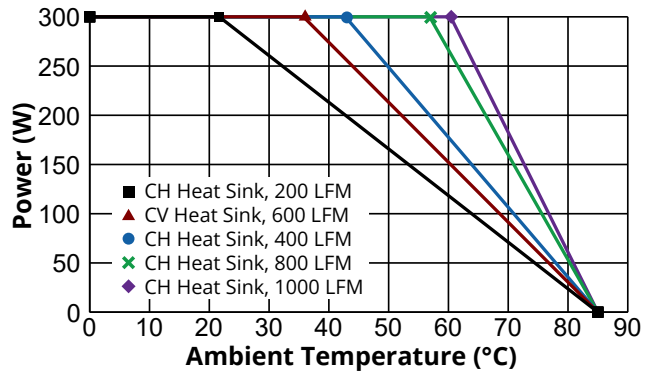
Airflow	Baseplate only	CV Heat Sink	CH Heat Sink	Units
Free Air	4.80	3.30	2.80	°C/W
200 LFM	2.60	1.60	0.90	
400 LFM	1.60	1.00	0.60	
600 LFM	1.30	0.70	0.50	
800 LFM	1.10	0.60	0.40	
1000 LFM	0.90	0.50	0.35	

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

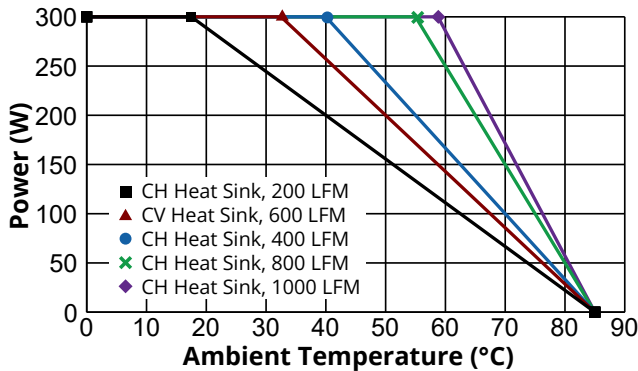
**Models with Max. Output Power = 300W
& Efficiency at full load = 82%**



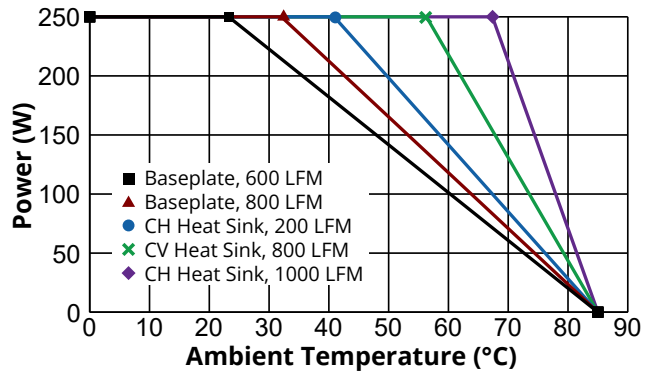
**Models with Max. Output Power = 300W
& Efficiency at full load = 81%**



**Models with Max. Output Power = 300W
& Efficiency at full load = 80%**

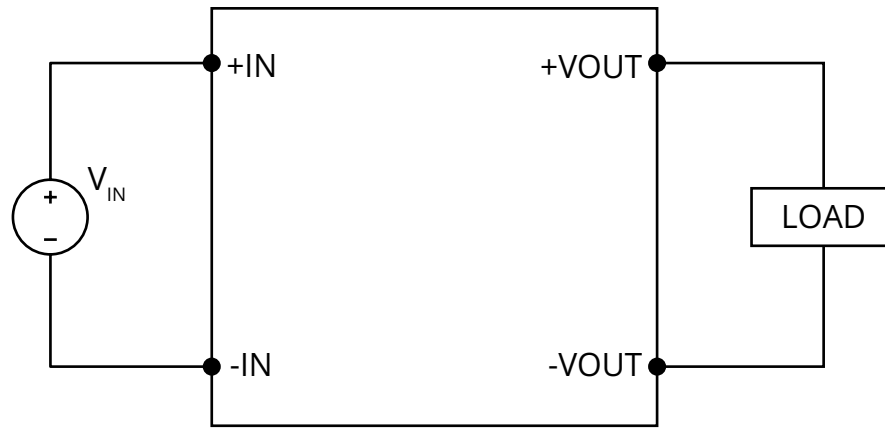


**Models with Max. Output Power = 250W
& Efficiency at full load = 85%**



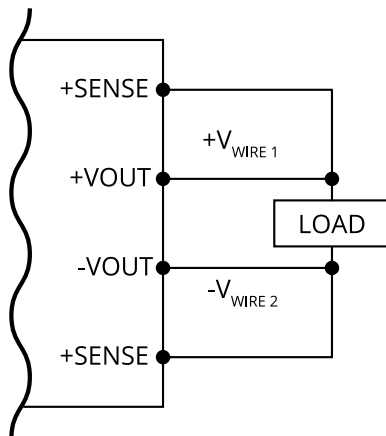
TYPICAL CONNECTION CIRCUIT

≥ 100V OUTPUT MODELS



SENSE - ≤ 48V OUTPUT MODELS

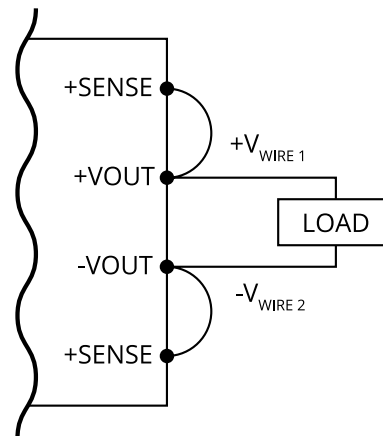
REMOTE SENSE



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

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.

LOCAL SENSE

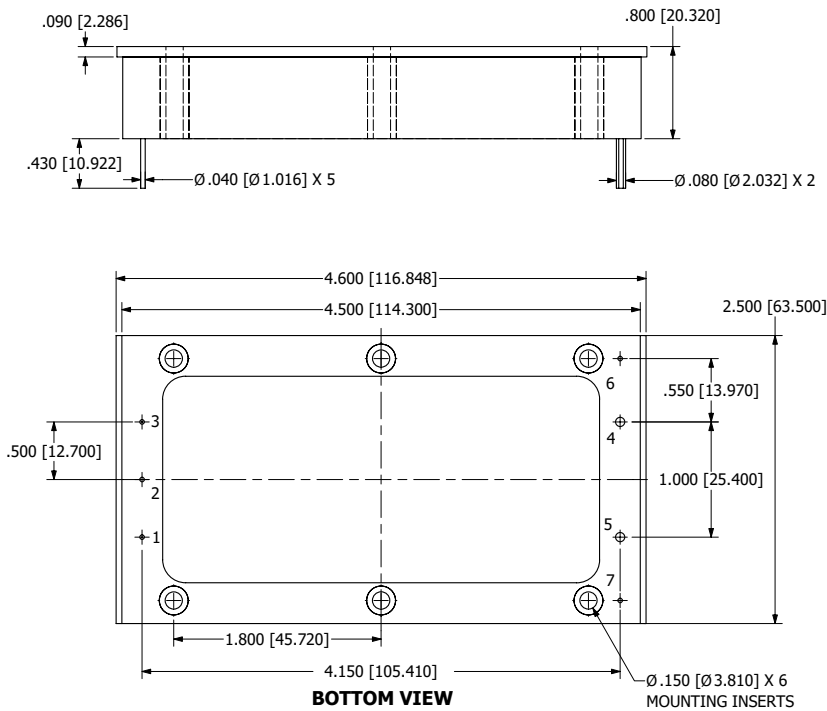


$$V_{LOAD} = V_{OUT} - V_{WIRE 1} - V_{WIRE 2}$$

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.

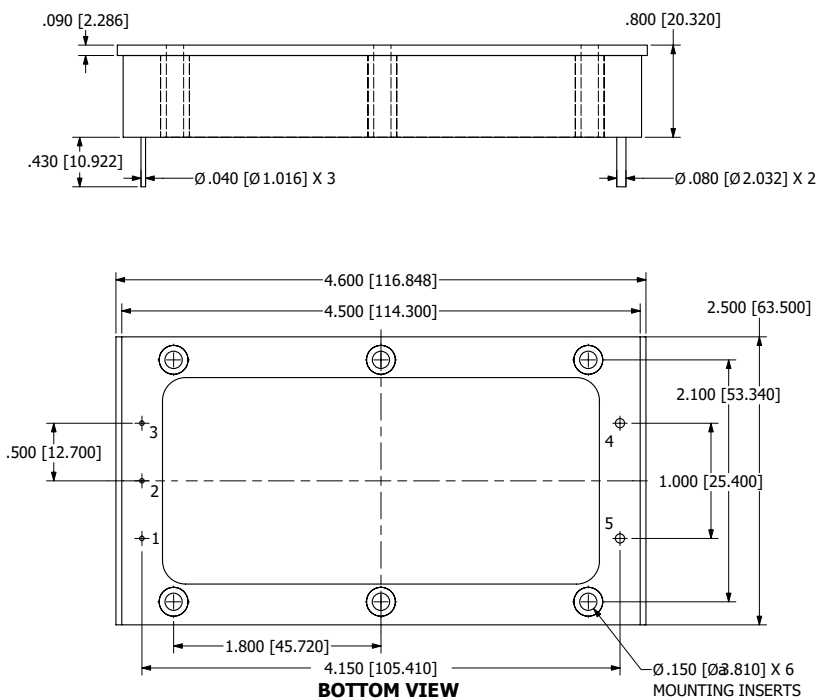
MECHANICAL DRAWINGS

≤48V OUTPUT MODELS



PIN	FUNCTION	PIN DIAMETER
1	+IN	.040 [1.016]
2	-IN	.040 [1.016]
3	N/C	.040 [1.016]
4	-VOUT	.080 [2.032]
5	+VOUT	.080 [2.032]
6	-SENSE	.040 [1.016]
7	+SENSE	.040 [1.016]

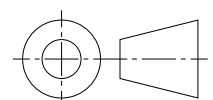
≥100V OUTPUT MODELS



PIN	FUNCTION	PIN DIAMETER
1	+IN	.040 [1.016]
2	-IN	.040 [1.016]
3	N/C	.040 [1.016]
4	-VOUT	.080 [2.032]
5	+VOUT	.080 [2.032]

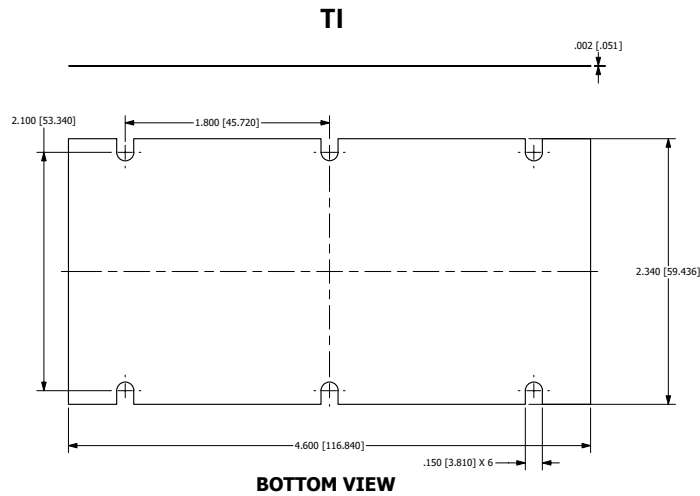
NOTES

- a. ALL DIMENSIONS ARE IN INCHES, [] = MM
- b. RECOMMENDED TORQUE FOR MOUNTING SCREWS: 6-9 INCH-LBS



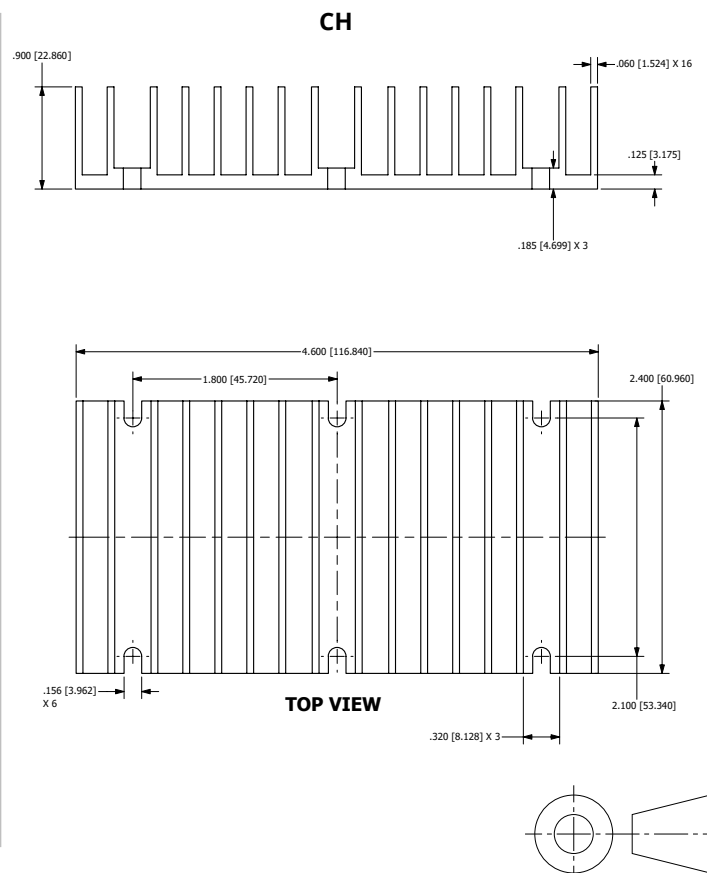
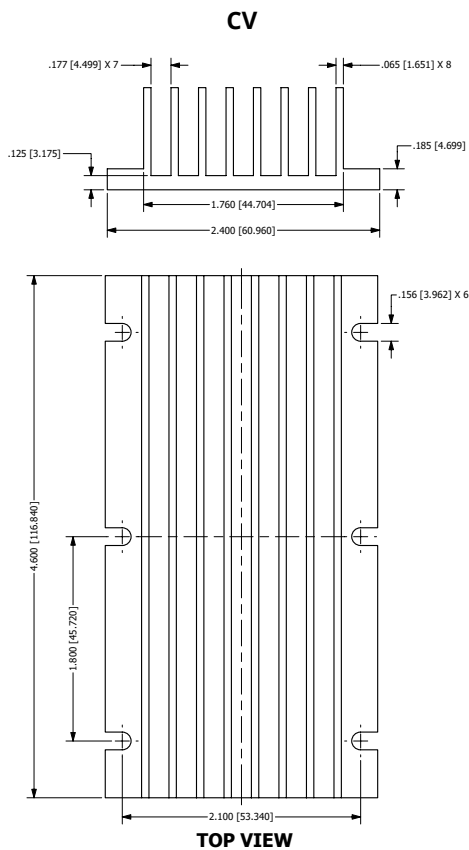
MECHANICAL DRAWINGS

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

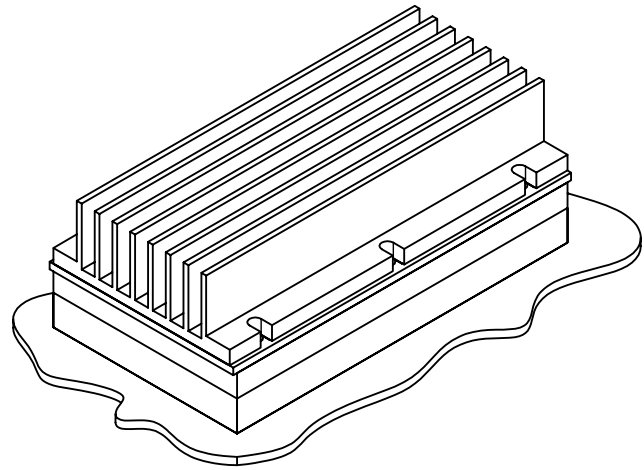
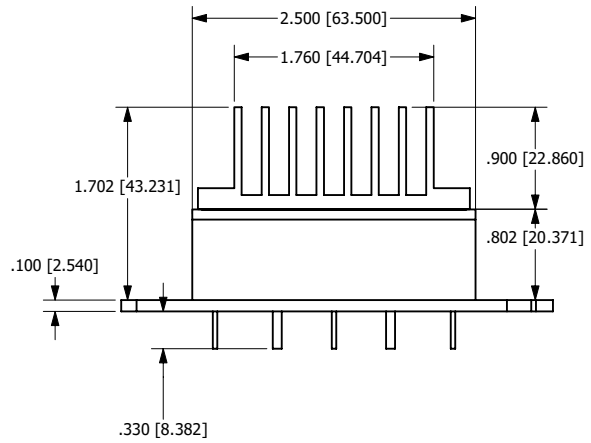
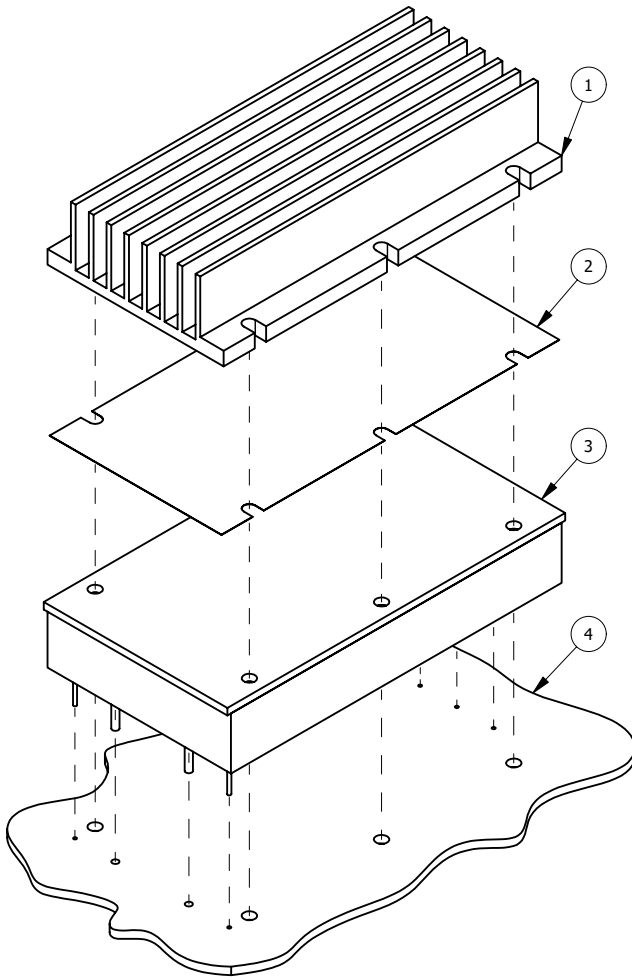
HEAT SINKS



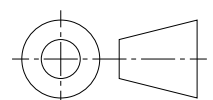
Weight: 145 grams typical

MECHANICAL DRAWINGS

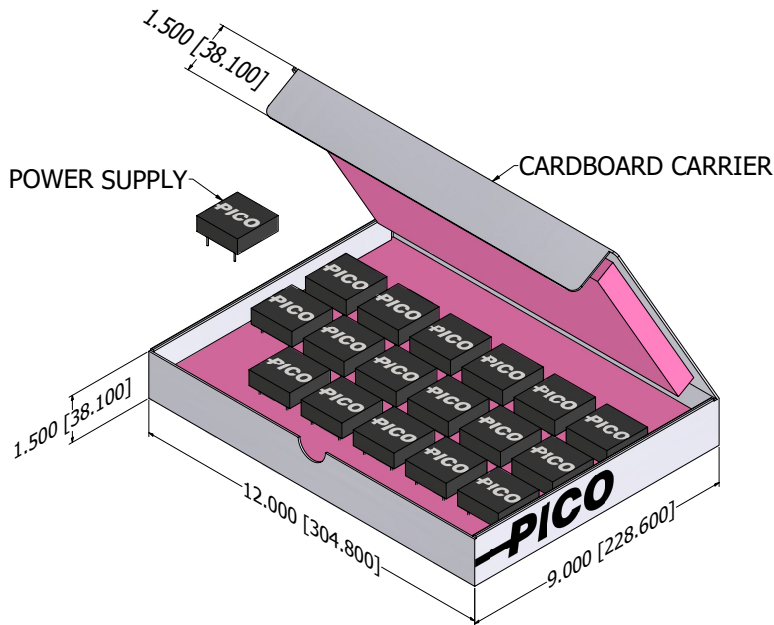
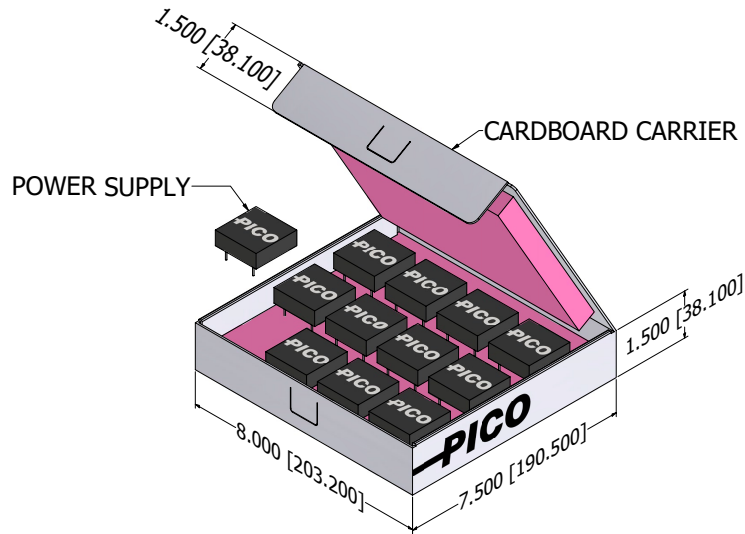
HEAT SINK ASSEMBLY



ITEM	QTY	DESCRIPTION
1	1	CH OR CV HEAT SINK
2	1	TI THERMAL INTERFACE
3	1	DC1, DC2A OR DC2B MODULE
4	1	PCB



BOX PACKAGING - BULK



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