

SERIES: PCSA1-S | **DESCRIPTION:** DC-DC CONVERTER

FEATURES

- up to 1 W isolated output
- industry standard SIP package
- nominal input voltages: 5, 12, 24 Vdc
- single unregulated output
- 1,000 Vdc isolation voltage
- low ripple and noise
- -40 to 100°C
- efficiency up to 82%

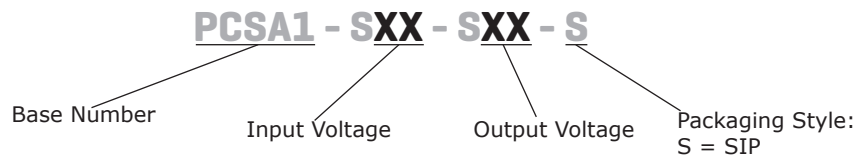


MODEL

MODEL	input voltage		output voltage	output current		output power	ripple & noise ¹	efficiency
	typ (Vdc)	range (Vdc)	(Vdc)	min (mA)	max (mA)	max (W)	max (mVp-p)	typ (%)
PCSA1-S5-S5-S	5	4.5~5.5	5	0	200	1	100	79
PCSA1-S5-S12-S	5	4.5~5.5	12	0	84	1	100	79
PCSA1-S5-S15-S	5	4.5~5.5	15	0	67	1	100	80
PCSA1-S12-S5-S	12	10.8~13.2	5	0	200	1	100	81
PCSA1-S12-S12-S	12	10.8~13.2	12	0	84	1	100	81
PCSA1-S12-S15-S	12	10.8~13.2	15	0	67	1	100	82
PCSA1-S24-S5-S	24	21.6~26.4	5	0	200	1	100	80
PCSA1-S24-S12-S	24	21.6~26.4	12	0	84	1	100	80
PCSA1-S24-S15-S	24	21.6~26.4	15	0	67	1	100	81

Notes: 1. At full load, nominal input, 20 MHz bandwidth oscilloscope, with a 0.33 μ F ceramic capacitor on the output.
 2. Required to add a 2.2 μ F (5 & 12 Vdc input models) or 4.7 μ F (24 Vdc input models) ceramic capacitor to the input to reduce input voltage stress.
 3. All specifications are measured at $T_a=25^\circ\text{C}$, nominal input voltage, and rated output load unless otherwise specified.

PART NUMBER KEY



INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage	5 Vdc input models	4.5	5	5.5	Vdc
	12 Vdc input models	10.8	12	13.2	Vdc
	24 Vdc input models	21.6	24	26.4	Vdc
surge voltage	for maximum of 100 ms				
	5 Vdc input models			9	Vdc
	12 Vdc input models			18	Vdc
	24 Vdc input models			30	Vdc
current	5 Vdc input models		250		mA
	12 Vdc input models		105		mA
	24 Vdc input models		55		mA
filter	capacitive				
input reverse polarity protection	no				
input fuse	0.5 A time delay fuse for all models (recommended)				

Notes: 1. Required to add a 2.2 μ F (5 & 12 Vdc input models) or 4.7 μ F (24 Vdc input models) ceramic capacitor to the input to reduce input voltage stress.

OUTPUT

parameter	conditions/description	min	typ	max	units
maximum capacitive load	at full load			220	μ F
voltage accuracy				± 3.0	%
line regulation	1.0% change in input voltage			± 1.2	%
load regulation	from 100% to 20% load			± 10	%
switching frequency	at nominal Vin, full load				
	5, 12 Vdc input models		90		kHz
	24 Vdc input models		80		kHz
temperature coefficient				± 0.05	%/ $^{\circ}$ C

PROTECTIONS

parameter	conditions/description	min	typ	max	units
short circuit protection	momentary			1	s

SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	input to output for 1 minute	1,000			Vdc
isolation resistance	input to output	1,000			M Ω
isolation capacitance	input to output		10		pF
conducted emissions	EN 55022 Class A & Class B (external circuit required, see Figure 3)				
MTBF	as per MIL-HDBK-217F, full load, GB, 25 $^{\circ}$ C		1,700,000		hours
RoHS	yes				

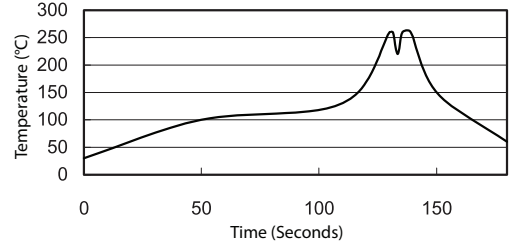
ENVIRONMENTAL

parameter	conditions/description	min	typ	max	units
operating ambient temperature	see derating curve	-40		100	$^{\circ}$ C
storage temperature		-55		125	$^{\circ}$ C
operating humidity	non-condensing			95	%

SOLDERABILITY

parameter	conditions/description	min	typ	max	units
wave soldering	see wave soldering profile			260	°C

- Notes:
1. Soldering materials: Sn/Cu/Ni
 2. Ramp up rate during preheat: 1.4°C/s (from 50°C to 100°C)
 3. Soaking temperature: 0.5°C/s (from 100°C to 130°C), 60±20 seconds
 4. Peak temperature: 260°C, above 250°C for 3~6 seconds
 5. Ramp down rate during cooling: -10°C/s (from 260°C to 150°C)



MECHANICAL

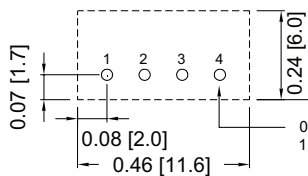
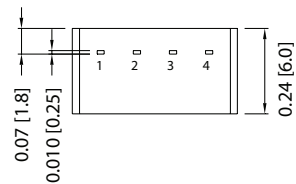
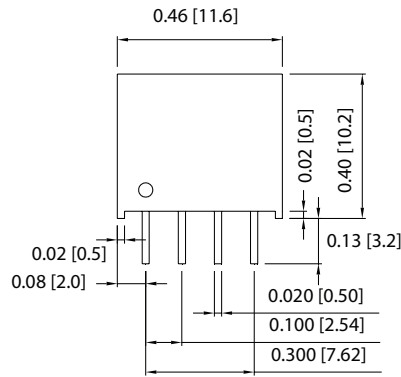
parameter	conditions/description	min	typ	max	units
dimensions	5,12 Vdc input models: 0.46 x 0.24 x 0.40 [11.6 x 6.0 x 10.2 mm] 24 Vdc input models: 0.46 x 0.30 x 0.40 [11.6 x 7.5 x 10.2 mm]				inches inches
case material	non-conductive black plastic				
weight	5, 12 Vdc input models 24 Vdc input models		1.3 1.7		g g

MECHANICAL DRAWING

units: inches [mm]
tolerance: X.XX ±0.01 [±0.25]
pin section tolerance: ±0.002[±0.05]

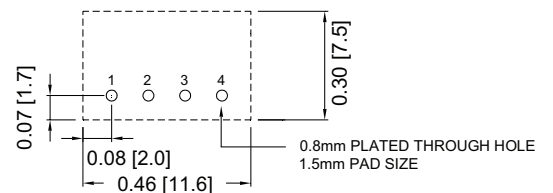
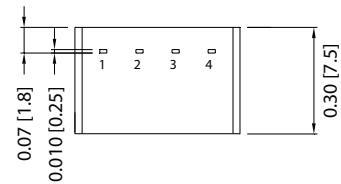
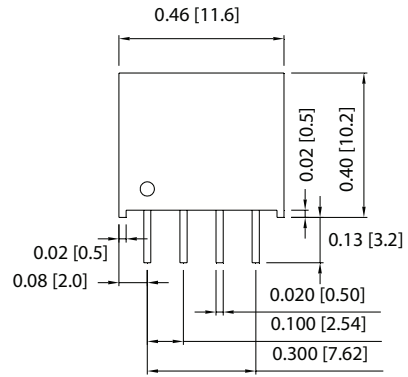
PIN CONNECTIONS	
PIN	Function
1	-Vin
2	+Vin
3	-Vout
4	+Vout

5, 12 Vdc input models



Recommended PCB Layout
Top View

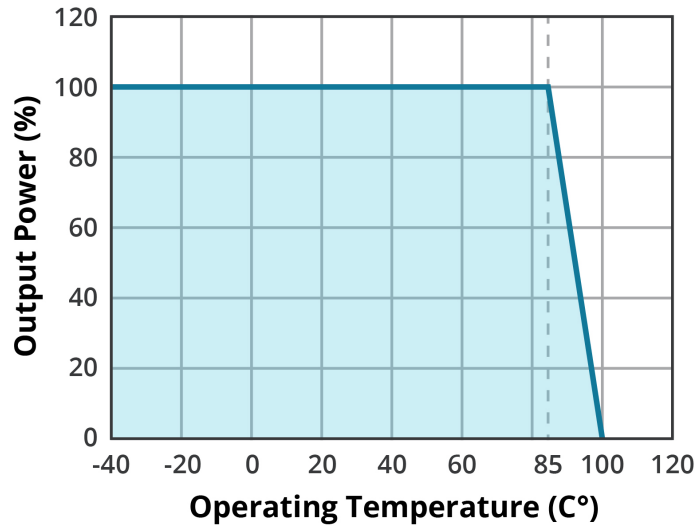
24 Vdc input models



Recommended PCB Layout
Top View

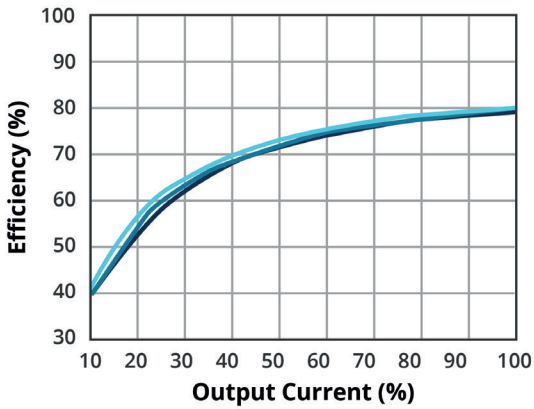
DERATING CURVE

TEMPERATURE DERATING CURVE

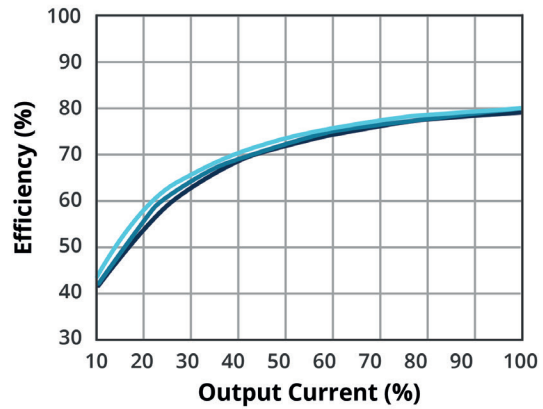


EFFICIENCY CURVES

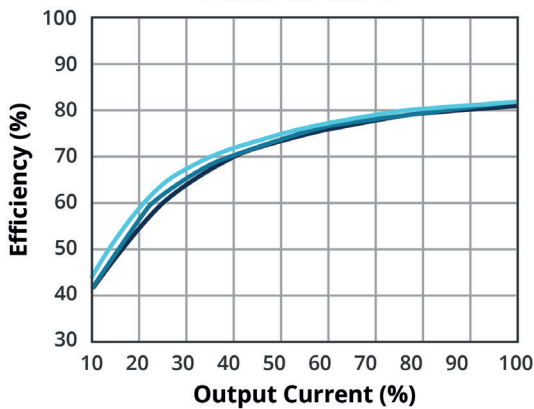
EFFICIENCY VS OUTPUT LOAD
PCSA1-S5-S5-S



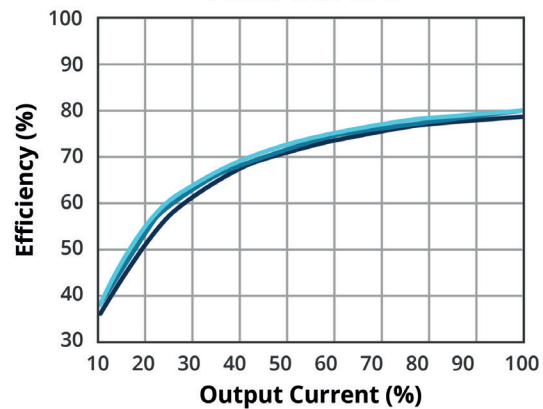
EFFICIENCY VS OUTPUT LOAD
PCSA1-S5-S12-S



EFFICIENCY VS OUTPUT LOAD
PCSA1-S5-S15-S

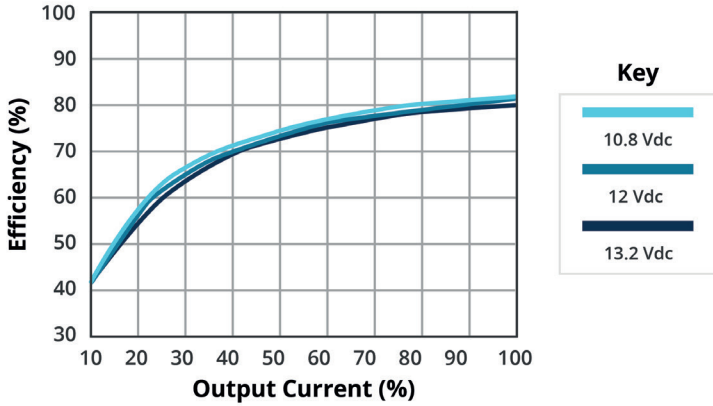


EFFICIENCY VS OUTPUT LOAD
PCSA1-S12-S5-S

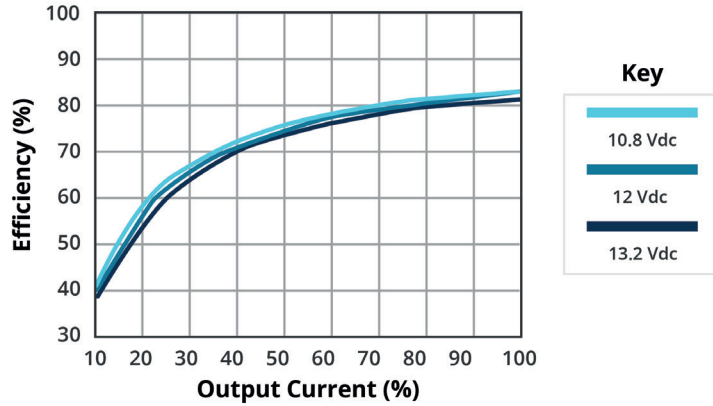


EFFICIENCY CURVES (CONTINUED)

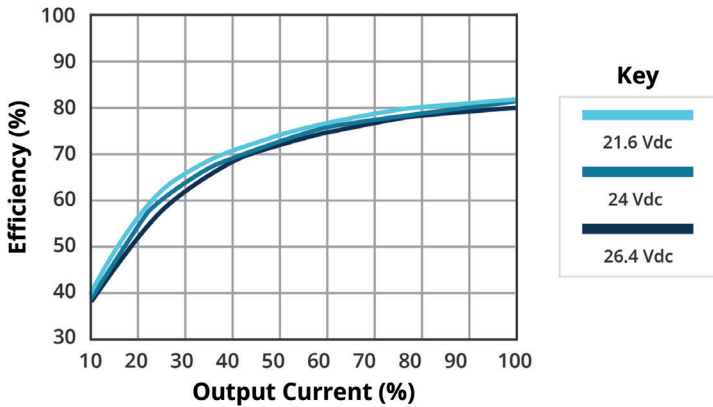
**EFFICIENCY VS OUTPUT LOAD
PCSA1-S12-S12-S**



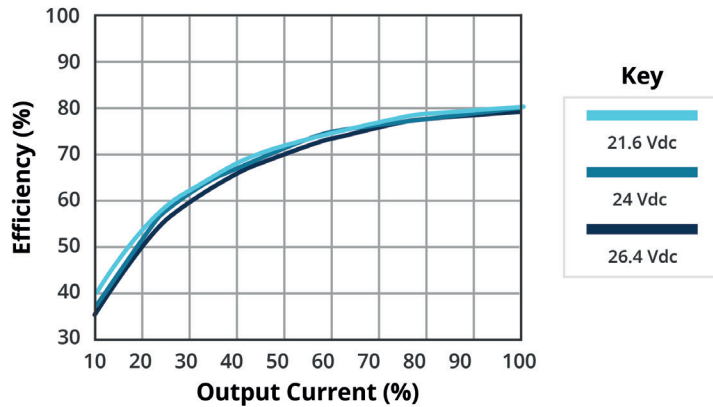
**EFFICIENCY VS OUTPUT LOAD
PCSA1-S12-S15-S**



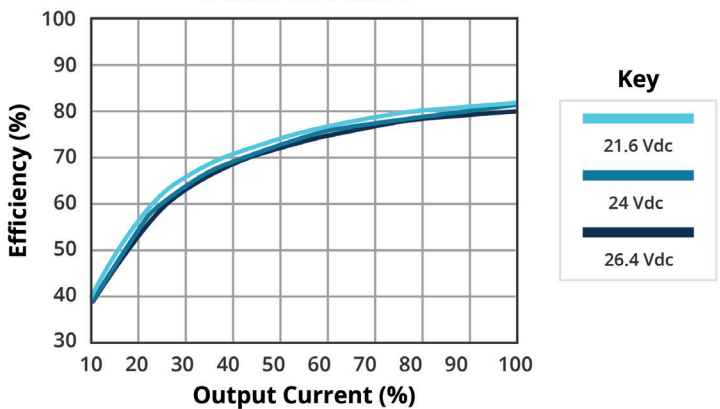
**EFFICIENCY VS OUTPUT LOAD
PCSA1-S24-S5-S**



**EFFICIENCY VS OUTPUT LOAD
PCSA1-S24-S12-S**



**EFFICIENCY VS OUTPUT LOAD
PCSA1-S24-S15-S**



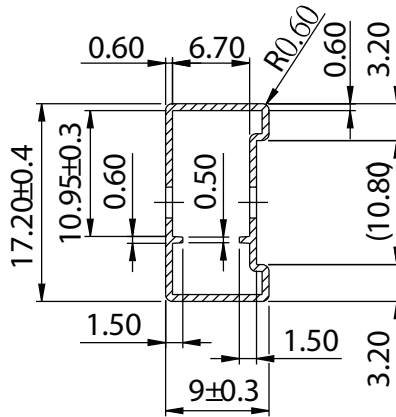
PACKAGING

5, 12 Vdc input models

units: mm

Tube size: 17.2 x 9 x 340 mm

QTY: 26 pcs

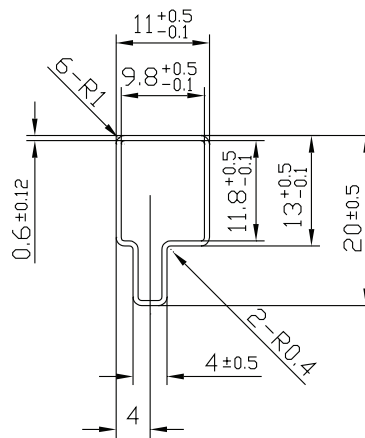


24 Vdc input models

units: mm

Tube size: 20 x 11 x 340 mm

QTY: 26 pcs



TEST CONFIGURATIONS

Input Ripple Current & Output Noise

Figure 1 Measuring Input Ripple Current

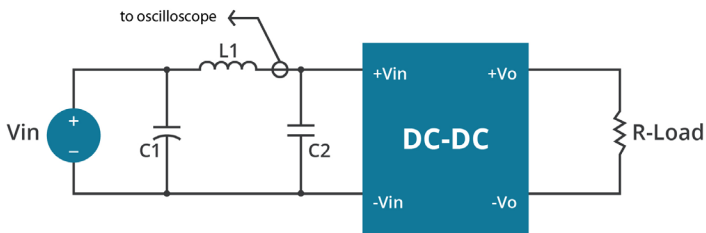


Figure 2 Measuring Output Ripple And Noise

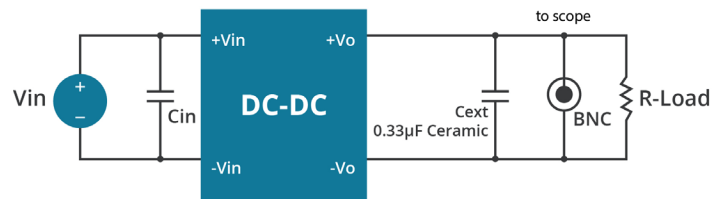


Table 1

Input Voltage (Vdc)	L1	C1	C2
5	12 µH	2.2 µF tantalum capacitor	NC
12	12 µH	2.2 µF tantalum capacitor	NC
24	12 µH	4.7 µF ceramic capacitor	NC

Table 2

Input Voltage (Vdc)	Cin
5	2.2 µF ceramic capacitor
12	2.2 µF ceramic capacitor
24	4.7 µF ceramic capacitor

EMC RECOMMENDED CIRCUIT

Test Condition

Input Voltage: Nominal

Output Load: Full Load

Figure 3 Conducted Emissions Test Circuit

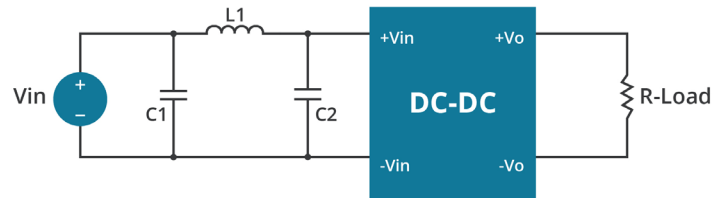


Table 3

EN55022 Class A Recommended External Circuit Components		
C1 ¹	C2 ¹	L1
4.7 μ F / 50 V	4.7 μ F / 50 V	3.3 μ H

Notes: 1. Ceramic Capacitor

Table 4

EN55022 Class B Recommended External Circuit Components		
C1 ¹	C2 ¹	L1
10 μ F / 50 V	10 μ F / 50 V	7.5 μ H

Notes: 1. Ceramic Capacitor

REVISION HISTORY

rev.	description	date
1.0	initial release	07/26/2016
1.01	company logo updated	03/30/2021
1.02	derating curves, efficiency curves and figures updated	06/29/2021
1.03	enviromental section updated	09/24/2024
1.04	datasheet updated	04/24/2025

The revision history provided is for informational purposes only and is believed to be accurate.



CUI INC
a bel group

Headquarters

15575 SW Sequoia Pkwy #100
Portland, OR 97224
800.275.4899

Fax 503.612.2383
cui.com
techsupport@cui.com

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