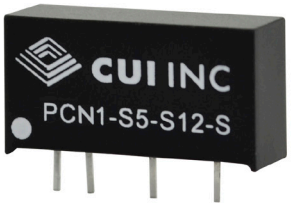
CUI INC
a bel group

SERIES: PCN1-S | DESCRIPTION: DC-DC CONVERTER

FEATURES

- up to 1 W isolated output
- industry standard SIP package
- nominal input voltages: 5, 12, 24 Vdc
- single/dual unregulated output
- 1,500 Vdc isolation voltage
- low ripple and noise
- -40 to 100°C
- efficiency up to 83%



RoHS

MODEL

MODEL	input voltage typ (Vdc)	input voltage range (Vdc)	output voltage (Vdc)	output current min (mA)	output current max (mA)	output power max (W)	ripple & noise[1] max (mVp-p)	efficiency typ (%)
PCN1-S5-S5-S	5	4.5~5.5	5	0	200	1	75	79
PCN1-S5-S12-S	5	4.5~5.5	12	0	84	1	75	79
PCN1-S5-S15-S	5	4.5~5.5	15	0	67	1	75	79
PCN1-S5-D5-S	5	4.5~5.5	±5	0	±100	1	75	74
PCN1-S5-D12-S	5	4.5~5.5	±12	0	±42	1	75	78
PCN1-S5-D15-S	5	4.5~5.5	±15	0	±33	1	75	78
PCN1-S12-S5-S	12	10.8~13.2	5	0	200	1	75	80
PCN1-S12-S12-S	12	10.8~13.2	12	0	84	1	75	81
PCN1-S12-S15-S	12	10.8~13.2	15	0	67	1	75	81
PCN1-S12-D5-S	12	10.8~13.2	±5	0	±100	1	75	77
PCN1-S12-D12-S	12	10.8~13.2	±12	0	±42	1	75	80
PCN1-S12-D15-S	12	10.8~13.2	±15	0	±33	1	75	81
PCN1-S24-S5-S	24	21.6~26.4	5	0	200	1	75	80
PCN1-S24-S12-S	24	21.6~26.4	12	0	84	1	75	83
PCN1-S24-S15-S	24	21.6~26.4	15	0	67	1	75	81
PCN1-S24-D5-S	24	21.6~26.4	±5	0	±100	1	75	79
PCN1-S24-D12-S	24	21.6~26.4	±12	0	±42	1	75	81
PCN1-S24-D15-S	24	21.6~26.4	±15	0	±33	1	75	82

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

PART NUMBER KEY

PCN1 - SXX - X XX - S

- PCN1 — Base Number
- SXX — Input Voltage
- X — Output: S = single, D = dual
- XX — Output Voltage
- S — Packaging Style: S = SIP

INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage	5 Vdc input models 12 Vdc input models 24 Vdc input models	4.5 10.8 21.6	5 12 24	5.5 13.2 26.4	Vdc Vdc Vdc
surge voltage	for maximum of 100 ms 5 Vdc input models 12 Vdc input models 24 Vdc input models			 9 18 30	 Vdc Vdc Vdc
current	5 Vdc input models 12 Vdc input models 24 Vdc input models		250 110 50		mA mA 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 µF (5 & 12 Vdc input models) or 4.7 µF (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	single output models dual output models			220 100	µF µF
voltage accuracy				±3.0	%
line regulation	1.0% change in input voltage			±1.2	%
load regulation	from 20% load to full load			±10	%
switching frequency	at nominal Vin, full load 24 Vdc input models all other models		 75 100		 kHz kHz
temperature coefficient				±0.05	%/°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	1,500			Vdc
isolation resistance	input to output	1,000			MΩ
isolation capacitance	input to output		10		pF
conducted emissions	EN 55022 Class B (external circuit required, see Figure 4)				
MTBF	as per MIL-HDBK-217F, full load, GB, 25°C		1,500,000		hours
RoHS	2011/65/EU				

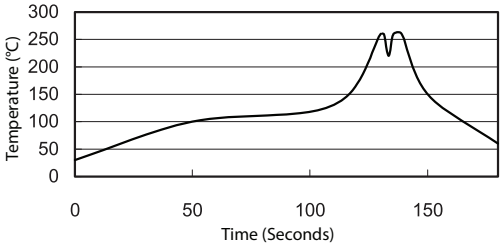
ENVIRONMENTAL

parameter	conditions/description	min	typ	max	units
operating temperature	see derating curve	-40		100	°C
storage temperature		-55		125	°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

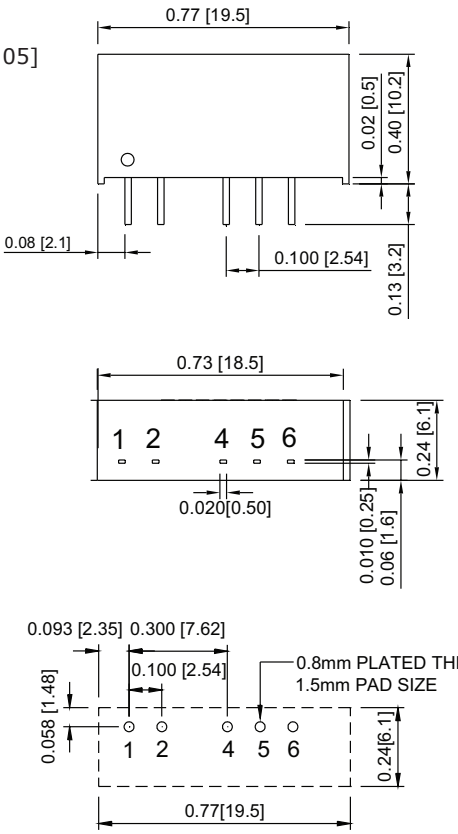
parameter	conditions/description	min	typ	max	units
dimensions	5, 12 Vdc input models: 0.77 x 0.24 x 0.40 [19.5 x 6.1 x 10.2 mm] 24 Vdc input models: 0.77 x 0.28 x 0.40 [19.5 x 7.2 x 10.2 mm]				inches inches
case material	non-conductive black plastic				
weight	24 Vdc input models all other models		2.7 1.8		g g

MECHANICAL DRAWING

units: inches [mm]
tolerance: X.XX ±0.01 [±0.25]
X.XXX ±0.005 [±0.13]
pin section tolerance: ±0.002[±0.05]

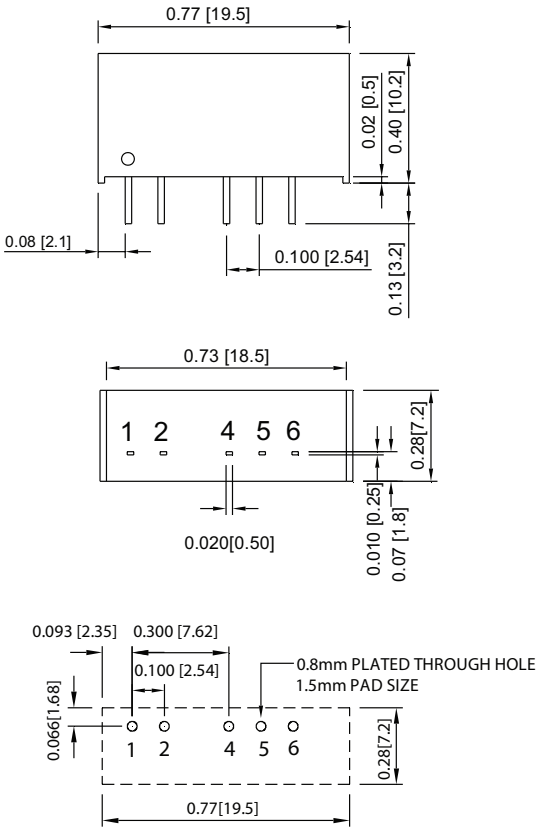
PIN CONNECTIONS		
PIN	Function	
	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	No pin	Common
6	+Vout	+Vout

5, 12 Vdc input models



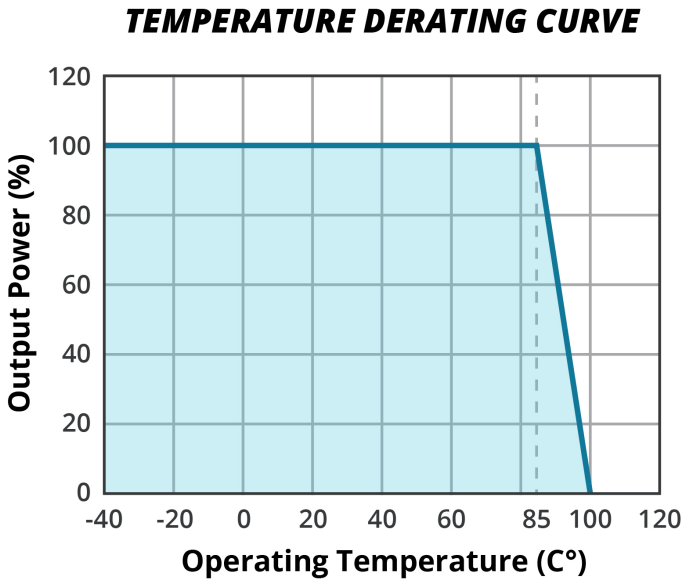
Recommended PCB Layout
Top View

24 Vdc input models

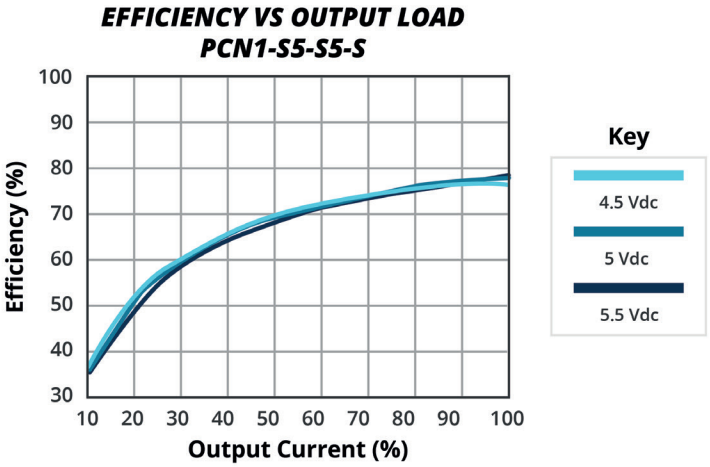


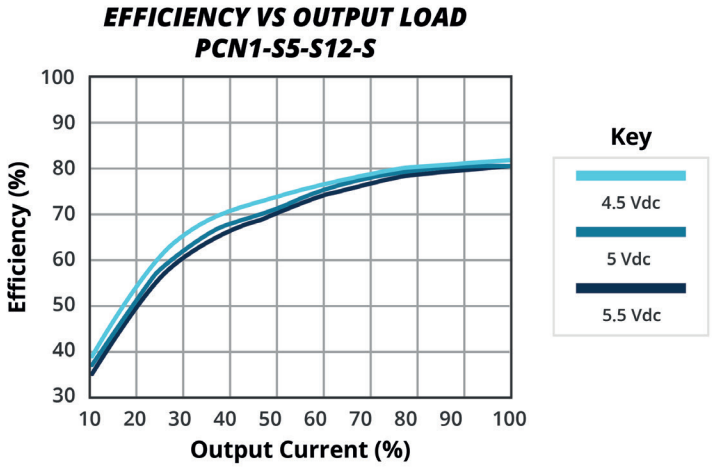
Recommended PCB Layout
Top View

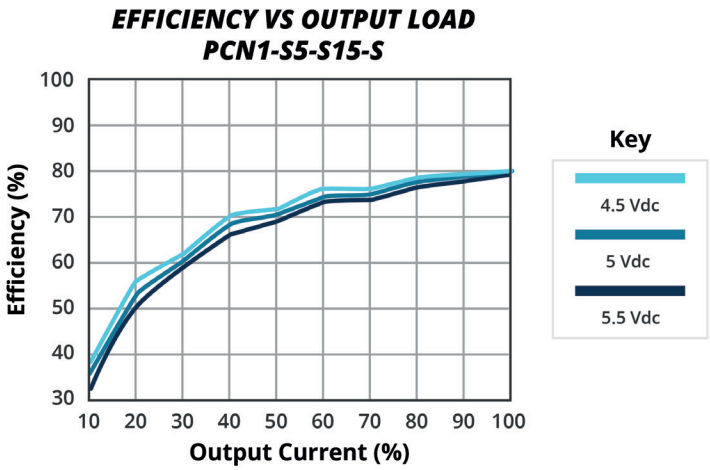
DERATING CURVE

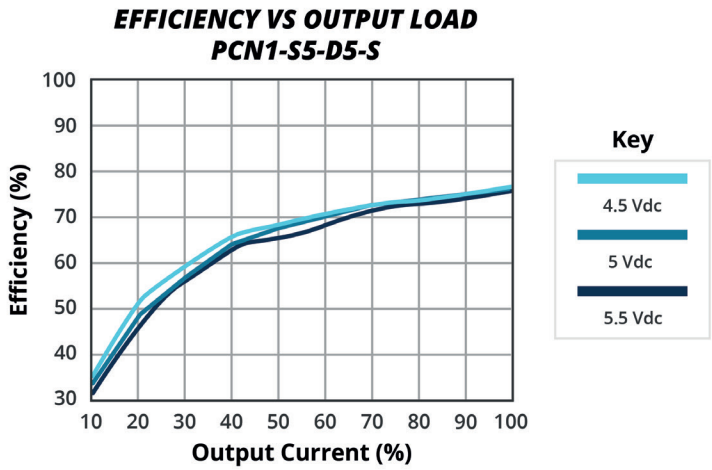


EFFICIENCY CURVES



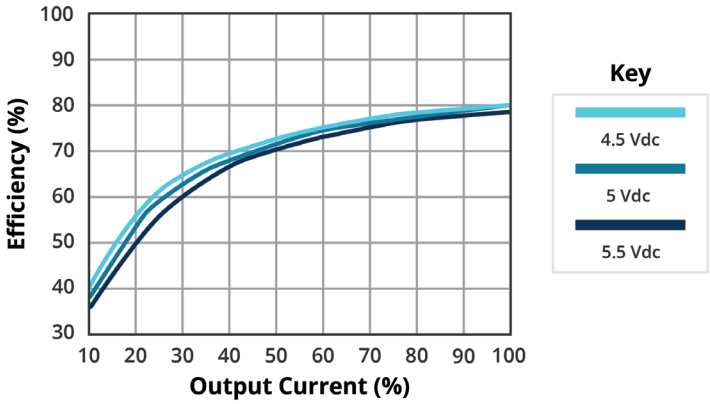




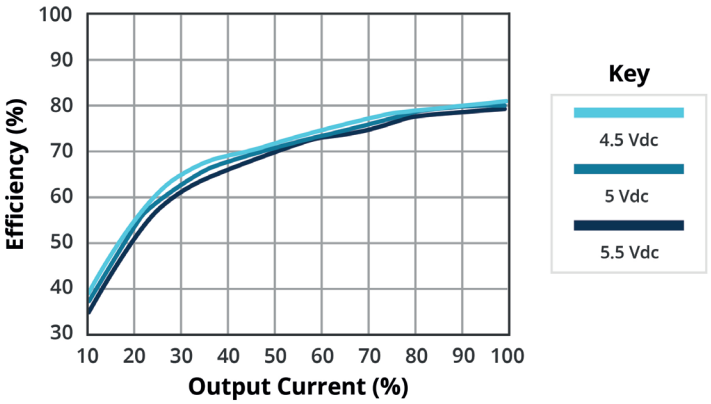


EFFICIENCY CURVES (CONTINUED)

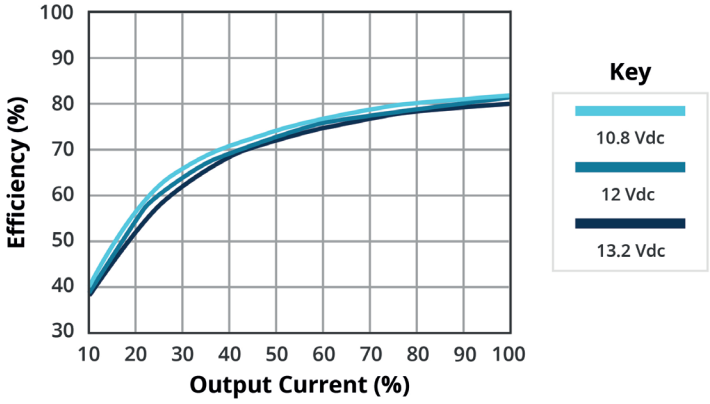
EFFICIENCY VS OUTPUT LOAD
PCN1-S5-D12-S



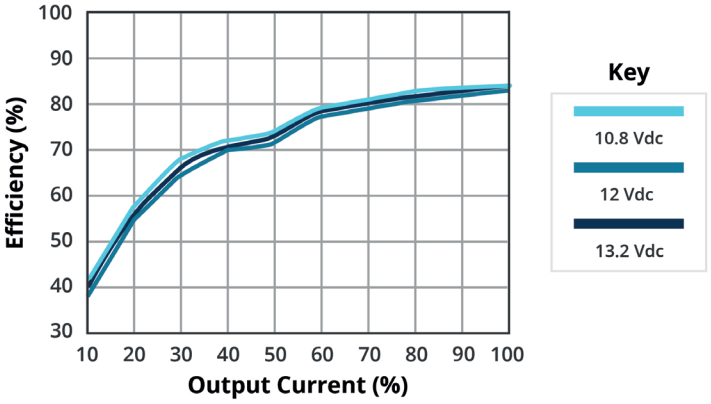
EFFICIENCY VS OUTPUT LOAD
PCN1-S5-D15-S



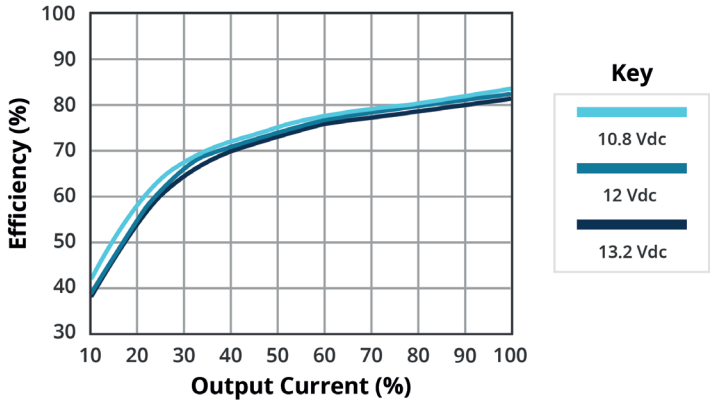
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-S5-S



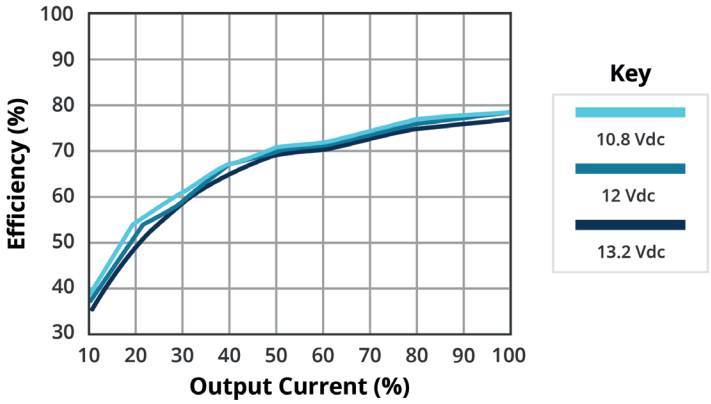
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-S12-S



EFFICIENCY VS OUTPUT LOAD
PCN1-S12-S15-S

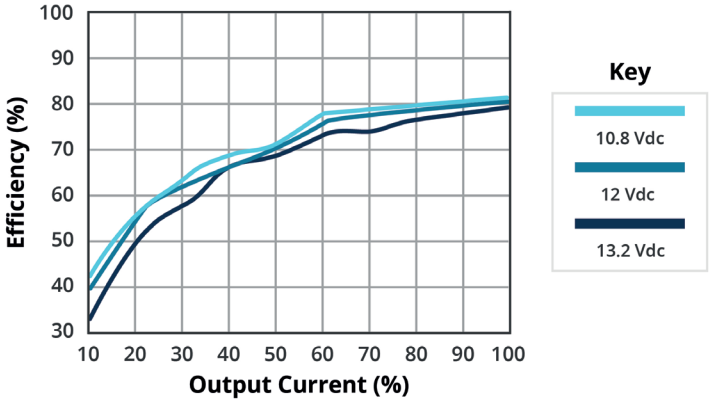


EFFICIENCY VS OUTPUT LOAD
PCN1-S12-D5-S

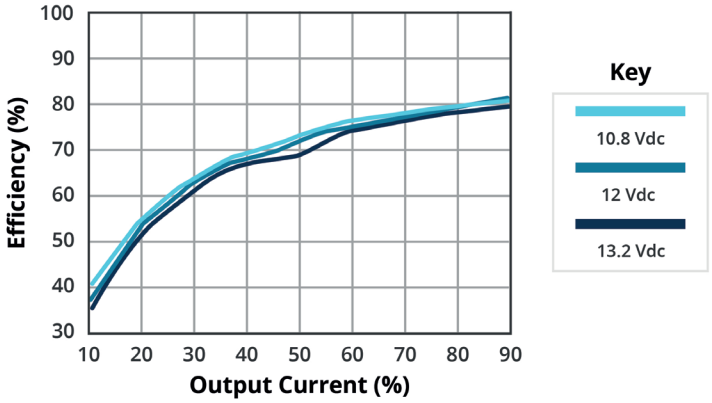


EFFICIENCY CURVES (CONTINUED)

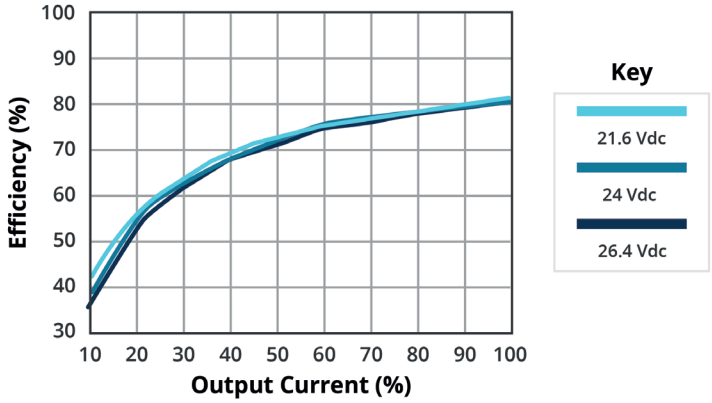
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-D12-S



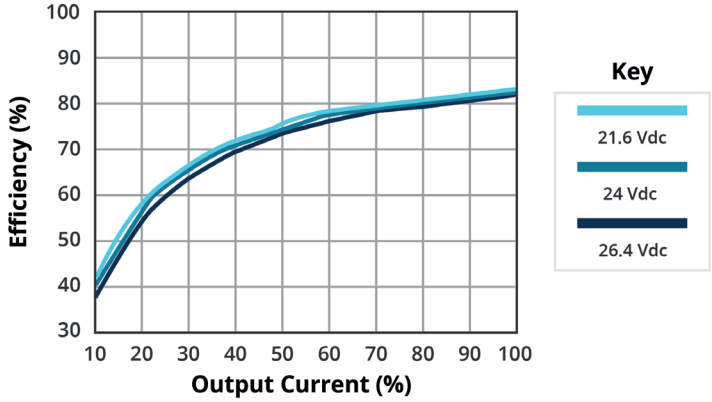
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-D15-S



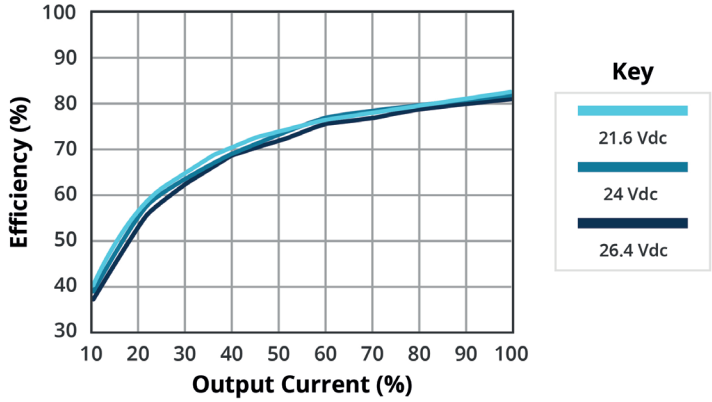
EFFICIENCY VS OUTPUT LOAD
PCN1-S24-S5-S



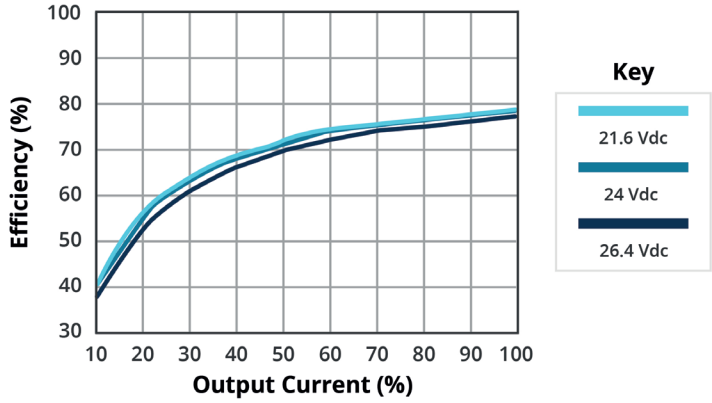
EFFICIENCY VS OUTPUT LOAD
PCN1-S24-S12-S



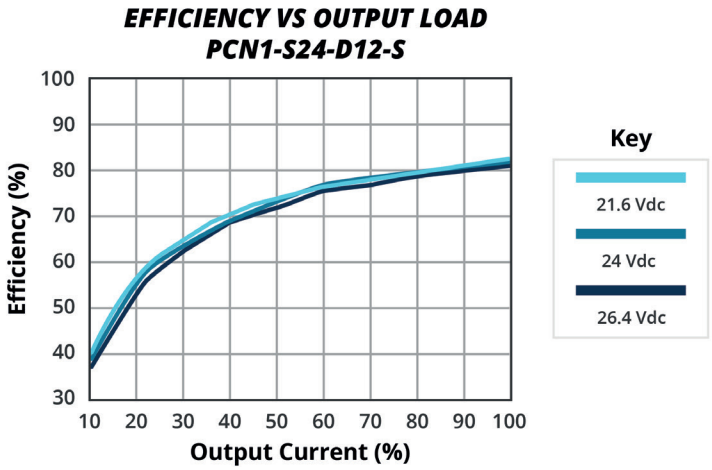
EFFICIENCY VS OUTPUT LOAD
PCN1-S24-S15-S

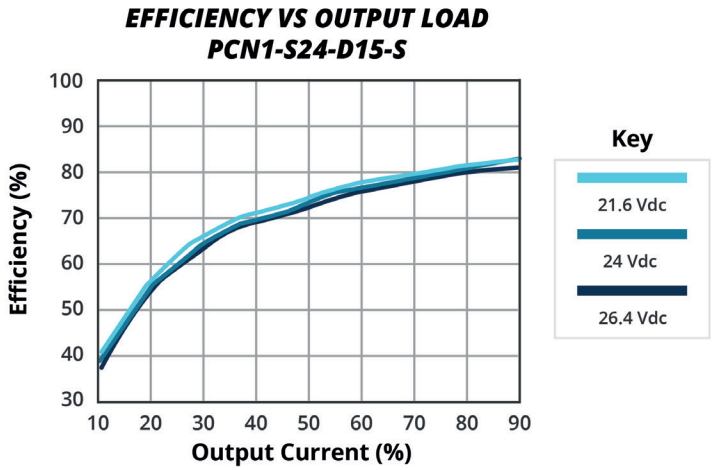


EFFICIENCY VS OUTPUT LOAD
PCN1-S24-D5-S



EFFICIENCY CURVES (CONTINUED)

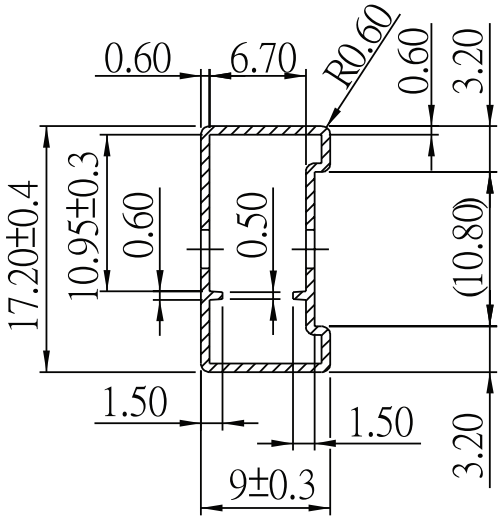




PACKAGING

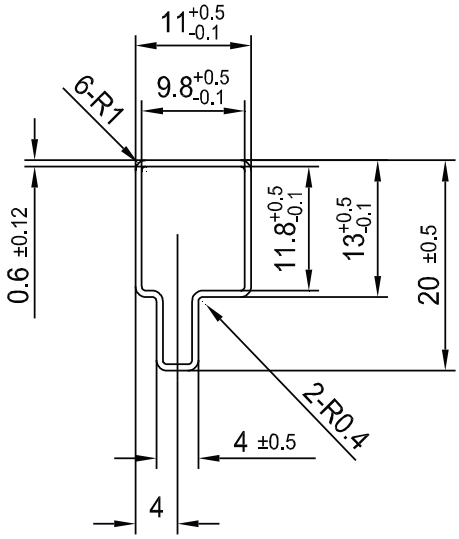
5, 12 Vdc input models
units: mm

Tube size: 17.2 x 9 x 340 mm
QTY: 16 pcs



24 Vdc input models
units: mm

Tube size: 20 x 11 x 340 mm
QTY: 14 pcs



TEST CONFIGURATIONS

Input Ripple Current & Output Noise

Figure 1
Measuring Input Ripple Current

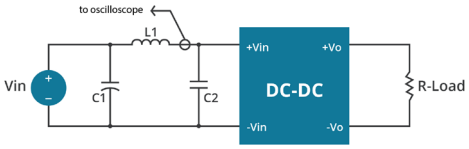


Figure 2
Measuring Output Ripple & Noise for Single Output Models

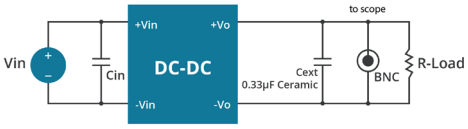


Figure 3
Measuring Output Ripple & Noise for Dual Output Models

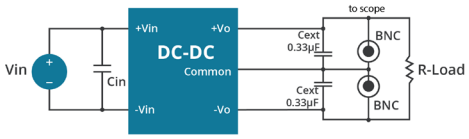


Table 1

L1	12 µH
C1	2.2 µF or 4.7 µF tantalum capacitor
C2	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 4
Conducted Emissions Test Circuit

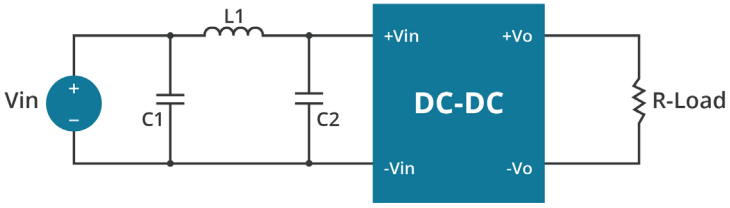


Table 3

EN55022 Class B Recommended External Circuit Components			
Input Voltage (Vdc)	C1[1]	C2[1]	L1
5	4.7 µF / 25 V	4.7 µF / 25 V	10 µH
12	4.7 µF / 25 V	4.7 µF / 25 V	10 µH
24	10 µF / 50 V	10 µF / 50 V	7.5 µH

Notes: 1. Ceramic Capacitor

REVISION HISTORY

rev.	description	date
1.0	initial release	07/26/2016
1.01	company logo updated	04/12/2021
1.02	derating curve, efficiency curves and circuit figures updated	07/01/2021

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

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