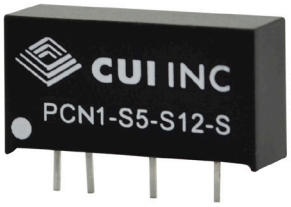
SERIES: PCN1-S | DESCRIPTION: DC-DC CONVERTER

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%



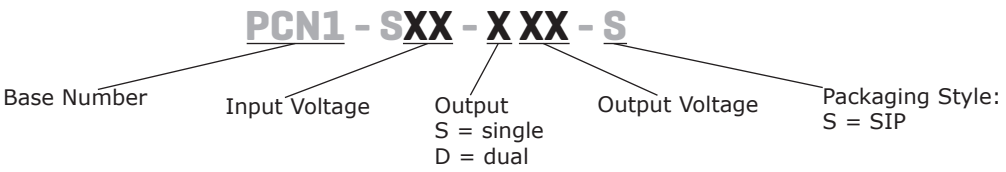
RoHS

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



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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	yes				

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	%

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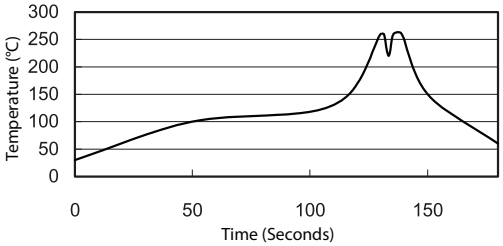
SOLDERABILITY

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

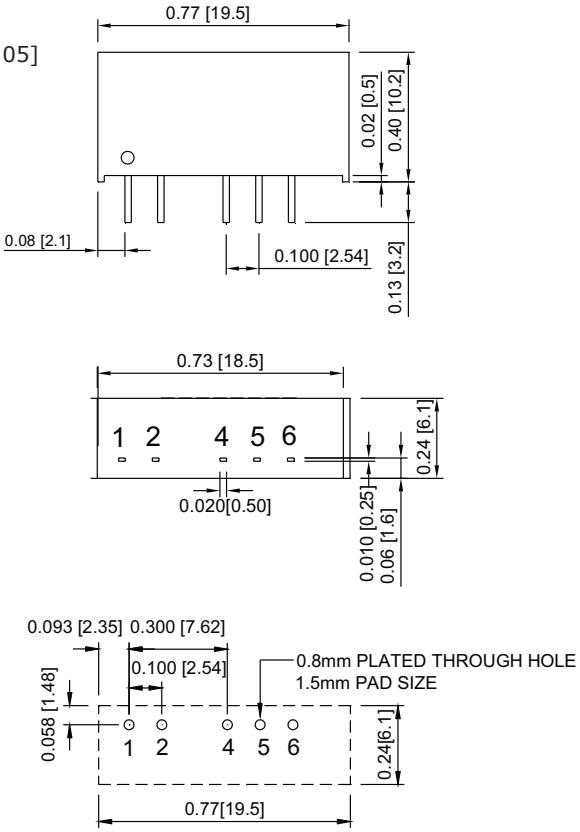
parameter	conditions/description	min	typ	max	units
dimensions	5, 12 Vdc input models: 0.77 x 0.24 x 0.40 [19.5 x 6.1 x 10.2 mm] 24 Vdc input models: 0.77 x 0.28 x 0.40 [19.5 x 7.2 x 10.2 mm]				inches inches
case material	non-conductive black plastic				
weight	24 Vdc input models all other models		2.7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

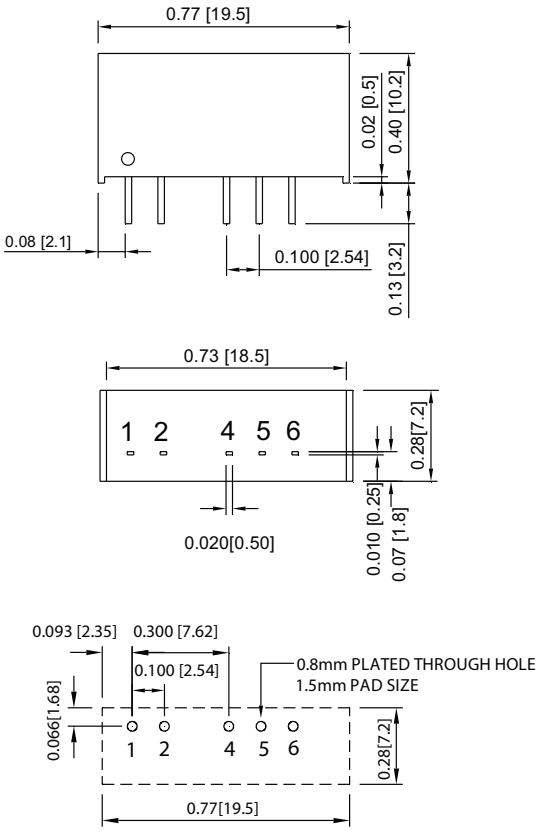
PIN CONNECTIONS		
PIN	Function	
	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	No pin	Common
6	+Vout	+Vout

5, 12 Vdc input models



Recommended PCB Layout
Top View

24 Vdc input models



Recommended PCB Layout
Top View

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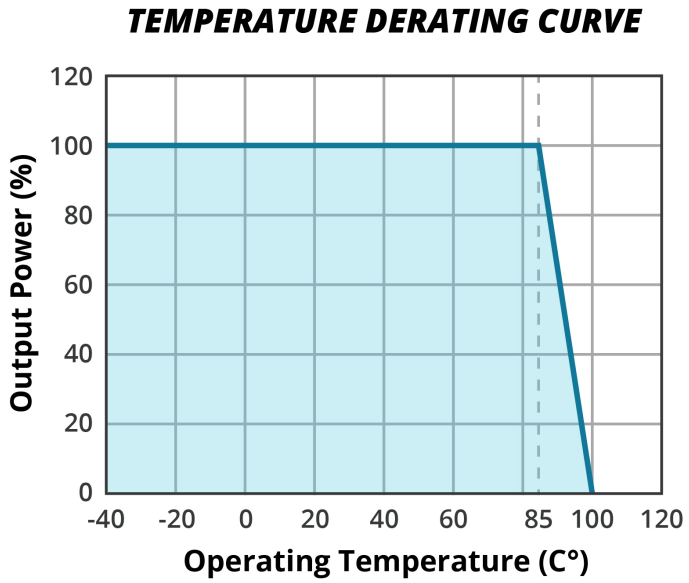
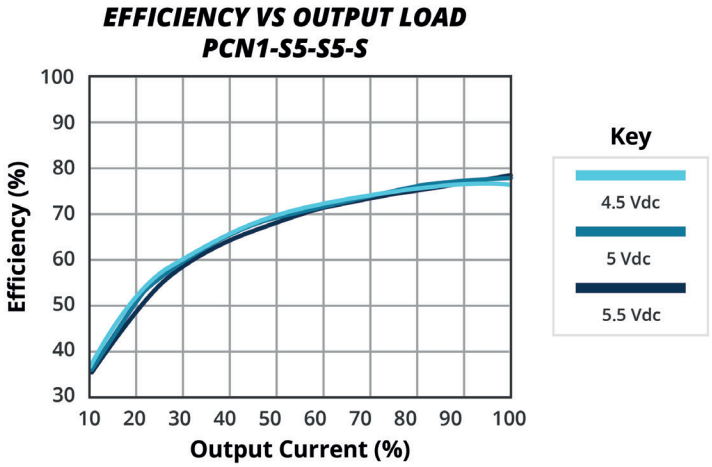
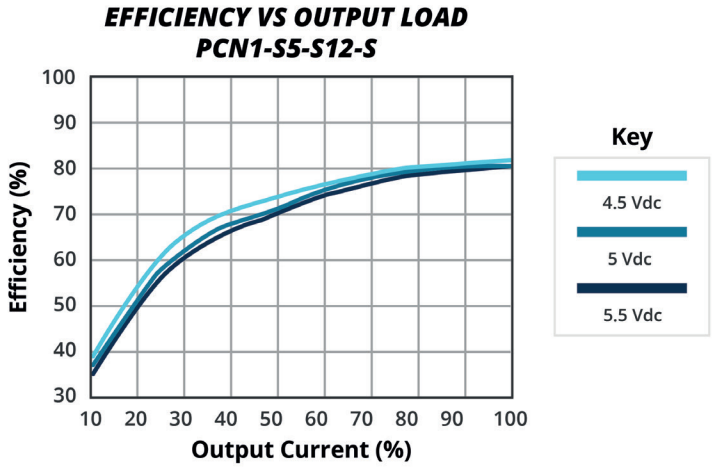
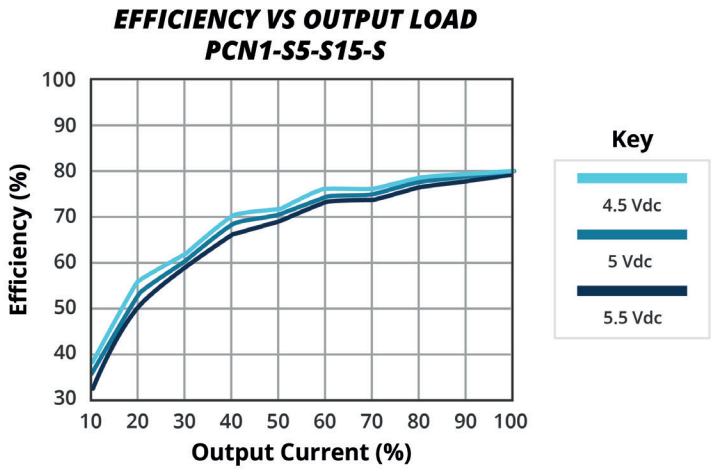
DERATING CURVE

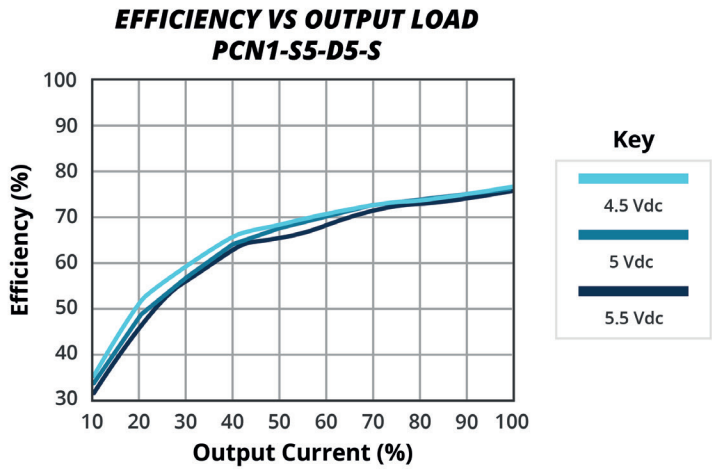


EFFICIENCY CURVES









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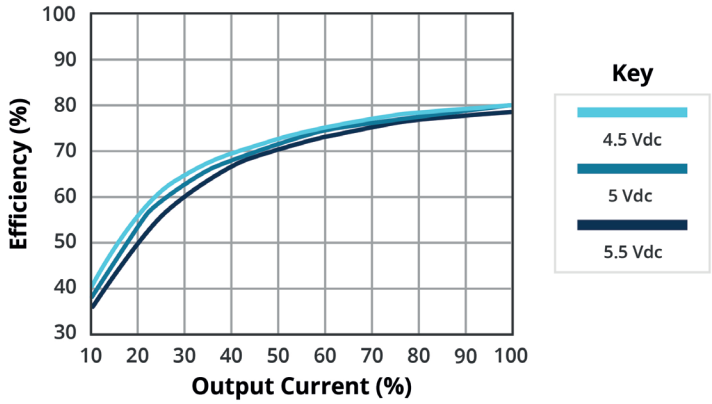
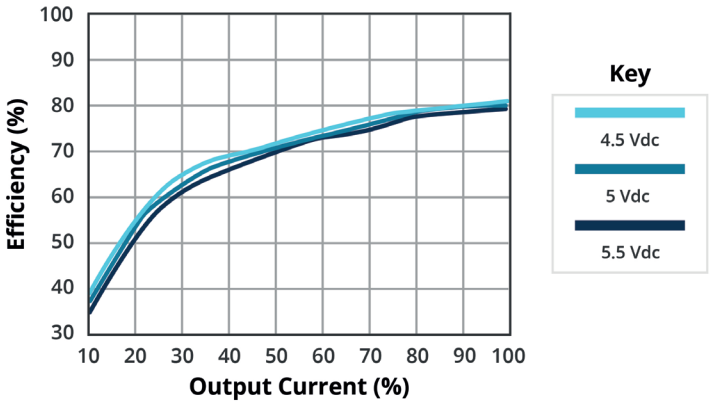
EFFICIENCY CURVES (CONTINUED)

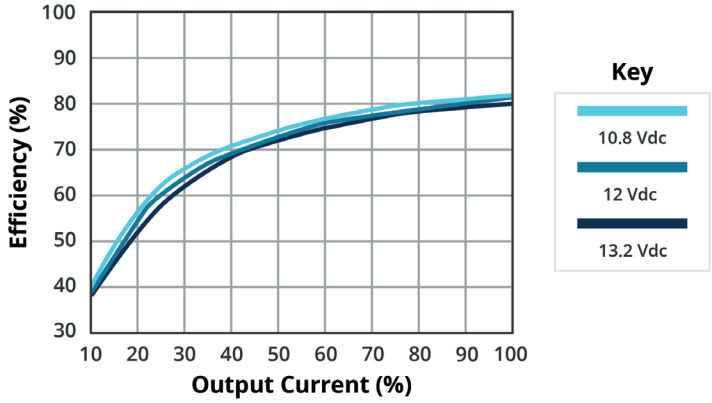
EFFICIENCY VS OUTPUT LOAD
PCN1-S5-D12-S



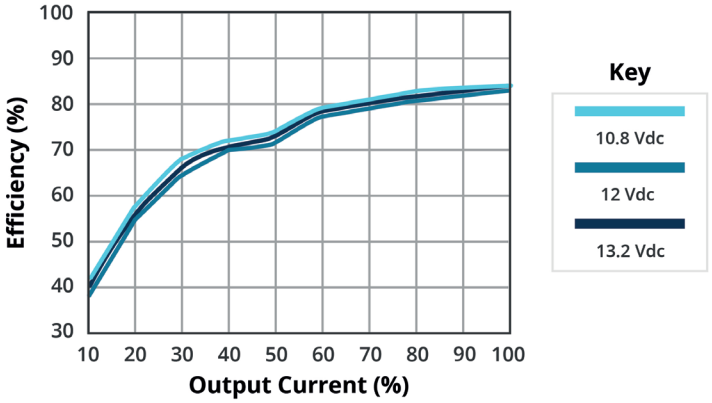
EFFICIENCY VS OUTPUT LOAD
PCN1-S5-D15-S



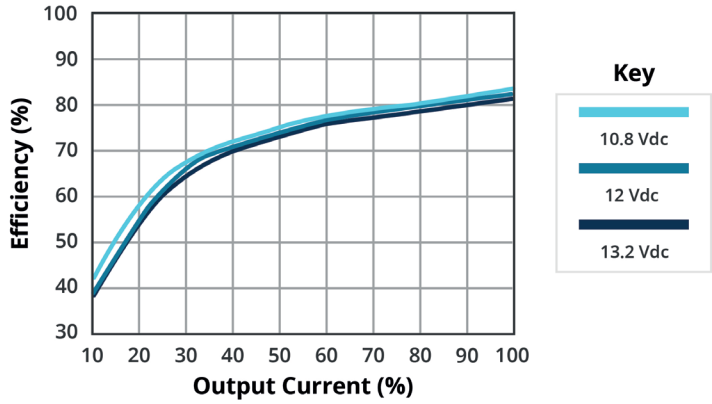
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-S5-S



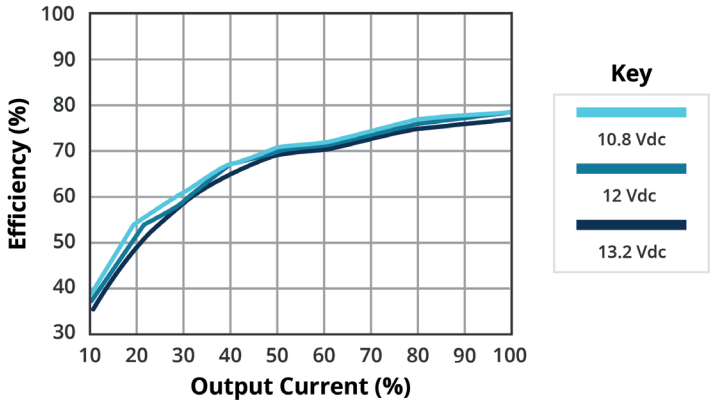
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-S12-S



EFFICIENCY VS OUTPUT LOAD
PCN1-S12-S15-S



EFFICIENCY VS OUTPUT LOAD
PCN1-S12-D5-S



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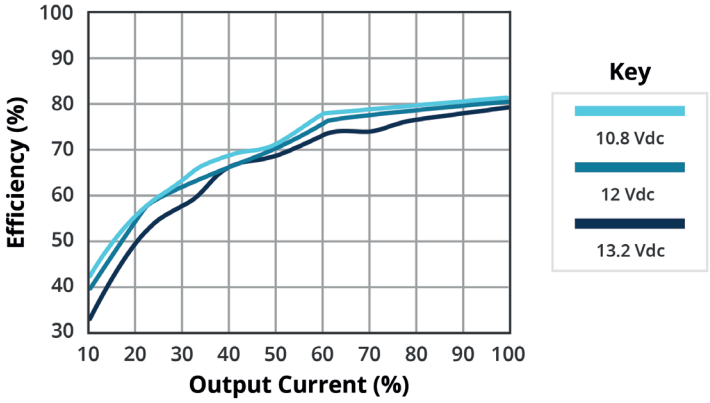
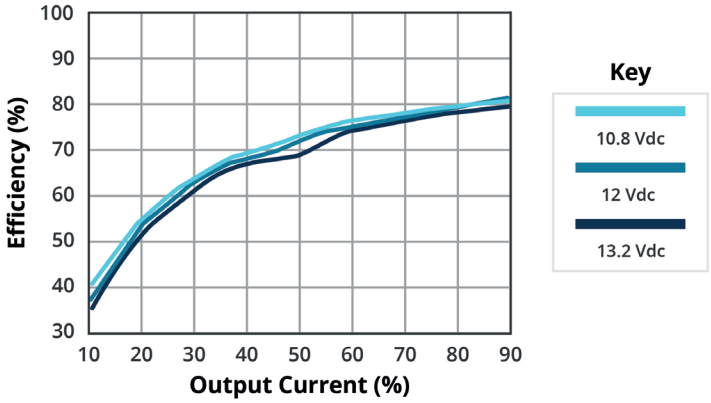
EFFICIENCY CURVES (CONTINUED)

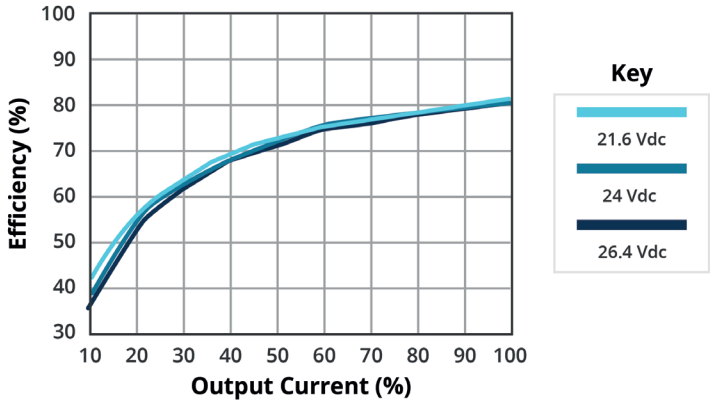
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-D12-S



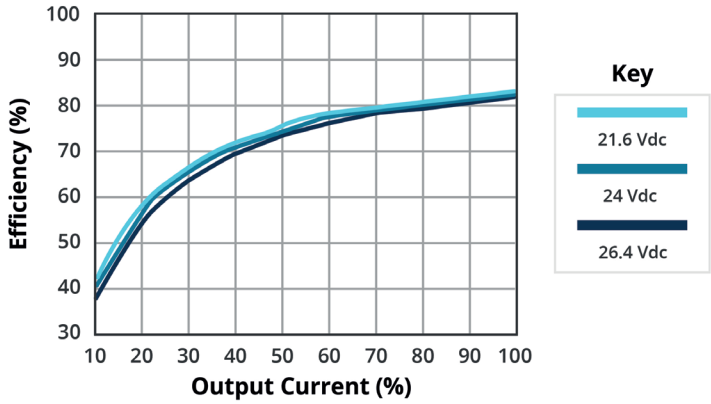
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-D15-S



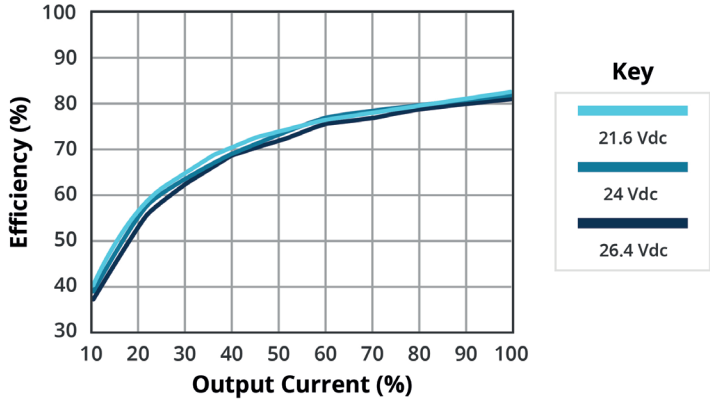
EFFICIENCY VS OUTPUT LOAD
PCN1-S24-S5-S



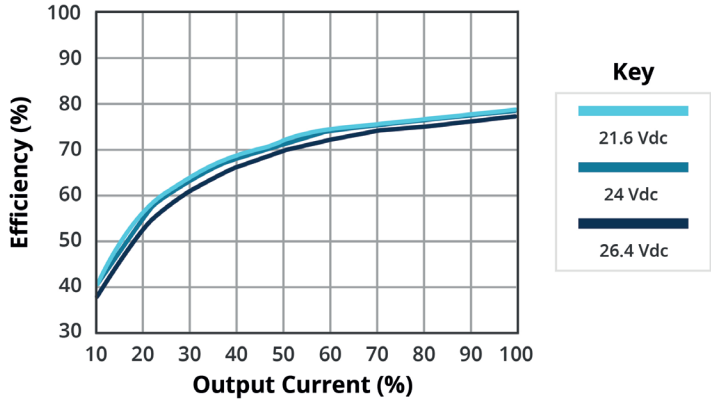
EFFICIENCY VS OUTPUT LOAD
PCN1-S24-S12-S



EFFICIENCY VS OUTPUT LOAD
PCN1-S24-S15-S



EFFICIENCY VS OUTPUT LOAD
PCN1-S24-D5-S



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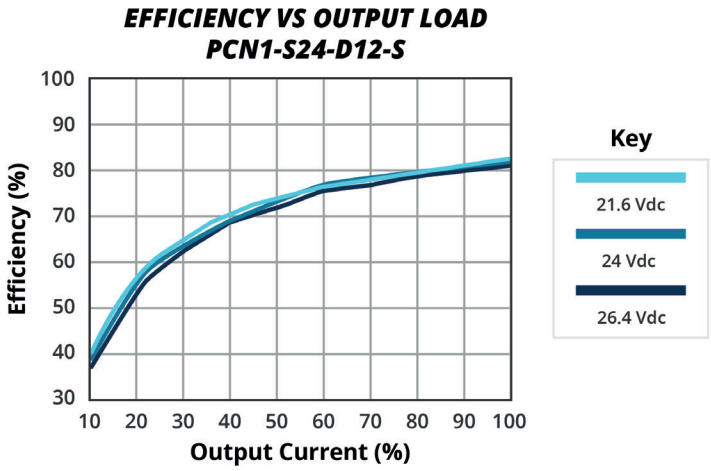
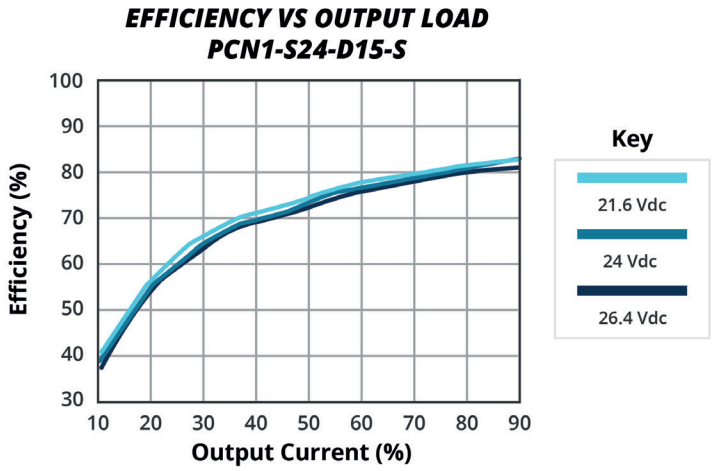
EFFICIENCY CURVES (CONTINUED)

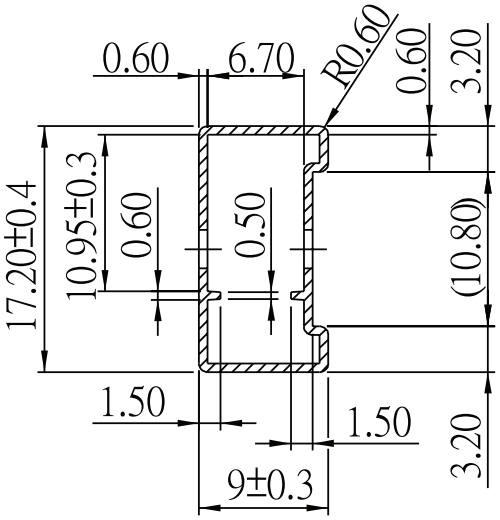




PACKAGING

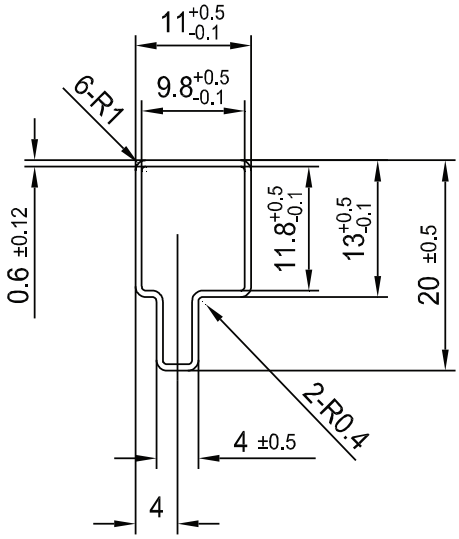
5, 12 Vdc input models
units: mm

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



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TEST CONFIGURATIONS

Input Ripple Current & Output Noise

Figure 1
Measuring Input Ripple Current

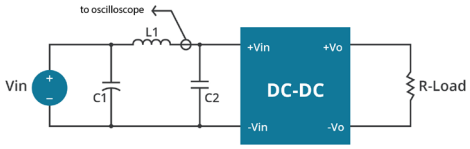

Figure 2
Measuring Output Ripple & Noise for Single Output Models

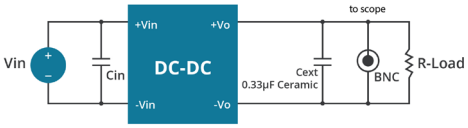

Figure 3
Measuring Output Ripple & Noise for Dual Output Models

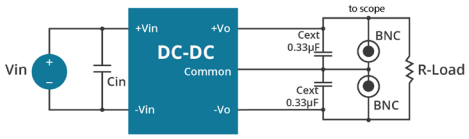

Table 1

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

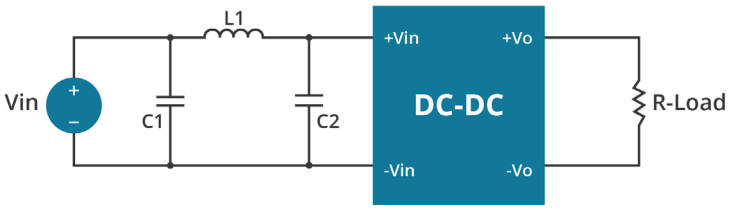

Table 3

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

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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
1.03	company address updated	11/05/2024
1.04	datasheet updated	04/24/2025

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

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