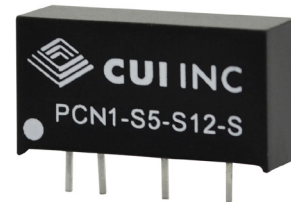


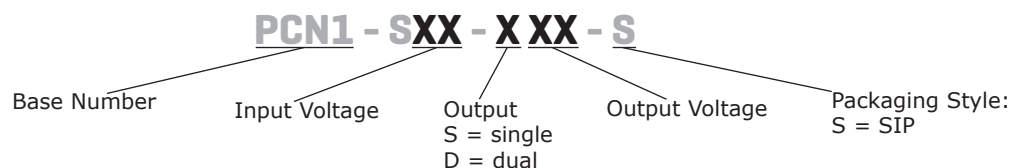
SERIES: PCN1-S | DESCRIPTION: DC-DC CONVERTER
FEATURES

- 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%


MODEL

MODEL	input voltage		output voltage (Vdc)	output current		output power max (W)	ripple & noise ¹ max (mVp-p)	efficiency typ (%)
	typ (Vdc)	range (Vdc)		min (mA)	max (mA)			
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 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		110		mA
	24 Vdc input models		50		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	single output models			220	μ F
	dual output models			100	μ F
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		75		kHz
	all other models		100		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	1,500			Vdc
isolation resistance	input to output	1,000			M Ω
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 $^{\circ}$ C		1,500,000		hours
RoHS	2011/65/EU				

ENVIRONMENTAL

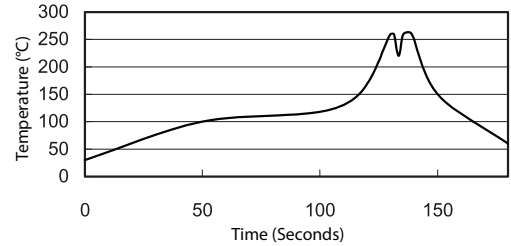
parameter	conditions/description	min	typ	max	units
operating temperature	see derating curve	-40		100	$^{\circ}$ C
storage temperature		-55		125	$^{\circ}$ C
operating humidity	non-condensing			95	%

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

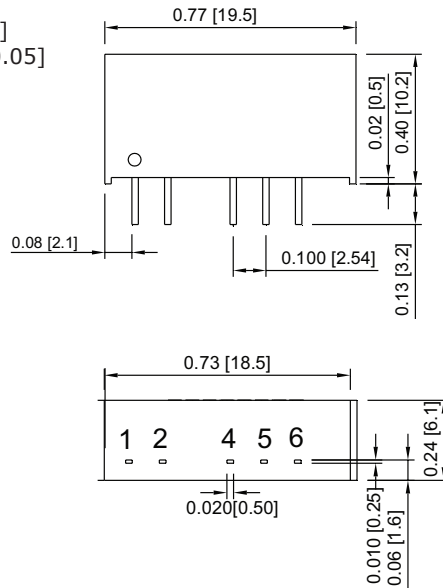
parameter	conditions/description	min	typ	max	units
dimensions	5, 12 Vdc input models: 0.77 x 0.24 x 0.40 [19.5 x 6.1 x 10.2 mm] 24 Vdc input models: 0.77 x 0.28 x 0.40 [19.5 x 7.2 x 10.2 mm]				inches inches
case material	non-conductive black plastic				
weight	24 Vdc input models all other models		2.7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

MECHANICAL DRAWING

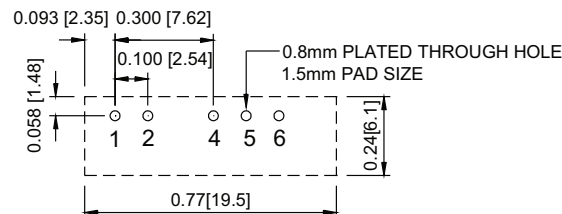
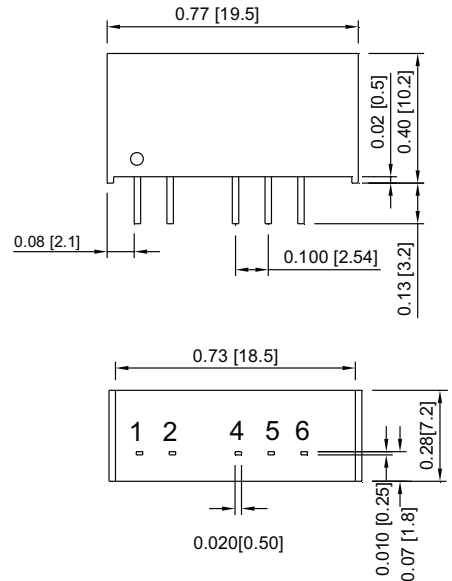
units: inches [mm]
tolerance: X.XX ±0.01 [±0.25]
X.XXX ±0.005 [±0.13]
pin section tolerance: ±0.002[±0.05]

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

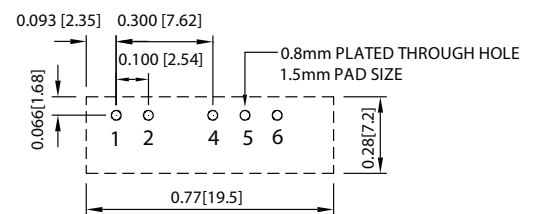
5, 12 Vdc input models



24 Vdc input models



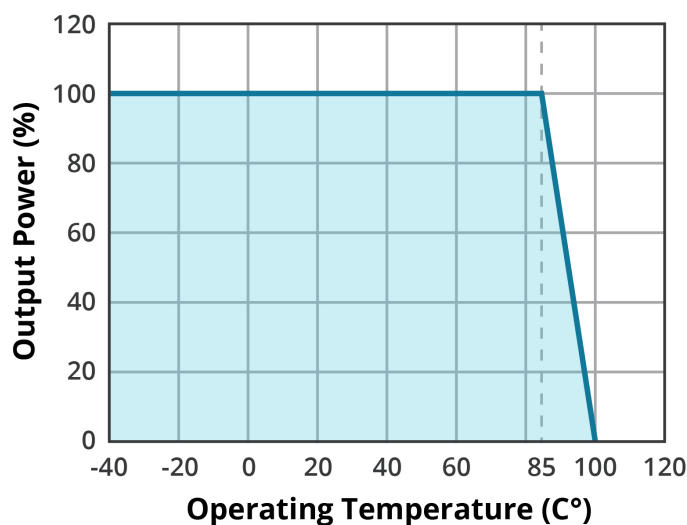
Recommended PCB Layout
Top View



Recommended PCB Layout
Top View

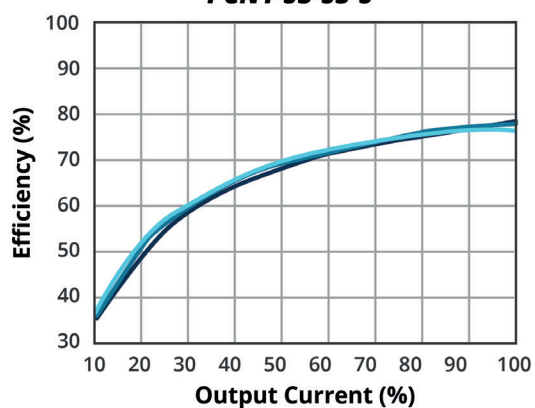
DERATING CURVE

TEMPERATURE DERATING CURVE

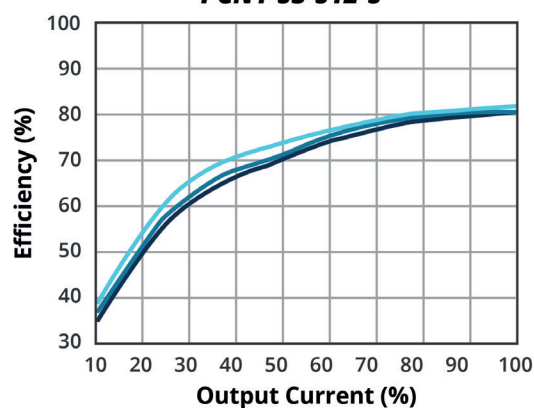


EFFICIENCY CURVES

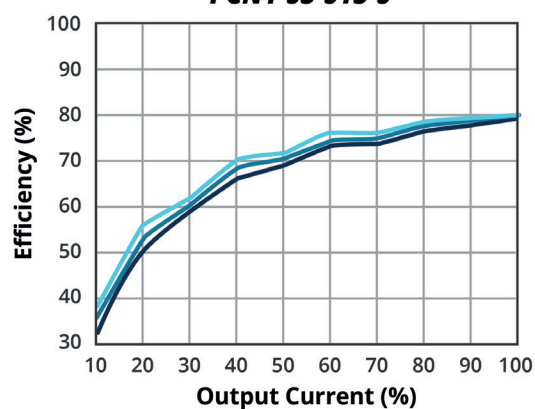
EFFICIENCY VS OUTPUT LOAD PCN1-S5-S5-S



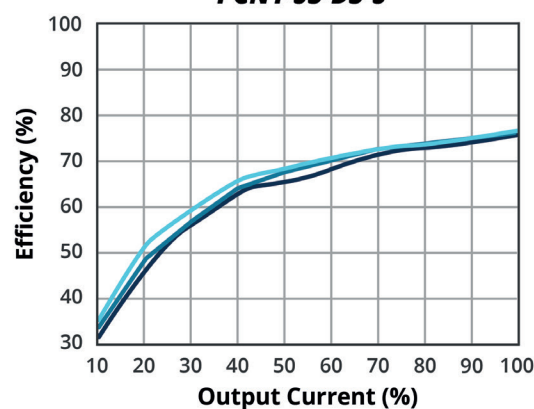
EFFICIENCY VS OUTPUT LOAD PCN1-S5-S12-S



EFFICIENCY VS OUTPUT LOAD PCN1-S5-S15-S

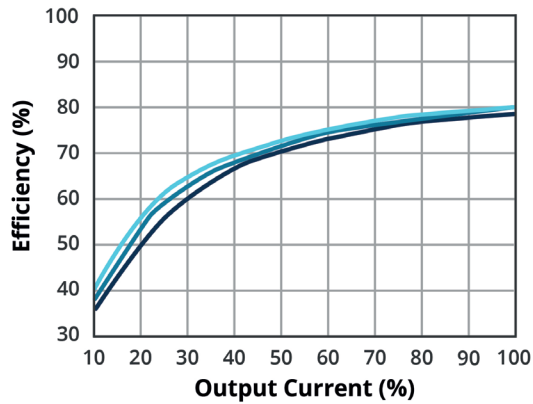


EFFICIENCY VS OUTPUT LOAD PCN1-S5-D5-S

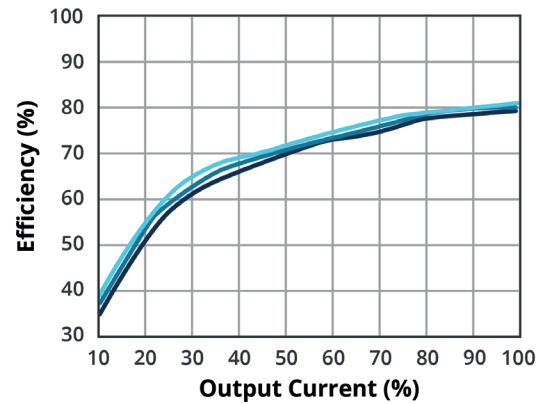


EFFICIENCY CURVES (CONTINUED)

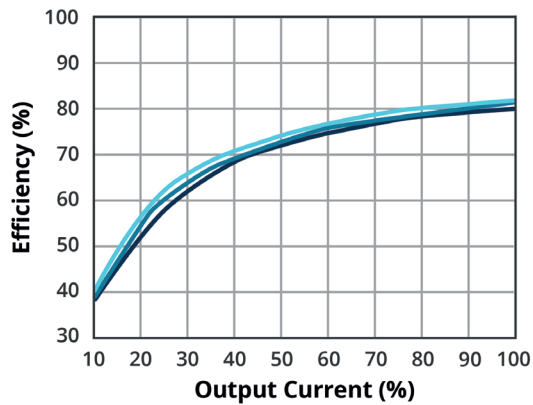
EFFICIENCY VS OUTPUT LOAD
PCN1-S5-D12-S



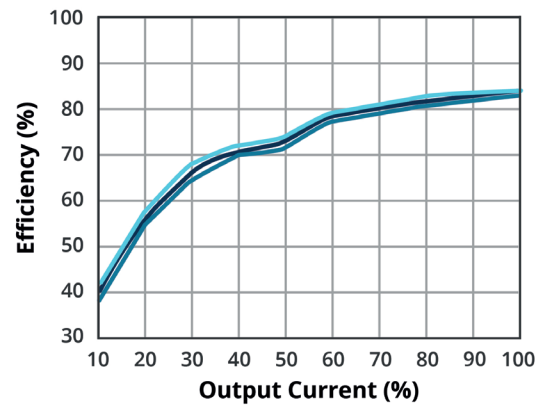
EFFICIENCY VS OUTPUT LOAD
PCN1-S5-D15-S



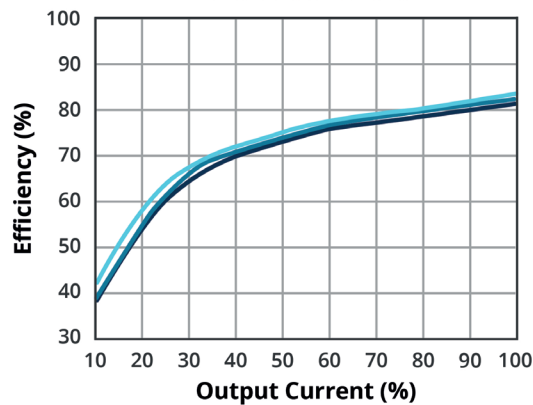
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-S5-S



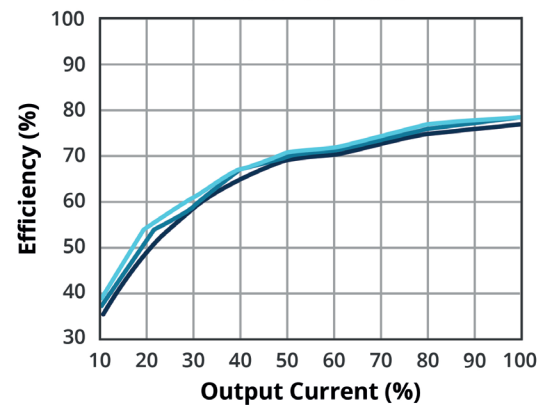
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-S12-S



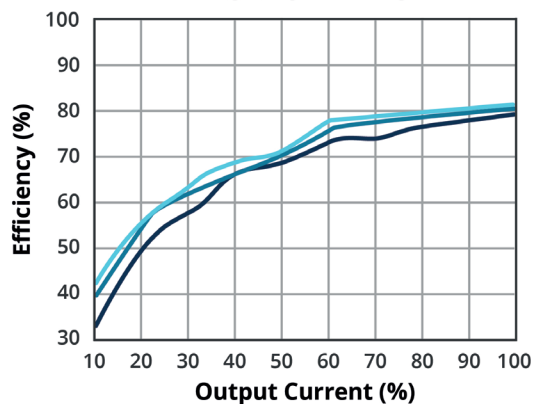
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-S15-S



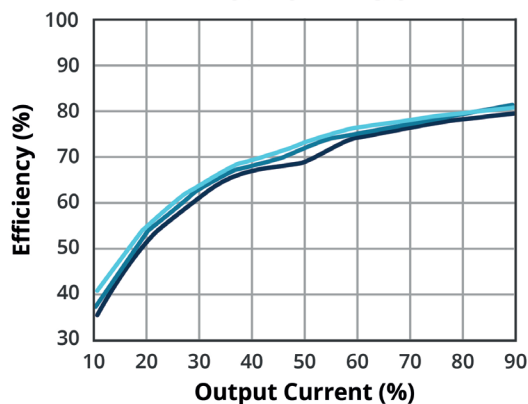
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-D5-S



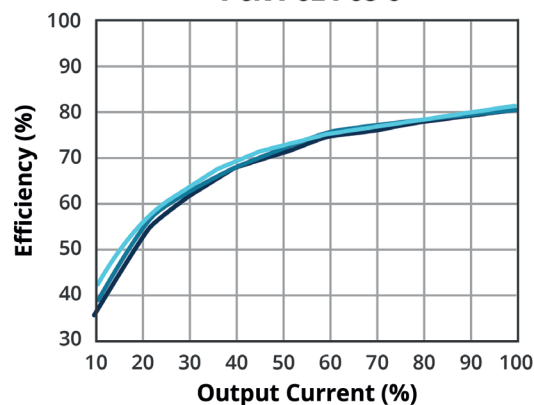
EFFICIENCY CURVES (CONTINUED)

**EFFICIENCY VS OUTPUT LOAD
PCN1-S12-D12-S****Key**

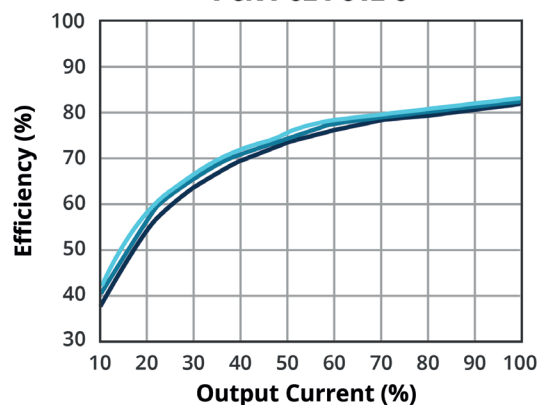
10.8 Vdc
12 Vdc
13.2 Vdc

**EFFICIENCY VS OUTPUT LOAD
PCN1-S12-D15-S****Key**

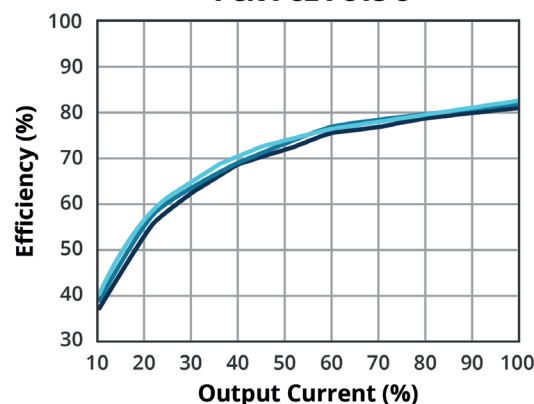
10.8 Vdc
12 Vdc
13.2 Vdc

**EFFICIENCY VS OUTPUT LOAD
PCN1-S24-S5-S****Key**

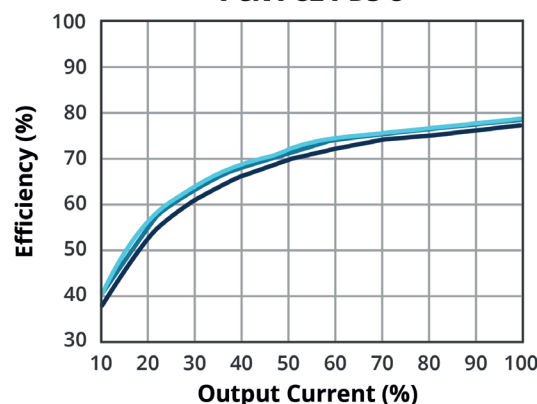
21.6 Vdc
24 Vdc
26.4 Vdc

**EFFICIENCY VS OUTPUT LOAD
PCN1-S24-S12-S****Key**

21.6 Vdc
24 Vdc
26.4 Vdc

**EFFICIENCY VS OUTPUT LOAD
PCN1-S24-S15-S****Key**

21.6 Vdc
24 Vdc
26.4 Vdc

**EFFICIENCY VS OUTPUT LOAD
PCN1-S24-D5-S****Key**

21.6 Vdc
24 Vdc
26.4 Vdc

TEST CONFIGURATIONS

Input Ripple Current & Output Noise

Figure 1
Measuring Input Ripple Current

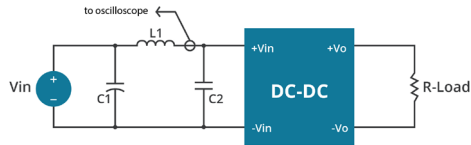


Figure 2
Measuring Output Ripple & Noise for Single Output Models

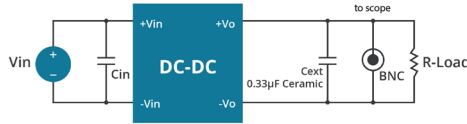


Figure 3
Measuring Output Ripple & Noise for Dual Output Models

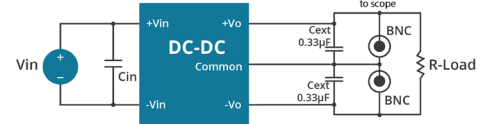


Table 1

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

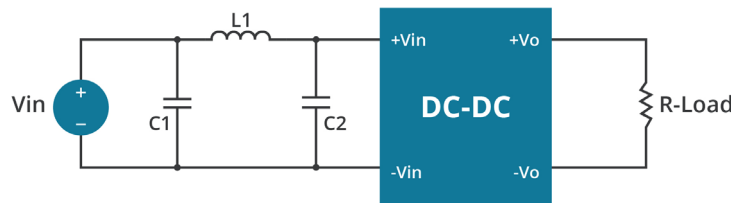


Table 3

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
1.03	company address updated	11/05/2024

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



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[PCN1-S24-S12-S](#) [PCN1-S12-D15-S](#) [PCN1-S24-D15-S](#) [PCN1-S24-D5-S](#) [PCN1-S12-S5-S](#)