CUI INC
a bel group

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

FEATURES

- up to 1 W isolated output
- industry standard surface mount package
- nominal input voltages: 5, 12 Vdc
- single/dual unregulated output
- 1,500 Vdc isolation voltage
- low ripple and noise
- -40 to 100°C
- efficiency up to 81%
- meets EN 62368-1

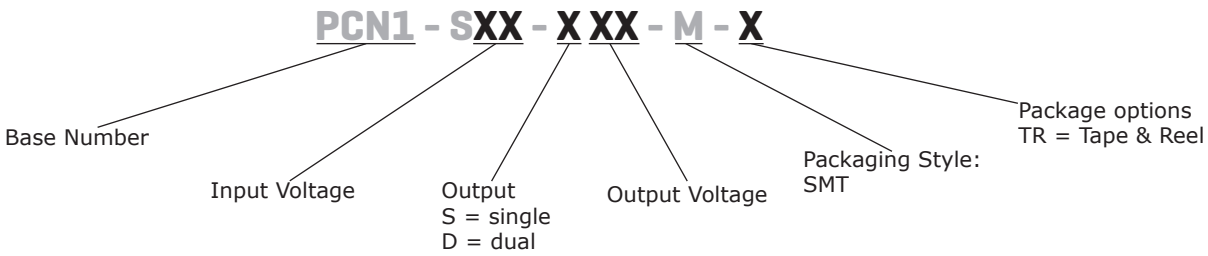
RoHS

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-M	5	4.5~5.5	5	0	200	1	75	79
PCN1-S5-S12-M	5	4.5~5.5	12	0	84	1	75	79
PCN1-S5-S15-M	5	4.5~5.5	15	0	67	1	75	79
PCN1-S5-D5-M	5	4.5~5.5	±5	0	±100	1	75	74
PCN1-S5-D12-M	5	4.5~5.5	±12	0	±42	1	75	78
PCN1-S5-D15-M	5	4.5~5.5	±15	0	±33	1	75	78
PCN1-S12-S5-M	12	10.8~13.2	5	0	200	1	75	80
PCN1-S12-S12-M	12	10.8~13.2	12	0	84	1	75	81
PCN1-S12-S15-M	12	10.8~13.2	15	0	67	1	75	81
PCN1-S12-D5-M	12	10.8~13.2	±5	0	±100	1	75	77
PCN1-S12-D12-M	12	10.8~13.2	±12	0	±42	1	75	80
PCN1-S12-D15-M	12	10.8~13.2	±15	0	±33	1	75	81

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 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



INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage	5 Vdc input models 12 Vdc input models	4.5 10.8	5 12	5.5 13.2	Vdc Vdc
surge voltage	for maximum of 100 ms 5 Vdc input models 12 Vdc input models			 9 18	 Vdc Vdc
current	5 Vdc input models 12 Vdc input models		250 110		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 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		100		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
safety approvals	meets 62368: EN				
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				

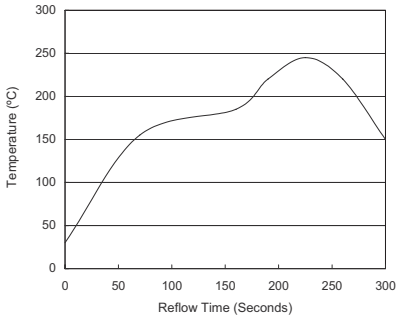
ENVIRONMENTAL

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
reflow soldering	see reflow solder profile			245	°C

Notes:
1. Soldering paste: SHENMAO PF610-P (Sn/Ag/Cu)
2. Ramp up rate during preheat: 1.79°C/second (from 30°C~155°C)
3. Soaking temperature: 0.33°C/second (from 155°C~185°C)
4. Ramp up rate during reflow: 0.71°C/second (from 220°C~245°C)
5. Peak temperature: 245°C (10 seconds max), above 220°C 40 to 70 seconds
6. Ramp up rate during cooling: -1.75°C/second (from 220°C~150)

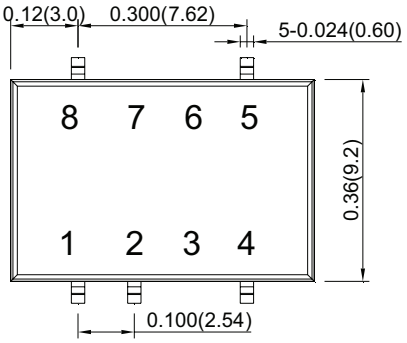


MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	single output models: 0.54 x 0.36 x 0.29 [13.7 x 9.2 x 7.4 mm] dual output models: 0.64 x 0.36 x 0.29 [16.2 x 9.2 x 7.4 mm]				inches inches
case material	non-conductive black plastic				
weight	single output models dual output models		1.4 1.5		g g

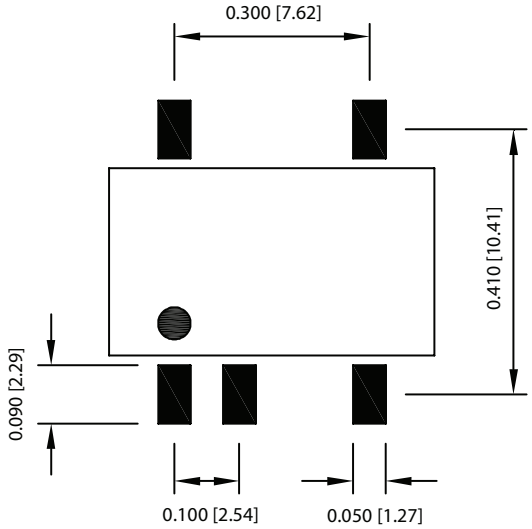
MECHANICAL DRAWING

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

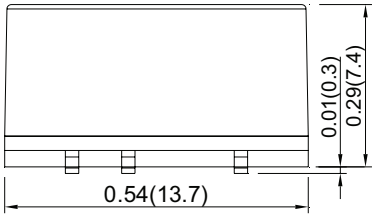


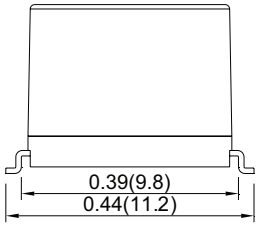
PIN CONNECTIONS	
PIN	Function
	Single
1	-Vin
2	+Vin
3	No pin
4	-Vout
5	+Vout
6	No pin
7	No pin
8	NC

NC=no connection



Recommended PCB Layout
Top View



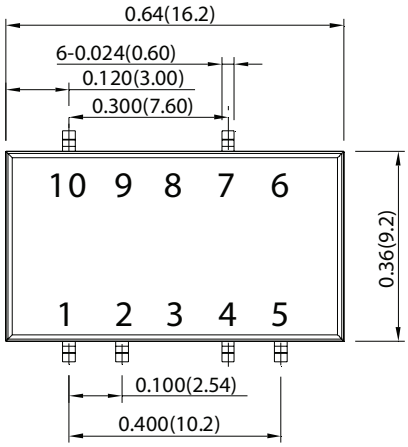


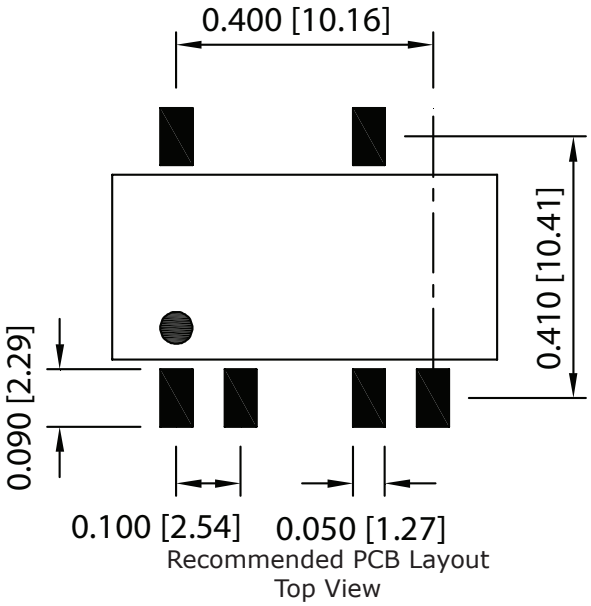
MECHANICAL DRAWING (CONTINUED)

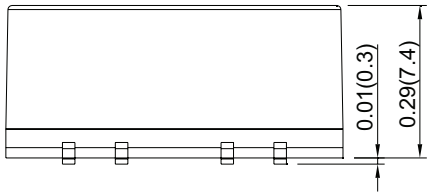
Dual output models
units: inches [mm]
tolerance: X.XX ±0.01 [±0.25]
X.XXX ±0.005 [±0.13]
pin section tolerance: ±0.002[±0.05]

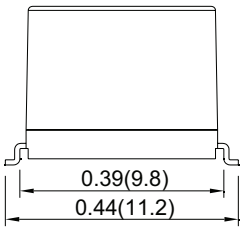
PIN CONNECTIONS	
PIN	Function
	Dual
1	-Vin
2	+Vin
3	No pin
4	Common
5	-Vout
6	No pin
7	+Vout
8	No pin
9	No pin
10	NC

NC=no connection

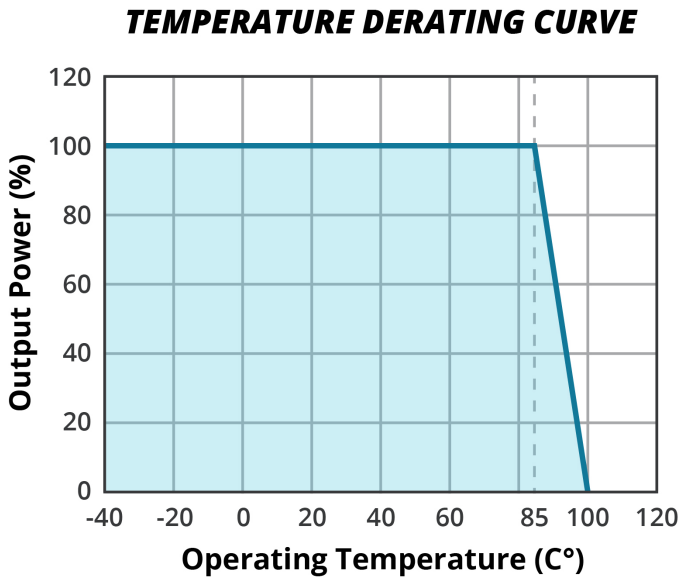




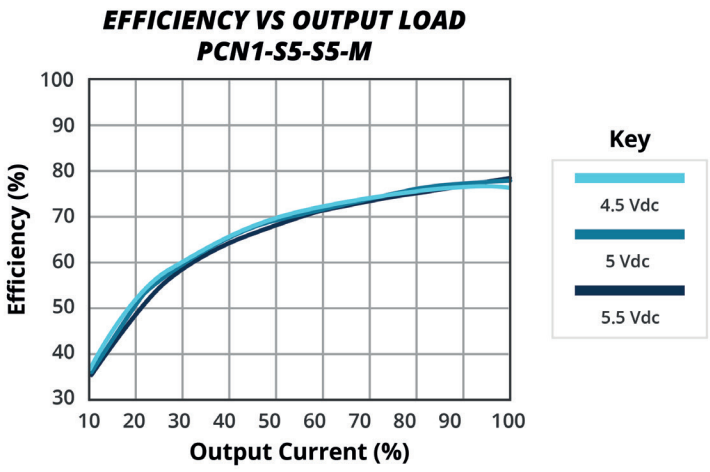


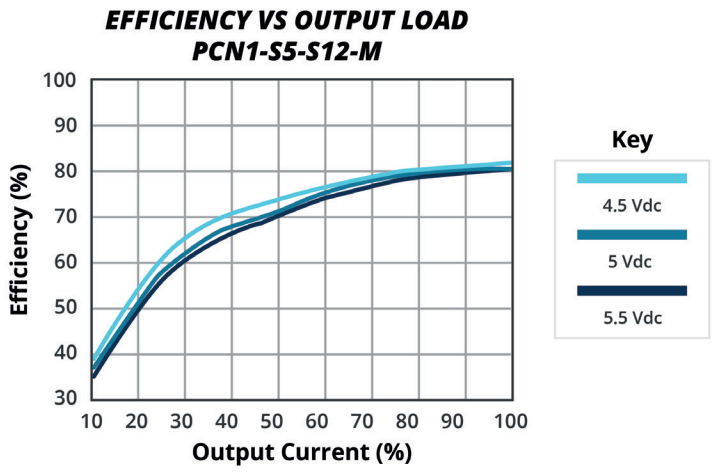


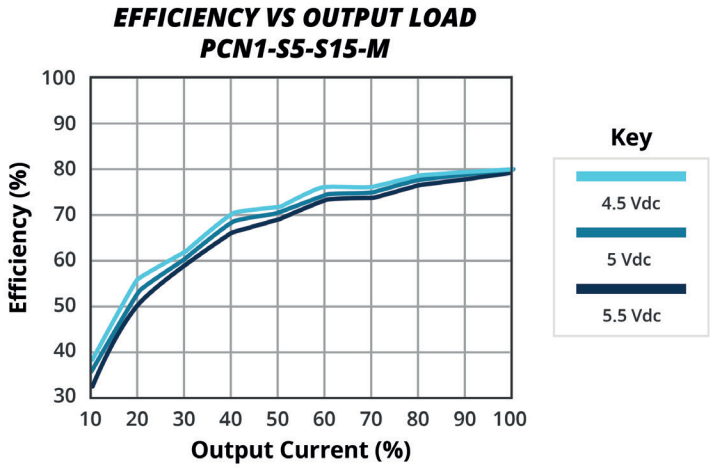
DERATING CURVE

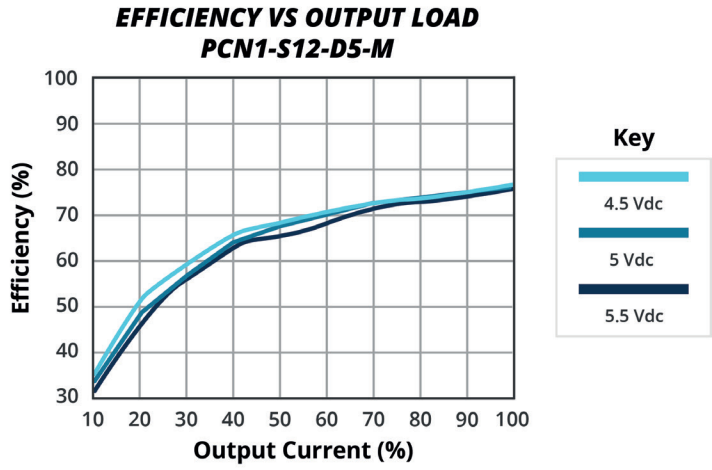


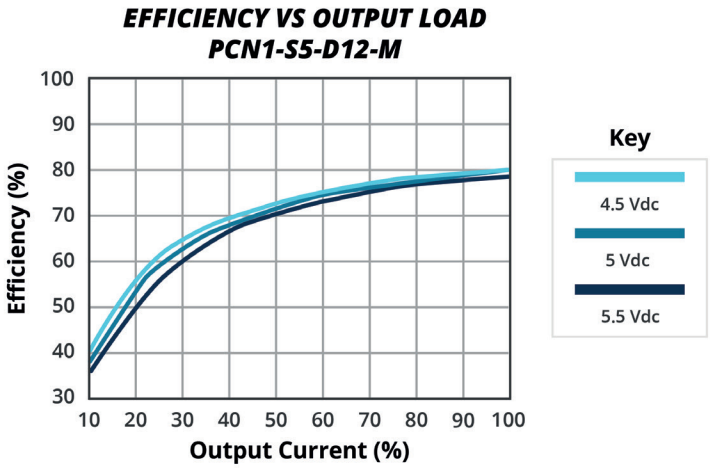
EFFICIENCY CURVES

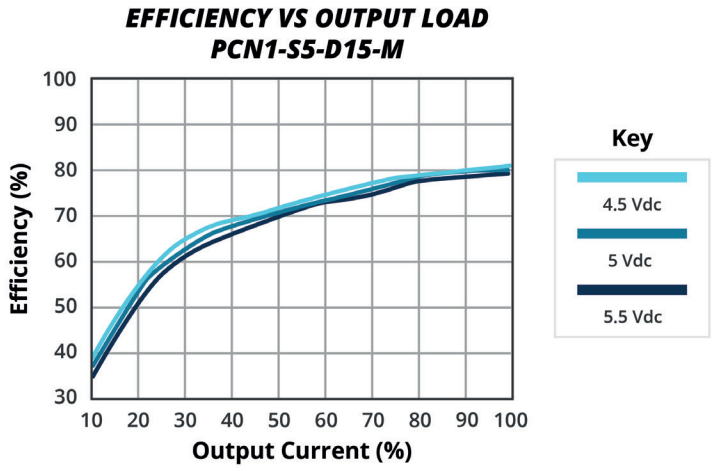






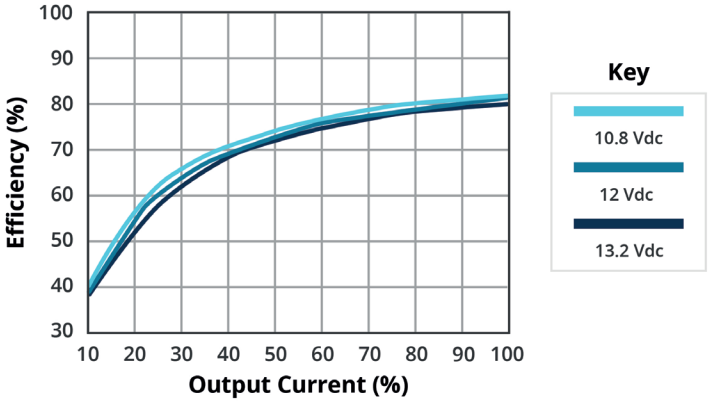




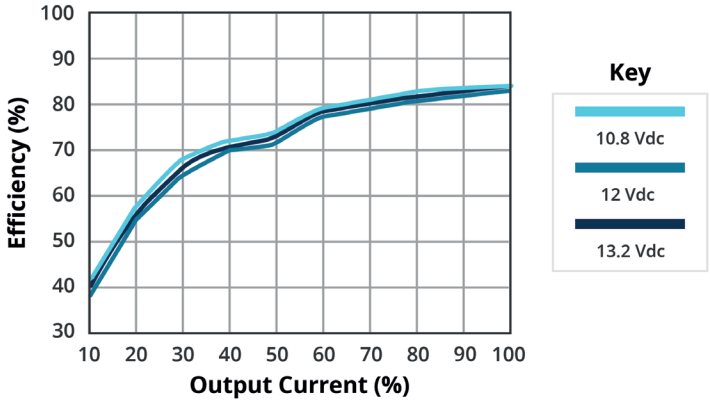


EFFICIENCY CURVES (CONTINUED)

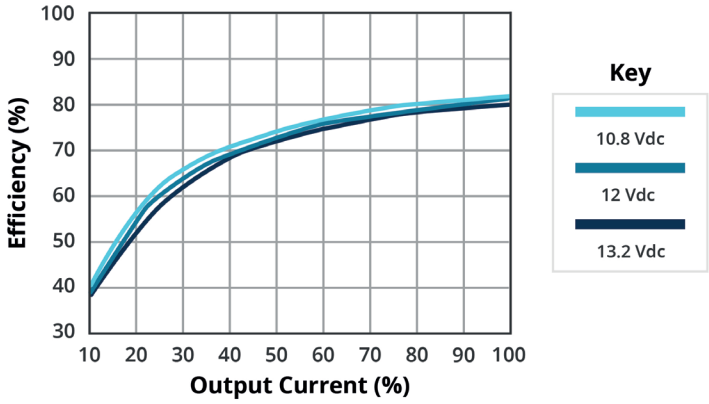
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-S5-M



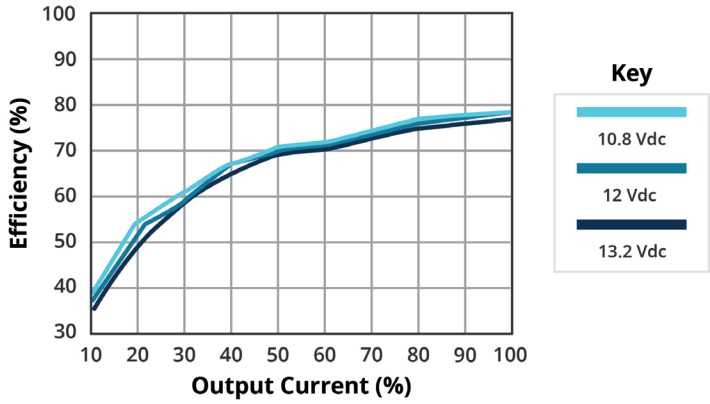
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-S12-M



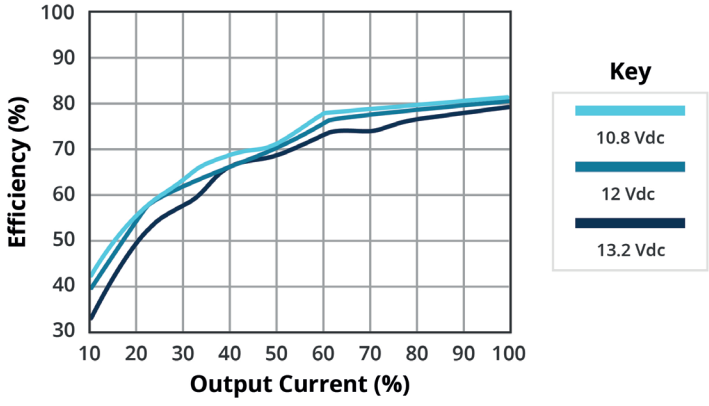
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-S15-M



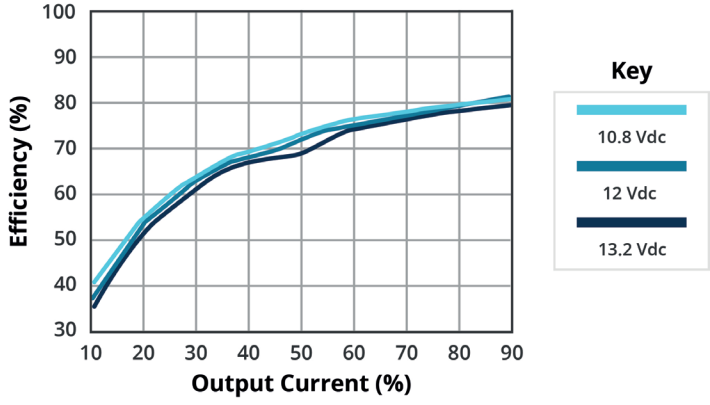
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-D5-M



EFFICIENCY VS OUTPUT LOAD
PCN1-S12-D12-M



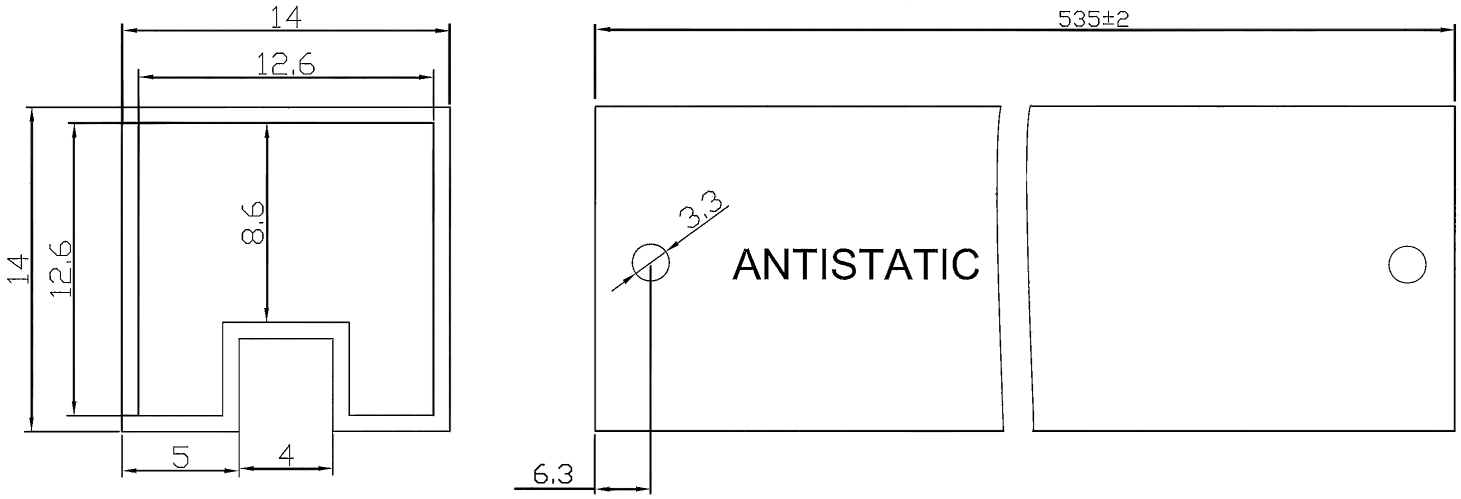
EFFICIENCY VS OUTPUT LOAD
PCN1-S12-D15-M



PACKAGING (TUBE)

units: mm

Tube Size: 14 x 14 x 535 mm
Single Output Models QTY: 36 pcs per tube
Dual Output Models QTY: 30 pcs per tube

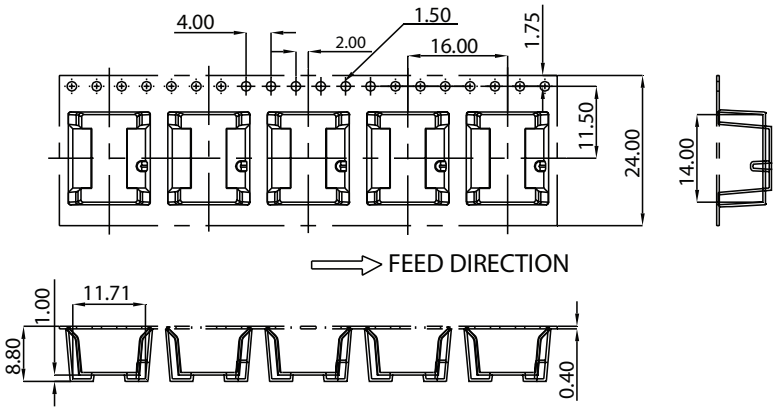


PACKAGING (TAPE & REEL)

Single output models

units: mm

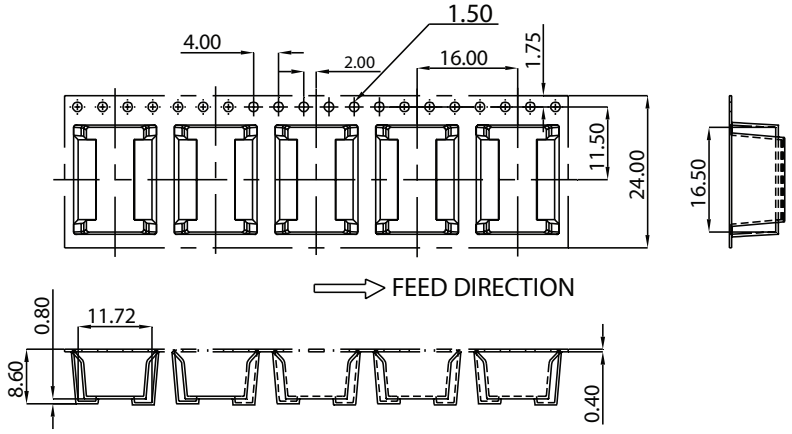
Reel Size: Ø13”
QTY: 430 pcs per reel



Dual output models

units: mm

Reel Size: Ø13”
QTY: 430 pcs per reel



TEST CONFIGURATIONS

Input Ripple Current & Output Noise

Figure 1
Measuring Input Ripple Current

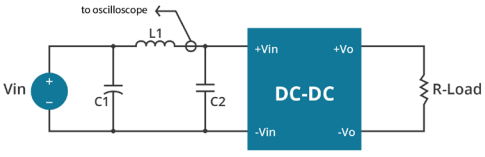


Figure 2
Measuring Output Ripple & Noise for Single Output Models

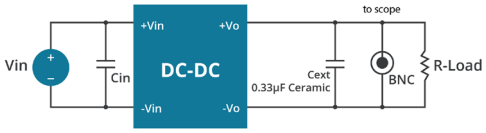


Figure 3
Measuring Output Ripple & Noise for Dual Output Models

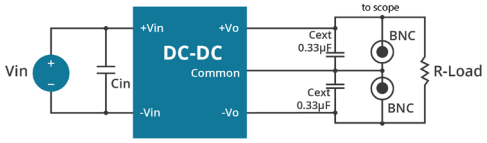


Table 1

L1	12 µH
C1	2.2 µF tantalum capacitor
C2	NC

Table 2

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

EMC RECOMMENDED CIRCUIT

Test Condition
Input Voltage: Nominal
Output Load: Full Load

Figure 4
Conducted Emissions Test Circuit

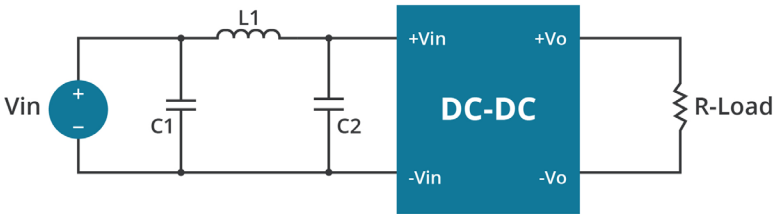


Table 3

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

Notes: 1. Ceramic Capacitor

REVISION HISTORY

rev.	description	date
1.0	initial release	07/26/2016
1.01	added tube packaging option	06/09/2017
1.02	removed tube packaging option	02/14/2020
1.03	safeties updated	05/26/2021
1.04	derating curve, efficiency curves and circuit figures updated	07/01/2021
1.05	CE certification updated	11/03/2022

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

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