

**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%
- designed to meet EN 62368-1

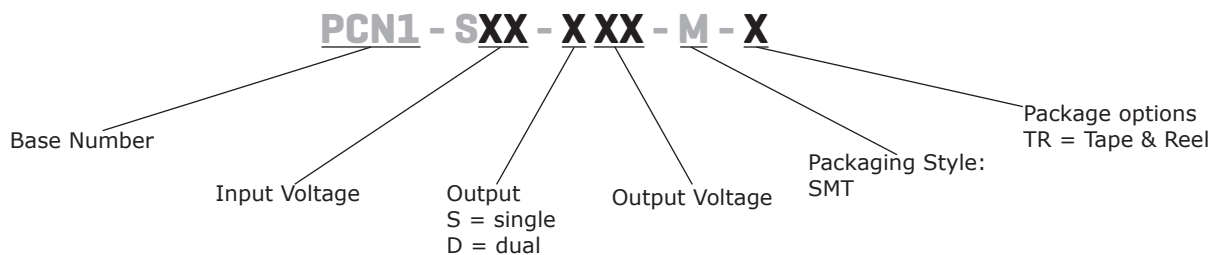


**MODEL**

MODEL	input voltage		output voltage	output current		output power	ripple & noise <sup>1</sup>	efficiency
	typ (Vdc)	range (Vdc)	(Vdc)	min (mA)	max (mA)	max (W)	max (mVp-p)	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  $\mu$ F ceramic capacitor on the output.
  2. Required to add a 2.2  $\mu$ F 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  $\mu$ F 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	$\mu$ F $\mu$ F
voltage accuracy				$\pm 3.0$	%
line regulation	1.0% change in input voltage			$\pm 1.2$	%
load regulation	from 20% load to full load			$\pm 10$	%
switching frequency	at nominal $V_{in}$ , full load		100		kHz
temperature coefficient				$\pm 0.05$	%/ $^{\circ}$ 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 $\Omega$
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	yes				

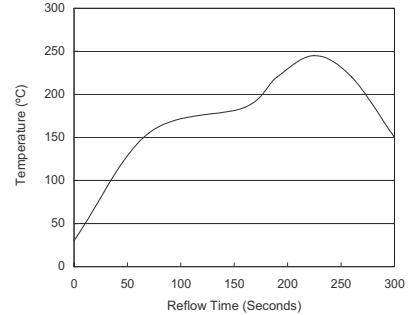
## ENVIRONMENTAL

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
reflow soldering	see reflow solder profile			245	°C

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

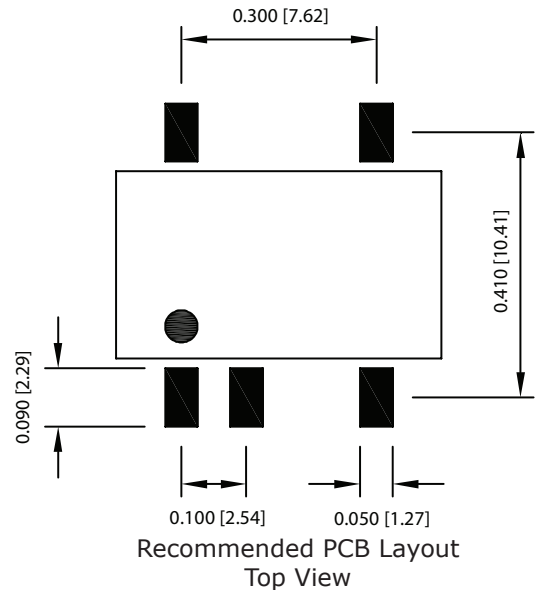
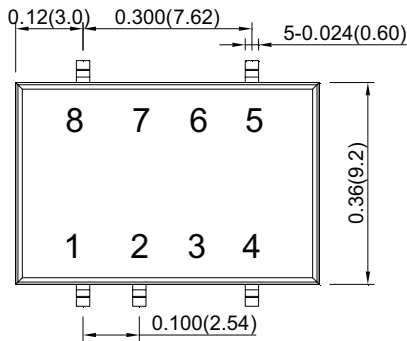
units: inches [mm]

tolerance: X.XX ±0.01 [±0.25]

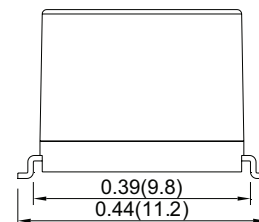
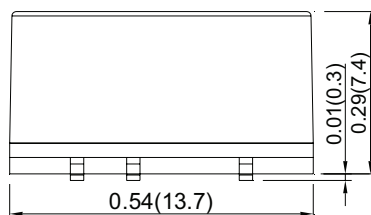
X.XXX ±0.005 [±0.13]

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



## MECHANICAL DRAWING (CONTINUED)

### Dual output models

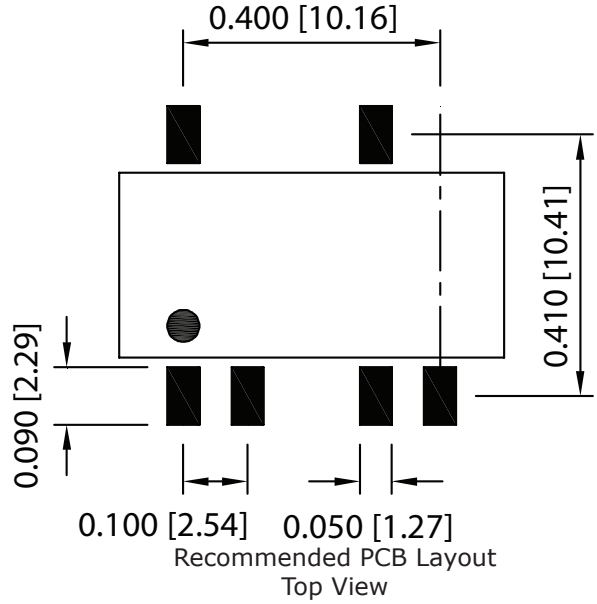
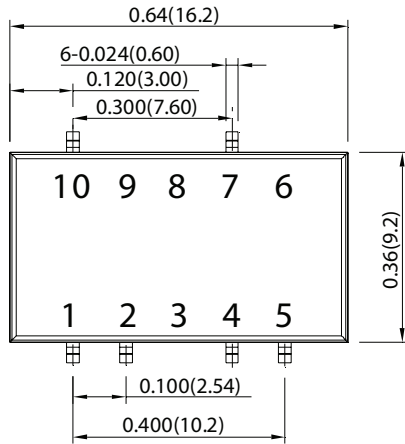
units: inches [mm]

tolerance: X.XX ±0.01 [±0.25]

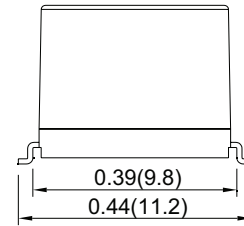
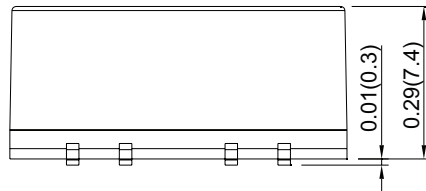
X.XXX ±0.005 [±0.13]

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

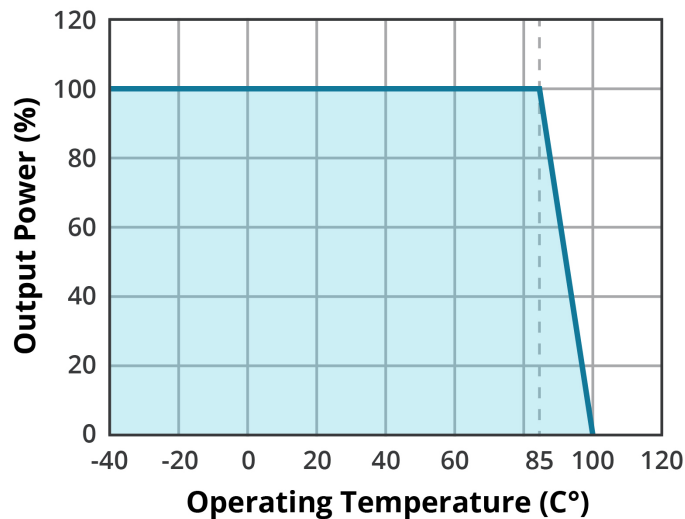


NC=no connection



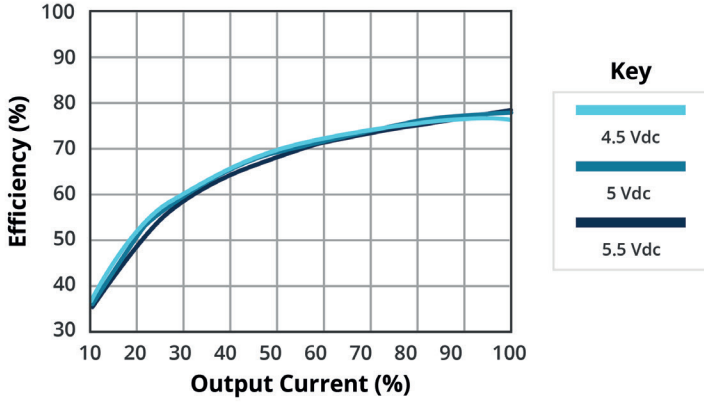
## DERATING CURVE

### TEMPERATURE DERATING CURVE

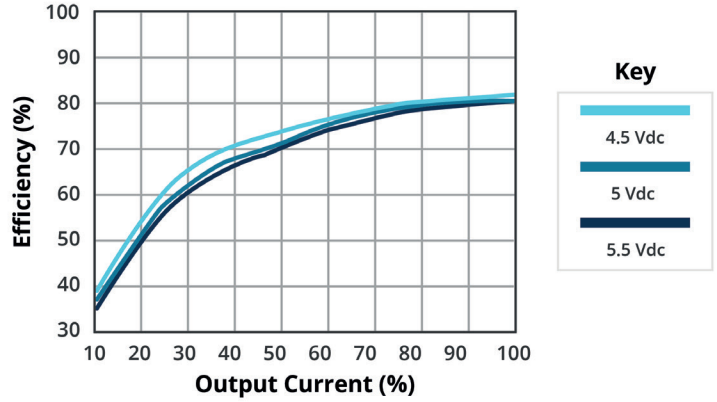


## EFFICIENCY CURVES

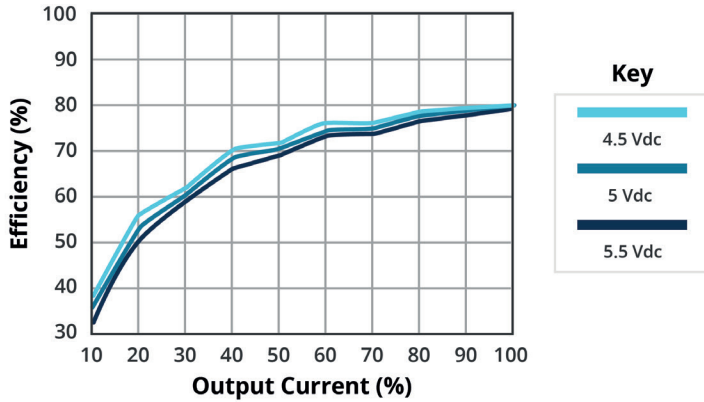
**EFFICIENCY VS OUTPUT LOAD  
PCN1-S5-S5-M**



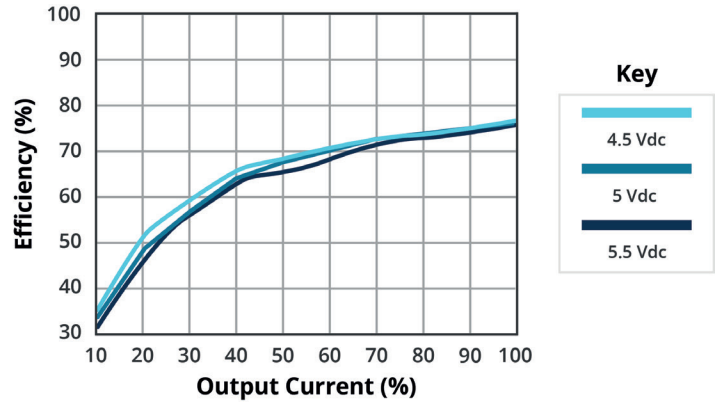
**EFFICIENCY VS OUTPUT LOAD  
PCN1-S5-S12-M**



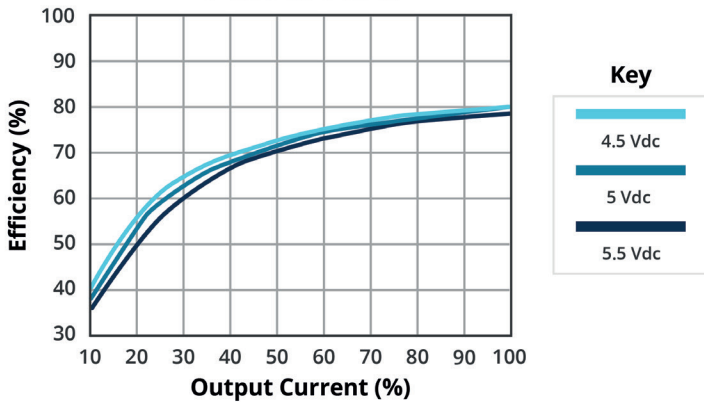
**EFFICIENCY VS OUTPUT LOAD  
PCN1-S5-S15-M**



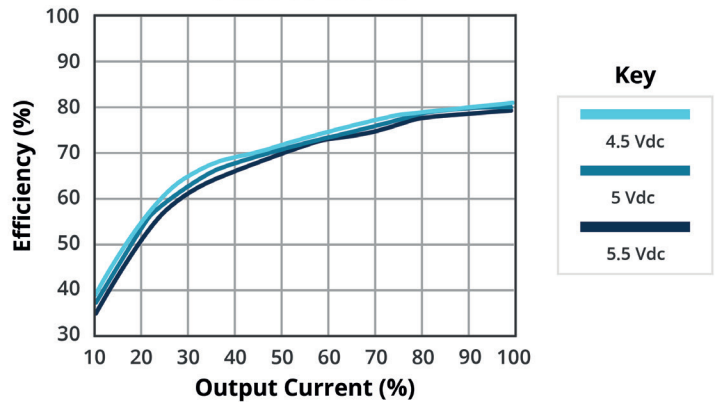
**EFFICIENCY VS OUTPUT LOAD  
PCN1-S12-D5-M**



**EFFICIENCY VS OUTPUT LOAD  
PCN1-S5-D12-M**

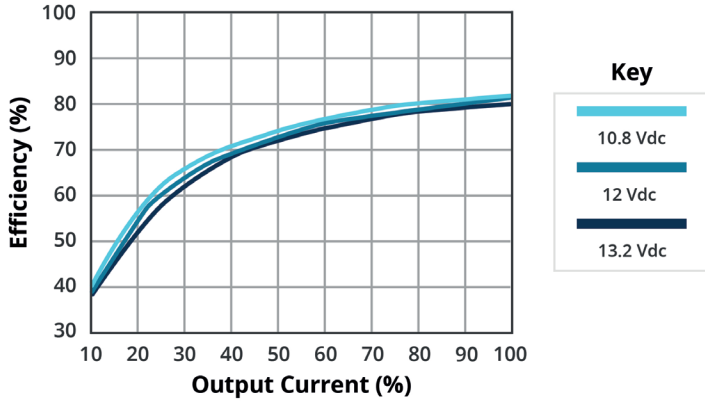


**EFFICIENCY VS OUTPUT LOAD  
PCN1-S5-D15-M**

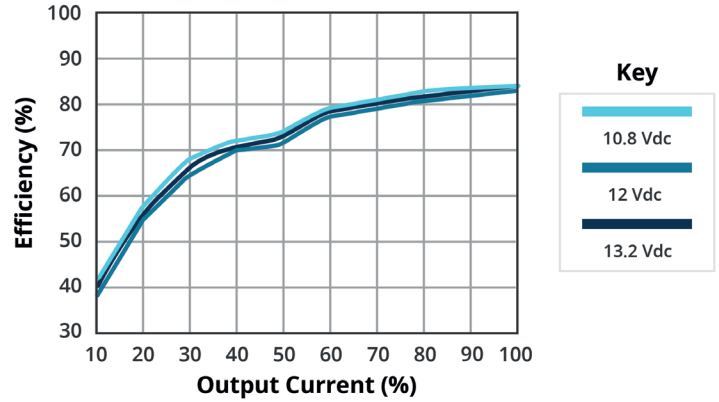


## EFFICIENCY CURVES (CONTINUED)

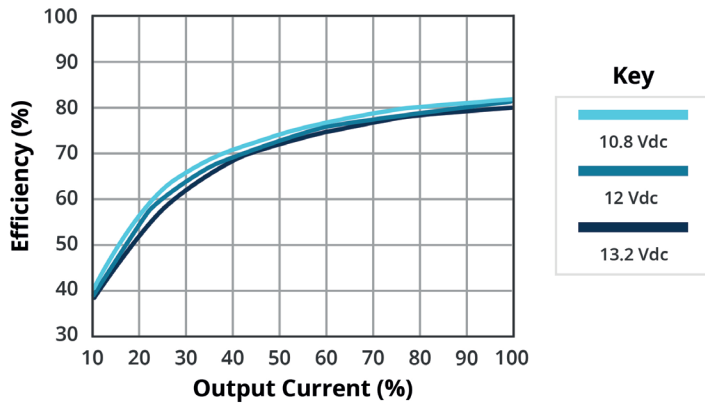
**EFFICIENCY VS OUTPUT LOAD  
PCN1-S12-S5-M**



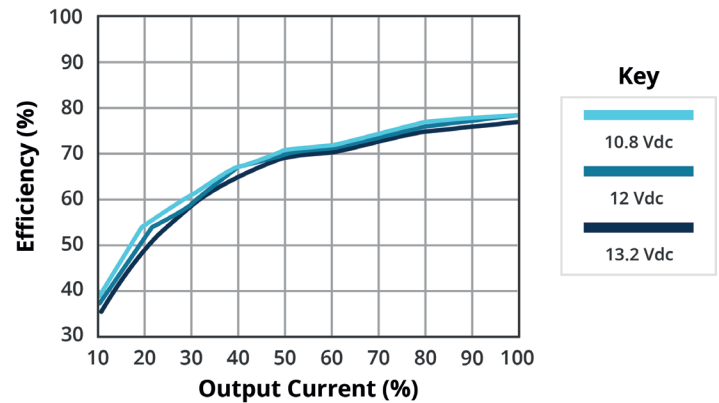
**EFFICIENCY VS OUTPUT LOAD  
PCN1-S12-S12-M**



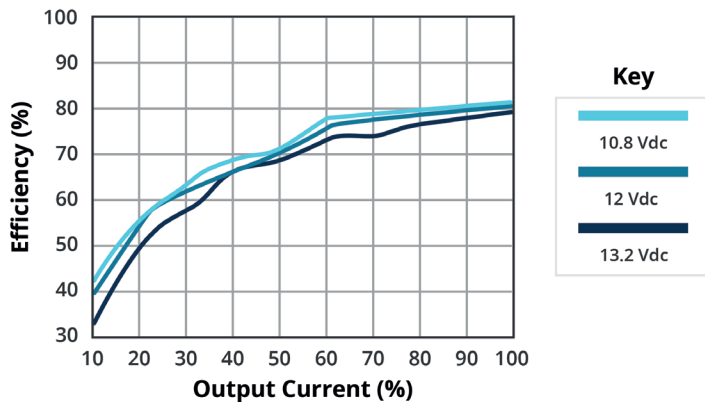
**EFFICIENCY VS OUTPUT LOAD  
PCN1-S12-S15-M**



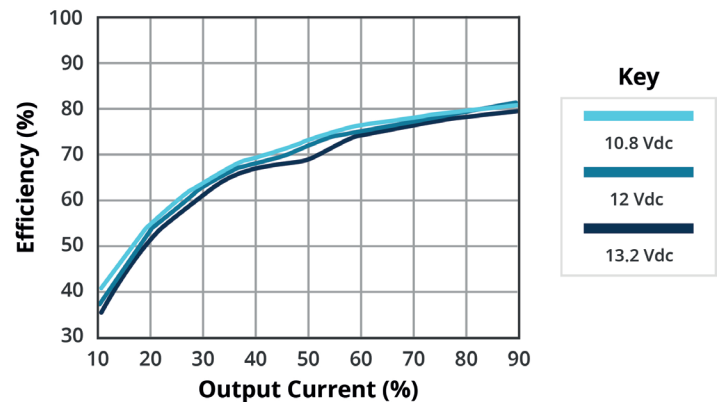
**EFFICIENCY VS OUTPUT LOAD  
PCN1-S12-D5-M**



**EFFICIENCY VS OUTPUT LOAD  
PCN1-S12-D12-M**



**EFFICIENCY VS OUTPUT LOAD  
PCN1-S12-D15-M**



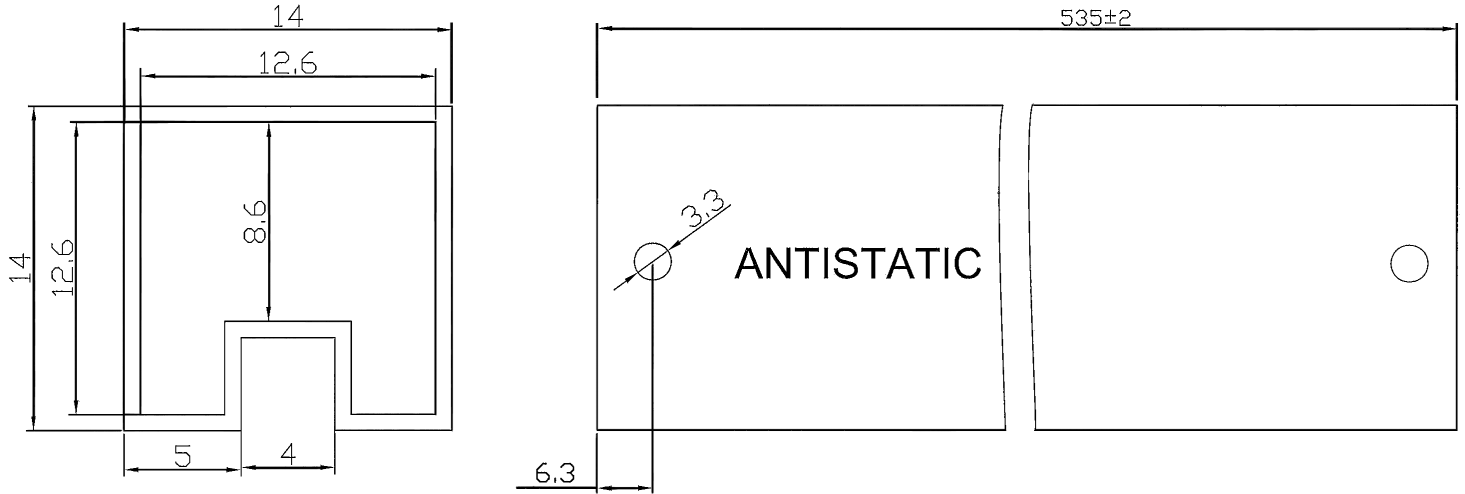
## PACKAGING (TUBE)

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



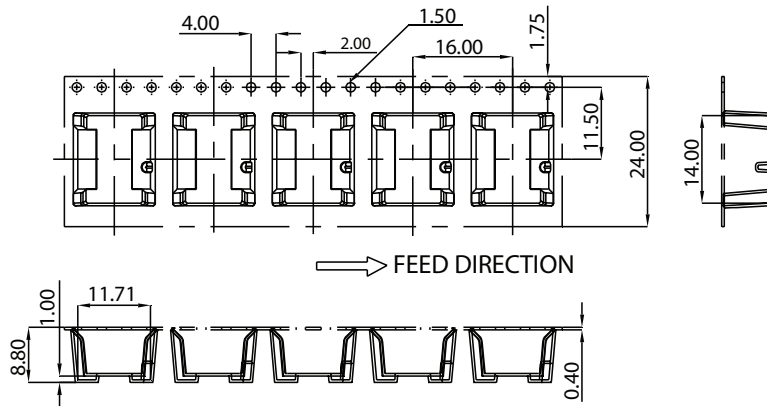
## PACKAGING (TAPE & REEL)

Single output models

units: mm

Reel Size: Ø13"

QTY: 430 pcs per reel

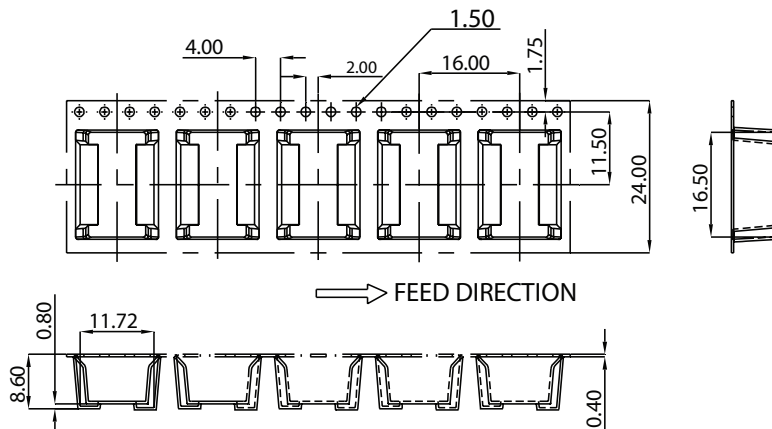


Dual output models

units: mm

Reel Size: Ø13"

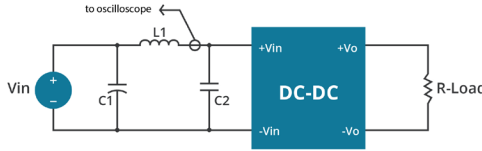
QTY: 430 pcs per reel



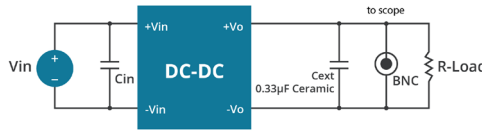
## TEST CONFIGURATIONS

### Input Ripple Current & Output Noise

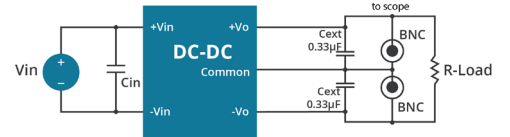
**Figure 1**  
Measuring Input Ripple Current



**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

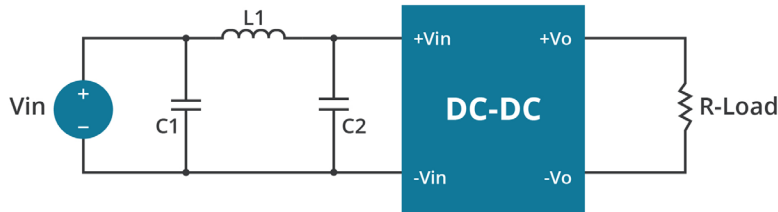
## EMC RECOMMENDED CIRCUIT

### 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 <sup>1</sup>	C2 <sup>1</sup>	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
1.06	safeties updated	10/08/2024

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



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