

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

**FEATURES**

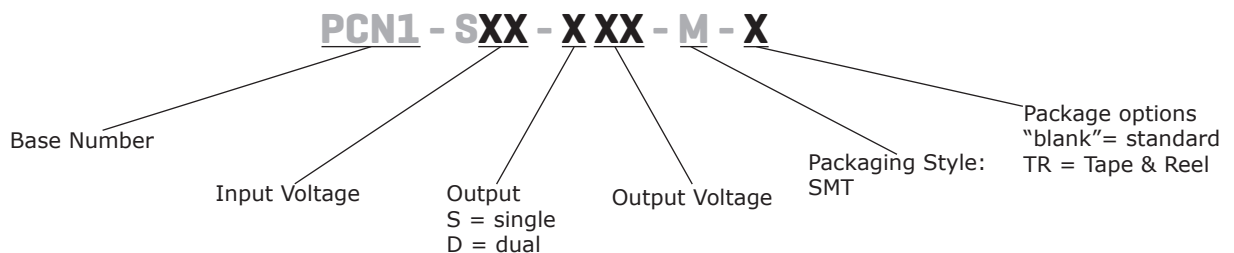
- up to 1 W isolated output
- industry standard surface mount package
- nominal input voltages: 5, 12 Vdc
- single/dual unregulated output
- 1,500 Vdc isolation voltage
- low ripple and noise
- -40 to 100°C
- efficiency up to 81%



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 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	4.5	5	5.5	Vdc
	12 Vdc input models	10.8	12	13.2	Vdc
surge voltage	for maximum of 100 ms				
	5 Vdc input models			9	Vdc
	12 Vdc input models			18	Vdc
current	5 Vdc input models		250		mA
	12 Vdc input models		110		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			220	$\mu$ F
	dual output models			100	$\mu$ 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 Vin, 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	2011/65/EU				

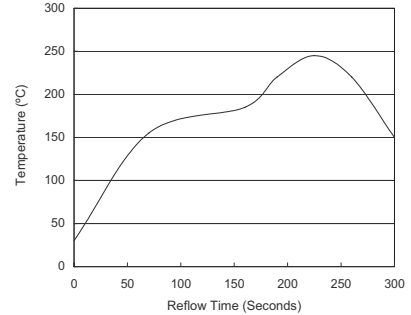
## ENVIRONMENTAL

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
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

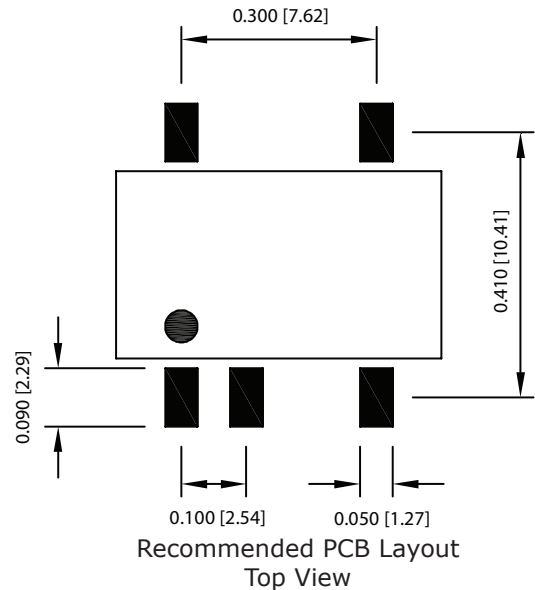
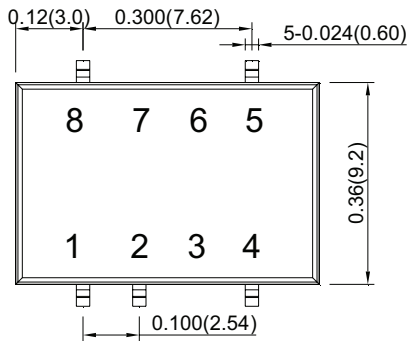
units: inches [mm]

tolerance: X.XX ±0.01 [±0.25]

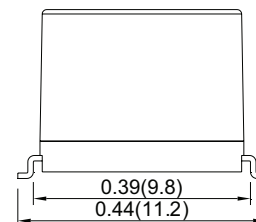
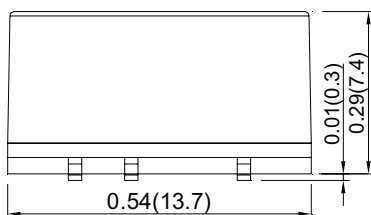
X.XXX ±0.005 [±0.13]

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



## MECHANICAL DRAWING (CONTINUED)

### Dual output models

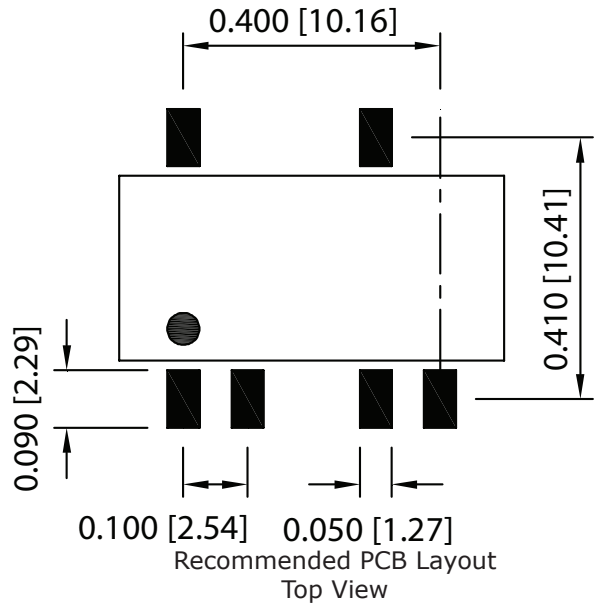
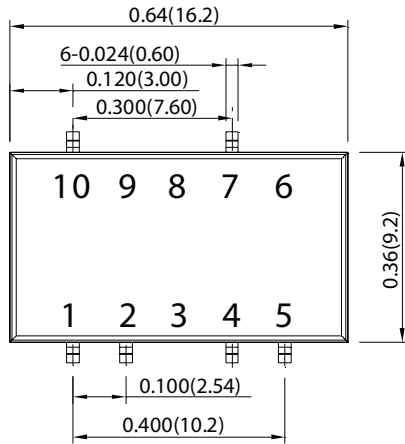
units: inches [mm]

tolerance: X.XX ±0.01 [±0.25]

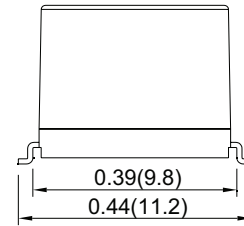
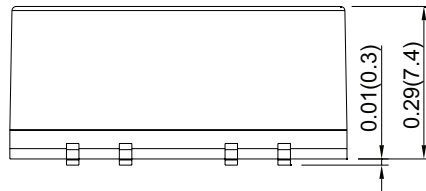
X.XXX ±0.005 [±0.13]

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

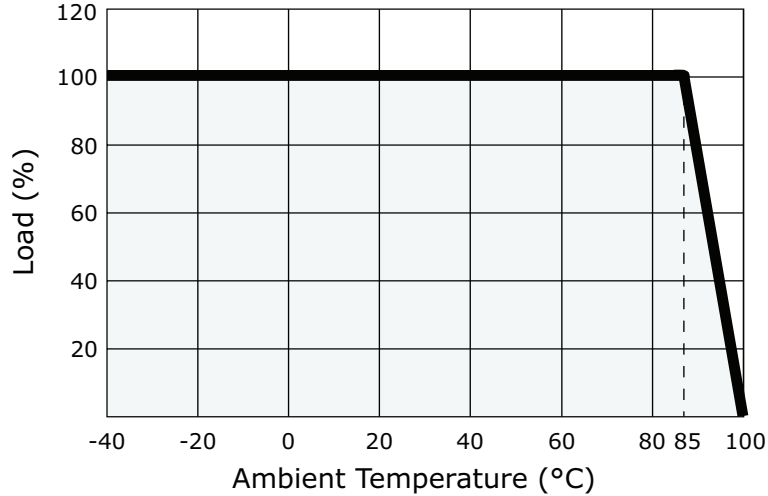


NC=no connection



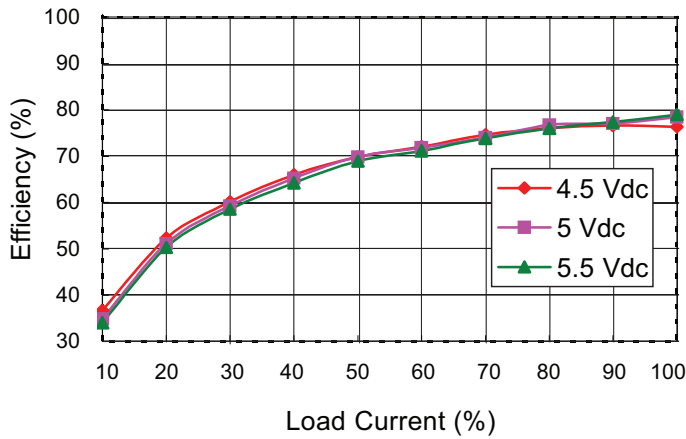
## DERATING CURVE

Temperature Derating Curve  
(Natural Convection)

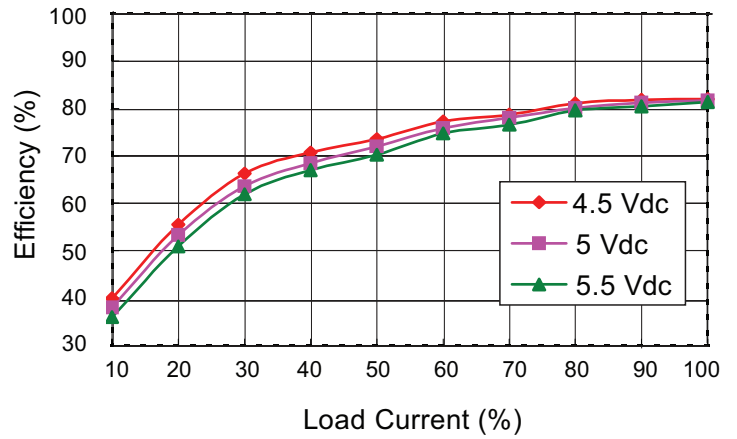


## EFFICIENCY CURVES

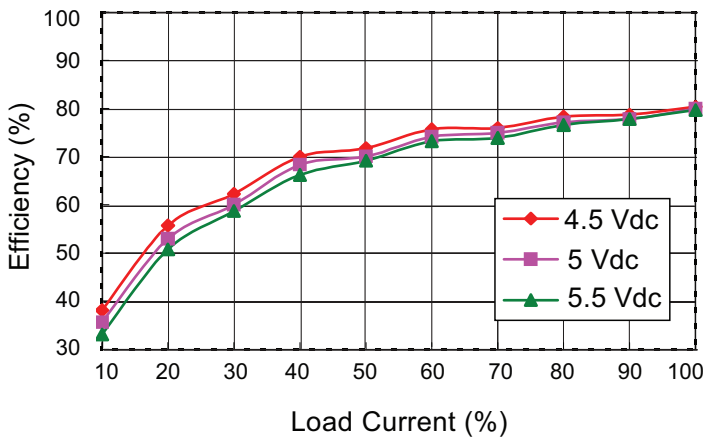
PCN1-S5-S5-M Efficiency Curve  
(Efficiency vs. Line Voltage and Load Current)



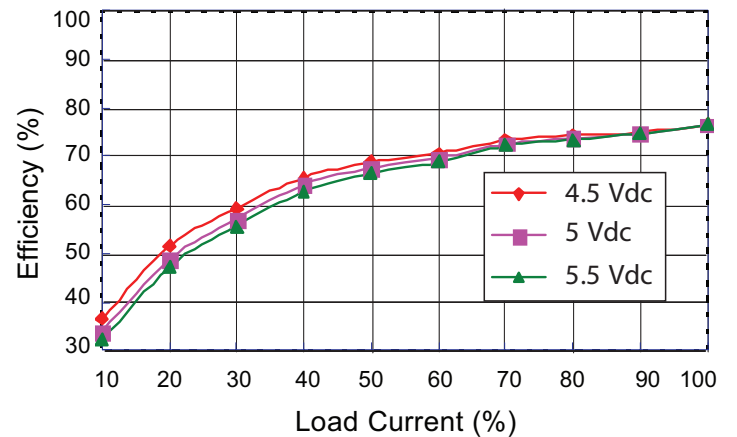
PCN1-S5-S12-M Efficiency Curve  
(Efficiency vs. Line Voltage and Load Current)



PCN1-S5-S15-M Efficiency Curve  
(Efficiency vs. Line Voltage and Load Current)

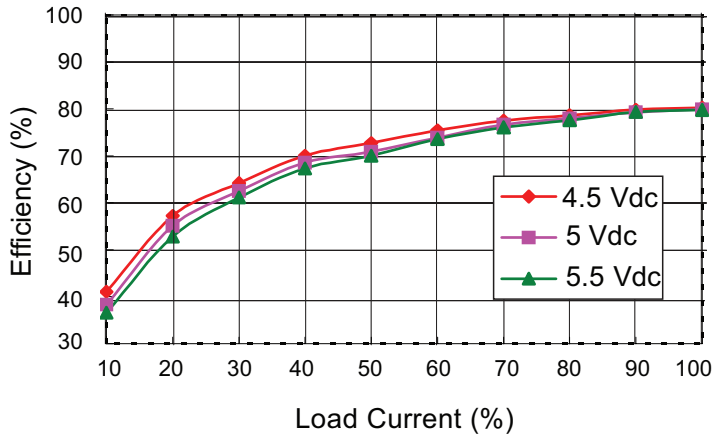


PCN1-S5-D5-M Efficiency Curve  
(Efficiency vs. Line Voltage and Load Current)

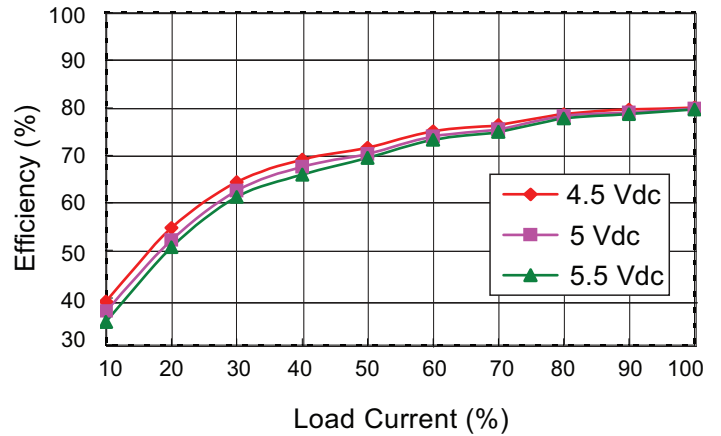


## EFFICIENCY CURVES (CONTINUED)

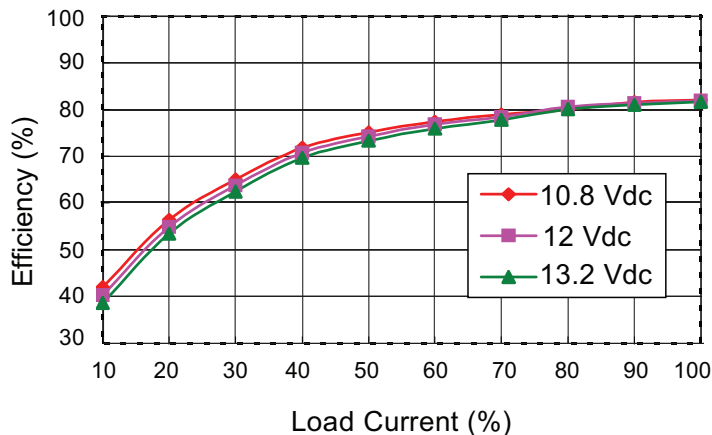
PCN1-S5-D12-M Efficiency Curve  
(Efficiency vs. Line Voltage and Load Current)



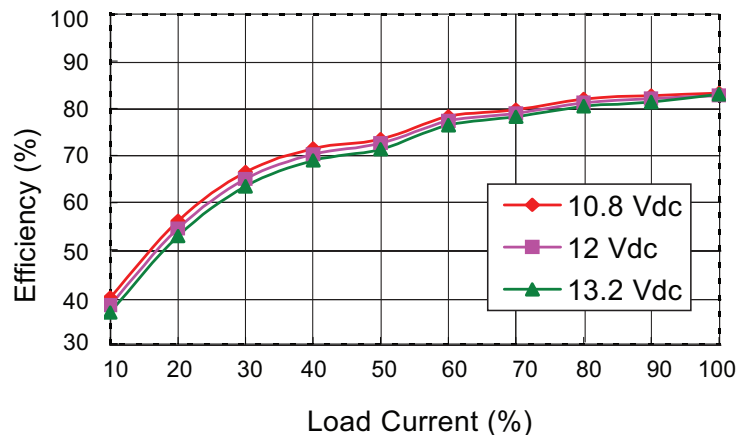
PCN1-S5-D15-M Efficiency Curve  
(Efficiency vs. Line Voltage and Load Current)



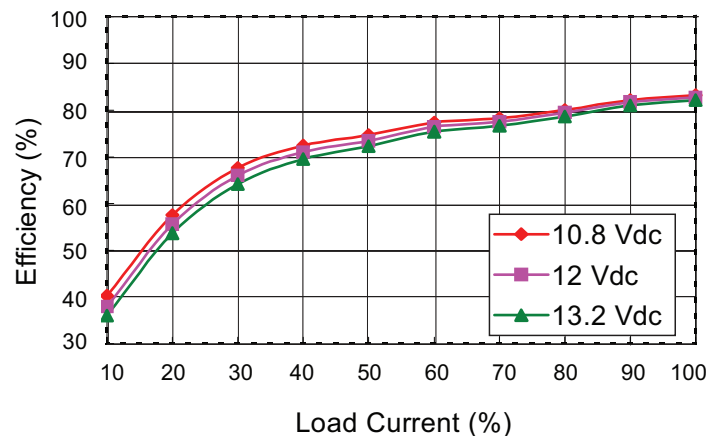
PCN1-S12-S5-M Efficiency Curve  
(Efficiency vs. Line Voltage and Load Current)



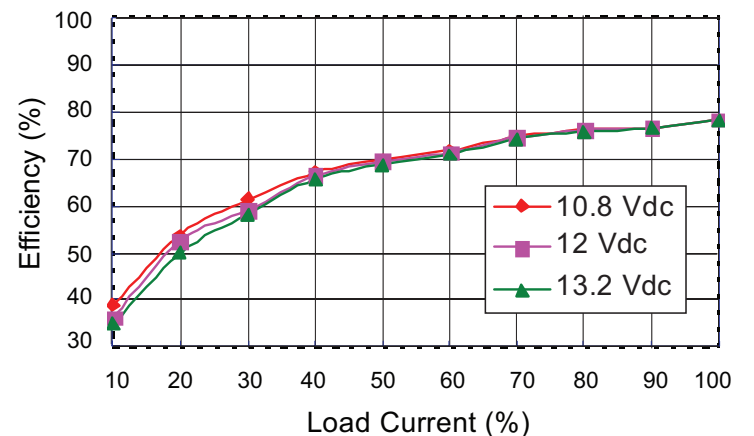
PCN1-S12-S12-M Efficiency Curve  
(Efficiency vs. Line Voltage and Load Current)



PCN1-S12-S15-M Efficiency Curve  
(Efficiency vs. Line Voltage and Load Current)

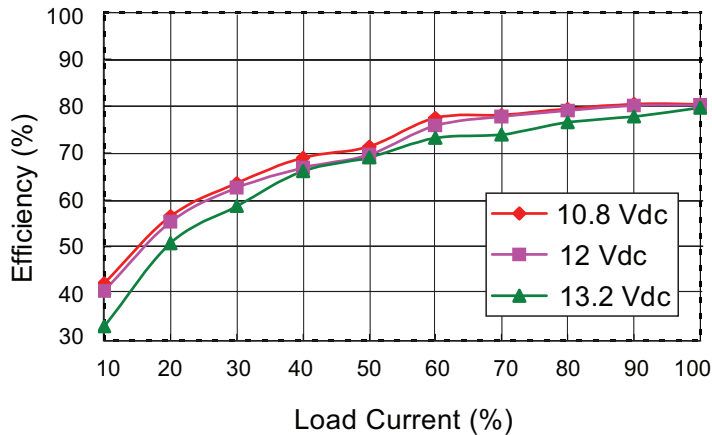


PCN1-S12-D5-M Efficiency Curve  
(Efficiency vs. Line Voltage and Load Current)

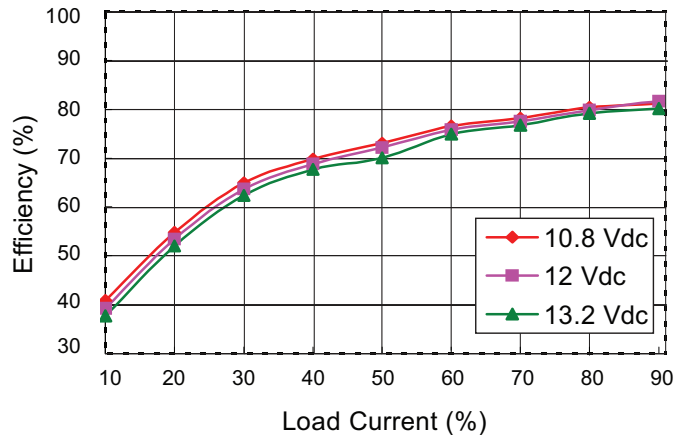


## EFFICIENCY CURVES (CONTINUED)

PCN1-S12-D12-M Efficiency Curve  
(Efficiency vs. Line Voltage and Load Current)



PCN1-S12-D15-M Efficiency Curve  
(Efficiency vs. Line Voltage and Load Current)



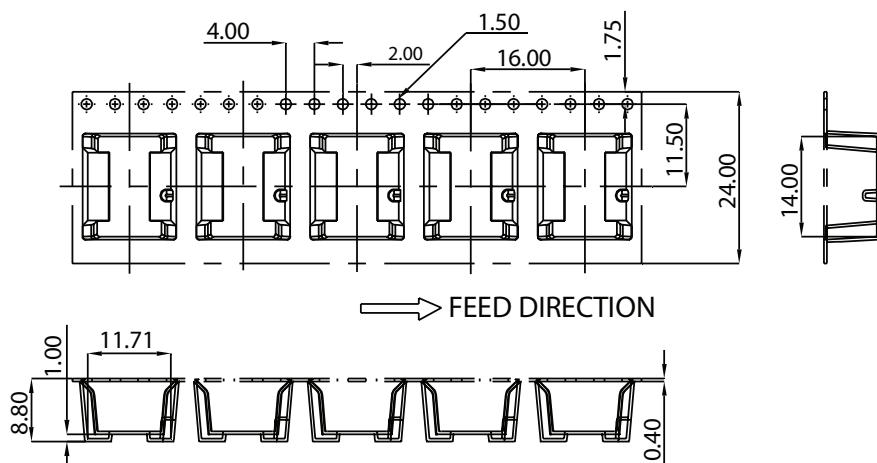
## PACKAGING

### Single output models

units: mm

Reel Size: Ø13"

QTY: 450 pcs per reel

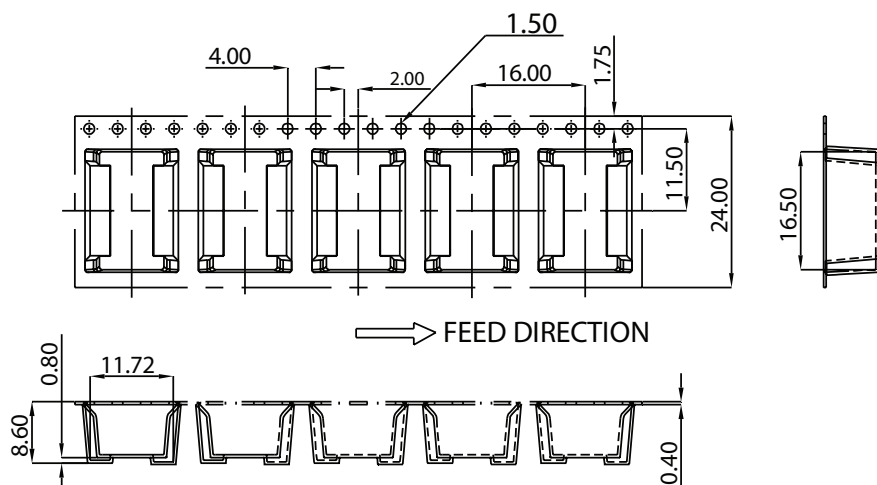


### Dual output models

units: mm

Reel Size: Ø13"

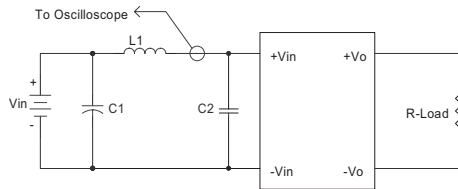
QTY: 450 pcs per reel



## TEST CONFIGURATIONS

### Input Ripple Current & Output Noise

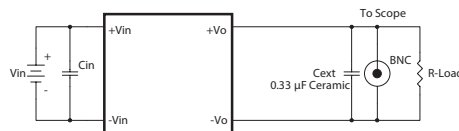
**Figure 1 Measuring Input Ripple Current**



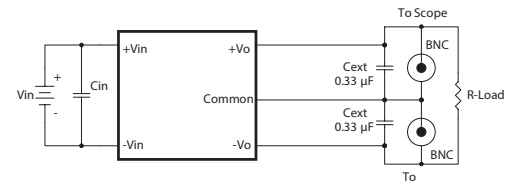
**Table 1**

L1	12 $\mu$ H
C1	2.2 $\mu$ F tantalum capacitor
C2	NC

**Figure 2 Measuring Output Ripple & Noise for Single Output Models**



**Figure 3 Measuring Output Ripple & Noise for Dual Output Models**



**Table 2**

Input Voltage (Vdc)	Cin
5	2.2 $\mu$ F ceramic capacitor
12	2.2 $\mu$ F ceramic capacitor

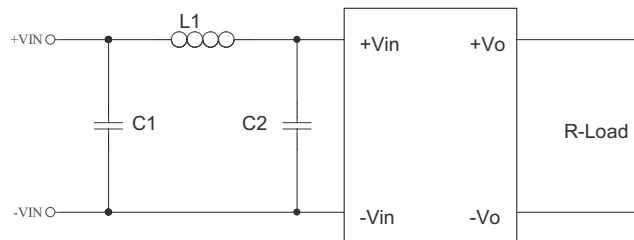
## EMC RECOMMENDED CIRCUIT

### 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 $\mu$ F / 25 V	4.7 $\mu$ F / 25 V	10 $\mu$ H
12	4.7 $\mu$ F / 25 V	4.7 $\mu$ F / 25 V	10 $\mu$ H

Notes: 1. Ceramic Capacitor



## REVISION HISTORY

---

rev.	description	date
1.0	initial release	07/26/2016

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



**Headquarters**  
20050 SW 112th Ave.  
Tualatin, OR 97062  
**800.275.4899**

Fax 503.612.2383  
**cui.com**  
techsupport@cui.com

CUI offers a two (2) year limited warranty. Complete warranty information is listed on our website.

CUI reserves the right to make changes to the product at any time without notice. Information provided by CUI is believed to be accurate and reliable. However, no responsibility is assumed by CUI for its use, nor for any infringements of patents or other rights of third parties which may result from its use.

CUI products are not authorized or warranted for use as critical components in equipment that requires an extremely high level of reliability. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.