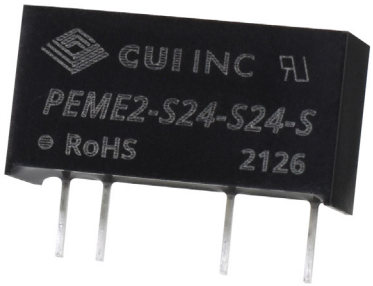
SERIES: PEME2-S | **DESCRIPTION:** DC-DC CONVERTER

FEATURES

- 2 W isolated output
- single/dual unregulated output
- 3000 Vdc isolation
- continuous short circuit protection
- extended temperature range (-40~105°C)
- no-load input current as low as 8mA
- efficiency up to 86%
- UL 62368-1
- designed to meet EN/BS EN 62368



MODEL	input voltage		output voltage	output current		output power	ripple & noise[1]	efficiency[2]
	typ (Vdc)	range (Vdc)	(Vdc)	min (mA)	max (mA)	max (W)	max (mVp-p)	typ (%)
PEME2-S5-D3-S[4]	5	4.5~5.5	±3.3	±30	±303	2	200	75
PEME2-S5-D5-S	5	4.5~5.5	±5	±20	±200	2	200	84
PEME2-S5-D9-S	5	4.5~5.5	±9	±11	±111	2	200	85
PEME2-S5-D12-S	5	4.5~5.5	±12	±8	±83	2	200	85
PEME2-S5-D15-S	5	4.5~5.5	±15	±7	±67	2	200	86
PEME2-S5-D24-S[4]	5	4.5~5.5	±24	±4	±42	2	200	86
PEME2-S5-S3-S[4]	5	4.5~5.5	3.3	40	400	1.32	200	78
PEME2-S5-S5-S[4]	5	4.5~5.5	5	40	400	2	200	84
PEME2-S5-S7-S[4]	5	4.5~5.5	7.2	28	278	2	200	84
PEME2-S5-S9-S[4]	5	4.5~5.5	9	22	222	2	200	85
PEME2-S5-S12-S[4]	5	4.5~5.5	12	17	167	2	200	85
PEME2-S5-S15-S[4]	5	4.5~5.5	15	13	133	2	200	86
PEME2-S5-S24-S[4]	5	4.5~5.5	24	8	83	2	200	86
PEME2-S12-D3-S	12	10.8~13.2	±3.3	±30	±303	2	180	75
PEME2-S12-D5-S	12	10.8~13.2	±5	±20	±200	2	180	80
PEME2-S12-D9-S[4]	12	10.8~13.2	±9	±11	±111	2	180	82
PEME2-S12-D12-S	12	10.8~13.2	±12	±8	±83	2	180	83
PEME2-S12-D15-S	12	10.8~13.2	±15	±7	±67	2	180	83
PEME2-S12-D24-S[4]	12	10.8~13.2	±24	±4	±42	2	180	83
PEME2-S12-S5-S	12	10.8~13.2	5	40	400	2	180	82
PEME2-S12-S9-S[4]	12	10.8~13.2	9	22	222	2	180	82
PEME2-S12-S12-S	12	10.8~13.2	12	17	167	2	180	84
PEME2-S12-S15-S	12	10.8~13.2	15	13	133	2	180	85
PEME2-S12-S24-S	12	10.8~13.2	24	8	83	2	180	86
PEME2-S15-D5-S[4]	15	13.5~16.5	±5	±20	±200	2	180	80
PEME2-S15-D15-S[4]	15	13.5~16.5	±15	±7	±67	2	180	82
PEME2-S15-S5-S[4]	15	13.5~16.5	5	40	400	2	180	80
PEME2-S15-S9-S[4]	15	13.5~16.5	9	22	222	2	180	80

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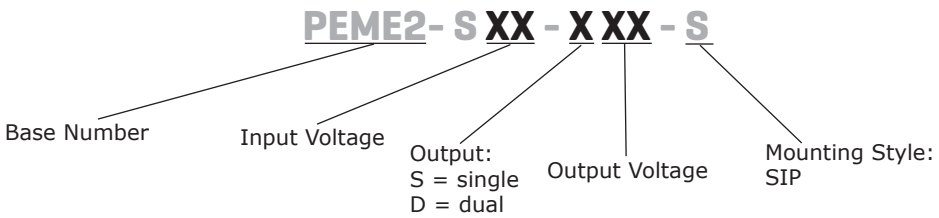
MODEL (CONTINUED)

	input voltage		output voltage	output current		output power	ripple & noise[1]	efficiency[2]
	typ (Vdc)	**range** (Vdc)	(Vdc)	**min** (mA)	**max** (mA)	**max** (W)	**max** (mVp-p)	**typ** (%)
PEME2-S15-S12-S[4]	15	13.5~16.5	12	17	167	2	180	81
PEME2-S15-S15-S[4]	15	13.5~16.5	15	13	133	2	180	81
PEME2-S15-S24-S[4]	15	13.5~16.5	24	8	83	2	180	81
PEME2-S24-D3-S[4]	24	21.6~26.4	±3.3	±30	±303	2	180	76
PEME2-S24-D5-S	24	21.6~26.4	±5	±20	±200	2	180	80
PEME2-S24-D9-S[4]	24	21.6~26.4	±9	±11	±111	2	180	81
PEME2-S24-D12-S	24	21.6~26.4	±12	±8	±83	2	180	83
PEME2-S24-D15-S	24	21.6~26.4	±15	±7	±67	2	180	83
PEME2-S24-D24-S[4]	24	21.6~26.4	±24	±4	±42	2	180	83
PEME2-S24-S3-S[4]	24	21.6~26.4	3.3	40	400	1.32	180	76
PEME2-S24-S5-S	24	21.6~26.4	5	40	400	2	180	80
PEME2-S24-S9-S[4]	24	21.6~26.4	9	22	222	2	180	81
PEME2-S24-S12-S	24	21.6~26.4	12	17	167	2	180	84
PEME2-S24-S15-S	24	21.6~26.4	15	13	133	2	180	86
PEME2-S24-S24-S	24	21.6~26.4	24	8	83	2	180	86

Notes:
1. Measured at nominal input, 20 MHz bandwidth oscilloscope, with 10 µF tantalum and 1 µF ceramic capacitors on the output.
2. Measured at nominal input voltage, full load.
3. All specifications are measured at Ta=25°C, humidity < 75%, nominal input voltage, and rated output load unless otherwise specified.
4. Model is not UL certified.

PART NUMBER KEY



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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
	15 Vdc input models		13.5	15	16.5	Vdc
	24 Vdc input models		21.6	24	26.4	Vdc
surge voltage	for maximum of 1 second					
	5 Vdc input models		-0.7		9	Vdc
	12 Vdc input models		-0.7		18	Vdc
	15 Vdc input models		-0.7		21	Vdc
	24 Vdc input models		-0.7		30	Vdc
current	5 Vdc input models	3.3 Vdc output			564	mA
		5 & 7.2 Vdc output			500	
		9 & 12 Vdc output			494	
		15 & 24 Vdc output			488	
	12 Vdc input models				208	mA
	15 Vdc input models				167	mA
	24 Vdc input models				104	mA
filter	filter capacitor					

OUTPUT

parameter	conditions/description		min	typ	max	units
maximum capacitive load[5]	3.3, 5 Vdc output models				2,400	µF
	±3.3, ±5 Vdc output models				1,200	µF
	7, 9 Vdc output models				1,000	µF
	12, 15 Vdc output models				560	µF
	24, ±12, ±15 Vdc output models				220	µF
	±9 Vdc output models				470	µF
	±24 Vdc output models				100	µF
voltage accuracy	see output regulation curves					
line regulation	for Vin change of 1%					
	3.3 Vdc output models				±1.5	%
	all other output models				±1.2	%
load regulation	5 Vdc input models	from 10% to full load				
		3.3 Vdc output		10		%
		5 & 7.2 Vdc output		8		%
		9, 12 & 15 Vdc output		7		%
		24 Vdc output		5		%
	all other input models	from 10% to full load				
		3.3 Vdc output		15		%
		5 Vdc output		7		%
		9, 12 Vdc output		5		%
		15 Vdc output		4		%
		24 Vdc output		3		%
switching frequency	100% load, nominal input voltage					
	5 Vdc input models			220		kHz
	all other input models			260		kHz
temperature coefficient	at full load			±0.02		%/°C

Note: 5. Tested at input voltage range and full load.

PROTECTIONS

parameter	conditions/description	min	typ	max	units
short circuit protection	continuous, auto recovery				

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SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	input to output for 1 minute at 1 mA	3,000			Vdc
isolation resistance	input to output at 500 Vdc	1,000			MΩ
isolation capacitance	input to output, 100 kHz / 0.1 V		20		pF
safety approvals[6]	certified to 62368: UL designed to meet 62368: EN, BS EN				
conducted emissions	CISPR 32/EN 55032 Class B				
radiated emissions	CISPR 32/EN 55032 Class B				
ESD	IEC/EN 61000-4-2 Air ±8kV, Contact ±6kV				
MTBF	as per MIL-HDBK-217F, 25°C	3,500,000			hours
RoHS	yes				

Note: 6. See the model table.

ENVIRONMENTAL

parameter	conditions/description	min	typ	max	units
operating temperature	see derating curves	-40		105	°C
storage temperature		-55		125	°C
storage humidity	non-condensing	5		95	%
case temperature rise	at 25°C		25		°C

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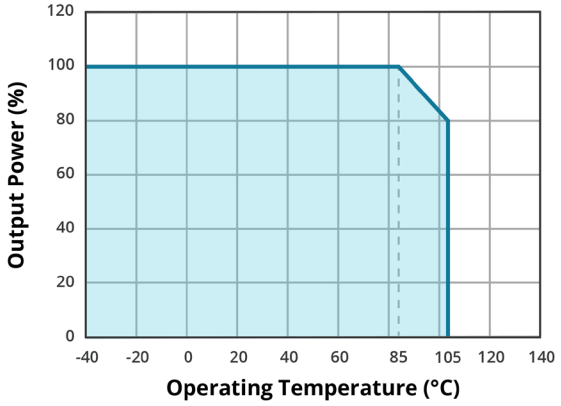
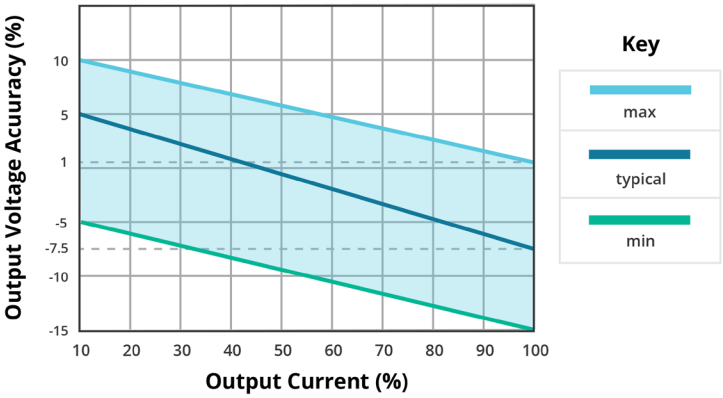
DERATING CURVES

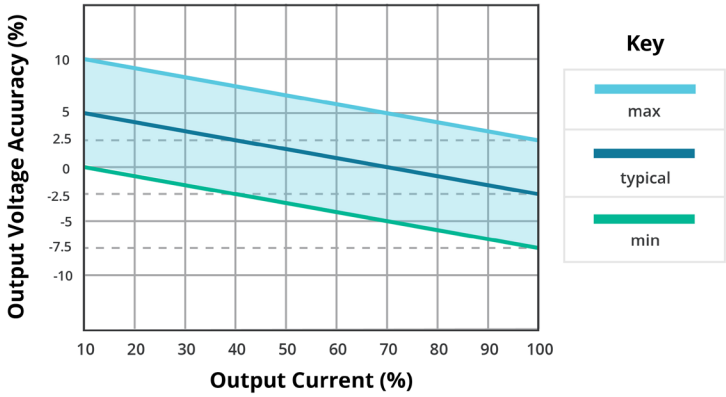
TEMPERATURE DERATING CURVE



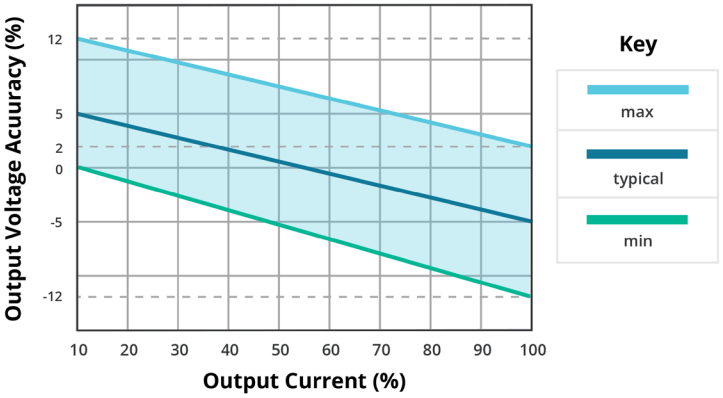
OUTPUT REGULATION CURVE
5 Vdc input / 3.3 Vdc output
(nominal input)



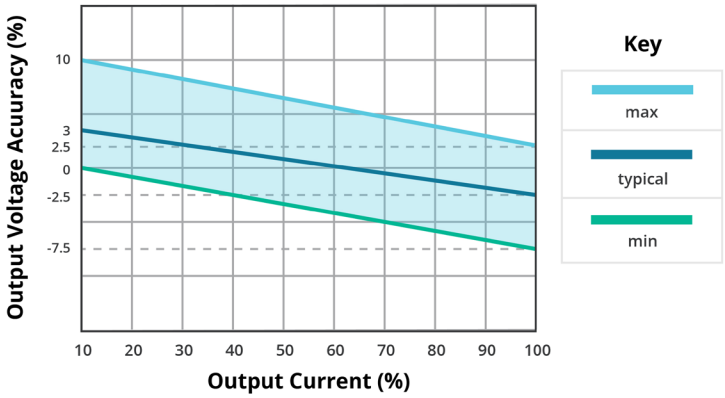
OUTPUT REGULATION CURVE
5 Vdc input / all other output models
(nominal input)



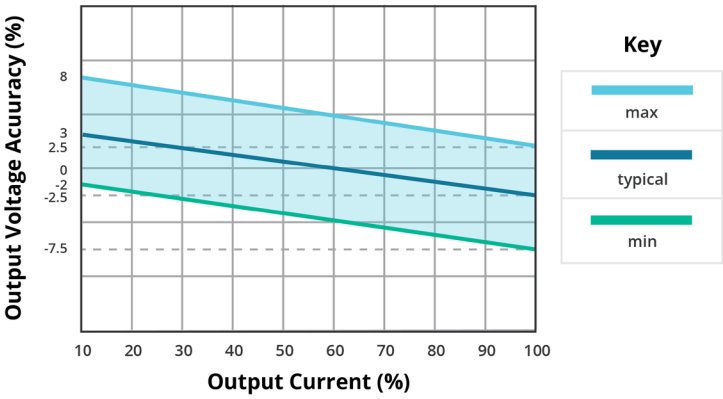
OUTPUT REGULATION CURVE
all other input models / 3.3 Vdc output models
(nominal input)



OUTPUT REGULATION CURVE
all other input models / 5 Vdc output models
(nominal input)



OUTPUT REGULATION CURVE
all other input models / all other output models
(nominal input)



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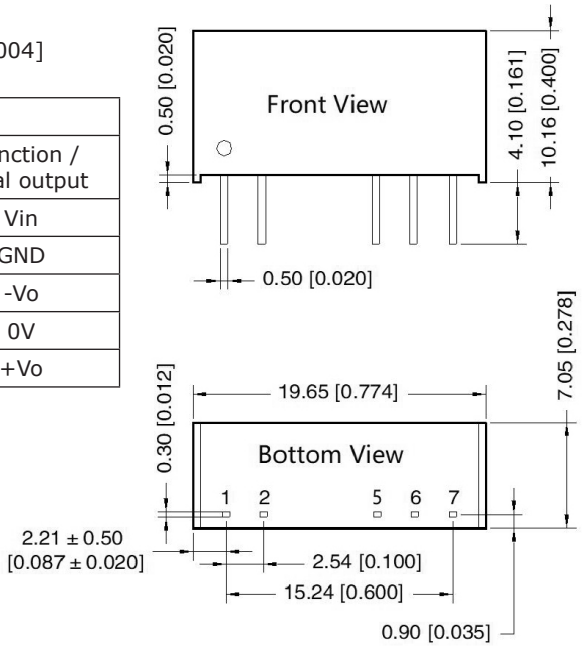
MECHANICAL

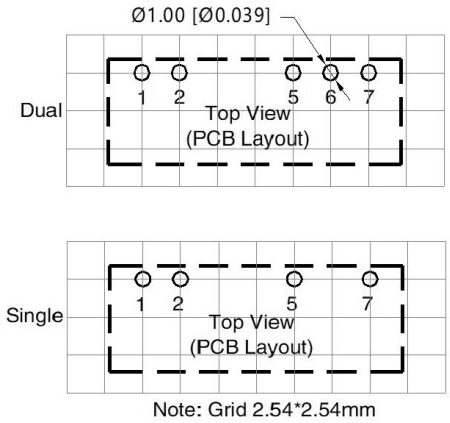
parameter	conditions/description	min	typ	max	units
dimensions	19.65 x 7.05 x 10.16 [0.773 x 0.277 x 0.400 inch]				mm
case material	black flame-retardant and heat-resistant plastic (UL94V-0)				
weight			2.4		g

MECHANICAL DRAWING

units: mm [inch]
tolerance: ±0.25[±0.010]
pin section tolerance: ±0.10[±0.004]

PIN CONNECTIONS		
PIN	Function / Single output	Function / Dual output
1	Vin	Vin
2	GND	GND
5	0V	-Vo
6	No pin	0V
7	+Vo	+Vo





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APPLICATION CIRCUIT

If you want to further reduce the input and output ripple, a filter capacitor may be connected to the input and output terminals (Figures 1 & 2) provided that the capacitance is less than the maximum capacitive load of the model, otherwise start-up problems may be caused if the capacitance is too large.

Figure 1
Single Output Models

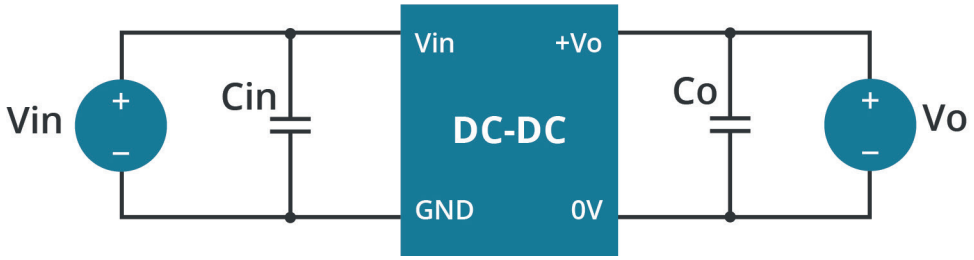

Table 1

Vin (Vdc)	Cin (µF / V)	Vo (Vdc)	Co (µF / V)
5	10 / 16	3.3	10 / 16
--	--	5	10 / 16
--	--	7.2	10 / 16
--	--	9	2.2 / 25
--	--	12	2.2 / 25
--	--	15	1 / 25
--	--	24	1 / 50
12	2.2 / 25	3.3	10 / 16
15	2.2 / 25	5	10 / 16
24	1 / 50	9	2.2 / 25
--	--	12	2.2 / 25
--	--	15	1 / 25
--	--	24	1 / 50

Figure 2
Dual Output Models

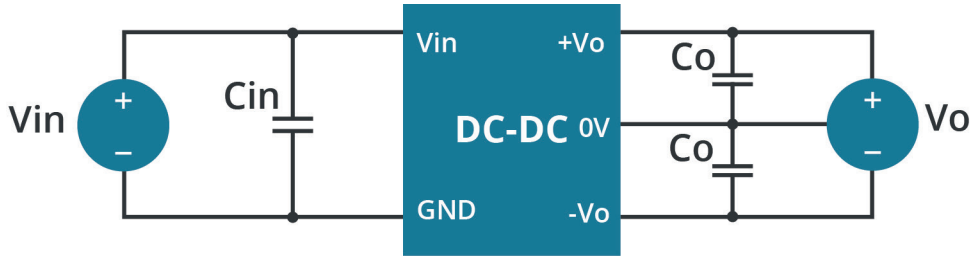

Table 2

Vin (Vdc)	Cin (µF / V)	Vo (Vdc)	Co[6] (µF / V)
5	10 / 16	±3.3	4.7 / 16
--	--	±5	4.7 / 16
--	--	±9	1 / 25
--	--	±12	1 / 25
--	--	±15	0.47 / 25
--	--	±24	0.47 / 50
12	2.2 / 25	±3.3	4.7 / 16
15	2.2 / 25	±5	4.7 / 16
24	1 / 50	±9	2.2 / 25
--	--	±12	1 / 25
--	--	±15	1 /25
--	--	±24	0.47 / 50

Note: 6. The capacitor value of the positive and the negative output is identical.

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EMC RECOMMENDED CIRCUIT

Figure 3
Single Output Models

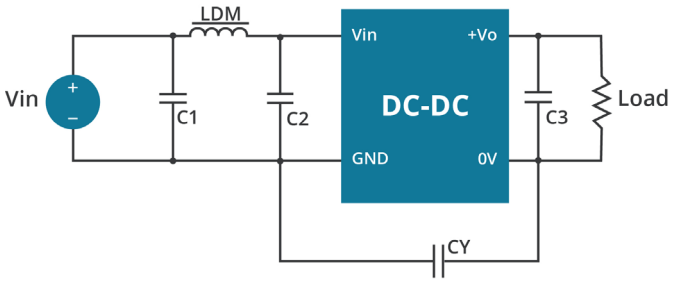

Figure 4
Dual Output Models

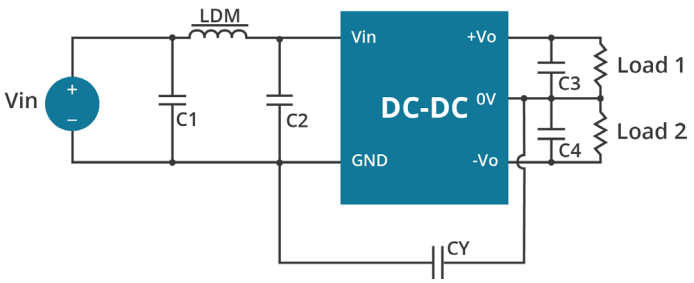

Table 3

Recommended External Circuit Components			
Vin (Vdc)	5	12, 15, 24	
Vo (Vdc)	all output models	12, 15, 24	±12, ±15, ±24
C1 / C2	4.7 µF / 16 V	4.7 µF / 50 V	4.7 µF / 50 V
CY	270 pF / 4 kV	270 pF / 3 kV	270 pF / 3 kV
C3 / C4	refer to the Co in Tables 1, 2		
LDM	6.8 µH	6.8 µH	6.8 µH

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REVISION HISTORY

rev.	description	date
1.0	initial release	07/23/2021
1.01	series expanded with 5 Vdc input models	06/21/2022
1.02	CE certification removed	11/07/2022
1.03	UL certification updated for 5 Vdc input models	04/18/2024

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

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