SERIES: PESE2-M | **DESCRIPTION:** DC-DC CONVERTER

FEATURES

- 2 W isolated output
- single unregulated output
- 3,000 Vdc isolation
- continuous short circuit protection
- extended temperature range (-40~105°C)
- efficiency up to 86%
- designed to meet EN/BS EN 62368-1



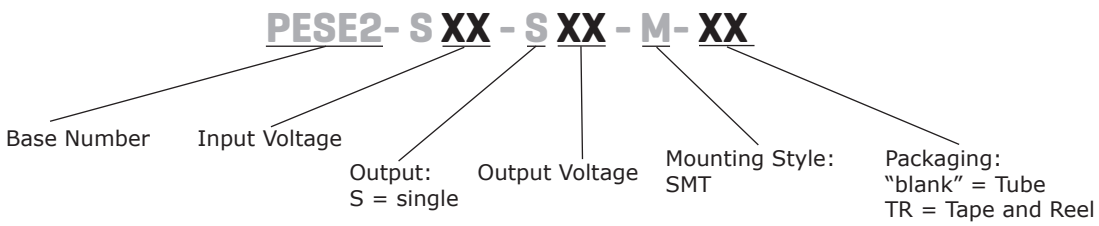
RoHS

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 (%)
PESE2-S5-S3-M	5	4.5~5.5	3.3	40	400	1.32	200	78
PESE2-S5-S5-M[3]	5	4.5~5.5	5	40	400	2	200	84
PESE2-S5-S7-M	5	4.5~5.5	7	29	286	2	200	84
PESE2-S5-S9-M	5	4.5~5.5	9	22	222	2	200	85
PESE2-S5-S12-M	5	4.5~5.5	12	17	167	2	200	85
PESE2-S5-S15-M	5	4.5~5.5	15	13	133	2	200	86
PESE2-S5-S24-M	5	4.5~5.5	24	8	83	2	200	86
PESE2-S12-S5-M[3]	12	10.8~13.2	5	40	400	2	150	83
PESE2-S12-S9-M	12	10.8~13.2	9	22	222	2	150	83
PESE2-S12-S12-M	12	10.8~13.2	12	17	167	2	150	84
PESE2-S12-S15-M	12	10.8~13.2	15	13	133	2	150	84
PESE2-S12-S24-M	12	10.8~13.2	24	8	83	2	150	85
PESE2-S15-S5-M	15	13.5~16.5	5	40	400	2	150	83
PESE2-S15-S15-M	15	13.5~16.5	15	13	133	2	150	84
PESE2-S24-S5-M[3]	24	21.6~26.4	5	40	400	2	150	83
PESE2-S24-S9-M	24	21.6~26.4	9	22	222	2	150	83
PESE2-S24-S12-M	24	21.6~26.4	12	17	167	2	150	84
PESE2-S24-S15-M	24	21.6~26.4	15	13	133	2	150	84
PESE2-S24-S24-M	24	21.6~26.4	24	8	83	2	150	85

Notes:
1. Measured at nominal input, 20 MHz bandwidth oscilloscope with 10 µF tantalum and 1 µF ceramic capacitor on output (see Application circuit).
2. Measured at nominal input voltage, full load.
3. Model is UL certified.
4. All specifications are measured at Ta=25°C, humidity < 75%, nominal input voltage, and rated output load unless otherwise specified.

Please read our datasheet & drawing disclaimer here.

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
	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 models		339/8	357/--	mA
		5, 7 Vdc output models		477/8	500/--	mA
		9, 12 Vdc output models		471/8	494/--	mA
		15, 24 Vdc output models		466/8	488/--	mA
	12 Vdc input models			196/8		mA
	15 Vdc input models			161/8		mA
	24 Vdc input models			98/8		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
	9 Vdc output models			1,000	µF
	12, 15 Vdc output models			560	µF
	24 Vdc output models			220	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	from 10% to full load				
	3.3 Vdc output models			20	%
	5 Vdc output models			15	%
	all other models			10	%
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				

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 62368-1: UL designed to meet 62368-1: 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				

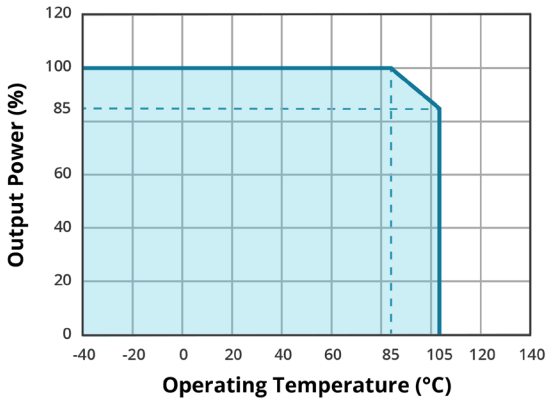
Note: 6. See the model table.

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

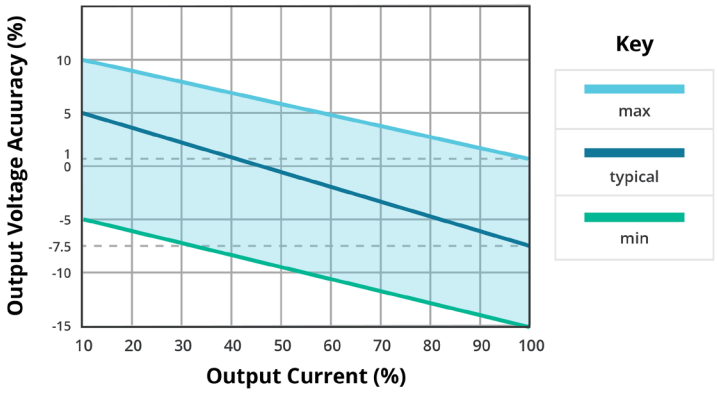
DERATING CURVES

TEMPERATURE DERATING CURVE

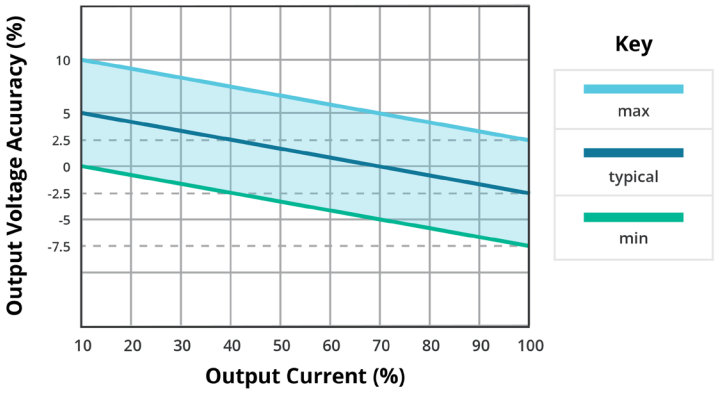


DERATING CURVES (CONTINUED)

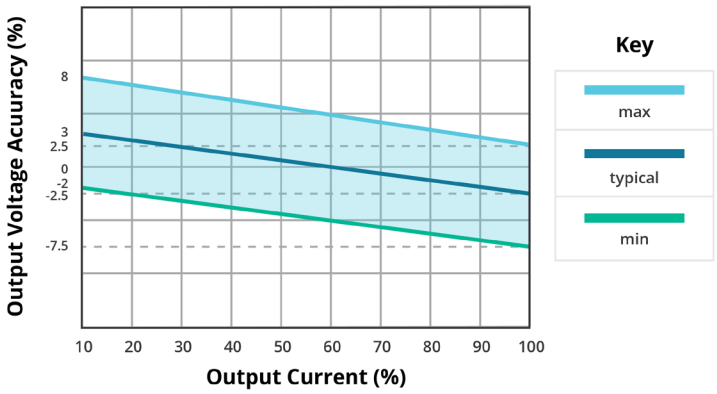
OUTPUT REGULATION CURVE
5 Vdc input model/3.3 output model
(nominal input)



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

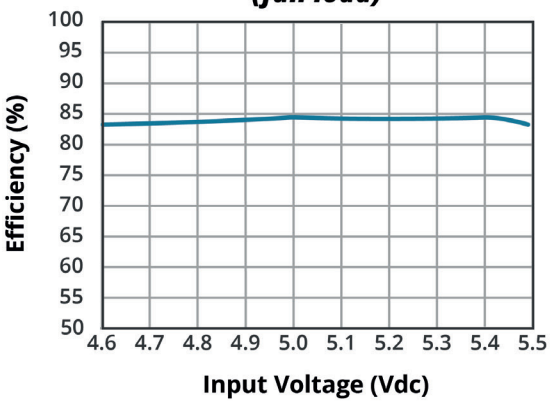


OUTPUT REGULATION CURVE
all other input and output models
(nominal input)

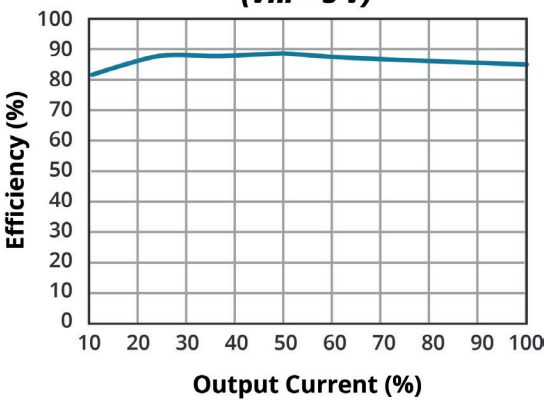


EFFICIENCY CURVES

EFFICIENCY VS INPUT VOLTAGE
PESE2-S5-S5-M
(full load)

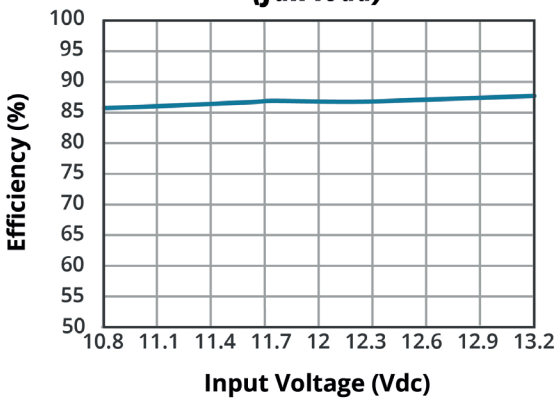


EFFICIENCY VS OUTPUT LOAD
PESE2-S5-S5-M
(Vin = 5 V)

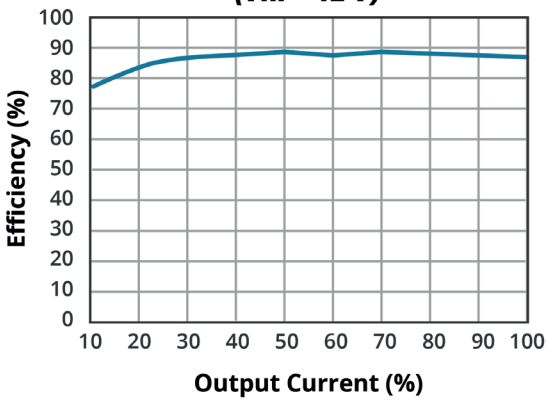


EFFICIENCY CURVES (CONTINUED)

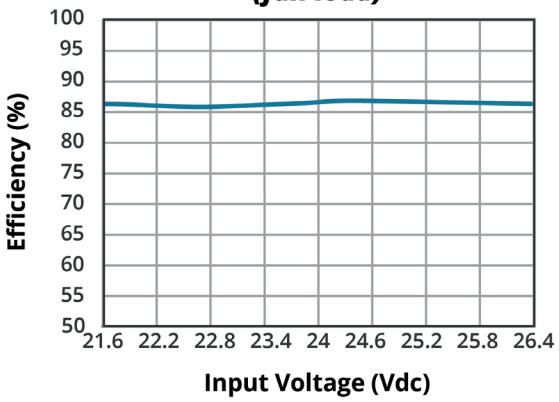
EFFICIENCY VS INPUT VOLTAGE
PESE2-S12-S5-M
(full load)



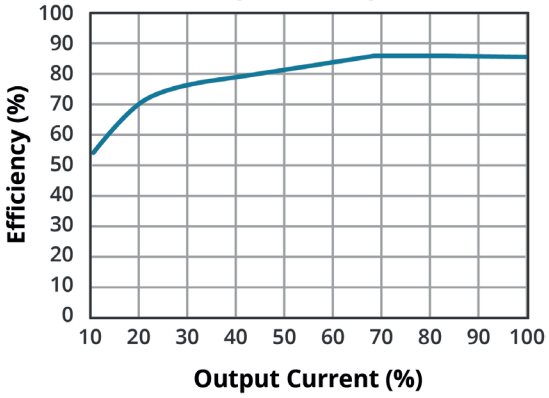
EFFICIENCY VS OUTPUT LOAD
PESE2-S12-S5-M
(Vin = 12 V)



EFFICIENCY VS INPUT VOLTAGE
PESE2-S24-S5-M
(full load)



EFFICIENCY VS OUTPUT LOAD
PESE2-S24-S5-M
(Vin = 24 V)



MECHANICAL

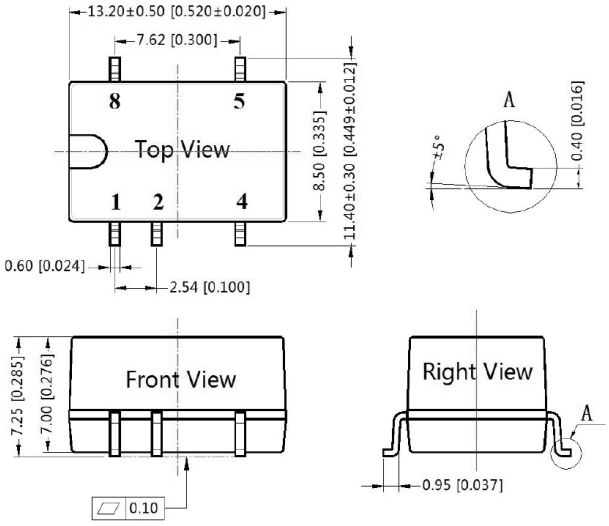
parameter	conditions/description	min	typ	max	units
dimensions	13.20 x 11.40 x 7.25 [0.520 x 0.448 x 0.285 inch]				mm
case material	black flame-retardant and heat-resistant plastic (UL94V-0)				
weight			1.4		g

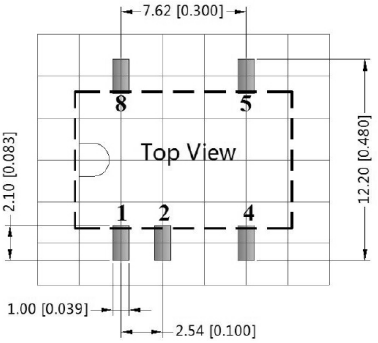
MECHANICAL DRAWING

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

PIN CONNECTIONS	
PIN	Function
1	GND
2	Vin
4	0V
5	+Vo
8	NC

NC = No connect





Note: Grid 2.54*2.54mm

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 (Figure 1) 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

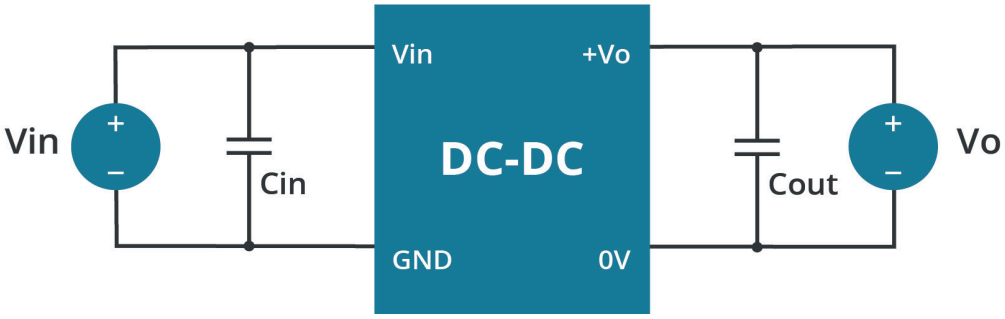


Table 1

Vin (Vdc)	Cin (µF / V)	Vo (Vdc)	Cout (µF / V)
5	4.7 / 16	3.3 / 5	10 / 16
---	---	7 / 9	4.7 / 16
---	---	12	2.2 / 25
---	---	15	1 / 25
---	---	24	0.47 / 50
12	2.2 / 25	5	10 / 10
15	1 / 25	9	2.2 / 25
24	1 / 50	12	2.2 / 25
---	---	15	1 / 25
---	---	24	0.47 / 50

EMC RECOMMENDED CIRCUIT

Figure 2

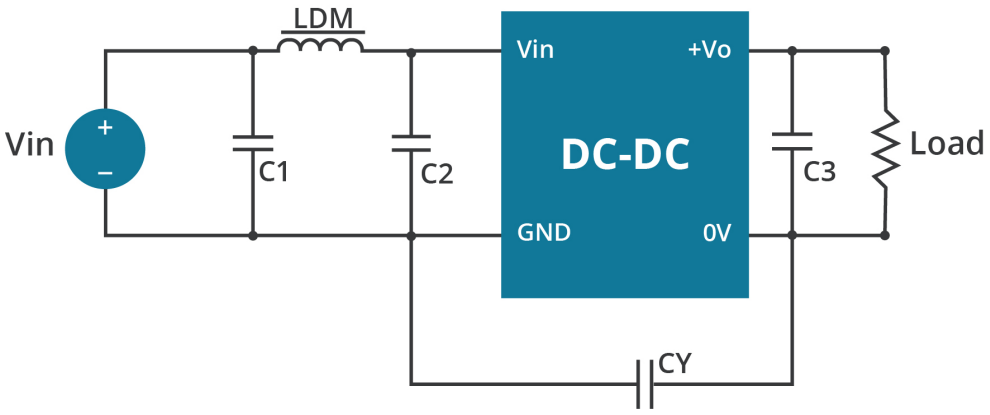


Table 2

Recommended External Circuit Components		
Vin	5 Vdc	12 / 15 / 24 Vdc
C1, C2	4.7 µF / 16 V	4.7 µF / 50 V
C3	refer to the Cout in Table 1	
CY	270 pF / 4 kV	270 pF / 3 kV
LDM	6.8 µH	

REVISION HISTORY

rev.	description	date
1.0	initial release	07/23/2021
1.01	model table updated	01/05/2022
1.02	CE certification added to PESE2-S15-S15-M	08/11/2022
1.03	CE certification removed	11/10/2022
1.04	5 V input models added	03/15/2024

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

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