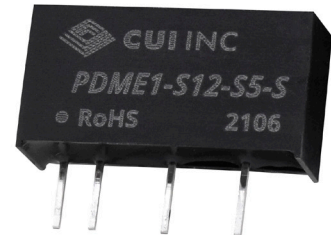


SERIES: PDME1-S | **DESCRIPTION:** DC-DC CONVERTER

FEATURES

- 1 W isolated output
- unregulated output
- compact SIP package
- single/dual output models
- continuous short circuit protection
- extended temperature range (-40~105°C)
- 1500 Vdc isolation
- no load input current as low as 5 mA
- UL 62368-1 certified
- efficiency up to 85%
- designed to meet EN/BS EN 62368



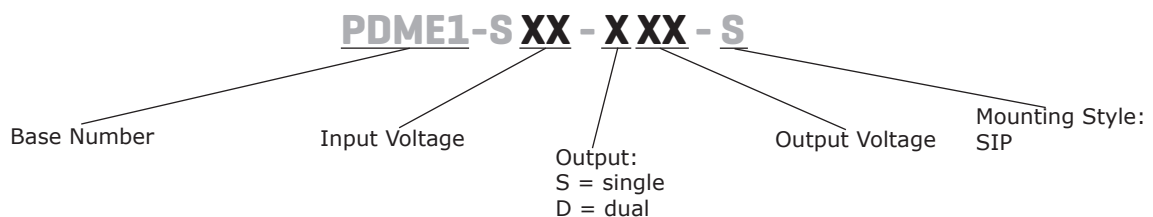
MODEL	input voltage		output voltage (Vdc)	output current		output power max (W)	ripple & noise ¹ max (mVp-p)	efficiency ² typ (%)
	typ (Vdc)	range (Vdc)		min (mA)	max (mA)			
PDME1-S3-S3-S ³	3.3	2.97~3.63	3.3	30	303	1	100	79
PDME1-S3-S5-S ³	3.3	2.97~3.63	5	20	200	1	100	82
PDME1-S3-S9-S ³	3.3	2.97~3.63	9	11	111	1	100	85
PDME1-S3-S12-S ³	3.3	2.97~3.63	12	8	83	1	100	82
PDME1-S3-S15-S ³	3.3	2.97~3.63	15	7	67	1	100	82
PDME1-S3-S24-S ³	3.3	2.97~3.63	24	4	42	1	100	84
PDME1-S3-D3-S ³	3.3	2.97~3.63	±3.3	±15	±152	1	100	78
PDME1-S3-D5-S ³	3.3	2.97~3.63	±5	±10	±100	1	100	82
PDME1-S3-D9-S ³	3.3	2.97~3.63	±9	±6	±56	1	100	85
PDME1-S3-D12-S ³	3.3	2.97~3.63	±12	±5	±42	1	100	82
PDME1-S3-D15-S ³	3.3	2.97~3.63	±15	±4	±34	1	100	82
PDME1-S3-D24-S ³	3.3	2.97~3.63	±24	±2	±21	1	100	84
PDME1-S5-S3-S	5	4.5~5.5	3.3	30	303	1	75	74
PDME1-S5-S5-S	5	4.5~5.5	5	20	200	1	75	82
PDME1-S5-S9-S	5	4.5~5.5	9	12	111	1	75	83
PDME1-S5-S12-S	5	4.5~5.5	12	9	84	1	75	83
PDME1-S5-S15-S	5	4.5~5.5	15	7	67	1	75	83
PDME1-S5-S24-S	5	4.5~5.5	24	4	42	1	100	85
PDME1-S5-D3-S ³	5	4.5~5.5	±3.3	±15	±152	1	75	74
PDME1-S5-D5-S	5	4.5~5.5	±5	±10	±100	1	75	82
PDME1-S5-D9-S	5	4.5~5.5	±9	±6	±56	1	75	83
PDME1-S5-D12-S	5	4.5~5.5	±12	±5	±42	1	75	83
PDME1-S5-D15-S	5	4.5~5.5	±15	±4	±34	1	75	83
PDME1-S5-D24-S	5	4.5~5.5	±24	±3	±21	1	100	85
PDME1-S12-S3-S	12	10.8~13.2	3.3	30	303	1	75	75
PDME1-S12-S5-S	12	10.8~13.2	5	20	200	1	75	80
PDME1-S12-S9-S	12	10.8~13.2	9	12	111	1	75	80

**MODEL
(CONTINUED)**

MODEL (CONTINUED)	input voltage		output voltage (Vdc)	output current		output power max (W)	ripple & noise ¹ max (mVp-p)	efficiency ² typ (%)
	typ (Vdc)	range (Vdc)		min (mA)	max (mA)			
PDME1-S12-S12-S	12	10.8~13.2	12	9	83	1	75	80
PDME1-S12-S15-S	12	10.8~13.2	15	7	67	1	75	81
PDME1-S12-S24-S	12	10.8~13.2	24	4	42	1	100	81
PDME1-S12-D3-S	12	10.8~13.2	±3.3	±15	±152	1	75	75
PDME1-S12-D5-S	12	10.8~13.2	±5	±10	±100	1	75	80
PDME1-S12-D12-S	12	10.8~13.2	±12	±5	±42	1	75	81
PDME1-S12-D15-S	12	10.8~13.2	±15	±4	±34	1	75	81
PDME1-S12-D24-S	12	10.8~13.2	±24	±3	±21	1	100	80
PDME1-S15-S5-S	15	13.5~16.5	5	20	200	1	75	80
PDME1-S15-S9-S	15	13.5~16.5	9	12	111	1	75	80
PDME1-S15-S12-S	15	13.5~16.5	12	9	83	1	75	80
PDME1-S15-S15-S	15	13.5~16.5	15	7	67	1	75	81
PDME1-S15-D5-S	15	13.5~16.5	±5	±10	±100	1	75	80
PDME1-S15-D9-S	15	13.5~16.5	±9	±5	±56	1	75	80
PDME1-S15-D12-S	15	13.5~16.5	±12	±5	±42	1	75	80
PDME1-S15-D15-S	15	13.5~16.5	±15	±4	±34	1	75	81
PDME1-S15-D24-S	15	13.5~16.5	±24	±2	±21	1	100	81
PDME1-S24-S3-S	24	21.6~26.4	3.3	30	303	1	75	75
PDME1-S24-S5-S	24	21.6~26.4	5	20	200	1	75	79
PDME1-S24-S9-S	24	21.6~26.4	9	12	111	1	75	80
PDME1-S24-S12-S	24	21.6~26.4	12	83	9	1	75	81
PDME1-S24-S15-S	24	21.6~26.4	15	7	67	1	75	81
PDME1-S24-S24-S	24	21.6~26.4	24	4	42	1	100	81
PDME1-S24-D5-S	24	21.6~26.4	±5	±10	±100	1	75	80
PDME1-S24-D12-S	24	21.6~26.4	±12	±5	±42	1	75	81
PDME1-S24-D15-S	24	21.6~26.4	±15	±4	±34	1	75	79
PDME1-S24-D24-S	24	21.6~26.4	±24	±3	±21	1	100	80

- 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. Model is not UL certified.
 4. All specifications are measured at Ta=25°C, humidity < 75%, nominal input voltage, and rated output load unless otherwise specified.

PART NUMBER KEY



INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage	3.3 Vdc input models	2.97	3.3	3.63	Vdc
	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				
	3.3 Vdc input models	-0.7		5	Vdc
	5 Vdc input models	-0.7		9	Vdc
	12 Vdc input models	-0.7		18	Vdc
	15 Vdc input models	-0.7		21	Vdc
current	at full load				
	3.3 Vdc input models			405	mA
	5 Vdc input models			389	mA
	12 Vdc input models			286	mA
	15 Vdc input models			254	mA
filter	at full load				
	3.3 Vdc output models			254	mA
	5 Vdc output models			254	mA
	12 Vdc output models			110	mA
	15 Vdc output models			88	mA
filter	at full load				
	3.3 Vdc output models			61	mA
	5 Vdc output models			61	mA
	12 Vdc output models			61	mA
	15 Vdc output models			61	mA

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, ±12, ±15 Vdc output models			220	μF
	±3.3, ±5 Vdc output models			1,200	μF
	±9 Vdc output models			470	μF
	all other output models			100	μF
voltage accuracy	see tolerance envelope curves				
line regulation	for Vin change of 1%				
	3.3 Vdc output models			±1.5	%
load regulation	all other models			±1.2	%
	from 10% to full load	3.3 Vdc output models		18	%
	3.3 input models	all other output models		15	%
	from 10% to full load	3.3 Vdc output models		±20	%
switching frequency	all other input models			±15	%
	100% load, nominal input voltage			±10	%
	3.3 Vdc input models		220		kHz
temperature coefficient	all other input models		270		kHz
	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, self recovery				

SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	input to output for 1 minute at 1 mA	1,500			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: EN/BS EN				
conducted emissions	CISPR32/EN55032, class B (external circuit required, see Figure 3)				
radiated emissions	CISPR32/EN55032, class B (external circuit required, see Figure 3)				
ESD	IEC/EN61000-4-2, air ± 8 kV; contact ± 4 kV, class B				
MTBF	as per MIL-HDBK-217F, 25°C	3,500,000			hours
RoHS	yes				

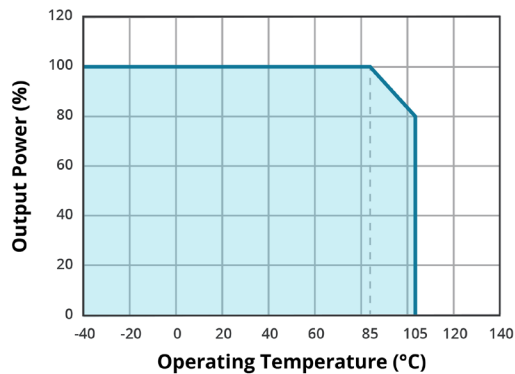
Note: 6. Model PDME1-S5-D3-S does not have UL or CE certification.

ENVIRONMENTAL

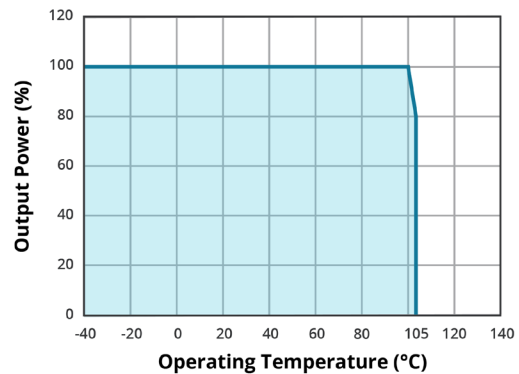
parameter	conditions/description	min	typ	max	units
operating temperature	see derating curves	-40		105	°C
storage temperature		-55		125	°C
storage humidity	non-condensing			95	%
case temperature rise	3.3 Vdc output model at 25°C all other models at 25°C		25 15		°C °C

DERATING CURVES

TEMPERATURE DERATING CURVE
5 Vdc input models



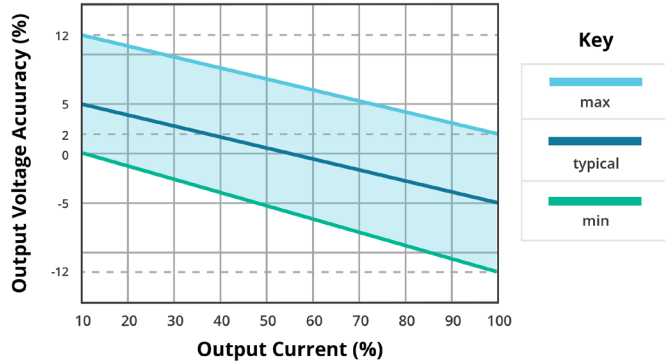
TEMPERATURE DERATING CURVE
all other input models



DERATING CURVES (CONTINUED)

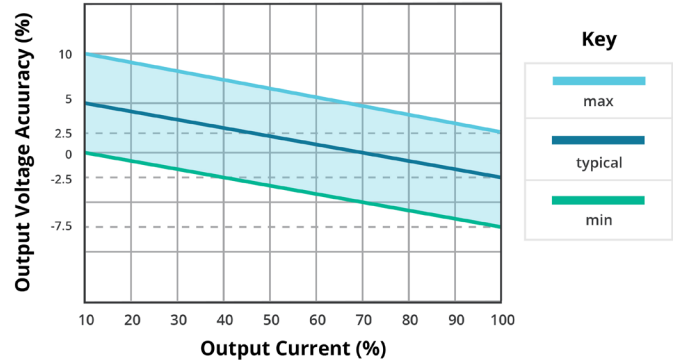
OUTPUT REGULATION CURVE

3.3, 5, 12, 15 & 24 Vdc input models / 3.3 Vdc output model
(nominal input)



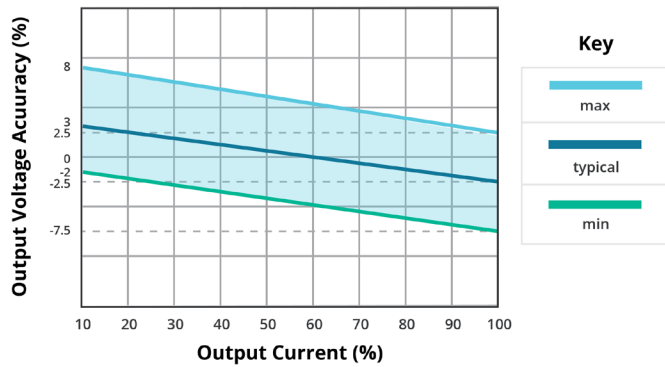
OUTPUT REGULATION CURVE

3.3 & 5 Vdc input / all other output models
(nominal input)



OUTPUT REGULATION CURVE

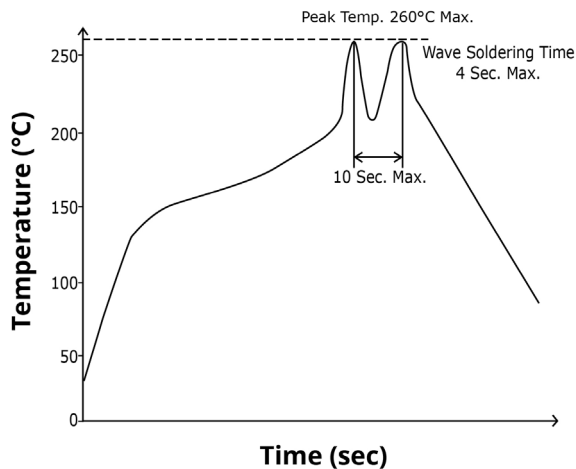
12, 15 & 24 Vdc input models / all other output models
(nominal input)



SOLDERABILITY

parameter	conditions/description	min	typ	max	units
hand soldering	1.5 mm from case for 10 seconds			300	°C
wave soldering	see wave soldering profile			260	°C

WAVE SOLDERING PROFILE



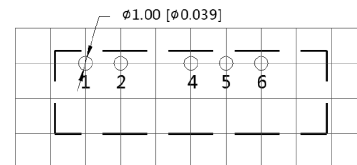
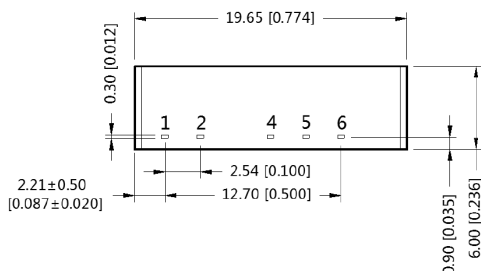
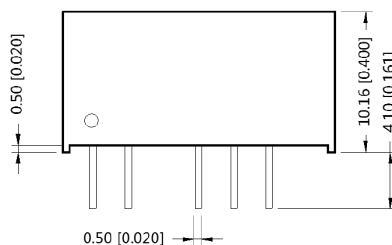
MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	19.65 x 6.00 x 10.16 [0.774 x 0.236 x 0.400 inch]				mm
case material	black flame-retardant and heat-resistant plastic (UL94V-0)				
weight			2.1		g

MECHANICAL DRAWING

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

PIN CONNECTIONS		
PIN	Function	
	Single	Dual
1	Vin	Vin
2	GND	GND
4	0V	-Vout
5	No Pin	0V
6	+Vout	+Vout



Note : Grid 2.54*2.54mm
Recommended PCB Layout
Top View

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

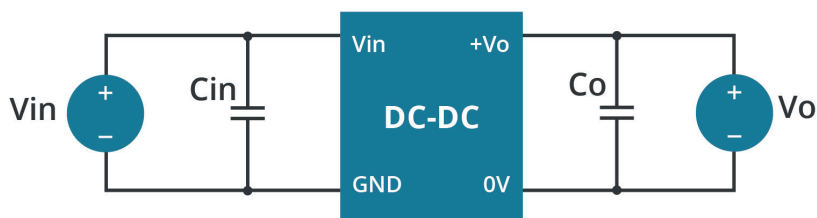


Table 1

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

Figure 2
Dual Output Models

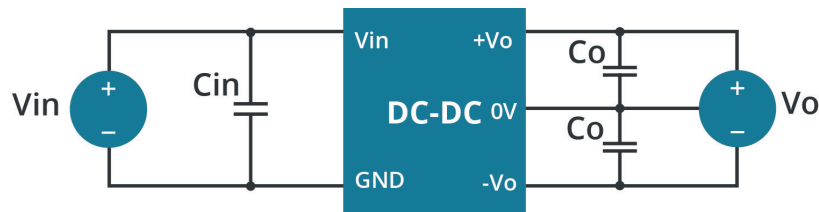


Table 2

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

EMC RECOMMENDED CIRCUIT

Figure 3
Single Output Models

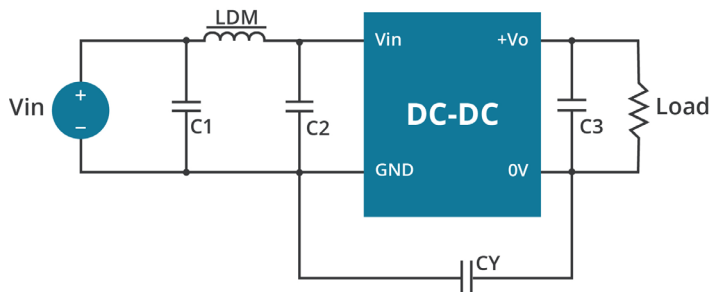


Figure 4
Dual Output Models

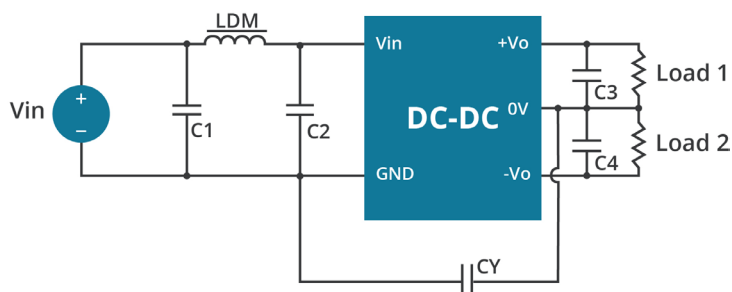


Table 3

Recommended External Circuit Components			
Vin (Vdc)	Vo (Vdc)	3.3, 5	9, 12, 15, 24
3.3	C1, C2	4.7 μ F / 25 V	4.7 μ F / 25 V
	CY	--	270 pF / 2 kVdc
	C3	refer to Cout in Tables 1, 2	
	LDM	6.8 μ H	6.8 μ H
Vin (Vdc)	Vo (Vdc)	3.3, 5, 9	12, 15, 24
5	C1, C2	4.7 μ F / 25 V	4.7 μ F / 25 V
	CY	--	1 nF / 4 kVdc
	C3	refer to Cout in Tables 1, 2	
	LDM	6.8 μ H	6.8 μ H
Vin (Vdc)	Vo (Vdc)	3.3, 5, 9	12, 15, 24
12, 15, 24	C1, C2	4.7 μ F / 50 V	4.7 μ F / 50 V
	CY	270 pF / 2 kVdc	270 pF / 2 kVdc
	C3, C4	refer to Cout in Tables 1, 2	
	LDM	6.8 μ H	6.8 μ H

REVISION HISTORY

rev.	description	date
1.0	initial release	05/10/2019
1.01	safeties updated in features and safety line	01/12/2021
1.02	model table updated, packaging removed	03/08/2021
1.03	3.3 Vdc input model added, derating curves and circuit figures updated	05/26/2022
1.04	CE removed	11/04/2022
1.05	PDME1-S15-D9-S & PDME1-S15-D24-S added	08/15/2023

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



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