

**SERIES:** PDQE30-D | **DESCRIPTION:** DC-DC CONVERTER

**FEATURES**

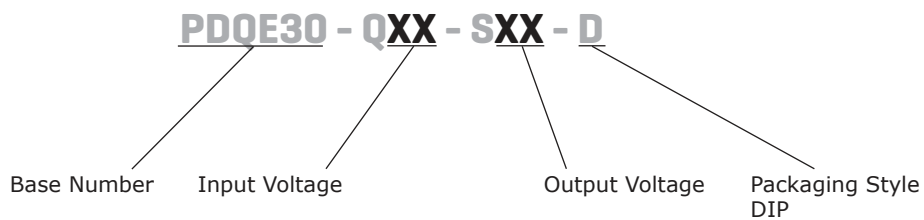
- 30W isolated output
- 1500 Vdc isolation
- 1 x 1 inch industry standard package
- ultra-wide 4:1 input voltage range
- EN62368 approved
- wide temperature range: -40°C to +85°C
- high efficiency up to 88%
- input under-voltage protection, output short circuit, over-current, over-voltage protection



MODEL	input voltage		output voltage (Vdc)	output current		output power max (W)	ripple and noise <sup>1</sup> max (mVp-p)	efficiency typ (%)
	typ (Vdc)	range (Vdc)		min (mA)	max (mA)			
PDQE30-Q48-S5-D	48	18~75	5	0	6000	30	120	88
PDQE30-Q48-S12-D	48	18~75	12	0	2500	30	120	88
PDQE30-Q48-S15-D	48	18~75	15	0	2000	30	120	88
PDQE30-Q48-S24-D	48	18~75	24	0	1250	30	150	88

Note: 1. Ripple & noise testing condition at nominal input voltage and 5%-100% load, 20MHz bandwidth

**PART NUMBER KEY**



## INPUT

parameter	conditions/description	min	typ	max	units
input voltage		18	48	75	Vdc
start-up voltage	nominal input voltage			18	Vdc
surge voltage	nominal input voltage	-0.7		100	Vdc
filter	capacitance filter				
current	nominal input voltage (full load/no load)		710/8	735/15	mA
under-voltage lockout		12	15.5		Vdc
start-up time	nominal input voltage		10		mS
CTRL <sup>1</sup>	module on - open or pulled high	3.5		12	Vdc
	module off - pulled low to GND	0		1.2	Vdc
	input current when off		2	7	mA

Note: 1. CTRL is referenced to GND

## OUTPUT

parameter	conditions/description	min	typ	max	units
line regulation	min to max Vin		±0.2	±0.5	%
load regulation	5% ~ 100% load		±0.5	±1	%
set-point accuracy			±1	±3	%
switching frequency	PWM mode		270		kHz
transient response	25% load step change		±3	±8	%
	5V output		±3	±5	%
	others				
temperature coefficient	full load			±0.03	%/°C
adjustability	via trim pin		±10		%

## PROTECTIONS

parameter	conditions/description	min	typ	max	units
over voltage protection		110		160	%Vo
over current protection		110		260	%Io
short circuit protection	continuous, self-recovery				

## SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	input-output electric strength test for 1 minute	1500			Vdc
isolation resistance	input-output insulation at 500 Vdc	1000			MΩ
isolation capacitance	input-output capacitance at 100 KHz / 0.1 V		2000		pF
safety approvals	EN62368 approved				
EMC	CISPR32/EN55032 Class B (see recommended circuit)				
ESD	IEC/EN61000-4-2, Contact ±6K, perf. Criteria B				
radiated immunity	IEC/EN61000-4-3, 10 v/m, perf. Criteria B				
EFT/burst	IEC/EN61000-4-4, ±2KV, perf. Criteria B (see recommended circuit)				
surge	IEC/EN61000-4-5, line to line ±2KV, perf. Criteria B (see recommended circuit)				
conducted immunity	IEC/EN61000-4-6 3 Vrms, perf. Criteria B				
RoHS	yes				
MTBF	MIL-HDBK-217F @ 25°C	1000			kHours

## ENVIRONMENTAL

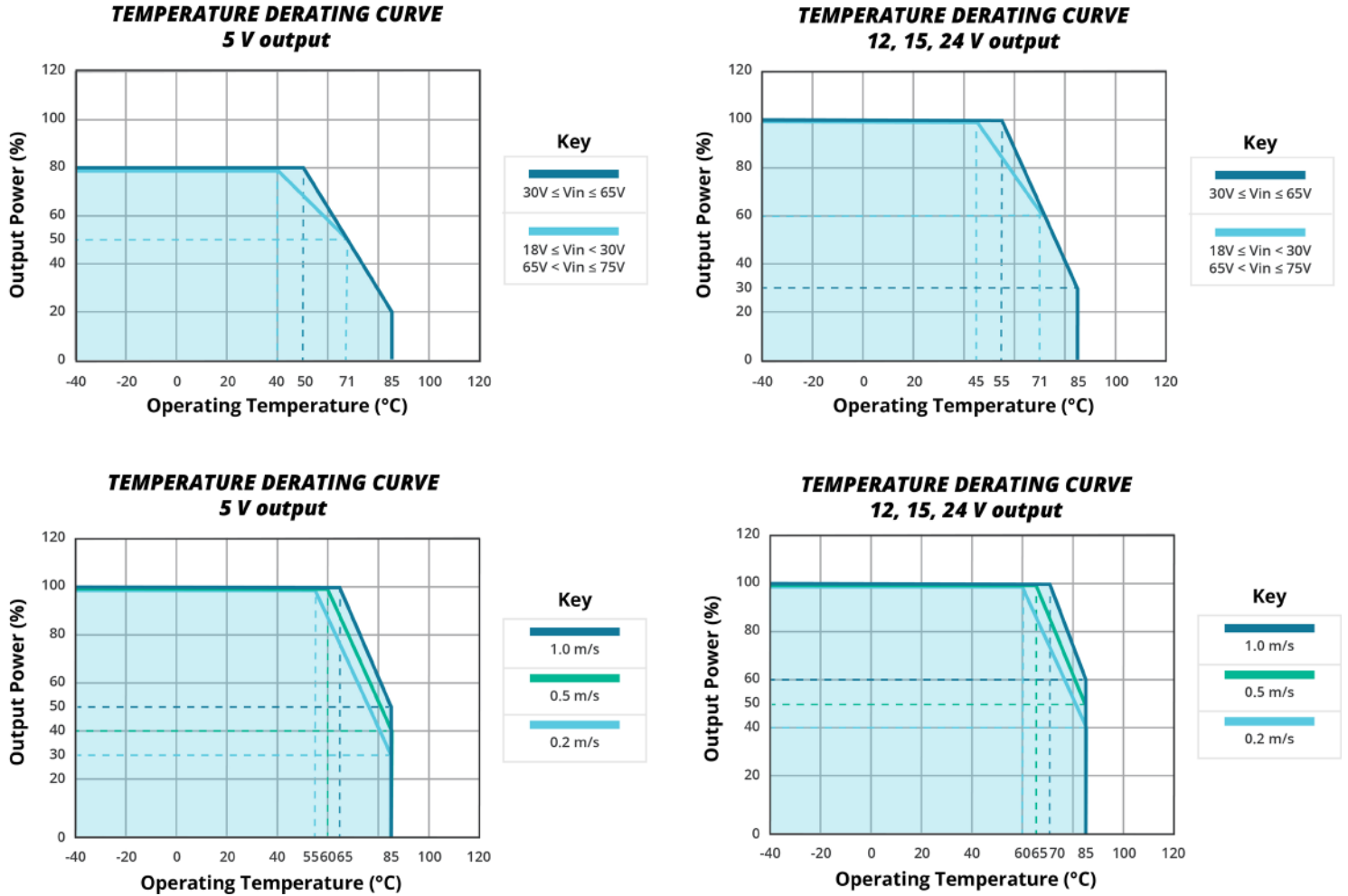
parameter	conditions/description	min	typ	max	units
operating temperature		-40		85	°C
storage temperature		-55		125	°C
humidity	non-condensing	5		95	%

## SOLDERABILITY

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

## DERATING CURVES

Figure 1



Note:

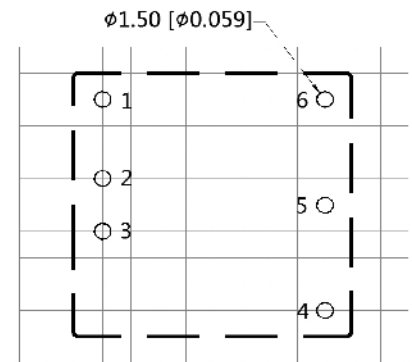
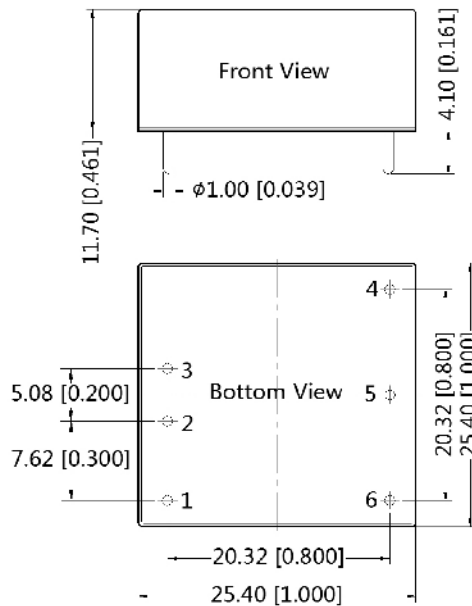
## MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	25.40 × 25.40 × 11.70 mm				inch
case material	aluminum alloy				
weight			18.4		g

## MECHANICAL DRAWING

units: inches [mm]  
tolerance: ± 0.50 [±0.020]

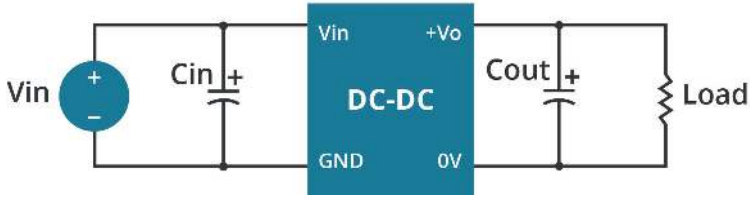
PIN CONNECTIONS	
PIN	FUNCTION
1	Ctrl
2	GND
3	Vin
4	Vo
5	Trim
6	0V



Note: Grid 2.54\*2.54mm

## TYPICAL APPLICATION CIRCUIT

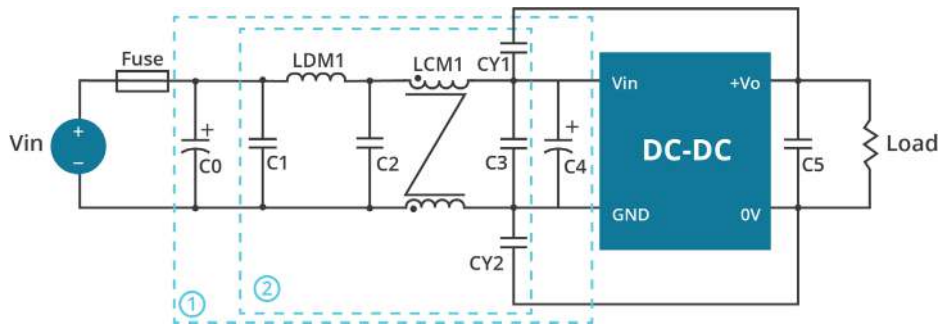
Figure 2



Vout (Vdc)	Cin (μF)	Cout (μF)
5/12/15	100	100
24		47

## EMC COMPLIANCE CIRCUITS

Figure 3

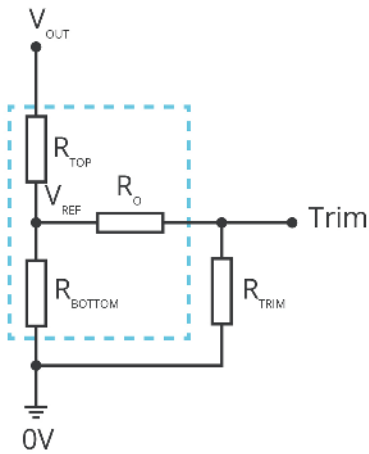


Note: We use Part ① in Fig. 3 for Immunity tests and Part ② for Emissions test. Selecting based on needs.

Model	Vin: 48 V
FUSE	Choose according to actual input current
C0, C4	470μF/100V
C1	10μF/100V
LDM1	22uH/3A
C2	22uF/100V
LCM1	1.4mH/3A
C3	22uF/100V
C5	Refer to the Cout Fig.2
CY1, CY2	1nF/2KV

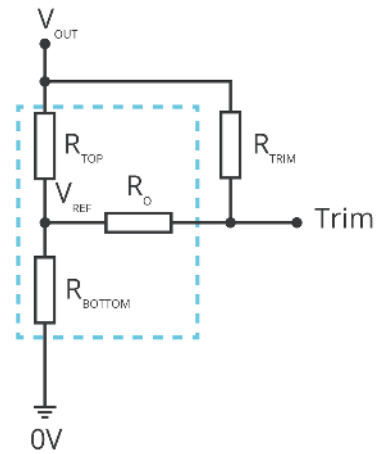
## TRIM FUNCTION FOR OUTPUT VOLTAGE ADJUSTMENT

Trim up



Trim resistor connection (dashed line shows internal resistor network).

Trim down



$$R_{TRIM} = \frac{a \cdot R_{BOTTOM}}{R_{BOTTOM} - a} - R_O \quad a = \frac{V_{REF}}{V_{OUT} - V_{REF}} \cdot R_{TOP}$$

Formula for Trim up

$$R_{TRIM} = \frac{a \cdot R_{TOP}}{R_{TOP} - a} - R_O \quad a = \frac{V_{OUT} - V_{REF}}{V_{REF}} \cdot R_{BOTTOM}$$

Formula for Trim down

$V_{NOM}$	$R_{TOP}$	$R_{BOTTOM}$	$R_O$	$V_{REF}$
(Vdc)	(kΩ)	(kΩ)	(kΩ)	(V)
5	8.832	2.87	10	1.24
12	11.00	2.87	8.2	2.5
15	14.40	2.87	10	2.5
24	24.87	2.87	7.5	2.5

Note: Value for  $R_{TOP}$ ,  $R_{BOTTOM}$ ,  $R_O$ , and  $V_{REF}$  refer to Table 4 (fixed internal values).

$R_{TRIM}$ : Trim resistance

$a$ : User-defined parameter, no actual meanings

$V_{NOM}$ : Nominal output voltage

$V_{OUT}$ : Target output voltage

## REVISION HISTORY

rev.	description	date
1.0	initial release	03/28/2020
1.01	derating curve and circuit figures updated	08/24/2021
1.02	adjustability limits added	03/14/2022
1.03	output voltage trimming updated	05/23/2023

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  
**cuicom**  
techsupport@cuicom

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