CUI INC
a bel group

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

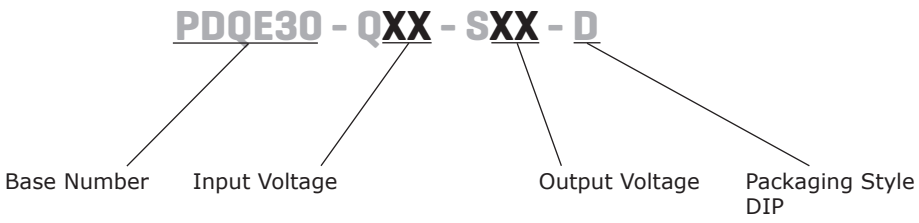
RoHS CE

MODEL

MODEL	input voltage typ (Vdc)	input voltage range (Vdc)	output voltage (Vdc)	output current min (mA)	output current max (mA)	output power max (W)	ripple and noise[1] max (mVp-p)	efficiency typ (%)
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[1]	module on - open or pulled high module off - pulled low to GND input current when off	3.5 0	 2	12 1.2 7	Vdc Vdc 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 5V output others		 ±3 ±3	 ±8 ±5	 % %
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

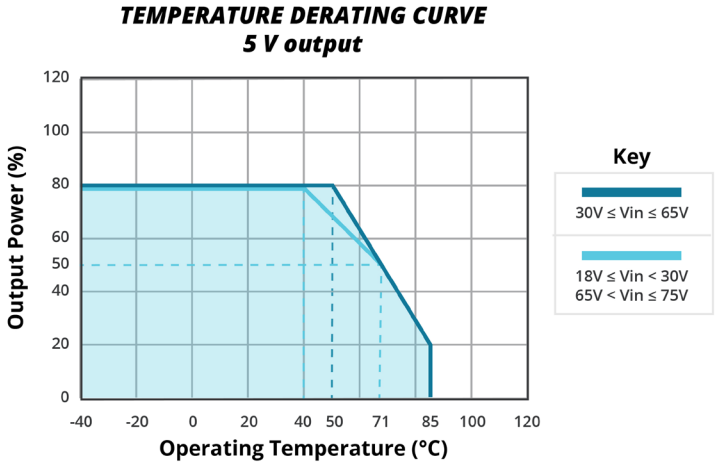
parameter	conditions/description	min	typ	max	units
operating temperature		-40		85	°C
storage temperature		-55		125	°C
humidity	non-condensing	5		95	%

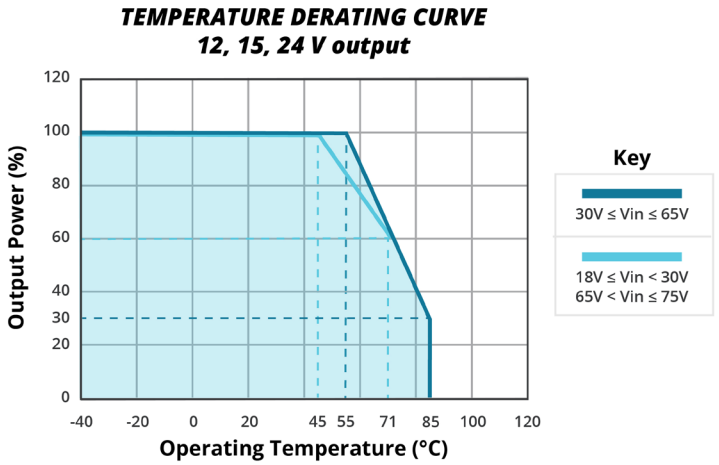
SOLDERABILITY

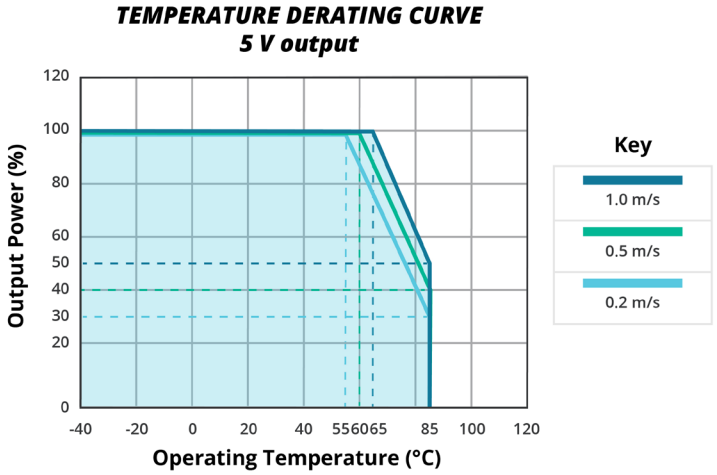
parameter	conditions/description	min	typ	max	units
hand soldering	1.5 mm from case for 10 seconds			300	°C

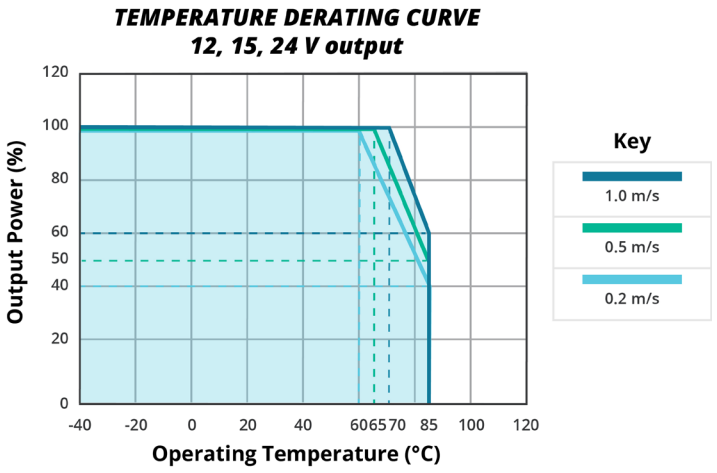
DERATING CURVES

Figure 1









Note:

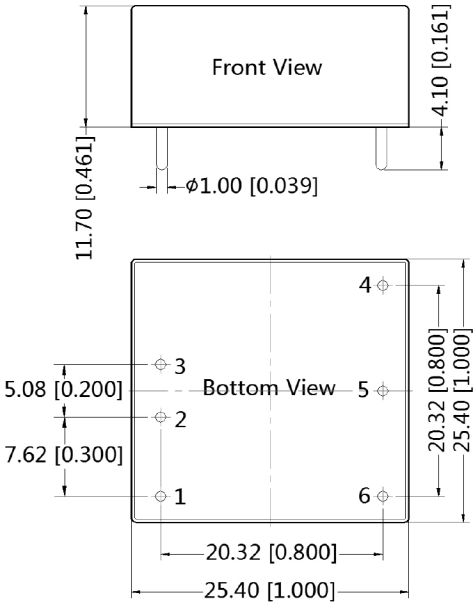
MECHANICAL

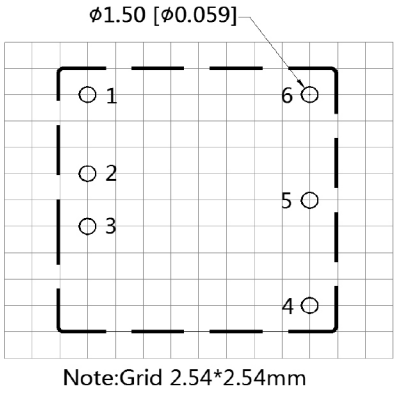
parameter	conditions/description	min	typ	max	units
dimensions	25.40 × 25.40 × 11.70 mm				inch
case material	aluminum alloy				
weight			18.4		g

MECHANICAL DRAWING

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

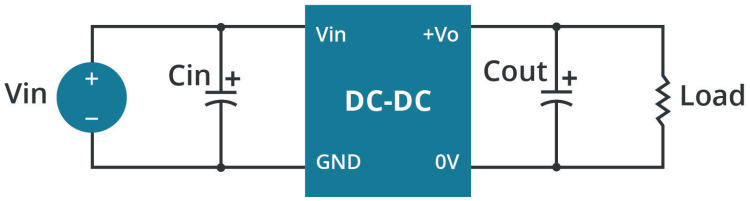
PIN CONNECTIONS	
PIN	FUNCTION
1	Ctrl
2	GND
3	Vin
4	Vo
5	Trim
6	0V





TYPICAL APPLICATION CIRCUIT

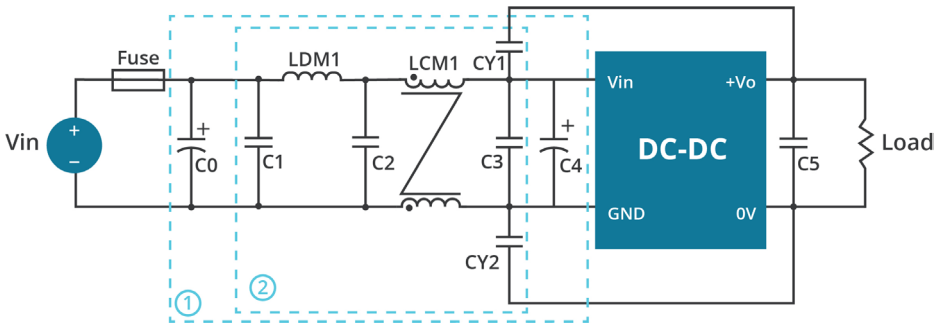
Figure 2



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

EMC COMPLIANCE CIRCUITS

Figure 3

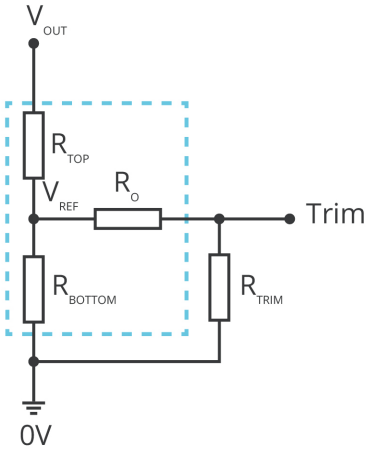


Note: We use Part ① in Fig. 3 for Immunity tests and Part ② for Emissions test. Selecting based on needs.

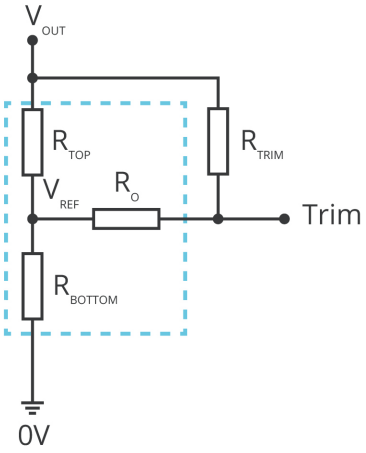
Model	Vin: 48 V
FUSE	Choose according to actual input current
C0, C4	470μF/100V
C1	10μF/100V
LDM1	22uH/3A
C2	22uF/100V
LCM1	1.4mH/3A
C3	22uF/100V
C5	Refer to the Cout Fig.2
CY1, CY2	1nF/2KV

TRIM FUNCTION FOR OUTPUT VOLTAGE ADJUSTMENT

Trim up



Trim down



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

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

Formula for Trim up

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

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.

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