CUI INC
a bel group

SERIES: PQDE6W-U | DESCRIPTION: DC-DC CONVERTER

FEATURES

- high efficiency up to 88%
- single and dual output models available
- same side input/output connections
- 1,500 Vdc isolation
- industrial operating temp -40~85 °C
- wide 4:1 input range
- input under-voltage, output short-circuit, over-current, & over-voltage protections
- EN/BS EN 62368-1 certified

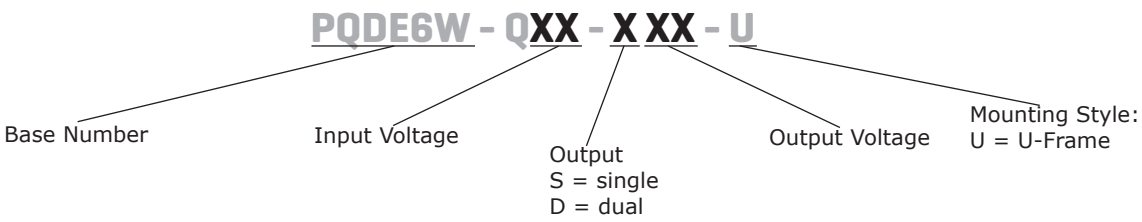
RoHS CE UKCA

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 & noise[1] max (mVp-p)	efficiency[2] typ (%)
PQDE6W-Q24-D5-U[3]	24	9~36	±5	0	±600	6	85	83
PQDE6W-Q24-D12-U[3]	24	9~36	±12	0	±250	6	85	87
PQDE6W-Q24-D15-U[3]	24	9~36	±15	0	±200	6	85	85
PQDE6W-Q24-D24-U[3]	24	9~36	±24	0	±125	6	85	87
PQDE6W-Q24-S3-U[3]	24	9~36	3.3	0	1500	4.95	85	77
PQDE6W-Q24-S5-U[3]	24	9~36	5	0	1200	6	85	83
PQDE6W-Q24-S9-U[3]	24	9~36	9	0	667	6	85	84
PQDE6W-Q24-S12-U[3]	24	9~36	12	0	500	6	85	85
PQDE6W-Q24-S15-U[3]	24	9~36	15	0	400	6	85	86
PQDE6W-Q24-S24-U[3]	24	9~36	24	0	250	6	85	86
PQDE6W-Q48-D5-U	48	18~75	±5	0	±600	6	85	83
PQDE6W-Q48-D12-U	48	18~75	±12	0	±250	6	85	87
PQDE6W-Q48-D15-U	48	18~75	±15	0	±200	6	85	88
PQDE6W-Q48-S3-U	48	18~75	3.3	0	1500	4.95	85	79
PQDE6W-Q48-S5-U	48	18~75	5	0	1200	6	85	83
PQDE6W-Q48-S12-U	48	18~75	12	0	500	6	85	87
PQDE6W-Q48-S15-U	48	18~75	15	0	400	6	85	88
PQDE6W-Q48-S24-U	48	18~75	24	0	250	6	85	88

Notes:
1. From 5~100% load, nominal input, 20 MHz bandwidth oscilloscope. From 0~5% load, ripple and noise is <5% Vo.
2. Measured at nominal input voltage and rated output load.
3. Model is not CE 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	24 Vdc input models 48 Vdc input models		9 18	24 48	40 80	Vdc Vdc
start-up voltage	24 Vdc input models 48 Vdc input models				9 18	Vdc Vdc
surge voltage	for maximum of 1 second 24 Vdc input models 48 Vdc input models		 -0.7 -0.7		 50 100	 Vdc Vdc
under voltage shutdown	24 Vdc input models 48 Vdc input models		5.5 12	6.5 15.5		Vdc Vdc
input current	24 Vdc input models at nominal voltage	3.3 Vdc output all other models		268/5 301/5	275/12 312/12	mA mA
	48 Vdc input models at nominal input voltage	3.3 Vdc output all other models		130/4 150/4	134/8 155/8	mA mA
reflected ripple current	at nominal input voltage			20		mA
filter	Pi filter					
input reverse polarity protection	no					
no load power consumption				0.12		W

OUTPUT

parameter	conditions/description	min	typ	max	units
maximum capacitive load[1]	3.3 Vdc output models 5 Vdc output models 9 Vdc output models 12, ±5 Vdc output models 15 Vdc output models all other models			1,800 1,000 680 470 220 100	µF µF µF µF µF µF
total regulation[2]	0% to full load		±1	±3	%
line regulation	from low line to high line, full load positive outputs negative outputs		 ±0.2 ±0.5	 ±0.5 ±1	 % %
load regulation[3]	from 5% to full load positive outputs negative outputs		 ±0.5 ±0.5	 ±1 ±1.5	 % %
cross regulation	dual output models: main output 50% load secondary output from 10~100% load			±5	%
switching frequency[4]	PWM mode		300		kHz

OUTPUT (CONTINUED)

parameter	conditions/description	min	typ	max	units
transient response deviation	25% load step change, nominal input voltage 3.3, 5, ±5 Vdc output models all other models		 ±5 ±3	 ±8 ±5	 % %
transient recovery time	25% load step change, nominal input voltage		300	500	µs
temperature coefficient	at full load			±0.03	%/°C

Note:
1. The specified maximum capacitive load value for positive and negative output is identical.
2. Output voltage accuracy of ±5 & ±9 Vdc ouput converter for 0~5% load is ±5% max.
3. At 0~100% load, the max load regulation is ±5%.
4. Value is based on full load. At loads <50%, the switching frequency decreases with decreasing load.

PROTECTIONS

parameter	conditions/description	min	typ	max	units
over voltage protection		110		160	%
over current protection		110	140	190	%
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 max	1,500			Vdc
isolation resistance	input to output at 500 Vdc	1,000			MΩ
isolation capacitance	input to output, 100 kHz / 0.1 V		1,000		pF
safety approvals	certified to 62368: EN/BS EN				
conducted emissions	CISPR32/EN55032 Class A (w/o external components), Class B (see Fig. 3-2 for recommended circuit) EN50121-3-2 150kHz-500kHz 99dBuV (see Fig. 3-2 for recommended circuit) EN55016-2-1 500kHz-30MHz 93dBuV (see Fig. 3-2 for recommended circuit)				
radiated emissions	CISPR32/EN55032 Class A (w/o external components), Class B (see Fig. 3-1 for recommended circuit) EN50121-3-2 30MHz-230MHz 40dBuV/m at 10m, 230MHz-1GHz 47dBuV/m at 10m (see Fig. 3-1 for recommended circuit)				
ESD	IEC/EN61000-4-2 Contact ±4kV, perf. Criteria B EN50121-3-2 Contact ±6kV/Air ±8kV, perf. Criteria A				
radiated immunity	IEC/EN61000-4-3 10V/m, perf. Criteria A EN50121-3-2 20V/m, perf. Criteria A				
EFT/burst	IEC/EN61000-4-4 ±2kV (See Fig. 3-1 for recommended circuit), perf. Criteria B EN50121-3-2 ±2kV 5/50ns 5kHz (See Fig. 3-1 for recommended circuit), perf. Criteria A				
surge	IEC/EN61000-4-5 line to line ±2KV (see Fig. 3-1 for recommended circuit), perf. Criteria A EN50121-3-2 line to line ±1KV (see Fig. 3-1 for recommended circuit), perf. Criteria A				
conducted immunity	IEC/EN61000-4-6 3 Vr.m.s, perf. Criteria A EN50121-3-2 10 Vr.m.s, perf. Criteria A				
voltage dips & interruptions	IEC/EN61000-4-29, 0%-70%, perf. Criteria B				
MTBF	as per MIL-HDBK-217F, 25°C	1,000,000			hours
RoHS	yes				

ENVIRONMENTAL

parameter	conditions/description	min	typ	max	units
operating temperature	see derating curve	-40		85	°C
storage temperature		-55		125	°C
storage humidity	non-condensing	5		95	%
vibration	IEC/EN61373 - Category 1, Grade B		10		G

SOLDERABILITY

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

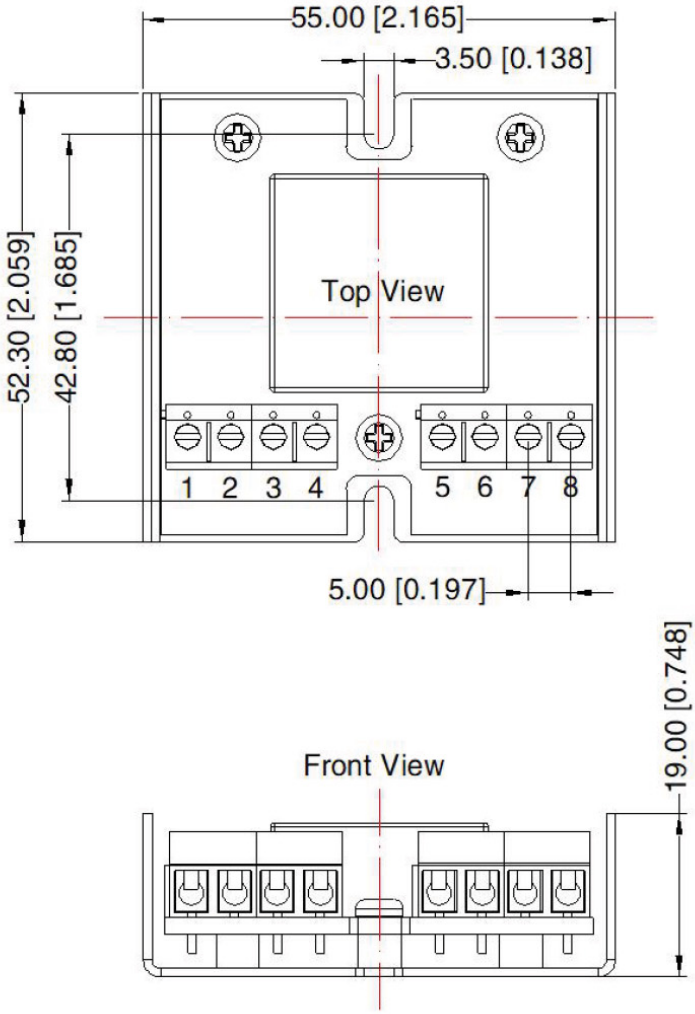
MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	55.00 x 52.30 x 19.00 [2.165 x 2.059 x 0.748 inch]				mm
case material	aluminum alloy				
weight			43.5		g

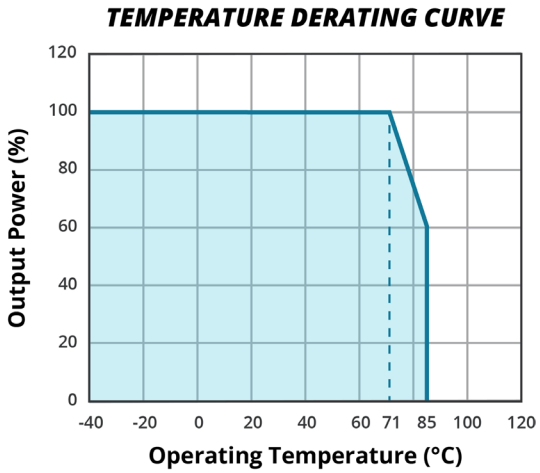
MECHANICAL DRAWING

units: mm [inch]
wire range: 24-12 AWG
tightening torque: Max 0.4 N·m
tolerance: ±1.00[±0.039]

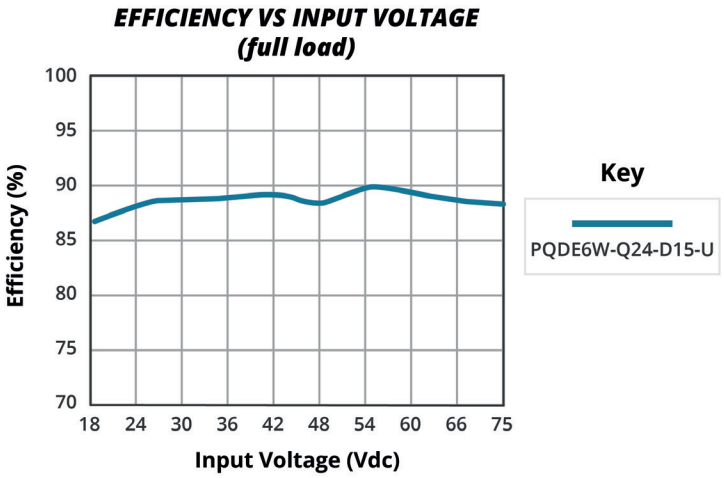
PIN CONNECTIONS		
PIN	Function	
	Single	Dual
1	GND	GND
2	Vin	Vin
3	NC	NC
4	Case	Case
5	NC	NC
6	+Vo	+Vo
7	NC	0V
8	0V	-Vo

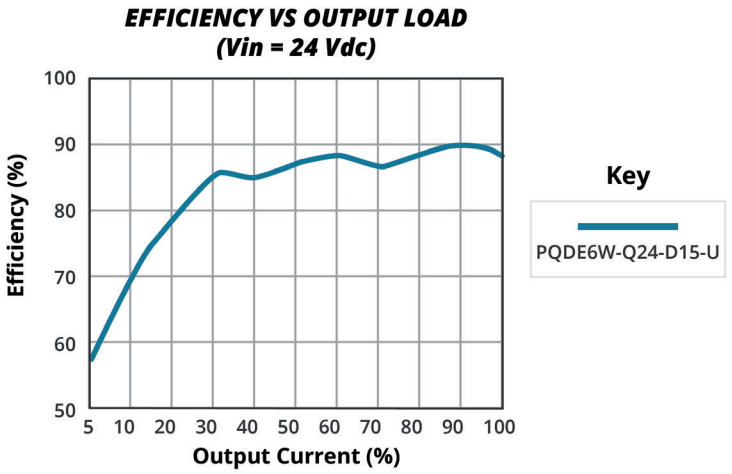


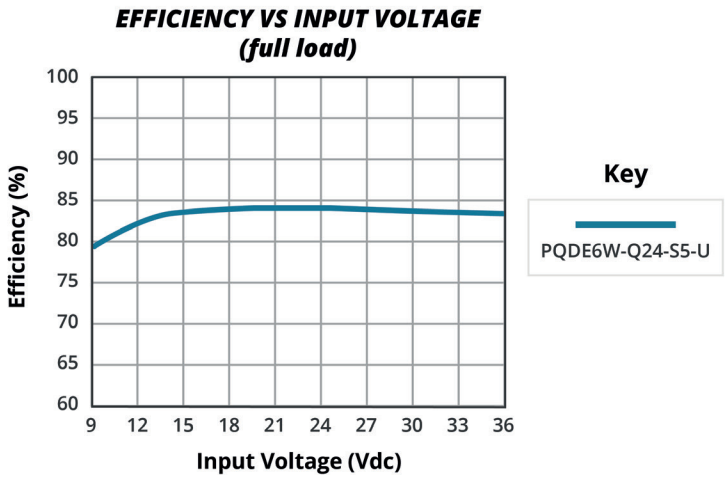
DERATING CURVE

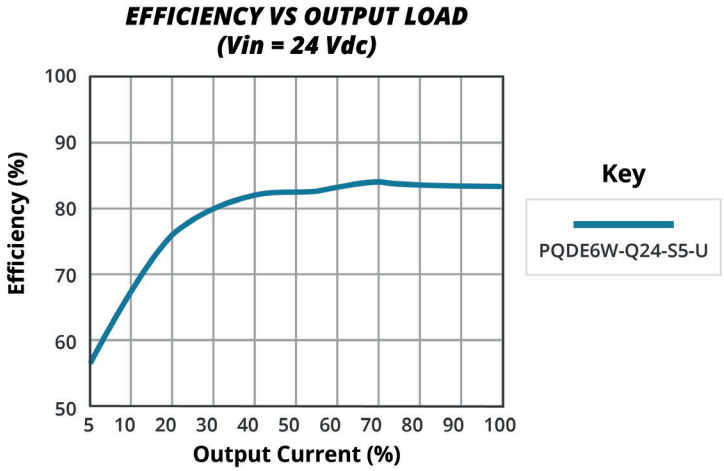


EFFICIENCY CURVES









APPLICATION CIRCUIT

This series has been tested according to the following recommended circuits (Figures 1 & 2) before leaving the factory. If you want to further reduce the input and output ripple, you can increase the input and output capacitors or select capacitors of low equivalent impedance provided that the capacitance is less than the maximum capacitive load of the model.

Figure 1
Single Output Models

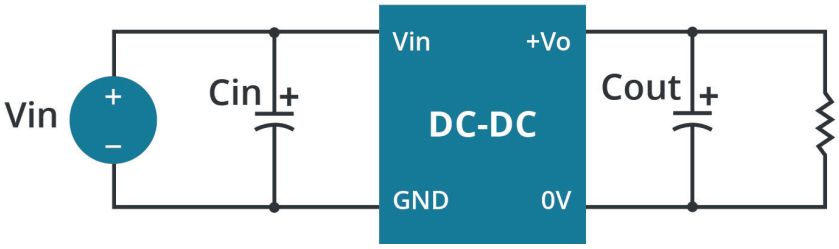


Figure 2
Dual Output Models

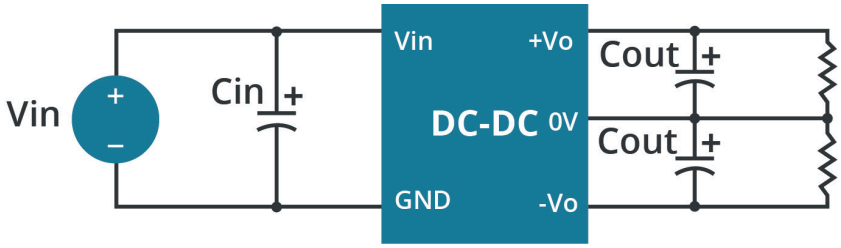


Table 1

Vin (Vdc)	Cin (μF/V)	Cout (μF/V)
24	100 μF/50 V	10 μF/50 V
48	10 μF ~ 47 μF / 100 V	10 μF/50 V

EMC RECOMMENDED CIRCUIT

Figure 3

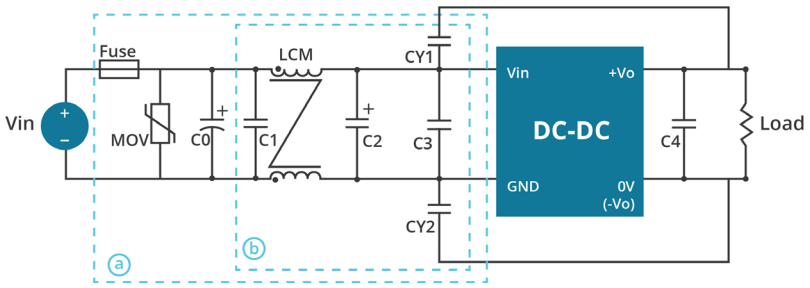


Table 2

Recommended External Circuit Components		
Vin (Vdc)	24	48
FUSE	choose according to actual input current	
MOV	S20K30	S14K60
C0	680 μF / 50 V	680 μF / 100 V
C1	1 μF / 50 V	1 μF / 100 V
C2	330 μF / 50 V	330 μF / 50 V
C3	4.7 μF / 50 V	4.7 μF / 100 V
C4	refer to the Cout in Fig. 1 & 2	
LCM	4.7 mH	
CY1, CY2	1 nF / 2 kV	

Notes: For EMC tests part ① in Figure 3 was used for immunity and part ② for emissions test. Selecting based on needs.

REVISION HISTORY

rev.	description	date
1.0	initial release	11/07/2022

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

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