CUI INC
a bel group

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

FEATURES

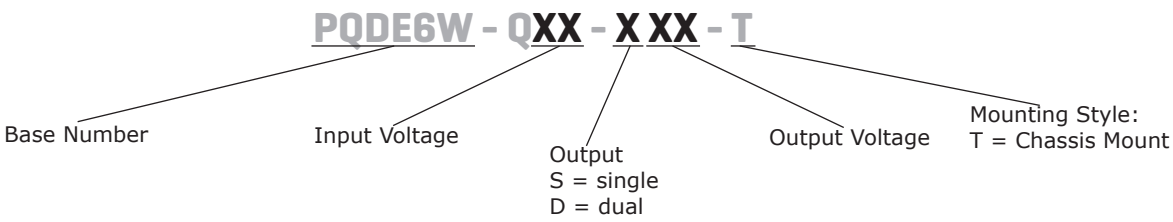
- industry standard footprint
- high efficiency up to 88%
- single and dual output models available
- chassis mount
- 1500 Vdc isolation
- industrial operating temp -40~+85 °C
- 4:1 wide input range
- input under voltage protection & over voltage protection
- over current protection
- EN 62368-1

RoHS CE cULus

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 (%)
PQDE6W-Q24-S3-T	24	10~36	3.3	0	1500	4.95	85	79
PQDE6W-Q24-S5-T	24	10~36	5	0	1200	6	85	83
PQDE6W-Q24-S9-T	24	10~36	9	0	667	6	85	85
PQDE6W-Q24-S12-T	24	10~36	12	0	500	6	85	87
PQDE6W-Q24-S15-T	24	10~36	15	0	400	6	85	88
PQDE6W-Q24-S24-T	24	10~36	24	0	250	6	85	88
PQDE6W-Q24-D5-T	24	10~36	±5	0	±600	6	85	83
PQDE6W-Q24-D12-T	24	10~36	±12	0	±250	6	85	87
PQDE6W-Q24-D15-T	24	10~36	±15	0	±200	6	85	88
PQDE6W-Q24-D24-T	24	10~36	±24	0	±125	6	85	88
PQDE6W-Q48-S3-T	48	19~75	3.3	0	1500	4.95	85	79
PQDE6W-Q48-S5-T	48	19~75	5	0	1200	6	85	83
PQDE6W-Q48-S12-T	48	19~75	12	0	500	6	85	87
PQDE6W-Q48-S15-T	48	19~75	15	0	400	6	85	88
PQDE6W-Q48-S24-T	48	19~75	24	0	250	6	85	88
PQDE6W-Q48-D5-T	48	19~75	±5	0	±600	6	85	83
PQDE6W-Q48-D12-T	48	19~75	±12	0	±250	6	85	87
PQDE6W-Q48-D15-T	48	19~75	±15	0	±200	6	85	88

Notes:
1. From 5~100% load, nominal input, 20 MHz bandwidth oscilloscope, with 10 µF tantalum and 1 µF ceramic capacitors on the output. From 0~5% load, ripple and noise is <5% Vo.
2. Measured at nominal input voltage, full load.
3. 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		10 19	24 48	36 75	Vdc Vdc
start-up voltage	24 Vdc input models 48 Vdc input models				10 19	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
current	24 Vdc input models	3.3 Vdc output models all other models			268 309	mA mA
	48 Vdc input models	3.3 Vdc output models all other models			134 155	mA mA
filter	Pi filter					
input reverse polarity protection	yes					
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
voltage accuracy[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	 % %
voltage balance[4]	dual output models			±5	%
cross regulation	dual output models: main output 50% load secondary output from 10~100% load			±5	%
switching frequency[5]	PWM mode		300		kHz
transient recovery time	25% load step change, nominal input voltage		300	500	µs

Note:
1. Tested at input voltage range and full load.
2. At 0~5% load, the max output voltage accuracy for the ±5 & ±9 Vdc output models is ±5%.
3. At 0~100% load, the max load regulation is ±5%.
4. Unbalanced loads should not exceed ±5%. If ±5% is exceeded, the product performance cannot be guaranteed.
5. Value is based on full load. At loads <50%, the switching frequency decreases with decreasing load.

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	 % %
temperature coefficient	at full load			±0.03	%/°C

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	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 62368-1: EN certified to 60950-1: UL				
conducted emissions	CISPR22/EN55022, class A (no external circuit); class B (external circuit required, see Figure 3-b)				
radiated emissions	CISPR22/EN55022, class A (no external circuit); class B (external circuit required, see Figure 3-b)				
ESD	IEC/EN61000-4-2, contact ± 4kV, class B				
radiated immunity	IEC/EN61000-4-3, 10V/m, class A				
EFT/burst	IEC/EN61000-4-4, ± 2kV, class B (external circuit required, see Figure 3-a)				
surge	IEC/EN61000-4-5, line-line ± 2kV, class B (external circuit required, see Figure 3-a)				
conducted immunity	IEC/EN61000-4-6, 3 Vr.m.s, class A				
voltage dips & interruptions	IEC/EN61000-4-29, 0%-70%, class B				
MTBF	as per MIL-HDBK-217F, 25°C	1,000,000			hours
RoHS	2011/65/EU				

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	10~55 Hz for 30 minutes on each axis		10		G

MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	76.00 x 31.50 x 21.20 [2.992 x 1.240 x 0.835 inch]				mm
case material	aluminum alloy				
weight			36		g

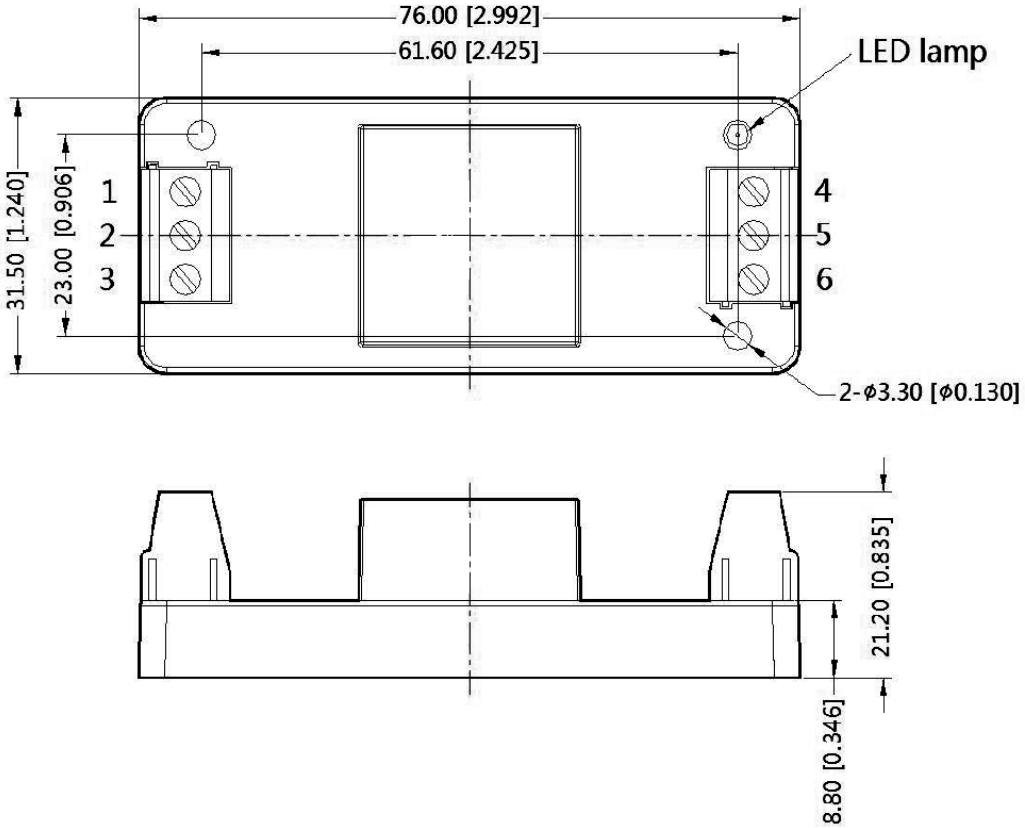
MECHANICAL DRAWING

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

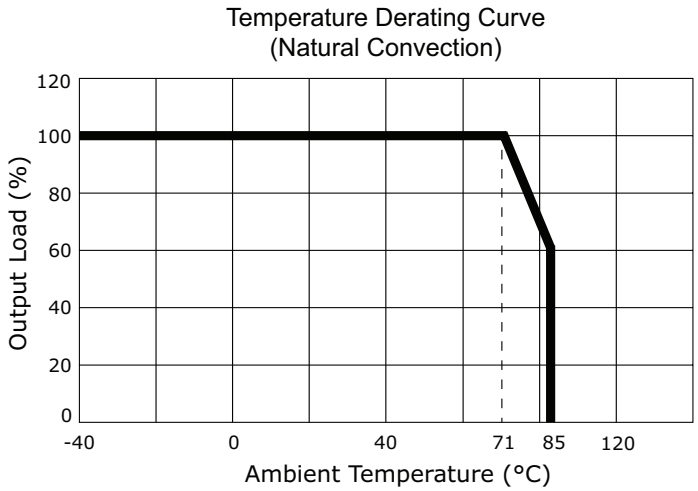
wire range: 24~12 AWG
tightening torque: max 0.4 N*m

PIN CONNECTIONS		
PIN	Function	
	Single	Dual
1	NC	NC
2	GND	GND
3	Vin	Vin
4	0V	-Vout
5	NC	0V
6	+Vout	+Vout

NC=no connection



DERATING CURVE



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

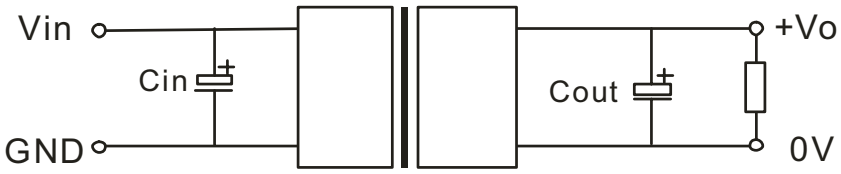


Figure 2
Dual Output Models

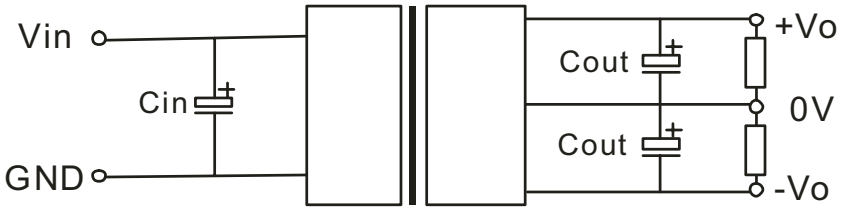


Table 1

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

EMC RECOMMENDED CIRCUIT

Figure 3

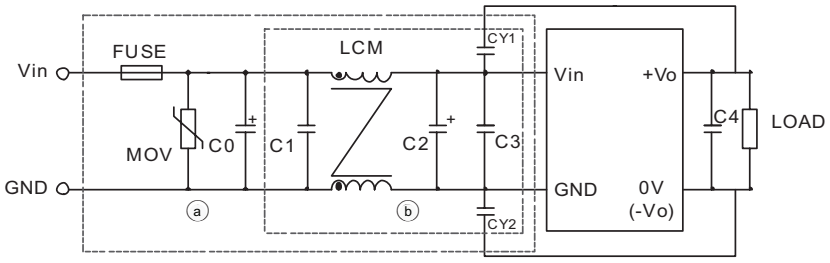


Table 2

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	10 μF	
LCM	4.7 mH	
CY1, CY2	1 nF / 2 kV	

REVISION HISTORY

rev.	description	date
1.0	initial release	02/20/2018
1.01	updated datasheet	08/07/2018
1.02	features and safety line updated, packaging removed	01/14/2021

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

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