SERIES: PQC10-O | **DESCRIPTION:** DC-DC CONVERTER

FEATURES

- 10 W isolated output
- 2:1 input range (36~60 Vdc)
- single regulated outputs
- industry standard 1/16th brick
- over-current, input under-voltage, over-voltage and output short-circuit protection

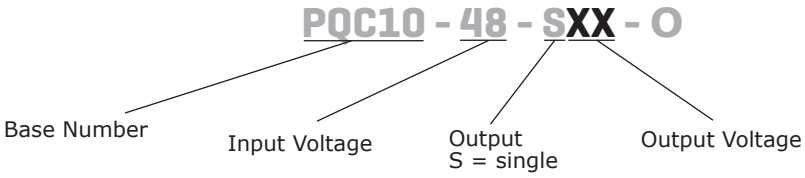
RoHS

MODEL

MODEL	input voltage		output voltage	output current		output power	ripple and noise[1]	efficiency[2]
	typ (Vdc)	range (Vdc)	(Vdc)	min (mA)	max (mA)	max (W)	max (mVp-p)	typ (%)
PQC10-48-S5-O	48	36~60	5	0	2,000	10	120	83
PQC10-48-S12-O	48	36~60	12	0	833	10	120	87
PQC10-48-S15-O	48	36~60	15	0	667	10	120	88
PQC10-48-S24-O	48	36~60	24	0	417	10	120	88

Notes: 1. Ripple and noise are measured at 20 MHz BW, 5%~100% load by "parallel cable" method with 1 µF ceramic and 10 µF electrolytic capacitors on the output.
2. Efficiency is measured at nominal input voltage and rated output load.

PART NUMBER KEY



INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage[3]		36	48	60	Vdc
current (full load/no load)	at nominal input voltage		252/4	258/8	mA
reflected ripple current	at nominal input voltage		50		mA
start-up voltage				36	Vdc
under-voltage protection		26	29		Vdc
start-up time	at nominal input voltage & constant resistance load			100	ms
surge voltage	for maximum of 1 second	-0.7		100	Vdc
CTRL[4]	module on (CTRL pin open or pulled high (TTL 3.5~12Vdc)				
	module off (CTRL pin pulled low to GND (0~1.2Vdc)				
	input current when off		6	10	mA
filter	C filter				

Notes: 3. Input must be supplied by ES1 source.
4. The CTRL pin voltage is referenced to input GND.

OUTPUT

parameter	conditions/description	min	typ	max	units
maximum capacitive load	5 Vdc output			2,200	µF
	12 Vdc output			470	µF
	15 Vdc output			330	µF
	24 Vdc output			100	µF
line regulation	full load, input voltage from low to high		±0.2	±0.5	%
load regulation	5% to 100% load		±0.5	±1	%
voltage accuracy	5% to 100% load		±1	±3	%
switching frequency[4]	PWM mode		300		kHz
transient recovery time	25% load step change		300	500	µs
transient response deviation	25% load step change				
	5 Vdc output voltage		±5	±8	%
	all other output models		±3	±5	%
temperature coeffecient	full load			±0.03	%/°C

Notes: 4. Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

PROTECTIONS

parameter	conditions/description	min	typ	max	units
over voltage protection		110		160	%
over current protection		110	140	190	%
short circuit protection	auto recovery, continuous				

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 at 100kHz/0.1V		1,000		pF
vibration	10-150Hz, 5G, 0.75mm. along X, Y and Z				
safety approvals	designed to meet 62368: EN, BS EN				
conducted emissions	CISPR32/EN55032 CLASS B (see Fig.2 for recommended circuit)				
radiated emissions	CISPR32/EN55032 CLASS B (see Fig.2 for recommended circuit)				
ESD	IEC/EN61000-4-2 Contact ±4kV, perf. Criteria B				
radiated immunity	IEC/EN61000-4-3 10V/m, perf. Criteria A				

SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
EFT/burst	IEC/EN61000-4-4 ±2kV (see Fig.2-1 for recommended circuit), perf Criteria B				
surge	IEC/EN61000-4-5 line to line ±2kV (see Fig.2-1 for recommended circuit), perf. Criteria B				
conducted immunity	IEC/EN61000-4-6 3Vrms, perf. Criteria A				
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	%

MECHANICAL

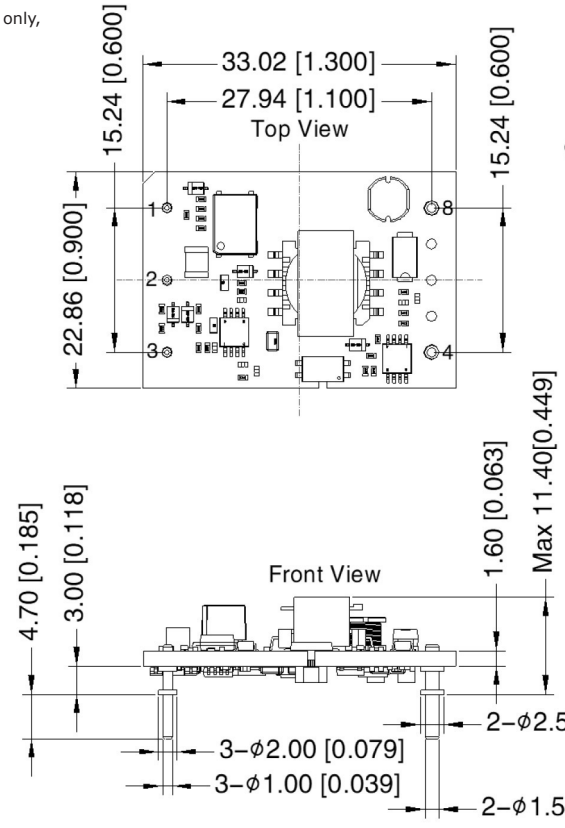
parameter	conditions/description	min	typ	max	units
dimensions	33.02 x 22.86 x 11.40 (1.300 x 0.900 x 0.449 inch)				mm
weight			5.8		g
cooling method	natural convection				

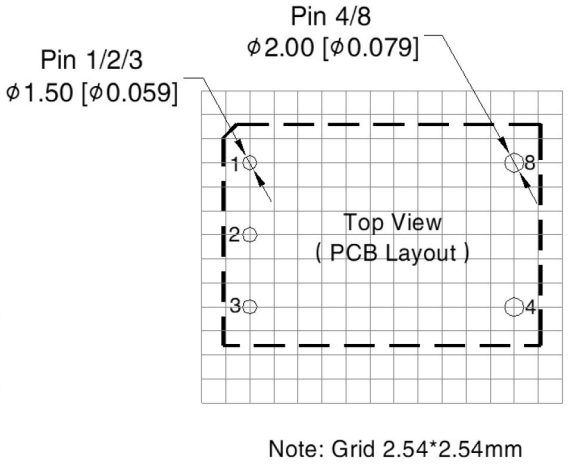
MECHANICAL DRAWING

units: mm[inch]
tolerance: ±0.50[±0.020]
pin section tolerance: ±0.10[±0.004]
pin 1,2,3: Ø1.0mm
pin 4,8: Ø1.5mm

Note: The layout of the device is for reference only, please refer to the actual product.

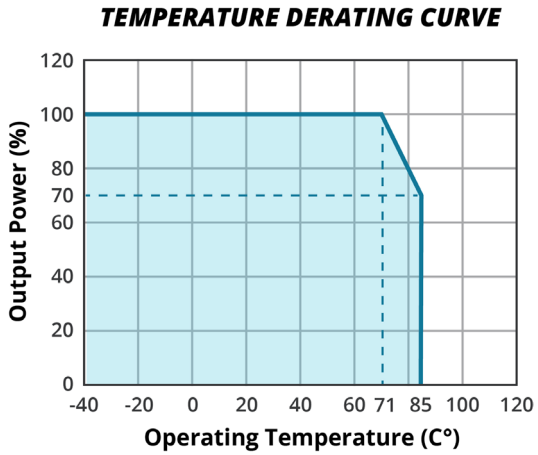
PIN CONNECTIONS	
PIN	Function
1	Vin
2	CTRL
3	GND
4	0V
8	+Vo



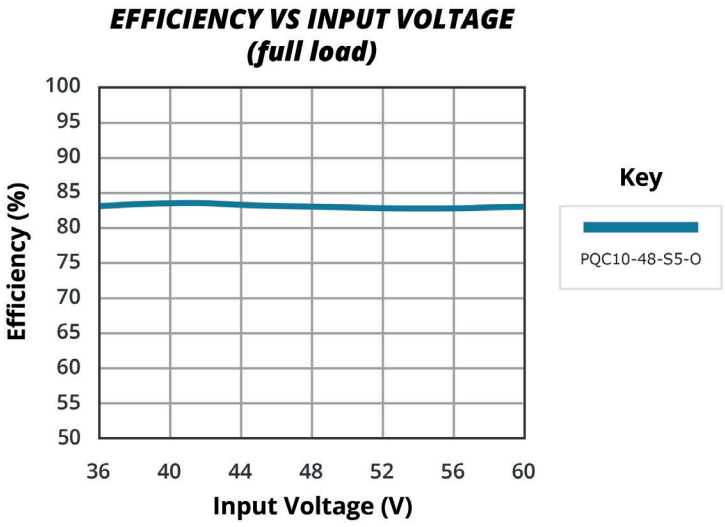


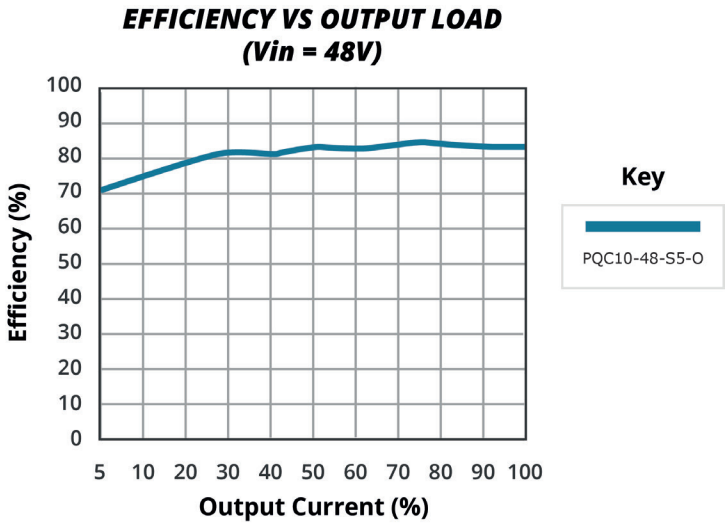
Note: Grid 2.54*2.54mm

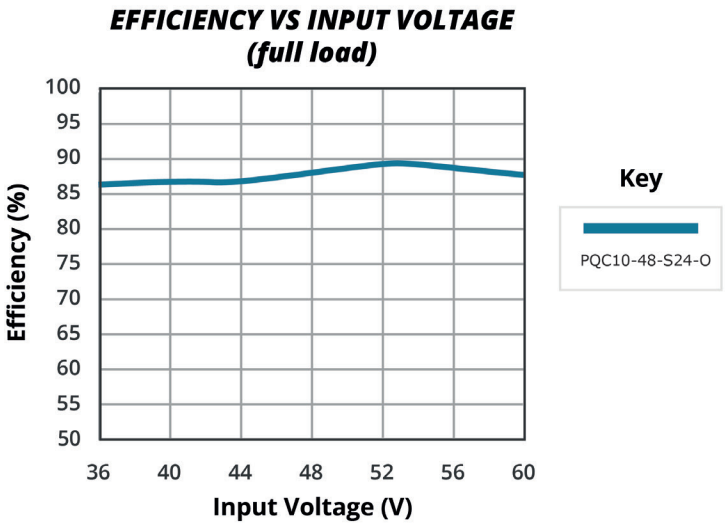
DERATING CURVE

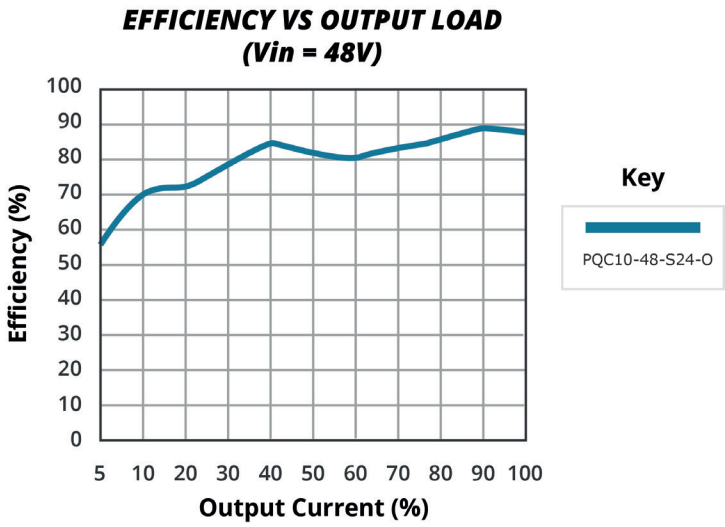


EFFICIENCY CURVES









APPLICATION NOTES

All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 1.
Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

Figure 1

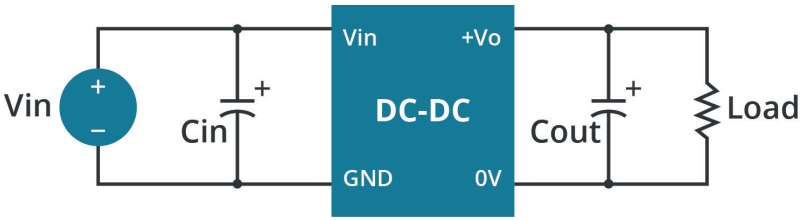
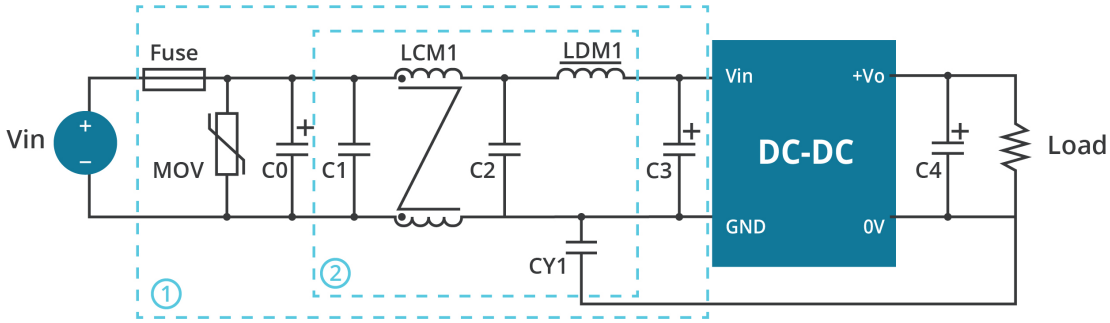


Table 1

Vin (Vdc)	Vout (Vdc)	Cin (μF/V)	Cout (μF)
48	5	100μF/100V	10μF/16V
	12/15		10μF/25V
	24		10μF/50V

EMC RECOMMENDED CIRCUIT

Figure 2



Notes: For EMC tests we use Part 1 in Fig. 2 for immunity and part 2 for emissions test. Selecting based on needs.

Table 2

Recommended external circuit components	
FUSE	choose according to practical input current
MOV	S14K60
C0	680μF/100V
C1/C2	4.7μF/100V
C3	330μF/100V
C4	refer to the Cout in Fig. 1
LCM1	4.7mH
LDM1	10μH
CY1	1nF/2kV

Note: 1. Maximum capacitive load is tested at input voltage range and full load.
2. All specifications are measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.

REVISION HISTORY

rev.	description	date
1.0	initial release	01/18/2023

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

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