SERIES: PQP3-M | **DESCRIPTION:** DC-DC CONVERTER

FEATURES

- wide 2:1 input range
- single & dual output options
- 1500 Vdc isolation
- industry standard pin-out
- ultra compact SMD package
- short circuit protection (continuous)
- wide operating temp: -40°C to +85°C
- supports negative output (dual output model)
- designed to meet EN/BS EN 62368



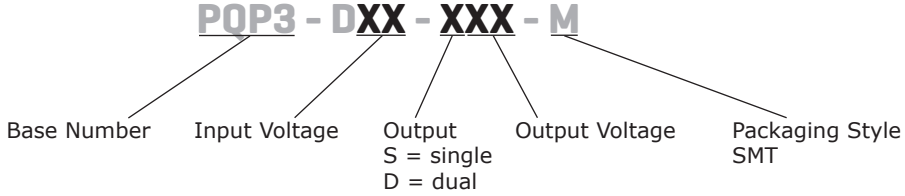
RoHS

MODEL

MODEL	input voltage		output voltage	output current		output power	ripple and noise[1]	efficiency
	typ (Vdc)	range (Vdc)	(Vdc)	min (mA)	max (mA)	max (W)	max (mVp-p)	typ (%)
PQP3-D12-S3-M	12	9~18	3.3	38	758	2.5	100	75
PQP3-D12-S5-M	12	9~18	5	30	600	3	100	79
PQP3-D12-S12-M	12	9~18	12	13	250	3	100	82
PQP3-D12-S15-M	12	9~18	15	10	200	3	100	83
PQP3-D12-S24-M	12	9~18	24	6	125	3	100	81
PQP3-D24-S3-M	24	18~36	3.3	38	758	2.5	100	74
PQP3-D24-S5-M	24	18~36	5	30	600	3	100	81
PQP3-D24-S12-M	24	18~36	12	13	250	3	100	83
PQP3-D24-S15-M	24	18~36	15	10	200	3	100	83
PQP3-D24-S24-M	24	18~36	24	6	125	3	100	83
PQP3-D12-D5-M	12	9~18	±5	±15	±300	3	100	78
PQP3-D12-D9-M	12	9~18	±9	±9	±167	3	100	78
PQP3-D12-D12-M	12	9~18	±12	±7	±125	3	100	79
PQP3-D12-D15-M	12	9~18	±15	±5	±100	3	100	79
PQP3-D24-D5-M	24	18~36	±5	±15	±300	3	100	78
PQP3-D24-D9-M	24	18~36	±9	±9	±167	3	100	80
PQP3-D24-D12-M	24	18~36	±12	±7	±125	3	100	82
PQP3-D24-D15-M	24	18~36	±15	±5	±100	3	100	81

Notes: 1. Ripple & noise testing condition at nominal input voltage and 5%-100% load, the "tip and barrel" method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information.

PART NUMBER KEY



Please read our datasheet & drawing disclaimer here.

INPUT

parameter	conditions/description	min	typ	max	units
input voltage	12 Vdc input models 24 Vdc input models	9 18	12 24	18 36	Vdc Vdc
start-up voltage	12 Vdc input models 24 Vdc input models			9 18	Vdc Vdc
surge voltage	for maximum of 1 second 12 Vdc input models 24 Vdc input models	 -0.7 -0.7		 25 50	 Vdc Vdc
filter	capacitance filter				
current	12 Vdc input models 24 Vdc input models		321/30 156/20	338/50 165/40	mA mA

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	5% ~ 100% load positive outputs negative outputs		 ±1 ±3	 ±3 ±5	 % %
switching frequency	full load, nominal input		300		kHz
transient response	25% load step change		±2.5	±5	%
temperature coefficient	full load			±0.03	%/°C

PROTECTIONS

parameter	conditions/description	min	typ	max	units
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		100		pF
safety approvals	designed to meet 62368: EN, BS EN				
EMC	CISPR32/EN55032 Class B (see recommended circuits)				
ESD	IEC/EN61000-4-2, Contact ±6K, perf. Criteria B				
radiated immunity	CISPR32/EN55032				
EFT/burst	IEC/EN61000-4-4, ±2KV, perf. Criteria B (see recommended circuits)				
surge	IEC/EN61000-4-5, line to line ±2KV, perf. Criteria B (see recommended circuits)				
conducted immunity	IEC/EN61000-4-6 3 Vrms				
RoHS	yes				
MTBF	MIL-HDBK-217F @ 25°C	1000			kHours

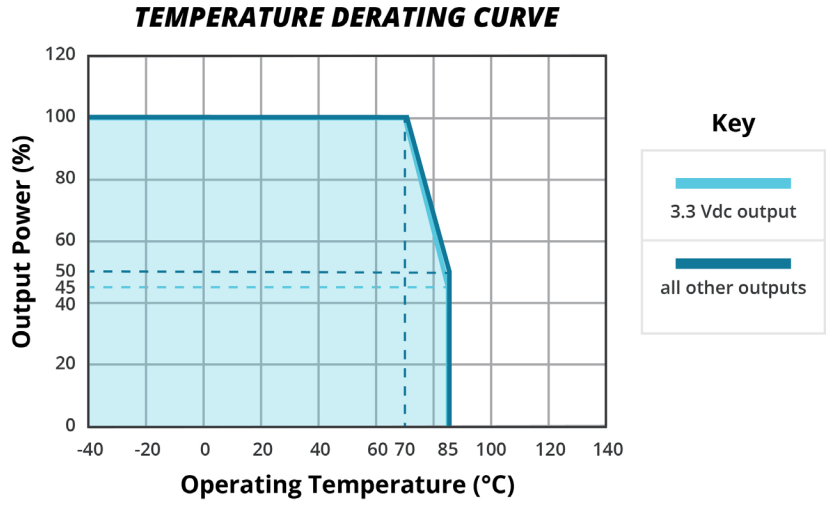
ENVIRONMENTAL

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
reflow soldering	60 s max			245	°C

DERATING CURVE



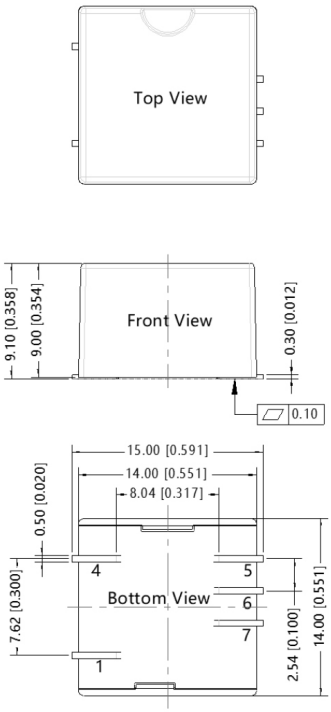
MECHANICAL

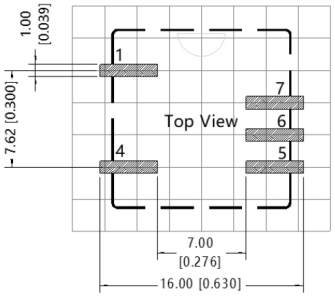
parameter	conditions/description	min	typ	max	units
dimensions	14 x 14 x 9				mm
case material	Black plastic; flame-retardant and heat-resistant (UL94-V0)				
weight			2.2		g

MECHANICAL DRAWING

units: mm [inches]
pin diameter tolerance: ± 0.10 [±0.004]
tolerance: ± 0.50 [±0.020]

PIN CONNECTIONS		
PIN	Single	Dual
1	GND	GND
4	Vin	Vin
5	+Vo	+Vo
6	NC	0V
7	0V	-Vo

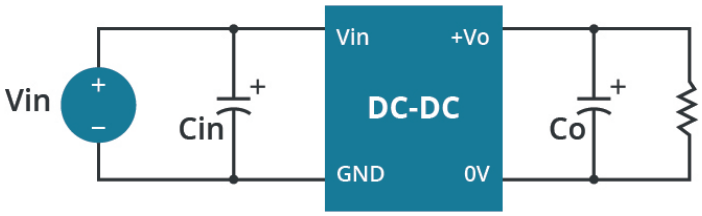




Note: Grid 2.54*2.54mm

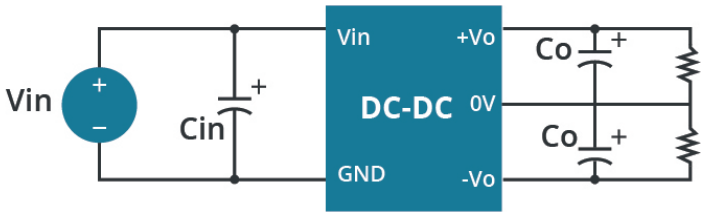
RECOMMENDED CIRCUITS

Figure 1
Single output



Parameter Description		
Vin (Vdc)	12	24
Cin	47uF/25V	47uF/50V
Vo (Vdc)	3.3, 5	12, 15, 24
Co	100uF/6.3V	27uF/35V

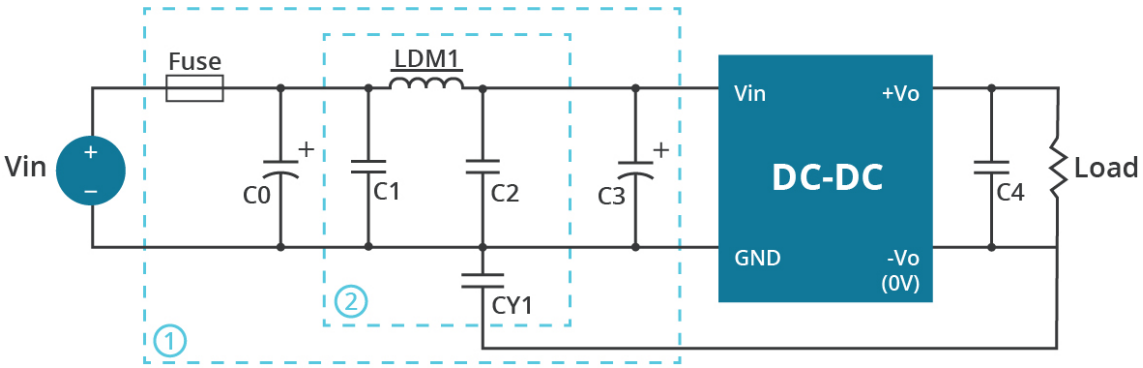
Figure 2
Dual output



Parameter Description		
Vin (Vdc)	12	24
Cin	47uF/50V	
Vo (Vdc)	5, 9	12, 15
Co	47uF/16V	10uF/25V

EMC COMPLIANCE CIRCUITS

Figure 3
Single output

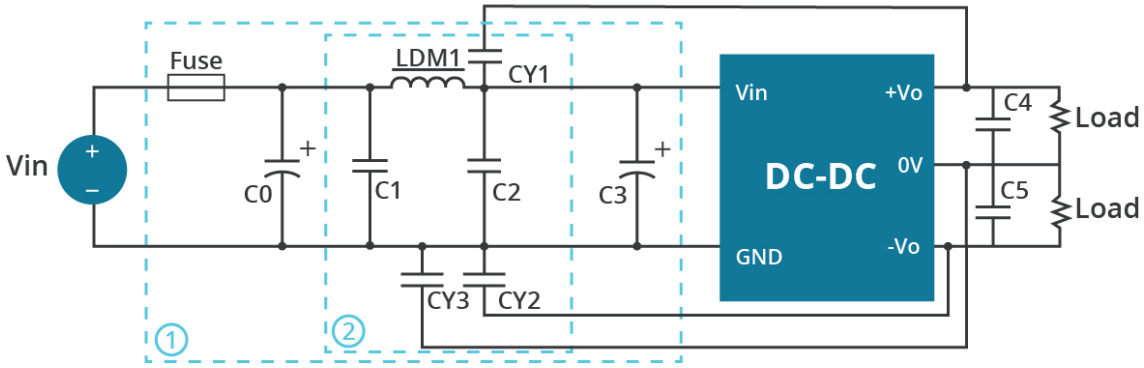


Parameter Description										
Part No.	Vin: 12 Vdc					Vin: 24 Vdc				
Vo (Vdc)	3.3	5	12	15	24	3.3	5	12	15	24
FUSE	slow blow, choose according to actual input current									
C0	1000μF/25V					680μF/50V				
C1	10μF/50V			4.7μF/50V		10μF/50V			4.7μF/50V	
LDM1	15μH									
C2	4.7μF/50V									
C3	330μF/50V									
CY1	1nF/2KV									
C4	Refer to the Cout Fig.2									

Note: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

EMC COMPLIANCE CIRCUITS (CONTINUED)

Figure 4
Dual output



Parameter Description			
Part No.	Vin: 12 Vdc		Vin: 24 Vdc
Vo (Vdc)	±5, ±9, ±12	±15	±5, ±9, ±12, ±15
FUSE	slow blow, choose according to actual input current		
C0	1000μF/25V		680μF/50V
C1	4.7μF/50V		
LDM1	10μH		
C2	10μF/50V		
C3	330μF/50V		
CY1	1nF/2KV	470pF/2KV	1nF/2KV
CY2	1nF/2KV	470pF/2KV	1nF/2KV
CY3	1nF/2KV	470pF/2KV	/
C4,C5	Refer to the Cout Fig.3		

Note: For EMC tests we use Part ① in Fig. 4 for immunity and part ② for emissions test. Selecting based on needs.

REVISION HISTORY

rev.	description	date
1.0	initial release	03/28/2020
1.01	tolerance update to page 4	06/09/2020
1.02	derating curve and circuit figures updated	07/15/2021
1.03	CE certification removed	11/22/2022
1.04	dual output circuits added	05/31/2023

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

CUI INC
a bel group

Headquarters
20050 SW 112th Ave.
Tualatin, OR 97062
800.275.4899

Fax 503.612.2383
cui.com
techsupport@cui.com

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