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SERIES: PQB3-D | **DESCRIPTION:** DC-DC CONVERTER

FEATURES

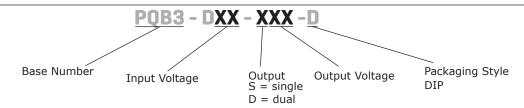
- 3 W isolated output
- smaller package
- single/dual regulated output
- 1,500 Vdc isolation
- continuous short circuit, over current protection
- temperature range (-40~105°C)
- high efficiency at light load
- efficiency up to 86%



MODEL		nput oltage	output voltage		itput rrent	output power	ripple and noise¹	efficiency
	typ (Vdc)	range (Vdc)	(Vdc)	min (mA)	max (mA)	max (W)	max (mVp-p)	typ (%)
PQB3-D5-S5-D	5	4.5~9	5	30	600	3	60	73
PQB3-D5-S12-D	5	4.5~9	12	13	250	3	60	76
PQB3-D5-S15-D	5	4.5~9	15	10	200	3	60	76
PQB3-D5-D5-D	5	4.5~9	±5	±15	±300	3	60	75
PQB3-D5-D12-D	5	4.5~9	±12	±6	±125	3	60	76
PQB3-D5-D15-D	5	4.5~9	±15	±5	±100	3	60	76
PQB3-D12-S5-D	12	9~18	5	30	600	3	60	80
PQB3-D12-S12-D	12	9~18	12	13	250	3	60	81
PQB3-D12-S15-D	12	9~18	15	10	200	3	60	82
PQB3-D12-S24-D	12	9~18	24	7	125	3	60	83
PQB3-D12-D5-D	12	9~18	±5	±15	±300	3	60	80
PQB3-D12-D12-D	12	9~18	±12	±6	±125	3	60	81
PQB3-D12-D15-D	12	9~18	±15	±5	±100	3	60	82
PQB3-D24-S5-D	24	18~36	5	30	600	3	60	81
PQB3-D24-S12-D	24	18~36	12	13	250	3	60	82
PQB3-D24-S15-D	24	18~36	15	10	200	3	60	84
PQB3-D24-D5-D	24	18~36	±5	±15	±300	3	60	81
PQB3-D24-D12-D	24	18~36	±12	±6	±125	3	60	82
PQB3-D24-D15-D	24	18~36	±15	±5	±100	3	60	84
PQB3-D48-S5-D	48	36~75	5	30	600	3	60	82
PQB3-D48-S12-D	48	36~75	12	13	250	3	60	83
PQB3-D48-S15-D	48	36~75	15	10	200	3	60	86
PQB3-D48-D5-D	48	36~75	±5	±15	±300	3	60	82
PQB3-D48-D12-D	48	36~75	±12	±6	±125	3	60	83
PQB3-D48-D15-D	48	36~75	±15	±5	±100	3	60	84

Notes: 1. ripple and noise are measured at 20 MHz BW by "parallel cable" method

PART NUMBER KEY



INPUT

parameter	conditions/description	min	typ	max	units
	5 V input models	4.5	5	9	Vdc
anaustina innut valtasa	12 V input models	9	12	18	Vdc
operating input voltage	24 V input models	18	24	36	Vdc
	48 V input models	36	48	75	Vdc
	5 V input models	3.5	4	4.5	Vdc
start up valtage	12 V input models	4.5	8	9	Vdc
start-up voltage	24 V input models	11	16	18	Vdc
	48 V input models	24	33	36	Vdc
	for maximum of 1 second				
	5 V input models	-0.7		12	Vdc
surge voltage	12 V input models	-0.7		25	Vdc
5	24 V input models	-0.7		50	Vdc
	48 V input models	-0.7		100	Vdc
filter	pi filter				

OUTPUT

parameter	conditions/description	min	typ	max	units
line regulation	full load, input voltage from low to high		±0.2	±0.5	%
load regulation	5% to 100% load		±0.2	±0.5	%
voltage accuracy	5% to 100% load		±1	±3	%
no-load voltage accuracy	input voltage range		±1.5	±5	%
voltage balance	dual output, balanced loads dual output, unbalanced loads		±0.5	±1 ±5	% %
switching frequency	100% load, nominal input voltage		200		KHz
transient recovery time	25% load step change		0.5	2	ms
transient response deviation	25% load step change		±2	±5	%
temperature coeffecient	100% load		±0.02	±0.03	%/°C

PROTECTIONS

parameter	conditions/description	min	typ	max	units
short circuit protection	continuous, automatic recovery				
over current protection		120			%

SAFETY AND COMPLIANCE

conditions/description	min	typ	max	units
for 1 minute at 1 mA max.	1,500			Vdc
at 500 Vdc 1,000			МΩ	
CISPR22/EN55022, class A, class B (external circuit required, see Figure 1-b)				
CISPR22/EN55022, class A, class B (external circuit required, see Figure 1-b)				
IEC/EN61000-4-2, class B, contact ± 4kV/ air ± 8kV				
IEC/EN61000-4-3, class A, 10V/m				
IEC/EN61000-4-4, class B, ± 2kV (external circuit required, see Figure 1-a)				
	for 1 minute at 1 mA max. at 500 Vdc CISPR22/EN55022, class A, class B (externormal description of the company of the compan	for 1 minute at 1 mA max. 1,500 at 500 Vdc 1,000 CISPR22/EN55022, class A, class B (external circuit required, see CISPR22/EN55022, class A, class B (external circuit required, see IEC/EN61000-4-2, class B, contact ± 4kV/ air ± 8kV IEC/EN61000-4-3, class A, 10V/m	for 1 minute at 1 mA max. 1,500 at 500 Vdc 1,000 CISPR22/EN55022, class A, class B (external circuit required, see Figure 1-b) CISPR22/EN55022, class A, class B (external circuit required, see Figure 1-b) IEC/EN61000-4-2, class B, contact ± 4kV/ air ± 8kV IEC/EN61000-4-3, class A, 10V/m	for 1 minute at 1 mA max. 1,500 at 500 Vdc 1,000 CISPR22/EN55022, class A, class B (external circuit required, see Figure 1-b) CISPR22/EN55022, class A, class B (external circuit required, see Figure 1-b) IEC/EN61000-4-2, class B, contact ± 4kV/ air ± 8kV IEC/EN61000-4-3, class A, 10V/m

SAFETY AND COMPLIANCE (CONTINUED)

parameter	conditions/description	min	typ	max	units
surge	IEC/EN61000-4-5, class B, \pm 2kV (external circuit required, see Figure 1-b)				
conducted immunity	IEC/EN61000-4-6, class A, 3 Vr.m.s				
voltage dips & interruptions	IEC/EN61000-4-29, class B, 0%-70%				
MTBF	as per MIL-HDBK-217F @ 25°C 1,000,000				hours
RoHS compliant	yes				

ENVIRONMENTAL

parameter	conditions/description	min	typ	max	units
operating temperature	see derating curve	-40		105	°C
storage temperature		-55		125	°C
storage humidity	non-condensing			95	%
temperature rise	at full load, Ta=25°C		25		°C

SOLDERABILITY

parameter	conditions/description min typ		typ	max	units
hand soldering	1.5 mm from case for 10 seconds	1.5 mm from case for 10 seconds		300	°C
wave soldering	see wave soldering profile			260	°C

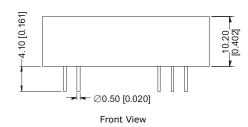
MECHANICAL

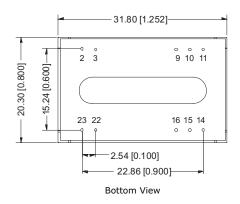
parameter	conditions/description	min	typ	max	units
dimensions	31.80 x 20.30 x 10.20 (1.252 x 0.80 x 0.402 inch)				mm
case material	plastic (UL94-V0)				
weight			14		g

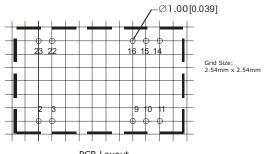
MECHANICAL DRAWING

units: mm[inch] tolerance: ±0.25[±0.010]

pin section tolerance: $\pm 0.10[\pm 0.004]$





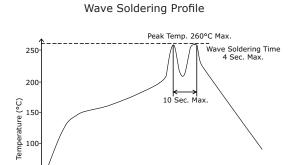


PCB Layout Top View

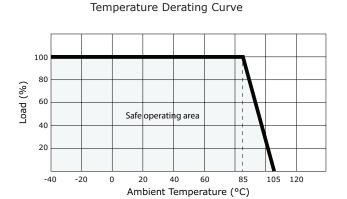
PIN CONNECTIONS				
PIN	Single Output	Dual Output		
2, 3	GND	GND		
9	NC	0V		
10, 15	NC	NC		
11	NC	-Vo		
14	+Vo	+Vo		
16	0V	0V		
22, 23	Vin	Vin		

DERATING CURVES

50

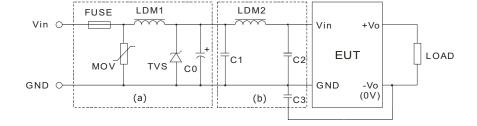


Time (sec.)



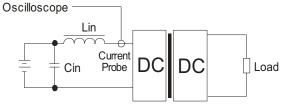
EMC RECOMMENDED CIRCUIT

Figure 1



	Recommended external circuit components				
Vin (Vdc)	5	12	24	48	
FUSE	choo	ose according to p	oractical input cur	rent	
MOV			10D560K	10D101K	
LDM1			56µH	56µH	
TVS	SMCJ13A	SMCJ28A	SMCJ48A	SMCJ90A	
C0	680µF/16V	680μF/25V	120µF/50V	120µF/100V	
C1	4.7μF/50V	4.7μF/50V	4.7μF/50V	4.7μF/100V	
LDM2	12µH	12µH	12µH	12µH	
C2	4.7μF/50V	4.7μF/50V	4.7μF/50V	4.7μF/100V	
C3	1nF/2kV	1nF/2kV	1nF/2kV	1nF/2kV	

TEST CONFIGURATION



External components		
Lin	Lin 4.7µH	
Cin	220μF, ESR < 1.0Ω at 100 KHz	

Note: Input reflected-ripple current is measured with an inductor Lin and Capacitor Cin to simulate source impedance.

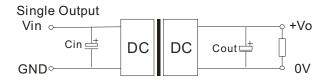
APPLICATION NOTES

Output load requirement

To ensure this module can operate efficiently and reliably, the minimum output load may not be less than 5% of the full load during operation. If the actual output power is low, connect a resistor at the output end in parallel to increase the load.

Recommended circuit

This series has been tested according to the following recommended testing circuit before leaving the factory. This series should be tested under load (see Figure 2). If you want to further decrease the input/output ripple, you can increase the capacitance accordingly or choose capacitors with low ESR. However, the capacitance of the output filter capacitor must be appropriate. If the capacitance is too high, a startup problem might arise. For every channel of the output, to ensure safe and reliable operation, the maximum capacitance must be less than the maximum capacitive load (see Table 1).



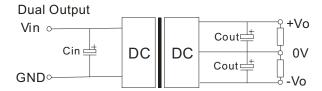


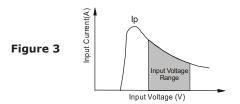
Figure 2

Table 1

Vin (Vdc)	Cin (µF)	Cout (µF/mA)	
5	100	10/100	
12	100	10/100	
24	10~47	10/100	
48	10~47	10/100	

3. Input Current

When it is used in an unregulated condition, make sure that the input fluctuations and ripple voltage do not exceed the module standard. Refer to Figure 3 for the startup current of this dc-dc module.



Vin (Vdc)	Ip (mA)
5	1400
12	620
24	300
48	150

Note: 1. Minimum load shouldn't be less than 5%, otherwise ripple may increase dramatically. Operation under minimum load will not damage the converter, however, they may not meet all specifications listed.

^{2.} Maximum capacitive load is tested at input voltage range and full load.

^{3.} All specifications are measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.

CUI Inc | SERIES: PQB3-D | DESCRIPTION: DC-DC CONVERTER

REVISION HISTORY

rev.	description	date
1.0	initial release	03/19/2013

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



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CUI offers a two (2) year limited warranty. Complete warranty information is listed on our website.

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