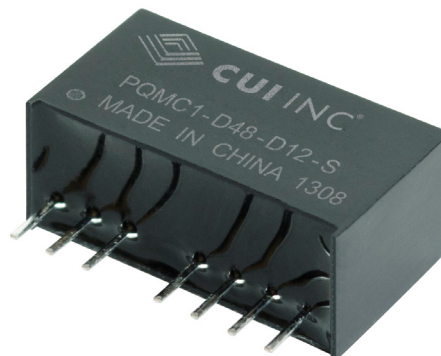


SERIES: PQMC1-S | DESCRIPTION: DC-DC CONVERTER
FEATURES

- 1 W isolated output
- smaller package
- single/dual regulated output
- 1,500 Vdc isolation
- short circuit protection
- temperature range (-40~105°C)
- high efficiency at light load
- efficiency up to 81%

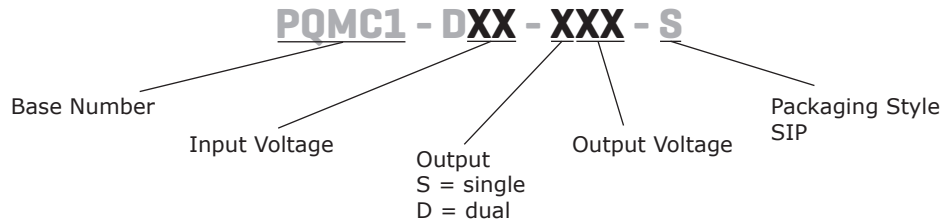

MODEL

MODEL	input voltage		output voltage (Vdc)	output current		output power max (W)	ripple and noise ¹ max (mVp-p)	efficiency typ (%)
	typ (Vdc)	range (Vdc)		min (mA)	max (mA)			
PQMC1-D5-S5-S	5	4.5~9	5	10	200	1	75	72
PQMC1-D5-S12-S	5	4.5~9	12	4	83	1	75	76
PQMC1-D5-S15-S	5	4.5~9	15	3	67	1	75	75
PQMC1-D5-D5-S	5	4.5~9	±5	±5	±100	1	75	73
PQMC1-D5-D12-S	5	4.5~9	±12	±2	±42	1	75	76
PQMC1-D5-D15-S	5	4.5~9	±15	±2	±33	1	75	75
PQMC1-D12-S3-S	12	9~18	3.3	15	303	1	75	75
PQMC1-D12-S5-S	12	9~18	5	10	200	1	75	77
PQMC1-D12-S9-S	12	9~18	9	6	111	1	75	79
PQMC1-D12-S12-S	12	9~18	12	4	83	1	75	80
PQMC1-D12-S15-S	12	9~18	15	3	67	1	75	80
PQMC1-D12-D5-S	12	9~18	±5	±5	±100	1	75	78
PQMC1-D12-D12-S	12	9~18	±12	±2	±42	1	75	81
PQMC1-D12-D15-S	12	9~18	±15	±2	±33	1	75	80
PQMC1-D24-S3-S	24	18~36	3.3	15	303	1	75	75
PQMC1-D24-S5-S	24	18~36	5	10	200	1	75	77
PQMC1-D24-S12-S	24	18~36	12	4	83	1	75	81
PQMC1-D24-S15-S	24	18~36	15	3	67	1	75	79
PQMC1-D24-S24-S	24	18~36	24	2	42	1	75	77
PQMC1-D24-D5-S	24	18~36	±5	±5	±100	1	75	80
PQMC1-D24-D12-S	24	18~36	±12	±2	±42	1	75	80
PQMC1-D24-D15-S	24	18~36	±15	±2	±33	1	75	80
PQMC1-D48-S3-S	48	36~75	3.3	15	303	1	75	75
PQMC1-D48-S5-S	48	36~75	5	10	200	1	75	76
PQMC1-D48-S12-S	48	36~75	12	4	83	1	75	81
PQMC1-D48-S15-S	48	36~75	15	3	67	1	75	80

**MODEL
(CONTINUED)**

	input voltage		output voltage	output current		output power	ripple and noise ¹	efficiency
	typ (Vdc)	range (Vdc)	(Vdc)	min (mA)	max (mA)	max (W)	typ (mVp-p)	typ (%)
PQMC1-D48-D5-S	48	36~75	±5	±5	±100	1	75	76
PQMC1-D48-D12-S	48	36~75	±12	±2	±42	1	75	80
PQMC1-D48-D15-S	48	36~75	±15	±2	±33	1	75	80

Notes: 1. ripple and noise are measured at 20 MHz BW by "parallel cable" method with 1 µF ceramic and 10 µF electrolytic capacitors on the output.

PART NUMBER KEY**INPUT**

parameter	conditions/description	min	typ	max	units
operating input voltage	5 Vdc input models	4.5	5	9	Vdc
	12 Vdc input models	9	12	18	Vdc
	24 Vdc input models	18	24	36	Vdc
	48 Vdc input models	36	48	75	Vdc
start-up voltage	5 Vdc input models	3.5	4	4.5	Vdc
	12 Vdc input models	4.5	8	9	Vdc
	24 Vdc input models	11	16	18	Vdc
	48 Vdc input models	24	33	36	Vdc
surge voltage	for maximum of 1 second				
	5 Vdc input models	-0.7		12	Vdc
	12 Vdc input models	-0.7		25	Vdc
	24 Vdc input models	-0.7		50	Vdc
filter	48 Vdc input models	-0.7		100	Vdc
	capacitance filter				
CTRL ²	models ON (CTRL open or insulated)				
	models OFF (connect voltage, current into CTRL is 5~10mA)				

Notes: 2. See application notes on page 5.

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		±0.4	±0.75	%
voltage accuracy	5% to 100% load		±1	±3	%
no-load voltage accuracy			±1.5	±5	%
voltage balance ³	dual output, balanced loads		±0.3	±0.5	%
switching frequency	100% load, nominal input voltage, PFM mode		200		kHz
transient recovery time	25% load step change		0.5	2	ms
transient response deviation	25% load step change		±2.5	±5	%
temperature coefficient	100% load		±0.02	±0.03	%/°C

Notes: 3. For dual output models, unbalanced loads should not exceed ±5%. If ±5% is exceeded, it may not meet all specifications.

PROTECTIONS

parameter	conditions/description	min	typ	max	units
short circuit protection	automatic 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
conducted emissions	CISPR22/EN55022, class B (external circuit required, see Figure 1-b)				
radiated emissions	CISPR22/EN55022, class B (external circuit required, see Figure 1-b)				
ESD	IEC/EN61000-4-2, class B, contact ± 4 kV				
radiated immunity	IEC/EN61000-4-3, class A, 10V/m				
EFT/burst	IEC/EN61000-4-4, class B, ± 2 kV (external circuit required, see Figure 1-a)				
surge	IEC/EN61000-4-5, class B, ± 2 kV (external circuit required, see Figure 1-a)				
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	2011/65/EU				

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	max	units
hand soldering	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	22.00 x 9.50 x 12.00 (0.866 x 0.374 x 0.472 inch)				mm
case material	plastic (UL94-V0)				
weight			4.9		g

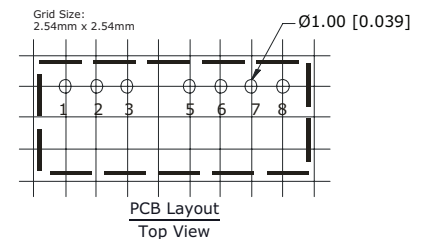
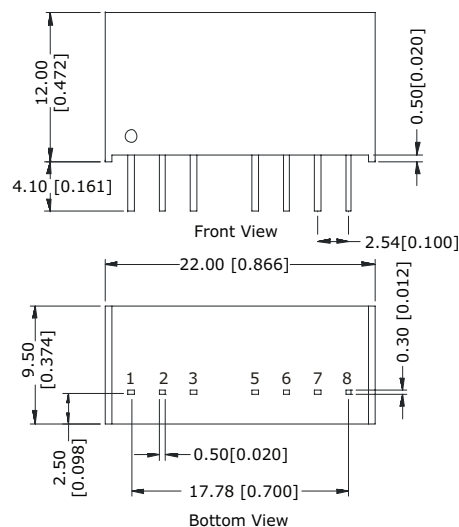
MECHANICAL DRAWING

units: mm[inch]

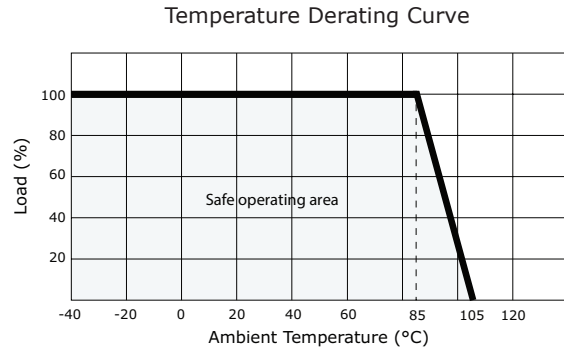
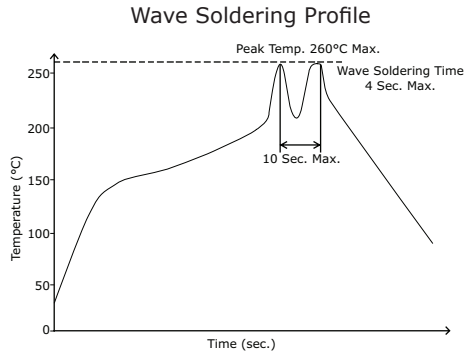
tolerance: ± 0.25 [± 0.010]pin section tolerance: ± 0.10 [± 0.004]

PIN CONNECTIONS		
PIN	Single Output	Dual Output
1	GND	GND
2	Vin	Vin
3	Ctrl	Ctrl
5	NC	NC
6	+Vo	+Vo
7	0V	0V
8	CS	-Vo

NC: No Connection



DERATING CURVES



EMC RECOMMENDED CIRCUIT

Figure 1

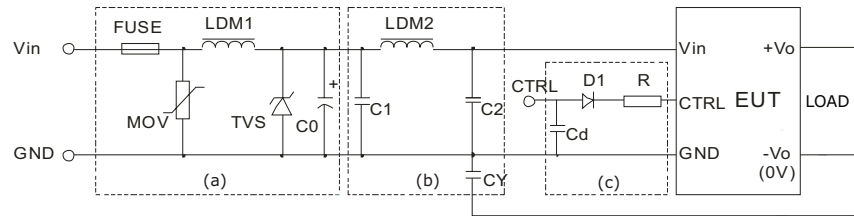


Table 1

Recommended external circuit components				
Vin (Vdc)	5	12	24	48
FUSE	choose according to practical input current			
MOV	--	--	S14K35	S14K60
LDM1	--	--	56μH	56μH
TVS	SMCJ13A	SMCJ28A	SMCJ48A	SMCJ90A
C0	680μF/16V	680μF/25V	330μF/50V	330μF/100V
C1	4.7μF/50V	4.7μF/50V	4.7μF/100V	4.7μF/100V
LDM2	12μH	12μH	12μH	12μH
C2	4.7μF/50V	4.7μF/50V	4.7μF/50V	4.7μF/100V
CY	1nF/2kV	1nF/2kV	1nF/2kV	1nF/2kV
D1	RB160M-60/1A	RB160M-60/1A	RB160M-60/1A	RB160M-60/1A
R	Follows: $R = \frac{V_C - V_D - 1.0}{I_C} - 300$			
Cd	47nF/100V	47nF/100V	47nF/100V	47nF/100V

Note: Figure 1-c is on/off control circuit. See page 5 for details.

TEST CONFIGURATION

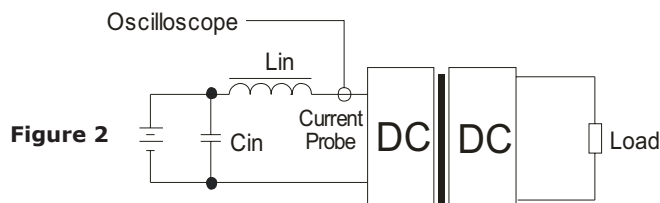


Table 2

External components	
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.

REVISION HISTORY

rev.	description	date
1.0	initial release	03/20/2013
1.01	added models, updated spec	10/14/2014

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



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