

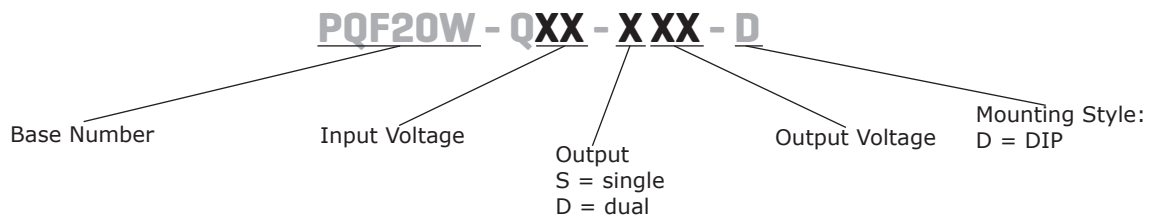
**SERIES:** PQF20W-D | **DESCRIPTION:** DC-DC CONVERTER**FEATURES**

- ultrawide 4:1 input range
- dual positive output with asymmetrical options
- 3000 Vdc isolation
- input under-voltage protection
- output short circuit and over current protection
- wide operating temp: -40°C to +105°C
- EN 62368 approved
- meets UL 62368 standards
- remote on/off



MODEL	input voltage		output voltage	output current		output power	ripple & noise <sup>1</sup>	efficiency <sup>2</sup>
	typ (Vdc)	range (Vdc)	Vo1/Vo2 (Vdc)	min (mA)	max (mA)	max (W)	max (mVp-p) Vo1/Vo2	min/typ (%)
PQF20W-Q48-D55-D	48	18~75	5/5	0/0	2000/2000	20	100/100	82/84
PQF20W-Q48-D512-D	48	18~75	5/12	0/0	2000/833	20	100/100	82/84
PQF20W-Q48-D524-D	48	18~75	5/24	0/0	2000/417	20	100/100	82/84

Notes: 1. From 5~100% load, nominal input, 20 MHz bandwidth oscilloscope, with 10  $\mu$ F tantalum and 1  $\mu$ F ceramic capacitors on the output. From 0~5% load, ripple and noise is <5% Vo.  
 2. Measured at nominal input voltage and rated output load.

**PART NUMBER KEY**

**INPUT**

parameter	conditions/description	min	typ	max	units
operating input voltage		18		80	Vdc
start-up voltage				18	Vdc
surge voltage	for maximum of 1 second	-0.7		100	Vdc
current	full load / no load		496/6	509/12	mA
filter	Pi filter				
CTRL	module on: CTRL open or pulled high (3.5~12 V) module off: CTRL pulled low to GND (0~1.2 V)				

**OUTPUT**

parameter	conditions/description	min	typ	max	units
maximum capacitive load	output voltage				
	5 Vdc			2000	μF
	12 Vdc			680	μF
	24 Vdc			220	μF
voltage accuracy	Vo1/Vo2 5% to full load		±1/±3	±3/±5	%
	0%~5% load		±1/±3	±3/±5	%
line regulation	from low line to high line, full load				
	Vo1		±0.5	±1	%
	Vo2		±2	±3	%
load regulation	Vo1/Vo2 5% to full load		±0.5/±1.5	±1/±3	%
	0%~5% load		±3/±3	±4/±5	%
switching frequency	PWM mode		300		kHz
transient recovery time	25% load step change, nominal input voltage		300	500	μs
transient response deviation	25% load step change, nominal input voltage		±4	±8	%
temperature coefficient	at full load			±0.03	%/°C

## PROTECTIONS

parameter	conditions/description	min	typ	max	units
over voltage protection		110		160	%Vo
over current protection		120		210	%
short circuit protection	output shutdown, auto recovery				
input under voltage protection		12	15		Vdc

## SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	input to output	3000			Vdc
	output to output	1500			Vdc
	input/output to case	1500			Vdc
isolation resistance	input to output at 500 Vdc	1000			MΩ
isolation capacitance	input to output, 100 kHz / 0.1 V		2200		pF
safety approvals	EN/IEC 62368				
EMI/EMC	CISPR32/EN55032, Class A (without external components) / Class B (see recommended circuit)				
ESD	IEC/EN61000-4-2, Contact ±4KV / perf. Criteria B				
radiated immunity	IEC/EN61000-4-3, 10V/m, perf. Criteria A				
EFT/burst	IEC/EN61000-4-4, ±2KV (see recommended circuit), perf. Criteria B				
surge	IEC/EN61000-4-5, line to line ±2KV (see recommended circuit), perf. Criteria B				
conducted immunity	IEC/EN61000-4-6, 3 Vr.m.s, perf. Criteria A				
MTBF	as per MIL-HDBK-217F, 25°C	1000			K hours
RoHS	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	5		95	%
vibration	10-55Hz		2		G

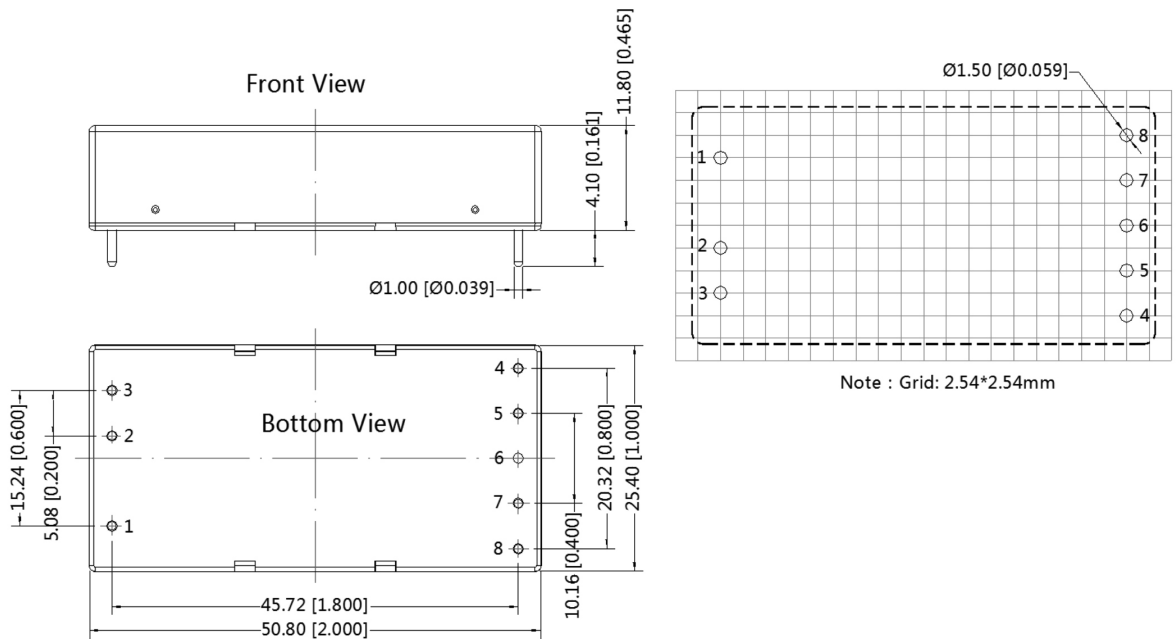
## MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	50.80 x 25.40 x 11.80 [2 x 1.000 x 0.464 inch]				mm
case material	aluminum alloy				
weight			28		g

## MECHANICAL DRAWING

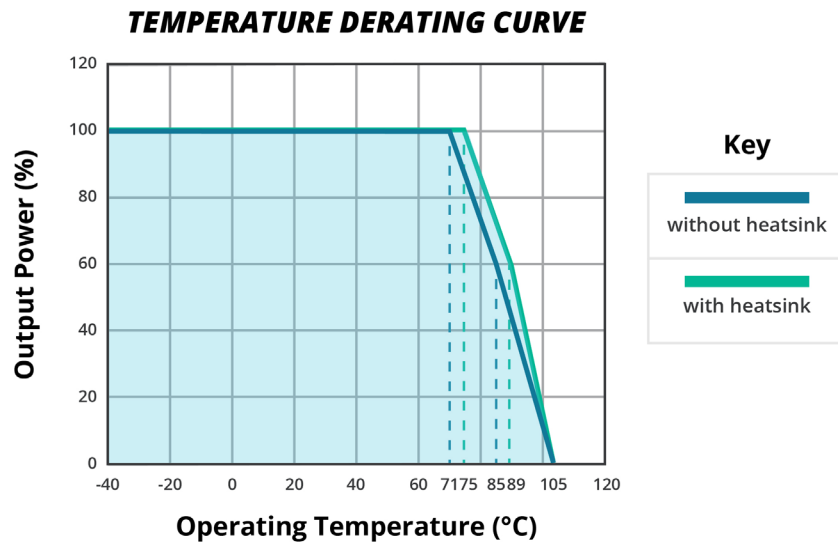
units: mm [inch]  
 tolerance:  $\pm 0.50$  [ $\pm 0.020$ ]  
 pin diameter tolerance:  $\pm 0.10$  [ $\pm 0.004$ ]

PIN Out	
PIN	Function
1	Ctrl
2	GND
3	Vin
4	+Vo2
5	0V2
6	no pin
7	0V1
8	+Vo1



## DERATING CURVES

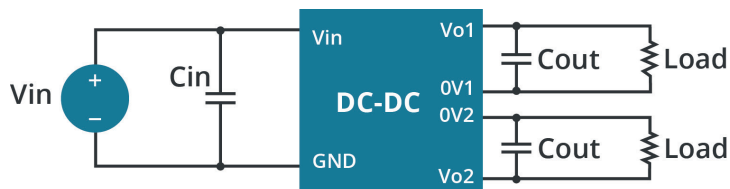
Figure 1



## APPLICATION CIRCUIT

All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values  $C_{in}$  and  $C_{out}$  and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the max. capacitive load value of the product.

**Figure 2**

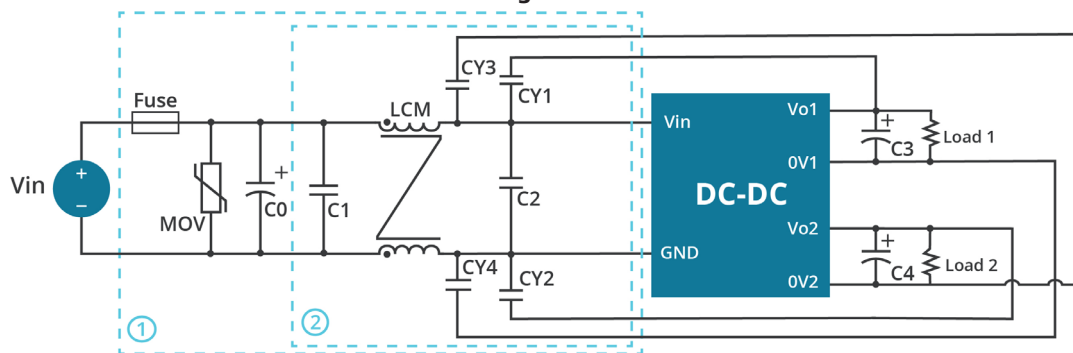


**Table 1**

Vout (Vdc)	Cin ( $\mu F$ )	Cout ( $\mu F$ )
5	100	100
12	100	22
24	100	22

## EMC RECOMMENDED CIRCUIT

**Figure 3**



**Table 2**

Recommended External Circuit Components	
Model	$V_{in}$ : 48V
FUSE	Choose according to actual input current
MOV	S14K60
C0	680 $\mu F$ /100V
C1, C2, C3, C4	Y1/102M/400 Vac
LCM	1mH (FL2D-30-102)
CY1, CY2, CY3, CY4	2.2nF/2000V

## REVISION HISTORY

rev.	description	date
1.0	initial release	06/29/2020
1.02	derating curve and circuit figures updated	08/23/2021
1.03	EMI/EMC information updated	09/09/2021
1.04	EMC circuit & table 2 updated	04/06/2022
1.05	EMC circuit updated	01/11/2023

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



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