

**SERIES: PQQ6W-S | DESCRIPTION: DC-DC CONVERTER**
**FEATURES**

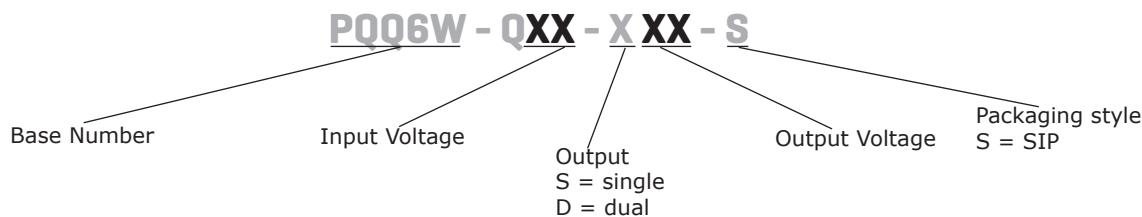
- 6W isolated output
- ultra wide 4:1 input range
- single and dual regulated outputs
- high efficiency up to 87%
- short circuit and over-current protection
- 1,600 Vdc isolation
- operating temperature -40°C ~ 105°C
- control pin
- designed to meet EN/BS EN 62368


**MODEL**

MODEL	input voltage	output voltage	output current	output power	ripple & noise <sup>1</sup>	efficiency <sup>2</sup>		
	typ (Vdc)	range (Vdc)	(Vdc)	min (mA)	max (mA)	max (W)	max (mVp-p)	typ (%)
PQQ6W-Q24-S3-S	24	9~36	3.3	0	1,350	4	100	78
PQQ6W-Q24-S5-S	24	9~36	5.0	0	1,200	6	100	82
PQQ6W-Q24-S9-S	24	9~36	9.0	0	667	6	100	84
PQQ6W-Q24-S12-S	24	9~36	12.0	0	500	6	100	86
PQQ6W-Q24-S15-S	24	9~36	15.0	0	400	6	100	87
PQQ6W-Q24-S24-S	24	9~36	24.0	0	250	6	100	85
PQQ6W-Q24-D5-S	24	9~36	±5	0	±600	6	150	80
PQQ6W-Q24-D9-S	24	9~36	±9	0	±333	6	150	83
PQQ6W-Q24-D12-S	24	9~36	±12	0	±250	6	150	83
PQQ6W-Q24-D15-S	24	9~36	±15	0	±200	6	150	83
PQQ6W-Q24-D24-S	24	9~36	±24	0	±125	6	150	82

Notes:

1. Ripple and noise are measured at 20 MHz BW by "parallel cable" method. See Figure 3.
2. At nominal input voltage.
3. Exceeding the maximum input voltage may cause permanent damage.

**PART NUMBER KEY**


**INPUT**

parameter	conditions/description	min	typ	max	units
operating input voltage		9	24	40	Vdc
start-up voltage				9	Vdc
surge voltage	for maximum of 1 second		-0.7	50	Vdc
	full load / no load				
	3.3 Vdc output		283/5	245/12	mA
	5 Vdc output		305/5	313/12	mA
current	9, 12, 15, 24 Vdc output		305/10	313/16	mA
	±5 Vdc output		313/12	320/16	mA
	±9, ±12, ±15 Vdc output		301/12	309/16	mA
	±24 Vdc output		305/12	313/16	mA
filter	capacitance filter				
CTRL	module on: CTRL pin open or pulled high (3.5-12 Vdc) module off: CTRL pin pulled low to GND (0-1.2 Vdc)				

**OUTPUT**

parameter	conditions/description	min	typ	max	units
	3.3 Vdc output			1,800	µF
	5 Vdc output			1,000	µF
	±5, 9 & 12 Vdc output			470	µF
maximum capacitive load <sup>4</sup>	±9, 15 Vdc output			220	µF
	±12 Vdc output			120	µF
	±15, 24 Vdc output			100	µF
	±24 Vdc output			68	µF
voltage accuracy	5%~100% load	Vout1 Vout2		±2 ±3	% %
line regulation	at full load, from low to high input voltage	Vout1 Vout2		±1 ±1.5	% %
load regulation	5%~100% load	Vout1 Vout2		±1.5 ±2	% %
switching frequency	PWM mode			500	kHz
transient recovery time	25% load step change, nominal input voltage single output models dual output models			300 450	µS µS
transient response deviation	25% load step change, nominal input voltage ±9, ±12, ±15 & ±24 Vdc output all other outputs			±3 ±5	% %
temperature coefficient	at full load			±0.03	%/°C

Notes: 4. The specified maximum capacitive load for positive and negative output is identical.

## PROTECTIONS

parameter	conditions/description	min	typ	max	units
over current protection		110		230	%
short circuit protection	continuous, auto recovery				

## SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	input to output, for 1 minute with 1 mA max single output models dual output models	1,600 1,500			Vdc Vdc
isolation resistance	input to output at 500 Vdc	1,000			MΩ
isolation capacitance	input to output, 100 kHz / 0.1 V		1,000		pF
safety approvals	designed to meet 62368-1: EN/BS EN				
EMI/EMC	CISPR32/EN 55032 Class B (see recommended circuit)				
ESD	IEC/EN 61000-4-2 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	1,000			K hours
RoHS	yes				

## ENVIRONMENTAL

parameter	conditions/description	min	typ	max	units
operating temperature	see derating curve single output models dual output models	-40 -40		105 85	°C °C
storage temperature		-55		125	°C
storage humidity	non-condensing	5		95	%
vibration	10-150Hz, 5G, 0.75mm. along X, Y and Z				

## MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	22.00 × 9.50 × 12.00 [0.866 × 0.374 × 0.472 inch]				mm
case material	black plastic				
weight		4.9		g	

## MECHANICAL DRAWING

units: mm [inch]

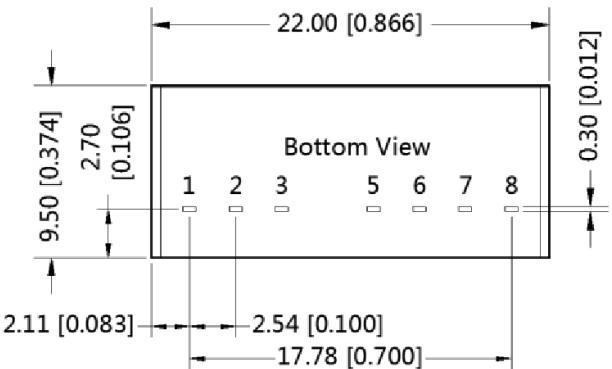
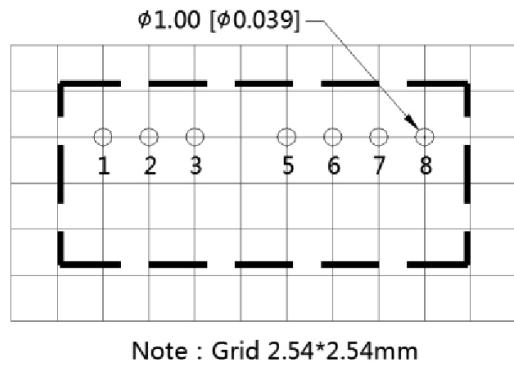
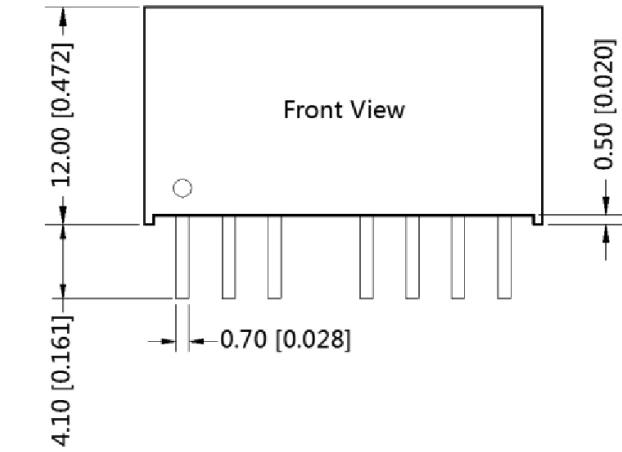
pin section tolerance: ±0.10[±0.004]

general tolerance: ±0.50[±0.020]

PIN Out		
PIN	Function Single output	Function Dual output
1	GND	GND
2	Vin	Vin
3	Ctrl	Ctrl
5	NC	NC
6	+Vout	+Vout
7	0V	0V
8	NC	-Vout

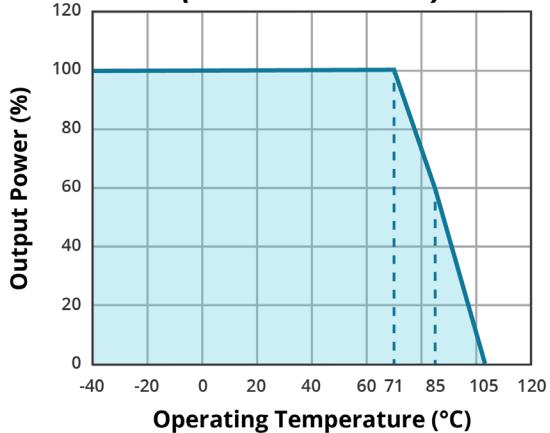
NC: Pin to be isolated from circuitry.

THIRD ANGLE PROJECTION

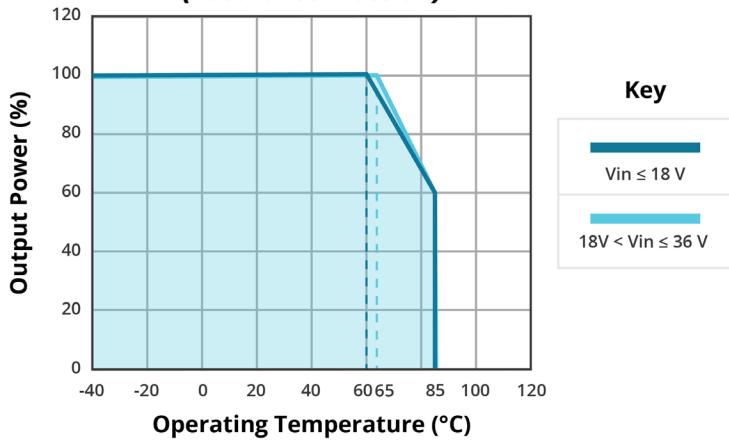


## DERATING CURVE

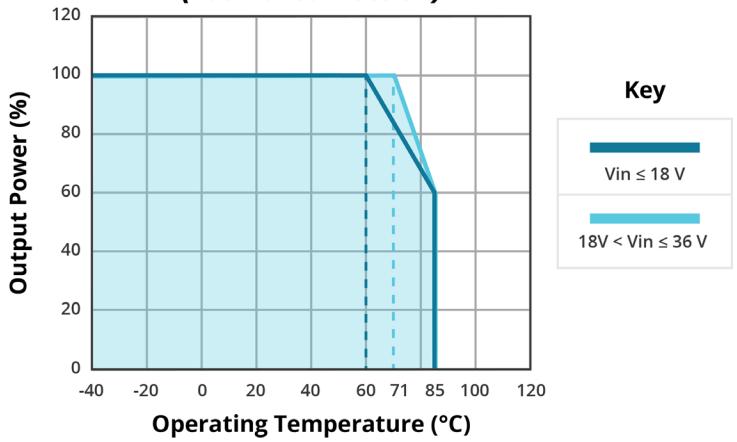
**TEMPERATURE DERATING CURVE**  
*single output models  
(natural convection)*



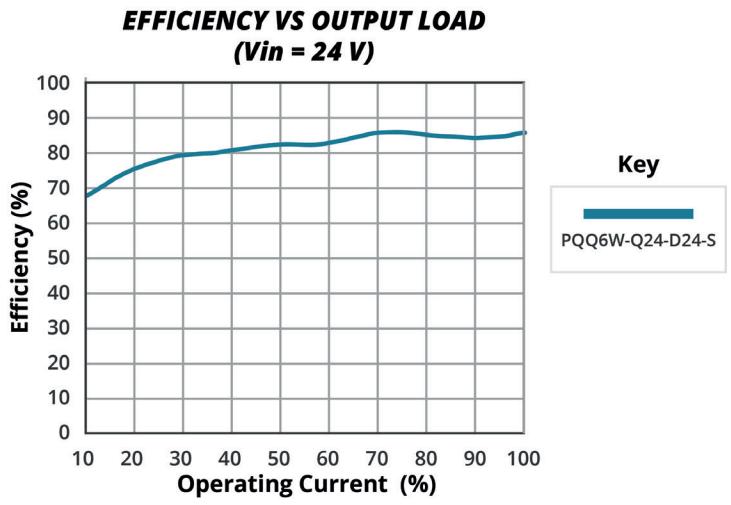
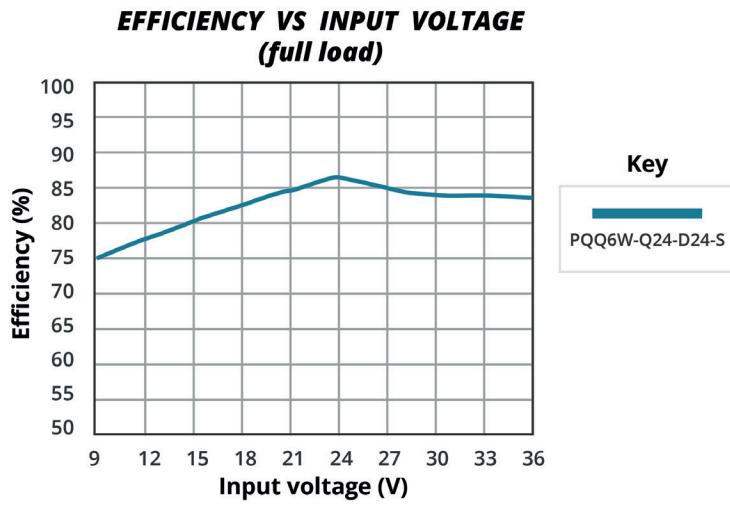
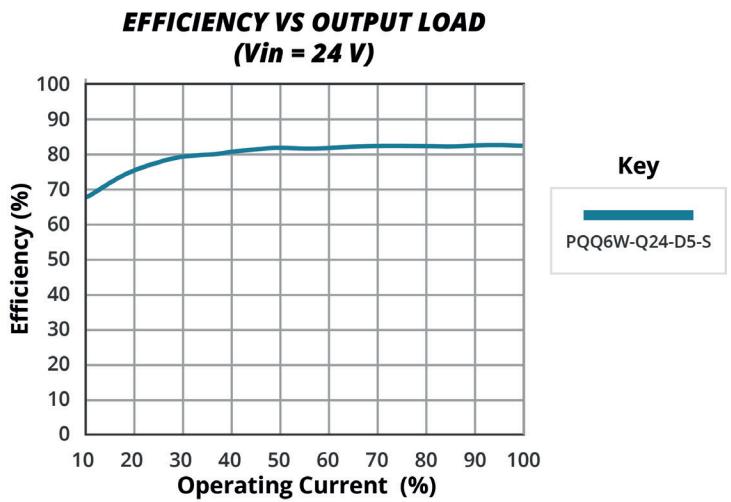
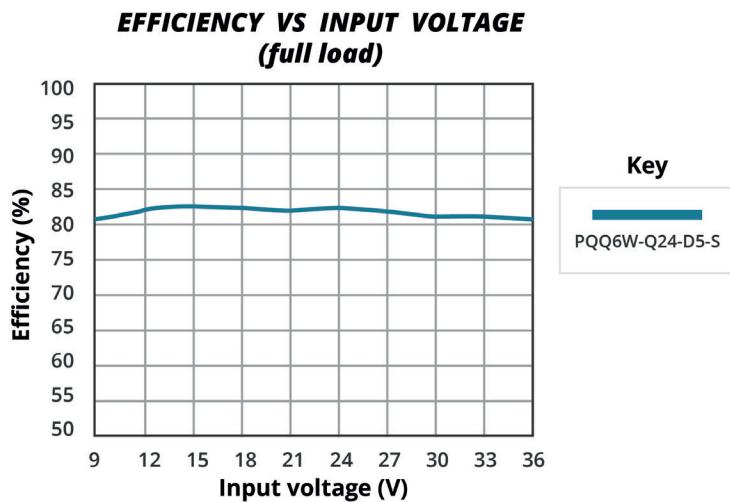
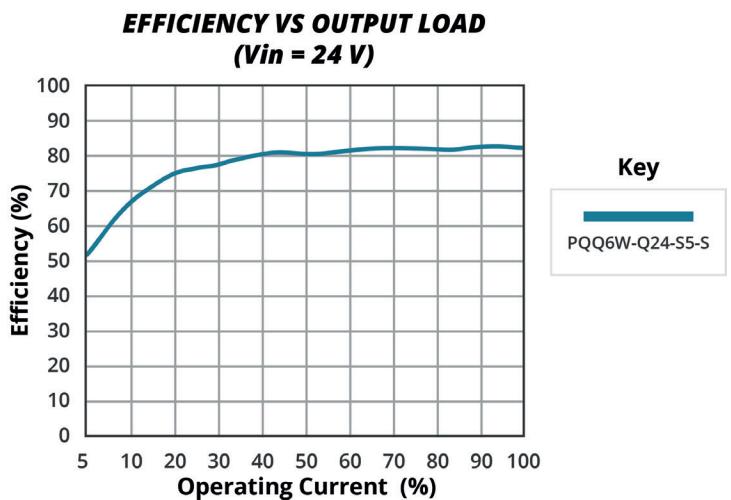
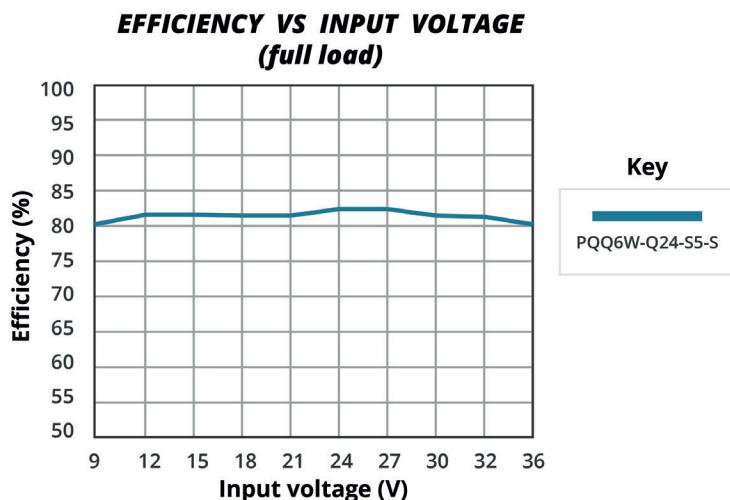
**TEMPERATURE DERATING CURVE**  
*±5 Vdc output  
(natural convection)*



**TEMPERATURE DERATING CURVE**  
*±9, ±12, ±15 & ±24 Vdc output  
(natural convection)*



## EFFICIENCY CURVES



## APPLICATION CIRCUIT

All the 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  $C_{in}$  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 1

### Single output

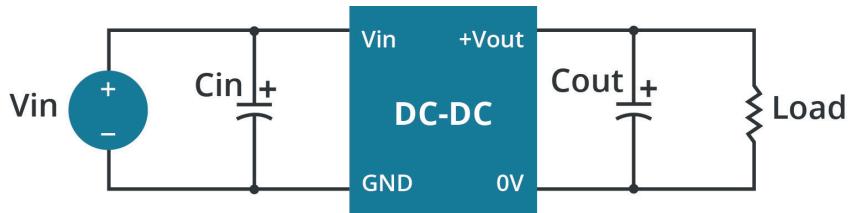
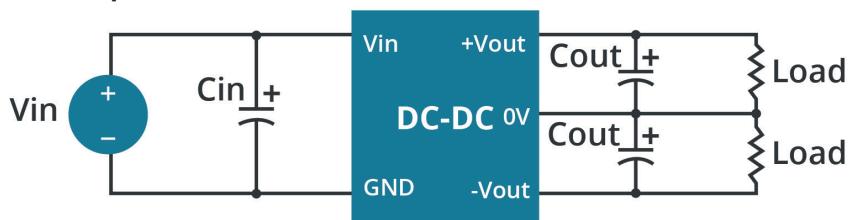


Table 1

$C_{in}$ ( $\mu F/V$ )	$C_{out}$ ( $\mu F/V$ )
100 $\mu F$ / 50V	22 $\mu F$ / 50V

### Dual output



## EMC RECOMMENDED CIRCUIT

Figure 2

### Single output

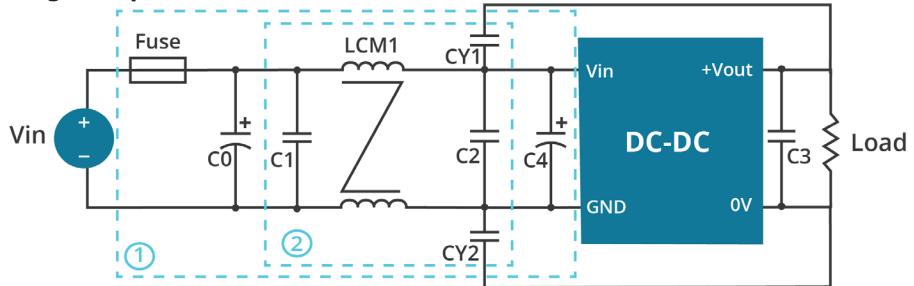
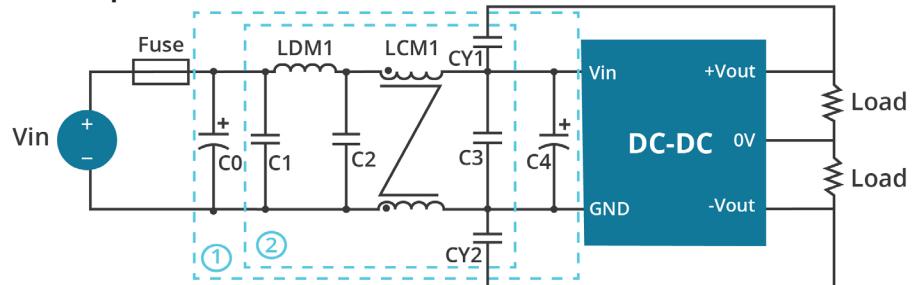


Table 2

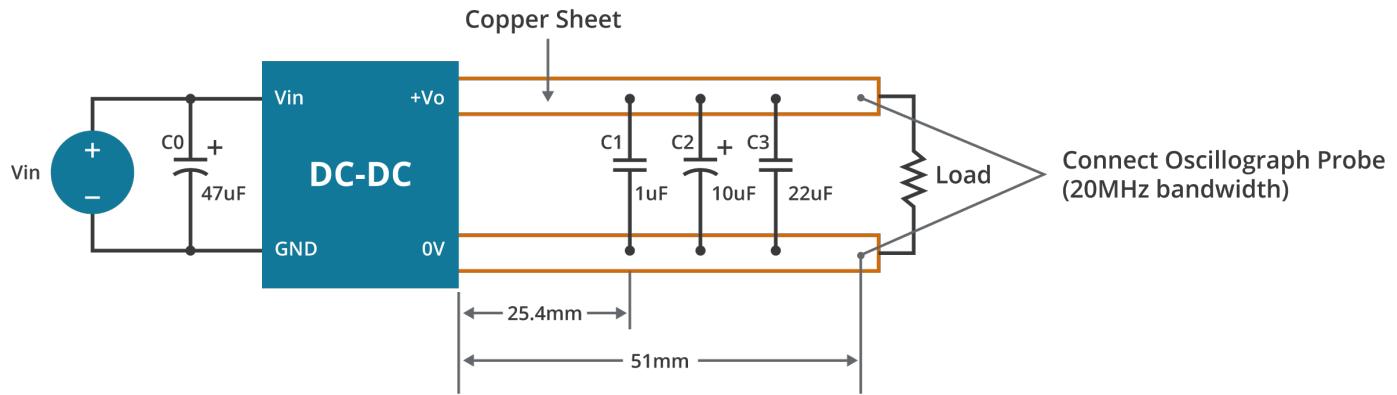
Model	Single output	Dual output
FUSE	Choose according to actual input current	
C0, C4	330 $\mu F$ /50V	330 $\mu F$ /100V
C1, C2	10 $\mu F$ /50V	10 $\mu F$ /50V
C3	22 $\mu F$ /50V	10 $\mu F$ /50V
LCM1		1.4-1.7mH (TN150-RH12.7*12.7*7.9)
LDM1	---	10 $\mu H$
CY1, CY2	1nF/400V	1nF/2kV

### Dual output



## RIPPLE AND NOISE

Figure 3



## REVISION HISTORY

rev.	description	date
1.0	initial release	09/22/2020
1.01	datasheet update	01/21/2021
1.02	product image updated, dual output models added	11/07/2022
1.03	CE safety mark removed	11/22/2022
1.04	efficiency curves updated	12/13/2022
1.05	features updated	02/07/2023

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



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

Fax 503.612.2383  
[cui.com](http://cui.com)  
[techsupport@cui.com](mailto:techsupport@cui.com)

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