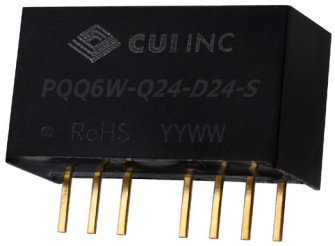
CUI INC
a bel group

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



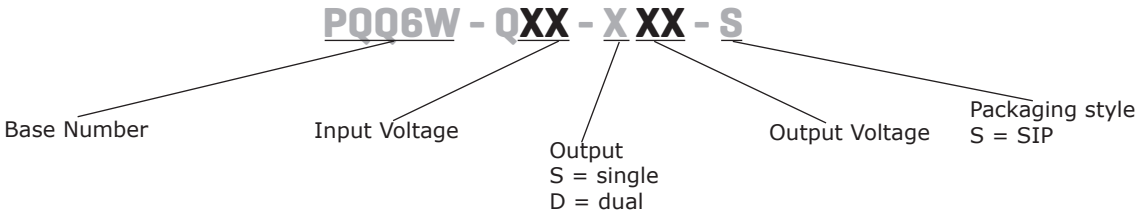
RoHS

MODEL

MODEL	input voltage		output voltage	output current		output power	ripple & noise[1]	efficiency[2]
	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
current	full load / no load 3.3 Vdc output 5 Vdc output 9, 12, 15, 24 Vdc output ±5 Vdc output ±9, ±12, ±15 Vdc output ±24 Vdc output		 283/5 305/5 305/10 313/12 301/12 305/12	 245/12 313/12 313/16 320/16 309/16 313/16	 mA mA mA mA mA 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
maximum capacitive load[4]	3.3 Vdc output 5 Vdc output ±5, 9 & 12 Vdc output ±9, 15 Vdc output ±12 Vdc output ±15, 24 Vdc output ±24 Vdc output				1,800 1,000 470 220 120 100 68	µF µF µF µF µF µF 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	 500 500	 µS µS
transient response deviation	25% load step change, nominal input voltage ±9, ±12, ±15 & ±24 Vdc output all other outputs			 ±3 ±5	 ±5 ±8	 % %
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

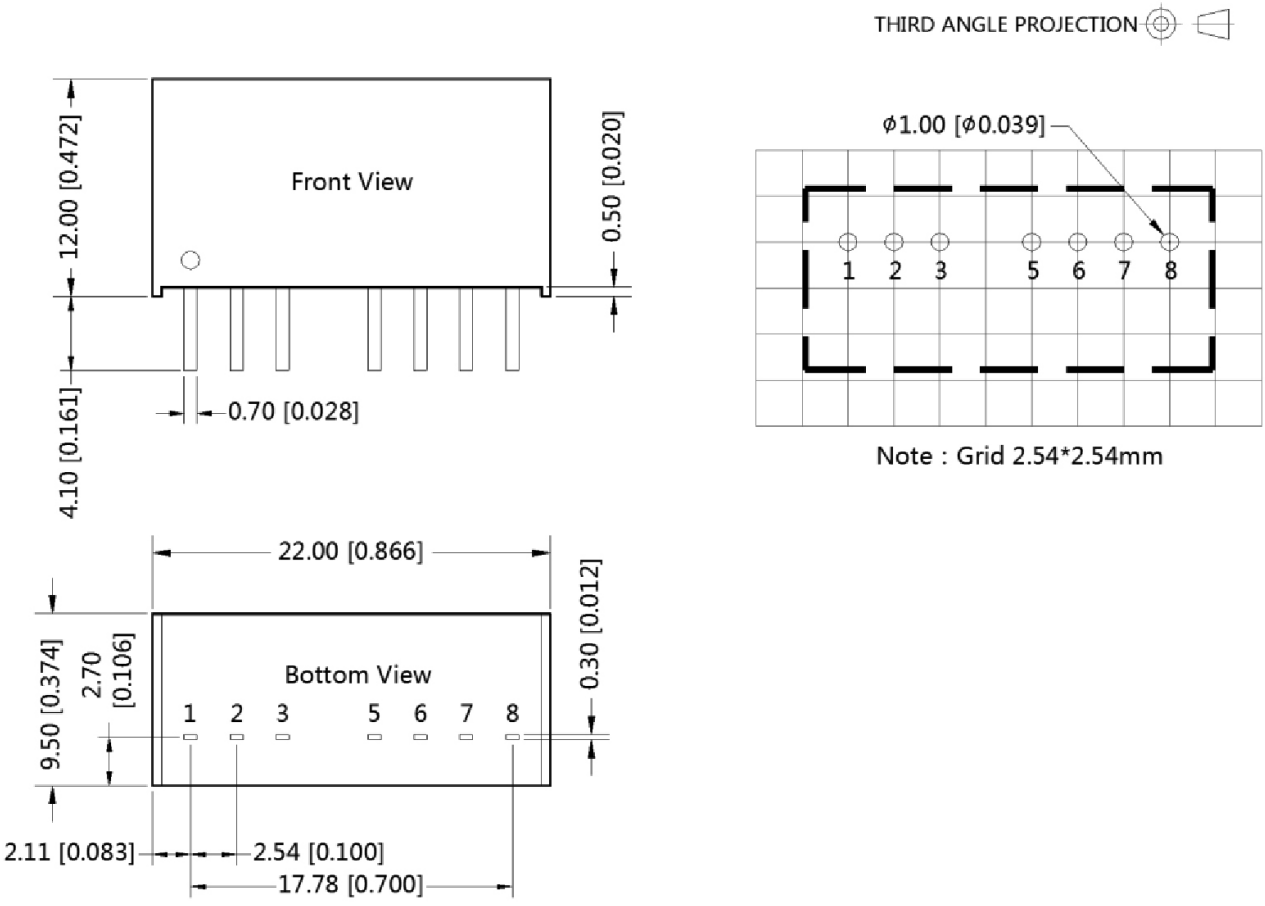
parameter	conditions/description	min	typ	max	units
dimensions	22.00 × 9.50 × 12.00 [0.866 x 0.374 x 0.472 inch]				mm
case material	black plastic				
weight			4.9		g

MECHANICAL DRAWING

units: mm [inch]
pin section tolerance: ±0.10[±0.004]
general tolerance: ±0.50[±0.020]

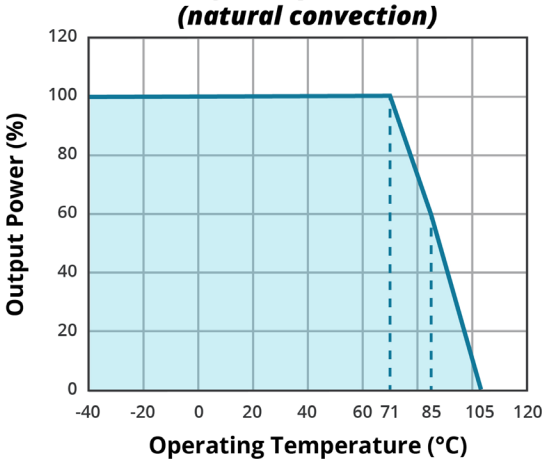
PIN Out		
PIN	Function Single output	Function Dual output
1	GND	GND
2	Vin	Vin
3	Ctrl	Ctrl
5	NC	NC
6	+Vout	+Vout
7	0V	0V
8	NC	-Vout

NC: Pin to be isolated from circuitry.

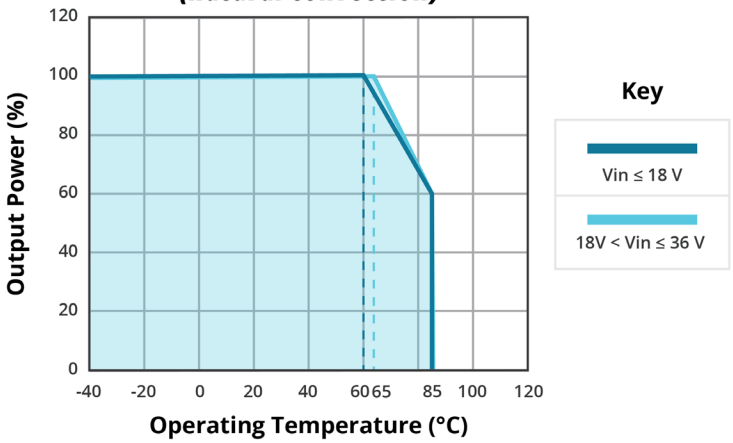


DERATING CURVE

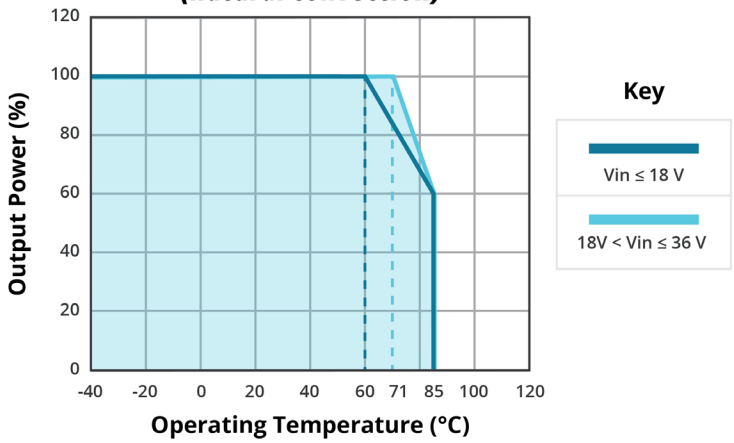
TEMPERATURE DERATING CURVE
single output models
(natural convection)



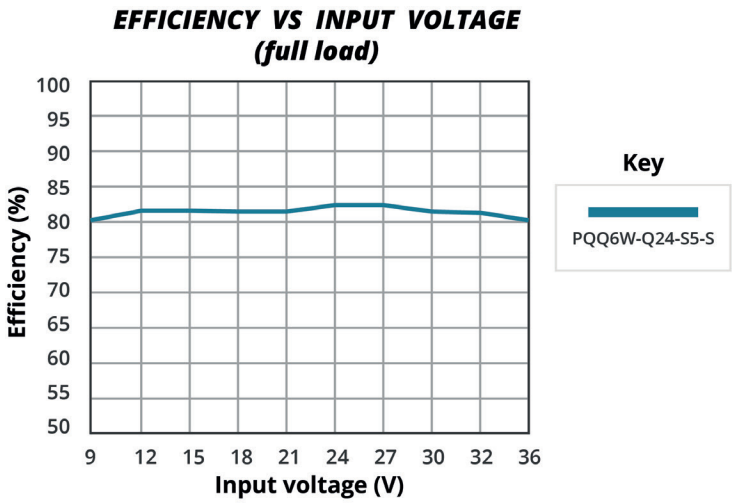
TEMPERATURE DERATING CURVE
±5 Vdc output
(natural convection)

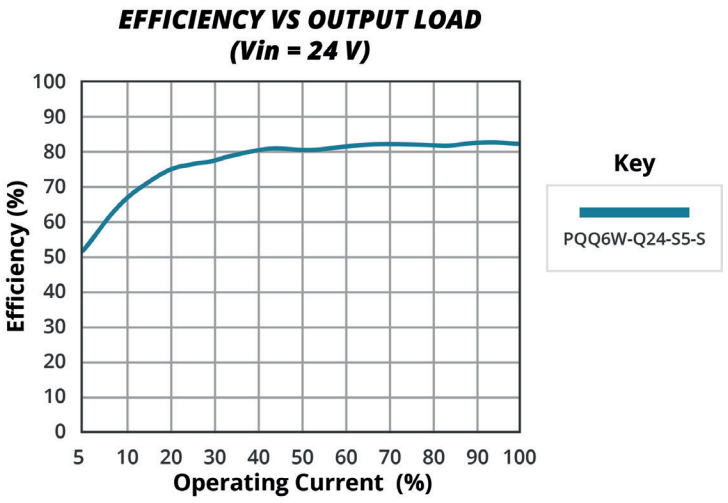


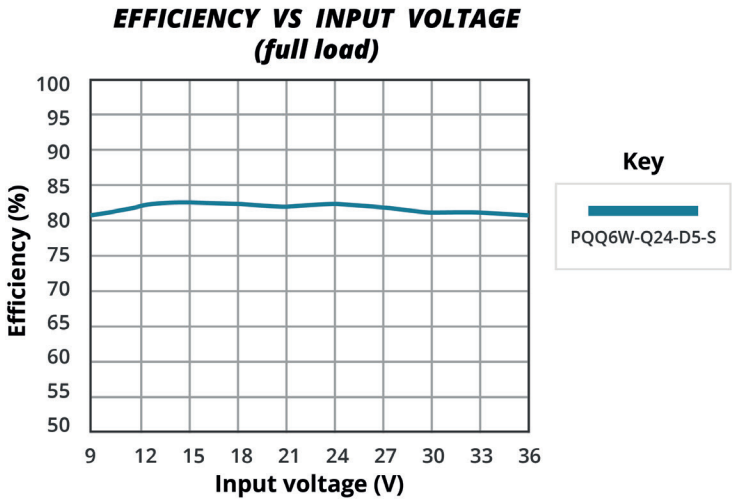
TEMPERATURE DERATING CURVE
±9, ±12, ±15 & ±24 Vdc output
(natural convection)

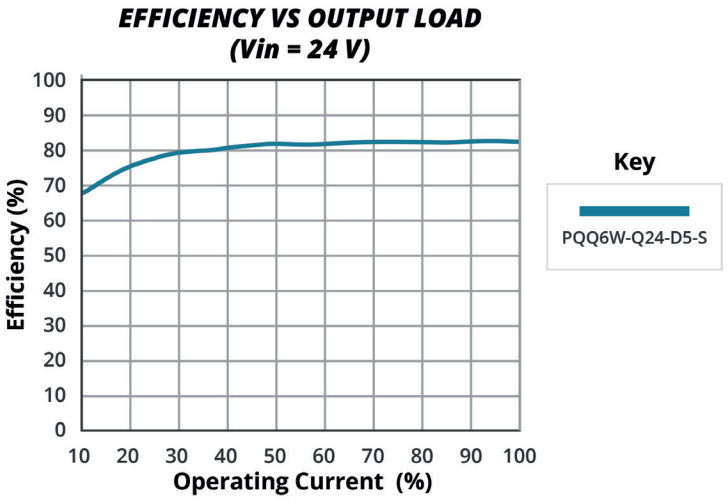


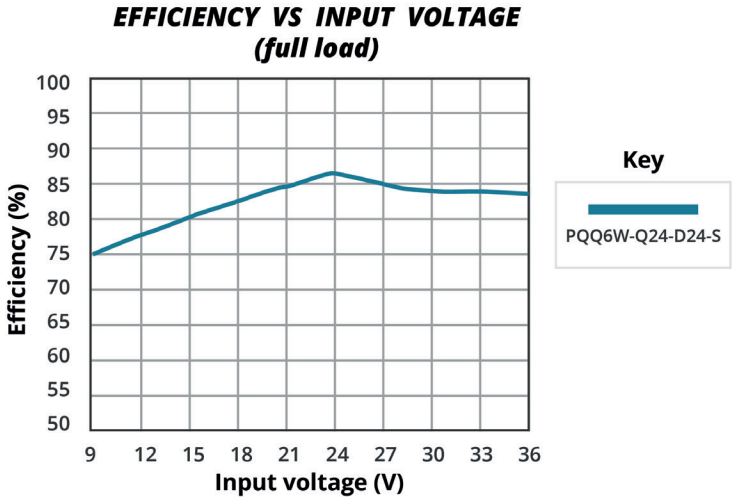
EFFICIENCY CURVES

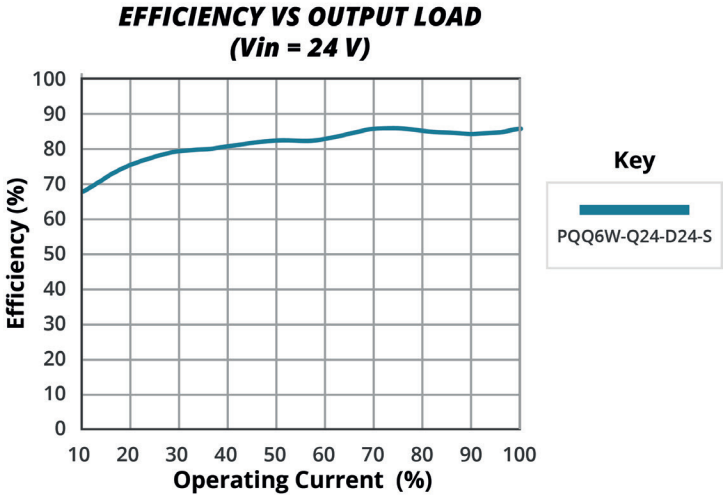










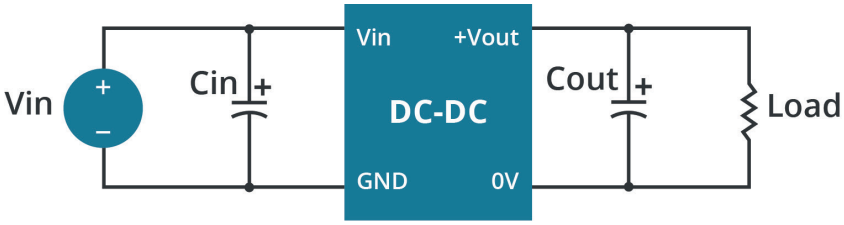


APPLICATION CIRCUIT

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 Cin and Cout 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



Dual output

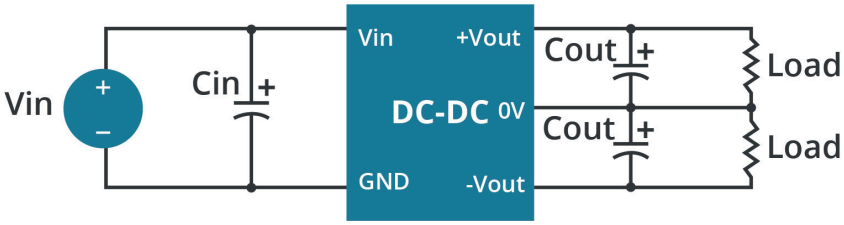


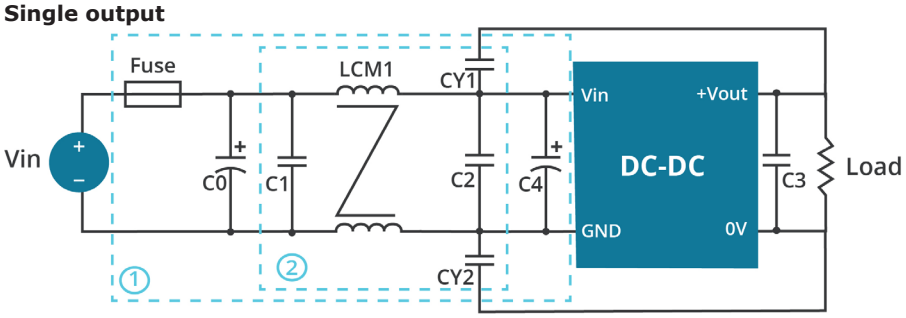
Table 1

Cin (μF/V)	Cout (μF/V)
100μF / 50V	22μF / 50V

EMC RECOMMENDED CIRCUIT

Figure 2

Single output



Dual output

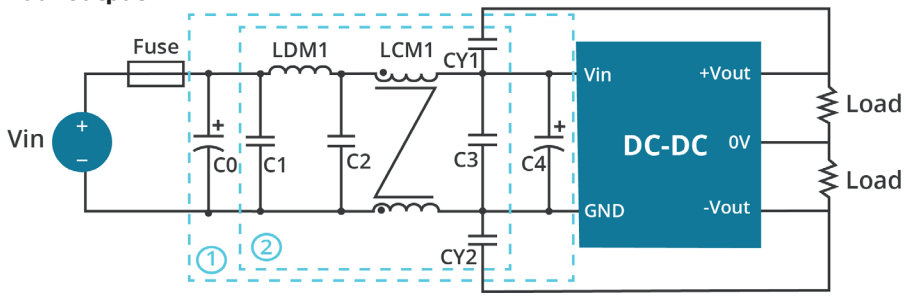
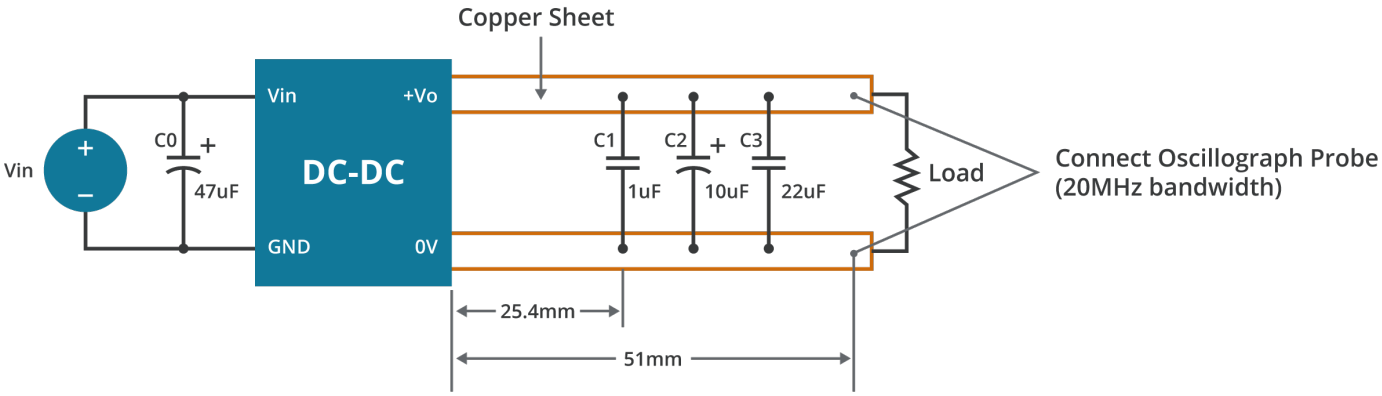


Table 2

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

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.

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