

SERIES: DQD50 | DESCRIPTION: DC-DC CONVERTER

FEATURES

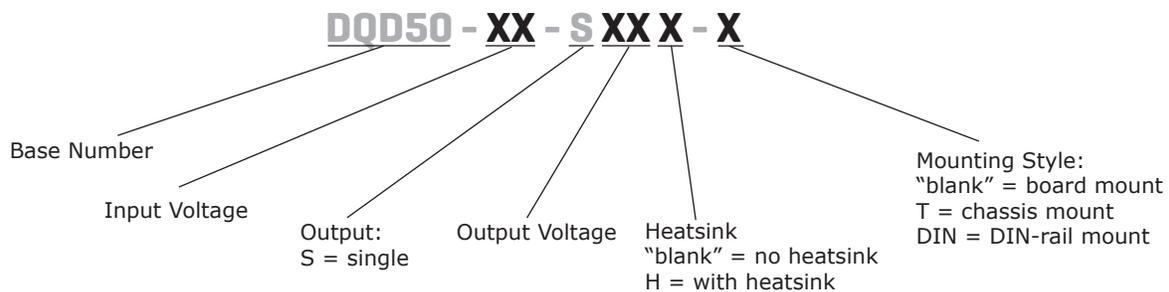
- up to 50 W isolated output
- single regulated outputs
- over voltage, input under voltage, short circuit, and over current protections
- remote on/off control
- 1,500 Vdc isolation
- -40 ~ 105°C temperature range, with derating
- certified to IEC/EN 62368-1
- PCB, chassis and DIN-rail mount options



MODEL	input voltage		output voltage	output current	output power	ripple & noise ¹	efficiency ²
	typ (Vdc)	range (Vdc)	typ (Vdc)	max (A)	max (W)	max (mVp-p)	typ (%)
DQD50-24-S5	24	9~36	5	10.0	50	150	92
DQD50-24-S12	24	9~36	12	4.167	50	150	92
DQD50-24-S15	24	9~36	15	3.333	50	150	92
DQD50-24-S24	24	9~36	24	2.083	50	150	92
DQD50-48-S5	48	18~75	5	10.0	50	150	92
DQD50-48-S12	48	18~75	12	4.167	50	150	92
DQD50-48-S15	48	18~75	15	3.333	50	150	92
DQD50-48-S24	48	18~75	24	2.083	50	150	92

Notes: 1. The ripple and noise is measured at 5%~100% load and 20MHz bandwidth. 0% ~5% load ripple & noise is less than or equal to 5%Vo; the ripple & noise test adopts the parallel line test method, see the ripple & noise test instructions for details.
 2. The efficiency is tested at full load.
 3. Unless otherwise specified, all values or indicators in this manual are tested at Ta=25°C, humidity<75%RH, rated input voltage and rated load (pure resistance load).

PART NUMBER KEY



INPUT

parameter	conditions/description	min	typ	max	units
input voltage range	24 Vdc input models	9	24	36	Vdc
	48 Vdc input models	18	48	75	Vdc
input current	24 Vd input models, at full load			6.4	A
	48 Vd input models, at full load			3.0	A
input current (full load/no load)	24 Vdc input; 5 Vdc output model		2264/8		mA
	24 Vdc input; 12, 15 Vdc output models		2264/4		mA
	24 Vdc input; 24 Vdc output models		2264/3		mA
	48 Vdc input; 5, 12, 15 Vdc output models		1133/4		mA
	48 Vdc input; 24 Vdc output models		1133/3		mA
surge voltage	1 second max				
	24 Vdc input models	-0.7		50	Vdc
	48 Vdc input models	-0.7		100	Vdc
start-up voltage	24 Vdc input models		8		Vdc
	48 Vdc input models		16		Vdc
turn-off voltage threshold	24 Vdc input models		7		Vdc
	48 Vdc input models		15		Vdc
filter	Pi filter				
no load power consumption			0.1		W
remote on/off ⁴	module on	CTRL pin suspended or pulled high (3~12 Vdc)			
	module off	CTRL pin connected to -Vin or pulled low (0~1.2 Vdc)			
input current when off			10		mA

Notes: 4. The voltage of CTRL pin is relative to -Vin pin.

OUTPUT

parameter	conditions/description	min	typ	max	units
maximum capacitive load	5 Vdc output models			10,000	μF
	12 Vdc output models			3,700	μF
	15 Vdc output models			2,000	μF
	24 Vdc output models			1,000	μF
voltage accuracy			±1	±3	%
voltage regulation	full voltage range, nominal load		±0.2	±0.5	%
load regulation	5% ~ 100% load		±0.5	±1	%
transient response recovery	25% rated load step change		300	500	μs
transient response deviation	25% rated load step change		±5	±10	%
	5 Vdc output models all other models		±3	±5	%
temperature coefficient				±0.03	%/°C
start-up time	at rated input voltage and constant resistance load		20	100	ms
switching frequency	PWM mode		300		kHz
adjustability	via trim	90		110	%

PROTECTIONS

parameter	conditions/description	min	typ	max	units
over current protection	5 Vdc output model	110	150	240	%
	all other models	110	150	200	%
over voltage protection		110	130	160	%
short circuit protection	continuous, auto recovery, hiccup				
output overshoot				10	%

SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	input to output for 1 minute, 1 mA max	1,500			Vdc
	input/output to case for 1 minute, 1 mA max	1,000			Vdc
isolation capacitance	input to output, (100 kHz, 0.1V)		1,000		pF
safety approvals	certified to 62368-1: IEC, EN				
conducted emissions	CISPR32/EN55032 Class B (see recommended circuit)				
radiated emissions	CISPR32/EN55032 Class B (see recommended circuit)				
ESD	IEC/EN61000-4-2 Contact ± 6 kV, perf. Criteria B				
radiated immunity	IEC/EN61000-4-3 10 V/m, perf. Criteria A (see recommended circuit)				
EFT/burst	IEC/EN61000-4-4 ± 2 kV, perf. Criteria B (see recommended circuit)				
surge	IEC/EN61000-4-5 ± 2 kV, perf. Criteria B (see recommended circuit)				
conducted immunity	IEC/EN61000-4-6 10 Vrms, perf. Criteria A (see recommended circuit)				
vibration	10-150 Hz, 5G, 0.75mm. along X, Y and Z axis				
MTBF	as per MIL-HDBK-217F at 25 °C	1,000,000			hours
RoHS	yes				

ENVIRONMENTAL

parameter	conditions/description	min	typ	max	units
operating temperature	see derating curve	-40		105	°C
storage temperature		-55		125	°C
operating humidity	non condensing	5		95	%
max case temperature				105	°C

SOLDERING

parameter	conditions/description	min	typ	max	units
pin soldering temperature	1.5mm from the case for 10 seconds			300	°C

MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	board mount: 50.8 x 25.4 x 11.8 [2.000 x 1.000 x 0.464 inches]				mm
	board mount with heatsink: 50.8 x 25.4 x 21.8 [2.000 x 1.000 x 0.858 inches]				mm
	chassis mount: 76.0 x 31.5 x 21.3 [2.990 x 1.240 x 0.838 inches]				mm
	chassis mount with heatsink 76.0 x 31.5 x 31.0 [2.990 x 1.240 x 1.220 inches]				mm
	DIN-rail mount: 76.0 x 31.5 x 26.0 [2.990 x 1.240 x 1.023 inches]				mm
	DIN-rail mount with heatsink: 76.0 x 31.5 x 35.5 [2.990 x 1.240 x 1.397 inches]				mm
case material	aluminum				
weight	board mount		36		g
	board mount with heatsink		48		g
	chassis mount		57		g
	chassis mount with heatsink		69		g
	DIN-rail mount		77		g
	DIN-rail mount with heatsink		89		g
cooling	natural convection				

MECHANICAL DRAWING

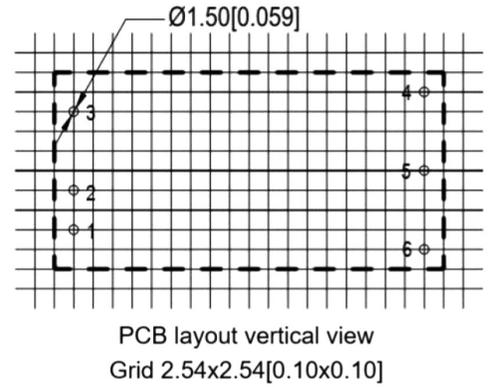
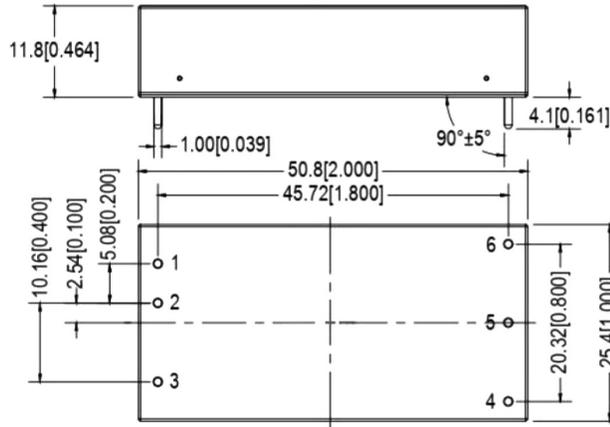
Board Mount

units: mm [inch]

pin diameter tolerance: ± 0.10 [± 0.004]

general tolerance: ± 0.50 [± 0.020]

PIN CONNECTIONS	
PIN	Single
1	+Vin
2	-Vin
3	Ctrl
4	Trim
5	-Vout
6	+Vout



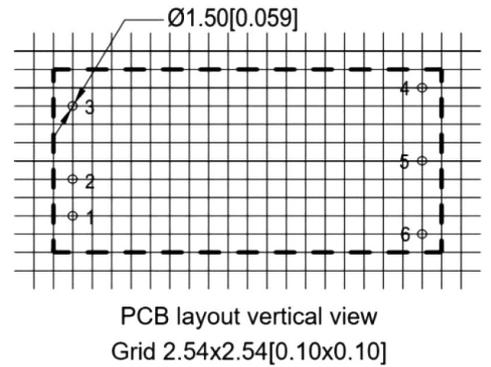
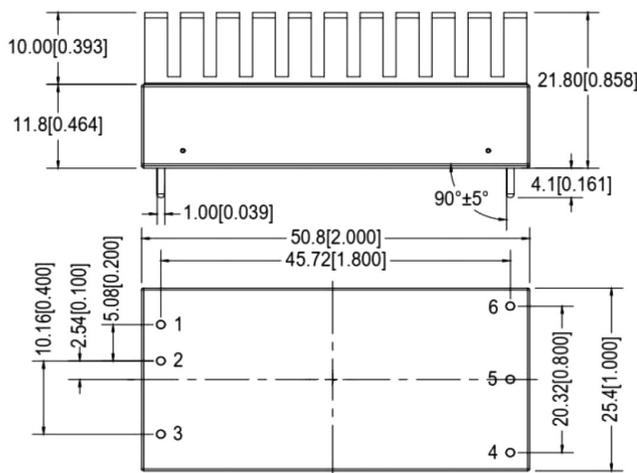
Board Mount with Heatsink

units: mm [inch]

pin diameter tolerance: ± 0.10 [± 0.004]

general tolerance: ± 0.50 [± 0.020]

PIN CONNECTIONS	
PIN	Single
1	+Vin
2	-Vin
3	Ctrl
4	Trim
5	-Vout
6	+Vout



MECHANICAL DRAWING (CONTINUED)

Chassis Mount

units: mm [inch]

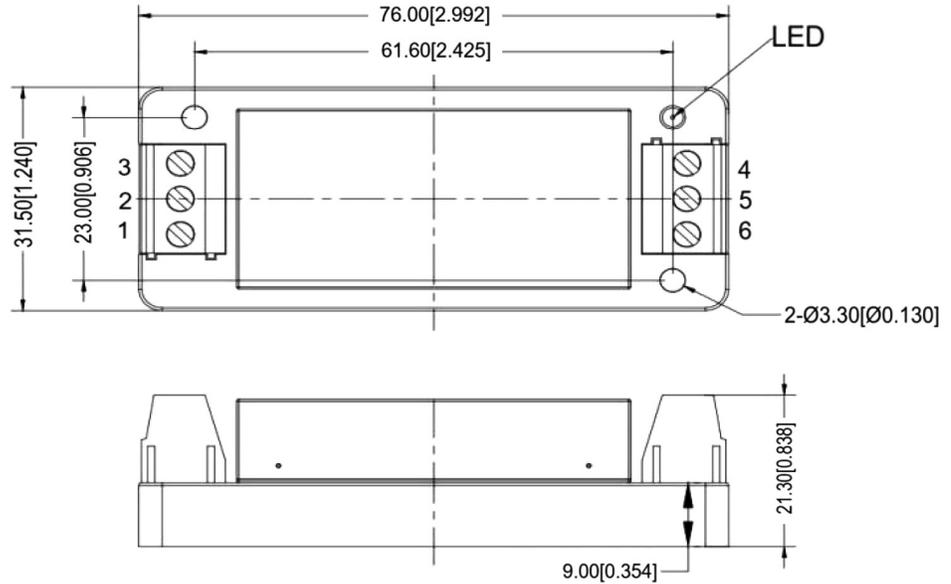
pin diameter tolerance: ± 0.10 [± 0.004]

general tolerance: ± 1.00 [± 0.039]

wire range: 24~12 AWG

tightening torque: max 0.4 N·m

PIN CONNECTIONS	
PIN	Single
1	+Vin
2	-Vin
3	Ctrl
4	Trim
5	-Vout
6	+Vout



Chassis Mount with Heatsink

units: mm [inch]

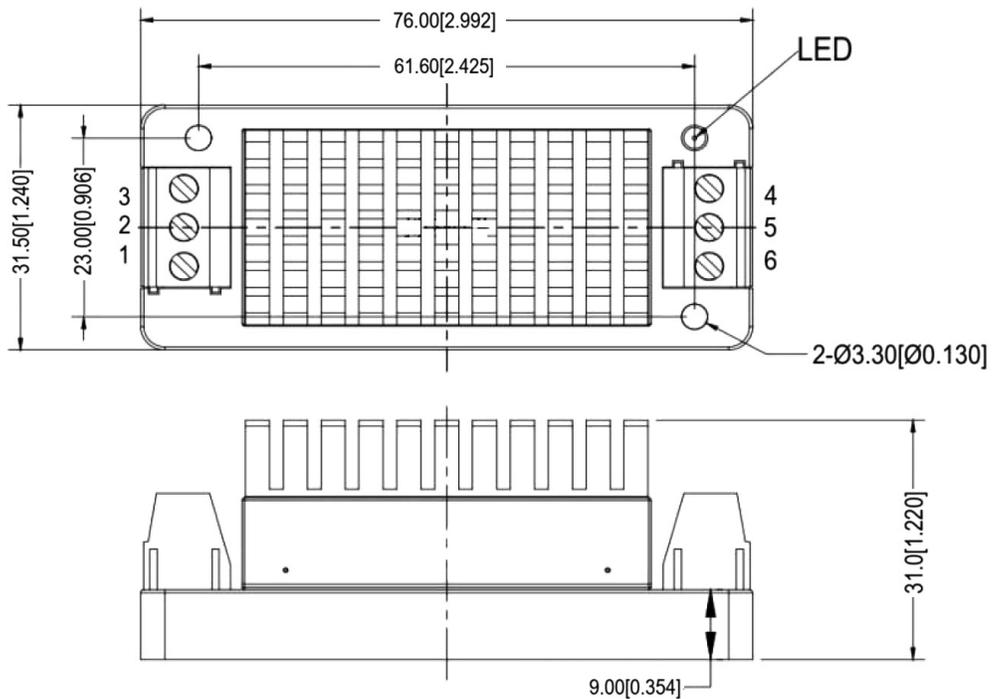
pin diameter tolerance: ± 0.10 [± 0.004]

general tolerance: ± 1.00 [± 0.039]

wire range: 24~12 AWG

tightening torque: max 0.4 N·m

PIN CONNECTIONS	
PIN	Single
1	+Vin
2	-Vin
3	Ctrl
4	Trim
5	-Vout
6	+Vout

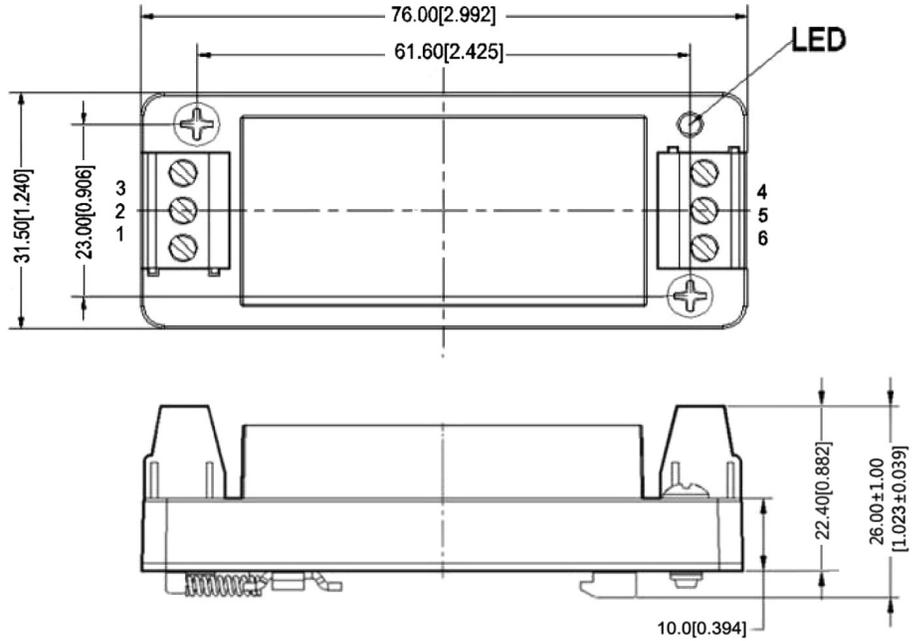


MECHANICAL DRAWING (CONTINUED)

DIN-rail Mount

units: mm [inch]
 pin diameter tolerance: ± 0.10 [± 0.004]
 general tolerance: ± 1.00 [± 0.039]
 wire range: 24~12 AWG
 tightening torque: max 0.4 N·m

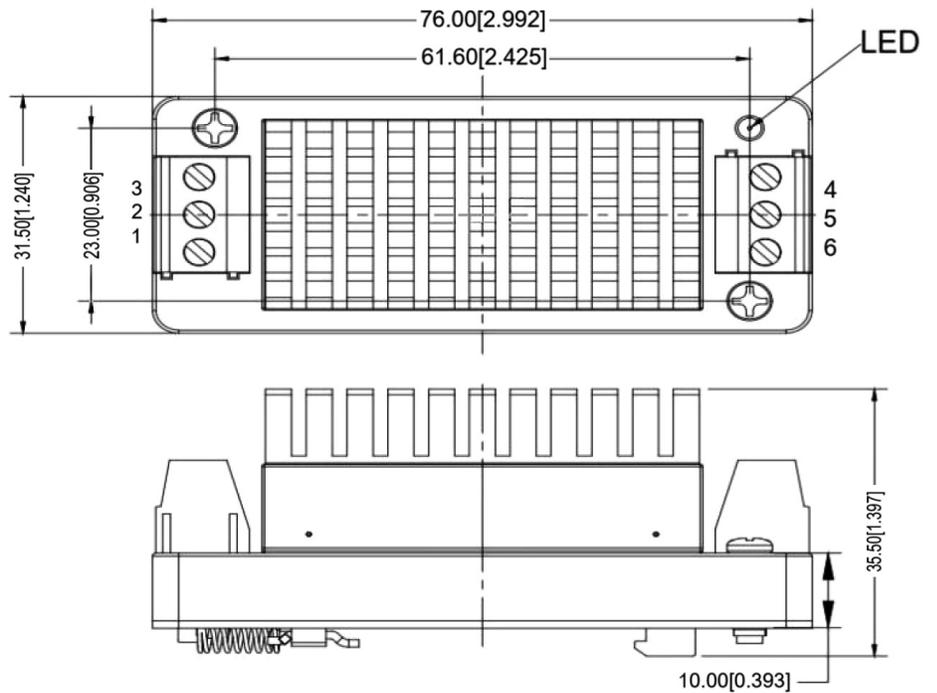
PIN CONNECTIONS	
PIN	Single
1	+Vin
2	-Vin
3	Ctrl
4	Trim
5	-Vout
6	+Vout



DIN-rail Mount with Heatsink

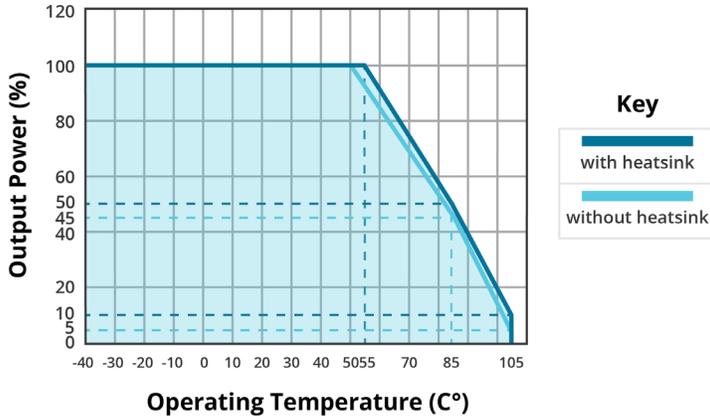
units: mm [inch]
 pin diameter tolerance: ± 0.10 [± 0.004]
 general tolerance: ± 1.00 [± 0.039]
 wire range: 24~12 AWG
 tightening torque: max 0.4 N·m

PIN CONNECTIONS	
PIN	Single
1	+Vin
2	-Vin
3	Ctrl
4	Trim
5	-Vout
6	+Vout

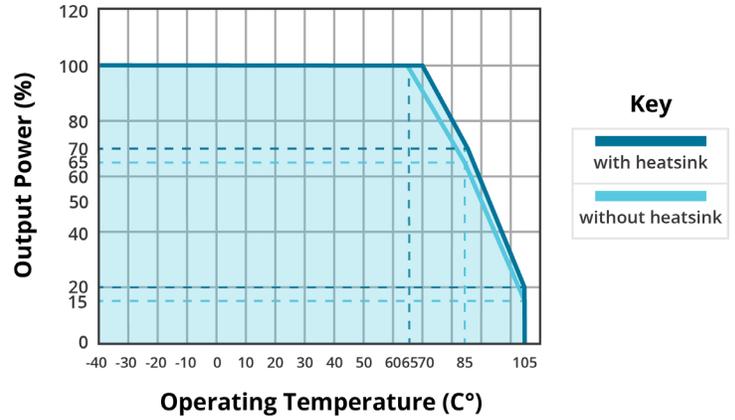


DERATING CURVES

TEMPERATURE DERATING CURVE
5 Vdc output model

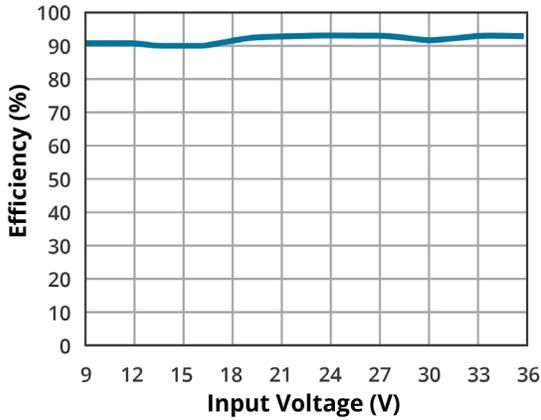


TEMPERATURE DERATING CURVE
all other output models

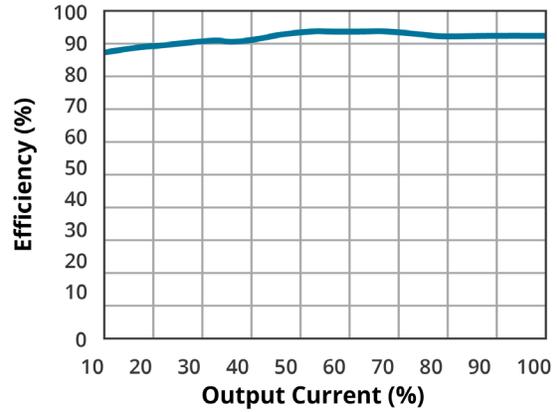


EFFICIENCY CURVES

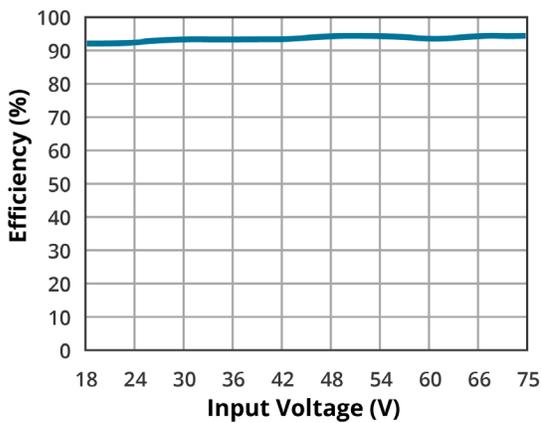
EFFICIENCY VS INPUT VOLTAGE
(full load)



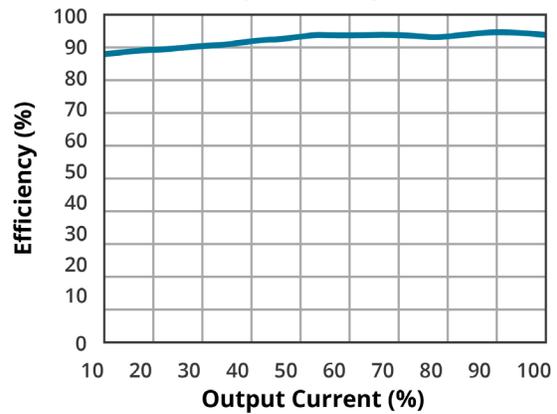
EFFICIENCY VS OUTPUT CURRENT
(Vin = 24 V)



EFFICIENCY VS INPUT VOLTAGE
(full load)



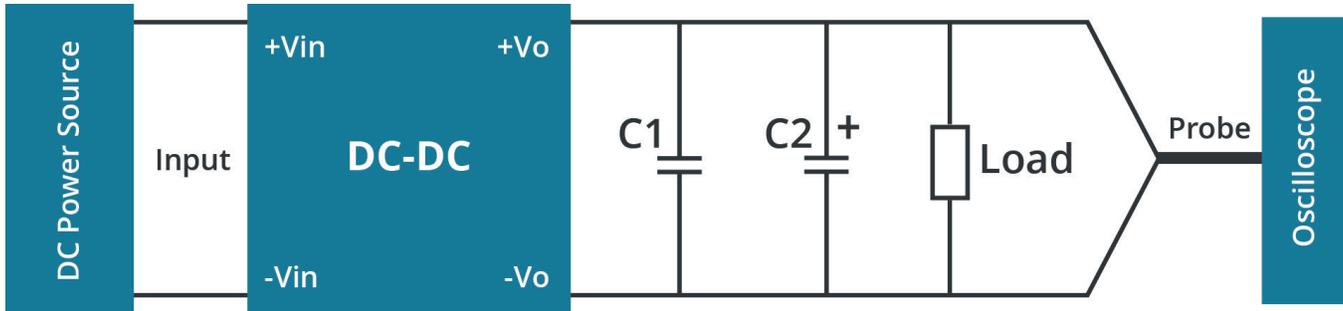
EFFICIENCY VS OUTPUT CURRENT
(Vin = 48 V)



RIPPLE AND NOISE TEST INSTRUCTION

1. The Ripple & Noise test needs the cables in parallel, an oscilloscope that should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. One polypropylene capacitor C1 (0.1 μ F) and one high-frequency low-resistance electrolytic capacitor C2(10 μ F) are connected in parallel with the probe.
2. Refer to the test diagram, the converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The test can start at the converter output terminals after the input power on.
3. It is recommended to connect a $\geq 5\%$ load or a high-frequency low resistance electrolytic capacitor ($\geq 470\mu$ F) load to the output to avoid the output ripple increasing.

Figure 1



APPLICATION NOTES

Figure 2
5 Vdc output model

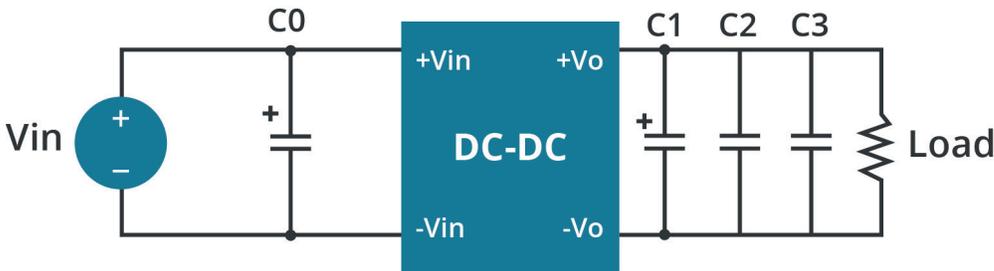


Table 1

5 Vdc output model	
COMPONENT	PARAMETER
C0	100 μ F / 100 V
C1	330 μ F / 50 V
C2	1 μ F / 16 V
C3	10 μ F / 16 V

Figure 3
all other output models

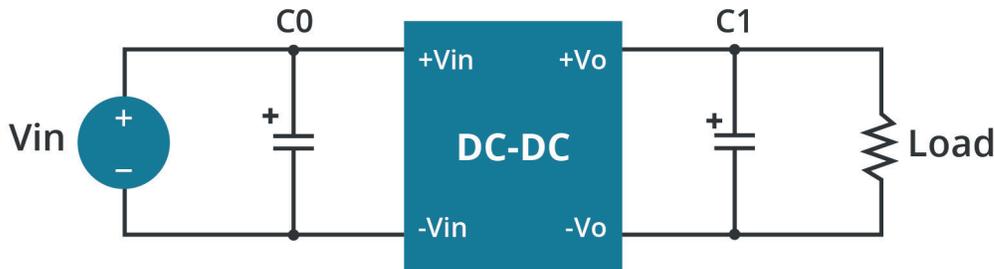


Table 2

12 & 15 Vdc output models	
COMPONENT	PARAMETER
C0	100 μ F / 100 V
C1	100 μ F / 25 V

24 Vdc output model	
COMPONENT	PARAMETER
C0	100 μ F / 100 V
C1	47 μ F / 50 V

EMC RECOMMENDED CIRCUIT

Figure 4
5 Vdc output model

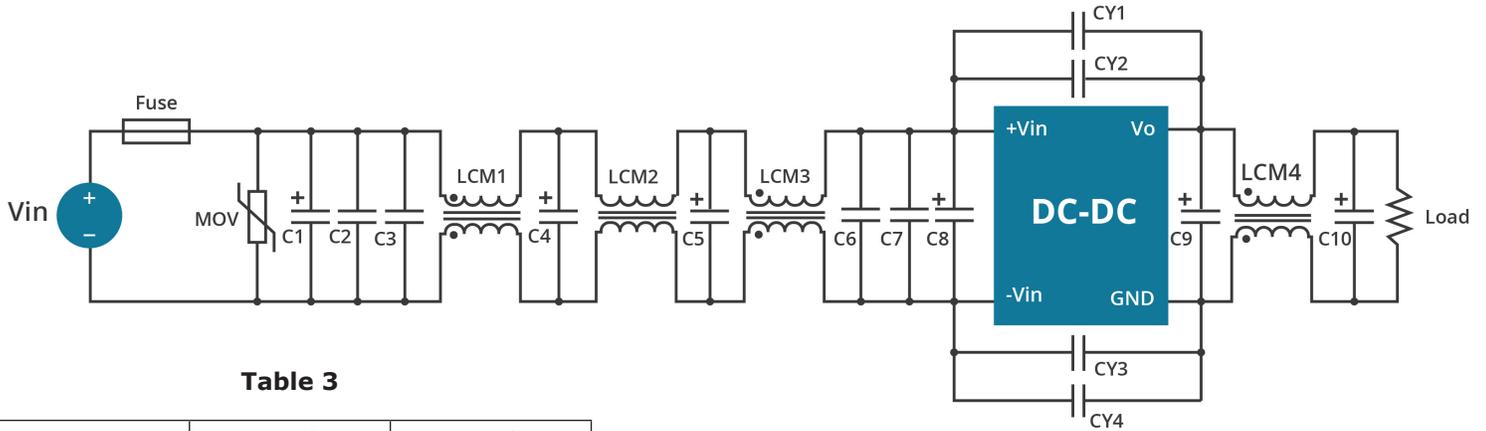


Table 3

COMPONENT	24 Vdc	48 Vdc
Fuse	TBD by customer	
MOV1	14D470K	14D101K
LCM1	2.2 mH	
LCM2	1.0 mH	
LCM3, LCM4	270 μ H	
C1, C4, C5, C8	330 μ F/100 V	
C2, C3	4.7 μ F/100 V	
C6, C7	10 μ F/100 V	
C9, C10	100 μ F/100 V	
CY1, CY3	2.2 nF/2 kV	
CY2, CY4	10 nF/2 kV	

Figure 5
12 & 15 Vdc output model

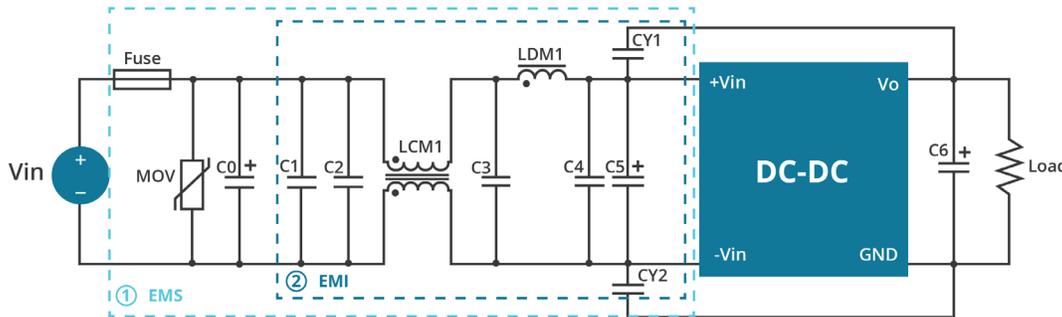


Table 4

COMPONENT	PARAMETER
Fuse	TBD by customer
MOV	14D470K
LDM1	2.2 μ H
LCM1	2.2 mH
LCM2	/
C0	680 μ F/100 V
C1, C2	4.7 μ F/100 V
C3	10 μ F/100 V
C4	10 μ F/100 V
C5	330 μ F/100 V
C6	100 μ F/50 kV
CY1, CY2	2.2 nF/2 kV

EMC RECOMMENDED CIRCUIT (CONTINUED)

Figure 6
24 Vdc output model

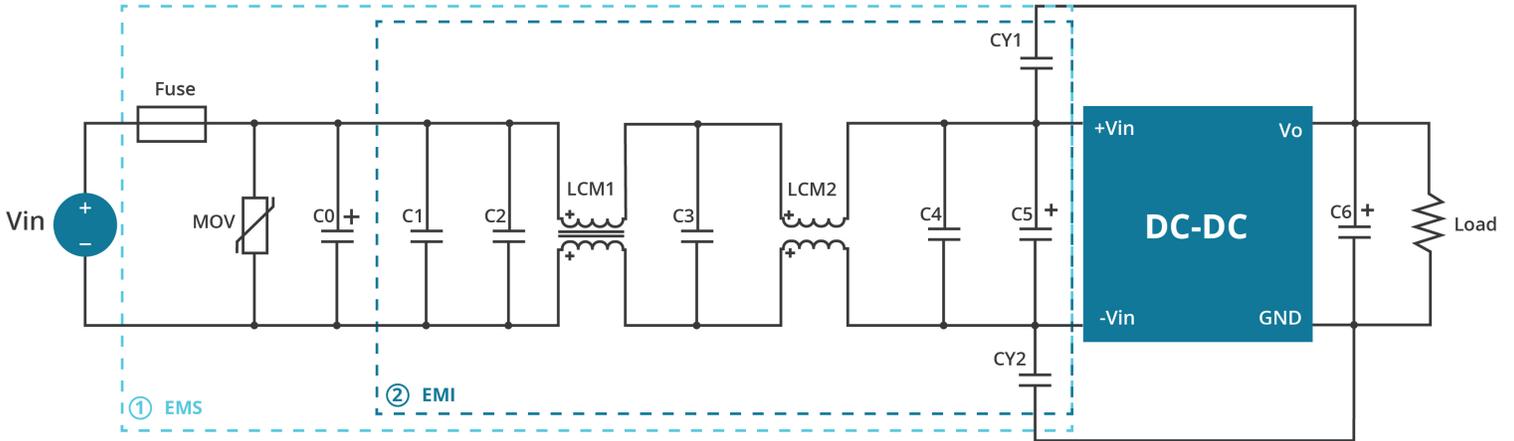


Table 5

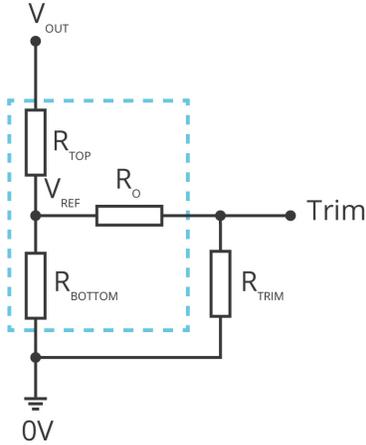
COMPONENT	PARAMETER
Fuse	TBD by customer
MOV	14D470K
LDM1	/
LCM1	10 mH
LCM2	10 mH
C0	680 μ H/100 V
C1, C2	4.7 μ F/100 V
C3	10 μ F/100 V
C4	47 μ F/100 V
C5	330 μ F/100 V
C6	100 μ F/50 kV
CY1, CY2	2.2 nF/2 kV

Note: Part 1 in the circuit is for EMS test, part 2 for EMI filtering, both can be adjusted according to the actual situation.

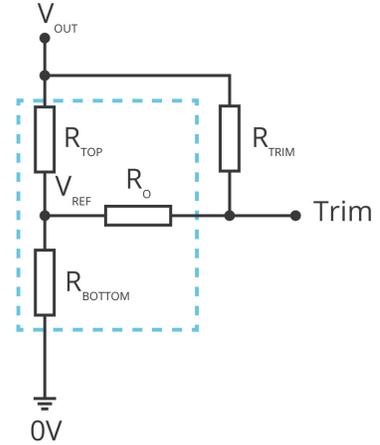
TRIM RESISTOR AND CALCULATION (SINGLE OUTPUT MODELS ONLY)

Figure 7

Trim up



Trim down



$$R_{TRIM} = \frac{a \cdot R_{BOTTOM}}{R_{BOTTOM} - a} - R_O \quad a = \frac{V_{REF}}{V_{OUT} - V_{REF}} \cdot R_{TOP}$$

Formula for Trim up

$$R_{TRIM} = \frac{a \cdot R_{TOP}}{R_{TOP} - a} - R_O \quad a = \frac{V_{OUT} - V_{REF}}{V_{REF}} \cdot R_{BOTTOM}$$

Formula for Trim down

Table 6

V_{NOM}	R_{TOP}	R_{BOTTOM}	R_O	V_{REF}
(Vdc)	(kΩ)	(kΩ)	(kΩ)	(V)
5	24	24.0	68	2.5
12	75	19.73	30	2.5
15	24	4.78	30	2.5
24	68	7.89	30	2.5

Note: Value for R_{TOP} , R_{BOTTOM} , R_O , and V_{REF} refer to Table 6 (fixed internal values).

R_{TRIM} : Trim resistance

a: User-defined parameter, no actual meanings

V_{NOM} : Nominal output voltage

V_{OUT} : Target output voltage

REVISION HISTORY

rev.	description	date
1.0	initial release	01/28/2026

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



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