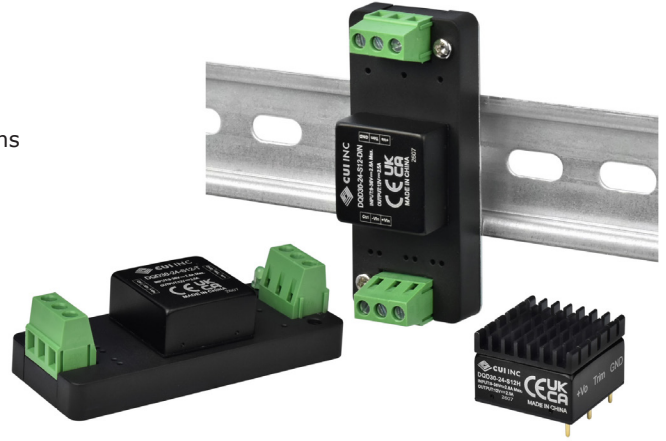


SERIES: DQD30 | DESCRIPTION: DC-DC CONVERTER

FEATURES

- up to 30 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

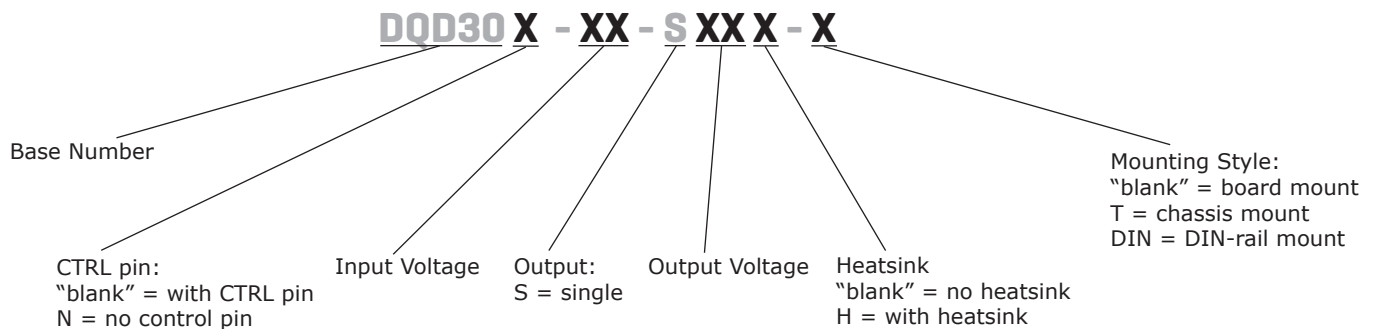


MODEL

MODEL	input voltage		output voltage		output current		output power		ripple & noise ¹		efficiency ²	
	typ (Vdc)	range (Vdc)	typ (Vdc)		max (mA)		max (W)		max (mVp-p)		typ (%)	
DQD30-24-S3	24	9~36	3.3		6,000		19.8		100		87	
DQD30-24-S5	24	9~36	5		6,000		30		100		88	
DQD30-24-S6	24	9~36	6		5,000		30		100		89	
DQD30-24-S9	24	9~36	9		3,333		30		100		90	
DQD30-24-S12	24	9~36	12		2,500		30		100		90	
DQD30-24-S15	24	9~36	15		2,000		30		100		90	
DQD30-24-S24	24	9~36	24		1,250		30		100		90	
DQD30-24-S48	24	9~36	48		625		30		100		88	
DQD30-48-S3	48	18~75	3.3		6,000		19.8		100		87	
DQD30-48-S5	48	18~75	5		6,000		30		100		88	
DQD30-48-S9	48	18~75	9		3,333		30		100		90	
DQD30-48-S12	48	18~75	12		2,500		30		100		91	
DQD30-48-S15	48	18~75	15		2,000		30		100		91	
DQD30-48-S24	48	18~75	24		1,250		30		100		90	

Notes: 1. The ripple and noise is measured at 0%~100% load and 20MHz bandwidth.
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 (full load/no load)	24 Vdc input; 3.3 Vdc output model		948/40		mA
	24 Vdc input; 5 Vdc output model		1,420/40		mA
	24 Vdc input; 6 Vdc output model		1,404/40		mA
	24 Vdc input; 9, 12, 15 Vdc output models		1,388/40		mA
	24 Vdc input; 24 Vdc output models		1,388/3		mA
	24 Vdc input; 48 Vdc output models		1,420/8		mA
	48 Vdc input; 3.3 Vdc output models		474/40		mA
	48 Vdc input; 5 Vdc output model		710/40		mA
	48 Vdc input; 9, 12, 15 Vdc output models		694/40		mA
	48 Vdc input; 24 Vdc output model		694/2		mA
maximum input current	24 Vdc input models			4.4	A
	48 Vdc input models			2.1	A
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	9	Vdc
	48 Vdc input models		15	18	Vdc
input undervoltage protection	24 Vdc input models	5	7	9	Vdc
	48 Vdc input models	11	13	18	Vdc
filter	Pi filter				
no load power consumption	24 Vdc output models		0.08		W
	48 Vdc output models		0.2		W
	all other output models		1.0		W
remote on/off ⁵	module on	CTRL pin left open or pulled high (3.3~12 Vdc)			
	module off	CTRL pin connected to -Vin or pulled low (0~1.2 Vdc)			
input current when off			2		mA
reflected ripple current	at nominal input		30		mA

Notes: 5. The voltage of CTRL pin is relative to -Vin pin.

OUTPUT

parameter	conditions/description	min	typ	max	units
maximum capacitive load	24 Vdc input; 3.3, 5 Vdc output models			10,000	μF
	24 Vdc input; 6 Vdc output models			8,000	μF
	24 Vdc input; 9 Vdc output models			3,000	μF
	24 Vdc input; 12 Vdc output models			2,000	μF
	24 Vdc input; 15 Vdc output models			1,500	μF
	24 Vdc input; 24 Vdc output models			750	μF
	24 Vdc input; 48 Vdc output models			330	μF
	48 Vdc input; all output models			10,000	μF
voltage accuracy			±1	±3	%
voltage regulation	full voltage range, nominal load		±0.2	±0.5	%
load regulation	10% ~ 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	±8	%
	≤6 Vdc output models		±3	±5	%
	all other models				%
start-up time	at nominal input		20		ms
switching frequency	PWM mode		280		kHz
adjustability	via trim	90		110	%
temperature coefficient	at full load			±0.03	%/°C

PROTECTIONS

parameter	conditions/description	min	typ	max	units
over current protection		110	140	260	%
over voltage protection		120	140	220	%
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/EN 61000-4-2 Contact ± 6 kV, Perf. Criteria B				
radiated immunity	IEC/EN 61000-4-3 10 V/m, Perf. Criteria A (see recommended circuit)				
conducted immunity	IEC/EN 61000-4-6 3 Vrms, Perf. Criteria A (see recommended circuit)				
surge	IEC/EN 61000-4-5 ± 2 kV, Perf. Criteria B (see recommended circuit)				
EFT	IEC/EN 61000-4-4 ± 2 kV Perf. Criteria B (see recommended circuit)				
vibration	10–150 Hz, 5 G, 0.75 mm along X, Y, 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
max case temperature				105	°C
storage temperature		-55		125	°C
operating humidity	non condensing	5		95	%

SOLDERING

parameter	conditions/description	min	typ	max	units
pin soldering temperature	solder joint 1.5 mm from housing, 10 s			300	°C

MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	board mount: 25.4 x 25.4 x 12.5 [1.000 x 1.000 x 0.492 inches]				mm
	board mount with heatsink: 25.4 x 25.4 x 17.5 [1.000 x 1.000 x 0.689 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 26.0 [2.990 x 1.240 x 1.023 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 30.8 [2.990 x 1.240 x 1.212 inches]				mm
case material	aluminum				
weight	single output models	board mount	18		g
		board mount with heatsink	21		g
		chassis mount	39		g
		chassis mount with heatsink	42		g
		DIN-rail mount	59		g
		DIN-rail mount with heatsink	62		g
cooling	natural convection				

MECHANICAL DRAWING

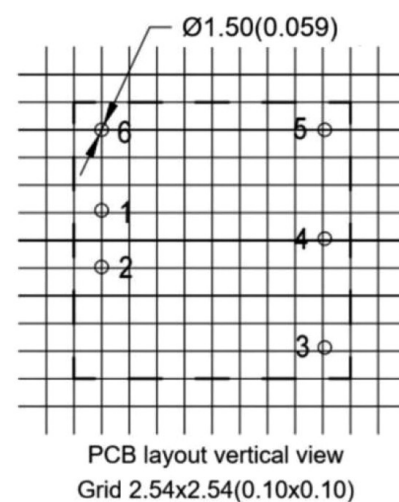
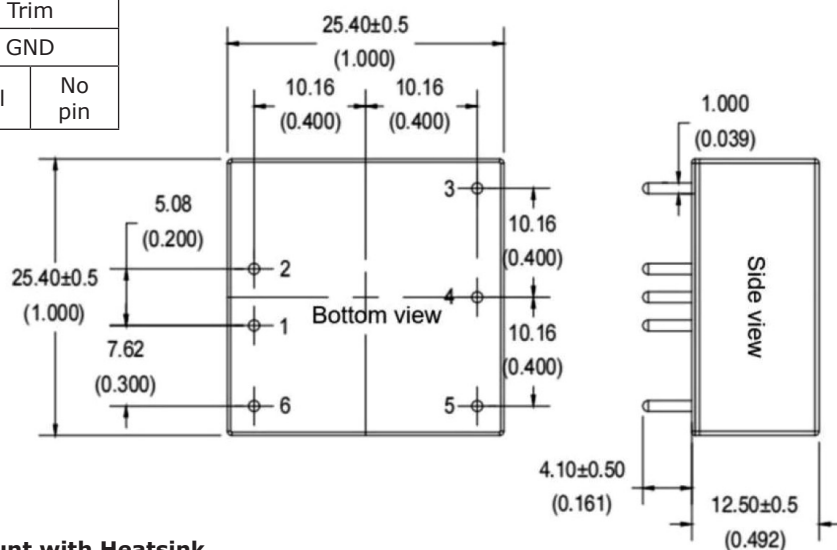
Board Mount

units: mm [inch]

pin diameter tolerance: ± 0.10 [± 0.004]

general tolerance: ± 0.50 [± 0.020]

PIN CONNECTIONS		
PIN	Function	
1	-Vin	
2	+Vin	
3	+Vo	
4	Trim	
5	GND	
6	Ctrl	No pin



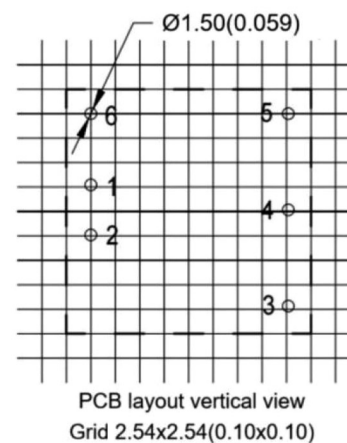
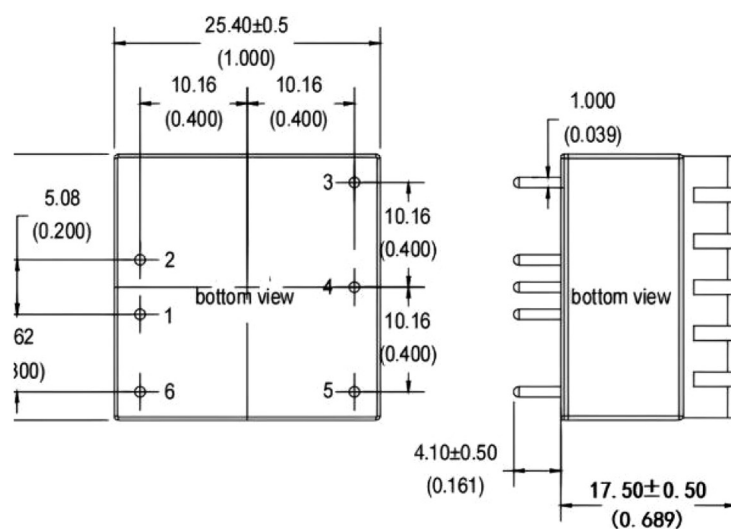
Board Mount with Heatsink

units: mm [inch]

pin diameter tolerance: ± 0.10 [± 0.004]

general tolerance: ± 0.50 [± 0.020]

PIN CONNECTIONS		
PIN	Function	
1	-Vin	
2	+Vin	
3	+Vo	
4	Trim	
5	GND	
6	Ctrl	No pin

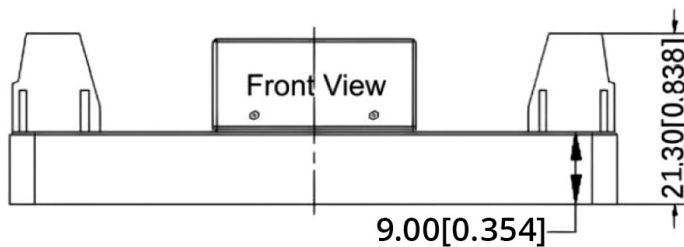
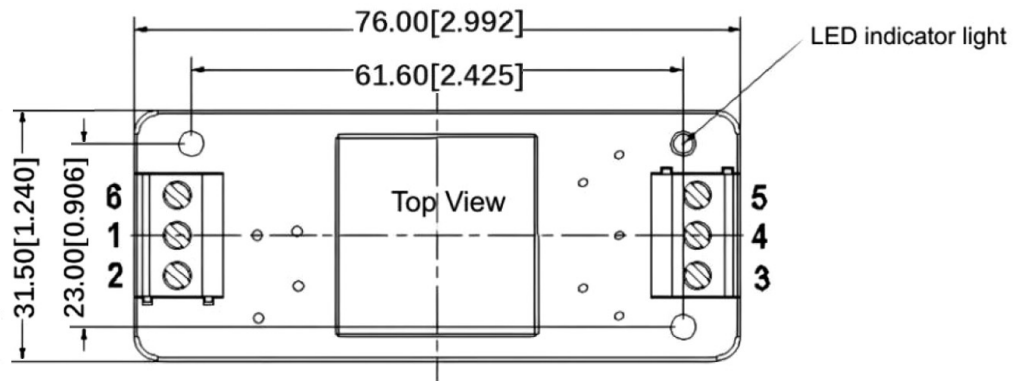


MECHANICAL DRAWING (CONTINUED)

Chassis Mount

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

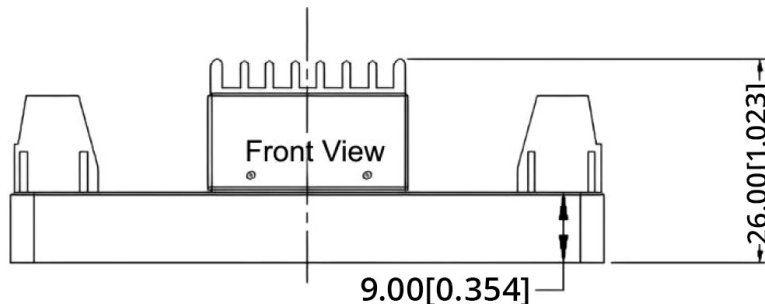
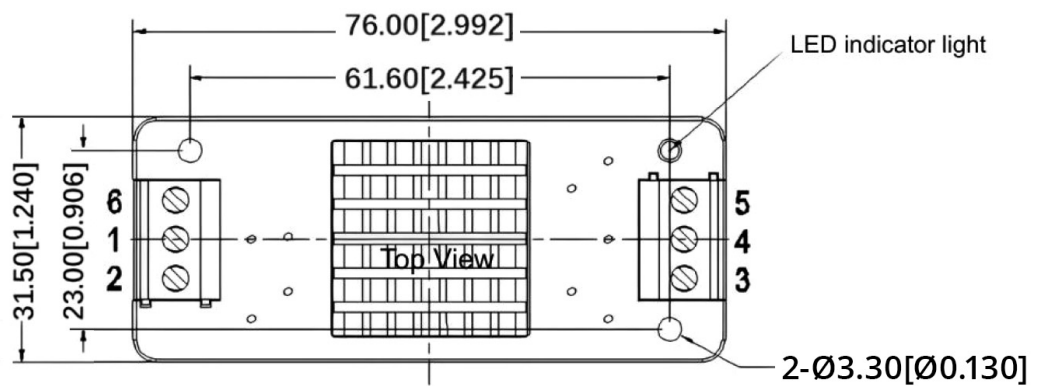
PIN CONNECTIONS		
PIN	Function	
1	-Vin	
2	+Vin	
3	+Vo	
4	Trim	
5	GND	
6	Ctrl	No pin



Chassis Mount with Heatsink

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

PIN CONNECTIONS		
PIN	Function	
1	-Vin	
2	+Vin	
3	+Vo	
4	Trim	
5	GND	
6	Ctrl	No pin



MECHANICAL DRAWING (CONTINUED)

DIN-rail Mount

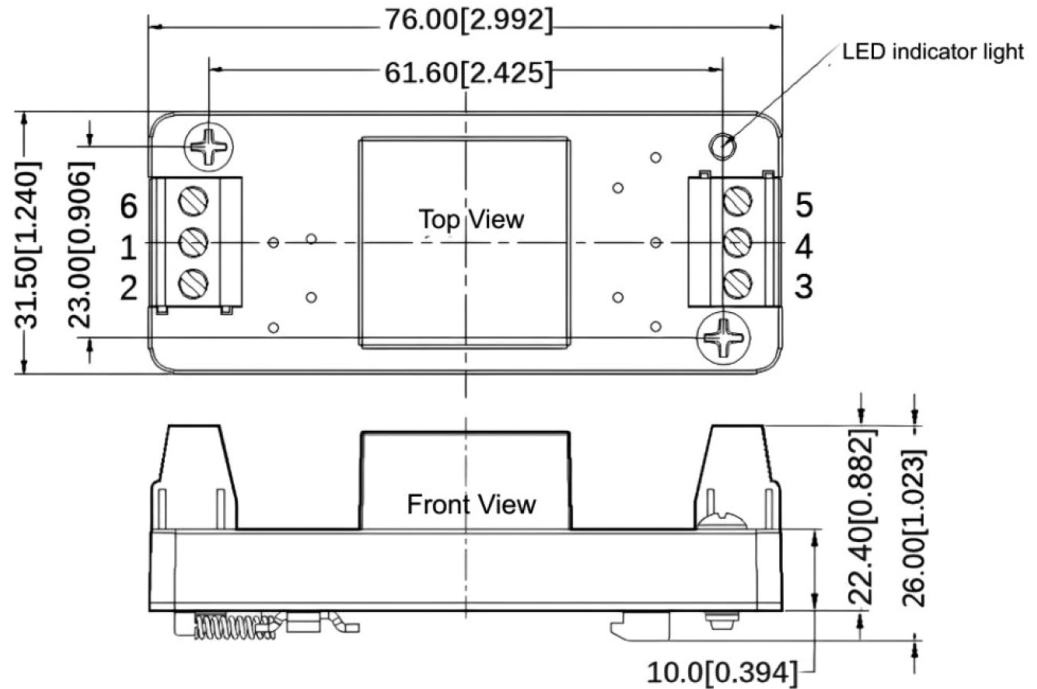
units: mm [inch]

general tolerance: ± 1.00 [± 0.039]

wire range: 24~12 AWG

tightening torque: max 0.4 N·m

PIN CONNECTIONS		
PIN	Function	
1	-Vin	
2	+Vin	
3	+Vo	
4	Trim	
5	GND	
6	Ctrl	No pin



DIN-rail Mount with Heatsink

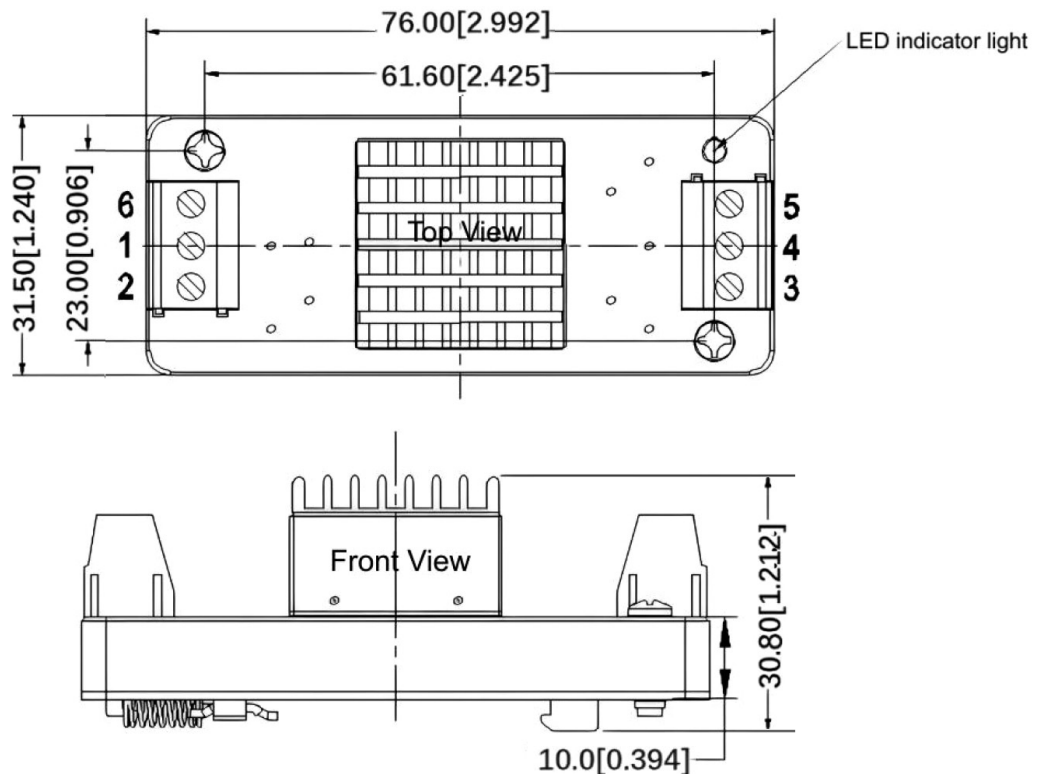
units: mm [inch]

general tolerance: ± 1.00 [± 0.039]

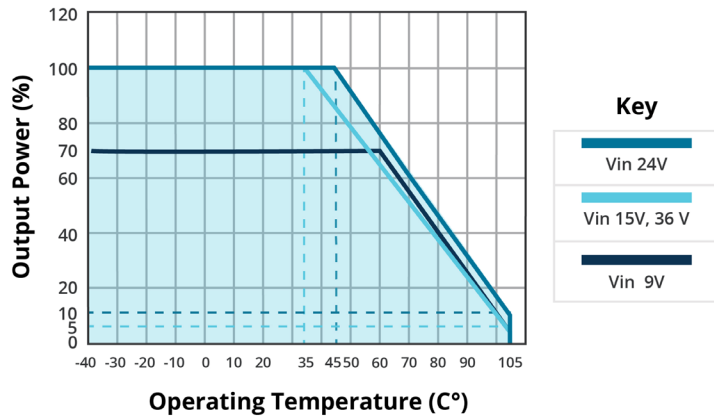
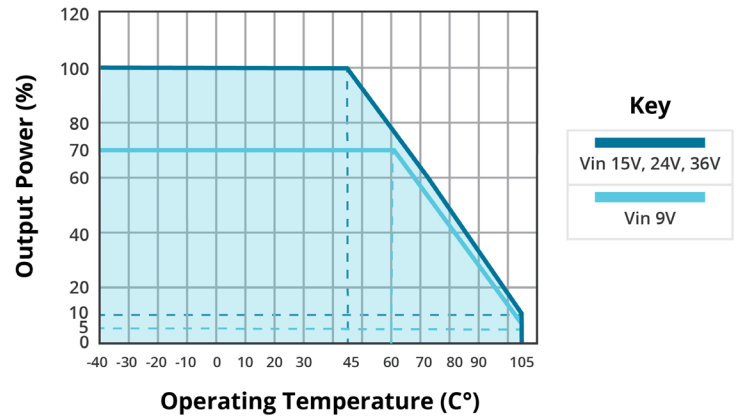
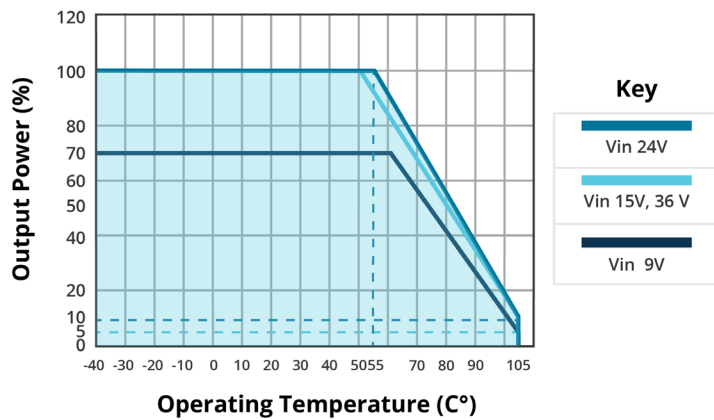
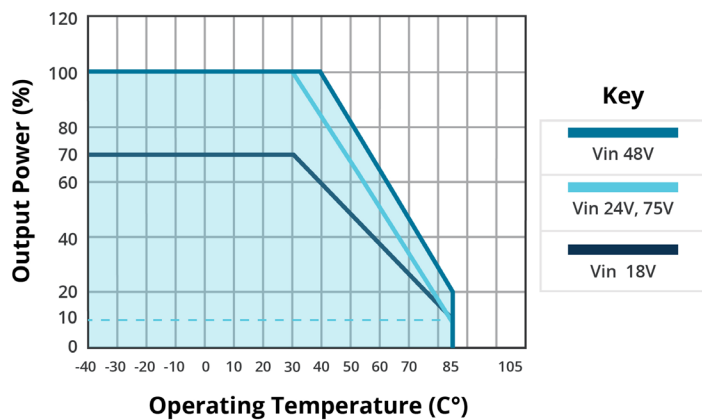
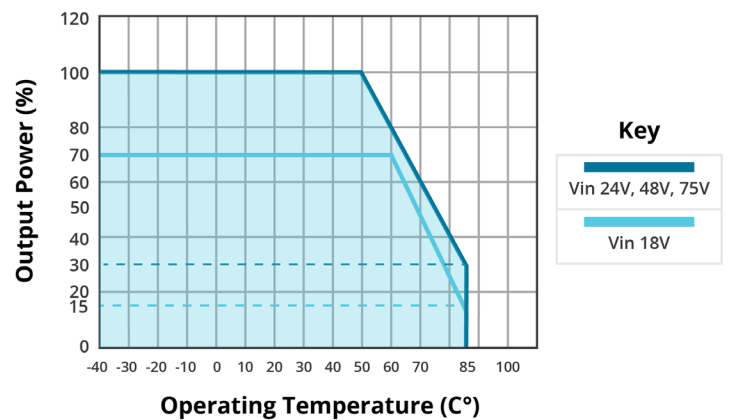
wire range: 24~12 AWG

tightening torque: max 0.4 N·m

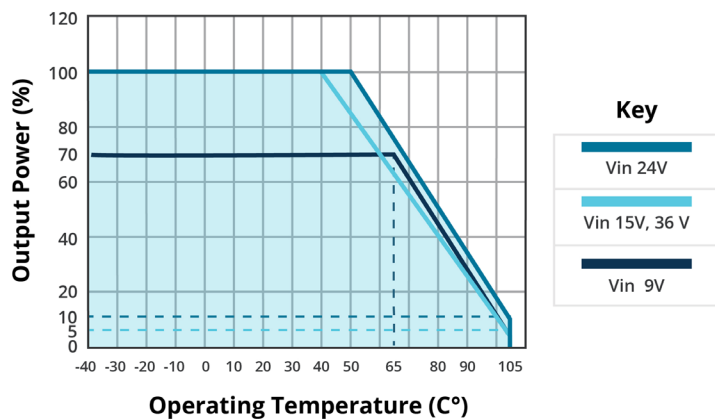
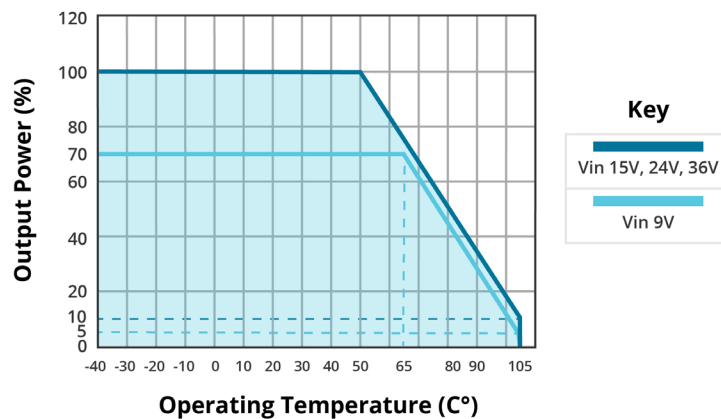
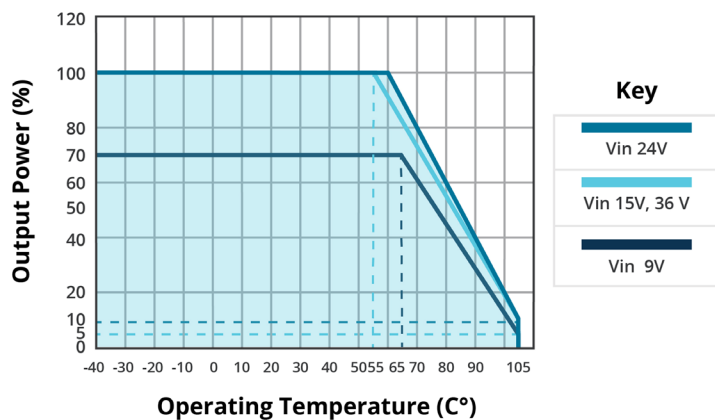
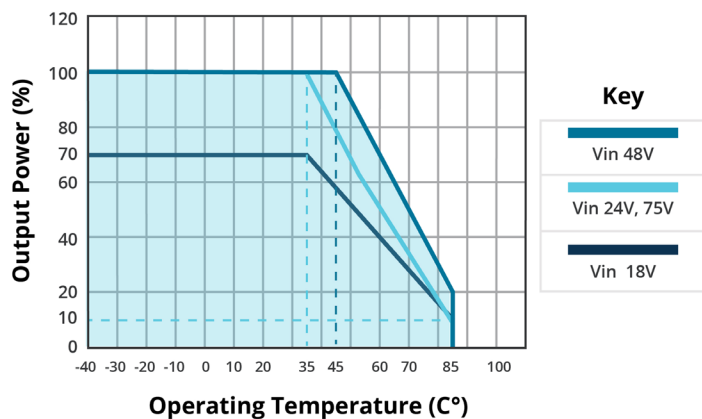
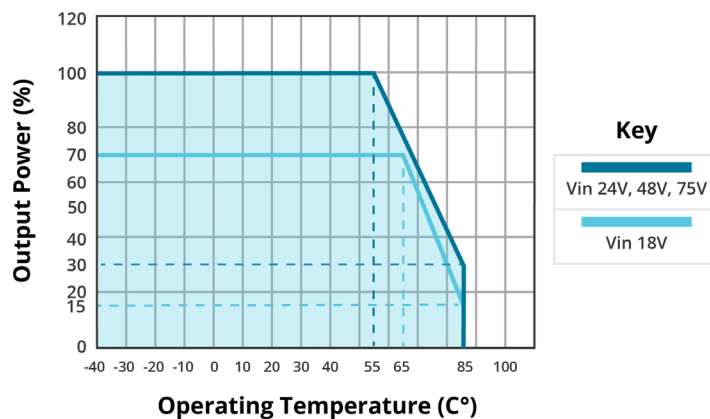
PIN CONNECTIONS		
PIN	Function	
1	-Vin	
2	+Vin	
3	+Vo	
4	Trim	
5	GND	
6	Ctrl	No pin



DERATING CURVES

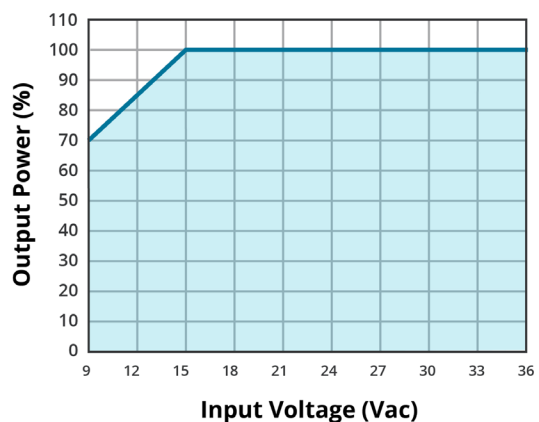
TEMPERATURE DERATING CURVE
DQD30-24-S3, DQD30-24-S5, DQD30-24-S6**TEMPERATURE DERATING CURVE**
DQD30-24-S9, DQD30-24-S12, DQD30-24-S48**TEMPERATURE DERATING CURVE**
DQD30-24-S15, DQD30-24-S24**TEMPERATURE DERATING CURVE**
DQD30-48-S3, DQD30-48-S5, DQD30-48-S9**TEMPERATURE DERATING CURVE**
DQD30-48-S12, DQD30-48-S15, DQD30-48-S24

DERATING CURVES (CONTINUED)

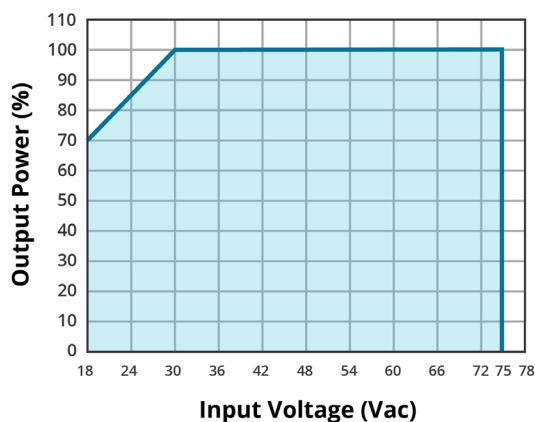
TEMPERATURE DERATING CURVE
DQD30-24-S3-H, DQD30-24-S5H, DQD30-24-S6H**TEMPERATURE DERATING CURVE**
DQD30-24-S9H, DQD30-24-S12H, DQD30-24-S48H**TEMPERATURE DERATING CURVE**
DQD30-24-S15H, DQD30-24-S24H**TEMPERATURE DERATING CURVE**
DQD30-48-S3H, DQD30-48-S5H, DQD30-48-S9H**TEMPERATURE DERATING CURVE**
DQD30-48-S12H, DQD30-48-S15H, DQD30-48-S24H

DERATING CURVES (CONTINUED)

INPUT VOLTAGE DERATING CURVE
 $V_{in} = 24\text{ V}$

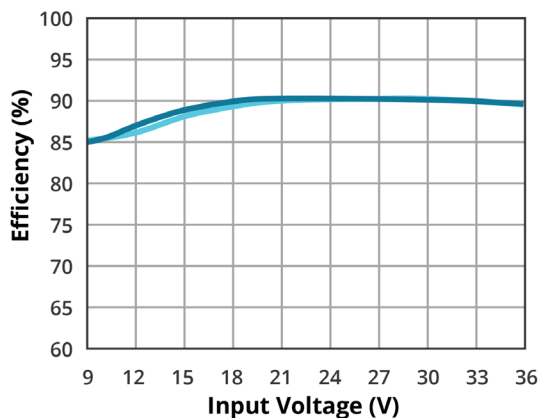


INPUT VOLTAGE DERATING CURVE
 $V_{in} = 48\text{ V}$

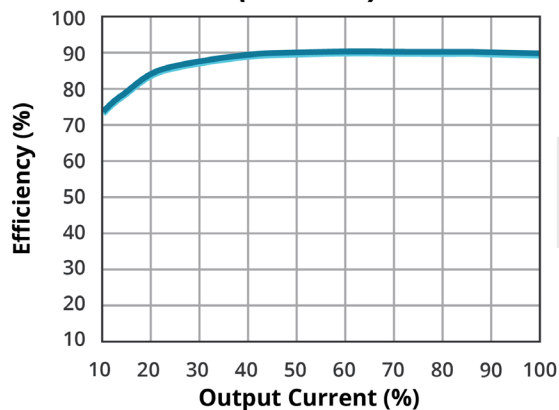


EFFICIENCY CURVES

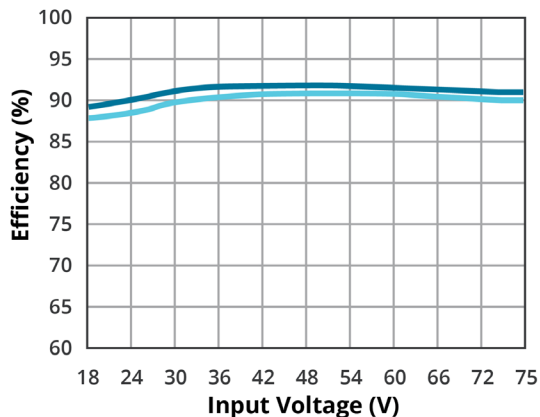
EFFICIENCY VS INPUT VOLTAGE
(full load)



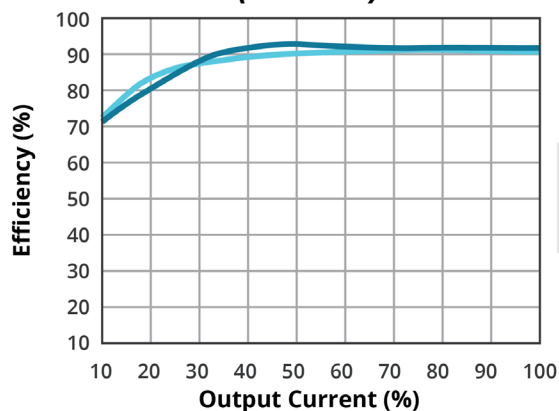
EFFICIENCY VS OUTPUT CURRENT
($V_{in} = 24\text{ V}$)



EFFICIENCY VS INPUT VOLTAGE
(full load)



EFFICIENCY VS OUTPUT CURRENT
($V_{in} = 48\text{ V}$)



RIPPLE AND NOISE TEST INSTRUCTION

Ripple & Noise Test Procedure

1. Test Equipment Configuration
- Cable Arrangement: Position test cables in parallel to minimize inductive effects.
 - Oscilloscope Settings: Select Sample Mode operation.

Limit bandwidth to 20 MHz to reduce high-frequency noise interference.

Utilize a 100 MHz bandwidth probe with the probe cap and ground lead removed for optimal signal fidelity.
 - Probe Compensation: Connect a 0.1 μF polypropylene capacitor (C1) and a 10 μF high-frequency, low-ESR electrolytic capacitor (C2) in parallel with the probe to filter transient disturbances.
2. Ripple & Noise Measurement Setup
- Module Connection: Connect the module input to a regulated power source.

Connect the module output to an electronic load via an appropriate test fixture.
 - Measurement Technique: Measure output voltage directly from the module's output pins using a dedicated sampling lead.

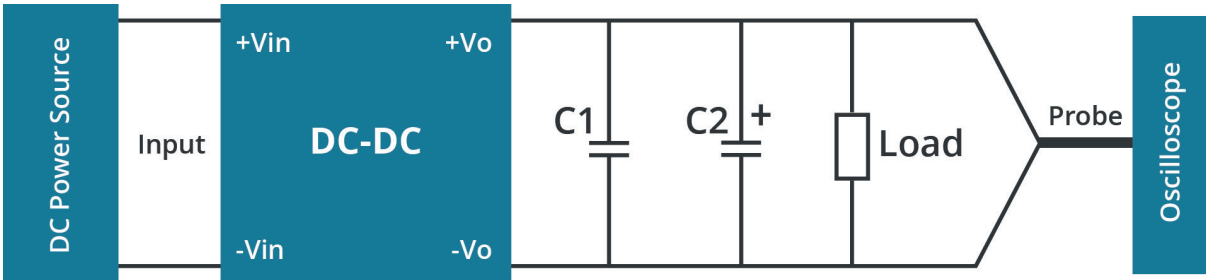
Employ insulated power cables with an AWG rating suitable for the specified output current to ensure safety and accuracy.

Application Reference

1. Maximum Capacitive Load: Determined under pure resistive, full-load conditions for accurate assessment.
2. Technical Support: Bel offers comprehensive power solutions and custom product designs.

For detailed inquiries or space-constrained applications, please contact our technical or sales team for further assistance.

Figure 1



RIPPLE AND NOISE TEST CIRCUIT

Input Reflected Ripple Current Test Circuit:
The capacitor (C) must be a low-ESR type with a voltage rating that exceeds the maximum input voltage of the product.

Figure 2

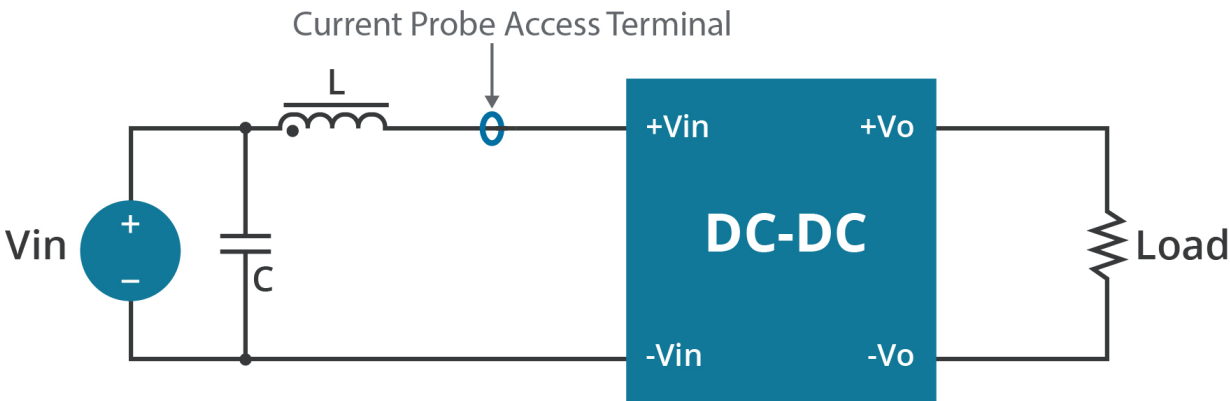


Table 1

COMPONENT	PARAMETER
C	220 μF / 100 V
L	4.7 μH / 15 A

APPLICATION NOTES

Figure 3

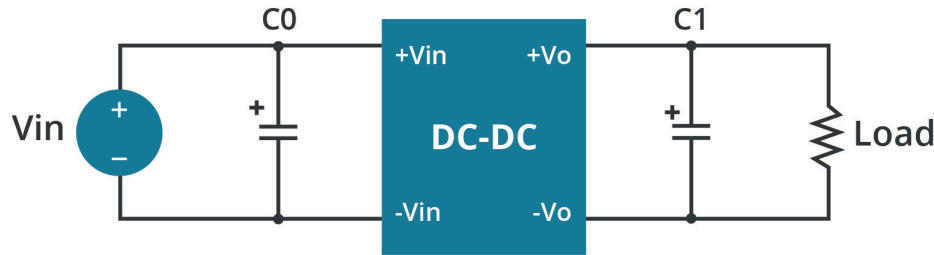
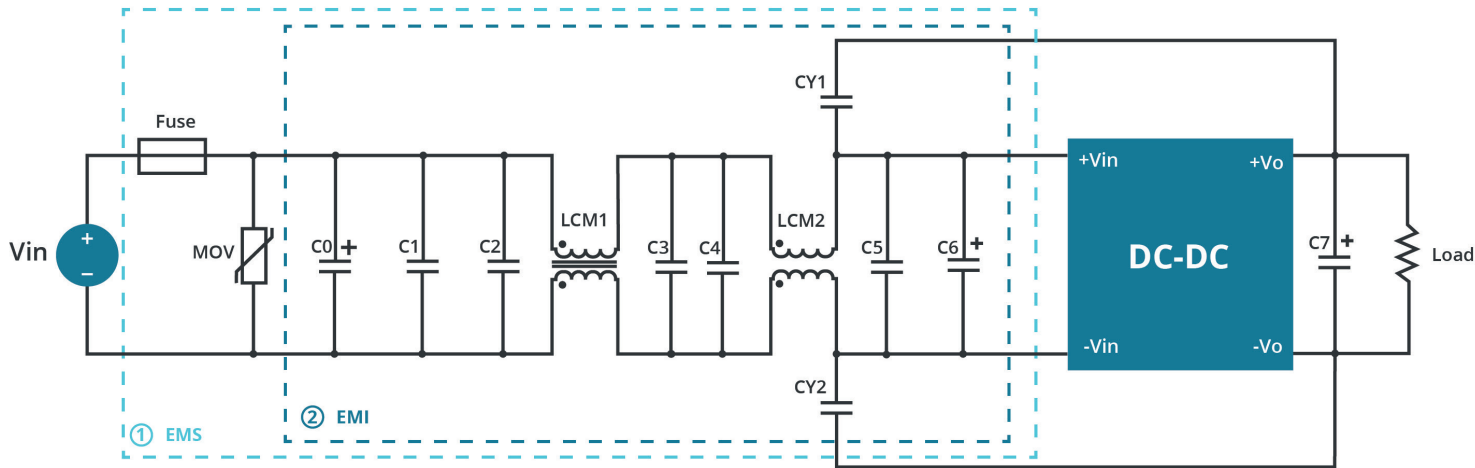


Table 2

COMPONENT	PARAMETER
C0	100 μ F / 100 V
C1	100 μ F / 50 V

EMC RECOMMENDED CIRCUIT

Figure 4



Note: Section 1 in the diagram is intended for EMS testing, while Section 2 is designated for EMI testing. Adjustments may be made as required.

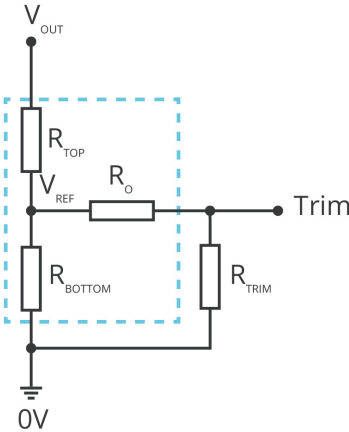
Table 3

COMPONENT	24 Vdc	48 Vdc
Fuse	TBD by customer	
MOV	14D560K	14D101K
LCM1	5 mH	
LCM2	250 μ H	
C0	1000 μ F/50 V	47 μ F/100 V
C1, C2, C3, C4, C5	10 μ F/50 V	10 μ F/100 V
C6	470 μ F/50 V	470 μ F/100 V
C7	100 μ F/50 V	
CY1, CY2	2.2 nF/2 kV	

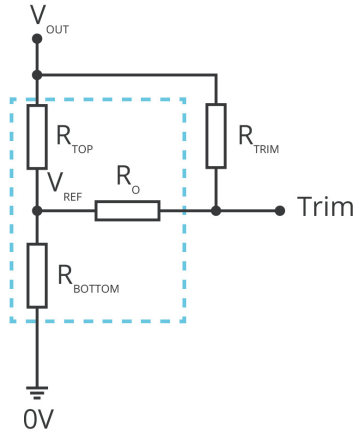
TRIM RESISTOR AND CALCULATION (SINGLE OUTPUT MODELS ONLY)

Figure 7

Trim up



Trim down



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

Formula for Trim up

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

Formula for Trim down

Table 4

V _{NOM}	R _{TOP}	R _{BOTTOM}	R _O	V _{REF}
(Vdc)	(kΩ)	(kΩ)	(kΩ)	(V)
3.3	4.22	2.55	12	1.25
5	5.10	5.10	20	2.50
6	6.20	4.44	20	2.50
9	9.31	3.57	24	2.50
12	18.0	4.73	33	2.50
15	18.0	3.59	25.5	2.50
24	30.0	3.47	30	2.50
48	45.3	2.47	18	2.50

Note: Value for R_{TOP}, R_{BOTTOM}, R_O, and V_{REF} refer to Table 4 (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	06/01/2026

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



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powersupport@belf.com

CUI offers a two (2) year limited warranty. Complete warranty information is listed on our website.

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CUI products are not authorized or warranted for use as critical components in equipment that requires an extremely high level of reliability. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.