BDCD-50

50 Watt

- **DC/DC converter modules**
- **2:1 input voltage range**
- **Compact fully encapsulated modules in metal case**
- **High efficiency up to 92%**
- **Extended temperature range -40...+105 °C**
- **Insulation voltage 1500 VDC**
- **DIN Rail mounting**
- **Meets IEC / UL 62368 standard**
- **No load power consumption ≤0.048 W**

Article No.	Output power	Input voltage	Output voltage	Output current (max) / min	Efficiency (typ)	Capacitive Load (µF) max.
BDCD-5005C	50 W	18–36 VDC (24 VDC nom.)	+5 V	10000 mA / 500	91 %	18900
BDCD-5012C			+12 V	4167 mA / 208	91 %	3700
BDCD-5015C			+15 V	3333 mA / 167	91 %	2000
BDCD-5024C			+24 V	2083 mA / 104	91 %	1000
BDCD-5005T	50 W	36–75 VDC (48 VDC nom.)	+5 V	10000 mA / 0	91 %	18900
BDCD-5012T			+12 V	4167 mA / 0	92 %	3700
BDCD-5015T			+15 V	3333 mA / 0	92 %	2000
BDCD-5024T			+24 V	2083 mA / 0	92 %	1000

Further types in different input and output voltages are available on request.

How to read the Article No.

BDCD - XX YY Z

- Input voltage (**C:** 18–36 VDC, **T:** 36–75 VDC)
- Output voltage
- Power (50 = 50 W)
- * **With „D“:** DIN Rail and chassis mounting
- Product series

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Technical data	
Input current	2290 mA (typ); C models: 1133 mA (typ) / T models: 1145 A (typ)
Surge voltage (1s max.)	Max. 139 % of nominal input voltage for BDCD-5005T
Standby consumption	≤0.048 W
Voltage accuracy	±3 % max.
Load regulation	±0.5 % (typ), ±1 % max.
Ripple & Noise*	300 mV_{pp} max (C models) / 350 mV_{pp} max (T models)
Remote on/off control	ON: 3.0–12 V or open circuit / OFF: 0–1.2 V or Ctrl connected to ground (≤2 mA)
Trimming (BDC-30/50)	± 10 % Trimming of output voltage
Protection	Overvoltage protection: 110-160 % (switch off, output voltage) Short circuit protection: Yes, with auto-recovery Overload protection 110-200 %
Insulation voltage	Input-Output: 1500 VDC
Insulation resistance	Input-Output: 100 MΩ (at 500 VDC)
Insulation capacity	Input-Output: 2200 pF
Switching frequency	300 KHz, typ. (PWM)
MTBF	>1 000 000 h according to MIL-HDBK-217F at 25 °C
Chassis material	Aluminium
Temperature	Operating: -40…+105 °C / Storage: -55…+125 °C Soldering: max. 300 °C (10 s)
Derating	In the range of +60…+85 °C, 1.6 % / °C +85…+105 °C, 2.5 % / °C (C models + T model + 5 V) +65…+85 °C, 1.25 % / °C +85…+105 °C, 3 % / °C (T models 12/15/24 V)
Max. operation altitude	2000 m
Humidity	Operating: 10…85 % RH, non-condensing / Storage: 5…95 % RH, non-condensing
Vibration	10-150 Hz, 5 G, 0.75mm X, Y, Z
Dimensions (W x D x H)	76 x 31.5 x 25.8 mm
Weight (net)	82 g

** Ripple & Noise was measured with parallel cables (1 µF ceramic capacitor + 10 µF electrolytic capacitor). All data was measured at +25 °C, operating humidity <75 %, nominal input voltage. We recommend to use a cable as short as possible to connect module and load. As a power component this modul is for assembly purposes only and it must not be operated in unassembled condition. For more information and recommended additional circuits to improve the EMC performance, see Application Notes.*

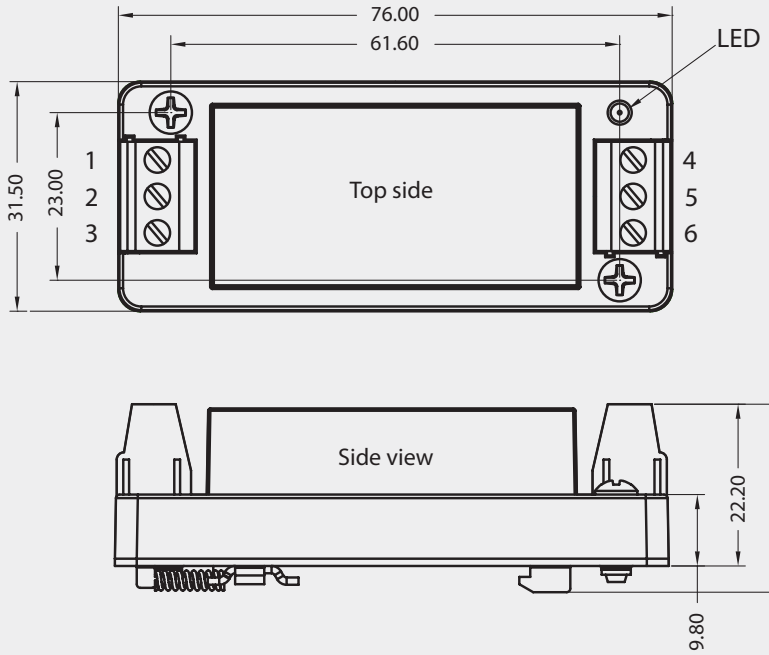
Optional Accessories

▷▷▷ *For detailed information please visit our website* ***www.bicker.de*** *and refer to the article number.*

PSZ-1009 | Male adapter

DCplug: 2.5 x 5.5 mm, AWG 26–12

Drawing

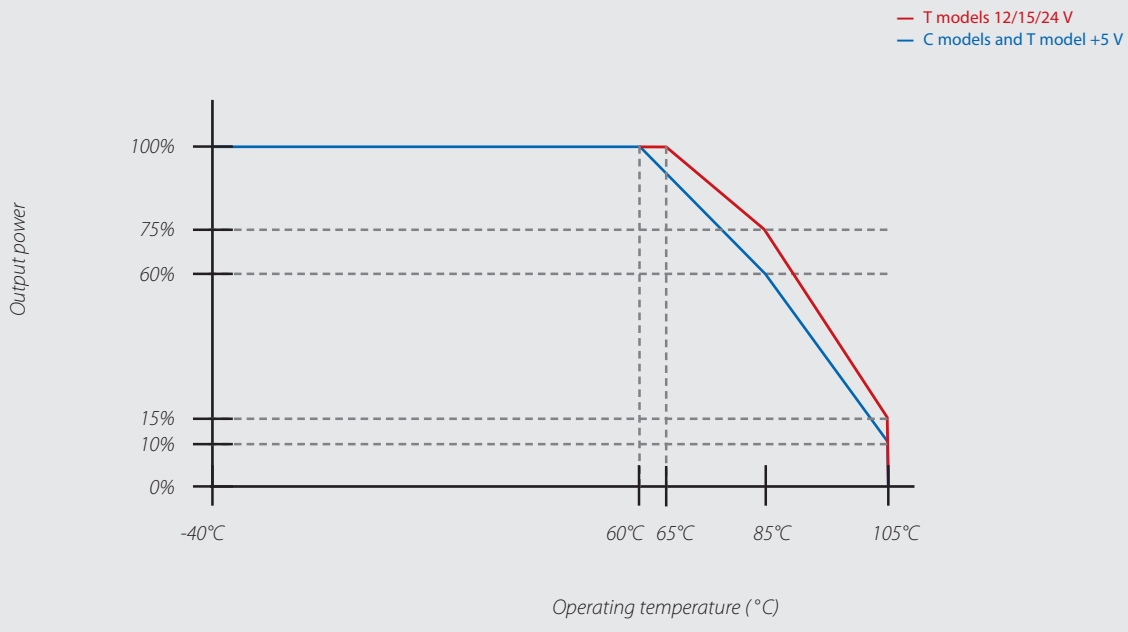


Pin assignment	
1	CTRL
2	–Vin
3	+Vin
4	TRIM
5	0V
6	+Vo

Terminal size
Wire Range AWG 24-12

Tolerance ±0.5 mm

Derating



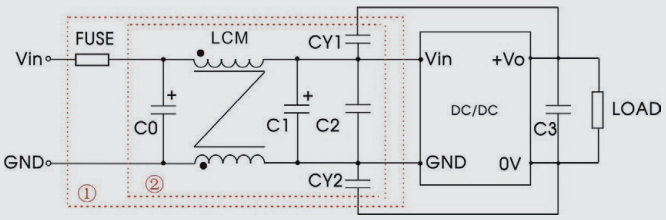
Design Reference

Typical application

All DC/DC converters of this series are tested before delivery using the recommended circuit.
Input and/or output ripple can be further reduced by appropriately increasing the input and 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 specified max. capacitive load value of the product.

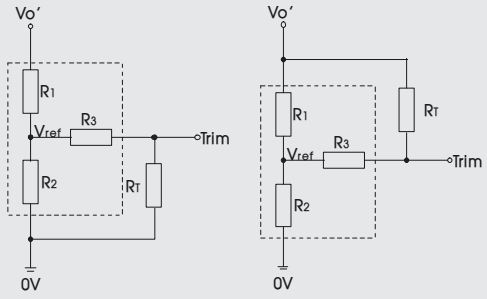
V_{out} (VDC)	C_{in} (µF)	C_{out} (µF)
3.3 / 5	100	470 / 10 V
12 / 15	100	100 / 25 V
24	100	47 / 50 V

EMC compliance circuit class B



Parameter description	
Model	V_{in}: 24 V
Fuse	T / 4A / 250 V AC
C0	680 µF / 50 V
LCM	2.2 mH
C1	330 µF / 50 V
C2	4.7 µF / 50 V
CY1, CY2	Y safety capacitor 2.2 nF / 250 V AC
C3	Refer to the C_{out} in Design Reference

C models: Trim function for output voltage adjustment (open if unused)



TRIM resistor connection (dashed line shows internal resistor network)

Calculating Trim resistor values:

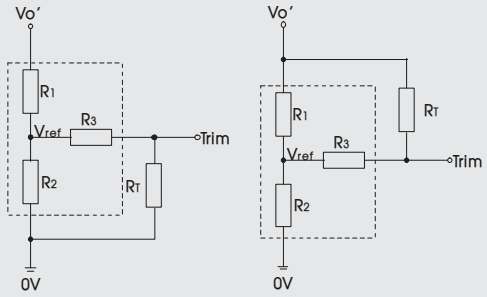
$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \qquad a = \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \qquad a = \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2$$

R_T is Trim resistance
a is a self-defined parameter, with no real meaning.

Vout(V)	Vout adjustable value(V)	RT(KΩ)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	Up：3.63	15.0	4.83	2.87	4.7	1.24
	Down：2.97	18.7	4.83	2.87	4.7	1.24
5	Up：5.5	13.3	2.97	2.87	4.7	2.5
	Down：4.5	5.4	2.97	2.87	4.7	2.5
12	Up：13.2	7.6	10.90	2.87	15	2.5
	Down：10.8	60.7	10.90	2.87	15	2.5
15	Up：16.5	8.9	14.35	2.87	15	2.5
	Down：13.5	90.2	14.35	2.87	15	2.5
24	Up：26.4	21.6	24.77	2.87	5.1	2.5
	Down：21.6	185.9	24.77	2.87	5.1	2.5

T models: Trim function for output voltage adjustment (open if unused)



TRIM resistor connection (dashed line shows internal resistor network)

Calculating Trim resistor values:

$$up:\ R_T = \frac{aR_2}{R_2 - a} - R_3 \qquad a = \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1$$

$$down:\ R_T = \frac{aR_1}{R_1 - a} - R_3 \qquad a = \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2$$

R_T is Trim resistance
a is a self-defined parameter, with no real meaning.

Vout(V)	Vout adjustable value(V)	RT(KΩ)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	Up：3.63	10	4.83	2.87	10	1.24
	Down：2.97	13.5	4.83	2.87	10	1.24
5	Up：5.5	4.3	2.87	2.87	10	2.5
	Down：4.5	1.5	2.87	2.87	10	2.5
12	Up：13.2	7.6	10.90	2.87	15	2.5
	Down：10.8	60.7	10.90	2.87	15	2.5
15	Up：16.5	8.9	14.35	2.87	15	2.5
	Down：13.5	90.2	14.35	2.87	15	2.5
24	Up：26.4	21.6	48.77	2.87	5.1	2.5
	Down：21.6	185.9	48.77	2.87	5.1	2.5