DC-DC Converters Bus Converter·Power Module Type

CBS350

Ordering information

CB	S	350	48	12	-□
①	②	③	④	⑤	⑥

①Series name
②Single output
③Output wattage
④Input voltage
⑤Output voltage
⑥Optional
R :with Remote ON/OFF Positive logic control
T :with Mounting hole ϕ3.4 thru

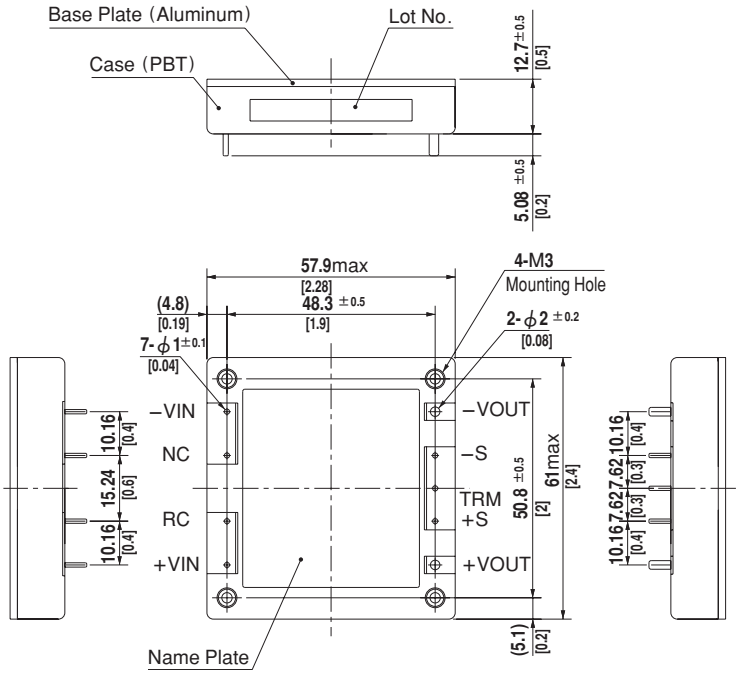
MODEL	CBS3502412	CBS3502424	CBS3502428	CBS3502432	CBS3502448	CBS3504812	CBS3504824	CBS3504828	CBS3504832	CBS3504848
MAX OUTPUT WATTAGE[W]	300	348	350	352	302	348	348	350	352	350
DC OUTPUT	12V 25A	24V 14.5A	28V 12.5A	32V 11A	48V 6.3A	12V 29A	24V 14.5A	28V 12.5A	32V 11A	48V 7.3A

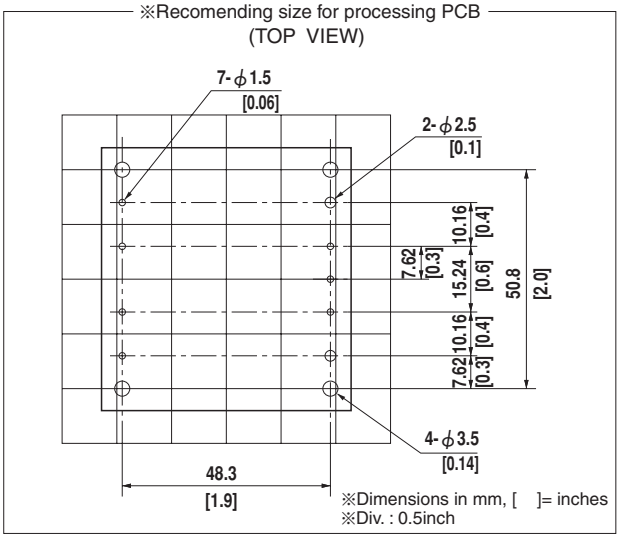
SPECIFICATIONS

	MODEL		CBS3502412	CBS3502424	CBS3502428	CBS3502432	CBS3502448	CBS3504812	CBS3504824	CBS3504828	CBS3504832	CBS3504848
INPUT	VOLTAGE[V]		DC20 - 36					DC36 - 76				DC36 - 60
	CURRENT[A]	*1	14.5typ	16.7typ	16.4typ	16.5typ	14.0typ	8.33typ	8.15typ	8.10typ	8.15typ	8.15typ
	EFFICIENCY[%]	*1	86typ	87typ	89typ	89typ	90typ	87typ	89typ	90typ	90typ	91typ
OUTPUT	VOLTAGE[V]		12	24	28	32	48	12	24	28	32	48
	CURRENT[A]		25	14.5	12.5	11	6.3	29	14.5	12.5	11	7.3
	LINE REGULATION[mV]		24max	48max	56max	64max	96max	24max	48max	56max	64max	96max
	LOAD REGULATION[mV]		24max	48max	56max	64max	96max	24max	48max	56max	64max	96max
	RIPPLE[mVp-p]	-20 to +100℃ *2	120max	150max	180max	180max	300max	120max	150max	180max	180max	300max
		-40 to -20℃ *2	150max	180max	220max	220max	360max	150max	180max	220max	220max	360max
		0 to 15%Load *2	240max	300max	360max	360max	600max	240max	300max	360max	360max	600max
	RIPPLE NOISE[mVp-p]	-20 to +100℃ *2	150max	180max	220max	220max	360max	150max	180max	220max	220max	360max
		-40 to -20℃ *2	200max	250max	280max	280max	500max	200max	250max	280max	280max	500max
		0 to 15%Load *2	300max	360max	440max	440max	720max	300max	360max	440max	440max	720max
	TEMPERATURE REGULATION[mV]	0 to +65℃	120max	240max	280max	320max	480max	120max	240max	280max	320max	480max
		-40 to +100℃	240max	480max	560max	640max	960max	240max	480max	560max	640max	960max
	DRIFT[mV]	*3	40max	90max	90max	120max	180max	40max	90max	90max	120max	180max
	START-UP TIME[ms]		200max (DCIN 24V, Io=100%)					200max (DCIN 48V, Io=100%)				
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external resistor									
			7.2 - 13.2	14.4 - 26.4	16.8 - 30.8	25.6 - 35.2	38.4 - 52.8	7.2 - 13.2	14.4 - 26.4	16.8 - 30.8	25.6 - 35.2	38.4 - 55.2
	OUTPUT VOLTAGE SETTING[V]	*1	11.88 - 12.12	23.76 - 24.24	27.72 - 28.28	31.68 - 32.32	47.52 - 48.48	11.88 - 12.12	23.76 - 24.24	27.72 - 28.28	31.68 - 32.32	47.52 - 48.48
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically									
	OVERVOLTAGE PROTECTION[V]		13.80 - 16.80	27.60 - 33.60	32.20 - 39.20	36.80 - 44.80	57.50 - 63.00	13.80 - 16.80	27.60 - 33.60	32.20 - 39.20	36.80 - 44.80	57.50 - 63.00
	REMOTE SENSING		Provided									
	REMOTE ON/OFF		Provided (Negative logic L : ON, H : OFF)									
ISOLATION	INPUT-OUTPUT		DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)									
	INPUT-BASE PLATE		DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)									
	OUTPUT-BASE PLATE		AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15℃)									
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE		-40 to +100℃ (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to DERATING CURVE), 3,000m (10,000feet) max									
	STORAGE TEMP.,HUMID.AND ALTITUDE		-40 to +100℃, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max									
	VIBRATION		10 - 55Hz, 49.0m/s² (5G), 3minutes period, 60minutes each along X, Y and Z axis									
	IMPACT		196.1m/s² (20G), 11ms, once each along X, Y and Z axis									
SAFETY	AGENCY APPROVALS		UL60950-1, C-UL, EN60950-1									
OTHERS	CASE SIZE/WEIGHT		57.9×12.7×61.0mm [2.28×0.5×2.4 inches] (W×H×D) / 83g max									
	COOLING METHOD		Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)									

*1 At rated input(DC24V,DC48V), rated load, and aluminum base plate temperature 25℃.
*2 Ripple and ripple noise is measured by using measuring board with recommended capacitor Co & the film capacitor 0.1μF. Refer to the manual.
*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃, with the input voltage held constant at the rated input/output.
*4 When the input voltage is in the range of DC20 - 22V, DC36 - 40V, output voltage is limited. Refer to the manual.

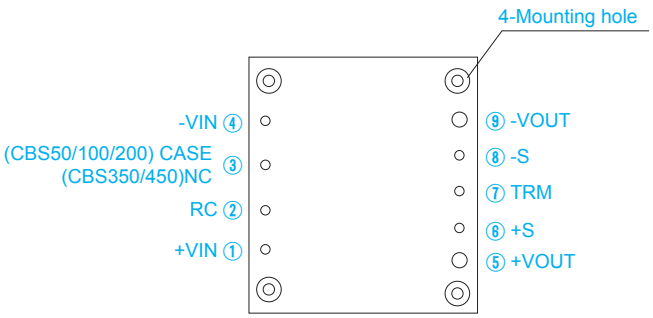
External view





※Weight : 83g max
※Tolerance : ±0.3 [±0.012]
※Case : PBT
※Base Plate: Aluminum
※Dimensions in mm, [ ]= inches
※Mounting hole screwing torque
: 0.49N•m(5.0kgf•cm)max

Pin Configuration



＊bottom view

No.	Pin Name	Function
①	+VIN	+DC input
②	RC	Remote ON/OFF
③	NC	No connection (CBS350/450)
	CASE	Wiring base plate (CBS50/100/200)
④	-VIN	-DC input
⑤	+VOUT	+DC output
⑥	+S	+Remote sensing
⑦	TRM	Adjustment of output voltage
⑧	-S	-Remote sensing
⑨	-VOUT	-DC output
—	Mounting hole	Mounting hole

Implementation • Mounting Method

Mounting method

■When multiple power modules are used side by side, position them with sufficient spaces to allow adequate air ventilation so that the aluminum base plate temperature of each power module will remain within the temperature range shown in the "derating".

■Do not pass the DC input pattern underneath the power module as this will increase conducted noise. Place the DC input pattern away from the power module. Do not pass the DC output pattern underneath the power module as this will increase output noise. Place the DC output pattern away from the power module.

■High frequency noise is radiated from the power module. When mounting the power module on a PCB, leave a copper pattern on the PCB to let it act as a shield and connect this pattern to the CASE pin (CBS50/100/200) or the mounting hole.

■When a heat sink cannot be fixed on the base plate side, order the power module with "-T"option. A heat sink can be mounted by affixing a M3 tap on the heat sink. In case of CBS350/450, make sure a mounting hole will be connected to a grounding capacitor CY.

	Mounting hole
Standard	M3 tapped
Optional : -T	ϕ3.4 thru

Stress onto the pins

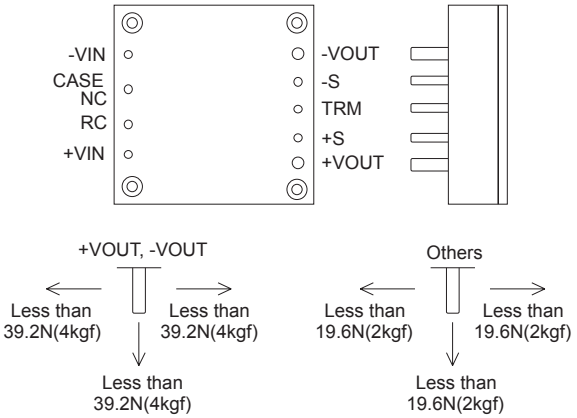
■Applying excessive stress to the input or output pins of the power module may damage internal connections. Avoid applying stress in excess of that shown in right figure.

■Input and output pins are soldered onto the internal PCB. Do not bend or pull the leads with excessive force.

■As unexpected stress may be applied to the pins, set the diameter of the PCB mounting hole at 3.5mm.

■As unexpected stress may be applied to the pins from vibration or shock, fix the power module by using the mounting holes with screws to reduce stress.

■Fix the power module to the PCB with the screws before soldering the input and output pins to prevent the PCB pattern being damaged.



Soldering temperature

■Flow soldering : 260℃ for up to 15 seconds.

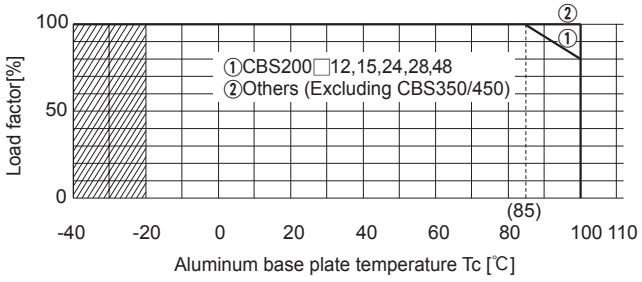
■Soldering iron (26W) : 450℃ for up to 5 seconds.

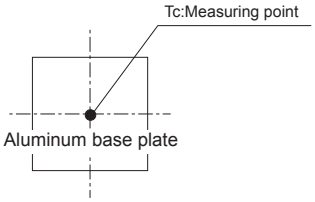
Derating

■Use the power modules with conduction cooling (e.g. heat dissipation from the aluminum base plate to the attached heat sink).Below shows the derating curves with respect to the aluminum base plate temperature. Note that operation within the hatched areas will cause a significant level of ripple and ripple noise. Contact us for more information on cooling methods.

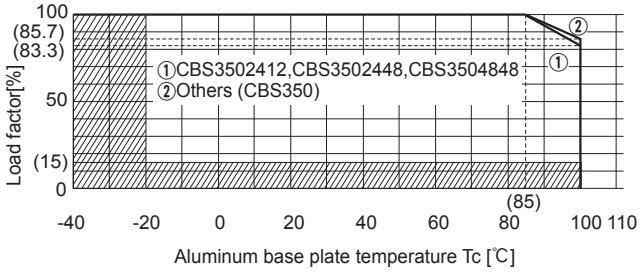
■It is necessary to note thermal fatigue life by power cycle. Please reduce the temperature fluctuation range as much as possible when the up and down of temperature are frequently generated.Contact for more information on cooling methods.

●CBS50, CBS100, CBS200

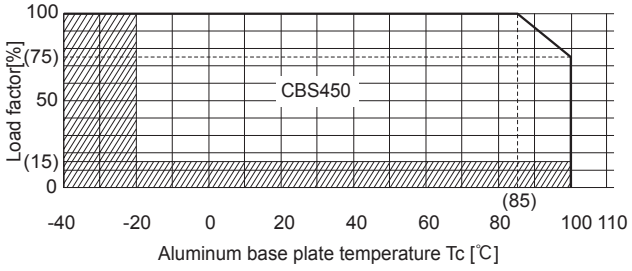




●CBS350



●CBS400



Instruction Manual

◆ It is neccessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection	PCB/Pattern			Series/Redundancy operation availability	
						Material	Single sided	Double sided	Series operation	Redundancy operation
CBS50	Forward converter	310	Refer to table No.1	-	-	Aluminum	Yes		Yes	✻1
CBS100	Forward converter	370		-	-	Aluminum	Yes		Yes	✻1
CBS200	Forward converter	370		-	-	Aluminum	Yes		Yes	✻1
CBS350	Forward converter	370		-	-	Aluminum	Yes		Yes	✻1
CBS450	Forward converter	370		-	-	Aluminum	Yes		Yes	✻1

✻1 Refer to Instruction Manual.

Table1. The value of input current (at rated input voltage and rated load) [A]

Model	Output Voltage									
	1.8V	2.5V	3.3V	5V	12V	15V	24V	28V	32V	48V
CBS5024	1.2	1.6	2.0	2.5	2.4	2.4	2.4	2.4	-	-
CBS5048	0.6	0.8	1.0	1.3	1.2	1.2	1.2	1.2	-	-
CBS10024	2.5	3.2	4.1	5.0	4.8	4.8	4.8	4.8	-	-
CBS10048	1.2	1.6	2.0	2.5	2.4	2.4	2.4	2.4	-	-
CBS20024	3.8	4.8	6.1	7.6	9.6	9.6	9.7	9.7	-	-
CBS20048	1.9	2.4	3.0	3.8	4.8	4.8	4.8	4.8	-	4.8
CBS35024	-	-	-	-	15	-	17	17	17	14
CBS35048	-	-	-	-	8.4	-	8.2	8.1	8.2	8.2
CBS45048	-	-	-	-	-	-	10.6	10.5	9.3	-