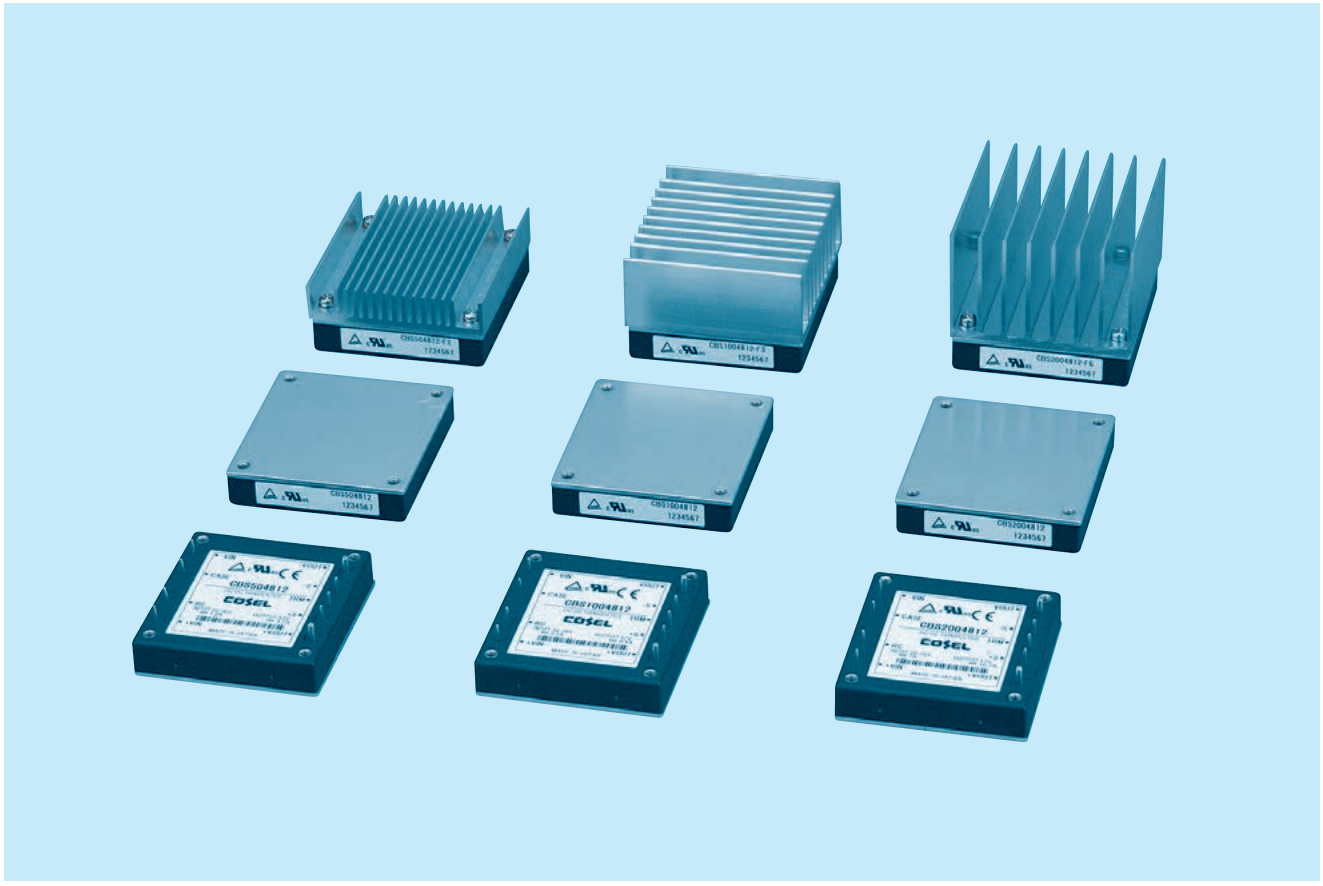
Low Profile | Isolated | Safety Approvals | OCP | OVP | Remote ON/OFF

CBS-series



Feature

Compact DC-DC Converter, "HALF BRICK" which has been standard size for Telecommunication Market
High efficiency
High density
High reliability : not built-in aluminum and tantalum electrolytic capacitor
Built-in overcurrent, overvoltage and thermal protection circuits
Built-in remote ON/OFF
Mounting hole (M3 tapped)

CE marking

Low Voltage Directive
RoHS Directive

UKCA marking

Electrical Equipment Safety Regulations
RoHS Regulations

Safety agency approvals

UL60950-1, C-UL recognized, TÜV approved

5-year warranty

Optional parts

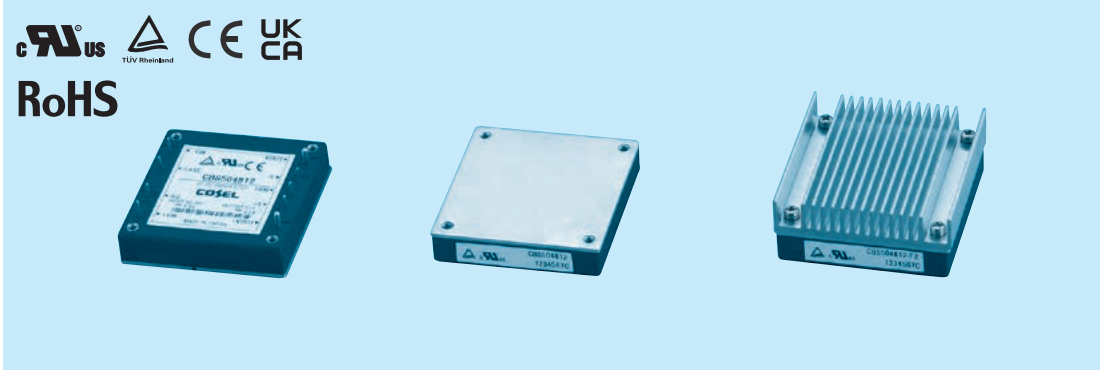
Optional parts	Model
Heat sink	CBS50, CBS100, CBS200

COSEL DC-DC Converters Bus Converter·Power Module Type

CBS50

Ordering information

CB	S	50	48	12	-□
①	②	③	④	⑤	⑧



①Series name
②Single output
③Output wattage
④Input voltage
24 :DC18 - 36V
48 :DC36 - 76V
⑤Output voltage
⑥Optional
R :with Remote ON/OFF Positive logic control
T :with Mounting hole ϕ3.4 thru
F□:with Addition of a Heat sink

MODEL	CBS50241R8	CBS50242R5	CBS502403	CBS502405	CBS502412	CBS502415	CBS502424	CBS502428
MAX OUTPUT WATTAGE[W]	21.06	29.25	38.6	50.0	50.4	51.0	50.4	50.4
DC OUTPUT	1.8V 11.7A	2.5V 11.7A	3.3V 11.7A	5V 10A	12V 4.2A	15V 3.4A	24V 2.1A	28V 1.8A

SPECIFICATIONS

	MODEL		CBS50241R8	CBS50242R5	CBS502403	CBS502405	CBS502412	CBS502415	CBS502424	CBS502428
INPUT	VOLTAGE[V]		DC18 - 36							
	CURRENT[A]	*1	1.24typ	1.58typ	2.04typ	2.48typ	2.39typ	2.44typ	2.41typ	2.41typ
	EFFICIENCY[%]	*1	71typ	77typ	79typ	84typ	88typ	87typ	87typ	87typ
OUTPUT	VOLTAGE[V]		1.8	2.5	3.3	5	12	15	24	28
	CURRENT[A]		11.7	11.7	11.7	10	4.2	3.4	2.1	1.8
	LINE REGULATION[mV]		10max	10max	10max	10max	24max	30max	48max	56max
	LOAD REGULATION[mV]		10max	10max	10max	10max	24max	30max	48max	56max
	RIPPLE[mVp-p]	-20 to +100℃ *2	80max	80max	80max	80max	120max	120max	120max	120max
		-40 to -20℃ *2	120max	120max	120max	120max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +100℃ *2	120max	120max	120max	120max	150max	150max	150max	150max
		-40 to -20℃ *2	200max	200max	200max	200max	200max	200max	250max	250max
	TEMPERATURE REGULATION[mV]	0 to +65℃	35max	35max	35max	50max	120max	150max	240max	280max
		-40 to +100℃	66max	66max	66max	100max	240max	300max	480max	560max
	DRIFT[mV]	*3	16max	16max	16max	20max	40max	60max	90max	90max
	START-UP TIME[ms]		200max (DCIN 24V, Io=100%)							
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external resistor							
			1.70 - 1.98	1.98 - 2.75	1.98 - 3.63	3.0 - 5.5	7.2 - 13.2	9.0 - 16.5	14.4 - 26.4	16.8 - 30.8
	OUTPUT VOLTAGE SETTING[V]		1.77 - 1.88	2.46 - 2.61	3.25 - 3.45	4.90 - 5.20	11.74 - 12.46	14.55 - 15.45	23.28 - 24.72	27.16 - 28.84
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically							
	OVERVOLTAGE PROTECTION[V]		2.16 - 2.88	3.00 - 4.00	4.00 - 5.50	5.75 - 7.00	13.80 - 16.80	17.25 - 21.00	27.60 - 33.60	32.20 - 39.20
	REMOTE SENSING		Provided							
	REMOTE ON/OFF		Provided (Negative logic L : ON, H : OFF)							

MODEL	CBS50481R8	CBS50482R5	CBS504803	CBS504805	CBS504812	CBS504815	CBS504824	CBS504828
MAX OUTPUT WATTAGE[W]	21.06	29.25	38.6	50.0	50.4	51.0	50.4	50.4
DC OUTPUT	1.8V 11.7A	2.5V 11.7A	3.3V 11.7A	5V 10A	12V 4.2A	15V 3.4A	24V 2.1A	28V 1.8A

SPECIFICATIONS

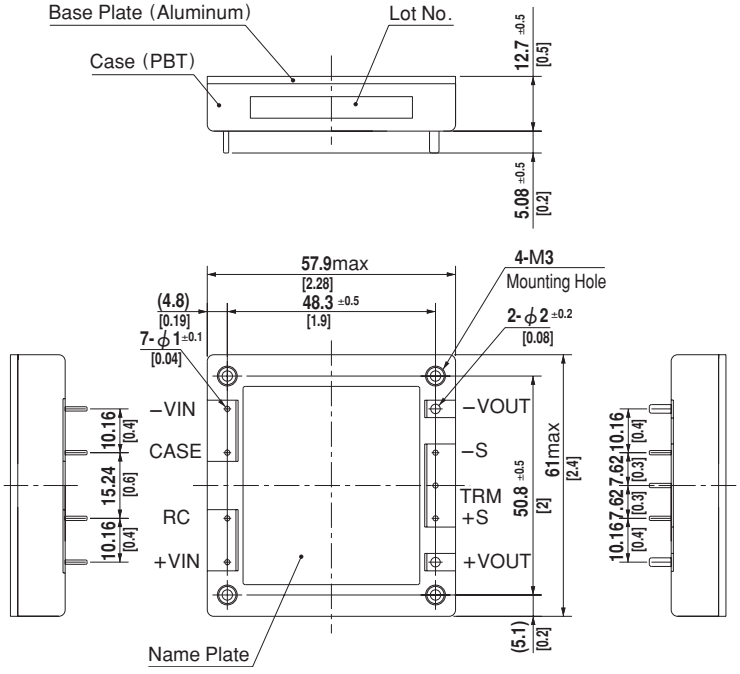
	MODEL		CBS50481R8	CBS50482R5	CBS504803	CBS504805	CBS504812	CBS504815	CBS504824	CBS504828
INPUT	VOLTAGE[V]		DC36 - 76							
	CURRENT[A]	*1	0.62typ	0.79typ	1.01typ	1.23typ	1.18typ	1.21typ	1.19typ	1.19typ
	EFFICIENCY[%]	*1	71typ	77typ	80typ	85typ	89typ	88typ	88typ	88typ
OUTPUT	VOLTAGE[V]		1.8	2.5	3.3	5	12	15	24	28
	CURRENT[A]		11.7	11.7	11.7	10	4.2	3.4	2.1	1.8
	LINE REGULATION[mV]		10max	10max	10max	10max	24max	30max	48max	56max
	LOAD REGULATION[mV]		10max	10max	10max	10max	24max	30max	48max	56max
	RIPPLE[mVp-p]	-20 to +100℃ *2	80max	80max	80max	80max	120max	120max	120max	120max
		-40 to -20℃ *2	120max	120max	120max	120max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +100℃ *2	120max	120max	120max	120max	150max	150max	150max	150max
		-40 to -20℃ *2	200max	200max	200max	200max	200max	200max	250max	250max
	TEMPERATURE REGULATION[mV]	0 to +65℃	35max	35max	35max	50max	120max	150max	240max	280max
		-40 to +100℃	66max	66max	66max	100max	240max	300max	480max	560max
	DRIFT[mV]	*3	16max	16max	16max	20max	40max	60max	90max	90max
	START-UP TIME[ms]		200max (DCIN 48V, Io=100%)							
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external resistor							
			1.70 - 1.98	1.98 -2.75	1.98 - 3.63	3.0 - 5.5	7.2 - 13.2	9.0 - 16.5	14.4 - 26.4	16.8 - 30.8
	OUTPUT VOLTAGE SETTING[V]		1.77 - 1.88	2.46 -2.61	3.25 - 3.45	4.90 - 5.20	11.74 - 12.46	14.55 - 15.45	23.28 - 24.72	27.16 - 28.84
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically							
	OVERVOLTAGE PROTECTION[V]		2.16 - 2.88	3.00 - 4.00	4.00 - 5.50	5.75 - 7.00	13.80 - 16.80	17.25 - 21.00	27.60 - 33.60	32.20 - 39.20
	REMOTE SENSING		Provided							
	REMOTE ON/OFF		Provided (Negative logic L : ON, H : OFF)							

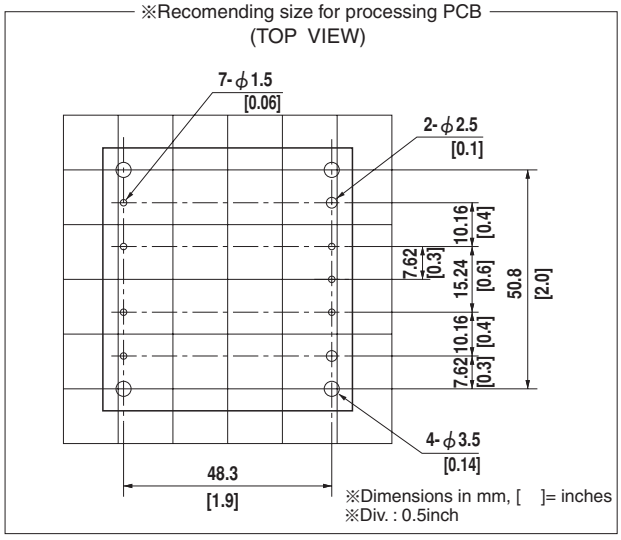
GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)
	INPUT-CASE PIN, BASE PLATE	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)
	OUTPUT-CASE PIN, 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"), 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, EN62368-1
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) and rated load.
*2 Ripple and ripple noise is measured by using measuring board with recommended capacitor Co & the film capacitor 0.1μF.
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM101).
*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 DC18 - 20V, DC36 - 40V, output voltage adjustment range is 60 - 105% (except for 1R8/2R5).

External view

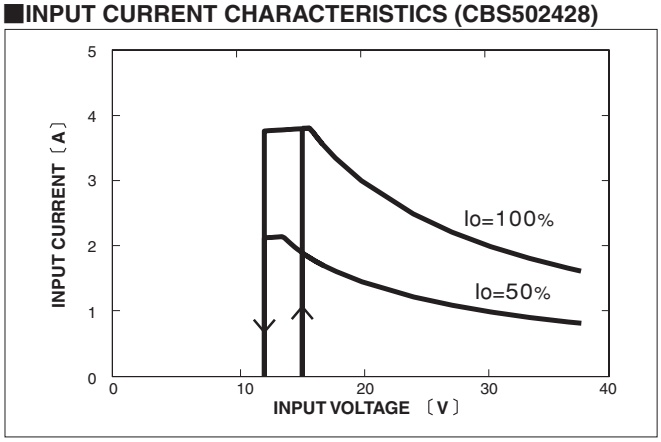




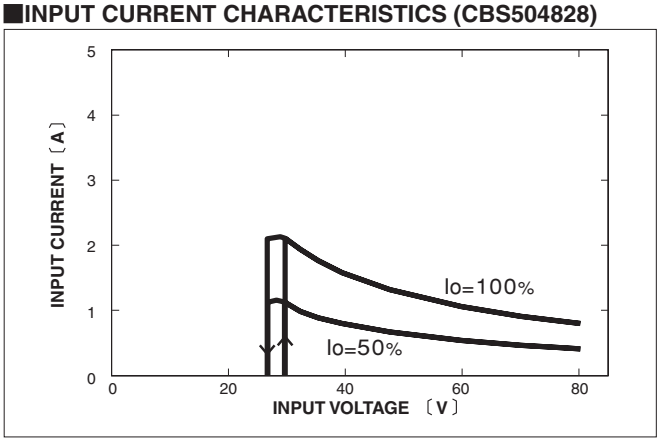
※Weight : 83g max
※Tolerance : ±0.3 [±0.012]
※Case : PBT
※Base Plate: Aluminum
※Dimensions in mm, [ ]= inches
※Mounting hole screwing torque
: 0.49N•m(5.0kgf•cm)max

Performance data

■INPUT CURRENT CHARACTERISTICS (CBS502428)



■INPUT CURRENT CHARACTERISTICS (CBS504828)

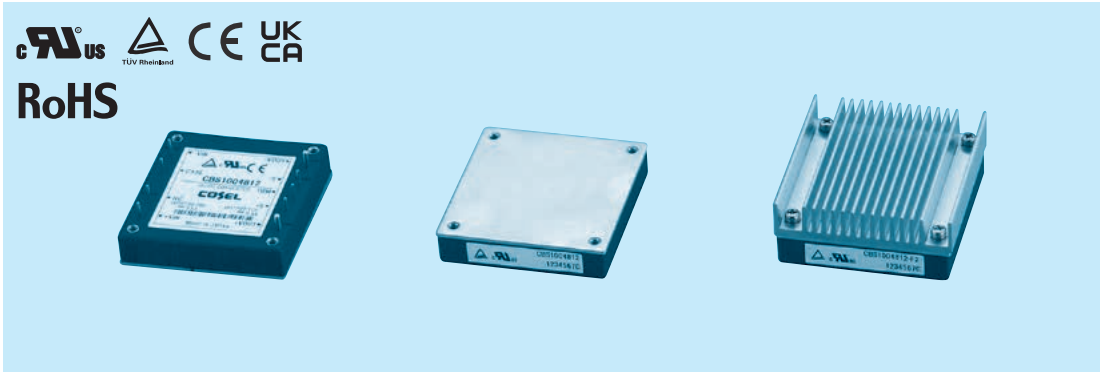


COSEL DC-DC Converters Bus Converter·Power Module Type

CBS100

Ordering information

CB	S	100	48	12	-□
①	②	③	④	⑤	⑧



①Series name
②Single output
③Output wattage
④Input voltage
24:DC18 - 36V
48:DC36 - 76V
⑤Output voltage
⑥Optional
R :with Remote ON/OFF Positive logic control
T :with Mounting hole ϕ3.4 thru
F□:with Addition of a Heat sink

MODEL	CBS100241R8	CBS100242R5	CBS1002403	CBS1002405	CBS1002412	CBS1002415	CBS1002424	CBS1002428
MAX OUTPUT WATTAGE[W]	42.12	58.50	77.2	100.0	100.8	100.5	100.8	100.8
DC OUTPUT	1.8V 23.4A	2.5V 23.4A	3.3V 23.4A	5V 20A	12V 8.4A	15V 6.7A	24V 4.2A	28V 3.6A

SPECIFICATIONS

	MODEL		CBS100241R8	CBS100242R5	CBS1002403	CBS1002405	CBS1002412	CBS1002415	CBS1002424	CBS1002428
INPUT	VOLTAGE[V]		DC18 - 36							
	CURRENT[A]	*1	2.47typ	3.17typ	4.07typ	5.02typ	4.77typ	4.81typ	4.83typ	4.83typ
	EFFICIENCY[%]	*1	71typ	77typ	79typ	83typ	88typ	87typ	87typ	87typ
OUTPUT	VOLTAGE[V]		1.8	2.5	3.3	5	12	15	24	28
	CURRENT[A]		23.4	23.4	23.4	20	8.4	6.7	4.2	3.6
	LINE REGULATION[mV]		10max	10max	10max	10max	24max	30max	48max	56max
	LOAD REGULATION[mV]		10max	10max	10max	10max	24max	30max	48max	56max
	RIPPLE[mVp-p]	-20 to +100℃ *2	80max	80max	80max	80max	120max	120max	120max	120max
		-40 to -20℃ *2	120max	120max	120max	120max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +100℃ *2	120max	120max	120max	120max	150max	150max	150max	150max
		-40 to -20℃ *2	200max	200max	200max	200max	200max	200max	250max	250max
	TEMPERATURE REGULATION[mV]	0 to +65℃	35max	35max	35max	50max	120max	150max	240max	280max
		-40 to +100℃	66max	66max	66max	100max	240max	300max	480max	560max
	DRIFT[mV]	*3	16max	16max	16max	20max	40max	60max	90max	90max
	START-UP TIME[ms]		200max (DCIN 24V, Io=100%)							
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external resistor							
			1.70 - 1.98	1.98 - 2.75	1.98 - 3.63	3.0 - 5.5	7.2 - 13.2	9.0 - 16.5	14.4 - 26.4	16.8 - 30.8
	OUTPUT VOLTAGE SETTING[V]		1.77 - 1.88	2.46 - 2.61	3.25 - 3.45	4.90 - 5.20	11.74 - 12.46	14.55 - 15.45	23.28 - 24.72	27.16 - 28.84
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically							
	OVERVOLTAGE PROTECTION[V]		2.16 - 2.88	3.00 - 4.00	4.00 - 5.50	5.75 - 7.00	13.80 - 16.80	17.25 - 21.00	27.60 - 33.60	32.20 - 39.20
	REMOTE SENSING		Provided							
	REMOTE ON/OFF		Provided (Negative logic L : ON, H : OFF)							

MODEL	CBS100481R8	CBS100482R5	CBS1004803	CBS1004805	CBS1004812	CBS1004815	CBS1004824	CBS1004828
MAX OUTPUT WATTAGE[W]	42.12	58.50	77.2	100.0	100.8	100.5	100.8	100.8
DC OUTPUT	1.8V 23.4A	2.5V 23.4A	3.3V 23.4A	5V 20A	12V 8.4A	15V 6.7A	24V 4.2A	28V 3.6A

SPECIFICATIONS

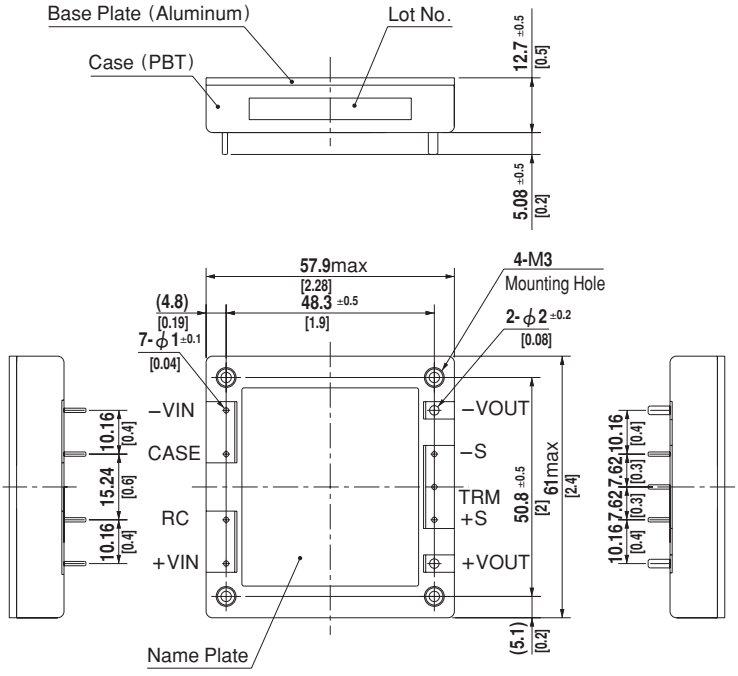
	MODEL		CBS100481R8	CBS100482R5	CBS1004803	CBS1004805	CBS1004812	CBS1004815	CBS1004824	CBS1004828
INPUT	VOLTAGE[V]		DC36 - 76							
	CURRENT[A]	*1	1.24typ	1.58typ	2.01typ	2.48typ	2.36typ	2.38typ	2.39typ	2.39typ
	EFFICIENCY[%]	*1	71typ	77typ	80typ	84typ	89typ	88typ	88typ	88typ
OUTPUT	VOLTAGE[V]		1.8	2.5	3.3	5	12	15	24	28
	CURRENT[A]		23.4	23.4	23.4	20	8.4	6.7	4.2	3.6
	LINE REGULATION[mV]		10max	10max	10max	10max	24max	30max	48max	56max
	LOAD REGULATION[mV]		10max	10max	10max	10max	24max	30max	48max	56max
	RIPPLE[mVp-p]	-20 to +100℃ *2	80max	80max	80max	80max	120max	120max	120max	120max
		-40 to -20℃ *2	120max	120max	120max	120max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +100℃ *2	120max	120max	120max	120max	150max	150max	150max	150max
		-40 to -20℃ *2	200max	200max	200max	200max	200max	200max	250max	250max
	TEMPERATURE REGULATION[mV]	0 to +65℃	35max	35max	35max	50max	120max	150max	240max	280max
		-40 to +100℃	66max	66max	66max	100max	240max	300max	480max	560max
	DRIFT[mV]	*3	16max	16max	16max	20max	40max	60max	90max	90max
	START-UP TIME[ms]		200max (DCIN 48V, Io=100%)							
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external resistor							
			1.70 - 1.98	1.98 -2.75	1.98 - 3.63	3.0 - 5.5	7.2 - 13.2	9.0 - 16.5	14.4 - 26.4	16.8 - 30.8
	OUTPUT VOLTAGE SETTING[V]		1.77 - 1.88	2.46 -2.61	3.25 - 3.45	4.90 - 5.20	11.74 - 12.46	14.55 - 15.45	23.28 - 24.72	27.16 - 28.84
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically							
	OVERVOLTAGE PROTECTION[V]		2.16 - 2.88	3.00 - 4.00	4.00 - 5.50	5.75 - 7.00	13.80 - 16.80	17.25 - 21.00	27.60 - 33.60	32.20 - 39.20
	REMOTE SENSING		Provided							
	REMOTE ON/OFF		Provided (Negative logic L : ON, H : OFF)							

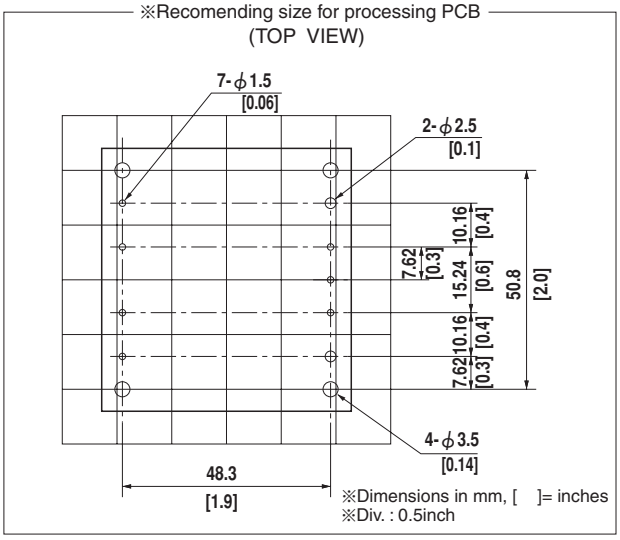
GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)
	INPUT-CASE PIN, BASE PLATE	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)
	OUTPUT-CASE PIN, 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"), 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, EN62368-1
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) and rated load.
*2 Ripple and ripple noise is measured by using measuring board with recommended capacitor Co & the film capacitor 0.1μF.
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM101).
*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 DC18 - 20V, DC36 - 40V output voltage adjustment range is 60 - 105% (except for 1R8/2R5).

External view

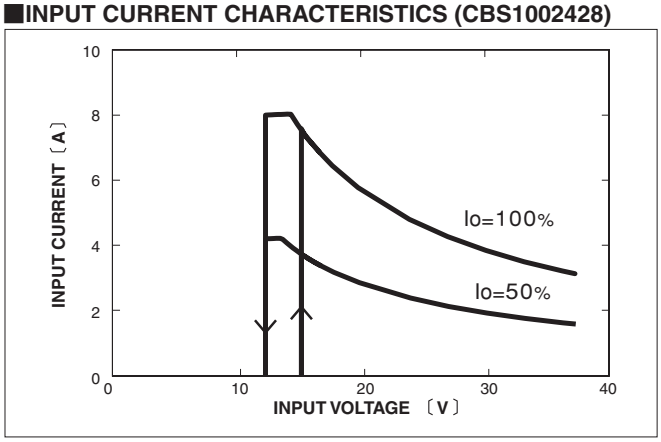




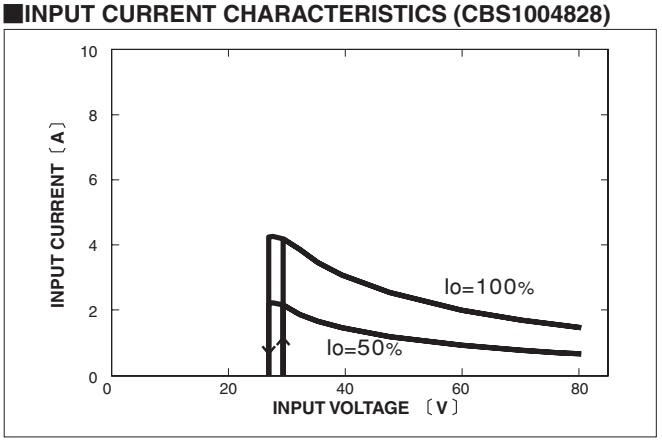
※Weight : 83g max
※Tolerance : ±0.3 [±0.012]
※Case : PBT
※Base Plate: Aluminum
※Dimensions in mm, [ ]= inches
※Mounting hole screwing torque
: 0.49N•m(5.0kgf•cm)max

Performance data

■INPUT CURRENT CHARACTERISTICS (CBS1002428)



■INPUT CURRENT CHARACTERISTICS (CBS1004828)

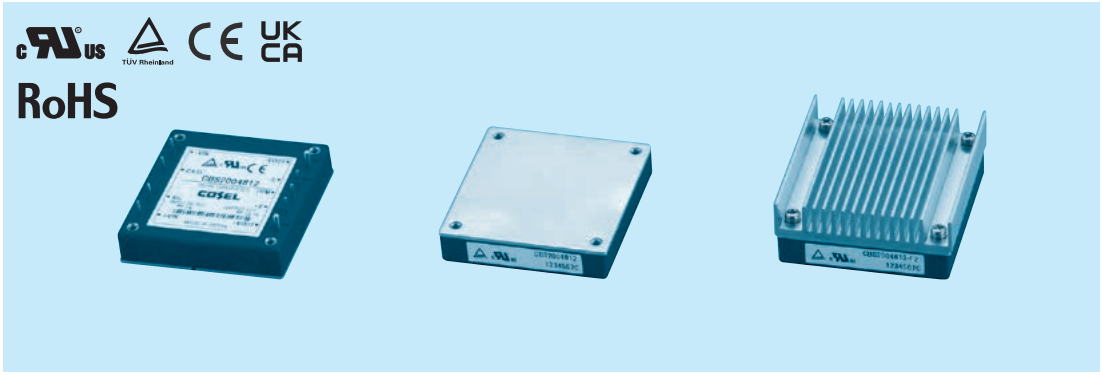


COSEL DC-DC Converters Bus Converter·Power Module Type

CBS200

Ordering information

CB	S	200	48	12	-□
①	②	③	④	⑤	⑧



①Series name
②Single output
③Output wattage
④Input voltage
24:DC18 - 36V
48:DC36 - 76V
⑤Output voltage
⑥Optional
R :with Remote ON/OFF Positive logic control
T :with Mounting hole ϕ3.4 thru
F□:with Addition of a Heat sink

MODEL	CBS200241R8	CBS200242R5	CBS2002403	CBS2002405	CBS2002412	CBS2002415	CBS2002424	CBS2002428
MAX OUTPUT WATTAGE[W]	63.00	87.50	115.5	150.0	200.4	201.0	201.6	201.6
DC OUTPUT	1.8V 35A	2.5V 35A	3.3V 35A	5V 30A	12V 16.7A	15V 13.4A	24V 8.4A	28V 7.2A

SPECIFICATIONS

	MODEL		CBS200241R8	CBS200242R5	CBS2002403	CBS2002405	CBS2002412	CBS2002415	CBS2002424	CBS2002428
INPUT	VOLTAGE[V]		DC18 - 36							
	CURRENT[A]	*1	3.75typ	4.80typ	6.09typ	7.62typ	9.60typ	9.63typ	9.66typ	9.66typ
	EFFICIENCY[%]	*1	70typ	76typ	79typ	82typ	87typ	87typ	87typ	87typ
OUTPUT	VOLTAGE[V]		1.8	2.5	3.3	5	12	15	24	28
	CURRENT[A]		35	35	35	30	16.7	13.4	8.4	7.2
	LINE REGULATION[mV]		10max	10max	10max	10max	24max	30max	48max	56max
	LOAD REGULATION[mV]		10max	10max	10max	10max	24max	30max	48max	56max
	RIPPLE[mVp-p]	-20 to +100℃ *2	80max	80max	80max	80max	120max	120max	120max	120max
		-40 to -20℃ *2	120max	120max	120max	120max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +100℃ *2	120max	120max	120max	120max	150max	150max	150max	150max
		-40 to -20℃ *2	200max	200max	200max	200max	200max	200max	250max	250max
	TEMPERATURE REGULATION[mV]	0 to +65℃	35max	35max	35max	50max	120max	150max	240max	280max
		-40 to +100℃	66max	66max	66max	100max	240max	300max	480max	560max
	DRIFT[mV]	*3	16max	16max	16max	20max	40max	60max	90max	90max
	START-UP TIME[ms]		200max (DCIN 24V, Io=100%)							
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external resistor							
			1.70 - 1.98	1.98 - 2.75	1.98 - 3.63	3.0 - 5.5	7.2 - 13.2	9.0 - 16.5	14.4 - 26.4	16.8 - 30.8
	OUTPUT VOLTAGE SETTING[V]		1.77 - 1.88	2.46 - 2.61	3.25 - 3.45	4.90 - 5.20	11.74 - 12.46	14.55 - 15.45	23.28 - 24.72	27.16 - 28.84
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically							
	OVERVOLTAGE PROTECTION[V]		2.16 - 2.88	3.00 - 4.00	4.00 - 5.50	5.75 - 7.00	13.80 - 16.80	17.25 - 21.00	27.60 - 33.60	32.20 - 39.20
	REMOTE SENSING		Provided							
	REMOTE ON/OFF		Provided (Negative logic L : ON, H : OFF)							

MODEL	CBS200481R8	CBS200482R5	CBS2004803	CBS2004805	CBS2004812	CBS2004815	CBS2004824	CBS2004828	CBS2004848
MAX OUTPUT WATTAGE[W]	63.00	87.50	115.5	150.0	200.4	201.0	201.6	201.6	201.6
DC OUTPUT	1.8V 35A	2.5V 35A	3.3V 35A	5V 30A	12V 16.7A	15V 13.4A	24V 8.4A	28V 7.2A	48V 4.2A

SPECIFICATIONS

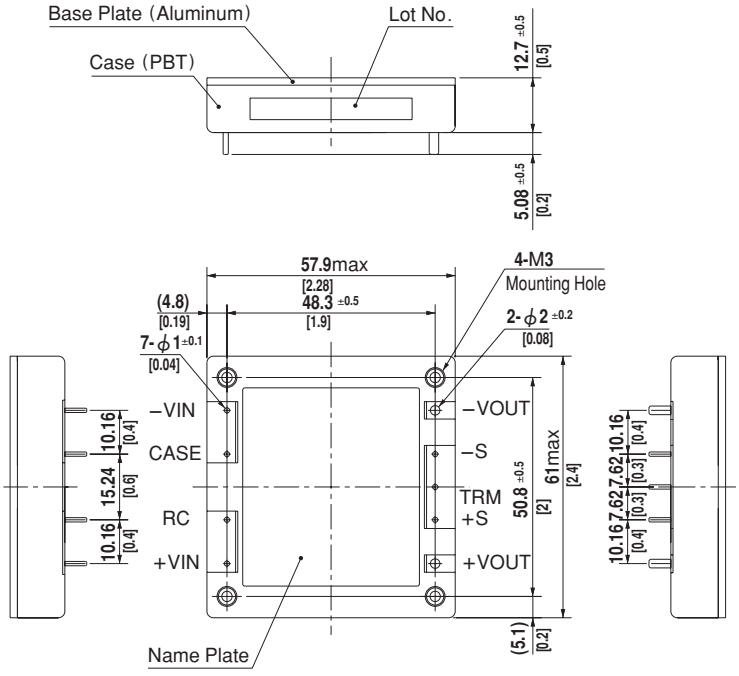
	MODEL		CBS200481R8	CBS200482R5	CBS2004803	CBS2004805	CBS2004812	CBS2004815	CBS2004824	CBS2004828	CBS2004848
INPUT	VOLTAGE[V]		DC36 - 76								
	CURRENT[A]	*1	1.88typ	2.40typ	3.01typ	3.77typ	4.74typ	4.76typ	4.77typ	4.77typ	4.77typ
	EFFICIENCY[%]	*1	70typ	76typ	80typ	83typ	88typ	88typ	88typ	88typ	88typ
OUTPUT	VOLTAGE[V]		1.8	2.5	3.3	5	12	15	24	28	48
	CURRENT[A]		35	35	35	30	16.7	13.4	8.4	7.2	4.2
	LINE REGULATION[mV]		10max	10max	10max	10max	24max	30max	48max	56max	96max
	LOAD REGULATION[mV]		10max	10max	10max	10max	24max	30max	48max	56max	96max
	RIPPLE[mVp-p]	-20 to +100℃ *2	80max	80max	80max	80max	120max	120max	120max	120max	200max
		-40 to -20℃ *2	120max	120max	120max	120max	150max	150max	150max	150max	250max
	RIPPLE NOISE[mVp-p]	-20 to +100℃ *2	120max	120max	120max	120max	150max	150max	150max	150max	250max
		-40 to -20℃ *2	200max	200max	200max	200max	200max	200max	250max	250max	400max
	TEMPERATURE REGULATION[mV]	0 to +65℃	35max	35max	35max	50max	120max	150max	240max	280max	480max
		-40 to +100℃	66max	66max	66max	100max	240max	300max	480max	560max	960max
	DRIFT[mV]	*3	16max	16max	16max	20max	40max	60max	90max	90max	180max
	START-UP TIME[ms]		200max (DCIN 48V, Io=100%)								
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external resistor								
			1.70 - 1.98	1.98 -2.75	1.98 - 3.63	3.0 - 5.5	7.2 - 13.2	9.0 - 16.5	14.4 - 26.4	16.8 - 30.8	43.2 - 52.8
	OUTPUT VOLTAGE SETTING[V]		1.77 - 1.88	2.46 -2.61	3.25 - 3.45	4.90 - 5.20	11.74 - 12.46	14.55 - 15.45	23.28 - 24.72	27.16 - 28.84	46.56 - 49.44
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically								
	OVERVOLTAGE PROTECTION[V]		2.16 - 2.88	3.00 - 4.00	4.00 - 5.50	5.75 - 7.00	13.80 - 16.80	17.25 - 21.00	27.60 - 33.60	32.20 - 39.20	55.20 - 67.20
	REMOTE SENSING		Provided								
	REMOTE ON/OFF		Provided (Negative logic L : ON, H : OFF)								

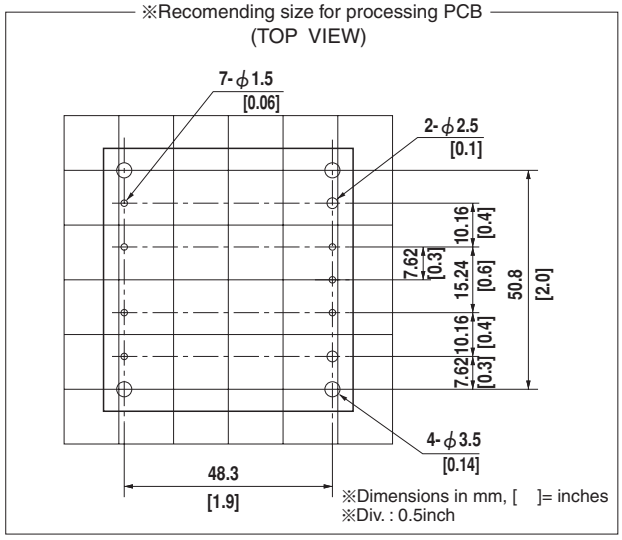
GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)
	INPUT-CASE PIN, BASE PLATE	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)
	OUTPUT-CASE PIN, 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"), 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, EN62368-1
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) and rated load.
*2 Ripple and ripple noise is measured by using measuring board with recommended capacitor Co & the film capacitor 0.1μF.
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM101).
*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 DC18 - 20V, DC36 - 40V, output voltage adjustment range is 60 - 105% (except for 1R8/2R5/48).

External view

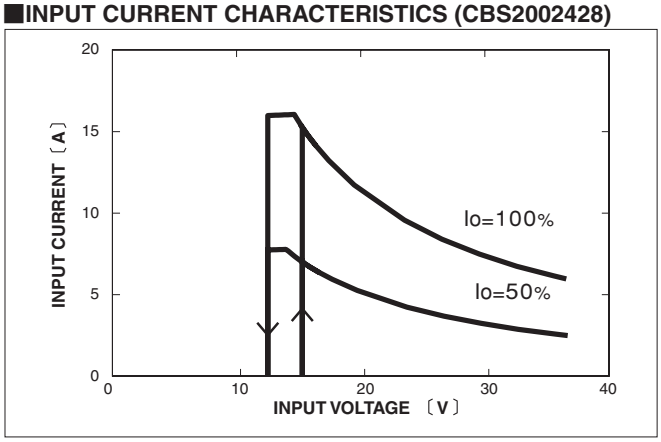




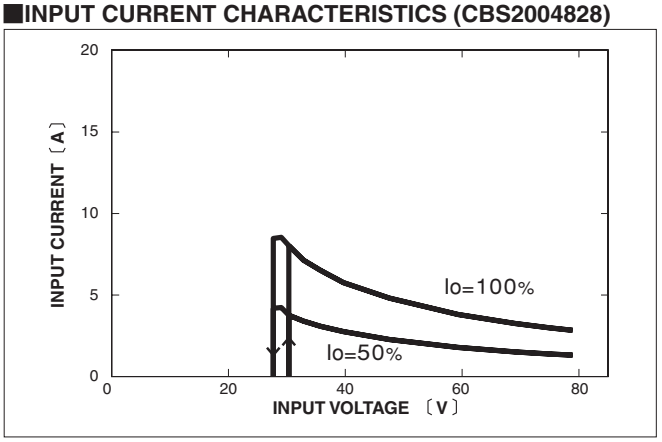
※Weight : 83g max
※Tolerance : ±0.3 [±0.012]
※Case : PBT
※Base Plate: Aluminum
※Dimensions in mm, [ ]= inches
※Mounting hole screwing torque
: 0.49N•m(5.0kgf•cm)max

Performance data

■INPUT CURRENT CHARACTERISTICS (CBS2002428)



■INPUT CURRENT CHARACTERISTICS (CBS2004828)



COSEL DC-DC Converters Bus Converter·Power Module Type

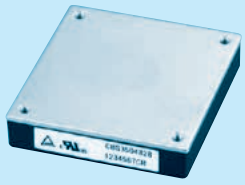
CBS350

Ordering information

CB	S	350	48	12	-□
①	②	③	④	⑤	⑥

RoHS





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

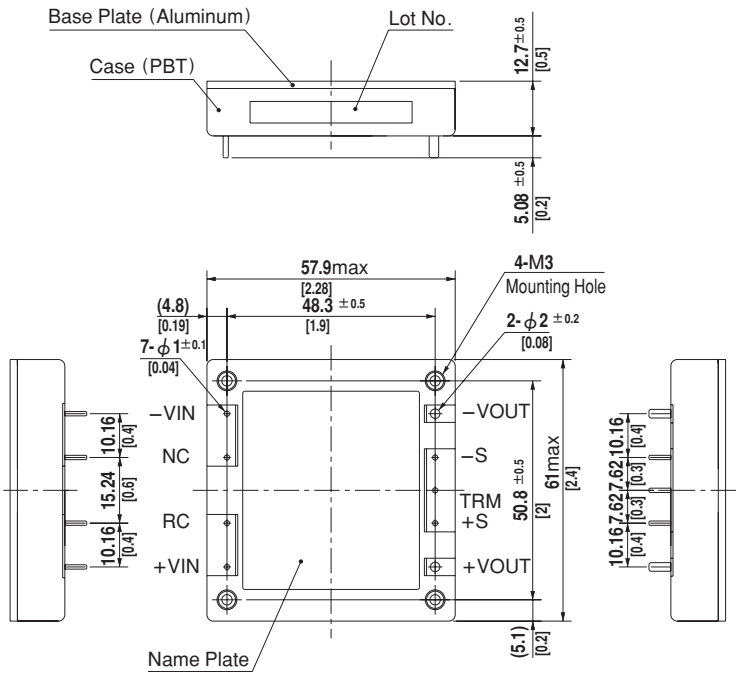
MODEL	CBS3502412	CBS3502424	CBS3502428	CBS3502432	CBS3502448	CBS3504812	CBS3504824	CBS3504828	CBS3504832	CBS3504848
MAX OUTPUT WATTAGE[W]	300	348	350	352	302	348	348	350	352	350
DC OUTPUT	12V 25A	24V 14.5A	28V 12.5A	32V 11A	48V 6.3A	12V 29A	24V 14.5A	28V 12.5A	32V 11A	48V 7.3A

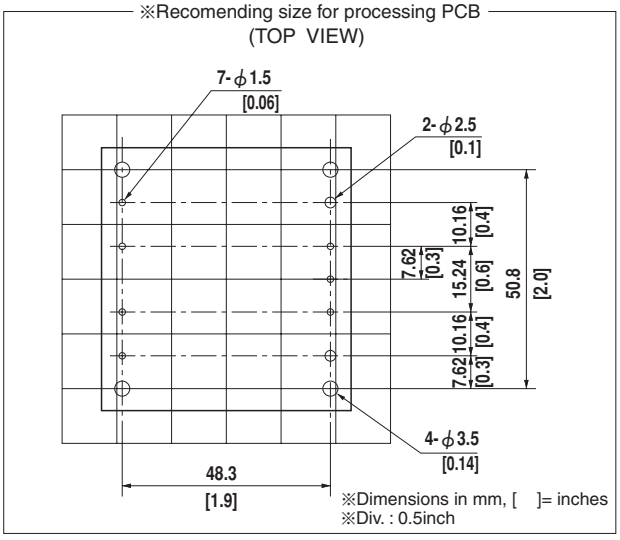
SPECIFICATIONS

	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, EN62368-1									
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

COSEL DC-DC Converters Bus Converter・Power Module Type

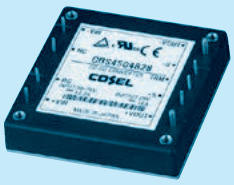
CBS450

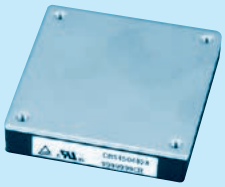
Ordering information

CB	S	450	48	28	-□
①	②	③	④	⑤	⑧

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

RoHS





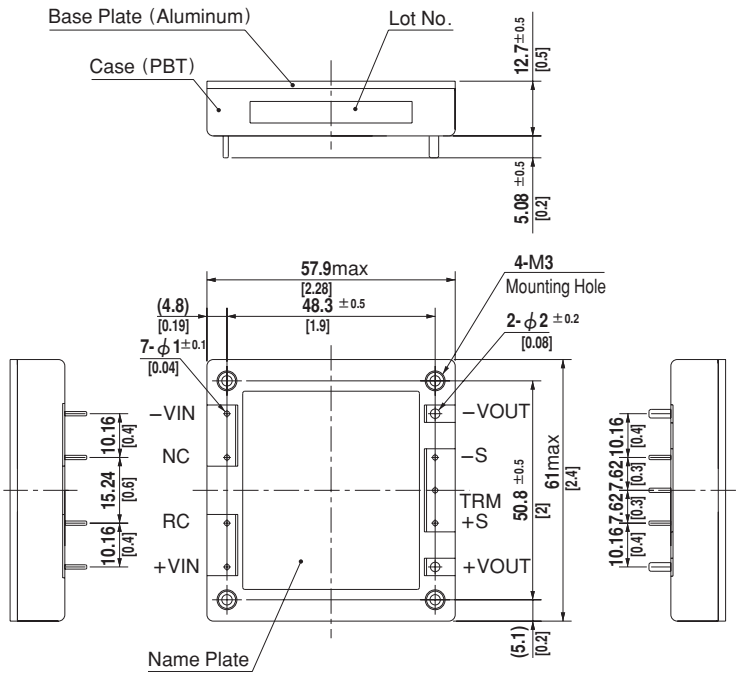
MODEL	CBS4504824	CBS4504828	CBS4504832
MAX OUTPUT WATTAGE[W]	456	448	400
DC OUTPUT	24V 19A	28V 16A	32V 12.5A

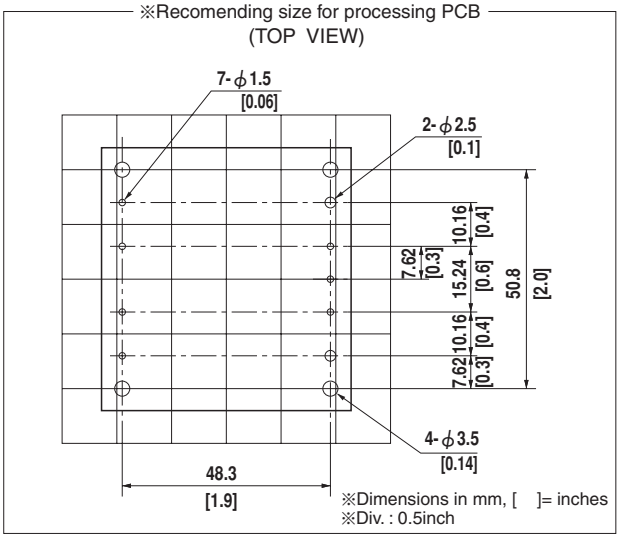
SPECIFICATIONS

	MODEL		CBS4504824	CBS4504828	CBS4504832
INPUT	VOLTAGE[V]		DC38 - 60	DC36 - 76	DC36 - 76
	CURRENT[A]	*1	10.6typ	10.5typ	9.3typ
	EFFICIENCY[%]	*1	90typ	91typ	91typ
OUTPUT	VOLTAGE[V]		24	28	32
	CURRENT[A]		19	16	12.5
	LINE REGULATION[mV]		48max	56max	64max
	LOAD REGULATION[mV]		48max	56max	64max
	RIPPLE[mVp-p]	-20 to +100℃ *2	180max	210max	210max
		-40 to -20℃ *2	220max	260max	260max
		0 to 15%Load *2	360max	430max	430max
	RIPPLE NOISE[mVp-p]	-20 to +100℃ *2	220max	260max	260max
		-40 to -20℃ *2	280max	330max	330max
		0 to 15%Load *2	440max	520max	520max
	TEMPERATURE REGULATION[mV]	0 to +65℃	240max	280max	280max
		-40 to +100℃	480max	560max	560max
	DRIFT[mV]	*3	90max	90max	120max
	START-UP TIME[ms]		200max (DCIN 48V, Io=100%)		
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external resistor		
			19.2 - 26.0	16.8 - 32.2	25.6 - 35.2
	OUTPUT VOLTAGE SETTING[V]	*1	23.52 - 24.48	27.44 - 28.56	31.36 - 32.64
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically		
	OVERVOLTAGE PROTECTION[V]		27.60 - 33.60	32.20 - 39.20	36.80 - 44.80
	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"), 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, EN62368-1		
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(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 Refer to the manual for the input range.

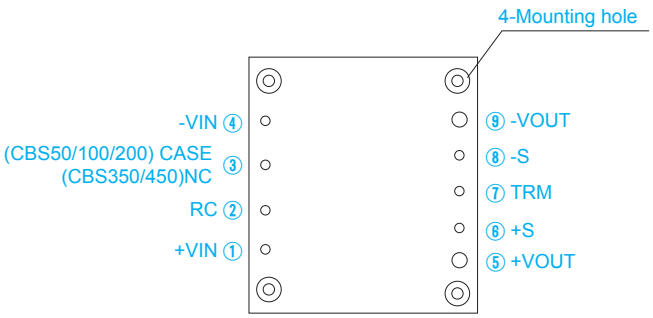
External view





※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

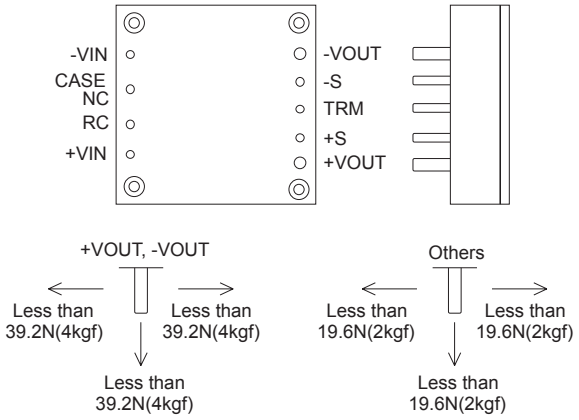
■Applying excessive stress to the input or output pins of the power module may damage internal connections. Avoid applying stress in excess of that shown in right figure.

■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.

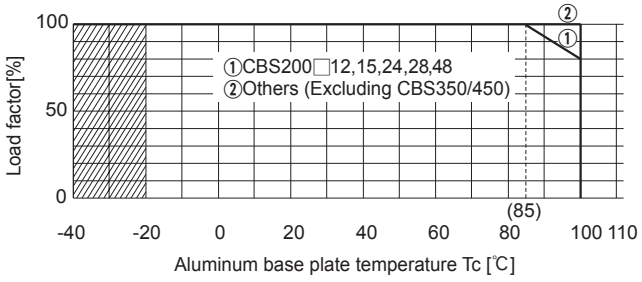
■Soldering iron (26W) : 450℃ for up to 5 seconds.

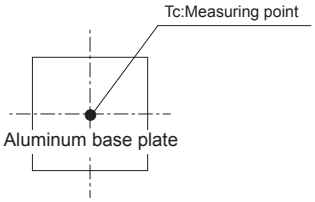
Derating

■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.

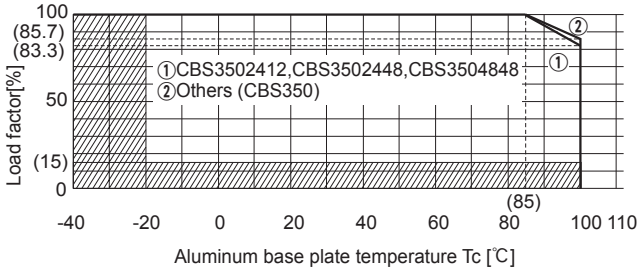
■It is necessary to note thermal fatigue life by power cycle. Please reduce the temperature fluctuation range as much as possible when the up and down of temperature are frequently generated.Contact for more information on cooling methods.

●CBS50, CBS100, CBS200

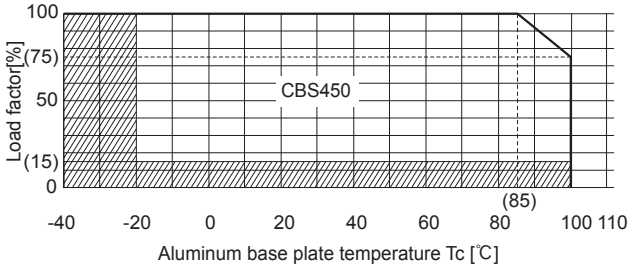




●CBS350



●CBS400



Instruction Manual

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

Instruction Manual	https://www.cosel.co.jp/redirect/catalog/en/CBS/
Before using our product	https://en.cosel.co.jp/technical/caution/index.html

CBS NOTICE

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	-