

DC-DCコンバータ 縦型オンボードタイプ

アルミ電解コンデンサレス、タンタルコンデンサレスにより高信頼性、長寿命化を実現。
立型実装 (SIP) により、省実装面積が可能な、絶縁型DC-DCコンバータです。

シリーズ名 Series Name		出力容量 Output Power (W)	形状(H×W×L) Dimension (mm)	入力電圧 Input Voltage (V.DC)	出力電圧 Output Voltage (V.DC)	効率 Efficiency (%)	特 長 Feature	ページ Page
LP		1W	13.5×10×22	5V (4.5~9) 12V (9~18) 24V (18~36) 48V (36~72)	5, 12, 15, 24, 5・5, 12・12, 15・15, 5・12, 5・15	65~75%	縦型実装タイプ 低価格 SIP package Low cost	
		2~3W	24.5×8.5×35	5V (4.5~9) 12V (8~18) 24V (16~36) 48V (32~72)	5, 6, 12, 15, 24, ±12, ±15	70~80%	縦型実装タイプ 低価格 SIP package Low cost	

DC-DCコンバータ オンボードタイプ

アルミ電解コンデンサレス、タンタルコンデンサレスにより高信頼性、長寿命化を実現。
入力フィルタを内蔵したオンボード絶縁型DC-DCコンバータです。

シリーズ名 Series Name		出力容量 Output Power (W)	形状(H×W×L) Dimension (mm)	入力電圧 Input Voltage (V.DC)	出力電圧 Output Voltage (V.DC)	効率 Efficiency (%)	特 長 Feature	ページ Page
SS		2〜3W	10×21×33	5V (4.5〜9) 12V (8〜18) 24V (16〜36) 48V (32〜72)	5, 6, 12, 15, 24, ±5, ±12, ±15	75〜82%	広範囲な入力電圧 高信頼性 Wide input voltage range High reliability	
		2〜3W	8.5×21×33			70〜81%	高さ 8.5mm 高信頼性 8.5mm in height High reliability	
		5〜6W	8.5×21×33	5V (4.5〜9) 12V (8〜18) 24V (16〜36) 48V (32〜72) 100V (64〜120)	3.3, 5, 6, 12, 15, 24	81〜88%	高さ 8.5mm 高信頼性 8.5mm in height High reliability	
		5〜6W	10×30×47	5V (4.5〜9) 12V (8〜18) 24V (16〜36) 48V (32〜72)	5, 6, 12, 15, 24, ±5, ±12, ±15	79〜87%	広範囲な入力電圧 高信頼性 Wide input voltage range High reliability	
		5〜6W	8.5×30×47			80〜85%	高さ 8.5mm 高信頼性 8.5mm in height High reliability	
		10〜12W	8.5×30×47	3.3, 5, 6, 12, 15, 24, 28	81〜87%	高さ 8.5mm 高信頼性 8.5mm in height High reliability		
		10〜15W	7×31×47	3.3, 5, 5.2, 6, 12, 15, 24, ±12, ±15	85〜88%	高さ 7mm ON/OFFコントロール内蔵 7mm in height ON/OFF control function		
		7〜15W	8.5×50×55	5V (4.5〜9) 12V (8〜18) 24V (16〜36) 48V (32〜76)	3.3, 5, 6, 12, 15, 24, 28, 48, ±5, ±12, ±15	77〜88%	高さ 8.5mm ON/OFFコントロール内蔵 8.5mm in height ON/OFF control function	
		23〜30W	8.5×50×55	12V (8〜18) 24V (16〜36) 48V (32〜76) 100V (64〜144)	3.3, 5, 6, 12, 15, 24, 28, 48	87〜90%	高さ 8.5mm ON/OFFコントロール内蔵 8.5mm in height ON/OFF control function	
		20〜50W	8.5×50×75	12V (8〜18) 24V (16〜36) 48V (32〜72) 100V (64〜144)	3.3, 5, 6, 12, 15, 24, ±3.3, ±5, ±12, ±15	81〜90%	高さ 8.5mm ON/OFFコントロール内蔵 8.5mm in height ON/OFF control function	
	80〜100W	12.8×50×98	3.3, 5, 6, 12, 15, 24		88〜91%	高効率 ON/OFFコントロール内蔵 High efficiency ON/OFF control function		
KMP		105〜200W	20×60×105	12V (8〜18) 24V (16〜36) 48V (36〜76) 100V (64〜144) 140V (90〜200)	3.3, 5, 6, 12, 13.8, 15, 24, 28, 48	87〜91%	高効率 ON/OFFコントロール内蔵 High efficiency ON/OFF control function	

DC-DCコンバータ ユニットタイプ

アルミ電解コンデンサレス (PD、RDPシリーズを除く)、タンタルコンデンサレスにより高信頼性、長寿命化を実現。
入力フィルタを内蔵した、ユニットタイプ絶縁型DC-DCコンバータです。

シリーズ名 Series Name	出力容量 Output Power (W)	形状(H×W×L) Dimension (mm)	入力電圧 Input Voltage (V.DC)	出力電圧 Output Voltage (V.DC)	効率 Efficiency (%)	特 長 Feature	ページ Page
BHM	 7~15W	12.8×50×75	5V (4.5~9) 12V (8~18) 24V (16~36) 48V (32~76)	3.3, 5, 6, 12, 15, 24, 28, 48, ±5, ±12, ±15	77~88%	高さ 12.8mm ON/OFFコントロール内蔵 12.8mm in height ON/OFF control function	
BRM	 23~30W	12.8×50×75	12V (8~18) 24V (16~36) 48V (32~76) 100V (64~144)	3.3, 5, 6, 12, 15, 24, 28, 48	87~90%	高さ 12.8mm ON/OFFコントロール内蔵 12.8mm in height ON/OFF control function	
BPM	 20~50W	12.8×50×95	12V (8~18) 24V (16~36) 48V (32~72) 100V (64~144)	3.3, 5, 6, 12, 15, 24, ±3.3, ±5, ±12, ±15	81~90%	高さ 12.8mm ON/OFFコントロール内蔵 12.8mm in height ON/OFF control function	
QD	 40~50W	16×50×82	12V (8~18) 24V (16~36) 48V (32~72) 100V (64~144)	3.3, 5, 6, 12, 15, 24	86~90%	高さ 16mm 高効率 16mm in height High efficiency	
BTS	 80~100W	12.8×50×118	12V (8~18) 24V (16~36) 48V (32~72) 100V (64~144)	3.3, 5, 6, 12, 15, 24	88~91%	高効率 ON/OFFコントロール内蔵 High efficiency ON/OFF control function	
BTM	 80~100W	12.8×50×118				高効率 ON/OFFコントロール内蔵 High efficiency ON/OFF control function	
FD	 80~100W	20×60×120	12V (8~18) 24V (16~36) 48V (32~72) 100V (64~144) 140V (90~200)	3.3, 5, 6, 12, 13.8, 15, 24	85~92%	高さ 20mm 高効率 20mm in height High efficiency	
PD	 85~110W	35×70×158	12V (6~18) 24V (14~40) 48V (28~80) 96V (56~160)	3.3, 5, 12, 13.8, 15, 24, 48, 100, 140, 200, 300	83~90%	高効率 広範囲な入力電圧 High efficiency Wide input voltage range	
FM	 105~200W	20×60×120	12V (8~18) 24V (16~36) 48V (36~76) 100V (64~144) 140V (90~200)	3.3, 5, 6, 12, 13.8, 15, 24, 28, 48	87~91%	並列運転可能 高さ 20mm Parallel operation 20mm in height	
KM	 105~200W	20×60×135			87~91%	並列運転可能 ON/OFFコントロール内蔵 Parallel operation ON/OFF control function	
PM	 240~300W	20×60×120		12, 13.8, 15, 24, 28, 48	89~93%	並列運転可能 高効率 Parallel operation High efficiency	
RDP	 130~250W	36×100×220	12V (9~18) 24V (18~36) 48V (36~72) 96V (70~144)	3.3, 5, 12, 13.8, 15, 24, 48, 100, 140, 200, 300	85~92%	並列運転可能 高効率 Parallel operation High efficiency	
VD	 500W	40×100×220	12V (9~18) 24V (18~36) 48V (36~75) 96V (70~144) 200V (150~300) 300V (225~450) 400V (300~600)	12, 13.8, 15, 24, 28, 48, 100, 140, 200, 300, 400	89~93%	並列運転可能 高効率 Parallel operation High efficiency	
XD	 1000W	55×120×280	100V (70~144) 200V (150~300) 300V (225~450) 400V (300~600) 600V (420~730)	24	89~93%	並列運転可能 高効率 Parallel operation High efficiency	

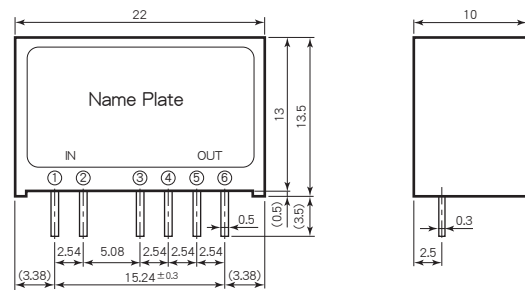
LP SERIES

1W DC/DC CONVERTERS Single Output & Dual Outputs



H13.5×W10×L22 (mm)

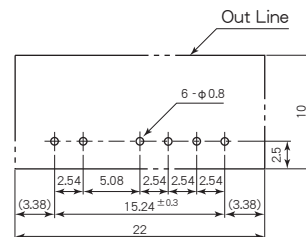
Pin Outs & Dimensions (±0.5mm)



Pin Outs

Single Output	Dual Outputs
① +Vdc in	① +Vdc in
② 0 Vdc in	② 0 Vdc in
③ No Connection	③ +Vdc out 1
④ No Connection	④ 0 Vdc out 1
⑤ +Vdc out	⑤ +Vdc out 2
⑥ 0 Vdc out	⑥ 0 Vdc out 2

Hole Configurations on PCB (Top View)



Features

- SIP Package
- Input-Output Isolation
- Each Output Isolation
- Wide Input Voltage Range
- High Reliability
- Low Cost
- Operating Ambient Temp. -30°C~+71°C
- Max. Case Temperature +90°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- SIP パッケージ
- 入出力間絶縁
- 各出力間絶縁
- 広範囲な入力電圧
- 高信頼性
- 低価格
- 動作周囲温度 -30°C~+71°C
- 最大ケース温度 +90°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Accuracy ±3%
- Efficiency See Table 1
- Line Regulation ±1.5% max. (at Vin Range)
- Load Regulation ±5% max. (min. Load~max. Load)
- Reflected Input Ripple and Noise (3% Vin)Vp-p max.
- Output Ripple 100mVp-p max.
- Output Noise 300mVp-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient 0.06%/°C max.
- Operating Ambient Temp. -30°C~+71°C (See Fig. 1)
- Max. Case Temperature +90°C
- Storage Temperature -40°C~+100°C
- Isolation Voltage AC500V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Switching Frequency 360kHz typ.
- Weight 8g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure Plastic Case
- Soldering Conditions Soldering iron 360°C, for 5 seconds max.
- MTBF 1,500,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

Selection Guide

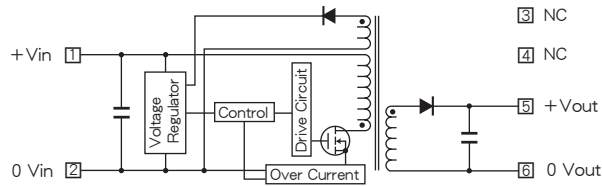
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Volt. (V. DC)		Output Current (mA)		Efficiency (Typical) (%)
		out 1	out 2	out 1	out 2	
LP 5 - 5S200	5 (4.5~9)	5	—	20~200	—	65
LP 5 - 12S 85		12	—	8~85	—	70
LP 5 - 15S 70		15	—	7~70	—	70
LP 5 - 24S 45		24	—	4~45	—	70
LP 5 - 5D100		5	5	10~100	10~100	65
LP 5 - 12D 45		12	12	5~45	5~45	70
LP 5 - 15D 35		15	15	4~35	4~35	70
LP 5 - 5S12S		5	12	10~100	5~50	68
LP 5 - 5S15S		5	15	10~100	4~40	68
LP 12 - 5S200	12 (9~18)	5	—	20~200	—	70
LP 12 - 12S 85		12	—	8~85	—	75
LP 12 - 15S 70		15	—	7~70	—	75
LP 12 - 24S 45		24	—	4~45	—	75
LP 12 - 5D100		5	5	10~100	10~100	70
LP 12 - 12D 45		12	12	5~45	5~45	75
LP 12 - 15D 35		15	15	4~35	4~35	75
LP 12 - 5S12S		5	12	10~100	5~50	72
LP 12 - 5S15S		5	15	10~100	4~40	72
LP 24 - 5S200	24 (18~36)	5	—	20~200	—	70
LP 24 - 12S 85		12	—	8~85	—	75
LP 24 - 15S 70		15	—	7~70	—	75
LP 24 - 24S 45		24	—	4~45	—	75
LP 24 - 5D100		5	5	10~100	10~100	70
LP 24 - 12D 45		12	12	5~45	5~45	75
LP 24 - 15D 35		15	15	4~35	4~35	75
LP 24 - 5S12S		5	12	10~100	5~50	72
LP 24 - 5S15S		5	15	10~100	4~40	72
LP 48 - 5S200	48 (36~72)	5	—	20~200	—	70
LP 48 - 12S 85		12	—	8~85	—	75
LP 48 - 15S 70		15	—	7~70	—	75
LP 48 - 24S 45		24	—	4~45	—	75
LP 48 - 5D100		5	5	10~100	10~100	70
LP 48 - 12D 45		12	12	5~45	5~45	75
LP 48 - 15D 35		15	15	4~35	4~35	75
LP 48 - 5S12S		5	12	10~100	5~50	72
LP 48 - 5S15S		5	15	10~100	4~40	72

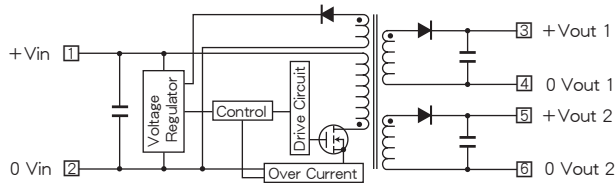
LP SERIES DATA SHEET

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

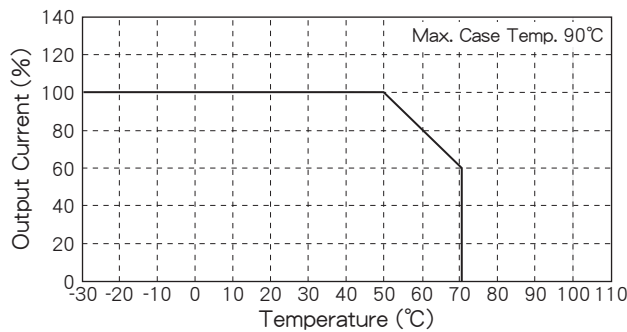


Fig. 2 Short Circuit Operating Area

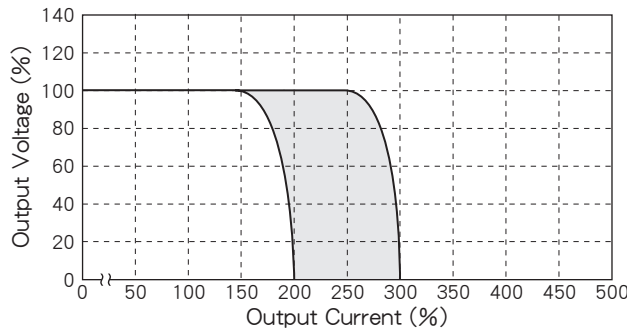


Fig. 3 Temperature Characteristic on Case Surface

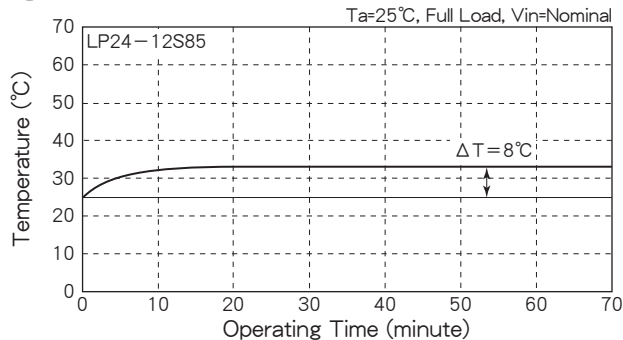


Fig. 4 Output Voltage vs. Output Current

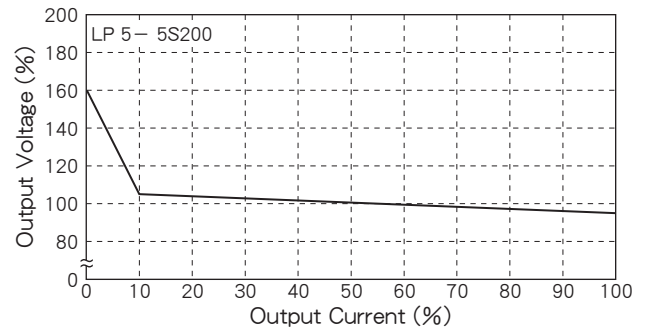


Fig. 5 Efficiency vs. Output Current (Single Output)

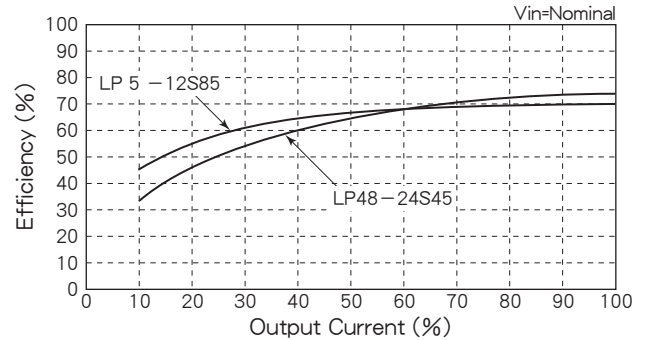
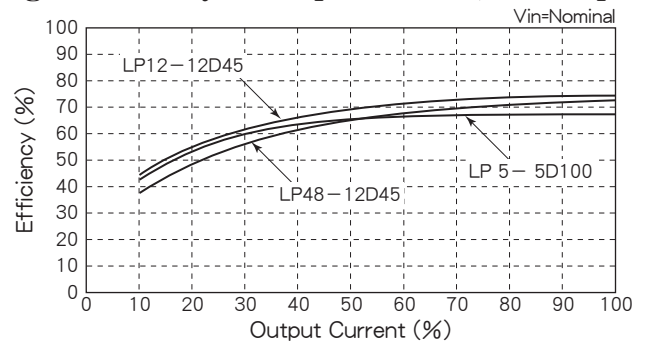
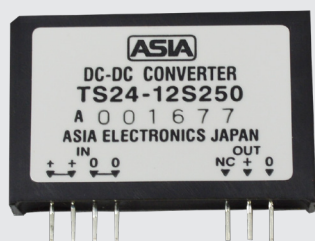


Fig. 6 Efficiency vs. Output Current (Dual Outputs)



TS SERIES

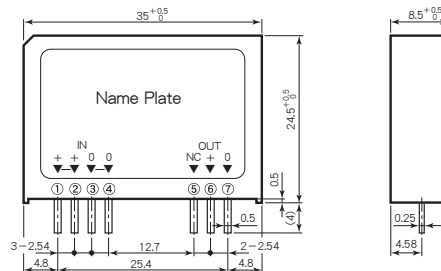
2~3W DC/DC CONVERTERS Single Output & Dual Outputs



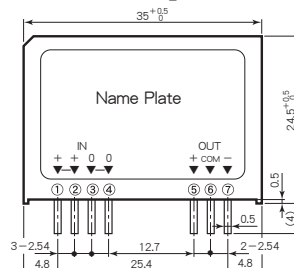
H24.5×W8.5×L35 (mm)

Pin Outs & Dimensions (±0.2mm)

Single Output



Dual Outputs



Pin Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	+Vdc in	②	+Vdc in
③	0 Vdc in	③	0 Vdc in
④	0 Vdc in	④	0 Vdc in
⑤	No Connection	⑤	+Vdc out
⑥	+Vdc out	⑥	Common
⑦	0 Vdc out	⑦	-Vdc out

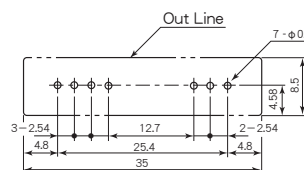
Features

- SIP Package
- Internal Input Filtering
- Input-Output Isolation
- High Efficiency 70~80%
- Wide Input Voltage Range
- High Reliability
- Low No Load Current
- Operating Ambient Temp. -30℃~+71℃
- Max. Case Temperature +90℃
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- SIP パッケージ
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 70~80%
- 広範囲な入力電圧
- 高信頼性
- 無負荷電流が少ない
- 動作周囲温度 -30℃~+71℃
- 最大ケース温度 +90℃
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range (at Ta : 25℃, Full Load, Nominal Vin) DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Accuracy ±3%
- Efficiency See Table 1
- Line Regulation 0.3% max. (at Vin Range)
- Load Regulation Single : ±0.5% max. (0~100% Load)
Dual : ±3% max. (0~100% Load)
(3% Vin)Vp-p max.
- Reflected Input Ripple and Noise
- Output Ripple 20mVp-p max.
- Output Noise 100mVp-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient 0.02%/℃ max.
- Operating Ambient Temp. -30℃~+71℃ (See Fig. 1)
- Max. Case Temperature +90℃
- Storage Temperature -40℃~+100℃
- Isolation Voltage AC500V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight 15g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure Plastic Case
- Soldering Conditions Soldering iron 360℃, for 5 seconds max.
- MTBF Single : 720,000H
Dual : 600,000H (Ta : 25℃, 80% Load, Nominal Vin)
- Warranty 5 years

Hole Configurations on PCB (Top View)



Selection Guide

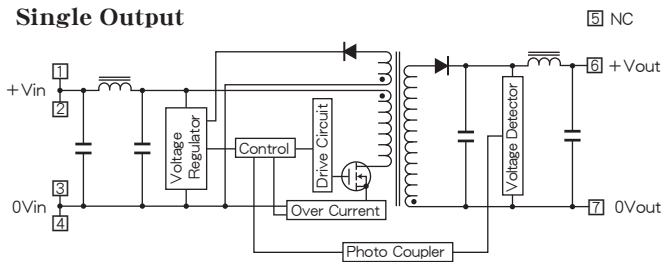
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
TS 5 - 5S400	5 (4.5~9)	5	400	70
TS 5 - 6S350		6	350	70
TS 5 - 12S200		12	200	72
TS 5 - 15S160		15	160	72
TS 5 - 24S100		24	100	72
TS 5 - 12D100		±12	±100	72
TS 5 - 15D80		±15	±80	72
TS 12 - 5S500	12 (8~18)	5	500	75
TS 12 - 6S450		6	450	75
TS 12 - 12S250		12	250	78
TS 12 - 15S200		15	200	78
TS 12 - 24S125		24	125	78
TS 12 - 12D125		±12	±125	78
TS 12 - 15D100		±15	±100	78
TS 24 - 5S500	24 (16~36)	5	500	75
TS 24 - 6S450		6	450	75
TS 24 - 12S250		12	250	80
TS 24 - 15S200		15	200	80
TS 24 - 24S125		24	125	80
TS 24 - 12D125		±12	±125	80
TS 24 - 15D100		±15	±100	80
TS 48 - 5S500	48 (32~72)	5	500	75
TS 48 - 6S450		6	450	75
TS 48 - 12S250		12	250	80
TS 48 - 15S200		15	200	80
TS 48 - 24S125		24	125	80
TS 48 - 12D125		±12	±125	80
TS 48 - 15D100		±15	±100	80

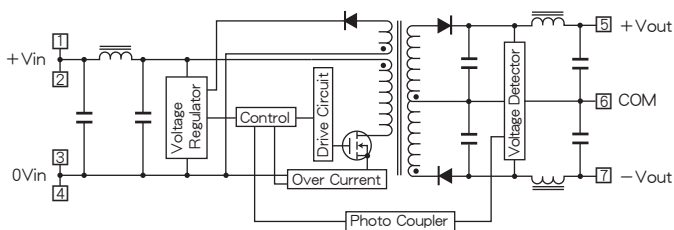
TS SERIES DATA SHEET

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

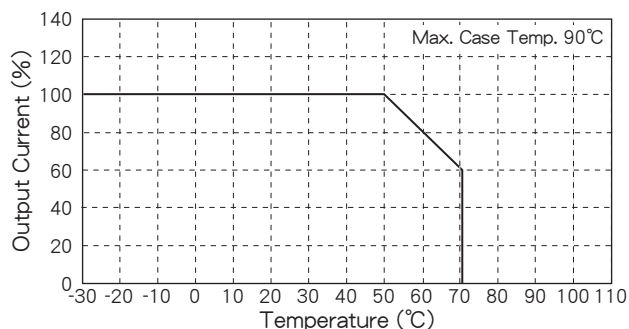


Fig. 2 Short Circuit Operating Area

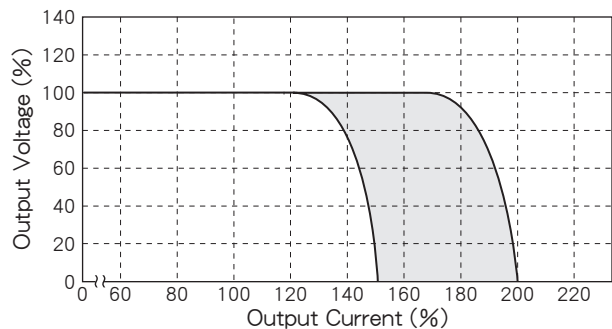


Fig. 3 Temperature Characteristic on Case Surface

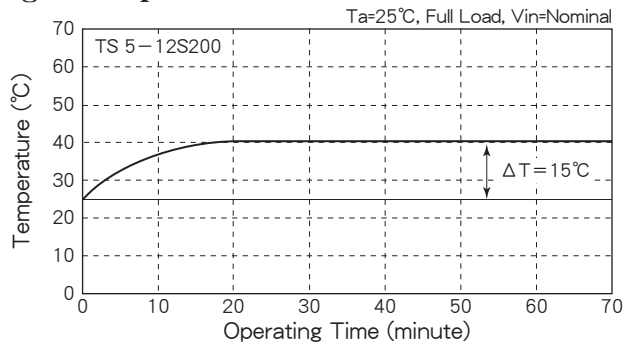


Fig. 4 No Load Current vs. Input Voltage

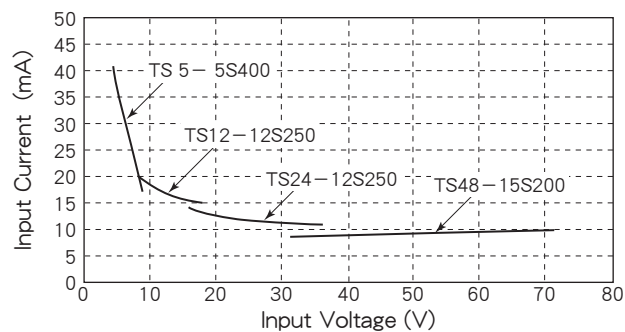


Fig. 5 Efficiency vs. Output Current

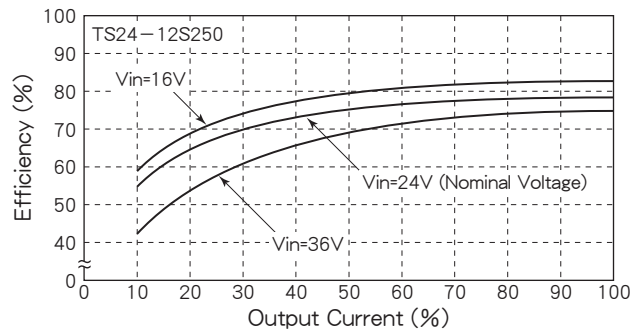
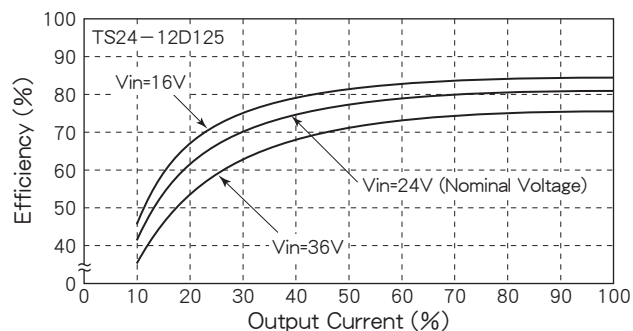


Fig. 6 Efficiency vs. Output Current



2~3W DC/DC CONVERTERS



H10×W21×L33 (mm)

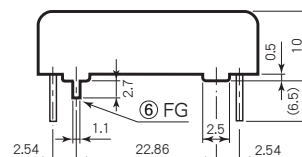
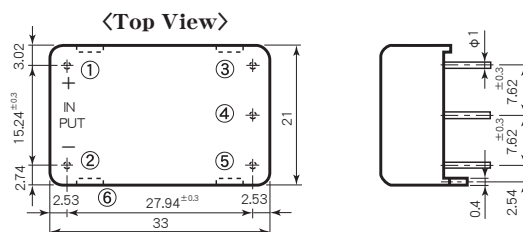
■ Features

- 10mm in Height
 - Built-in Input Filter
 - Input-Output Isolation
 - High Efficiency 75~82%
 - Wide Input Voltage Range
 - High Reliability
 - Low No Load Current
 - 5 Sided Metal Shielding
 - Operating Ambient Temp.
-40℃~+85℃
 - Max. Case Temperature
+100℃
 - Conformity to RoHS2 Directive
 - Not built in aluminum and tantalum electrolytic capacitor
 - 高さ10mm
 - 入力フィルタ内蔵
 - 入出力間絶縁
 - 高効率 75~82%
 - 広範囲な入力電圧
 - 高信頼性
 - 無負荷電流が少ない
 - 5面メタルシールド
 - 動作周囲温度
-40℃~+85℃
 - 最大ケース温度
+100℃
 - RoHS2指令対応
 - アルミ電解コンデンサ及び
タンタルコンデンサ不使用

■ General Characteristics

- | | |
|------------------------------------|--|
| ● Input Voltage, Range | DC5, 12, 24, 48V (See Table 1) |
| ● Output Voltage, Current | See Table 1 |
| ● Output Voltage Accuracy | ±2% |
| | ±3%(5, 6V Vout only) |
| ● Efficiency | See Table 1 |
| ● Line Regulation | 0.3% max. (at Vin Range) |
| ● Load Regulation | Single : ±0.5% max. (0~100% Load) |
| | Dual : ±3% max. (0~100% Load) |
| ● Reflected Input Ripple and Noise | (3% Vin)Vp-p max. |
| ● Output Ripple | 20mVp-p max. |
| ● Output Noise | 100mVp-p max. |
| ● Short Circuit Protection | Built-in, Auto-restart (See Fig. 2) |
| ● Temperature Coefficient | 0.02%/°C max. |
| ● Operating Ambient Temp. | -40°C~+85°C (See Fig. 1) |
| | -30°C~+85°C (5V Vin only) |
| ● Storage Temperature | -40°C~+100°C |
| ● Isolation Voltage | AC500V one minute |
| | (Input-Output-Case) |
| ● Isolation Impedance | 100MΩ min. (at DC1000V) |
| | (Input-Output-Case) |
| ● Weight | 18g max. |
| ● Humidity | 20~95% RH |
| ● Shock | 490m/s ² (11msec 3directions) |
| ● Vibration | 10~55Hz 98m/s ² |
| | (30minutes 3directions) |
| ● Surface Structure | 5 Sided Steel Case |
| ● Soldering Conditions | |
| Soldering DIP | 260°C, for 15 seconds max. |
| Soldering iron | 360°C, for 5 seconds max. |
| ● MTBF | Single : 1,200,000H |
| | Dual : 1,000,000H |
| | (Ta : 25°C, 80% Load, Nominal Vin) |
| ● Warranty | 5 years |

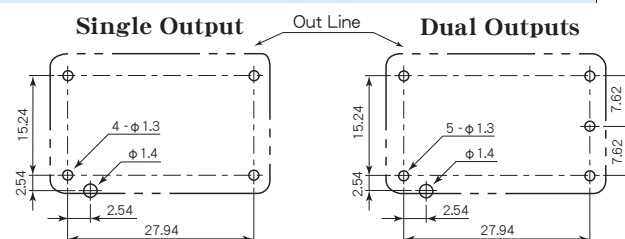
■ Pin Outs & Dimensions (±0.5mm)



Pin Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	-Vdc in	②	-Vdc in
③	+Vdc out	③	+Vdc out
④	No Pin	④	Common
⑤	-Vdc out	⑤	-Vdc out
⑥	Frame Ground	⑥	Frame Ground

■ Hole Configurations on PCB (Top View)



■ Selection Guide

Table 1

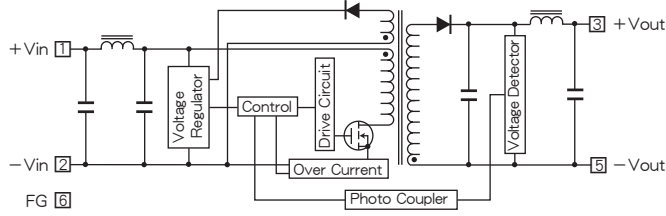
Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
SS 5 - 5S400	5 (4.5~9)	5	400	76
SS 5 - 6S350		6	350	76
SS 5 - 12S200		12	200	78
SS 5 - 15S160		15	160	79
SS 5 - 24S100		24	100	75
SS 5 - 5D200		±5	±200	75
SS 5 - 12D100		±12	±100	76
SS 5 - 15D80		±15	±80	78
SS12 - 5S500	12 (8~18)	5	500	79
SS12 - 6S450		6	450	79
SS12 - 12S250		12	250	80
SS12 - 15S200		15	200	80
SS12 - 24S125		24	125	80
SS12 - 5D250		±5	±250	75
SS12 - 12D125		±12	±125	82
SS12 - 15D100		±15	±100	80
SS24 - 5S500	24 (16~36)	5	500	79
SS24 - 6S450		6	450	79
SS24 - 12S250		12	250	81
SS24 - 15S200		15	200	80
SS24 - 24S125		24	125	80
SS24 - 5D250		±5	±250	75
SS24 - 12D125		±12	±125	82
SS24 - 15D100		±15	±100	82
SS48 - 5S500	48 (32~72)	5	500	78
SS48 - 6S450		6	450	78
SS48 - 12S250		12	250	80
SS48 - 15S200		15	200	80
SS48 - 24S125		24	125	80
SS48 - 5D250		±5	±250	75
SS48 - 12D125		±12	±125	80
SS48 - 15D100		±15	±100	80

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

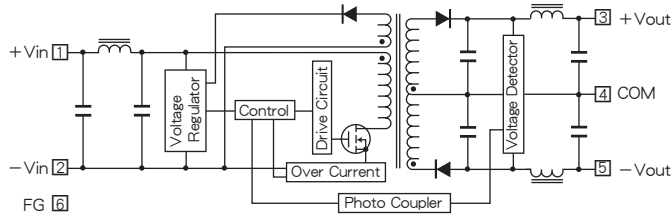
SS SERIES DATA SHEET

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

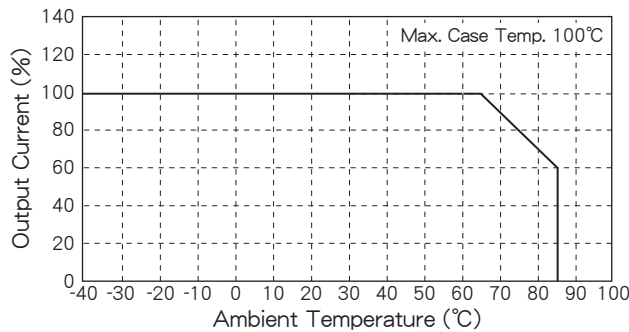


Fig. 2 Short Circuit Operating Area

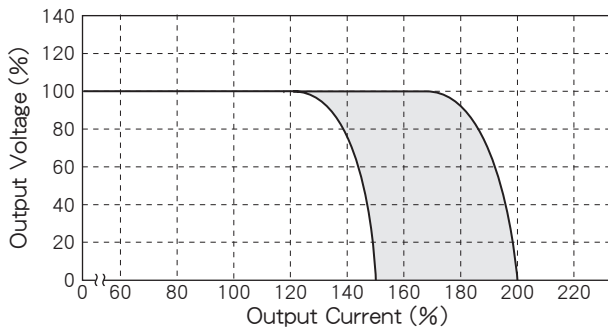


Fig. 3 Temperature Characteristic on Case Surface

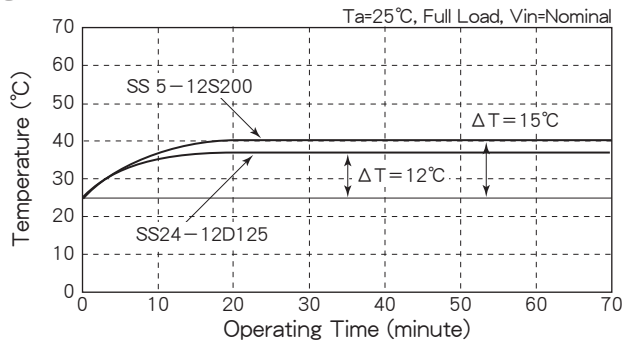


Fig. 4 No Load Current vs. Input Voltage

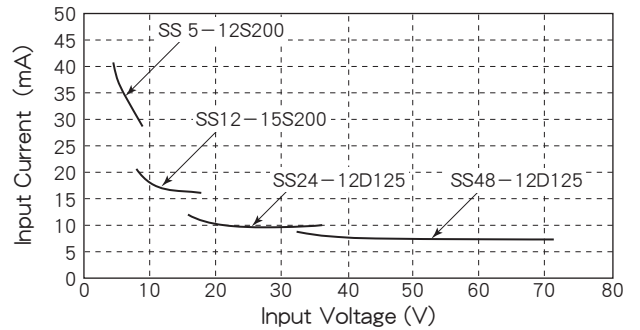


Fig. 5 Efficiency vs. Output Current (Single Output)

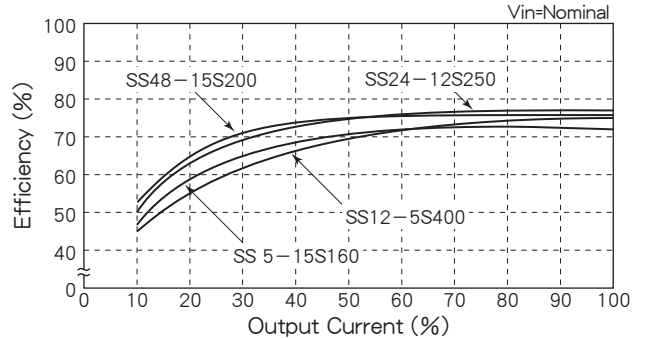
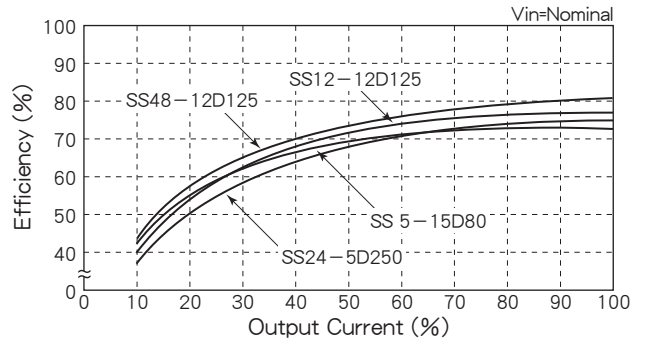


Fig. 6 Efficiency vs. Output Current (Dual Outputs)



SSK SERIES

2~3W DC/DC CONVERTERS Single Output & Dual Outputs



H8.5×W21×L33 (mm)

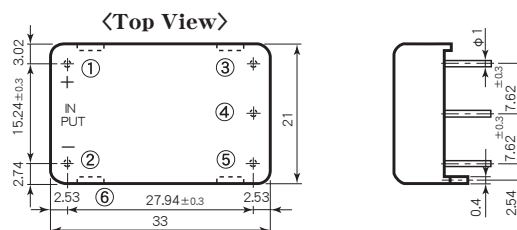
Features

- Low Profile 8.5mm
- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 70~81%
- Wide Input Voltage Range
- High Reliability
- Low No Load Current
- 5 Sided Metal Shielding
- Operating Ambient Temp. -40°C~+85°C
- Max. Case Temperature +100°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 8.5mm
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 70~81%
- 広範囲な入力電圧
- 高信頼性
- 無負荷電流が少ない
- 5面メタルシールド
- 動作周囲温度 -40°C~+85°C
- 最大ケース温度 +100°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range
 - Output Voltage, Current
 - Output Voltage Accuracy
 - Efficiency
 - Line Regulation
 - Load Regulation
 - Reflected Input Ripple and Noise
 - Output Ripple
 - Output Noise
 - Short Circuit Protection
 - Temperature Coefficient
 - Operating Ambient Temp.
 - Storage Temperature
 - Isolation Voltage
 - Isolation Impedance
 - Weight
 - Humidity
 - Shock
 - Vibration
 - Surface Structure
 - Soldering Conditions
 - MTBF
 - Warranty
- (at Ta : 25°C, Full Load, Nominal Vin)
- DC5, 12, 24, 48V (See Table 1)
- See Table 1
- ±3%
- See Table 1
- 0.3% max. (at Vin Range)
- Single : ±0.5% max. (0~100% Load)
- Dual : ±3% max. (10~100% Load)
- (3% Vin)Vp-p max.
- 20mVp-p max.
- 100mVp-p max.
- Built-in, Auto-restart (See Fig. 2)
- 0.02%/°C max.
- 40°C~+85°C (See Fig. 1)
- 30°C~+85°C (5V Vin only)
- 40°C~+100°C
- AC500V one minute
- (Input-Output-Case)
- 100MΩ min. (at DC1000V)
- (Input-Output-Case)
- 15g max.
- 20~95% RH
- 490m/s² (11msec 3directions)
- 10~55Hz 98m/s²
- (30minutes 3directions)
- 5 Sided Steel Case
- 260°C, for 15 seconds max.
- 360°C, for 5 seconds max.
- Single : 720,000H
- Dual : 600,000H
- (Ta : 25°C, 80% Load, Nominal Vin)
- 5 years

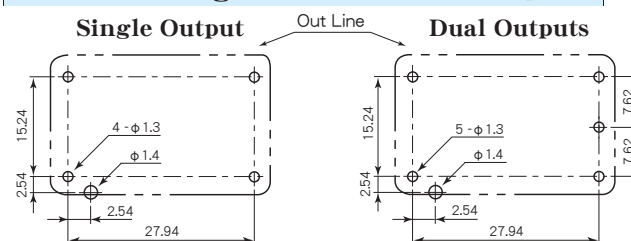
Pin Outs & Dimensions (±0.5mm)



Pin Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	-Vdc in	②	-Vdc in
③	+Vdc out	③	+Vdc out
④	No Pin	④	Common
⑤	-Vdc out	⑤	-Vdc out
⑥	Frame Ground	⑥	Frame Ground

Hole Configurations on PCB (Top View)



Selection Guide

Table 1

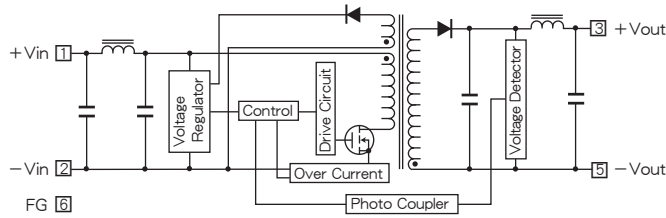
Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
SSK 5 - 5S400	5 (4.5~9)	5	400	70
SSK 5 - 6S350		6	350	70
SSK 5 - 12S200		12	200	74
SSK 5 - 15S160		15	160	72
SSK 5 - 24S100		24	100	72
SSK 5 - 5D200		±5	±200	74
SSK 5 - 12D100	12 (8~18)	±12	±100	74
SSK 5 - 15D80		±15	±80	74
SSK 12 - 5S500		5	500	78
SSK 12 - 6S450		6	450	77
SSK 12 - 12S250		12	250	80
SSK 12 - 15S200		15	200	78
SSK 12 - 24S125	24 (16~36)	24	125	78
SSK 12 - 5D250		±5	±250	81
SSK 12 - 12D125		±12	±125	81
SSK 12 - 15D100		±15	±100	78
SSK 24 - 5S500		5	500	76
SSK 24 - 6S450	48 (32~72)	6	450	76
SSK 24 - 12S250		12	250	80
SSK 24 - 15S200		15	200	81
SSK 24 - 24S125		24	125	80
SSK 24 - 5D250		±5	±250	80
SSK 24 - 12D125		±12	±125	80
SSK 24 - 15D100	48 (32~72)	±15	±100	80
SSK 48 - 5S500		5	500	75
SSK 48 - 6S450		6	450	75
SSK 48 - 12S250		12	250	80
SSK 48 - 15S200		15	200	80
SSK 48 - 24S125		24	125	80
SSK 48 - 5D250	48 (32~72)	±5	±250	75
SSK 48 - 12D125		±12	±125	80
SSK 48 - 15D100		±15	±100	81

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

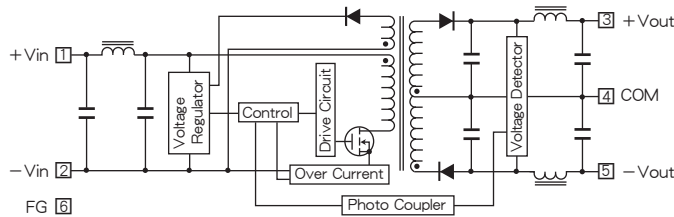
SSK SERIES DATA SHEET

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

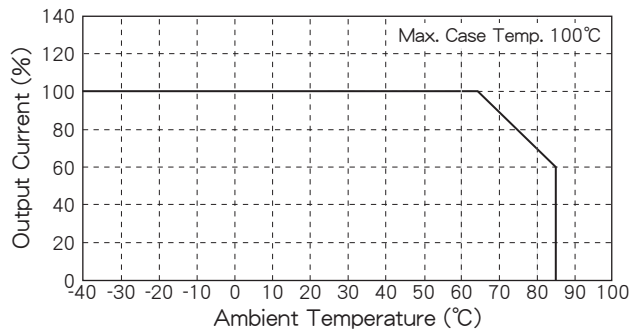


Fig. 2 Short Circuit Operating Area

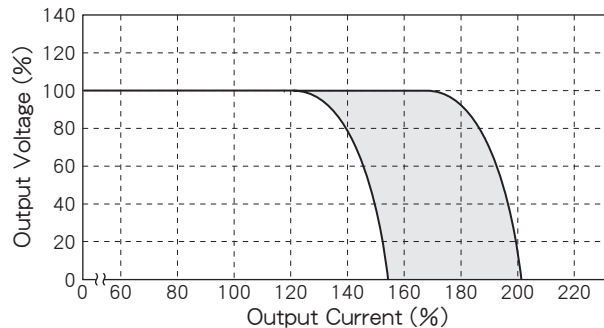


Fig. 3 Temperature Characteristic on Case Surface

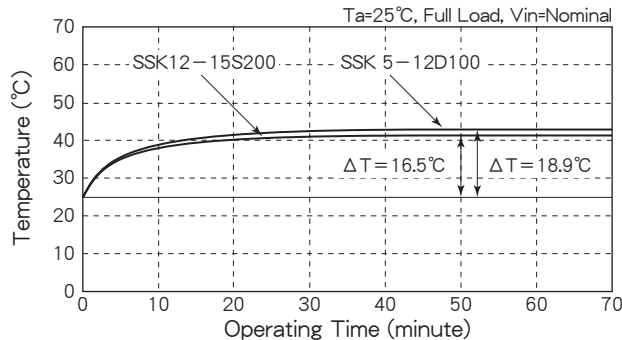


Fig. 4 No Load Current vs. Input Voltage

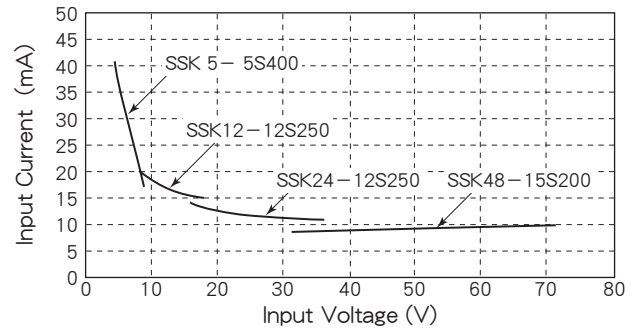


Fig. 5 Efficiency vs. Output Current (Single Output)

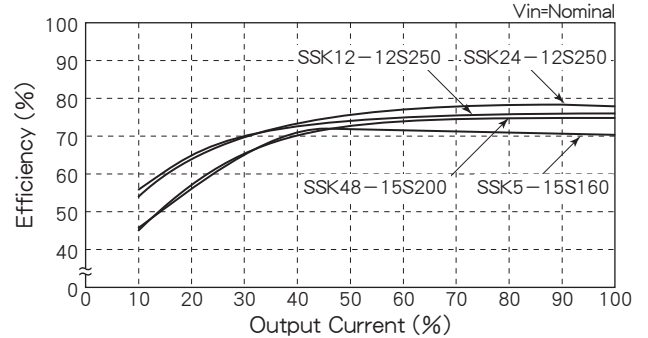
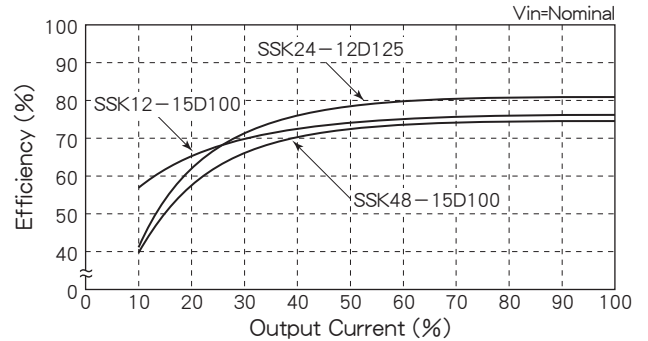


Fig. 6 Efficiency vs. Output Current (Dual Outputs)



SSV SERIES

5~6W DC/DC CONVERTERS Single Output



H8.5×W21×L33 (mm)

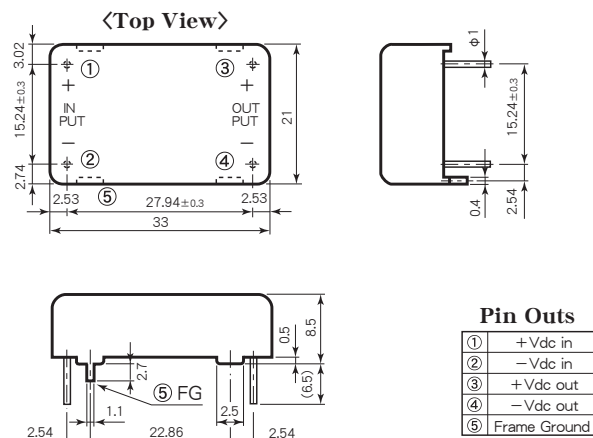
Features

- High Efficiency 81~88%
- 8.5mm in Height
- Compact, Light Weight
- Built-in Input Filter
- Wide Input Voltage Range
- Input-Output Isolation
- Low No Load Current
- 5 Sided Metal Shielding
- High Reliability
- Operating Ambient Temperature -40°C~+85°C
- Max. Case Temperature +100°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 高効率 81~88%
- 高さ8.5mm
- 小形、軽量
- 入力フィルタ内蔵
- 広範囲な入力電圧
- 入出力間絶縁
- 無負荷電流が少ない
- 5面メタルシールド
- 高信頼性
- 動作周囲温度 -40°C~+85°C
- 最大ケース温度 +100°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

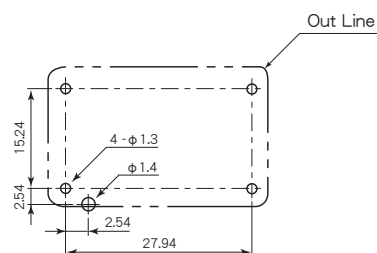
General Characteristics

- Input Voltage, Range
 - Output Voltage, Current
 - Output Voltage Accuracy
 - Efficiency
 - Line Regulation
 - Load Regulation
 - Reflected Input Ripple, Noise
 - Output Ripple
 - Output Noise
 - Short Circuit Protection
 - Temperature Coefficient
 - Operating Ambient Temp.
 - Max. Case Temperature
 - Storage Temperature
 - Isolation Voltage
 - Isolation Impedance
 - Weight
 - Humidity
 - Shock
 - Vibration
 - Surface Structure
 - Soldering Conditions
 - MTBF
 - Warranty
- (at Ta : 25°C, Full Load, Nominal Vin)
DC5, 12, 24, 48, 100V (See Table 1)
See Table 1
±2% (12, 15, 24V Vout)
±3% (3.3, 5, 6V Vout)
See Table 1
0.3% max. (at Vin Range)
±0.5% max. (0~100% Load)
(3% Vin)Vp-p max.
20mVp-p max.
80mVp-p max. (0~20MHz)
150mVp-p max. (0~100MHz)
Built-in, Auto-restart (See Fig. 2)
0.02%/°C max.
-40°C~+85°C (See Fig. 1)
-30°C~+85°C (5V Vin only)
+100°C
-40°C~+100°C
AC500V one minute
(Input-Output-Case)
100MΩ min. (at DC1000V)
(Input-Output-Case)
15g max.
20~95% RH
490m/s² (11msec 3directions)
10~55Hz 98m/s²
(30minutes 3directions)
5 Sided Steel Case
260°C, for 15 seconds max.
360°C, for 5 seconds max.
1,000,000H
(Ta : 25°C, 80% Load, Nominal Vin)
5 years

Pin Outs & Dimensions (±0.5mm)



Hole Configurations on PCB (Top View)



Selection Guide

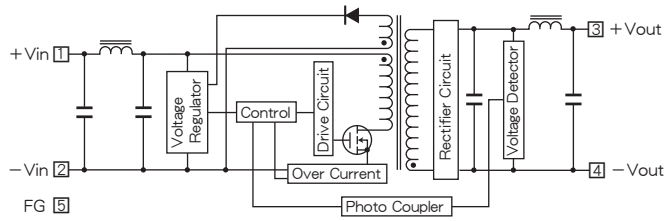
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
SSV 5 - 3.3 S 1500	5 (4.5~9)	3.3	1500	81
SSV 5 - 5 S 1000		5	1000	83
SSV 5 - 6 S 800		6	800	83
SSV 5 - 12 S 400		12	400	83
SSV 5 - 15 S 320		15	320	83
SSV 5 - 24 S 200		24	200	83
SSV 12 - 3.3 S 1500	12 (8~18)	3.3	1500	83
SSV 12 - 5 S 1000		5	1000	85
SSV 12 - 6 S 900		6	900	85
SSV 12 - 12 S 500		12	500	87
SSV 12 - 15 S 400		15	400	87
SSV 12 - 24 S 250		24	250	87
SSV 24 - 3.3 S 1500	24 (16~36)	3.3	1500	83
SSV 24 - 5 S 1000		5	1000	85
SSV 24 - 6 S 900		6	900	85
SSV 24 - 12 S 500		12	500	87
SSV 24 - 15 S 400		15	400	87
SSV 24 - 24 S 250		24	250	87
SSV 48 - 3.3 S 1500	48 (32~72)	3.3	1500	84
SSV 48 - 5 S 1000		5	1000	86
SSV 48 - 6 S 900		6	900	86
SSV 48 - 12 S 500		12	500	88
SSV 48 - 15 S 400		15	400	88
SSV 48 - 24 S 250		24	250	88
SSV 100 - 12 S 500	100 (64~120)	12	500	88
SSV 100 - 15 S 400		15	400	88
SSV 100 - 24 S 250		24	250	88

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

SSV SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

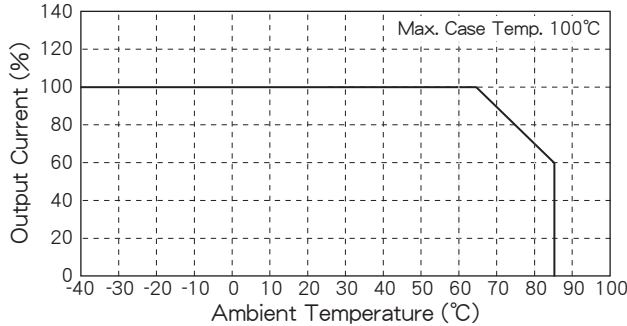


Fig. 2 Short Circuit Operating Area

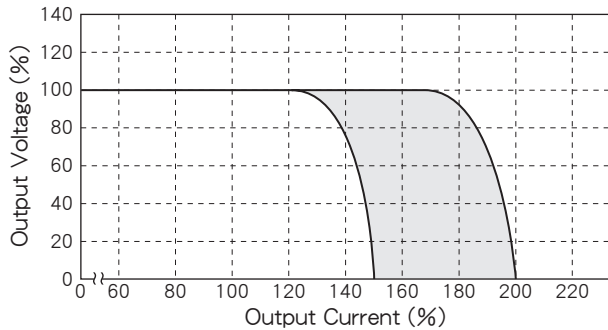


Fig. 3 Temperature Characteristic on Case Surface

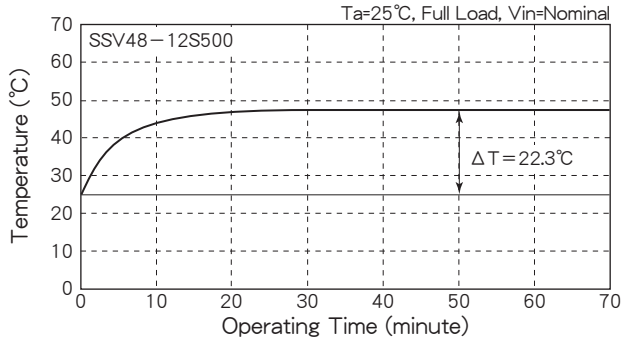


Fig. 4 Efficiency vs. Output Current

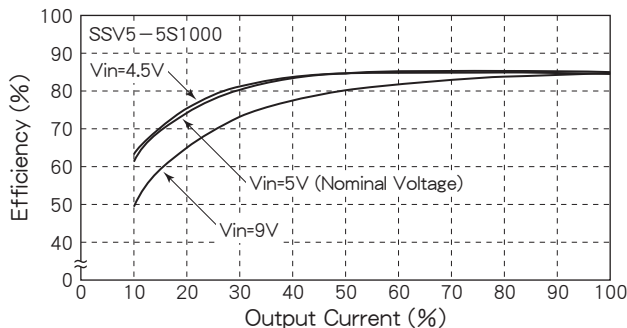


Fig. 5 Efficiency vs. Output Current

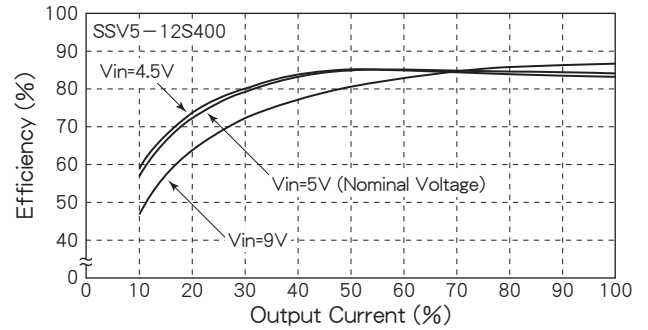


Fig. 6 Efficiency vs. Output Current

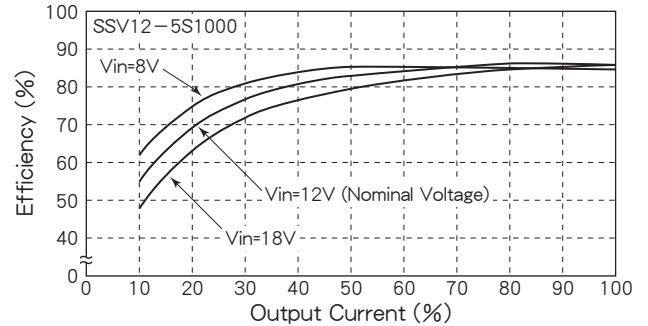


Fig. 7 Efficiency vs. Output Current

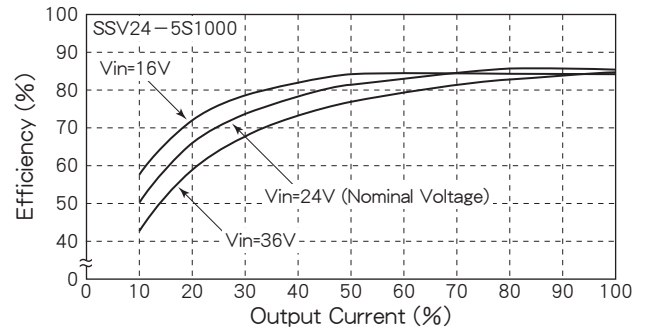


Fig. 8 Efficiency vs. Output Current

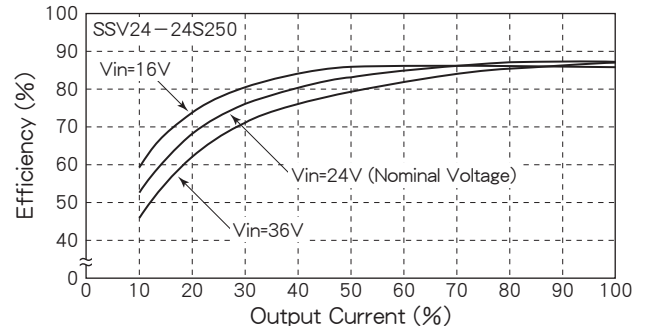
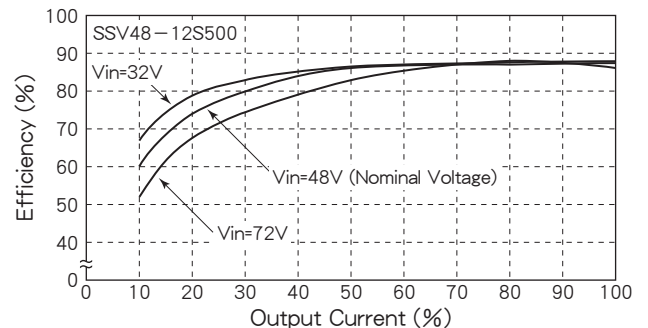


Fig. 9 Efficiency vs. Output Current



SQ SERIES

5~6W DC/DC CONVERTERS Single Output & Dual Outputs



H10×W30×L47 (mm)

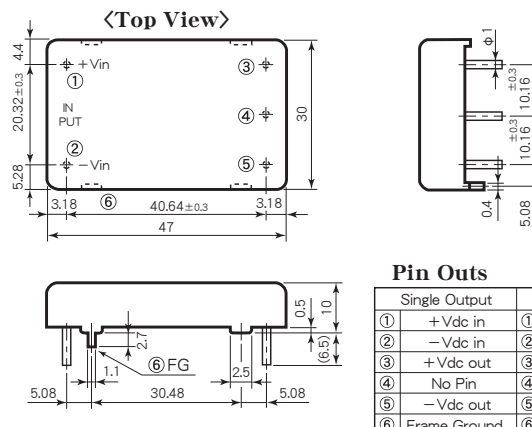
Features

- 10mm in Height
- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 79~87%
- Wide Input Voltage Range
- High Reliability
- Low No Load Current
- 5 Sided Metal Shielding
- Operating Ambient Temp. -40°C~+85°C
- Max. Case Temperature +100°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 高さ10mm
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 79~87%
- 広範囲な入力電圧
- 高信頼性
- 無負荷電流が少ない
- 5面メタルシールド
- 動作周囲温度 -40°C~+85°C
- 最大ケース温度 +100°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

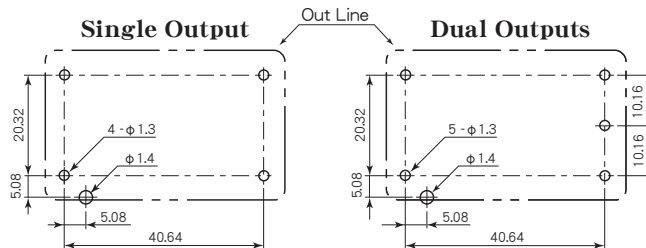
General Characteristics

- Input Voltage, Range
 - Output Voltage, Current
 - Output Voltage Accuracy
 - Efficiency
 - Line Regulation
 - Load Regulation
 - Reflected Input Ripple and Noise
 - Output Ripple
 - Output Noise
 - Short Circuit Protection
 - Temperature Coefficient
 - Operating Ambient Temp.
 - Storage Temperature
 - Isolation Voltage
 - Isolation Impedance
 - Switching Frequency
 - Weight
 - Humidity
 - Shock
 - Vibration
 - Surface Structure
 - Soldering Conditions
 - MTBF
 - Warranty
- (at Ta : 25°C, Full Load, Nominal Vin)
- DC5, 12, 24, 48V (See Table 1)
- See Table 1
- ±2%
- ±3%(5, 6V Vout only)
- See Table 1
- 0.3% max. (at Vin Range)
- Single : ±0.5% max. (0~100% Load)
- Dual : ±3% max. (0~100% Load)
- (2% Vin)/Vp-p max.
- 20mVp-p max.
- 100mVp-p max.
- Built-in, Auto-restart (See Fig. 2)
- 0.02%/°C max.
- 40°C~+85°C (See Fig. 1)
- 30°C~+85°C (5V Vin only)
- 40°C~+100°C
- AC500V one minute
- (Input-Output-Case)
- 100MΩ min. (at DC1000V)
- (Input-Output-Case)
- 230kHz typ.
- 35g max.
- 20~95% RH
- 490m/s² (11msec 3directions)
- 10~55Hz 98m/s²
- (30minutes 3directions)
- 5 Sided Steel Case
- 260°C, for 15 seconds max.
- 360°C, for 5 seconds max.
- Single : 1,200,000H
- Dual : 1,000,000H
- (Ta : 25°C, 80% Load, Nominal Vin)
- 5 years

Pin Outs & Dimensions (±0.5mm)



Hole Configurations on PCB (Top View)



Selection Guide

Table 1

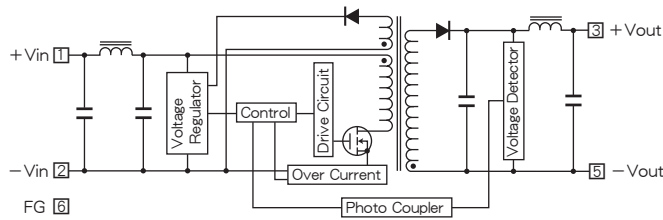
Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
SQ 5 - 5S1000	5 (4.5~9)	5	1000	79
SQ 5 - 6S900		6	900	79
SQ 5 - 12S500		12	500	83
SQ 5 - 15S400		15	400	83
SQ 5 - 24S250		24	250	83
SQ 5 - 5D500		±5	±500	79
SQ 5 - 12D250		±12	±250	83
SQ 5 - 15D200		±15	±200	83
SQ 12 - 5S1000	12 (8~18)	5	1000	83
SQ 12 - 6S900		6	900	83
SQ 12 - 12S500		12	500	85
SQ 12 - 15S400		15	400	87
SQ 12 - 24S250		24	250	85
SQ 12 - 5D500		±5	±500	82
SQ 12 - 12D250		±12	±250	86
SQ 12 - 15D200		±15	±200	86
SQ 24 - 5S1000	24 (16~36)	5	1000	81
SQ 24 - 6S900		6	900	82
SQ 24 - 12S500		12	500	85
SQ 24 - 15S400		15	400	85
SQ 24 - 24S250		24	250	85
SQ 24 - 5D500		±5	±500	81
SQ 24 - 12D250		±12	±250	85
SQ 24 - 15D200		±15	±200	85
SQ 48 - 5S1000	48 (32~72)	5	1000	81
SQ 48 - 6S900		6	900	81
SQ 48 - 12S500		12	500	85
SQ 48 - 15S400		15	400	85
SQ 48 - 24S250		24	250	85
SQ 48 - 5D500		±5	±500	81
SQ 48 - 12D250		±12	±250	85
SQ 48 - 15D200		±15	±200	85

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

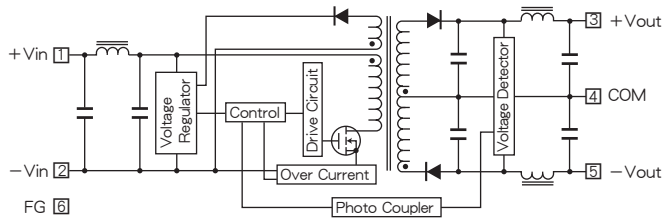
SQ SERIES DATA SHEET

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

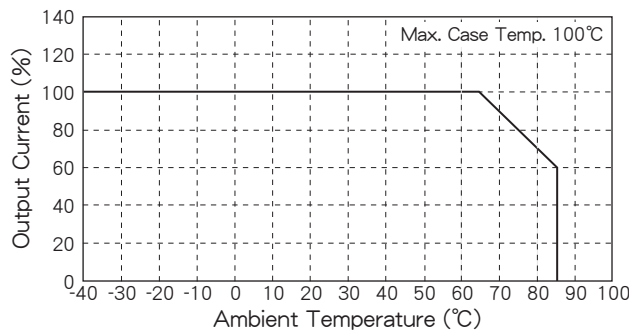


Fig. 2 Short Circuit Operating Area

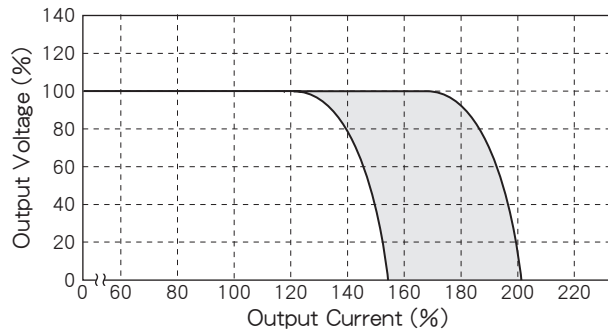


Fig. 3 Temperature Characteristic on Case Surface

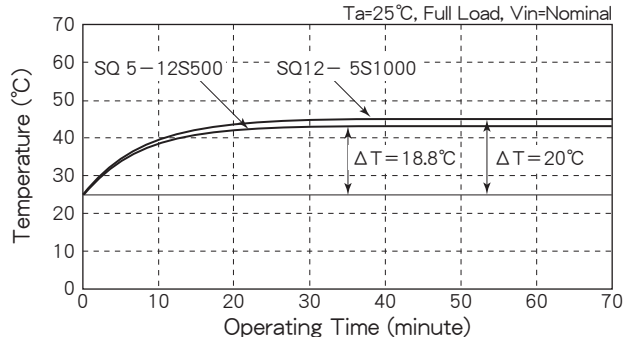


Fig. 4 No Load Current vs. Input Voltage

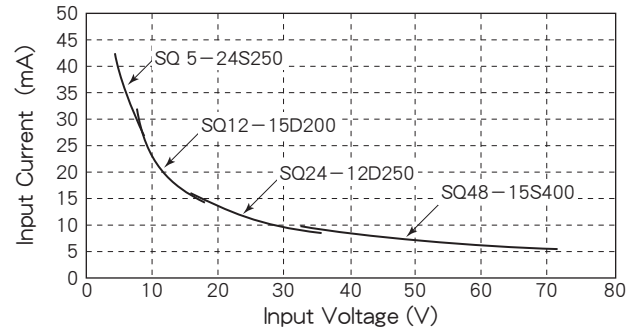


Fig. 5 Efficiency vs. Output Current

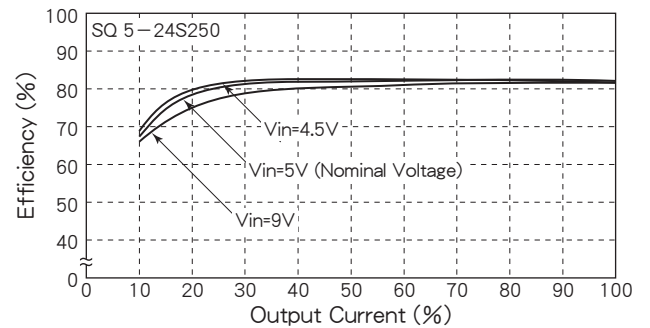


Fig. 6 Efficiency vs. Output Current

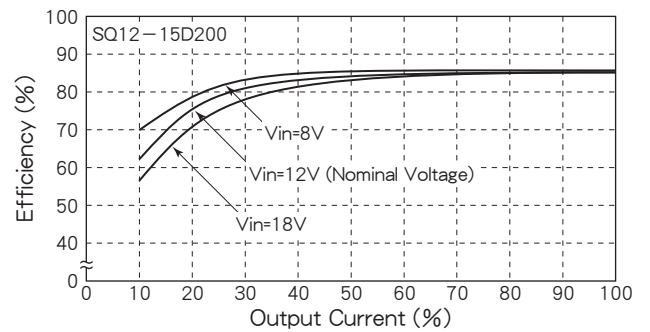


Fig. 7 Efficiency vs. Output Current

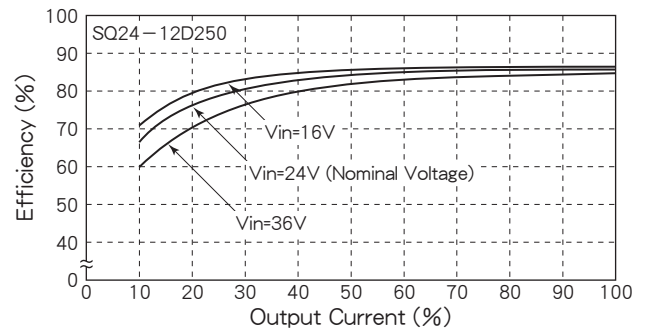
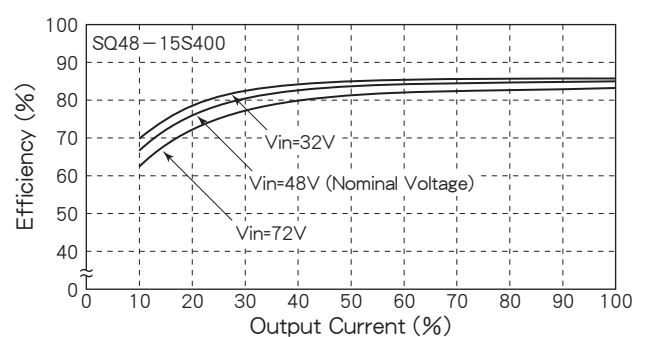


Fig. 8 Efficiency vs. Output Current



SQK SERIES

5~6W DC/DC CONVERTERS Single Output & Dual Outputs



H8.5×W30×L47 (mm)

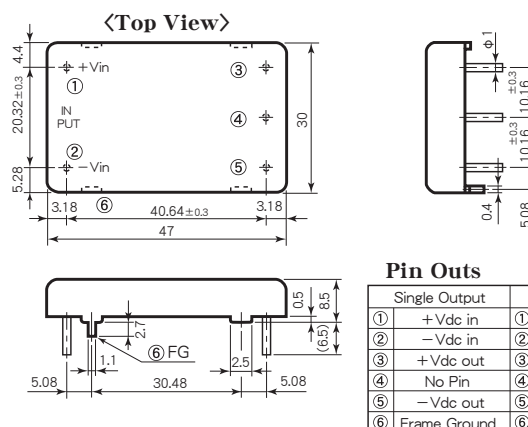
Features

- Low Profile 8.5mm
- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 80~85%
- Wide Input Voltage Range
- High Reliability
- Low No Load Current
- 5 Sided Metal Shielding
- Operating Ambient Temp. -40°C~+85°C
- Max. Case Temperature +100°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 8.5mm
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 80~85%
- 広範囲な入力電圧
- 高信頼性
- 無負荷電流が少ない
- 5面メタルシールド
- 動作周囲温度 -40°C~+85°C
- 最大ケース温度 +100°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

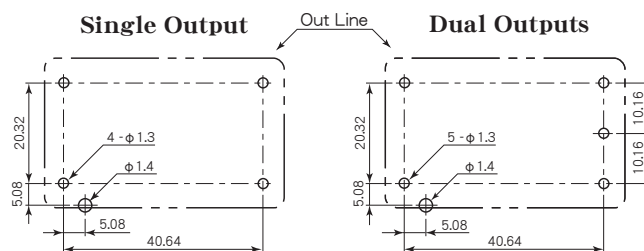
General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin) DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Accuracy ±3%
- Efficiency See Table 1
- Line Regulation 0.3% max. (at Vin Range)
- Load Regulation Single : ±0.5% max. (0~100% Load)
Dual : ±3% max. ±5% max. (±5V Vout only) (10~100% Load)
- Reflected Input Ripple and Noise (2% Vin)Vp-p max.
- Output Ripple 20mVp-p max.
- Output Noise 100mVp-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
-30°C~+85°C (5V Vin only)
-40°C~+100°C
- Storage Temperature AC500V one minute (Input-Output-Case)
- Isolation Voltage 100MΩ min. (at DC1000V) (Input-Output-Case)
- Isolation Impedance
- Weight 30g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure 5 Sided Steel Case
- Soldering Conditions Soldering DIP 260°C, for 15 seconds max.
Soldering iron 360°C, for 5 seconds max.
- MTBF Single : 720,000H
Dual : 600,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

Pin Outs & Dimensions (±0.5mm)



Hole Configurations on PCB (Top View)



Selection Guide

Table 1

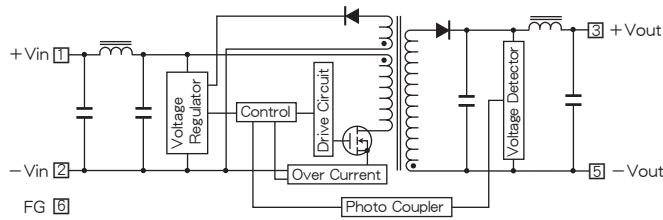
Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
SQK 5 - 5S1000	5 (4.5~9)	5	1000	84
SQK 5 - 6S 900		6	900	84
SQK 5 - 12S 500		12	500	84
SQK 5 - 15S 400		15	400	85
SQK 5 - 24S 250		24	250	85
SQK 5 - 5D 500		±5	±500	81
SQK 5 - 12D 250		±12	±250	85
SQK 5 - 15D 200		±15	±200	85
SQK 12 - 5S1000		5	1000	80
SQK 12 - 6S 900		6	900	80
SQK 12 - 12S 500	12 (8~18)	12	500	83
SQK 12 - 15S 400		15	400	83
SQK 12 - 24S 250		24	250	83
SQK 12 - 5D 500		±5	±500	81
SQK 12 - 12D 250		±12	±250	83
SQK 12 - 15D 200		±15	±200	83
SQK 24 - 5S1000	24 (16~36)	5	1000	80
SQK 24 - 6S 900		6	900	80
SQK 24 - 12S 500		12	500	84
SQK 24 - 15S 400		15	400	84
SQK 24 - 24S 250		24	250	83
SQK 24 - 5D 500		±5	±500	80
SQK 24 - 12D 250		±12	±250	83
SQK 24 - 15D 200		±15	±200	83
SQK 48 - 5S1000	48 (32~72)	5	1000	80
SQK 48 - 6S 900		6	900	80
SQK 48 - 12S 500		12	500	84
SQK 48 - 15S 400		15	400	84
SQK 48 - 24S 250		24	250	84
SQK 48 - 5D 500		±5	±500	81
SQK 48 - 12D 250		±12	±250	83
SQK 48 - 15D 200		±15	±200	83

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

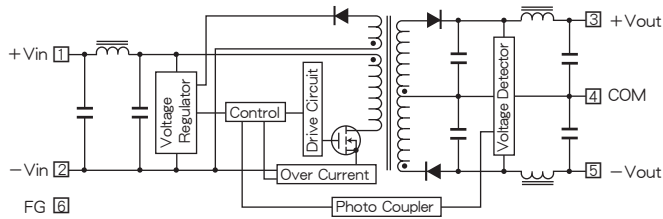
SQK SERIES DATA SHEET

■ Block Diagram

Single Output



Dual Outputs



■ Characteristic Curves

Fig. 1 Derating Curve

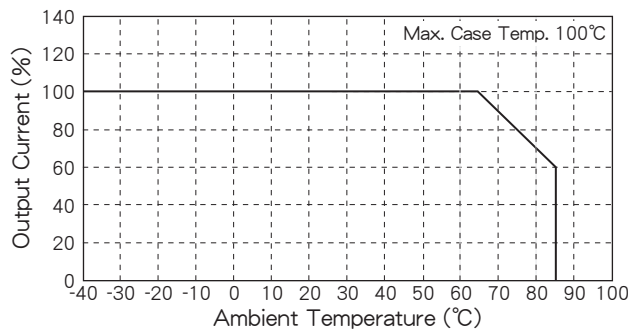


Fig. 2 Short Circuit Operating Area

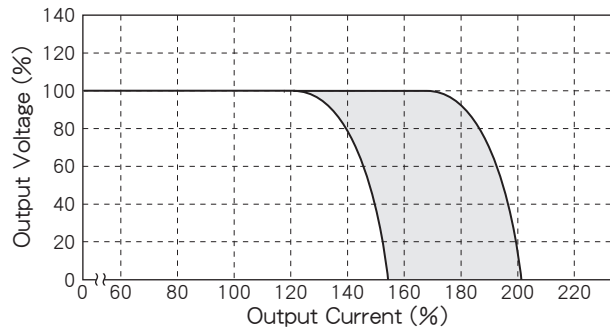


Fig. 3 Temperature Characteristic on Case Surface

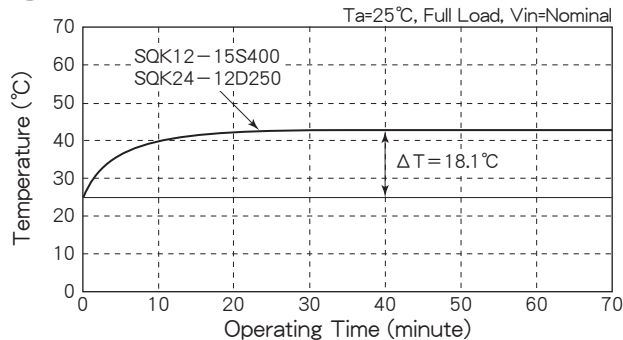


Fig. 4 No Load Current vs. Input Voltage

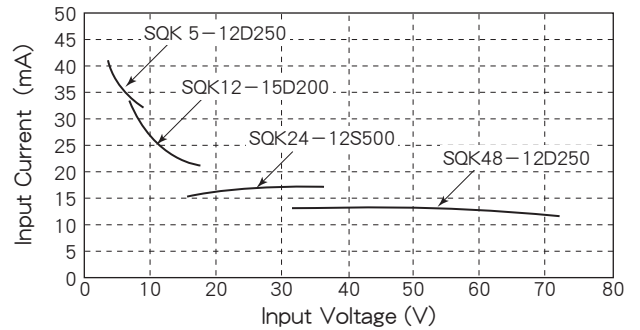


Fig. 5 Efficiency vs. Output Current (Single Output)

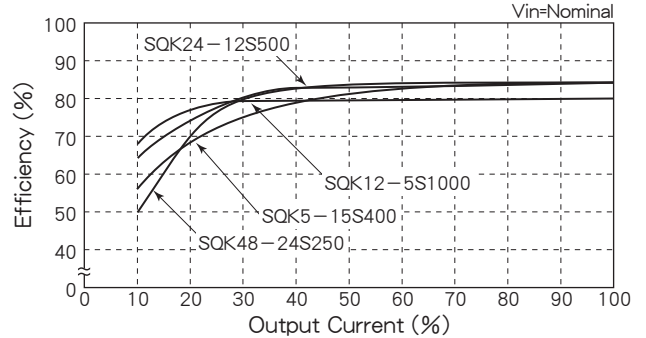
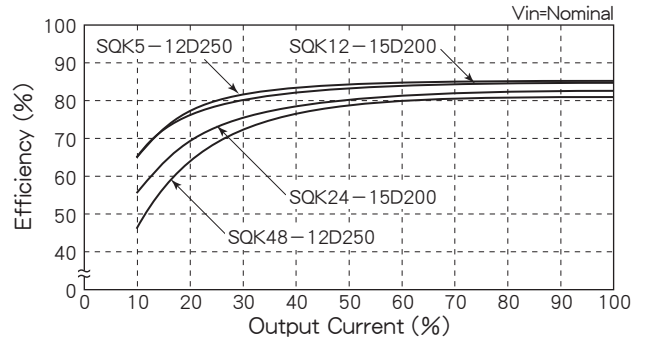


Fig. 6 Efficiency vs. Output Current (Dual Outputs)



SQV SERIES

10~12W DC/DC CONVERTERS Single Output



H8.5×W30×L47 (mm)

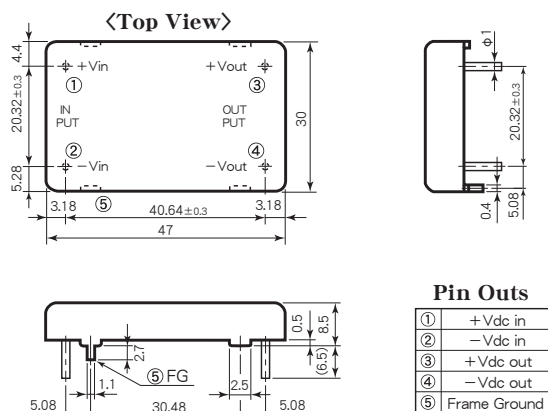
Features

- High Efficiency 81~87%
- 8.5mm in Height
- Compact, Light Weight
- Built-in Input Filter
- Wide Input Voltage Range
- Input-Output Isolation
- Low No Load Current
- 5 Sided Metal Shielding
- High Reliability
- Operating Ambient Temperature -40°C~+85°C
- Max. Case Temperature +100°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 高効率 81~87%
- 高さ8.5mm
- 小形、軽量
- 入力フィルタ内蔵
- 広範囲な入力電圧
- 入出力間絶縁
- 無負荷電流が少ない
- 5面メタルシールド
- 高信頼性
- 動作周囲温度 -40°C~+85°C
- 最大ケース温度 +100°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

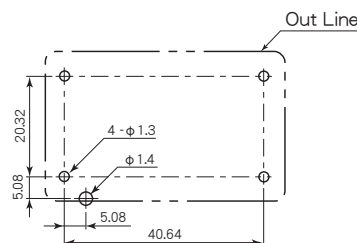
General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin) DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Accuracy ±2% (12, 15, 24, 28V Vout) ±3% (3.3, 5, 6V Vout)
- Efficiency See Table 1
- Line Regulation 0.3% max. (at Vin Range)
- Load Regulation ±0.5% max. (0~100% Load)
- Reflected Input Ripple, Noise (2% Vin)Vp-p max.
- Output Ripple 20mVp-p max.
- Output Noise 80mVp-p max. (0~20MHz) 150mVp-p max. (0~100MHz)
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1) -30°C~+85°C (5V Vin only)
- Max. Case Temperature +100°C
- Storage Temperature -40°C~+100°C
- Isolation Voltage AC500V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight 30g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s² (30minutes 3directions)
- Surface Structure 5 Sided Steel Case
- Soldering Conditions Soldering DIP 260°C, for 15 seconds max. Soldering iron 360°C, for 5 seconds max.
- MTBF 1,000,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

Pin Outs & Dimensions (±0.5mm)



Hole Configurations on PCB (Top View)



Selection Guide

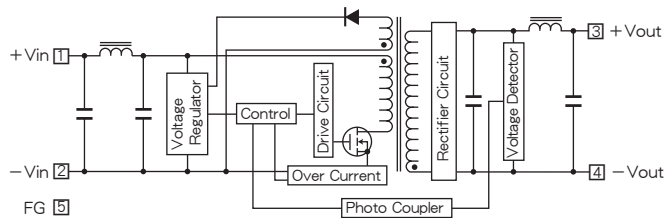
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (mA)	Efficiency (Typical) (%)
SQV 5 - 3.3 S 3000	5 (4.5~9)	3.3	3000	81
SQV 5 - 5 S 2000		5	2000	82
SQV 5 - 6 S 1600		6	1600	82
SQV 5 - 12 S 800		12	800	85
SQV 5 - 15 S 640		15	640	83
SQV 5 - 24 S 400		24	400	83
SQV 5 - 28 S 350		28	350	83
SQV 12 - 3.3 S 3000	12 (8~18)	3.3	3000	83
SQV 12 - 5 S 2200		5	2200	85
SQV 12 - 6 S 2000		6	2000	85
SQV 12 - 12 S 1000		12	1000	87
SQV 12 - 15 S 800		15	800	87
SQV 12 - 24 S 500		24	500	87
SQV 12 - 28 S 400		28	400	87
SQV 24 - 3.3 S 3000	24 (16~36)	3.3	3000	83
SQV 24 - 5 S 2200		5	2200	85
SQV 24 - 6 S 2000		6	2000	85
SQV 24 - 12 S 1000		12	1000	87
SQV 24 - 15 S 800		15	800	87
SQV 24 - 24 S 500		24	500	87
SQV 24 - 28 S 400		28	400	87
SQV 48 - 3.3 S 3000	48 (32~72)	3.3	3000	83
SQV 48 - 5 S 2200		5	2200	85
SQV 48 - 6 S 2000		6	2000	85
SQV 48 - 12 S 1000		12	1000	87
SQV 48 - 15 S 800		15	800	87
SQV 48 - 24 S 500		24	500	87
SQV 48 - 28 S 400		28	400	87

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

SQV SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

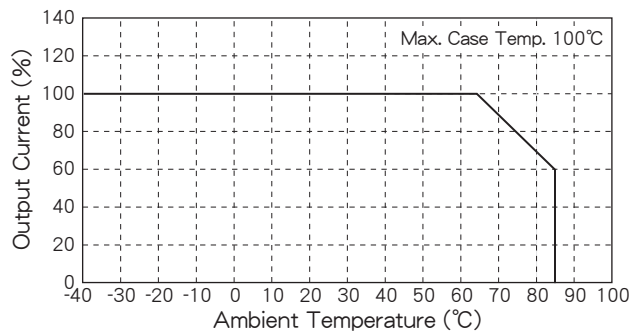


Fig. 2 Short Circuit Operating Area

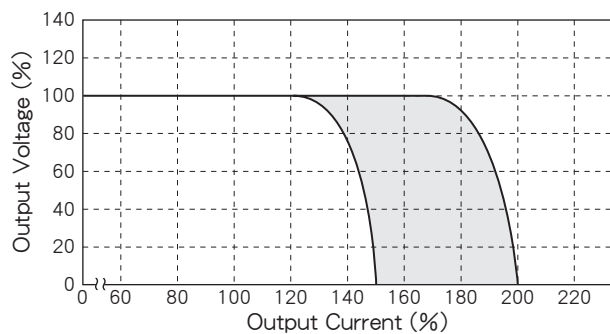


Fig. 3 Temperature Characteristic on Case Surface

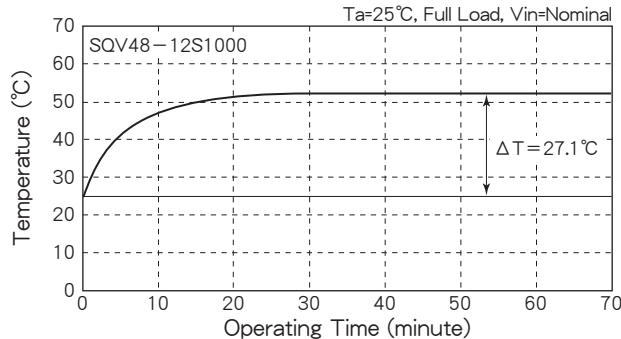


Fig. 4 Efficiency vs. Output Current

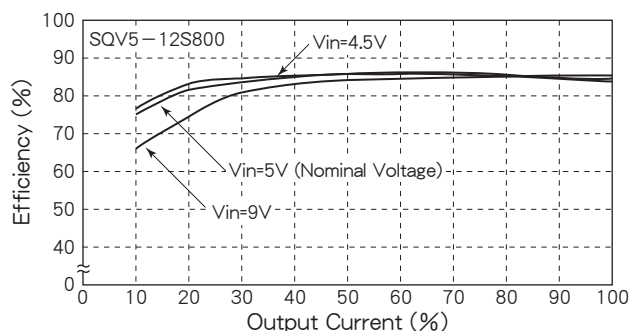


Fig. 5 Efficiency vs. Output Current

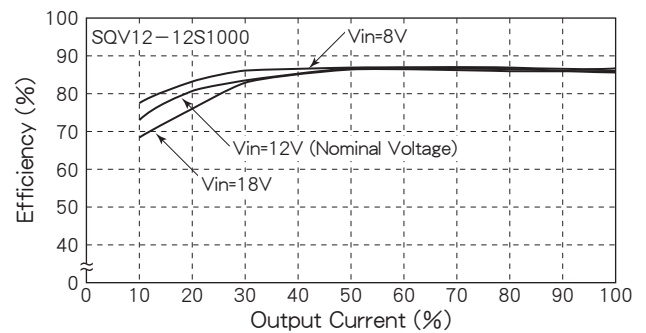


Fig. 6 Efficiency vs. Output Current

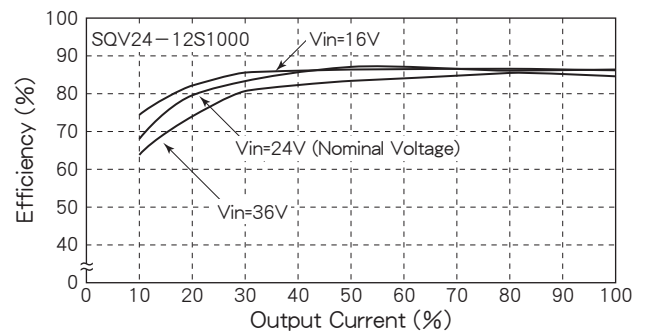


Fig. 7 Efficiency vs. Output Current

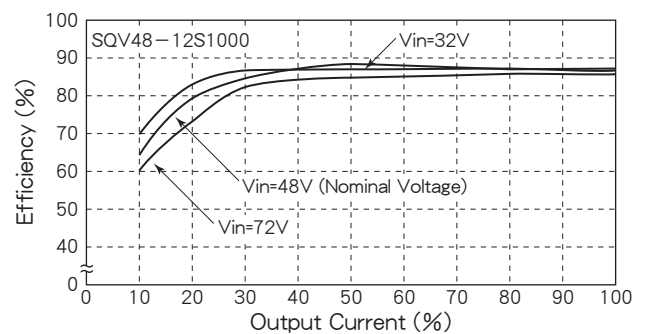
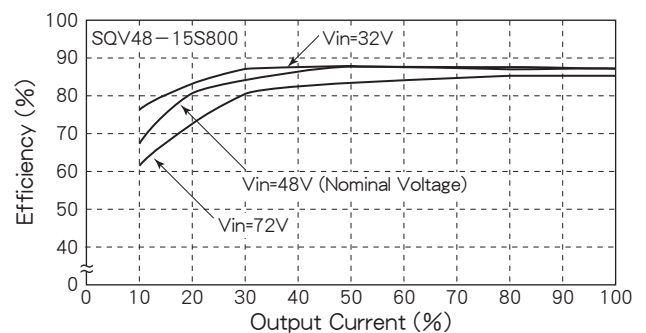


Fig. 8 Efficiency vs. Output Current



SQT SERIES

10~15W DC/DC CONVERTERS Single Output & Dual Outputs



H7×W31×L47 (mm)

Features

- 7mm in Height
- High Efficiency 85~88%
- Built-in Input Filter
- Wide Input Voltage Range
- Input-Output Isolation AC1500V
- Low No Load Current
- 5 Sided Metal Shielding
- Remote ON/OFF Control
- Operating Ambient Temperature -40°C~+85°C
- Adjustable Output Voltage $\pm 5\%$ (Single Output Only)
- Max. Case Temperature +100°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 高さ7mm
- 高効率 85~88%
- 入力フィルタ内蔵
- 広範囲な入力電圧
- 入出力間絶縁 AC1500V
- 無負荷電流が少ない
- 5面メタルシールド
- リモートON/OFFコントロール
- 動作周囲温度 -40°C~+85°C
- 出力電圧調整可能 $\pm 5\%$ (単出力のみ)
- 最大ケース温度 +100°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

Specifications

Input

- Input Voltage, Range
- Input Current (No Load)

(at T_a : 25°C, Full Load, Nominal V_{in})

DC5, 12, 24, 48V (See Table 1)

5V : 30mA typ.

12V : 18mA typ.

24V : 10mA typ.

48V : 7mA typ.

(3% V_{in})Vp-p max.

- Reflected Input Ripple, Noise

Output

- Output Voltage, Current
- Output Voltage Accuracy

See Table 1

Single : $\pm 2\%$

Dual : $\pm 3\%$

$\pm 5\%$ Adjustable (Used trimmer)

(Single Output only)

ON : Short or 0~0.8V

OFF : Open or 2~10V

(Between pin ②~③)

See Table 1

0.3% max. (at V_{in} Range)

Single : $\pm 0.5\%$ max. (0~100% Load)

Dual : $\pm 3\%$ max. (10~100% Load)

20mVp-p max.

80mVp-p max. (0~20MHz)

150mVp-p max. (0~100MHz)

Built-in, Auto-restart (See Fig. 2)

0.02%/°C max.

- Output Ripple
- Output Noise

- Short Circuit Protection
- Temperature Coefficient

General

- Operating Ambient Temp.
- Max. Case Temperature
- Storage Temperature
- Isolation Voltage

-40°C~+85°C (See Fig. 1)

+100°C

-55°C~+100°C

AC1500V one minute

(Input-Output-Case)

100M Ω min. (at DC1000V)

(Input-Output-Case)

- Humidity
- MTBF

20~95% RH

1,000,000H

- Switching Frequency

(T_a : 25°C, 80% Load, Nominal V_{in})

210kHz ($\pm 10\%$)

Physical

- Weight
- Shock
- Vibration

30g max.

490m/s² (11msec 3directions)

10~55Hz 98m/s²

(30minutes 3directions)

5 Sided Steel Case

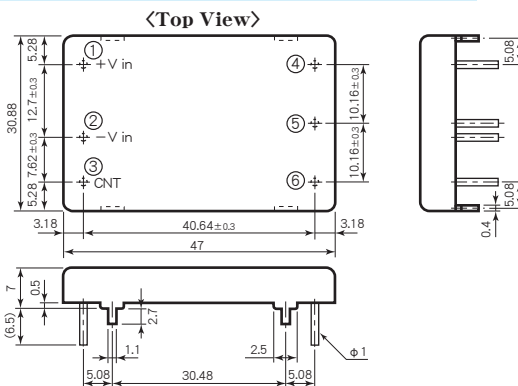
- Surface Structure
- Soldering Conditions
- Soldering iron
- Warranty

260°C, for 15 seconds max.

360°C, for 5 seconds max.

5 years

Pin Outs & Dimensions (± 0.5 mm)

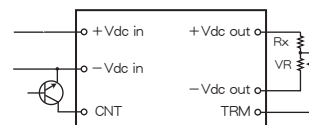


Pin Outs

Single Output	Dual Outputs
① +Vdc in	① +Vdc in
② -Vdc in	② -Vdc in
③ CNT	③ CNT
④ +Vdc out	④ +Vdc out
⑤ -Vdc out	⑤ COM
⑥ TRM	⑥ -Vdc out

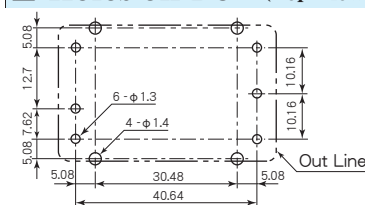
Application

ON/OFF Control and Vout Adjustment (Single Output)



Vout (V)	VR (Ω)	Rx (Ω)
3.3V	50k	13k
5V	50k	3k
5.2V	50k	3k
6V	50k	6.8k
12V	50k	43k
15V	50k	62k
24V	50k	150k

Holes on PCB (Top View)



Selection Guide

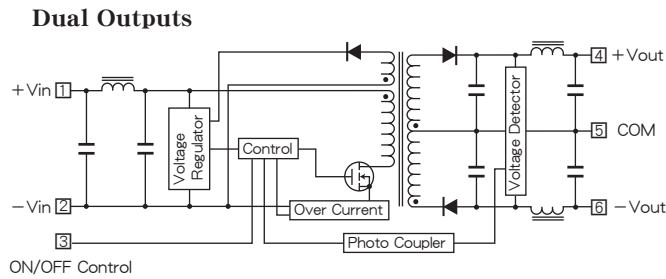
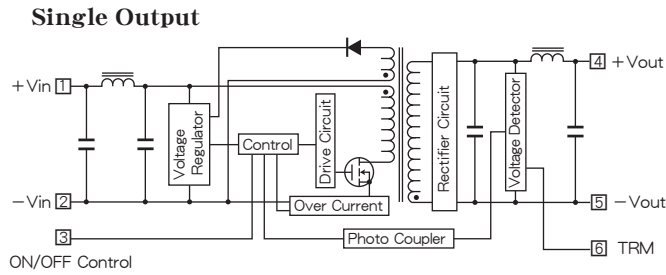
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency 20% Load (typ.)(%)	Efficiency 80% Load (typ.)(%)
SQT 5-3.3S 3A	5 (4.5~9)	3.3	3	81	85
SQT 5-5S 2.2A		5	2.2	81	85
SQT 5-5.2S 2.1A		5.2	2.1	81	85
SQT 5-6S 1.9A		6	1.9	83	85
SQT 5-12S 1A		12	1	84	85
SQT 5-15S 0.8A		15	0.8	84	85
SQT 5-24S 0.5A		24	0.5	84	85
SQT 5-12D 0.5A		± 12	± 0.5	86	86
SQT 5-15D 0.4A		± 15	± 0.4	86	85
SQT12-3.3S 3.6A	12 (8~18)	3.3	3.6	80	85
SQT12-5S 2.6A		5	2.6	82	86
SQT12-5.2S 2.5A		5.2	2.5	82	85
SQT12-6S 2.3A		6	2.3	85	86
SQT12-12S 1.3A		12	1.3	85	87
SQT12-15S 1A		15	1	85	88
SQT12-24S 0.6A		24	0.6	84	87
SQT12-12D 0.6A		± 12	± 0.6	85	87
SQT12-15D 0.5A		± 15	± 0.5	84	87
SQT24-3.3S 3.6A	24 (16~36)	3.3	3.6	82	85
SQT24-5S 2.6A		5	2.6	82	87
SQT24-5.2S 2.5A		5.2	2.5	83	87
SQT24-6S 2.3A		6	2.3	83	87
SQT24-12S 1.3A		12	1.3	86	88
SQT24-15S 1A		15	1	84	87
SQT24-24S 0.6A		24	0.6	84	87
SQT24-12D 0.6A		± 12	± 0.6	85	87
SQT24-15D 0.5A		± 15	± 0.5	86	87
SQT48-3.3S 3.6A	48 (32~72)	3.3	3.6	80	85
SQT48-5S 2.6A		5	2.6	82	87
SQT48-5.2S 2.5A		5.2	2.5	82	87
SQT48-6S 2.3A		6	2.3	82	87
SQT48-12S 1.3A		12	1.3	84	87
SQT48-15S 1A		15	1	84	87
SQT48-24S 0.6A		24	0.6	84	87
SQT48-12D 0.6A		± 12	± 0.6	84	87
SQT48-15D 0.5A		± 15	± 0.5	84	87

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

SQT SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

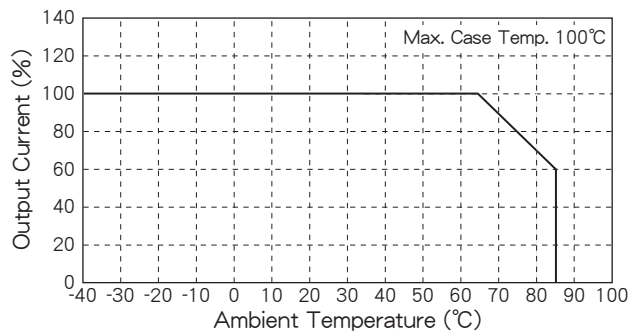


Fig. 2 Short Circuit Operating Area

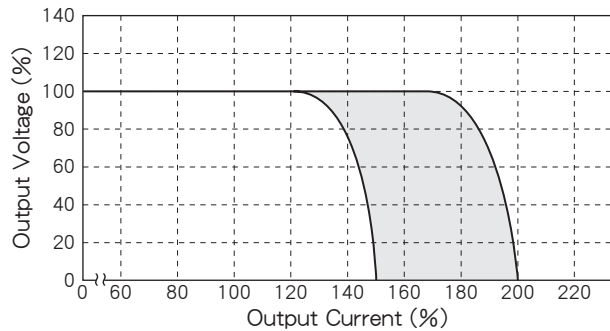


Fig. 3 Temperature Characteristic on Case Surface

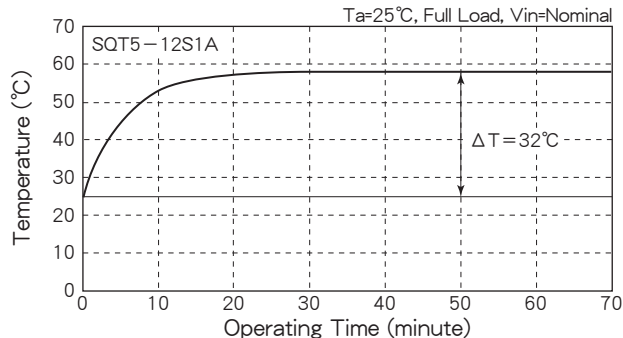


Fig. 4 Efficiency vs. Output Current

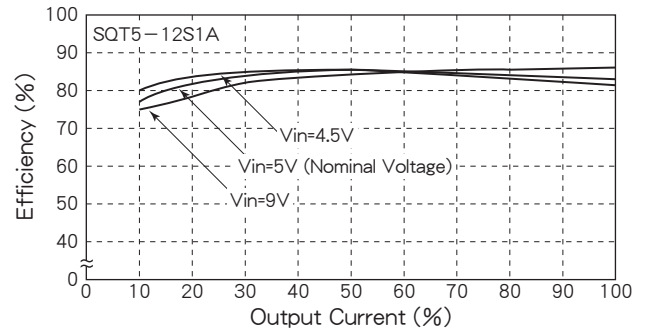


Fig. 5 Efficiency vs. Output Current

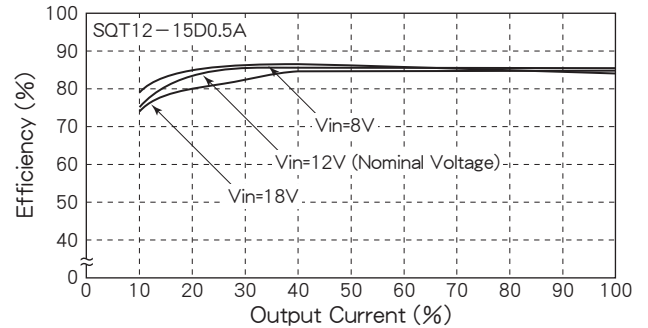
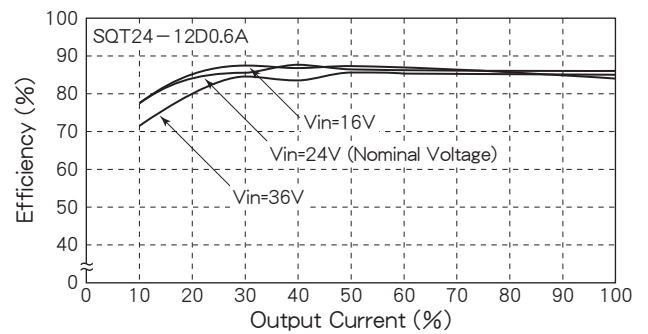
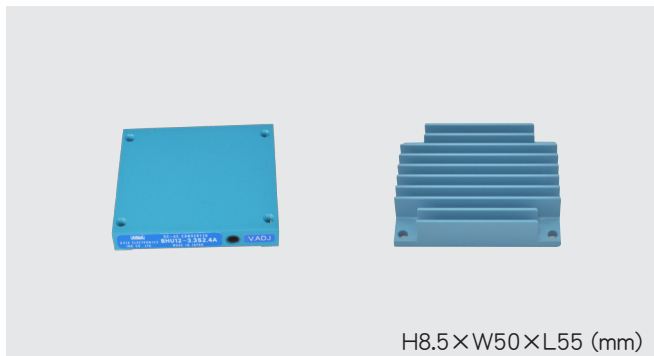


Fig. 6 Efficiency vs. Output Current

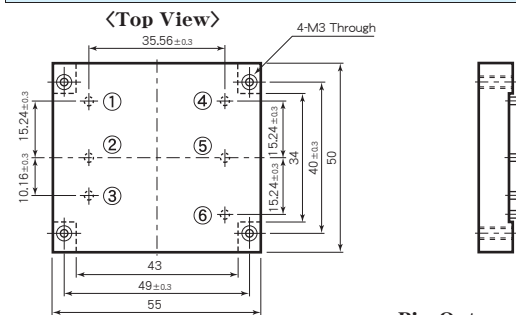


BHU SERIES

7~15W DC/DC CONVERTERS Single Output & Dual Outputs

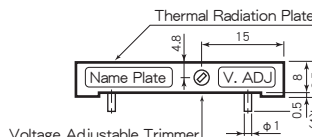


Pin Outs & Dimensions (±0.5mm)

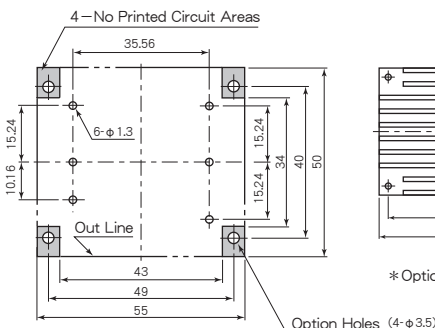


Pin Outs

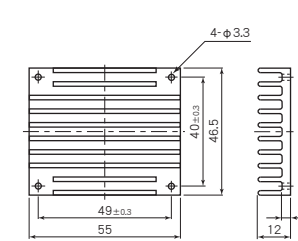
Single Output	Dual Outputs
① +Vdc in	① +Vdc in
② 0 Vdc in	② 0 Vdc in
③ ON/OFF Control	③ ON/OFF Control
④ +Vdc out	④ +Vdc out
⑤ 0 Vdc out	⑤ Common
⑥ No Connection	⑥ -Vdc out



Holes on PCB (Top View)



Option Heat Sink



* Option Heat Sink Model : A4-3080

Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical) (%)
BHU 5-3.3S 2A	5 (4.5~9)	3.3	2	83
BHU 5-5S 2A		5	2	82
BHU 5-6S 1.8A		6	1.8	82
BHU 5-12S 1A		12	1	84
BHU 5-15S 0.8A		15	0.8	83
BHU 5-24S 0.5A		24	0.5	83
BHU 5-28S 0.4A		28	0.4	83
BHU 5-5D 1A		±5	±1	77
BHU 5-12D 0.5A		±12	±0.5	81
BHU 5-15D 0.4A		±15	±0.4	81
BHU 12-3.3S 2.4A	12 (8~18)	3.3	2.4	83
BHU 12-5S 2.4A		5	2.4	85
BHU 12-6S 2.2A		6	2.2	85
BHU 12-12S 1.3A		12	1.3	85
BHU 12-15S 1A		15	1	85
BHU 12-24S 0.65A		24	0.65	85
BHU 12-28S 0.5A		28	0.5	85
BHU 12-48S 0.3A		48	0.3	85
BHU 12-5D 1.2A		±5	±1.2	78
BHU 12-12D 0.65A		±12	±0.65	83
BHU 12-15D 0.5A		±15	±0.5	83
BHU 24-3.3S 2.4A	24 (16~36)	3.3	2.4	84
BHU 24-5S 2.4A		5	2.4	86
BHU 24-6S 2.2A		6	2.2	86
BHU 24-12S 1.3A		12	1.3	86
BHU 24-15S 1A		15	1	86
BHU 24-24S 0.65A		24	0.65	86
BHU 24-28S 0.5A		28	0.5	86
BHU 24-48S 0.3A		48	0.3	85
BHU 24-5D 1.2A		±5	±1.2	78
BHU 24-12D 0.65A		±12	±0.65	83
BHU 24-15D 0.5A		±15	±0.5	83
BHU 48-3.3S 2.4A	48 (32~76)	3.3	2.4	83
BHU 48-5S 2.4A		5	2.4	86
BHU 48-6S 2.2A		6	2.2	86
BHU 48-12S 1.3A		12	1.3	88
BHU 48-15S 1A		15	1	88
BHU 48-24S 0.65A		24	0.65	86
BHU 48-28S 0.5A		28	0.5	86
BHU 48-5D 1.2A		±5	±1.2	80
BHU 48-12D 0.65A		±12	±0.65	85
BHU 48-15D 0.5A		±15	±0.5	85

* 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

Features

- Low Profile 8.5mm
- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 77~88%
- Wide Input Voltage Range
- High Reliability
- 6 Sided Metal Shielding
- Remote ON/OFF Control
- Adjustable Output Volt. ±5%
- Output Over Voltage Protection 115~140% Operation
- Operating Ambient Temperature -40°C~+85°C
- Max. Case Temperature +105°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor

- 薄型 8.5mm
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 77~88%
- 広範囲な入力電圧
- 高信頼性
- 6面メタルシールド
- リモートON/OFFコントロール
- 可変出力電圧 ±5%
- 出力過電圧保護回路内蔵 115~140% 動作
- 動作周囲温度 -40°C~+85°C
- 最大ケース温度 +105°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

(at Ta : 25°C, Full Load, Nominal Vin)

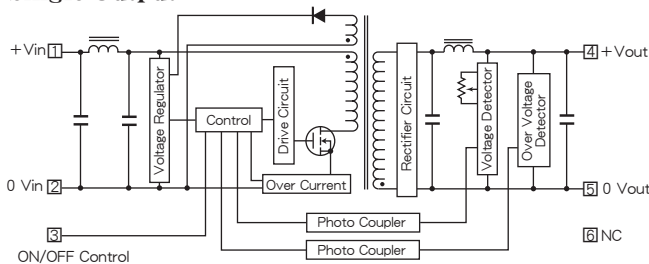
- Input Voltage, Range DC5, 12, 24, 48V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Range ±5% Adjustable
- Efficiency See Table 1
- Line Regulation ±0.3% max. (at Vin Range)
- Load Regulation Single : ±0.5% max. (0~100% Load)
- Dual : ±3% max. (10~100% Load)
- Reflected Input Ripple, Noise (3% Vin)Vp-p max.
- Output Ripple 40mVp-p max.
- Output Noise 100mVp-p max. (48V Vout only)
- Short Circuit Protection 100mVp-p max.
- Over Voltage Protection 200mVp-p max. (48V Vout only)
- Remote ON/OFF Control Built-in, Auto-restart (See Fig. 2)
- Temperature Coefficient 115~140% Output Voltage
- Operating Ambient Temp. ON : Short or 0~0.8V
- Max. Case Temperature OFF : Open or 2~10V
- Storage Temperature (Between pin ② ~ ③) -40°C~+85°C (See Fig. 1)
- Isolation Voltage +105°C
- Isolation Impedance AC1500V one minute
- Weight (Input-Output-Case) 100MΩ min. (at DC1000V)
- Humidity (Input-Output-Case) Main Body : 60g max.
- Shock 20~95% RH Heat Sink : 40g max.
- Vibration 490m/s² (11msec 3directions)
- Surface Structure 10~55Hz 98m/s²
- Soldering Conditions (30minutes 3directions)
- Soldering DIP 6 Sided Aluminum Case
- Soldering iron 260°C, for 15 seconds max.
- MTBF Single : 1,000,000H
- Warranty Dual : 700,000H

(Ta : 25°C, 80% Load, Nominal Vin)

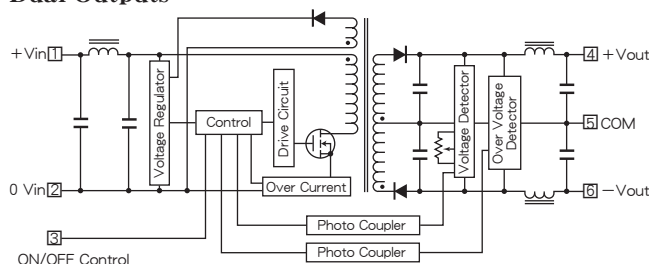
5 years

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

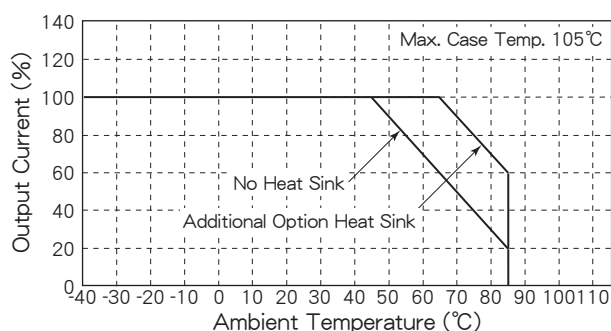


Fig. 2 Short Circuit Operating Area

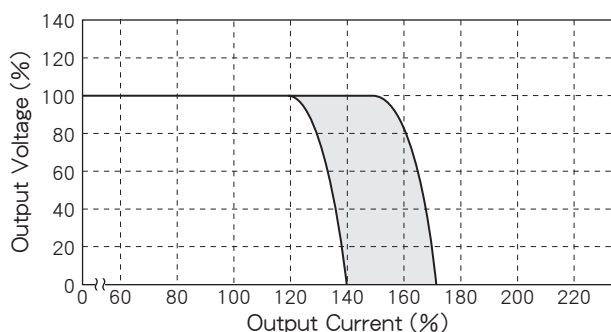


Fig. 3 Temperature Characteristic on Case Surface

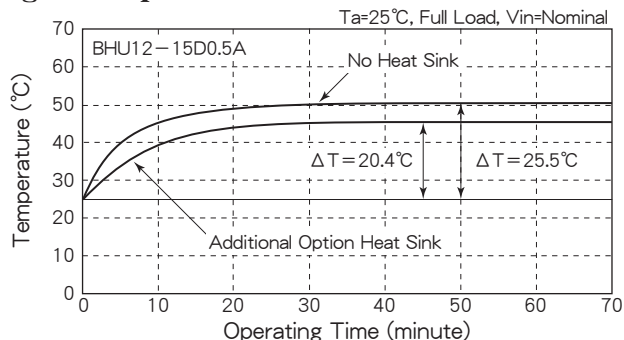


Fig. 4 Efficiency vs. Output Current

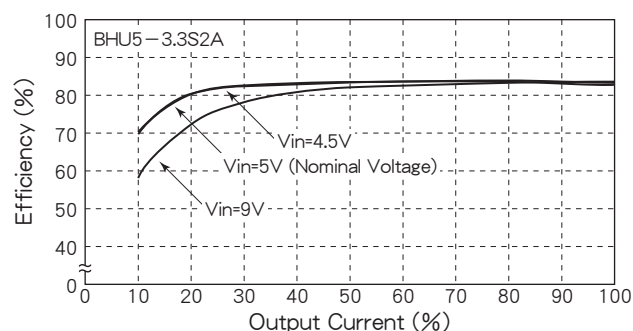


Fig. 5 Efficiency vs. Output Current

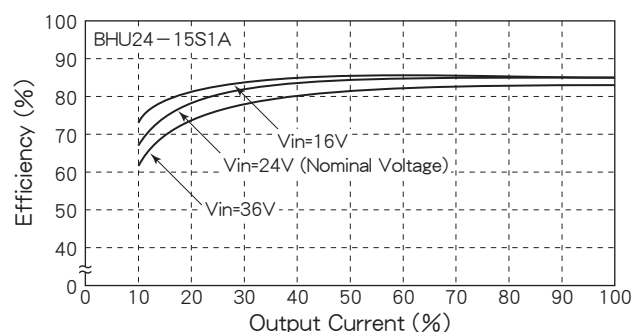


Fig. 6 Efficiency vs. Output Current

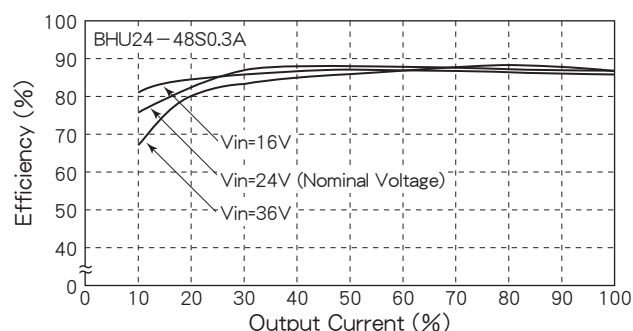


Fig. 7 Efficiency vs. Output Current

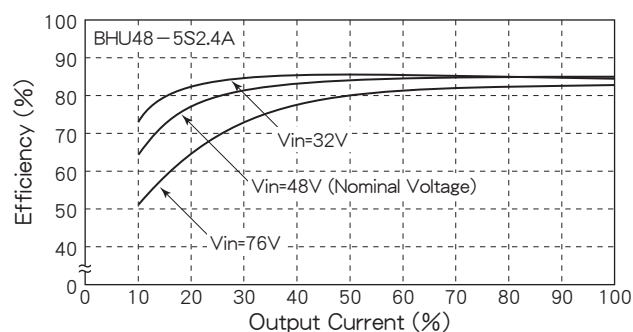
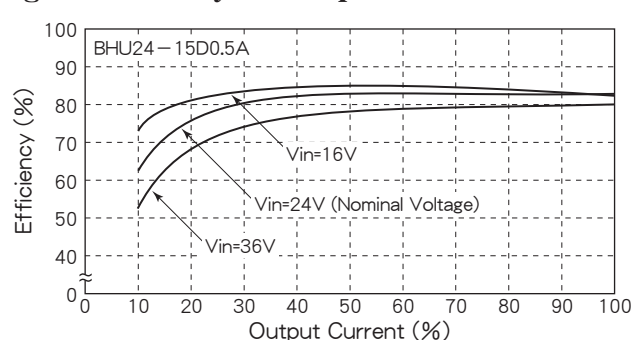
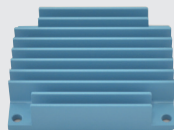


Fig. 8 Efficiency vs. Output Current



BRU SERIES

23~30W DC/DC CONVERTERS Single Output



H8.5×W50×L55 (mm)

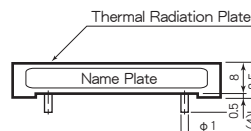
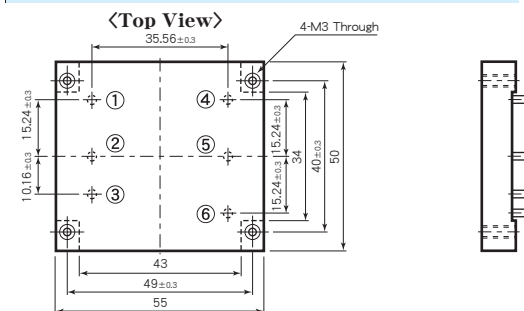
Features

- Low Profile 8.5mm
 - Built-in Input Filter
 - Input-Output Isolation (AC2000V)
 - High Efficiency 87~90%
 - Wide Input Voltage Range
 - High Reliability
 - 6 Sided Metal Shielding
 - Remote ON/OFF Control
 - Adjustable Output Volt. $\pm 5\%$
 - Input Low Voltage Protection
 - Input Over Voltage Protection
 - Output Over Voltage Protection 115~140% Operation
 - Thermal Protection $+110^{\circ}\text{C} \sim +120^{\circ}\text{C}$
 - Operating Ambient Temperature $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
 - Max. Case Temperature $+105^{\circ}\text{C}$
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 8.5mm
 - 入力フィルタ内蔵
 - 入出力間絶縁 (AC2000V)
 - 高効率 87~90%
 - 広範囲な入力電圧
 - 高信頼性
 - 6面メタルシールド
 - リモートON/OFFコントロール
 - 可変出力電圧 $\pm 5\%$
 - 入力低電圧保護回路内蔵
 - 入力過電圧保護回路内蔵
 - 出力過電圧保護回路内蔵 115~140% 動作
 - 過熱保護回路内蔵 $+110^{\circ}\text{C} \sim +120^{\circ}\text{C}$
 - 動作周囲温度 $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
 - 最大ケース温度 $+105^{\circ}\text{C}$
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range
 - Output Voltage, Current
 - Output Voltage Accuracy
 - Output Voltage Range
 - Efficiency
 - Line Regulation
 - Load Regulation
 - Reflected Input Ripple, Noise
 - Output Ripple
 - Output Noise
 - Short Circuit Protection
 - Over Voltage Protection
 - Remote ON/OFF Control
 - Temperature Coefficient
 - Operating Ambient Temp.
 - Max. Case Temperature
 - Storage Temperature
 - Isolation Voltage
 - Isolation Impedance
 - Weight
 - Humidity
 - Shock
 - Vibration
 - Surface Structure
 - Soldering Conditions
 - Soldering DIP
 - Soldering iron
 - MTBF
 - Warranty
- (at $T_a : 25^{\circ}\text{C}$, Full Load, Nominal V_{in})
 DC12, 24, 48, 100V (See Table 1)
 See Table 1
 $\pm 2\%$
 $\pm 3\%$ (3.3, 5, 6V V_{out} only)
 $\pm 5\%$ Adjustable (Used trimmer)
 See Table 1
 $\pm 0.3\%$ max. (at V_{in} Range)
 $\pm 0.5\%$ max. (0~100% Load)
 (3% V_{in}) Vp-p max.
 40mVp-p max.
 100mVp-p max. (48V V_{out} only)
 100mVp-p max.
 200mVp-p max. (48V V_{out} only)
 Built-in, Auto-restart (See Fig. 2)
 115~140% Output Voltage
 ON : Short or 0~0.8V
 OFF : Open or 2~10V
 (Between pin ② ~ ③)
 0.02%/°C max.
 $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$ (See Fig. 1)
 $+105^{\circ}\text{C}$
 $-50^{\circ}\text{C} \sim +115^{\circ}\text{C}$
 AC2000V one minute
 (Input-Output-Case)
 100M Ω min. (at DC1000V)
 (Input-Output-Case)
 Main Body : 60g max.
 Heat Sink : 40g max.
 20~95% RH
 490m/s² (11msec 3directions)
 10~55Hz 98m/s²
 (30minutes 3directions)
 6 Sided Aluminum Case
 260°C , for 15 seconds max.
 360°C , for 5 seconds max.
 500,000H
 ($T_a : 25^{\circ}\text{C}$, 80% Load, Nominal V_{in})
 5 years

Pin Outs & Dimensions ($\pm 0.5\text{mm}$)

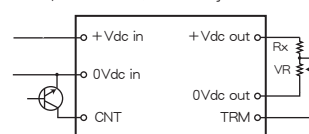


Pin Outs

①	+Vdc in
②	0 Vdc in
③	ON/OFF Control
④	+Vdc out
⑤	0 Vdc out
⑥	TRIM

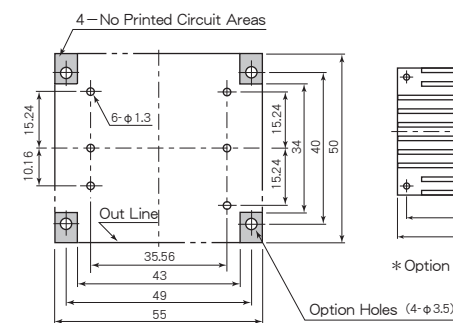
Application

ON/OFF Control and Vout Adjustment

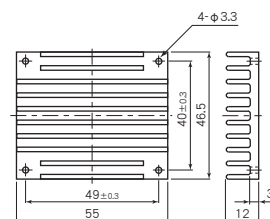


V_{out} (V)	3.3V	5V	6V	12V	15V	24V	28V	48V
VR (Ω)	50k	50k	50k	50k	50k	50k	50k	50k
Rx (Ω)	10k	33k	47k	47k	62k	110k	130k	220k

Holes on PCB (Top View)



Option Heat Sink



* Option Heat Sink Model : A4-3080

Selection Guide

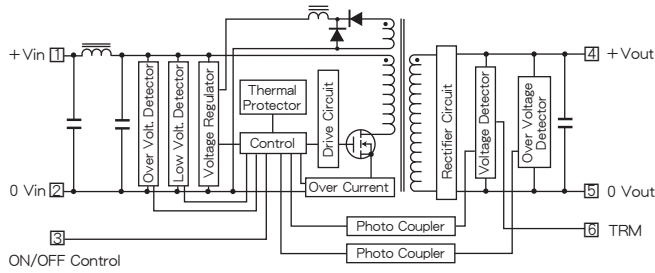
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%)	
				20% Load	80% Load
BRU12-3.3S	7 A	3.3	7	84	87
BRU12-5S	6 A	5	6	84	90
BRU12-6S	5 A	6	5	84	90
BRU12-12S	2.5 A	12	2.5	84	90
BRU12-15S	2 A	15	2	84	90
BRU12-24S	1.25 A	24	1.25	84	90
BRU12-28S	1.07 A	28	1.07	84	90
BRU12-48S	0.6 A	48	0.6	84	90
BRU24-3.3S	7 A	3.3	7	84	87
BRU24-5S	6 A	5	6	84	90
BRU24-6S	5 A	6	5	84	90
BRU24-12S	2.5 A	12	2.5	84	90
BRU24-15S	2 A	15	2	84	90
BRU24-24S	1.25 A	24	1.25	84	90
BRU24-28S	1.07 A	28	1.07	84	90
BRU24-48S	0.6 A	48	0.6	84	90
BRU48-3.3S	7 A	3.3	7	84	87
BRU48-5S	6 A	5	6	84	90
BRU48-6S	5 A	6	5	84	90
BRU48-12S	2.5 A	12	2.5	84	90
BRU48-15S	2 A	15	2	84	90
BRU48-24S	1.25 A	24	1.25	84	90
BRU48-28S	1.07 A	28	1.07	84	90
BRU100-3.3S	7 A	3.3	7	84	87
BRU100-5S	6 A	5	6	84	90
BRU100-6S	5 A	6	5	84	90
BRU100-12S	2.5 A	12	2.5	84	90
BRU100-15S	2 A	15	2	84	90
BRU100-24S	1.25 A	24	1.25	84	90
BRU100-28S	1.07 A	28	1.07	84	90

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
 Please consult with us about other specification.

BRU SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

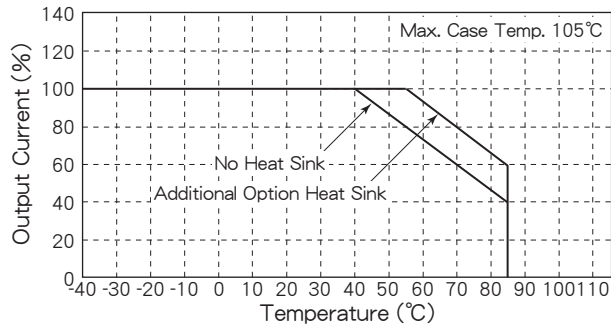


Fig. 2 Short Circuit Operating Area

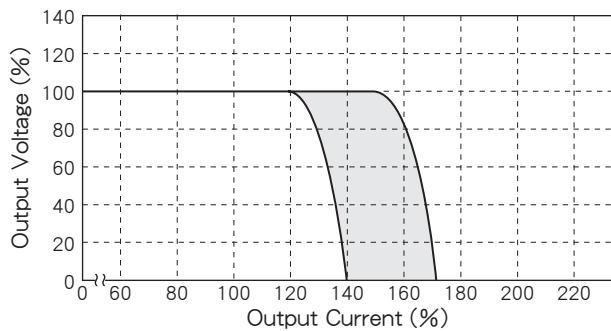


Fig. 3 Temperature Characteristic on Case Surface

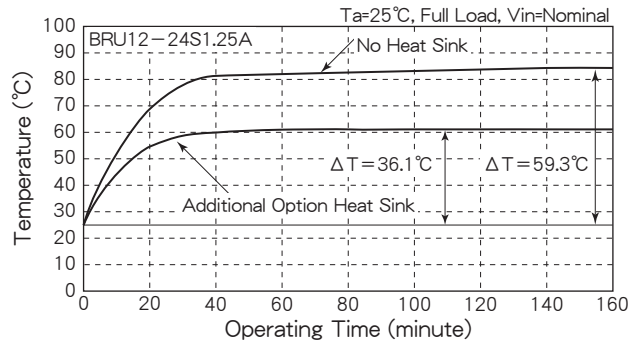


Fig. 4 Efficiency vs. Output Current

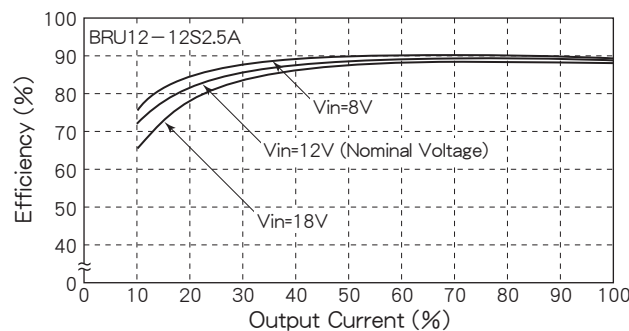


Fig. 5 Efficiency vs. Output Current

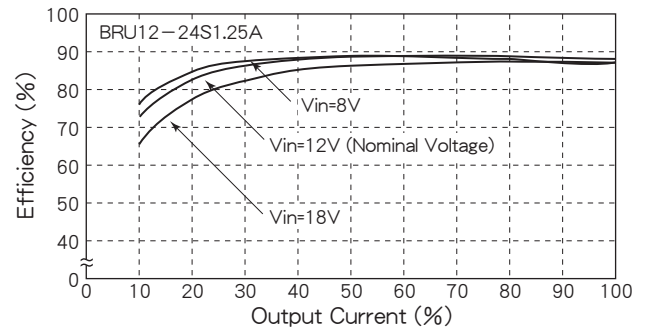


Fig. 6 Efficiency vs. Output Current

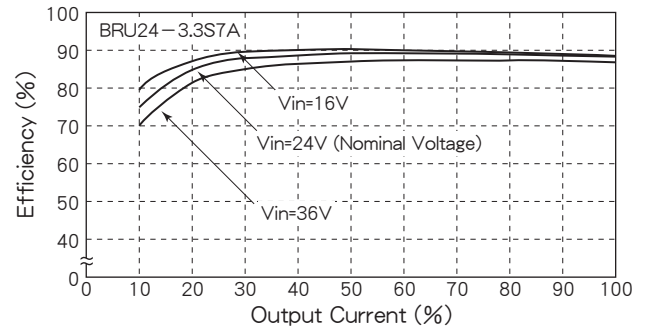


Fig. 7 Efficiency vs. Output Current

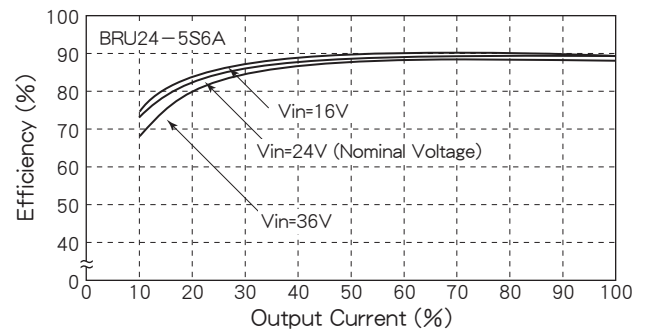


Fig. 8 Efficiency vs. Output Current

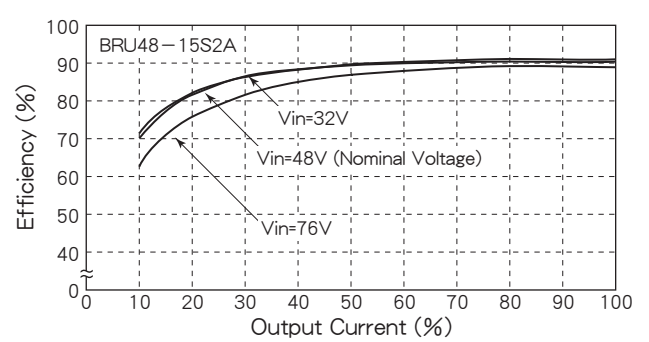
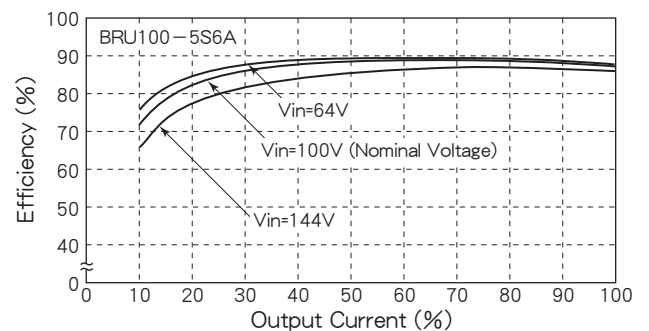
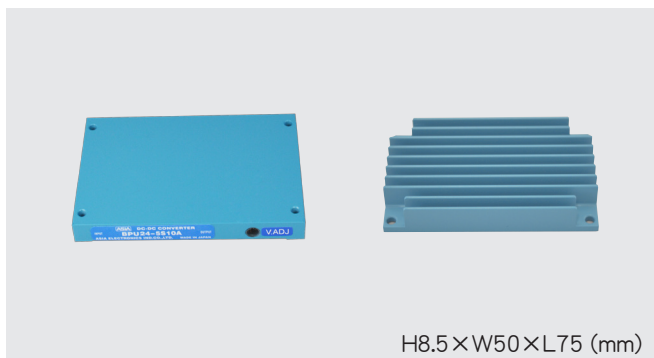


Fig. 9 Efficiency vs. Output Current

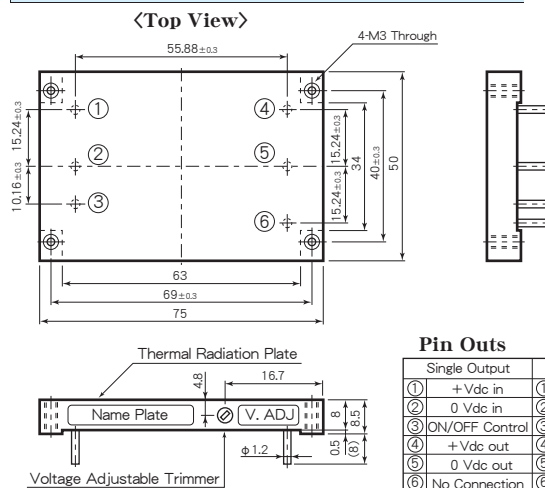


BPU SERIES

20~50W DC/DC CONVERTERS Single Output & Dual Outputs



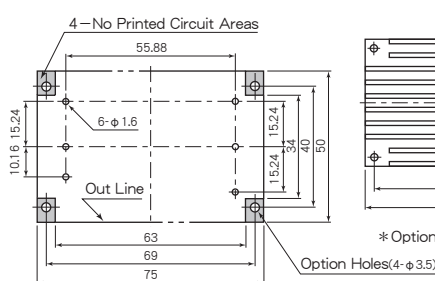
Pin Outs & Dimensions (±0.5mm)



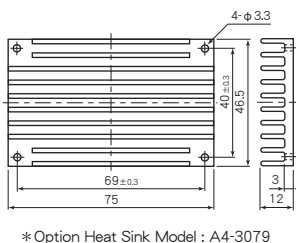
Features

- Low Profile 8.5mm
 - 6 Sided Metal Shielding
 - Built-in Input Filter
 - Wide Input Voltage Range
 - Input-Output Isolation
 - Adjustable Output Volt. ±5%
 - High Efficiency 81~90%
 - Remote ON/OFF Control
 - Input Low Voltage Protection
 - Input Over Voltage Protection
 - Output Over Voltage Protection 115~140% Operation
 - Thermal Protection +110°C~+120°C
 - Operating Ambient Temperature -40°C~+85°C
 - Max. Case Temperature +105°C
 - High Reliability
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 8.5mm
 - 6面メタルシールド
 - 入力フィルタ内蔵
 - 広範囲な入力電圧
 - 入出力間絶縁
 - 可変出力電圧 ±5%
 - 高効率 81~90%
 - リモートON/OFFコントロール
 - 入力低電圧保護回路内蔵
 - 入力過電圧保護回路内蔵
 - 出力過電圧保護回路内蔵 115~140% 動作
 - 過熱保護回路内蔵 +110°C~+120°C
 - 動作周囲温度 -40°C~+85°C
 - 最大ケース温度 +105°C
 - 高信頼性
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

Holes on PCB (Top View)



Option Heat Sink



General Characteristics

- Input Voltage, Range DC12, 24, 48, 100V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Range ±5% Adjustable
- Efficiency See Table 1
- Line Regulation ±0.3% max. (at Vin Range)
- Load Regulation Single : ±0.5% max. (0~100% Load)
- Dual : ±3% max. (10~100% Load)
- Reflected Input Ripple, Noise (3% Vin)/Vp-p max.
- Output Ripple 40mVp-p max.
- Output Noise 100mVp-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Over Voltage Protection 115~140% Output Voltage
- Remote ON/OFF Control ON : Short or 0~0.8V
- OFF : Open or 2~10V (Between pin ② ~ ③)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- Max. Case Temperature +105°C
- Storage Temperature -40°C~+115°C
- Isolation Voltage AC1500V 1 min.
- AC2000V 1 min. (100V Vin only)
- Isolation Impedance (Input-Output-Case) 100MΩ min. (at DC1000V)
- Weight Main Body : 100g max.
- Humidity Heat Sink : 55g max.
- Shock 20~95% RH
- Vibration 490m/s² (11msec 3directions)
- Surface Structure 10~55Hz 98m/s²
- Soldering Conditions (30minutes 3directions)
- MTBF 6 Sided Aluminum Case
- Warranty 260°C, for 15 seconds max.
- 360°C, for 5 seconds max.
- Single : 500,000H
- Dual : 600,000H
- (Ta : 25°C, 80% Load, Nominal Vin)
- 5 years

Selection Guide

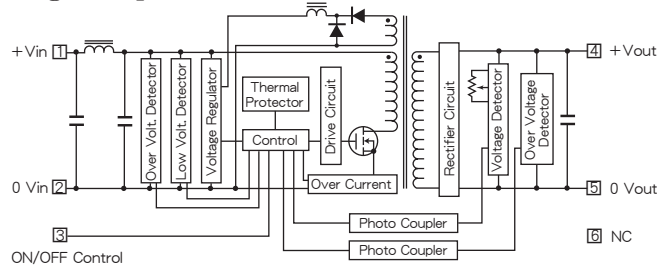
Table 1

Model Number	Input Voltage (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (typ.) (%)	
				30% Load	80% Load
BPU12-3.3S 12A	12 (8~18)	3.3	12	87	85
BPU12-5S 10A		5	10	86	89
BPU12-6S 8.4A		6	8.4	87	87
BPU12-12S 4.2A		12	4.2	84	88
BPU12-15S 3.3A		15	3.3	83	88
BPU12-24S 2.1A		24	2.1	83	88
BPU12-3.3D 3A		±3.3	±3	80	81
BPU12-5D 3A		±5	±3	80	82
BPU12-12D 1.5A		±12	±1.5	81	83
BPU12-15D 1.2A		±15	±1.2	81	84
BPU24-3.3S 12A	24 (16~36)	3.3	12	84	85
BPU24-5S 10A		5	10	85	88
BPU24-6S 8.4A		6	8.4	87	89
BPU24-12S 4.2A		12	4.2	84	89
BPU24-15S 3.3A		15	3.3	85	89
BPU24-24S 2.1A		24	2.1	84	89
BPU24-3.3D 3A		±3.3	±3	80	81
BPU24-5D 3A		±5	±3	80	82
BPU24-12D 1.5A		±12	±1.5	81	84
BPU24-15D 1.2A		±15	±1.2	82	85
BPU48-3.3S 12A	48 (32~72)	3.3	12	85	86
BPU48-5S 10A		5	10	85	88
BPU48-6S 8.4A		6	8.4	85	88
BPU48-12S 4.2A		12	4.2	85	88
BPU48-15S 3.3A		15	3.3	85	90
BPU48-24S 2.1A		24	2.1	85	90
BPU48-3.3D 3A		±3.3	±3	80	81
BPU48-5D 3A		±5	±3	80	82
BPU48-12D 1.5A		±12	±1.5	81	84
BPU48-15D 1.2A		±15	±1.2	82	85
BPU100-3.3S 12A	100 (64~144)	3.3	12	84	87
BPU100-5S 10A		5	10	86	89
BPU100-6S 8.4A		6	8.4	84	89
BPU100-12S 4.2A		12	4.2	85	90
BPU100-15S 3.3A		15	3.3	85	90
BPU100-24S 2.1A		24	2.1	85	90
BPU100-3.3D 3A		±3.3	±3	80	81
BPU100-5D 3A		±5	±3	80	82
BPU100-12D 1.5A		±12	±1.5	81	84
BPU100-15D 1.2A		±15	±1.2	82	85

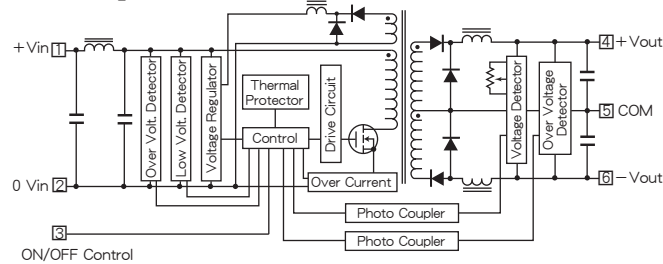
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

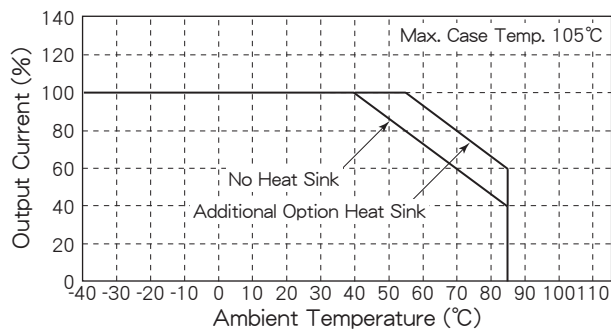


Fig. 2 Short Circuit Operating Area

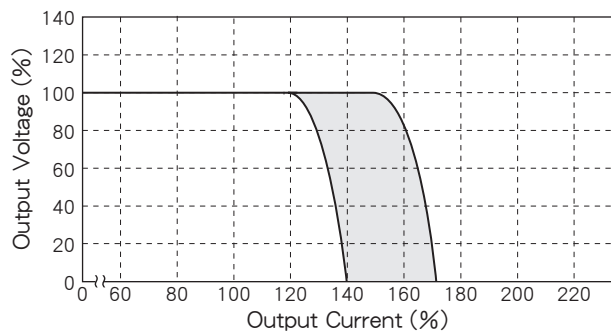


Fig. 3 Temperature Characteristic on Case Surface

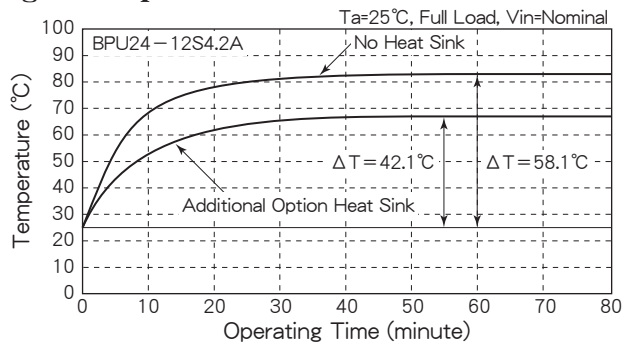


Fig. 4 Efficiency vs. Output Current

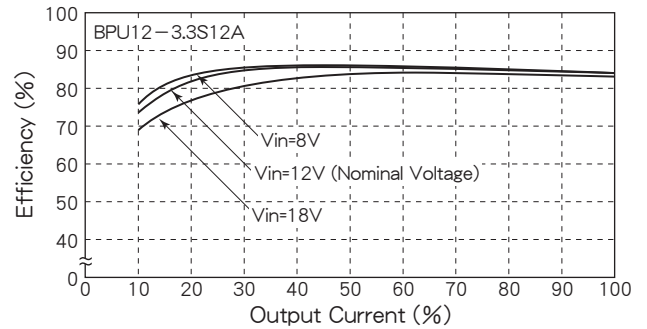


Fig. 5 Efficiency vs. Output Current

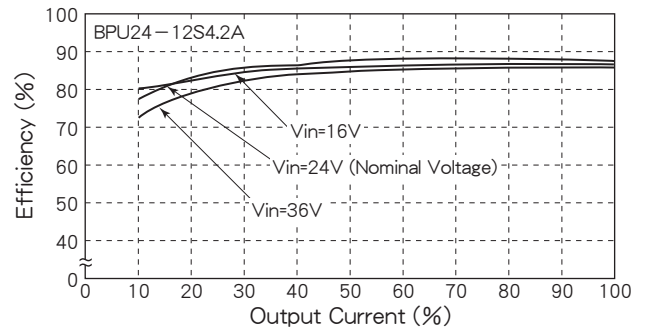


Fig. 6 Efficiency vs. Output Current

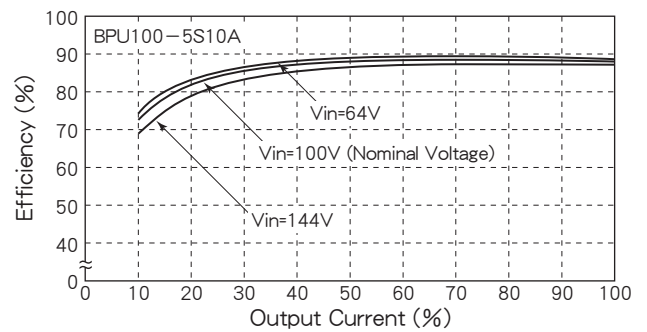


Fig. 7 Efficiency vs. Output Current

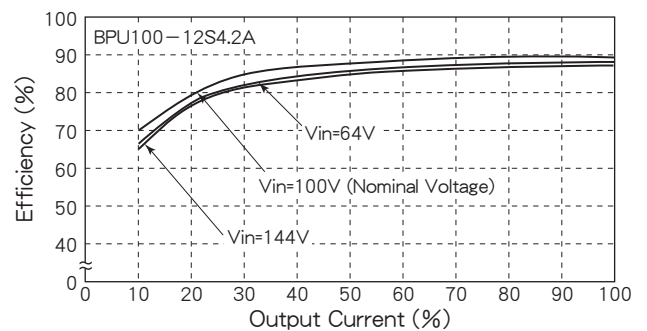
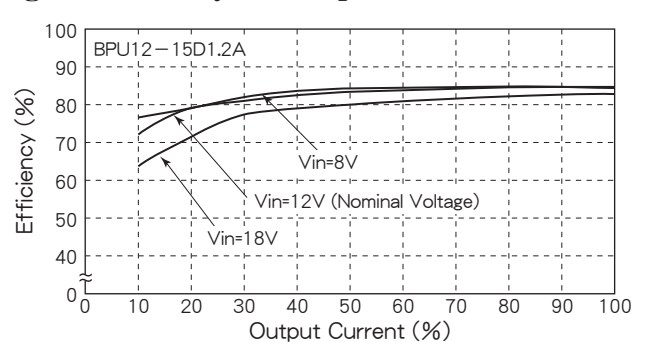


Fig. 8 Efficiency vs. Output Current



BTU SERIES

80~100W DC/DC CONVERTERS Single Output



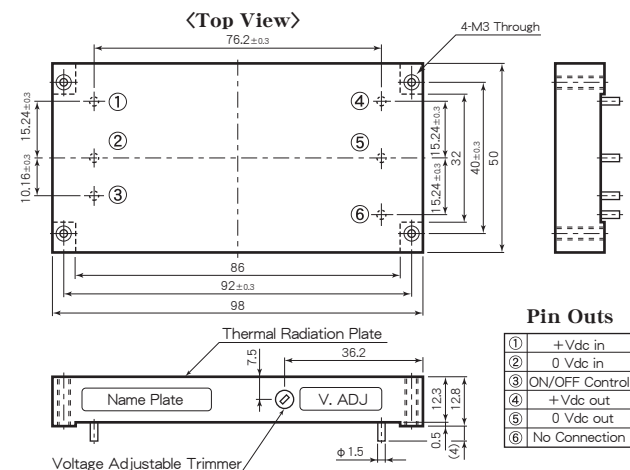
Features

- Low Profile 12.8mm
 - Built-in Input Filter
 - Input-Output Isolation
 - High Efficiency 88~91%
 - Wide Input Voltage Range
 - High Reliability
 - 6 Sided Metal Shielding
 - Remote ON/OFF Control
 - Adjustable Output Voltage $\pm 5\%$
 - Input Low Voltage Protection
 - Input Over Voltage Protection
 - Output Over Voltage Protection
 - 115~140% Operation
 - Thermal Protection
 - $+110^{\circ}\text{C} \sim +120^{\circ}\text{C}$
 - Operating Ambient Temperature
 - $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
 - Max. Case Temperature $+105^{\circ}\text{C}$
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 12.8mm
 - 入力フィルタ内蔵
 - 入出力間絶縁
 - 高効率 88~91%
 - 広範囲な入力電圧
 - 高信頼性
 - 6面メタルシールド
 - リモートON/OFFコントロール
 - 可変出力電圧 $\pm 5\%$
 - 入力低電圧保護回路内蔵
 - 入力過電圧保護回路内蔵
 - 出力過電圧保護回路内蔵
 - 115~140% 動作
 - 過熱保護回路内蔵
 - $+110^{\circ}\text{C} \sim +120^{\circ}\text{C}$
 - 動作周囲温度
 - $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
 - 最大ケース温度 105°C
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

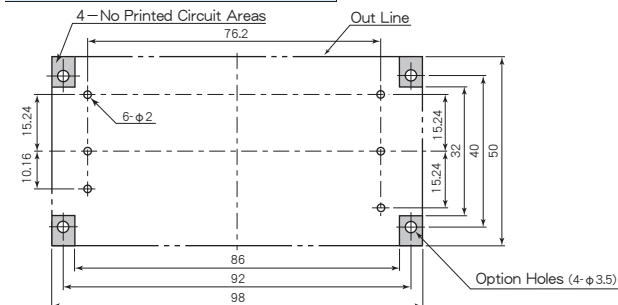
General Characteristics

- Input Voltage, Range
 - Output Voltage, Current
 - Output Voltage Range
 - Efficiency
 - Line Regulation
 - Load Regulation
 - Reflected Input Ripple, Noise
 - Output Ripple
 - Output Noise
 - Short Circuit Protection
 - Over Voltage Protection
 - Remote ON/OFF Control
- (at $T_a : 25^{\circ}\text{C}$, Full Load, Nominal V_{in})
- DC12, 24, 48, 100V (See Table 1)
See Table 1
 $\pm 5\%$ Adjustable
See Table 1
 $\pm 0.3\%$ max. (at V_{in} Range)
 $\pm 0.5\%$ max. (0~100% Load)
(3% V_{in})Vp-p max.
40mVp-p max.
100mVp-p max.
Built-in, Auto-restart (See Fig. 2)
115~140% Output Voltage
ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between pin ② ~ ③)
0.02%/°C max.
 $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$ (See Fig. 1)
 $+105^{\circ}\text{C}$
 $-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$
AC1500V 1 min.
AC2000V 1 min. (100V V_{in} only)
(Input-Output-Case)
100M Ω min. (at DC1000V)
(Input-Output-Case)
Main Body : 170g max.
Heat Sink : 73g max.
20~95% RH
490m/s² (11msec 3directions)
10~55Hz 98m/s²
(30minutes 3directions)
6 Sided Aluminum Case
260°C, for 15 seconds max.
360°C, for 5 seconds max.
400,000H
($T_a : 25^{\circ}\text{C}$, 80% Load, Nominal V_{in})
5 years
- Temperature Coefficient
 - Operating Ambient Temp.
 - Max. Case Temperature
 - Storage Temperature
 - Isolation Voltage
- Isolation Impedance
 - Weight
 - Humidity
 - Shock
 - Vibration
- Surface Structure
 - Soldering Conditions
 - Soldering DIP
 - Soldering iron
 - MTBF
 - Warranty

Pin Outs & Dimensions ($\pm 0.5\text{mm}$)

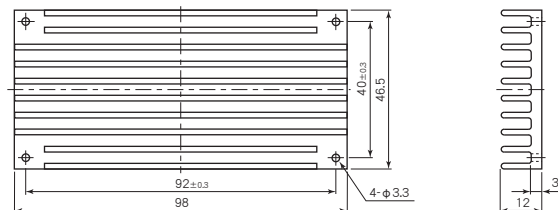


Holes on PCB (Top View)



Option Heat Sink

* Option Heat Sink Model : A3-7292



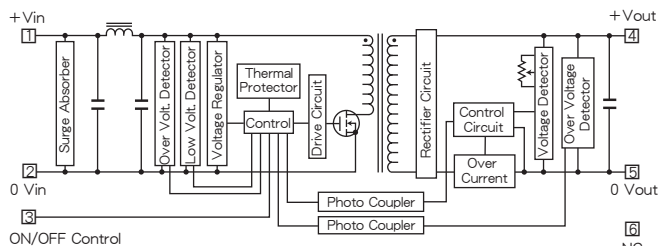
Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%)	
				20% Load	80% Load
BTU 12- 3.3S 24A	12 (8~18)	3.3	24	88	88
BTU 12- 5S 20A		5	20	87	89
BTU 12- 6S16.7A		6	16.7	87	89
BTU 12- 12S 8.4A		12	8.4	87	89
BTU 12- 15S 6.7A		15	6.7	86	89
BTU 12- 24S 4.2A	24 (16~36)	24	4.2	85	89
BTU 24- 3.3S 24A		3.3	24	88	88
BTU 24- 5S 20A		5	20	88	90
BTU 24- 6S16.7A		6	16.7	88	90
BTU 24- 12S 8.4A		12	8.4	86	90
BTU 24- 15S 6.7A	48 (32~72)	15	6.7	86	91
BTU 24- 24S 4.2A		24	4.2	86	91
BTU 48- 3.3S 24A		3.3	24	87	88
BTU 48- 5S 20A		5	20	87	90
BTU 48- 6S16.7A		6	16.7	87	90
BTU 48- 12S 8.4A	100 (64~144)	12	8.4	87	91
BTU 48- 15S 6.7A		15	6.7	86	91
BTU 48- 24S 4.2A		24	4.2	86	91
BTU100- 3.3S 24A		3.3	24	85	88
BTU100- 5S 20A		5	20	86	90
BTU100- 6S16.7A		6	16.7	86	90
BTU100- 12S 8.4A		12	8.4	86	91
BTU100- 15S 6.7A		15	6.7	86	91
BTU100- 24S 4.2A		24	4.2	86	89

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

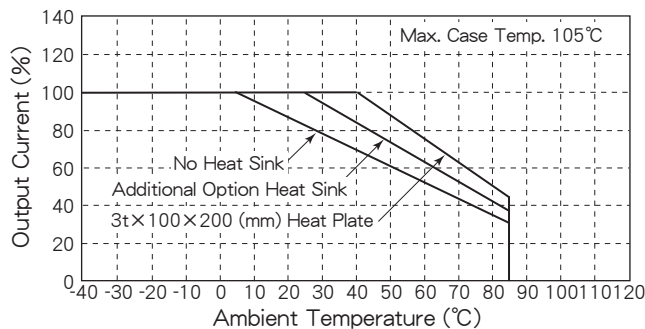


Fig. 2 Short Circuit Operating Area

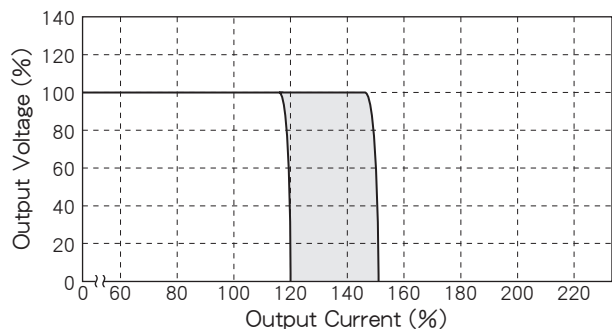


Fig. 3 Temperature Characteristic on Case Surface

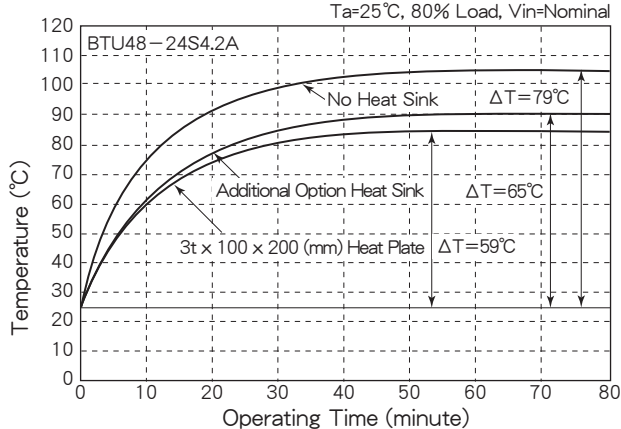


Fig. 4 Efficiency vs. Output Current

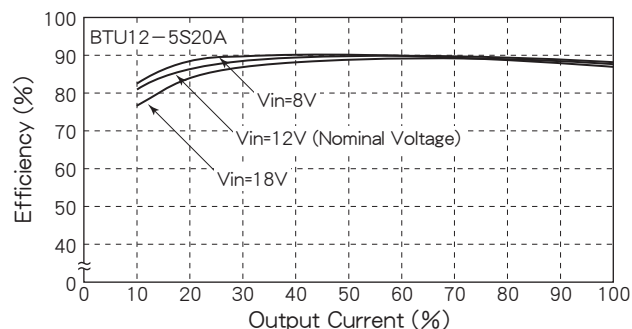


Fig. 5 Efficiency vs. Output Current

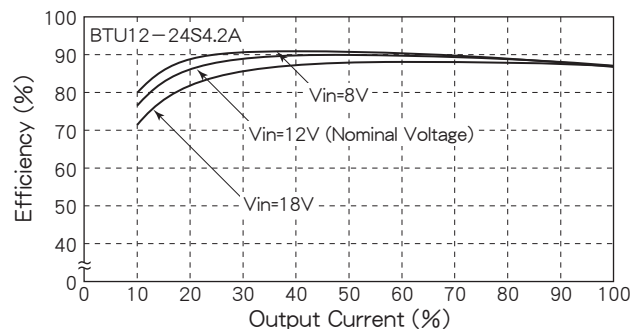


Fig. 6 Efficiency vs. Output Current

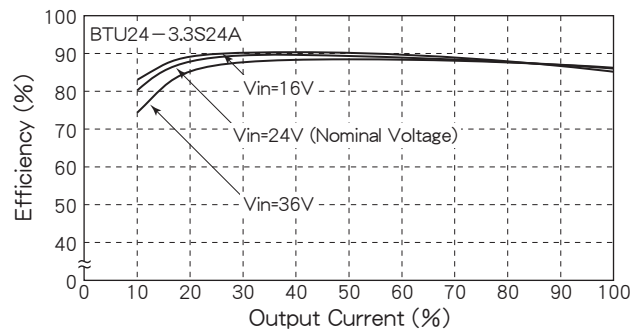


Fig. 7 Efficiency vs. Output Current

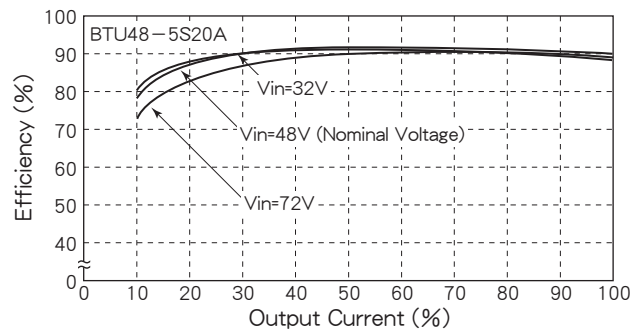
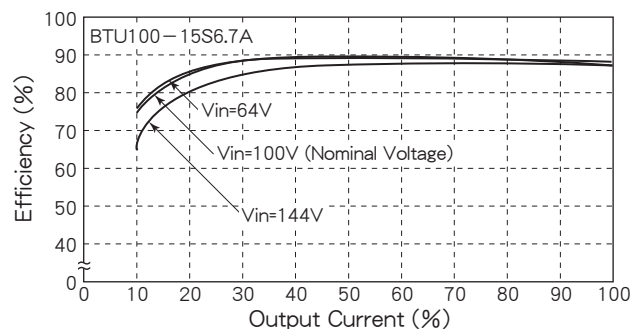


Fig. 8 Efficiency vs. Output Current



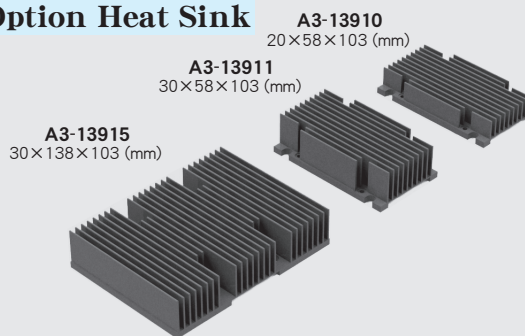
KMP SERIES

105~200W DC/DC CONVERTERS Single Output



H20×W60×L105 (mm)

Option Heat Sink



Features

- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 87~91%
- Wide Input Voltage Range
- High Reliability
- 6 Sided Metal Shielding
- Adjustable Output Volt. $\pm 8\%$
- Input Low Voltage Protection
- Input Over Voltage Protection
- Output Over Voltage Protection
- Thermal Protection
+110°C~+120°C
- Remote ON/OFF Control
- Operating Ambient Temperature
-40°C~+85°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 87~91%
- 広範囲な入力電圧
- 高信頼性
- 6面メタルシールド
- 可変出力電圧 $\pm 8\%$
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 出力過電圧保護回路内蔵
- 過熱保護回路内蔵
+110°C~+120°C
- リモートON/OFFコントロール
- 動作周囲温度
-40°C~+85°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin)
DC12, 24, 48, 100, 140V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Accuracy $\pm 2\%$
 $\pm 3\%$ (3.3, 5, 6V Vout only)
- Output Voltage Range $\pm 8\%$ Adjustable (Used trimmer)
- Efficiency See Table 1
- Line Regulation $\pm 0.3\%$ max. (at Vin Range)
- Load Regulation $\pm 1\%$ max.
 $\pm 1.5\%$ max. (3.3, 5, 6V Vout only)
(0~100% Load)
- Reflected Input Ripple, Noise (5% Vin)Vp-p max.
80mVp-p max.
- Output Ripple (0.5% Vout+100mV)p-p max.
- Output Noise Built-in, Auto-restart (See Fig. 5)
- Short Circuit Protection 115~140% Output Voltage
- Over Voltage Protection ON : Short or 0~0.8V
- Remote ON/OFF Control OFF : Open or 2~10V
(Between pin ② ~ ③)
0.02%/°C max.
- Temperature Coefficient -40°C~+85°C (See Fig. 1)
- Operating Ambient Temp. +105°C
- Max. Case Temperature -55°C~+125°C
- Storage Temperature AC2000V one minute
(Input-Output-Case)
- Isolation Voltage 100M Ω min. (at DC1000V)
(Input-Output-Case)
- Isolation Impedance Main Body : 300g max.
- Weight Heat Sink
A3-13910 : 135g max.
A3-13911 : 175g max.
A3-13915 : 425g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s²
(30minutes 3directions)
- Surface Structure Aluminum Case
- Soldering Conditions 260°C, for 15 seconds max.
Soldering DIP 360°C, for 5 seconds max.
- Soldering iron
- MTBF 400,000H
(Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

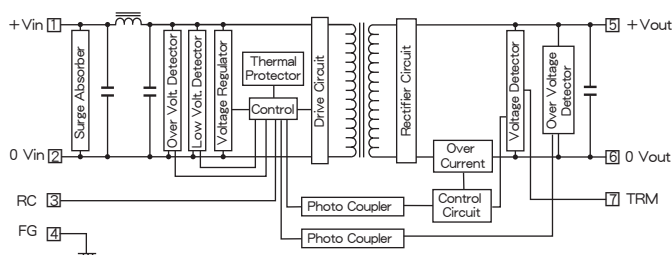
Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%)		
				20% Load	50% Load	80% Load
KMP12 - 3.3S 32A	12 (8~18) at 50% Load (9~18) at 100% Load	3.3	32	85	88	87
KMP12 - 5S 28A		5	28	86	90	88
KMP12 - 6S23.3A		6	23.3	86	90	88
KMP12 - 12S13.4A		12	13.4	87	90	89
KMP12 - 13.8S11.6A		13.8	11.6	87	90	89
KMP12 - 15S10.7A		15	10.7	87	90	89
KMP12 - 24S 6.7A		24	6.7	87	90	89
KMP12 - 28S 5.8A		28	5.8	87	90	89
KMP12 - 48S 3.4A		48	3.4	87	90	89
KMP24 - 3.3S 40A		3.3	40	88	91	90
KMP24 - 5S 32A	24 (16~36)	5	32	90	92	91
KMP24 - 6S26.6A		6	26.6	90	92	91
KMP24 - 12S16.7A		12	16.7	90	92	91
KMP24 - 13.8S14.5A		13.8	14.5	90	92	91
KMP24 - 15S13.4A		15	13.4	90	92	91
KMP24 - 24S 8.4A		24	8.4	90	92	91
KMP24 - 28S 7.2A		28	7.2	90	92	91
KMP24 - 48S 4.2A		48	4.2	90	92	91
KMP48 - 3.3S 40A		3.3	40	88	91	90
KMP48 - 5S 32A	48 (36~76)	5	32	91	92	91
KMP48 - 6S26.6A		6	26.6	91	92	91
KMP48 - 12S16.7A		12	16.7	91	92	91
KMP48 - 13.8S14.5A		13.8	14.5	91	92	91
KMP48 - 15S13.4A		15	13.4	91	92	91
KMP48 - 24S 8.4A		24	8.4	91	92	91
KMP48 - 28S 7.2A		28	7.2	91	92	91
KMP48 - 48S 4.2A		48	4.2	91	92	91
KMP100 - 3.3S 40A		3.3	40	85	91	90
KMP100 - 5S 32A	100 (64~144)	5	32	87	92	91
KMP100 - 6S26.6A		6	26.6	87	92	91
KMP100 - 12S16.7A		12	16.7	87	92	91
KMP100 - 13.8S14.5A		13.8	14.5	87	92	91
KMP100 - 15S13.4A		15	13.4	87	92	91
KMP100 - 24S 8.4A		24	8.4	87	92	91
KMP100 - 28S 7.2A		28	7.2	87	92	91
KMP100 - 48S 4.2A		48	4.2	87	92	91
KMP140 - 3.3S 40A		3.3	40	85	91	90
KMP140 - 5S 32A	140 (90~200)	5	32	87	92	91
KMP140 - 6S26.6A		6	26.6	87	92	91
KMP140 - 12S16.7A		12	16.7	87	92	91
KMP140 - 13.8S14.5A		13.8	14.5	87	92	91
KMP140 - 15S13.4A		15	13.4	87	92	91
KMP140 - 24S 8.4A		24	8.4	87	92	91
KMP140 - 28S 7.2A		28	7.2	87	92	91
KMP140 - 48S 4.2A		48	4.2	87	92	91

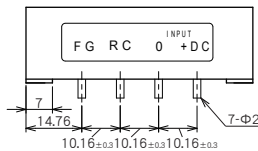
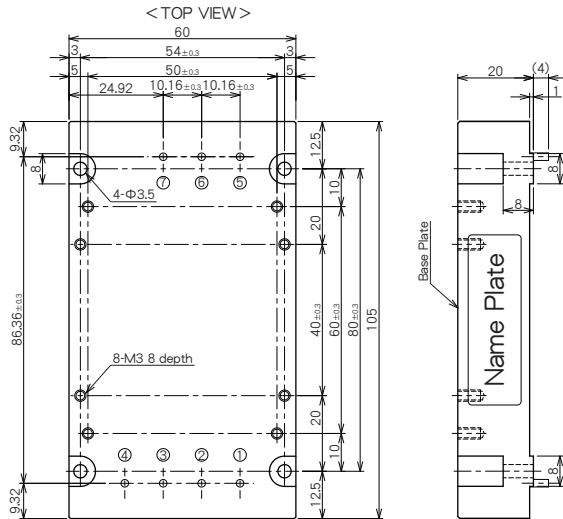
* 上記仕様以外にも対応可能ですのでお問い合わせください。
Please consult with us about other specification.

Block Diagram



KMP SERIES DATA SHEET

Pin Outs & Dimensions ($\pm 0.5\text{mm}$)

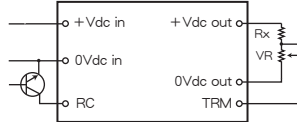


Pin Outs

①	+Vdc in
②	0 Vdc in
③	RC
④	FG
⑤	+Vdc out
⑥	0 Vdc out
⑦	TRM

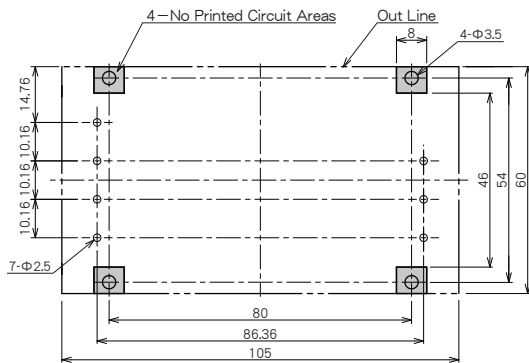
Application

ON/OFF Control and Vout Adjustment



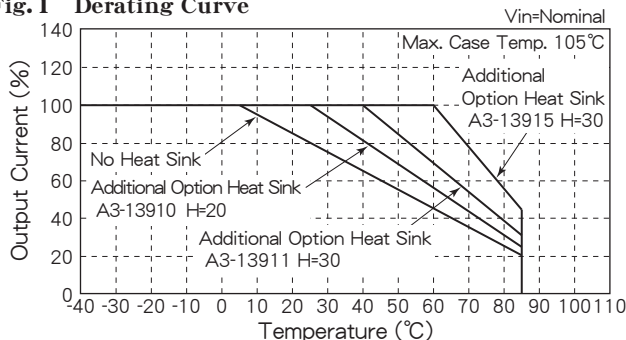
Vout (V)	3.3V	5V	6V	12V	13.8V	15V	24V	28V	48V
VR (Ω)	50k	50k	50k	50k	50k	50k	50k	50k	50k
Rx (Ω)	6.2k	3k	6.8k	13k	16k	20k	39k	51k	150k

Holes on PCB (Top View)



Characteristic Curves

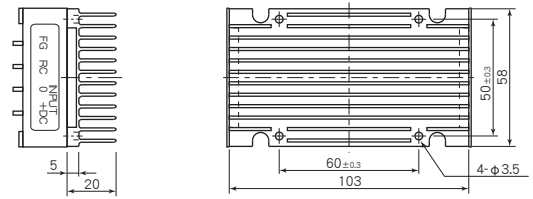
Fig. 1 Derating Curve



Option Heat Sink

Fig. 2 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13910



KMP24-12S16.7A Additional Heat Sink A3-13910
Ta=25°C, 100% Load, Vin=Nominal

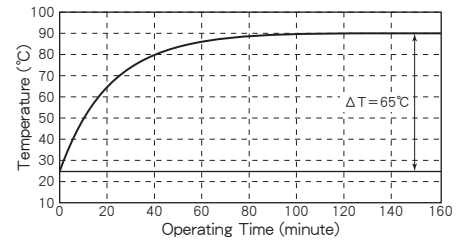
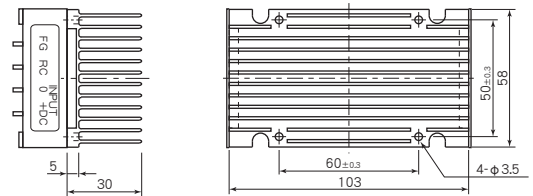


Fig. 3 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13911



KMP24-12S16.7A Additional Heat Sink A3-13911
Ta=25°C, 100% Load, Vin=Nominal

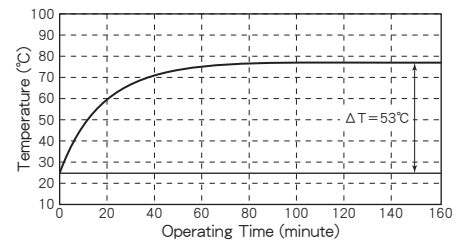
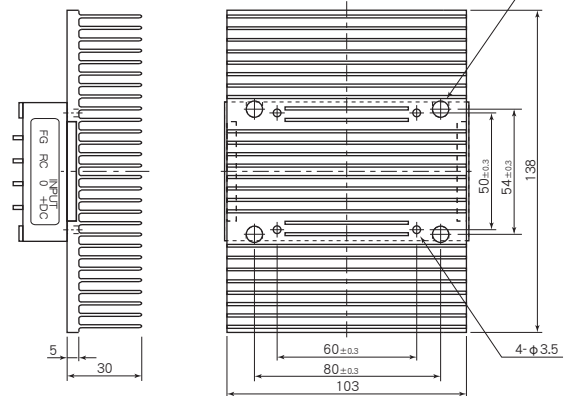


Fig. 4 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13915



KMP24-12S16.7A Additional Heat Sink A3-13915
Ta=25°C, 100% Load, Vin=Nominal

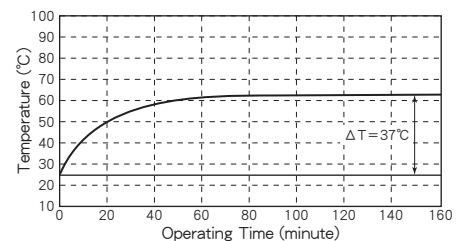


Fig. 5 Short Circuit Operating Area

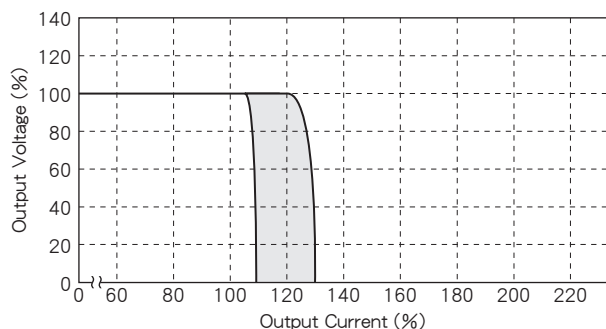


Fig. 6 Efficiency vs. Output Current

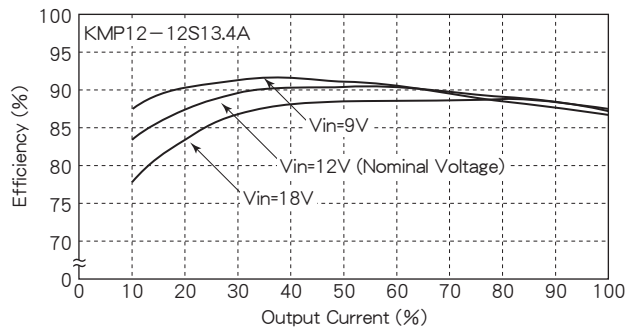


Fig. 7 Efficiency vs. Output Current

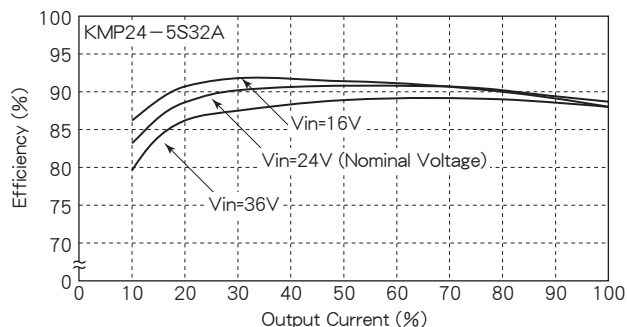


Fig. 8 Efficiency vs. Output Current

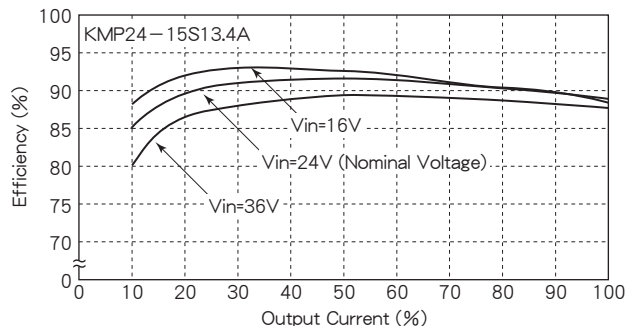


Fig. 9 Efficiency vs. Output Current

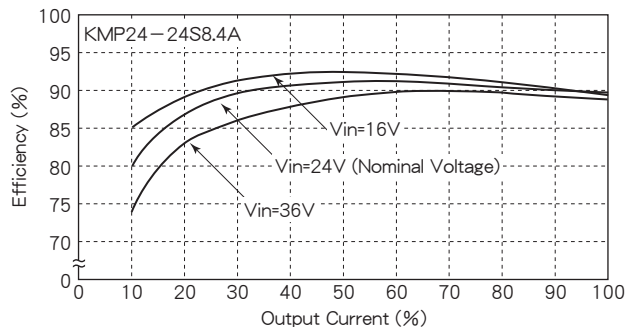


Fig. 10 Efficiency vs. Output Current

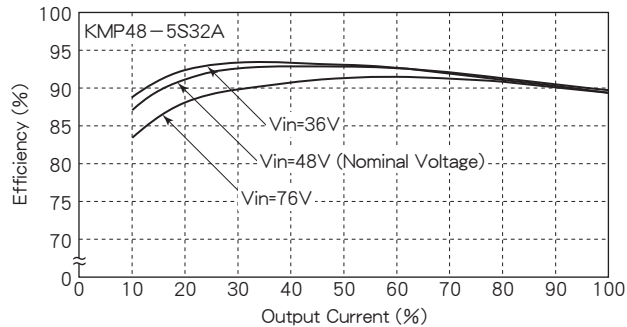


Fig. 11 Efficiency vs. Output Current

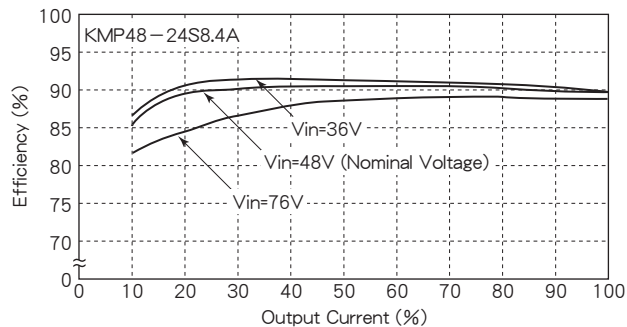
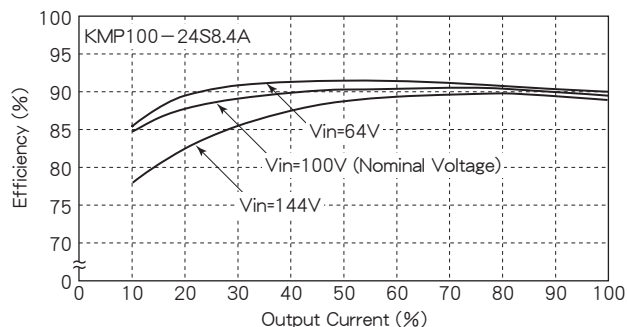
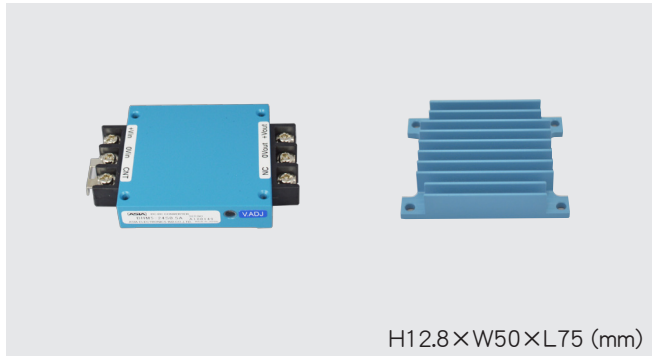


Fig. 12 Efficiency vs. Output Current



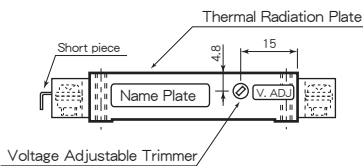
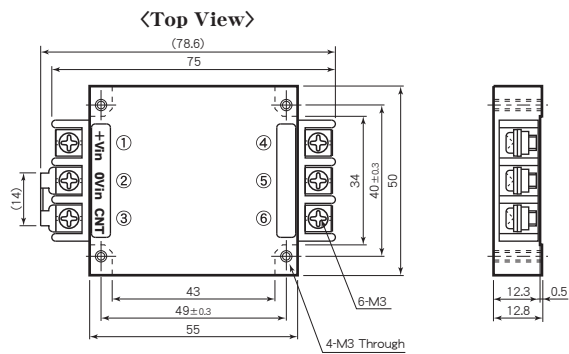
BHM SERIES

7~15W DC/DC CONVERTERS Single Output & Dual Outputs



H12.8×W50×L75 (mm)

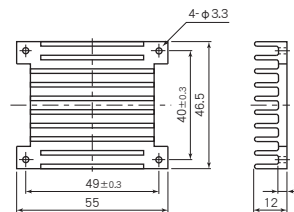
■ Terminal Outs & Dimensions (±0.5mm)



Terminal Outs

Single Output		Dual Outputs	
①	+Vdc in	①	+Vdc in
②	0 Vdc in	②	0 Vdc in
③	ON/OFF Control	③	ON/OFF Control
④	+Vdc out	④	+Vdc out
⑤	0 Vdc out	⑤	Common
⑥	No Connection	⑥	-Vdc out

■ Option Heat Sink



* Option Heat Sink Model : A3-13988

■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical) (%)
BHM 5-3.3 S 2 A	5 (4.5~9)	3.3	2	83
BHM 5-5 S 2 A		5	2	82
BHM 5-6 S 1.8 A		6	1.8	82
BHM 5-12 S 1 A		12	1	84
BHM 5-15 S 0.8 A		15	0.8	83
BHM 5-24 S 0.5 A		24	0.5	83
BHM 5-28 S 0.4 A		28	0.4	83
BHM 5-5 D 1 A		±5	±1	77
BHM 5-12 D 0.5 A		±12	±0.5	81
BHM 5-15 D 0.4 A		±15	±0.4	81
BHM 12-3.3 S 2.4 A	12 (8~18)	3.3	2.4	83
BHM 12-5 S 2.4 A		5	2.4	85
BHM 12-6 S 2.2 A		6	2.2	85
BHM 12-12 S 1.3 A		12	1.3	85
BHM 12-15 S 1 A		15	1	85
BHM 12-24 S 0.65 A		24	0.65	85
BHM 12-28 S 0.5 A		28	0.5	85
BHM 12-48 S 0.3 A		48	0.3	85
BHM 12-5 D 1.2 A		±5	±1.2	78
BHM 12-12 D 0.65 A		±12	±0.65	83
BHM 12-15 D 0.5 A		±15	±0.5	83
BHM 24-3.3 S 2.4 A	24 (16~36)	3.3	2.4	84
BHM 24-5 S 2.4 A		5	2.4	86
BHM 24-6 S 2.2 A		6	2.2	86
BHM 24-12 S 1.3 A		12	1.3	86
BHM 24-15 S 1 A		15	1	86
BHM 24-24 S 0.65 A		24	0.65	86
BHM 24-28 S 0.5 A		28	0.5	86
BHM 24-48 S 0.3 A		48	0.3	85
BHM 24-5 D 1.2 A		±5	±1.2	78
BHM 24-12 D 0.65 A		±12	±0.65	83
BHM 24-15 D 0.5 A		±15	±0.5	83
BHM 48-3.3 S 2.4 A	48 (32~76)	3.3	2.4	83
BHM 48-5 S 2.4 A		5	2.4	86
BHM 48-6 S 2.2 A		6	2.2	86
BHM 48-12 S 1.3 A		12	1.3	88
BHM 48-15 S 1 A		15	1	88
BHM 48-24 S 0.65 A		24	0.65	86
BHM 48-28 S 0.5 A		28	0.5	86
BHM 48-5 D 1.2 A		±5	±1.2	80
BHM 48-12 D 0.65 A		±12	±0.65	85
BHM 48-15 D 0.5 A		±15	±0.5	85

* 上記仕様以外にも対応可能ですのでお問い合わせ下さい。
Please consult with us about other specification.

■ Features

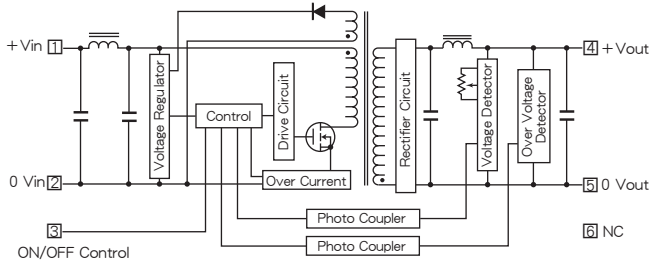
- Low Profile 12.8mm
- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 77~88%
- Wide Input Voltage Range
- High Reliability
- 6 Sided Metal Shielding
- Remote ON/OFF Control
- Adjustable Output Volt. ±5%
- Output Over Voltage Protection 115~140% Operation
- Operating Ambient Temperature -40℃~+85℃
- Max. Case Temperature +105℃
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 12.8mm
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 77~88%
- 広範囲な入力電圧
- 高信頼性
- 6面メタルシールド
- リモートON/OFFコントロール
- 可変出力電圧 ±5%
- 出力過電圧保護回路内蔵 115~140% 動作
- 動作周囲温度 -40℃~+85℃
- 最大ケース温度 +105℃
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

■ General Characteristics

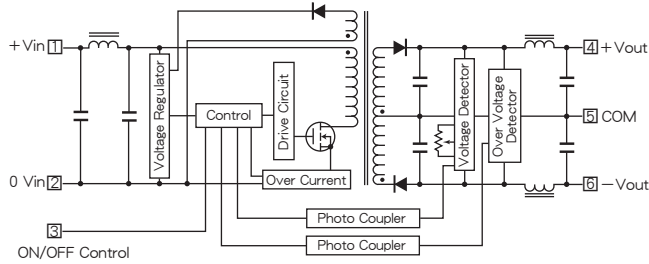
- Input Voltage, Range
 - Output Voltage, Current
 - Output Voltage Range
 - Efficiency
 - Line Regulation
 - Load Regulation
 - Reflected Input Ripple, Noise
 - Output Ripple
 - Output Noise
 - Short Circuit Protection
 - Over Voltage Protection
 - Remote ON/OFF Control
 - Temperature Coefficient
 - Operating Ambient Temp.
 - Max. Case Temperature
 - Storage Temperature
 - Isolation Voltage
 - Isolation Impedance
 - Weight
 - Humidity
 - Shock
 - Vibration
 - Surface Structure
 - MTBF
 - Warranty
- (at Ta : 25℃, Full Load, Nominal Vin)
DC5, 12, 24, 48V (See Table 1)
See Table 1
±5% Adjustable
See Table 1
±0.3% max. (at Vin Range)
Single : ±0.5% max. (0~100% Load)
Dual : ±3% max. (10~100% Load)
(3% Vin) Vp-p max.
40mVp-p max.
100mVp-p max. (48V Vout only)
100mVp-p max.
200mVp-p max. (48V Vout only)
Built-in, Auto-restart (See Fig. 2)
115~140% Output Voltage
ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between terminal ② ~ ③)
0.02%/℃ max.
-40℃~+85℃ (See Fig. 1)
-30℃~+85℃ (5V Vin only)
+105℃
-40℃~+115℃
AC1500V one minute
(Input-Output-Case)
100MΩ min. (at DC1000V)
(Input-Output-Case)
Main Body : 100g max.
Heat Sink : 40g max.
20~95% RH
490m/s² (11msec 3directions)
10~55Hz 98m/s²
(30minutes 3directions)
6 Sided Aluminum Case
Single : 1,000,000H
Dual : 700,000H
(Ta : 25℃, 80% Load, Nominal Vin)
5 years

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

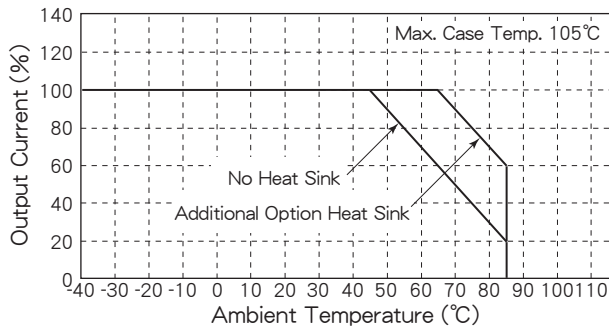


Fig. 2 Short Circuit Operating Area

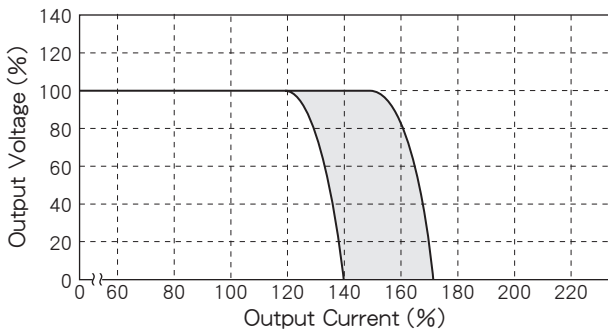


Fig. 3 Temperature Characteristic on Case Surface

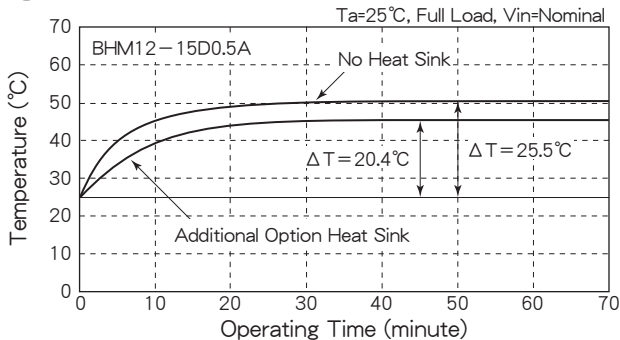


Fig. 4 Efficiency vs. Output Current

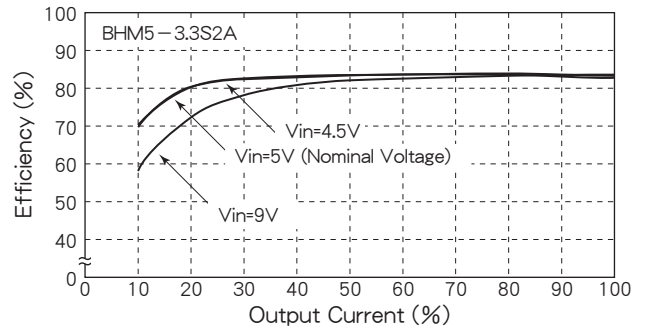


Fig. 5 Efficiency vs. Output Current

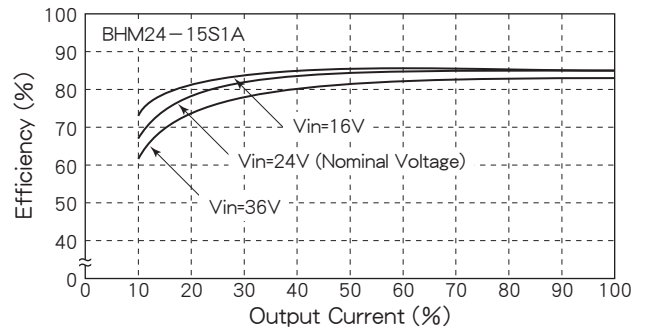


Fig. 6 Efficiency vs. Output Current

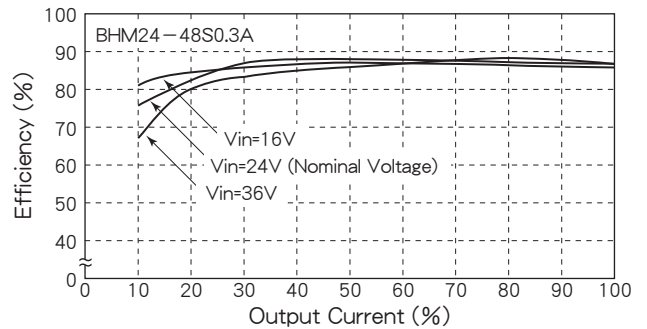


Fig. 7 Efficiency vs. Output Current

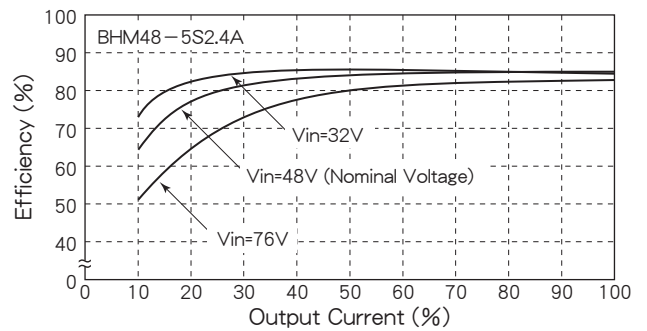
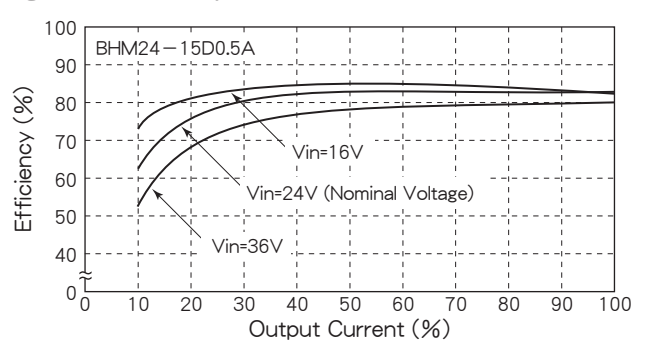
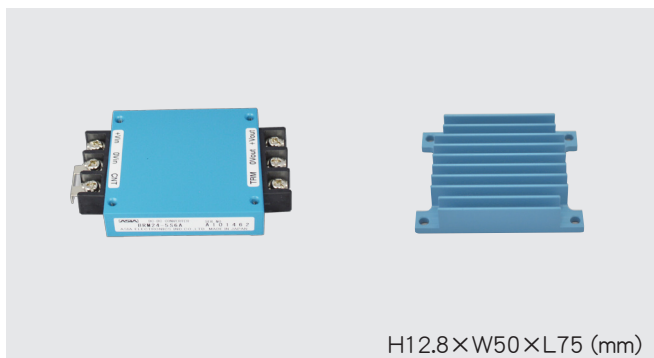


Fig. 8 Efficiency vs. Output Current



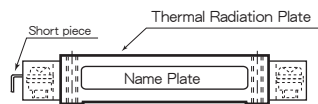
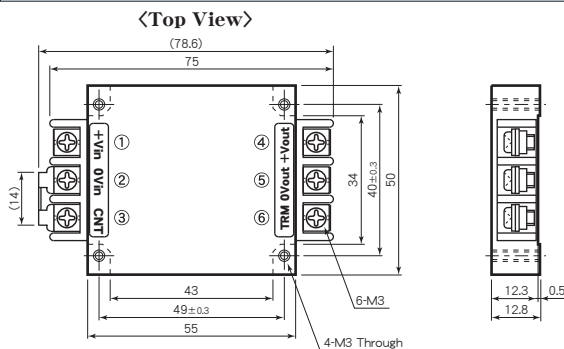
BRM SERIES

23~30W DC/DC CONVERTERS Single Output



H12.8×W50×L75 (mm)

■ Terminal Outs & Dimensions (±0.5mm)



Application

ON/OFF Control and Vout Adjustment

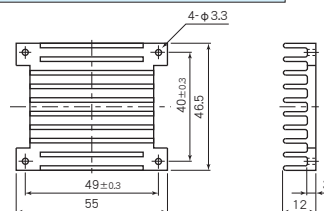


Terminal Outs

①	+Vdc in
②	0 Vdc in
③	ON/OFF Control
④	+Vdc out
⑤	0 Vdc out
⑥	TRM

Vout (V)	3.3V	5V	6V	12V	15V	24V	28V	48V
VR (Ω)	50k	50k	50k	50k	50k	50k	50k	50k
Rx (Ω)	10k	33k	47k	47k	62k	110k	130k	220k

■ Option Heat Sink



* Option Heat Sink Model : A3-13988

■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%)	
				20% Load	80% Load
BRM 12 - 3.3 S 7A	12 (8~18)	3.3	7	84	87
BRM 12 - 5 S 6A		5	6	84	90
BRM 12 - 6 S 5A		6	5	84	90
BRM 12 - 12 S 2.5A		12	2.5	84	90
BRM 12 - 15 S 2A		15	2	84	90
BRM 12 - 24 S 1.25A		24	1.25	84	90
BRM 12 - 28 S 1.07A		28	1.07	84	90
BRM 12 - 48 S 0.6A		48	0.6	84	90
BRM 24 - 3.3 S 7A	24 (16~36)	3.3	7	84	87
BRM 24 - 5 S 6A		5	6	84	90
BRM 24 - 6 S 5A		6	5	84	90
BRM 24 - 12 S 2.5A		12	2.5	84	90
BRM 24 - 15 S 2A		15	2	84	90
BRM 24 - 24 S 1.25A		24	1.25	84	90
BRM 24 - 28 S 1.07A		28	1.07	84	90
BRM 24 - 48 S 0.6A		48	0.6	84	90
BRM 48 - 3.3 S 7A	48 (32~76)	3.3	7	84	87
BRM 48 - 5 S 6A		5	6	84	90
BRM 48 - 6 S 5A		6	5	84	90
BRM 48 - 12 S 2.5A		12	2.5	84	90
BRM 48 - 15 S 2A		15	2	84	90
BRM 48 - 24 S 1.25A		24	1.25	84	90
BRM 48 - 28 S 1.07A		28	1.07	84	90
BRM 100 - 3.3 S 7A	100 (64~144)	3.3	7	84	87
BRM 100 - 5 S 6A		5	6	84	90
BRM 100 - 6 S 5A		6	5	84	90
BRM 100 - 12 S 2.5A		12	2.5	84	90
BRM 100 - 15 S 2A		15	2	84	90
BRM 100 - 24 S 1.25A		24	1.25	84	90
BRM 100 - 28 S 1.07A		28	1.07	84	90

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Features

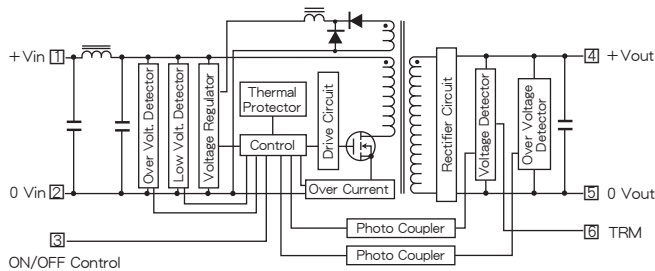
- Low Profile 12.8mm
 - Built-in Input Filter
 - Input-Output Isolation (AC2000V)
 - High Efficiency 87~90%
 - Wide Input Voltage Range
 - High Reliability
 - 6 Sided Metal Shielding
 - Remote ON/OFF Control
 - Adjustable Output Volt. ±5%
 - Input Low Voltage Protection
 - Input Over Voltage Protection
 - Output Over Voltage Protection 115~140% Operation
 - Thermal Protection +110°C~+120°C
 - Operating Ambient Temperature -40°C~+85°C
 - Max. Case Temperature +105°C
 - Conformity to RoHS2 Directive
 - Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 12.8mm
 - 入力フィルタ内蔵
 - 入出力間絶縁 (AC2000V)
 - 高効率 87~90%
 - 広範囲な入力電圧
 - 高信頼性
 - 6面メタルシールド
 - リモートON/OFFコントロール
 - 可変出力電圧 ±5%
 - 入力低電圧保護回路内蔵
 - 入力過電圧保護回路内蔵
 - 出力過電圧保護回路内蔵 115~140% 動作
 - 過熱保護回路内蔵 +110°C~+120°C
 - 動作周囲温度 -40°C~+85°C
 - 最大ケース温度 +105°C
 - RoHS2指令対応
 - アルミ電解コンデンサ及びタンタルコンデンサ不使用

■ General Characteristics

- Input Voltage, Range
 - Output Voltage, Current
 - Output Voltage Accuracy
- (at Ta : 25°C, Full Load, Nominal Vin)
DC12, 24, 48, 100V (See Table 1)
See Table 1
±2%
±3% (3.3, 5, 6V Vout only)
±5% Adjustable (Used trimmer)
See Table 1
±0.3% max. (at Vin Range)
±0.5% max. (0~100% Load)
(3% Vin) Vp-p max.
40mVp-p max.
100mVp-p max. (48V Vout only)
100mVp-p max.
200mVp-p max. (48V Vout only)
Built-in, Auto-restart (See Fig. 2)
115~140% Output Voltage
ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between terminal ② ~ ③)
0.02%/°C max.
-40°C~+85°C (See Fig. 1)
+105°C
AC2000V one minute
(Input-Output-Case)
100MΩ min. (at DC1000V)
(Input-Output-Case)
Main Body : 100g max.
Heat Sink : 40g max.
20~95% RH
490m/s² (11msec 3directions)
10~55Hz 98m/s²
(30minutes 3directions)
6 Sided Aluminum Case
500,000H
(Ta : 25°C, 80% Load, Nominal Vin)
5 years
- Output Voltage Range
 - Efficiency
 - Line Regulation
 - Load Regulation
 - Reflected Input Ripple, Noise
 - Output Ripple
 - Output Noise
 - Short Circuit Protection
 - Over Voltage Protection
 - Remote ON/OFF Control
 - Temperature Coefficient
 - Operating Ambient Temp.
 - Max. Case Temperature
 - Storage Temperature
 - Isolation Voltage
 - Isolation Impedance
 - Weight
 - Humidity
 - Shock
 - Vibration
 - Surface Structure
 - MTBF
 - Warranty

BRM SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

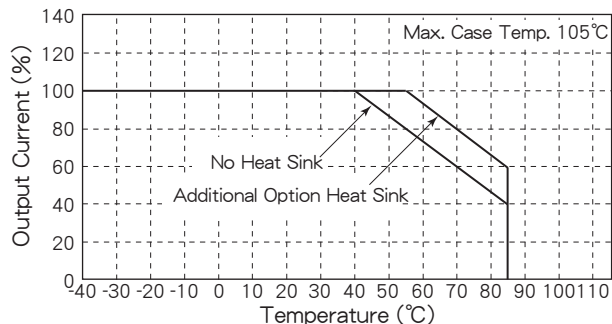


Fig. 2 Short Circuit Operating Area

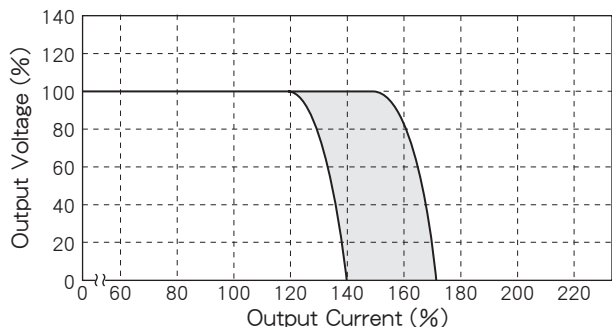


Fig. 3 Temperature Characteristic on Case Surface

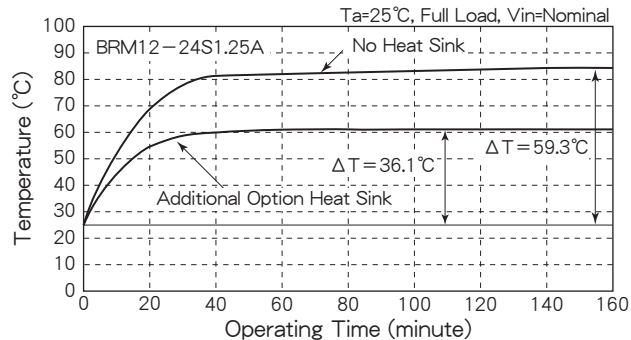


Fig. 4 Efficiency vs. Output Current

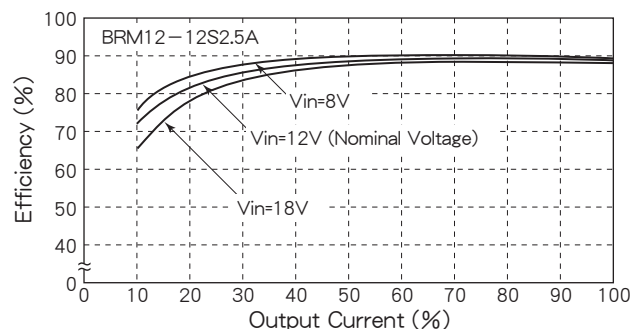


Fig. 5 Efficiency vs. Output Current

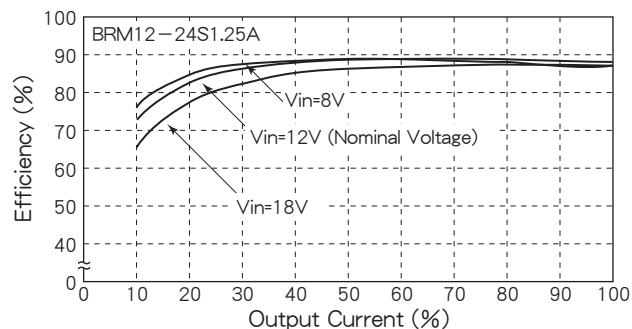


Fig. 6 Efficiency vs. Output Current

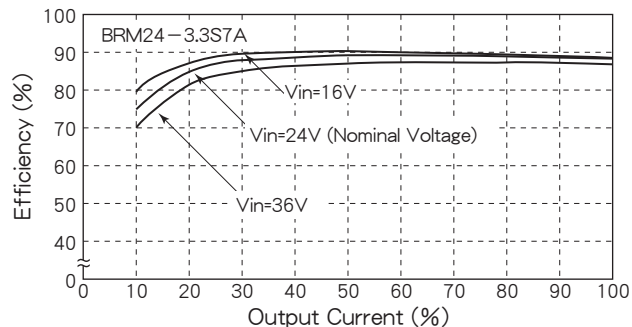


Fig. 7 Efficiency vs. Output Current

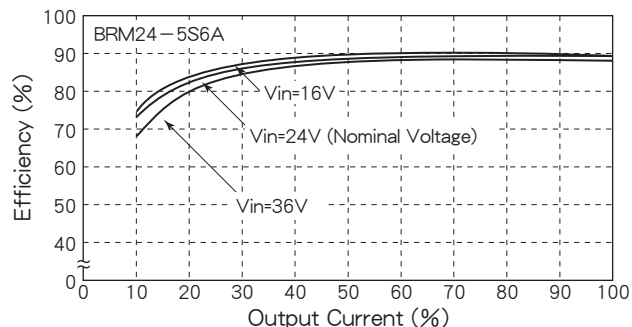


Fig. 8 Efficiency vs. Output Current

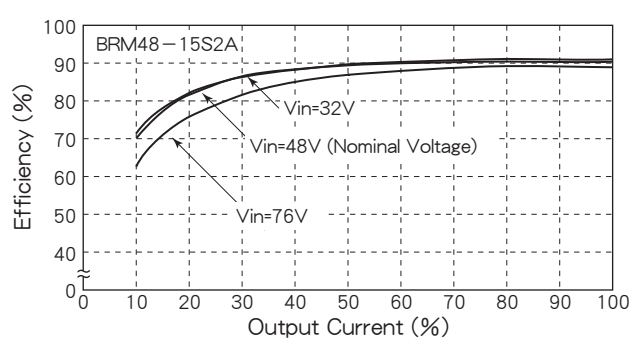
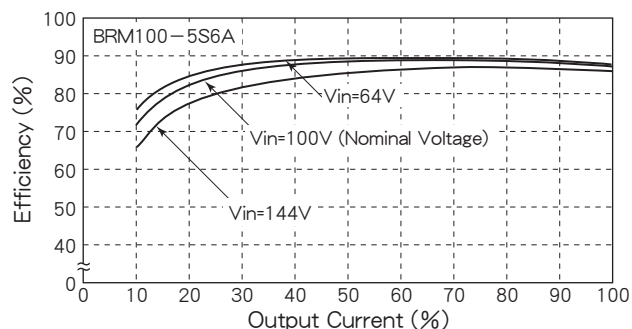


Fig. 9 Efficiency vs. Output Current



BPM SERIES

20~50W DC/DC CONVERTERS Single Output & Dual Outputs



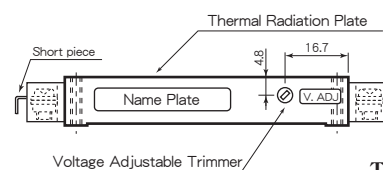
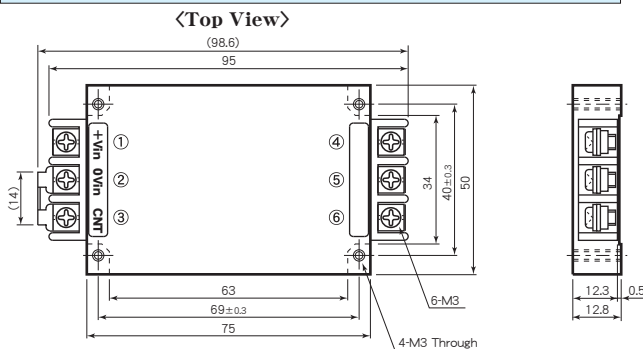
H12.8×W50×L95 (mm)

■ Features

- Low Profile 12.8mm
- 6 Sided Metal Shielding
- Built-in Input Filter
- Wide Input Voltage Range
- Input-Output Isolation
- Adjustable Output Volt. $\pm 5\%$
- High Efficiency 81~90%
- Remote ON/OFF Control
- Input Low Voltage Protection
- Input Over Voltage Protection
- Output Over Voltage Protection
- 115~140% Operation
- Thermal Protection
- +110°C~+120°C
- Operating Ambient Temperature
- -40°C~+85°C
- Max. Case Temperature +105°C
- High Reliability
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor

- 薄型 12.8mm
- 6面メタルシールド
- 入力フィルタ内蔵
- 広範囲な入力電圧
- 入出力間絶縁
- 可変出力電圧 $\pm 5\%$
- 高効率 81~90%
- リモートON/OFFコントロール
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 出力過電圧保護回路内蔵
- 115~140% 動作
- 過熱保護回路内蔵
- +110°C~+120°C
- 動作周囲温度
- -40°C~+85°C
- 最大ケース温度 +105°C
- 高信頼性
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

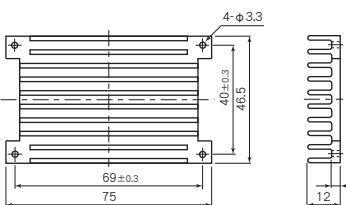
■ Terminal Outs & Dimensions ($\pm 0.5\text{mm}$)



Terminal Outs

Single Output	Dual Outputs
① +Vdc in	① +Vdc in
② 0 Vdc in	② 0 Vdc in
③ ON/OFF Control	③ ON/OFF Control
④ +Vdc out	④ +Vdc out
⑤ 0 Vdc out	⑤ Common
⑥ No Connection	⑥ -Vdc out

■ Option Heat Sink



* Option Heat Sink Model : A3-13987

■ General Characteristics

- Input Voltage, Range
- Output Voltage, Current
- Output Voltage Range
- Efficiency
- Line Regulation
- Load Regulation
- Reflected Input Ripple, Noise
- Output Ripple
- Output Noise
- Short Circuit Protection
- Over Voltage Protection
- Remote ON/OFF Control
- Temperature Coefficient
- Operating Ambient Temp.
- Max. Case Temperature
- Storage Temperature
- Isolation Voltage
- Isolation Impedance
- Weight
- Humidity
- Shock
- Vibration
- Surface Structure
- MTBF
- Warranty

(at Ta : 25°C, Full Load, Nominal Vin)
DC12, 24, 48, 100V (See Table 1)
See Table 1
 $\pm 5\%$ Adjustable
See Table 1
 $\pm 0.3\%$ max. (at Vin Range)
Single : $\pm 0.5\%$ max. (0~100% Load)
Dual : $\pm 3\%$ max. (10~100% Load)
(3% Vin) Vp-p max.
40mVp-p max.
100mVp-p max.
Built-in, Auto-restart (See Fig. 2)
115~140% Output Voltage
ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between terminal ② ~ ③)
0.02%/°C max.
-40°C~+85°C (See Fig. 1)
+105°C
-40°C~+115°C
AC1500V 1 min.
AC2000V 1 min. (100V Vin only)
(Input-Output-Case)
100M Ω min. (at DC1000V)
(Input-Output-Case)
Main Body : 150g max.
Heat Sink : 55g max.
20~95% RH
490m/s² (11msec 3directions)
10~55Hz 98m/s²
(30minutes 3directions)
6 Sided Aluminum Case
Single : 500,000H
Dual : 600,000H
(Ta : 25°C, 80% Load, Nominal Vin)
5 years

■ Selection Guide

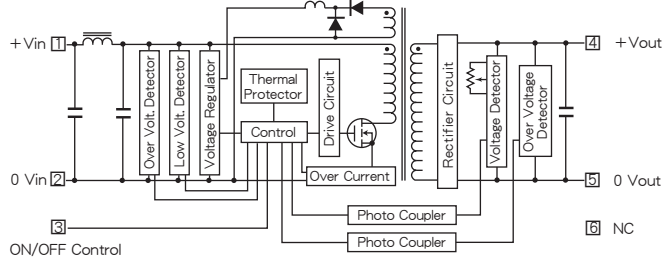
Table 1

Model Number	Input Voltage (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (typ.) (%)	
				30% Load	80% Load
BPM 12-3.3S 12A	12 (8~18)	3.3	12	87	85
BPM 12-5S 10A		5	10	86	89
BPM 12-6S 8.4A		6	8.4	87	87
BPM 12-12S 4.2A		12	4.2	84	88
BPM 12-15S 3.3A		15	3.3	83	88
BPM 12-24S 2.1A		24	2.1	83	88
BPM 12-3.3D 3A		± 3.3	± 3	80	81
BPM 12-5D 3A		± 5	± 3	80	82
BPM 12-12D 1.5A		± 12	± 1.5	81	83
BPM 12-15D 1.2A		± 15	± 1.2	81	84
BPM 24-3.3S 12A	24 (16~36)	3.3	12	84	85
BPM 24-5S 10A		5	10	85	88
BPM 24-6S 8.4A		6	8.4	87	89
BPM 24-12S 4.2A		12	4.2	84	89
BPM 24-15S 3.3A		15	3.3	85	89
BPM 24-24S 2.1A		24	2.1	84	89
BPM 24-3.3D 3A		± 3.3	± 3	80	81
BPM 24-5D 3A		± 5	± 3	80	82
BPM 24-12D 1.5A		± 12	± 1.5	81	84
BPM 24-15D 1.2A		± 15	± 1.2	82	85
BPM 48-3.3S 12A	48 (32~72)	3.3	12	85	86
BPM 48-5S 10A		5	10	85	88
BPM 48-6S 8.4A		6	8.4	85	88
BPM 48-12S 4.2A		12	4.2	85	88
BPM 48-15S 3.3A		15	3.3	85	90
BPM 48-24S 2.1A		24	2.1	85	90
BPM 48-3.3D 3A		± 3.3	± 3	80	81
BPM 48-5D 3A		± 5	± 3	80	82
BPM 48-12D 1.5A		± 12	± 1.5	81	84
BPM 48-15D 1.2A		± 15	± 1.2	82	85
BPM 100-3.3S 12A	100 (64~144)	3.3	12	84	87
BPM 100-5S 10A		5	10	86	89
BPM 100-6S 8.4A		6	8.4	84	89
BPM 100-12S 4.2A		12	4.2	85	90
BPM 100-15S 3.3A		15	3.3	85	90
BPM 100-24S 2.1A		24	2.1	85	90
BPM 100-3.3D 3A		± 3.3	± 3	80	81
BPM 100-5D 3A		± 5	± 3	80	82
BPM 100-12D 1.5A		± 12	± 1.5	81	84
BPM 100-15D 1.2A		± 15	± 1.2	82	85

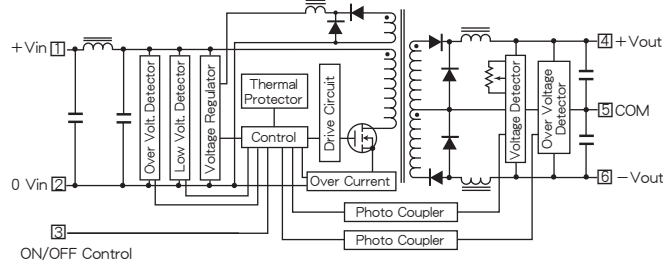
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

Block Diagram

Single Output



Dual Outputs



Characteristic Curves

Fig. 1 Derating Curve

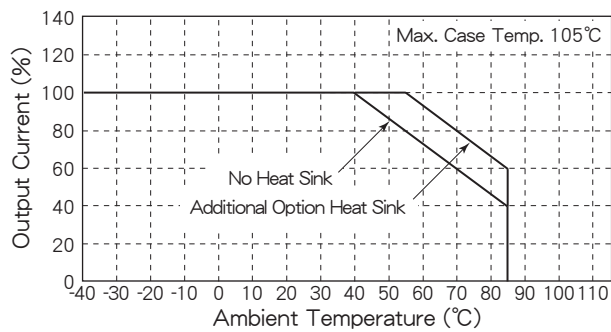


Fig. 2 Short Circuit Operating Area

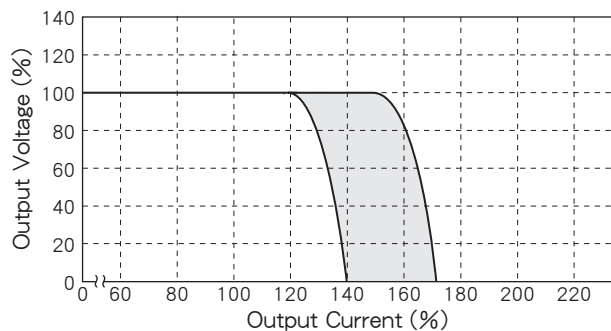


Fig. 3 Temperature Characteristic on Case Surface

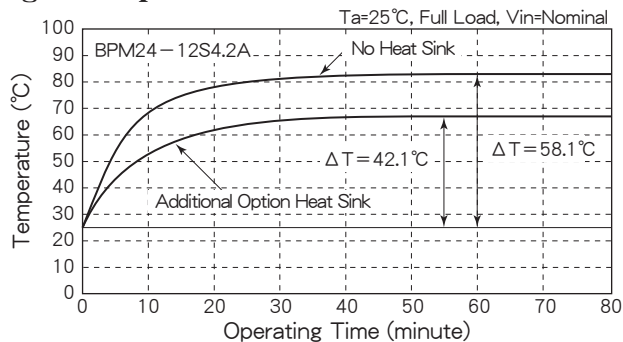


Fig. 4 Efficiency vs. Output Current

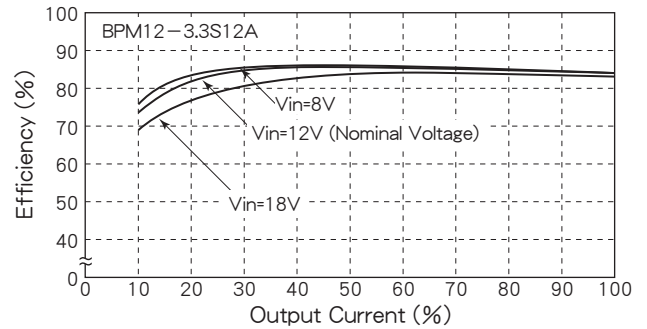


Fig. 5 Efficiency vs. Output Current

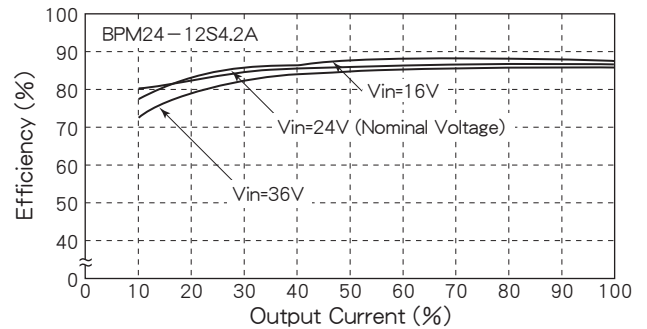


Fig. 6 Efficiency vs. Output Current

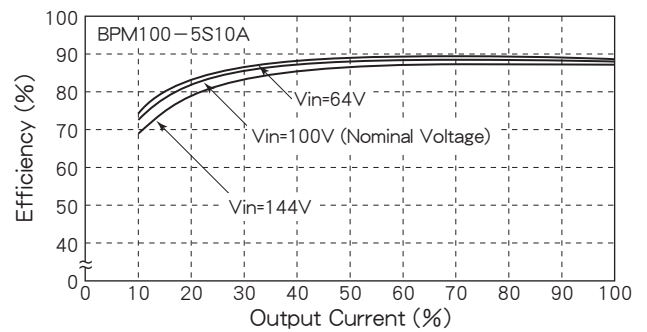


Fig. 7 Efficiency vs. Output Current

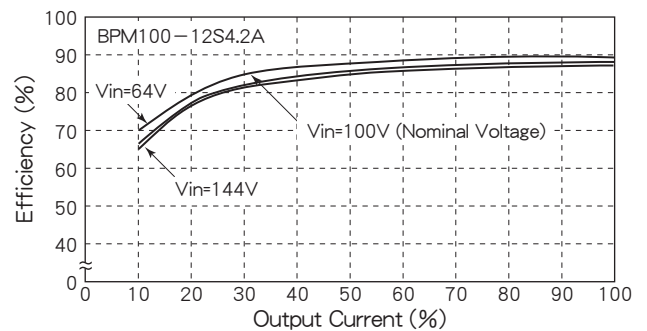
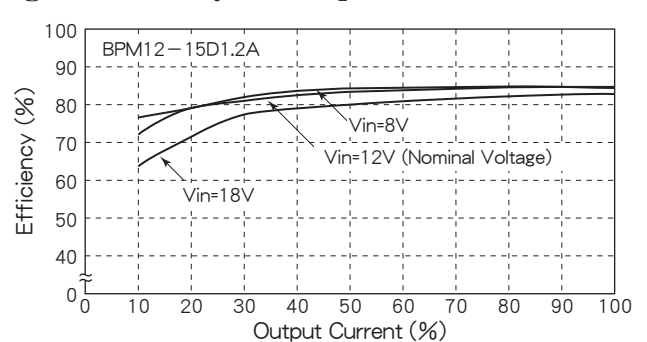


Fig. 8 Efficiency vs. Output Current



40~50W DC/DC CONVERTERS



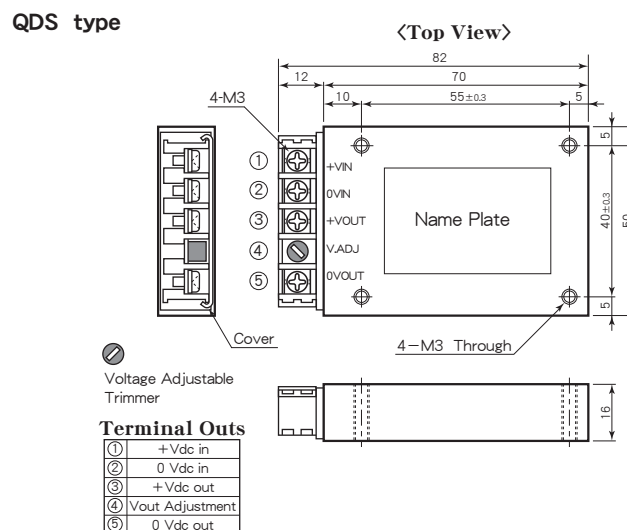
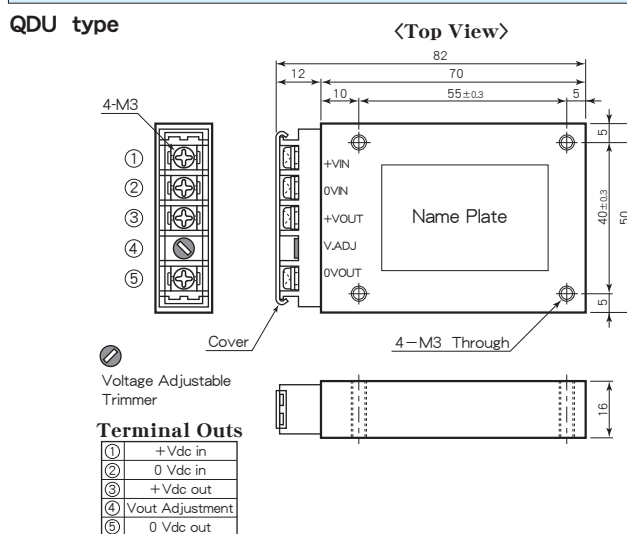
■ Features

- | | |
|---|----------------------------|
| ● Low Profile 16mm | ● 薄型 16mm |
| ● Built-in Input Filter | ● 入力フィルタ内蔵 |
| ● Wide Input Voltage Range | ● 広範囲な入力電圧 |
| ● Input-Output Isolation | ● 入出力間絶縁 |
| ● Adjustable Output Volt. $\pm 5\%$ | ● 可変出力電圧 $\pm 5\%$ |
| ● Input Low Voltage Protection | ● 入力低電圧保護回路内蔵 |
| ● Input Over Voltage Protection | ● 入力過電圧保護回路内蔵 |
| ● Output Over Voltage Protection | ● 出力過電圧保護回路内蔵 |
| 115~140% Operation | 115~140%にて動作 |
| ● High Efficiency 86~90% | ● 高効率 86~90% |
| ● Thermal Protection | ● 過熱保護回路内蔵 |
| +110°C~+120°C | +110°C~+120°C |
| ● Operating Ambient Temperature | ● 動作周囲温度 |
| -40°C~+85°C | -40°C~+85°C |
| ● Conformity to RoHS2 Directive | ● RoHS2指令対応 |
| ● Not built-in aluminum and tantalum electrolytic capacitor | ● アルミ電解コンデンサ及びタンタルコンデンサ不使用 |

■ General Characteristics

- | | |
|---------------------------------|---|
| ● Input Voltage, Range | DC12, 24, 48, 100V (See Table 1) |
| ● Output Voltage, Current | See Table 1 |
| ● Output Voltage Range | ±5% Adjustable |
| ● Efficiency | See Table 1 |
| ● Line Regulation | ±0.3% max. (at Vin Range) |
| ● Load Regulation | ±0.5% max. (0~100% Load) |
| ● Reflected Input Ripple, Noise | (3% Vin)Vp-p max. |
| ● Output Ripple | 40mVp-p max. |
| ● Output Noise | 100mVp-p max. |
| ● Short Circuit Protection | Built-in, Auto-restart (See Fig. 2) |
| ● Over Voltage Protection | 115~140% Output Voltage |
| ● Temperature Coefficient | 0.02%/°C max. |
| ● Operating Ambient Temp. | −40°C~+85°C (See Fig. 1) |
| ● Storage Temperature | −40°C~+115°C |
| ● Isolation Voltage | AC1500V one minute
(Input–Output–Case) |
| ● Isolation Impedance | 100MΩ min. (at DC1000V)
(Input–Output–Case) |
| ● Weight | 150g max. |
| ● Humidity | 20~95% RH |
| ● Shock | 490m/s ² (11msec 3directions) |
| ● Vibration | 10~55Hz 98m/s ²
(30minutes 3directions) |
| ● Surface Structure | 6 Sided Aluminum Case |
| ● MTBF | 500,000H
(Ta : 25°C, 80% Load, Nominal Vin) |
| ● Warranty | 5 years |

■ Terminal Outs & Dimensions (±0.5mm)



■ Selection Guide

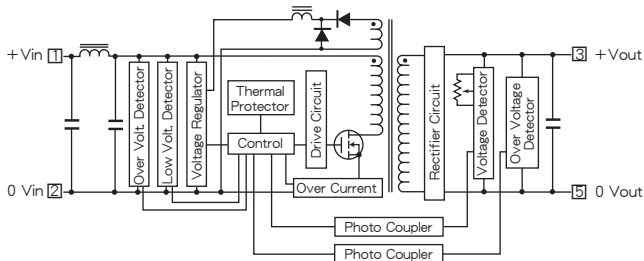
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%)	
				20% Load	80% Load
QDU(QDS) 12-3.3S 12A	12 (8~18)	3.3	12	81	86
QDU(QDS) 12- 5S 10A		5	10	82	88
QDU(QDS) 12- 6S 8.4A		6	8.4	82	88
QDU(QDS) 12- 12S 4.2A		12	4.2	83	88
QDU(QDS) 12- 15S 3.3A		15	3.3	83	88
QDU(QDS) 12- 24S 2.1A		24	2.1	83	88
QDU(QDS) 24-3.3S 12A	24 (16~36)	3.3	12	81	86
QDU(QDS) 24- 5S 10A		5	10	85	88
QDU(QDS) 24- 6S 8.4A		6	8.4	85	88
QDU(QDS) 24- 12S 4.2A		12	4.2	84	89
QDU(QDS) 24- 15S 3.3A		15	3.3	84	89
QDU(QDS) 24- 24S 2.1A		24	2.1	84	89
QDU(QDS) 48-3.3S 12A	48 (32~72)	3.3	12	81	86
QDU(QDS) 48- 5S 10A		5	10	83	88
QDU(QDS) 48- 6S 8.4A		6	8.4	83	88
QDU(QDS) 48- 12S 4.2A		12	4.2	85	90
QDU(QDS) 48- 15S 3.3A		15	3.3	85	90
QDU(QDS) 48- 24S 2.1A		24	2.1	79	89
QDU(QDS)100-3.3S 12A	100 (64~144)	3.3	12	82	87
QDU(QDS)100- 5S 10A		5	10	84	89
QDU(QDS)100- 6S 8.4A		6	8.4	84	89
QDU(QDS)100- 12S 4.2A		12	4.2	85	90
QDU(QDS)100- 15S 3.3A		15	3.3	85	90
QDU(QDS)100- 24S 2.1A		24	2.1	79	89

* 上記仕様以外にも対応可能ですのでお問い合わせ下さい。
Please consult with us about other specification.

QD SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

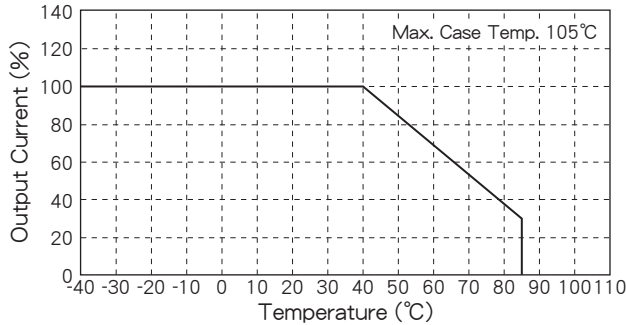


Fig. 2 Short Circuit Operating Area

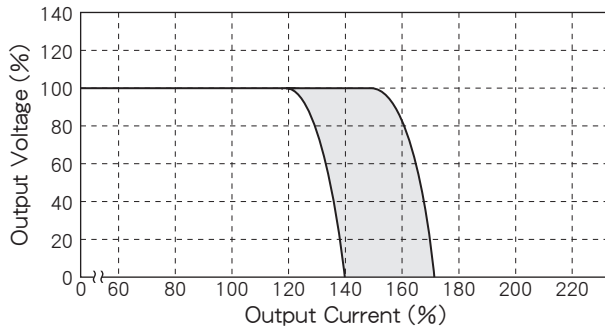


Fig. 3 Temperature Characteristic on Case Surface

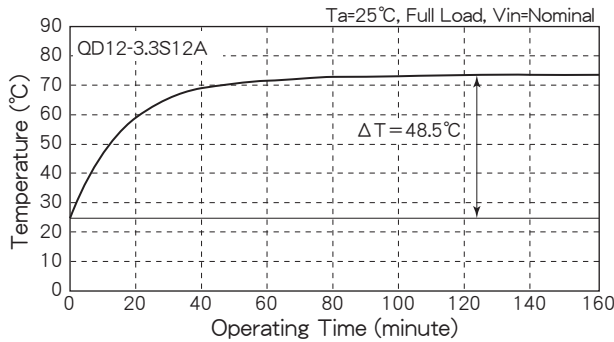


Fig. 4 Efficiency vs. Output Current

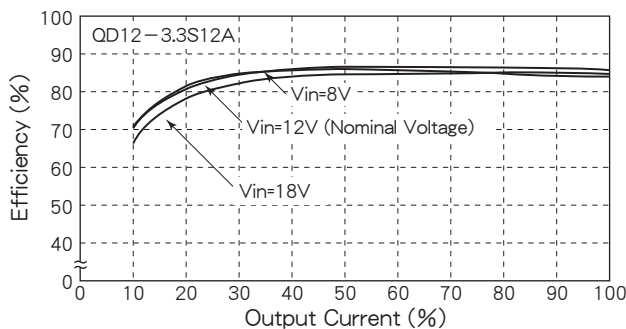


Fig. 5 Efficiency vs. Output Current

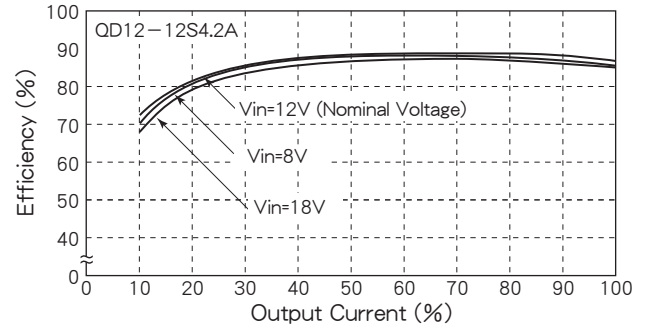


Fig. 6 Efficiency vs. Output Current

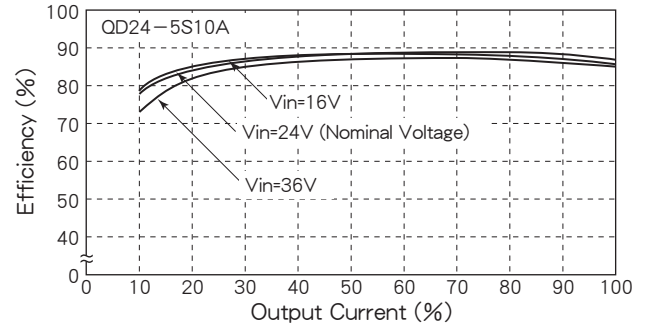


Fig. 7 Efficiency vs. Output Current

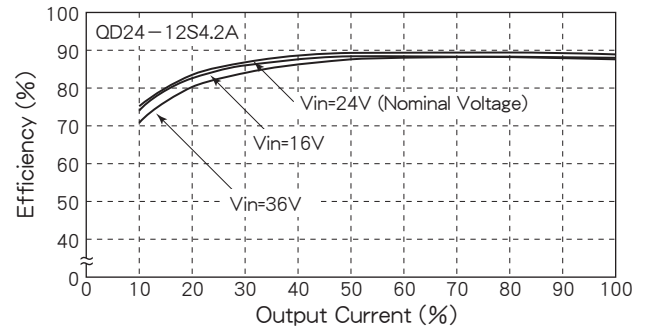


Fig. 8 Efficiency vs. Output Current

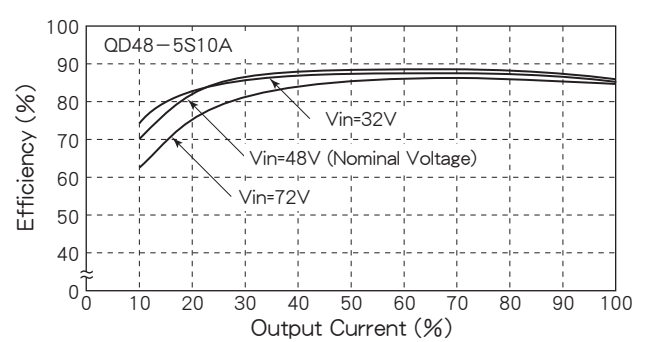
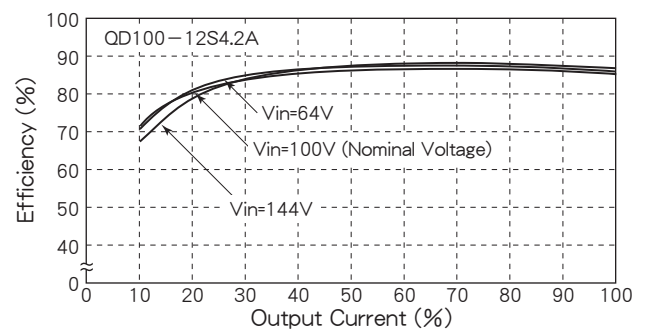


Fig. 9 Efficiency vs. Output Current



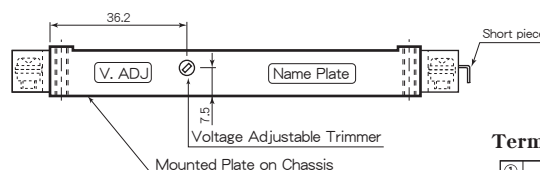
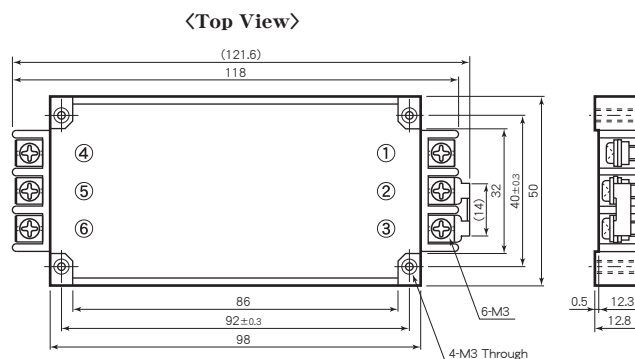
BTS SERIES

80~100W DC/DC CONVERTERS Single Output



H12.8×W50×L118 (mm)

■ Terminal Outs & Dimensions (±0.5mm)



Terminal Outs

①	+Vdc in
②	0 Vdc in
③	ON/OFF Control
④	+Vdc out
⑤	0 Vdc out
⑥	No Connection

■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%)	
				20% Load	80% Load
BTS 12- 3.3S 24 A	12 (8~18)	3.3	24	88	88
BTS 12- 5S 20 A		5	20	87	89
BTS 12- 6S 16.7A		6	16.7	87	89
BTS 12- 12S 8.4 A		12	8.4	87	89
BTS 12- 15S 6.7 A		15	6.7	86	89
BTS 12- 24S 4.2 A		24	4.2	85	89
BTS 24- 3.3S 24 A	24 (16~36)	3.3	24	88	88
BTS 24- 5S 20 A		5	20	88	90
BTS 24- 6S 16.7A		6	16.7	88	90
BTS 24- 12S 8.4 A		12	8.4	86	90
BTS 24- 15S 6.7 A		15	6.7	86	90
BTS 24- 24S 4.2 A		24	4.2	86	90
BTS 48- 3.3S 24 A	48 (32~72)	3.3	24	87	88
BTS 48- 5S 20 A		5	20	87	90
BTS 48- 6S 16.7A		6	16.7	87	90
BTS 48- 12S 8.4 A		12	8.4	87	91
BTS 48- 15S 6.7 A		15	6.7	86	91
BTS 48- 24S 4.2 A		24	4.2	86	91
BTS100- 3.3S 24 A	100 (64~144)	3.3	24	85	88
BTS100- 5S 20 A		5	20	86	90
BTS100- 6S 16.7A		6	16.7	86	90
BTS100- 12S 8.4 A		12	8.4	86	91
BTS100- 15S 6.7 A		15	6.7	86	91
BTS100- 24S 4.2 A		24	4.2	86	89

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

■ Features

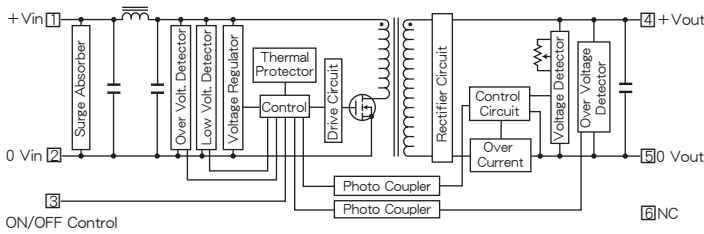
- Low Profile 12.8mm
- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 88~91%
- Wide Input Voltage Range
- High Reliability
- 6 Sided Metal Shielding
- Remote ON/OFF Control
- Adjustable Output Voltage ±5%
- Input Low Voltage Protection
- Input Over Voltage Protection
- Output Over Voltage Protection
- 115~140% Operation
- Thermal Protection
- +110℃~+120℃
- Operating Ambient Temperature
- -40℃~+85℃
- Max. Case Temperature +105℃
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 12.8mm
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 88~91%
- 広範囲な入力電圧
- 高信頼性
- 6面メタルシールド
- リモートON/OFFコントロール
- 可変出力電圧 ±5%
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 出力過電圧保護回路内蔵
- 115~140% 動作
- 過熱保護回路内蔵
- +110℃~+120℃
- 動作周囲温度
- -40℃~+85℃
- 最大ケース温度 +105℃
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

■ General Characteristics

- Input Voltage, Range
 - Output Voltage, Current
 - Output Voltage Range
 - Efficiency
 - Line Regulation
 - Load Regulation
 - Reflected Input Ripple, Noise
 - Output Ripple
 - Output Noise
 - Short Circuit Protection
 - Over Voltage Protection
 - Remote ON/OFF Control
 - Temperature Coefficient
 - Operating Ambient Temp.
 - Max. Case Temperature
 - Storage Temperature
 - Isolation Voltage
 - Isolation Impedance
 - Weight
 - Humidity
 - Shock
 - Vibration
 - Surface Structure
 - MTBF
 - Warranty
- (at Ta : 25℃, Full Load, Nominal Vin)
- DC12, 24, 48, 100V (See Table 1)
- See Table 1
- ±5% Adjustable
- See Table 1
- ±0.3% max. (at Vin Range)
- ±0.5% max. (0~100% Load)
- (3% Vin) Vp-p max.
- 40mVp-p max.
- 100mVp-p max.
- Built-in, Auto-restart (See Fig. 2)
- 115~140% Output Voltage
- ON : Short or 0~0.8V
- OFF : Open or 2~10V
- (Between terminal ② ~ ③)
- 0.02%/℃ max.
- 40℃~+85℃ (See Fig. 1)
- +105℃
- 55℃~+125℃
- AC1500V 1 min.
- AC2000V 1 min. (100V Vin only)
- (Input-Output-Case)
- 100MΩ min. (at DC1000V)
- (Input-Output-Case)
- Main Body : 170g max.
- 20~95% RH
- 490m/s² (11msec 3directions)
- 10~55Hz 98m/s²
- (30minutes 3directions)
- 6 Sided Aluminum Case
- 400,000H
- (Ta : 25℃, 80% Load, Nominal Vin)
- 5 years

BTS SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

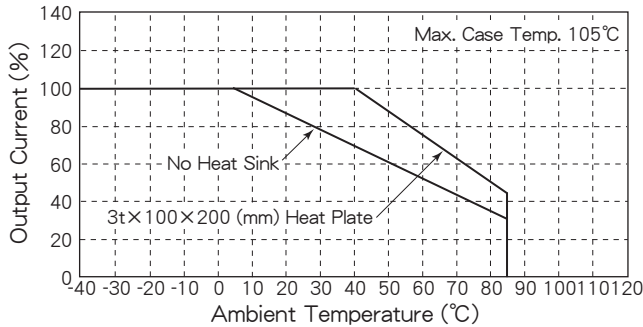


Fig. 2 Short Circuit Operating Area

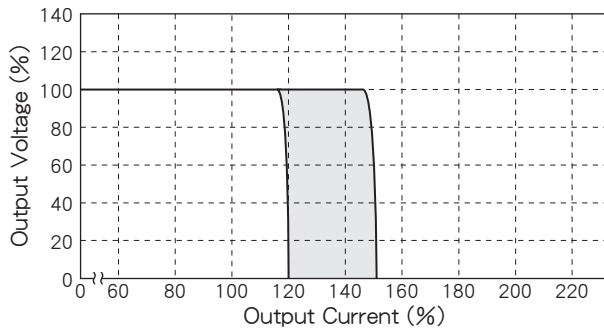


Fig. 3 Temperature Characteristic on Case Surface

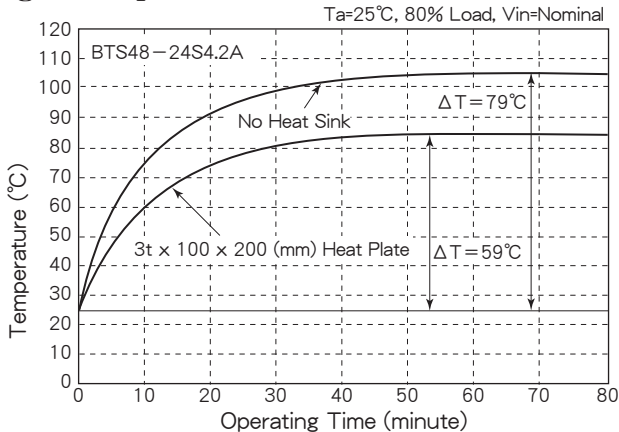


Fig. 4 Efficiency vs. Output Current

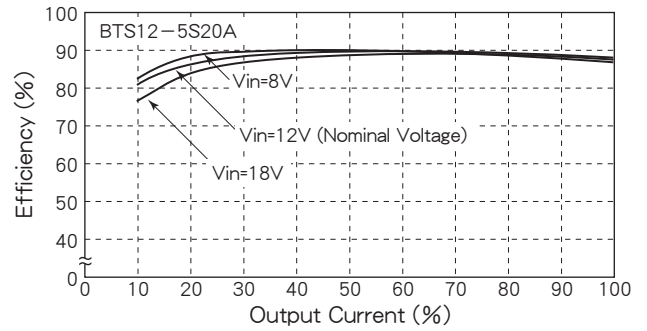


Fig. 5 Efficiency vs. Output Current

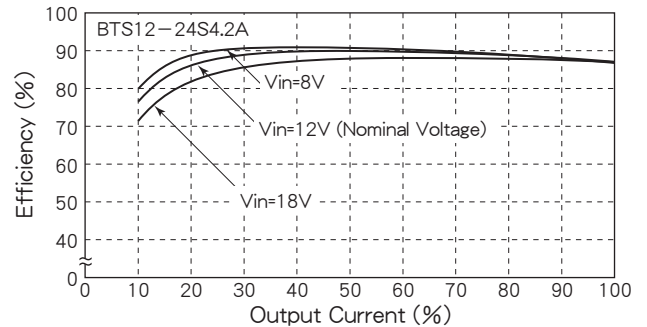


Fig. 6 Efficiency vs. Output Current

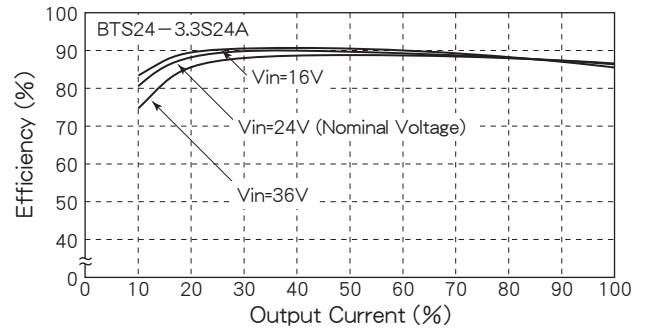


Fig. 7 Efficiency vs. Output Current

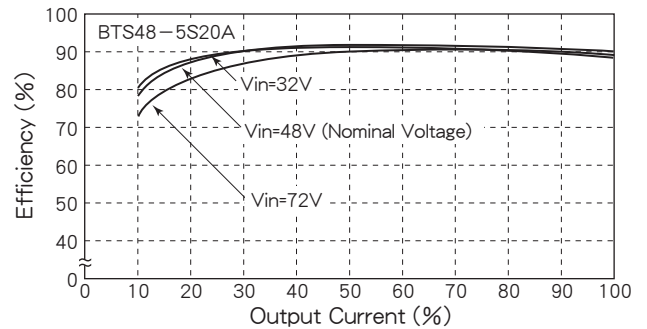
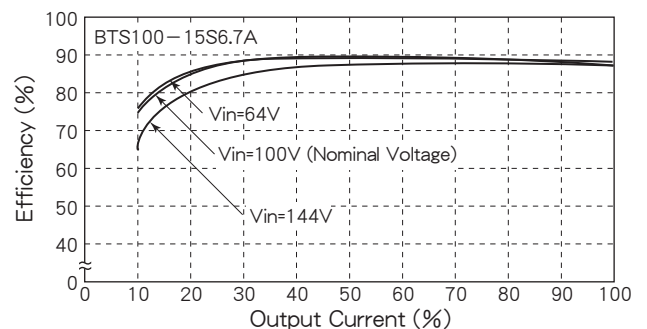


Fig. 8 Efficiency vs. Output Current

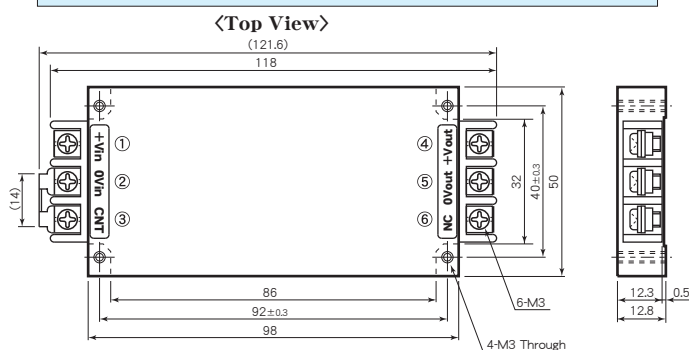


BTM SERIES

80~100W DC/DC CONVERTERS Single Output



■ Terminal Outs & Dimensions (±0.5mm)

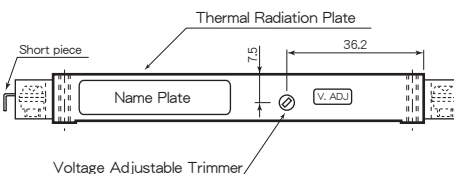


■ Features

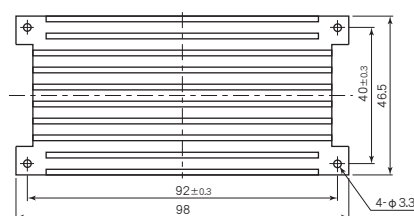
- Low Profile 12.8mm
- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 88~91%
- Wide Input Voltage Range
- High Reliability
- 6 Sided Metal Shielding
- Remote ON/OFF Control
- Adjustable Output Voltage $\pm 5\%$
- Input Low Voltage Protection
- Input Over Voltage Protection
- Output Over Voltage Protection
- 115~140% Operation
- Thermal Protection
- +110°C~+120°C
- Operating Ambient Temperature
- -40°C~+85°C
- Max. Case Temperature +105°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 薄型 12.8mm
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 88~91%
- 広範囲な入力電圧
- 高信頼性
- 6面メタルシールド
- リモートON/OFFコントロール
- 可変出力電圧 $\pm 5\%$
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 出力過電圧保護回路内蔵
- 115~140% 動作
- 過熱保護回路内蔵
- +110°C~+120°C
- 動作周囲温度
- -40°C~+85°C
- 最大ケース温度 +105°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

■ General Characteristics

- Input Voltage, Range
 - Output Voltage, Current
 - Output Voltage Range
 - Efficiency
 - Line Regulation
 - Load Regulation
 - Reflected Input Ripple, Noise
 - Output Ripple
 - Output Noise
 - Short Circuit Protection
 - Over Voltage Protection
 - Remote ON/OFF Control
 - Temperature Coefficient
 - Operating Ambient Temp.
 - Max. Case Temperature
 - Storage Temperature
 - Isolation Voltage
 - Isolation Impedance
 - Weight
 - Humidity
 - Shock
 - Vibration
 - Surface Structure
 - MTBF
 - Warranty
- (at Ta : 25°C, Full Load, Nominal Vin)
DC12, 24, 48, 100V (See Table 1)
See Table 1
 $\pm 5\%$ Adjustable
See Table 1
 $\pm 0.3\%$ max. (at Vin Range)
 $\pm 0.5\%$ max. (0~100% Load)
(3% Vin) Vp-p max.
40mVp-p max.
100mVp-p max.
Built-in, Auto-restart (See Fig. 2)
115~140% Output Voltage
ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between terminal ② ~ ③)
0.02%/°C max.
-40°C~+85°C (See Fig. 1)
+105°C
-55°C~+125°C
AC1500V 1 min.
AC2000V 1 min. (100V Vin only)
(Input-Output-Case)
100M Ω min. (at DC1000V)
(Input-Output-Case)
Main Body : 170g max.
Heat Sink : 73g max.
20~95% RH
490m/s² (11msec 3directions)
10~55Hz 98m/s²
(30minutes 3directions)
6 Sided Aluminum Case
400,000H
(Ta : 25°C, 80% Load, Nominal Vin)
5 years



■ Option Heat Sink



■ Selection Guide

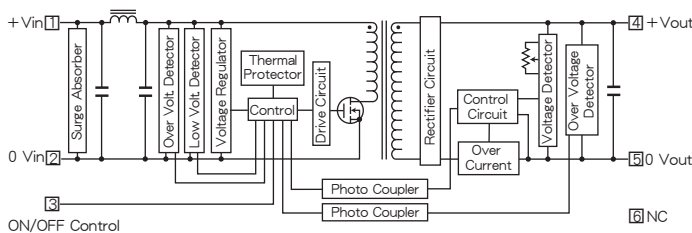
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%)	
				20% Load	80% Load
BTM 12-3.3S 24 A	12 (8~18)	3.3	24	88	88
BTM 12- 5S 20 A		5	20	87	89
BTM 12- 6S 16.7A		6	16.7	87	89
BTM 12-12S 8.4 A		12	8.4	87	89
BTM 12-15S 6.7 A		15	6.7	86	89
BTM 12-24S 4.2 A	24 (16~36)	24	4.2	85	89
BTM 24-3.3S 24 A		3.3	24	88	88
BTM 24- 5S 20 A		5	20	88	90
BTM 24- 6S 16.7A		6	16.7	88	90
BTM 24-12S 8.4 A		12	8.4	86	90
BTM 24-15S 6.7 A	48 (32~72)	15	6.7	86	90
BTM 24-24S 4.2 A		24	4.2	86	90
BTM 48-3.3S 24 A		3.3	24	87	88
BTM 48- 5S 20 A		5	20	87	90
BTM 48- 6S 16.7A		6	16.7	87	90
BTM 48-12S 8.4 A	100 (64~144)	12	8.4	87	91
BTM 48-15S 6.7 A		15	6.7	86	91
BTM 48-24S 4.2 A		24	4.2	86	91
BTM100-3.3S 24 A		3.3	24	85	88
BTM100- 5S 20 A		5	20	86	90
BTM100- 6S 16.7A		6	16.7	86	90
BTM100-12S 8.4 A		12	8.4	86	91
BTM100-15S 6.7 A		15	6.7	86	91
BTM100-24S 4.2 A		24	4.2	86	89

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

BTM SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

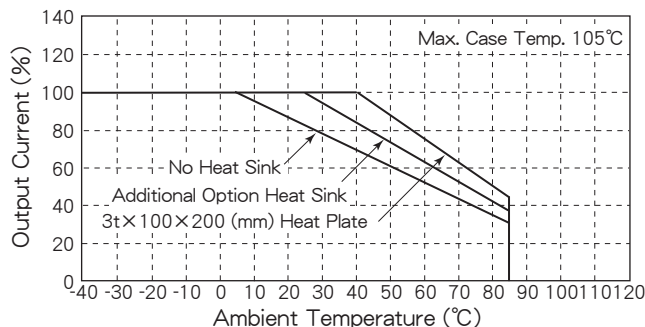


Fig. 2 Short Circuit Operating Area

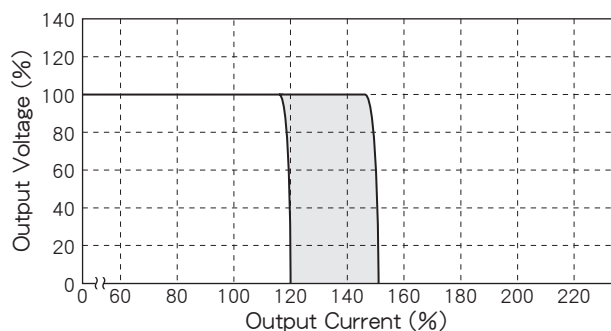


Fig. 3 Temperature Characteristic on Case Surface

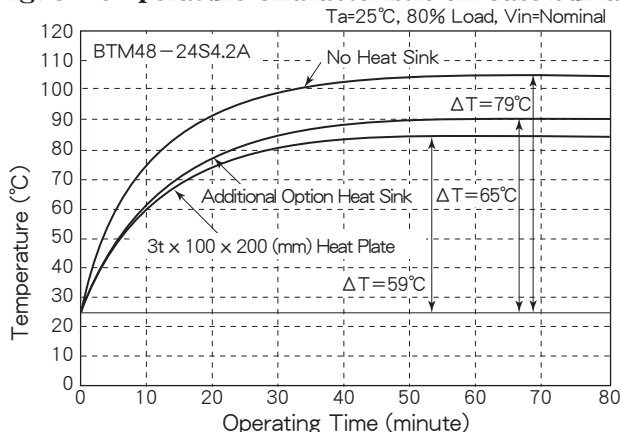


Fig. 4 Efficiency vs. Output Current

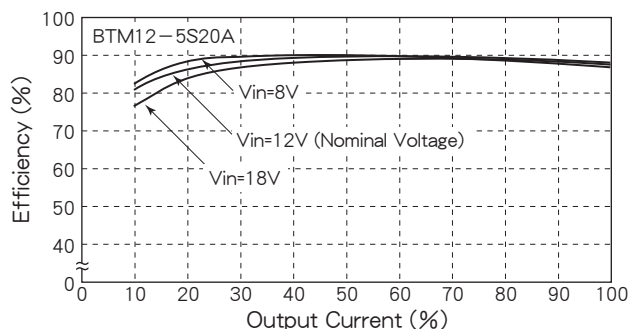


Fig. 5 Efficiency vs. Output Current

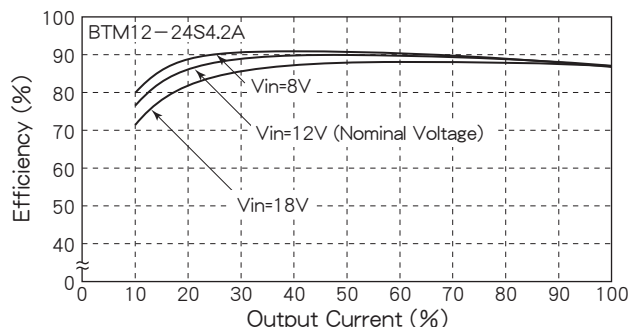


Fig. 6 Efficiency vs. Output Current

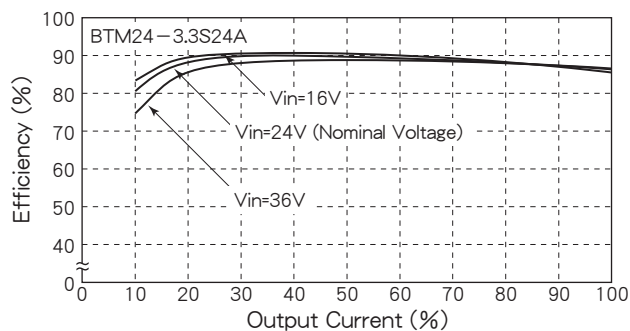


Fig. 7 Efficiency vs. Output Current

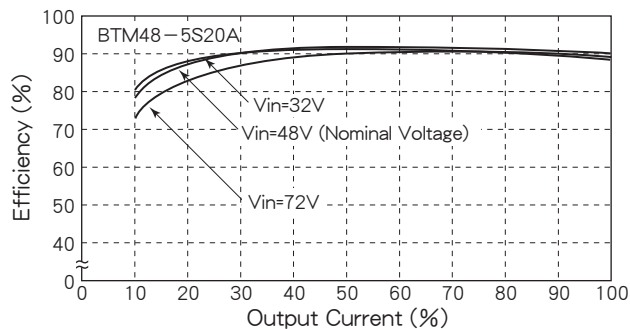
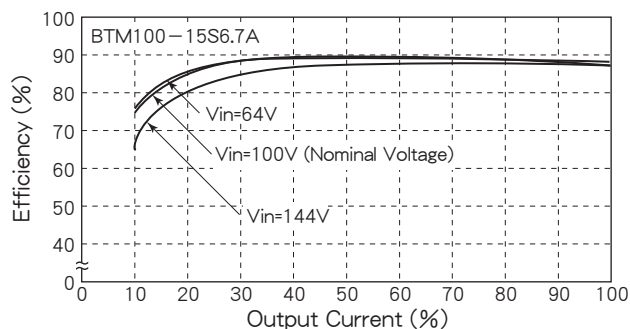


Fig. 8 Efficiency vs. Output Current



FD SERIES

80~100W DC/DC CONVERTERS Single Output

FDU type



H20×W60×L120 (mm)

FDS type



H20×W60×L120 (mm)

Features

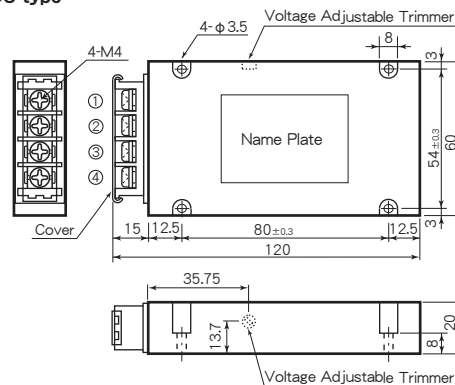
- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 85~92%
- Wide Input Voltage Range
- High Reliability
- Long Life by Mounting on Chassis or Using Heat Sink
- Adjustable Output Voltage $\pm 5\%$
- Input Low Voltage Protection
- Input Over Voltage Protection
- Output Over Voltage Protection
- Thermal Protection
+110°C~+120°C
- Operating Ambient Temperature
-40°C~+85°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and tantalum electrolytic capacitor
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 85~92%
- 広範囲な入力電圧
- 高信頼性
- シャーシや放熱板への取り付けにより長寿命化
- 可変出力電圧 $\pm 5\%$
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 出力過電圧保護回路内蔵
- 過熱保護回路内蔵
+110°C~+120°C
- 動作周囲温度
-40°C~+85°C
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

General Characteristics

- Input Voltage, Range
 - Output Voltage, Current
 - Output Voltage Range
 - Efficiency
 - Line Regulation
 - Load Regulation
 - Reflected Input Ripple, Noise
 - Output Ripple
 - Output Noise
 - Short Circuit Protection
 - Over Voltage Protection
 - Temperature Coefficient
 - Operating Ambient Temp.
 - Max. Case Temperature
 - Storage Temperature
 - Isolation Voltage
 - Isolation Impedance
 - Weight
 - Humidity
 - Shock
 - Vibration
 - Surface Structure
 - MTBF
 - Warranty
- (at Ta : 25°C, Full Load, Nominal Vin)
DC12, 24, 48, 100, 140V (See Table 1)
See Table 1
 $\pm 5\%$ Adjustable
See Table 1
 $\pm 0.3\%$ max. (at Vin Range)
 $\pm 0.5\%$ max.
 $\pm 1\%$ max. (3.3, 5V Vout only)
(0~100% Load)
(5% Vin) Vp-p max.
40mVp-p max.
(0.5% Vout+100mV) p-p max.
Built-in, Auto-restart (See Fig. 2)
115~140V Output Voltage
0.02%/°C max.
-40°C~+85°C (See Fig. 1)
+105°C
-55°C~+125°C
AC2000V one minute
(Input-Output-Case)
100M Ω min. (at DC1000V)
(Input-Output-Case)
350g max.
20~95% RH
490m/s² (11msec 3directions)
10~55Hz 98m/s²
(30minutes 3directions)
Aluminum Case
400,000H
(Ta : 25°C, 80% Load, Nominal Vin)
5 years

Terminal Outs & Dimensions (± 0.5 mm)

FDU type

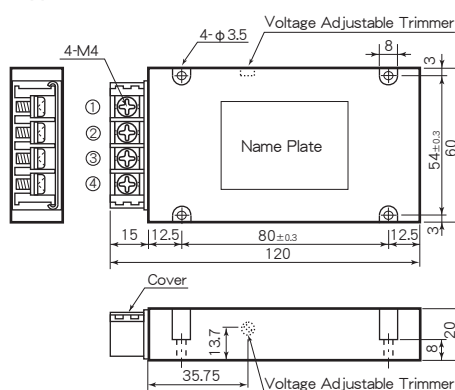


Terminal Outs

- ① +Vdc in
- ② 0 Vdc in
- ③ +Vdc out
- ④ 0 Vdc out

⑤ Voltage Adjustable Trimmer

FDS type



Terminal Outs

- ① +Vdc in
- ② 0 Vdc in
- ③ +Vdc out
- ④ 0 Vdc out

⑤ Voltage Adjustable Trimmer

Selection Guide

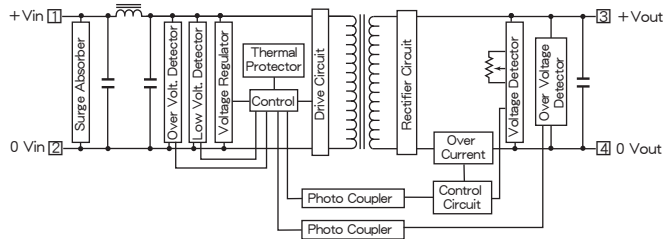
Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%)	
				20% Load	80% Load
FDU(FDS) 12- 3.3S 24A	12 (8~18)	3.3	24	85	85
FDU(FDS) 12- 5S 20A		5	20	87	89
FDU(FDS) 12- 6S 16.7A		6	16.7	87	89
FDU(FDS) 12- 12S 8.4A		12	8.4	88	90
FDU(FDS) 12- 13.8S 7.2A		13.8	7.2	88	89
FDU(FDS) 12- 15S 6.7A		15	6.7	88	89
FDU(FDS) 12- 24S 4.2A	24 (16~36)	24	4.2	88	89
FDU(FDS) 24- 3.3S 24A		3.3	24	88	90
FDU(FDS) 24- 5S 20A		5	20	88	91
FDU(FDS) 24- 6S 16.7A		6	16.7	88	91
FDU(FDS) 24- 12S 8.4A		12	8.4	88	91
FDU(FDS) 24- 13.8S 7.2A		13.8	7.2	88	91
FDU(FDS) 24- 15S 6.7A	48 (32~72)	15	6.7	88	91
FDU(FDS) 24- 24S 4.2A		24	4.2	88	91
FDU(FDS) 48- 3.3S 24A		3.3	24	87	88
FDU(FDS) 48- 5S 20A		5	20	89	92
FDU(FDS) 48- 6S 16.7A		6	16.7	88	92
FDU(FDS) 48- 12S 8.4A		12	8.4	88	91
FDU(FDS) 48- 13.8S 7.2A	100 (64~144)	13.8	7.2	88	91
FDU(FDS) 48- 15S 6.7A		15	6.7	88	91
FDU(FDS) 48- 24S 4.2A		24	4.2	88	91
FDU(FDS) 100- 3.3S 24A		3.3	24	87	88
FDU(FDS) 100- 5S 20A		5	20	88	90
FDU(FDS) 100- 6S 16.7A		6	16.7	88	90
FDU(FDS) 100- 12S 8.4A	140 (90~200)	12	8.4	88	91
FDU(FDS) 100- 13.8S 7.2A		13.8	7.2	88	91
FDU(FDS) 100- 15S 6.7A		15	6.7	88	91
FDU(FDS) 140- 3.3S 24A		3.3	24	87	88
FDU(FDS) 140- 5S 20A		5	20	88	90
FDU(FDS) 140- 6S 16.7A		6	16.7	88	90
FDU(FDS) 140- 12S 8.4A		12	8.4	88	91
FDU(FDS) 140- 13.8S 7.2A		13.8	7.2	88	91
FDU(FDS) 140- 15S 6.7A		15	6.7	88	91
FDU(FDS) 140- 24S 4.2A		24	4.2	88	91

* 上記仕様以外にも対応可能ですのでお問い合わせください。
Please consult with us about other specification.

FD SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

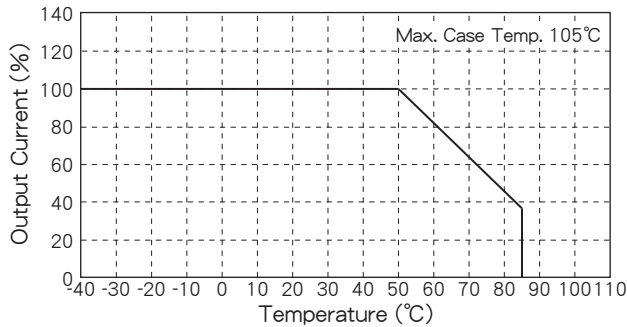


Fig. 2 Short Circuit Operating Area

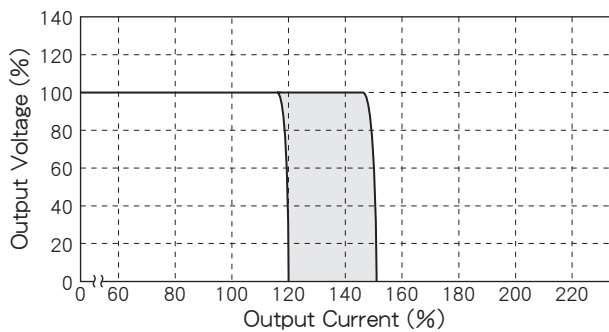


Fig. 3 Efficiency vs. Output Current

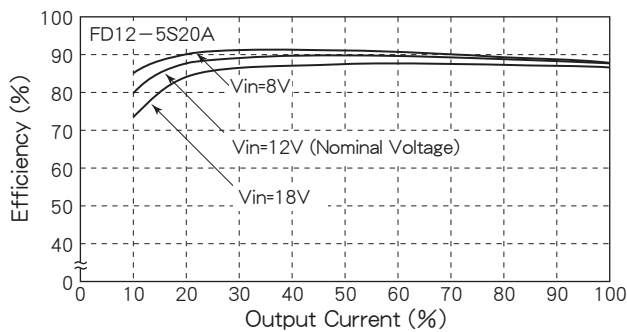


Fig. 4 Efficiency vs. Output Current

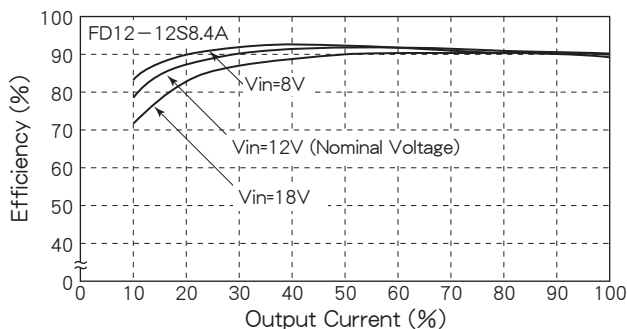


Fig. 5 Efficiency vs. Output Current

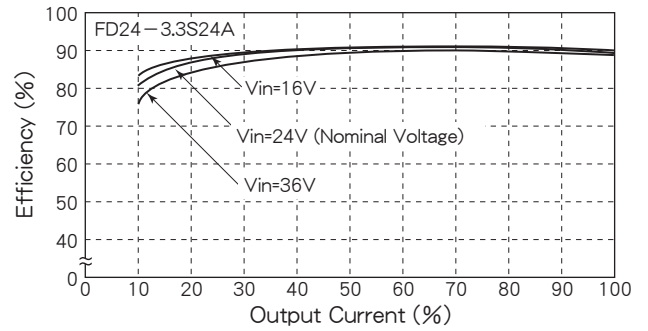


Fig. 6 Efficiency vs. Output Current

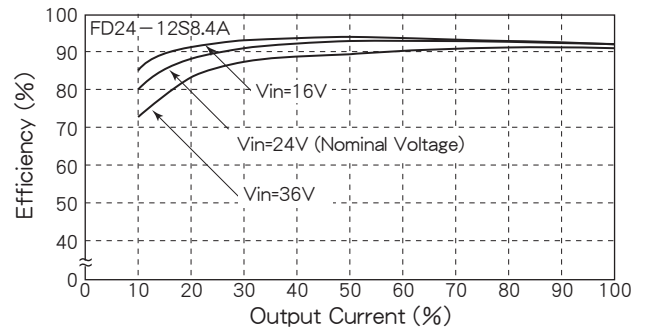


Fig. 7 Efficiency vs. Output Current

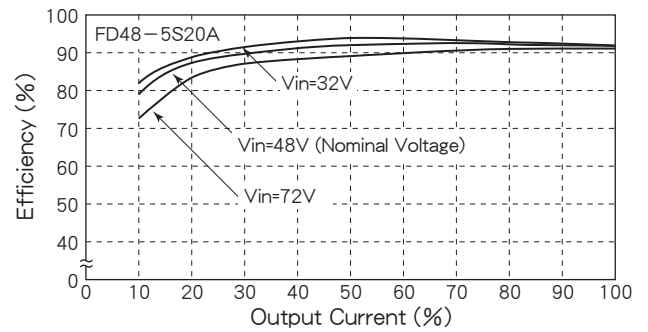


Fig. 8 Efficiency vs. Output Current

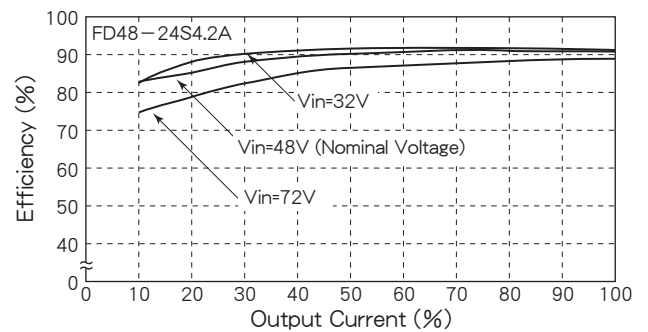
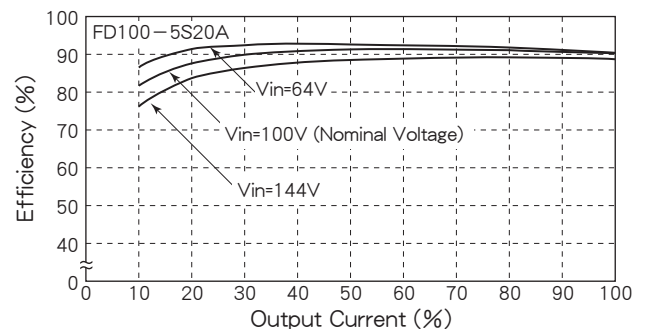
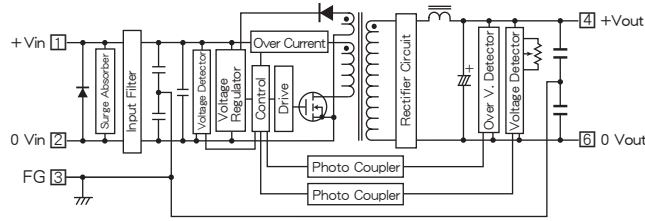


Fig. 9 Efficiency vs. Output Current



PD SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

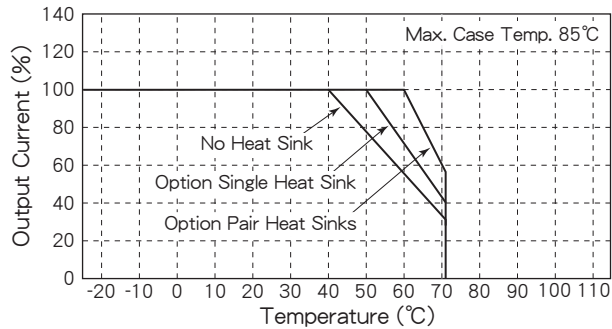


Fig. 2 Short Circuit Operating Area

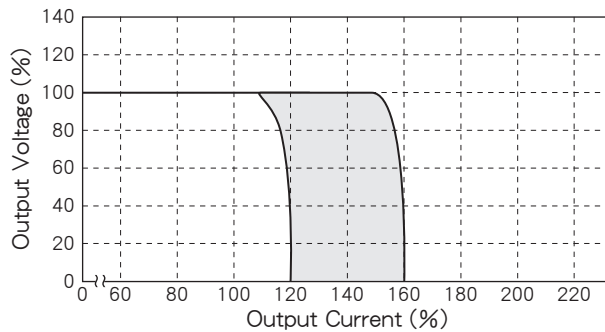


Fig. 3 Temperature Characteristic on Case Surface

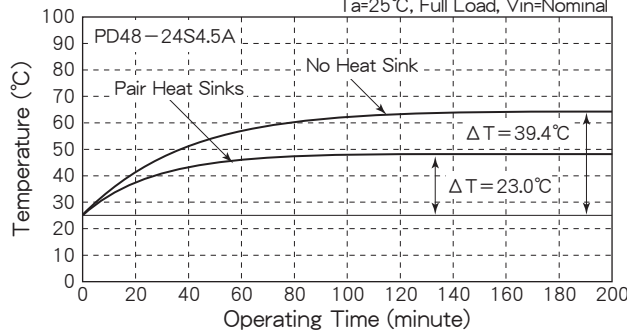


Fig. 4 Efficiency vs. Output Current

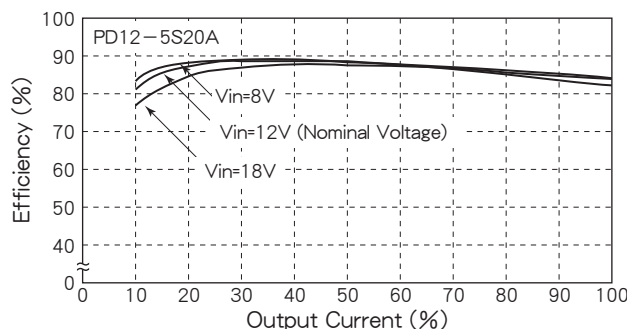


Fig. 5 Efficiency vs. Output Current

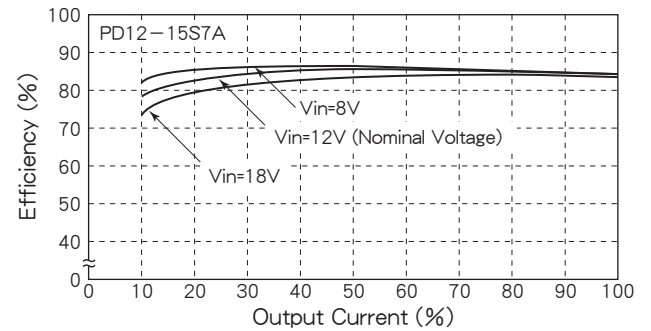


Fig. 6 Efficiency vs. Output Current

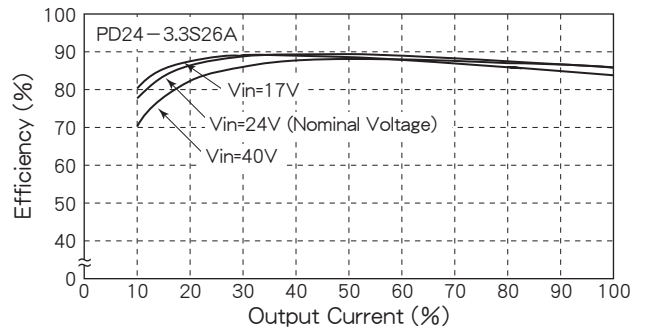


Fig. 7 Efficiency vs. Output Current

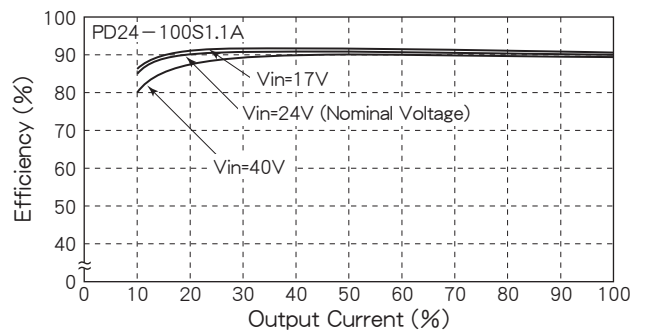


Fig. 8 Efficiency vs. Output Current

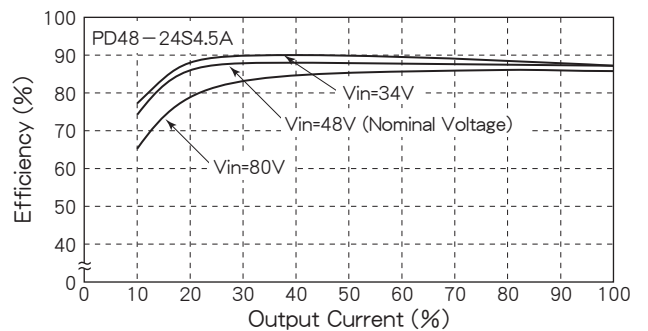
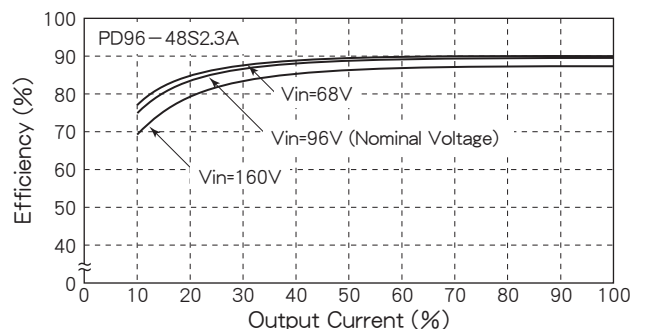


Fig. 9 Efficiency vs. Output Current



FM SERIES

105~200W DC/DC CONVERTERS 並列運転可能 Parallel Operation

FMU type



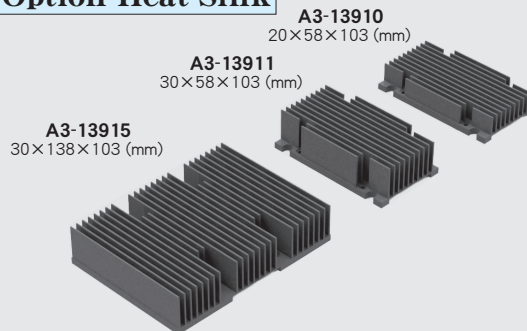
H20×W60×L120 (mm)

FMS type



H20×W60×L120 (mm)

■ Option Heat Sink



■ Features

- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 87~91%
- Wide Input Voltage Range
- High Reliability
- Adjustable Output Volt. $\pm 10\%$
- Input Low Voltage Protection
- Input Over Voltage Protection
- Output Over Voltage Protection
- Thermal Protection
+110°C~+120°C
- Possible Parallel Operation
up to 3 converters
- Operating Ambient Temperature
-40°C~+85°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and
tantalum electrolytic capacitor
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 87~91%
- 広範囲な入力電圧
- 高信頼性
- 可変出力電圧 $\pm 10\%$
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 出力過電圧保護回路内蔵
- 過熱保護回路内蔵
+110°C~+120°C
- 3台まで並列運転可能
- 動作周囲温度
-40°C~+85°C
- RoHS2指令対応
- アルミ電解コンデンサ及び
タンタルコンデンサ不使用

■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%)		
				20% Load	50% Load	80% Load
FMU(FMS) 12- 3.3S 32A	12 (8~18) at 50% Load (9~18) at 100% Load	3.3	32	85	88	87
		5	28	86	90	88
		6	23.3	86	90	88
		12	13.4	87	90	89
		13.8	11.6	87	90	89
		15	10.7	87	90	89
		24	6.7	87	90	89
		28	5.8	87	90	89
		48	3.4	87	90	89
		3.3	40	88	91	90
		5	32	90	92	91
		6	26.6	90	92	91
FMU(FMS) 24- 3.3S 40A	24 (16~36)	5	28	86	90	88
		6	23.3	86	90	88
		12	13.4	87	90	89
		13.8	11.6	87	90	89
		15	10.7	87	90	89
		24	6.7	87	90	89
		28	5.8	87	90	89
		48	3.4	87	90	89
		3.3	40	88	91	90
		5	32	90	92	91
		6	26.6	90	92	91
		12	16.7	90	92	91
FMU(FMS) 48- 3.3S 40A	48 (36~76)	13.8	14.5	90	92	91
		15	13.4	90	92	91
		24	8.4	90	92	91
		28	7.2	90	92	91
		48	4.2	90	92	91
		3.3	40	88	91	90
		5	32	91	92	91
		6	26.6	91	92	91
		12	16.7	91	92	91
		13.8	14.5	91	92	91
		15	13.4	91	92	91
		24	8.4	91	92	91
FMU(FMS) 100- 3.3S 40A	100 (64~144)	28	7.2	91	92	91
		48	4.2	91	92	91
		3.3	40	85	91	90
		5	32	87	92	91
		6	26.6	87	92	91
		12	16.7	87	92	91
		13.8	14.5	87	92	91
		15	13.4	87	92	91
		24	8.4	87	92	91
		28	7.2	87	92	91
		48	4.2	87	92	91
		3.3	40	85	91	90
FMU(FMS) 140- 3.3S 40A	140 (90~200)	5	32	87	92	91
		6	26.6	87	92	91
		12	16.7	87	92	91
		13.8	14.5	87	92	91
		15	13.4	87	92	91
		24	8.4	87	92	91
		28	7.2	87	92	91
		48	4.2	87	92	91
		3.3	40	85	91	90
		5	32	87	92	91
		6	26.6	87	92	91
		12	16.7	87	92	91

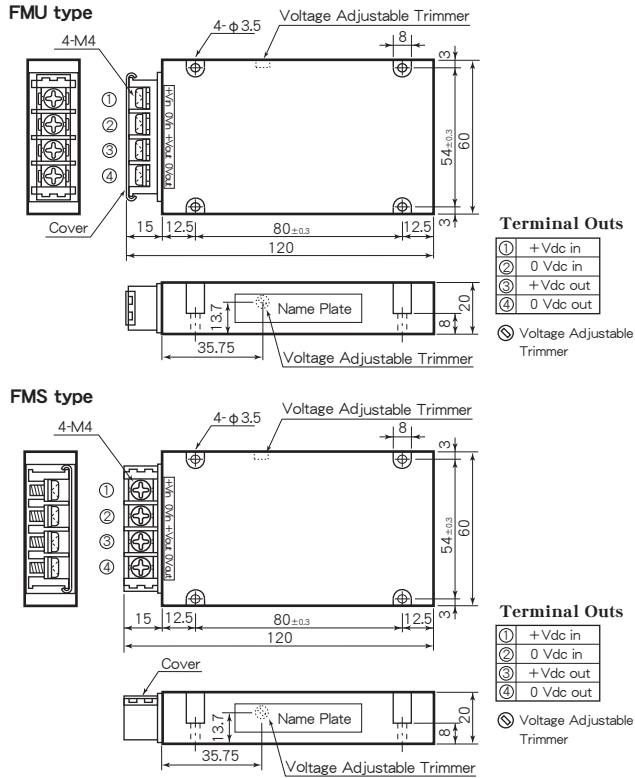
* 上記仕様以外にも対応可能ですのでお問い合わせください。
Please consult with us about other specification.

■ General Characteristics

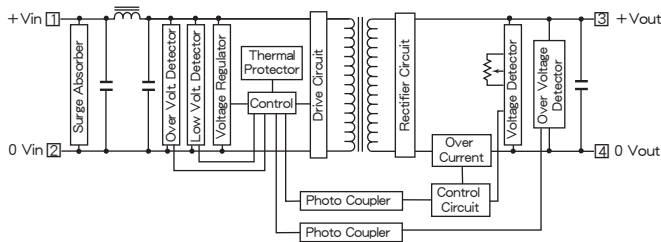
- Input Voltage, Range
DC12, 24, 48, 100, 140V (See Table 1)
- Output Voltage, Current
See Table 1
- Output Voltage Range
 $\pm 10\%$ Adjustable
- Efficiency
See Table 1
- Line Regulation
 $\pm 0.3\%$ max. (at Vin Range)
- Load Regulation
3% max. (0~100% Load) (See Fig. 6)
- Reflected Input Ripple, Noise
(5% Vin)/Vp-p max.
- Output Ripple
80mVp-p max.
- Output Noise
(0.5% Vout+100mV) p-p max.
- Short Circuit Protection
Built-in, Auto-restart (See Fig. 5)
- Over Voltage Protection
115~140% Output Voltage
- Temperature Coefficient
0.02%/°C max.
- Operating Ambient Temp.
-40°C~+85°C (See Fig. 1)
- Max. Case Temperature
+105°C
- Storage Temperature
-55°C~+125°C
- Isolation Voltage
AC2000V one minute
(Input-Output-Case)
- Isolation Impedance
100M Ω min. (at DC1000V)
(Input-Output-Case)
- Weight
Main Body : 350g max.
Heat Sink
A3-13910 : 135g max.
A3-13911 : 175g max.
A3-13915 : 425g max.
- Humidity
20~95% RH
- Shock
490m/s² (11msec 3directions)
- Vibration
10~55Hz 98m/s²
(30minutes 3directions)
- Surface Structure
Aluminum Case
- MTBF
400,000H
(Ta : 25°C, 80% Load, Nominal Vin)
- Warranty
5 years

FM SERIES DATA SHEET

Terminal Outs & Dimensions ($\pm 0.5\text{mm}$)

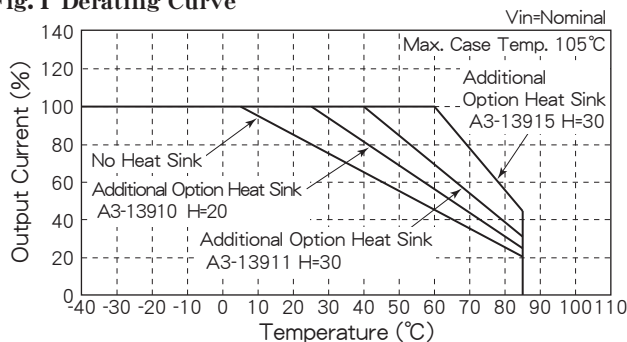


Block Diagram



Characteristic Curves

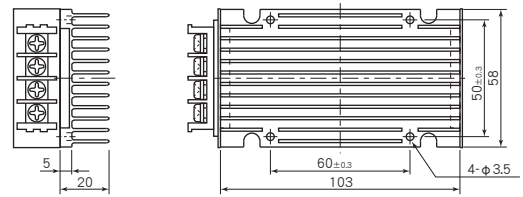
Fig. 1 Derating Curve



Option Heat Sink

Fig. 2 Temperature Characteristic on Case Surface

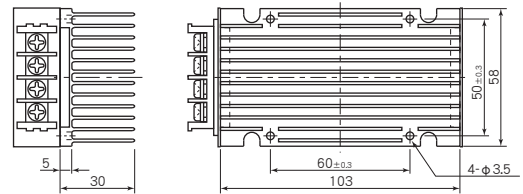
* Option Heat Sink Model : A3-13910



FMU24-12S16.7A Additional Heat Sink A3-13910
Ta=25°C, 100% Load, Vin=Nominal

Fig. 3 Temperature Characteristic on Case Surface

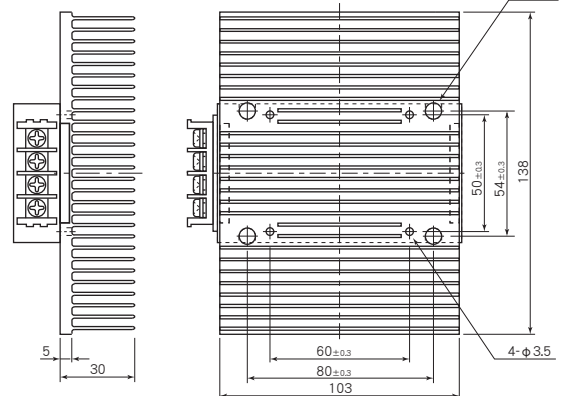
* Option Heat Sink Model : A3-13911



FMU24-12S16.7A Additional Heat Sink A3-13911
Ta=25°C, 100% Load, Vin=Nominal

Fig. 4 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13915



FMU24-12S16.7A Additional Heat Sink A3-13915
Ta=25°C, 100% Load, Vin=Nominal

FM SERIES DATA SHEET

Characteristic Curves

Fig. 5 Short Circuit Operating Area

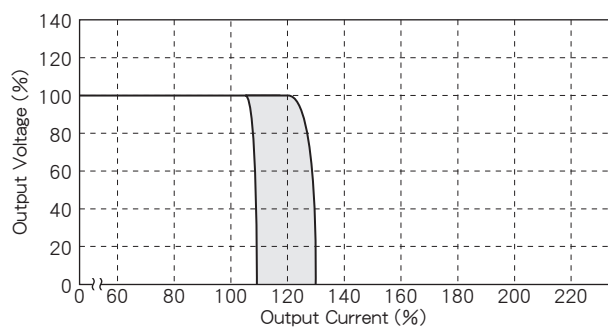
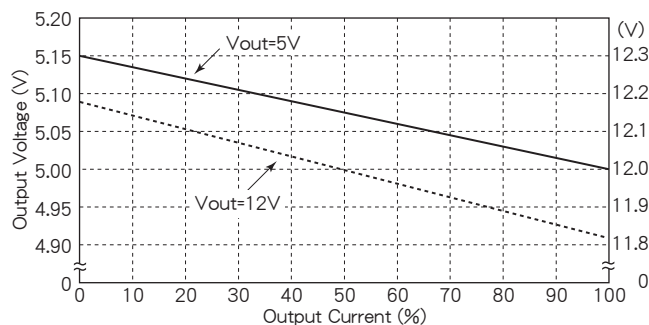


Fig. 6 Output Voltage vs. Output Current



* 並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。
Load Regulation is regulated large on purpose to equate
the each unit's output current at parallel operation.

Fig. 7 Efficiency vs. Output Current

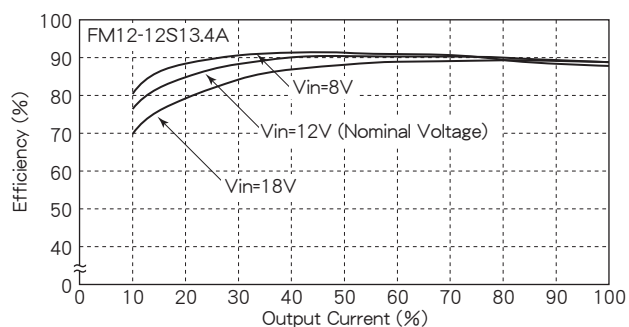


Fig. 8 Efficiency vs. Output Current

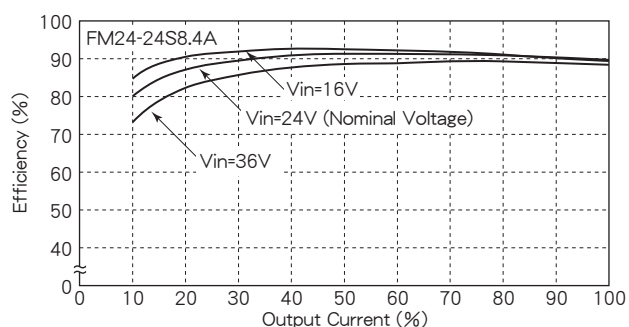


Fig. 9 Efficiency vs. Output Current

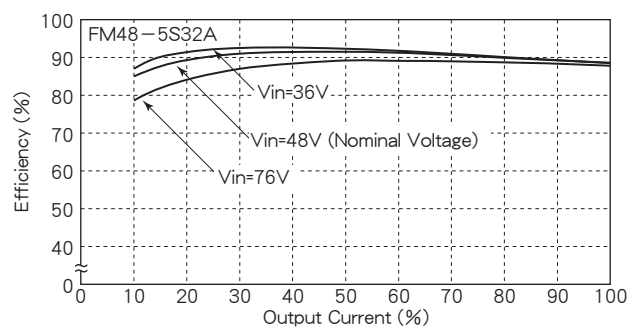


Fig. 10 Efficiency vs. Output Current

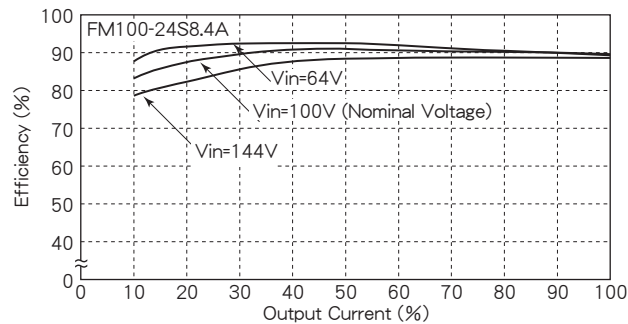
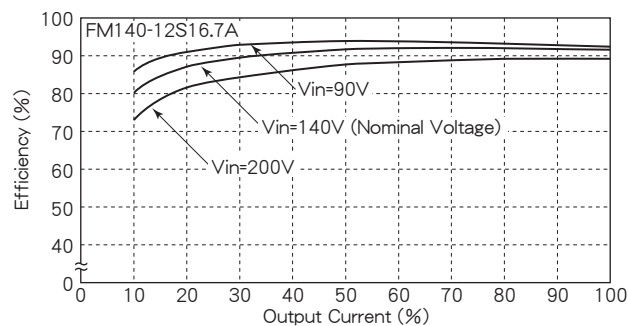


Fig. 11 Efficiency vs. Output Current

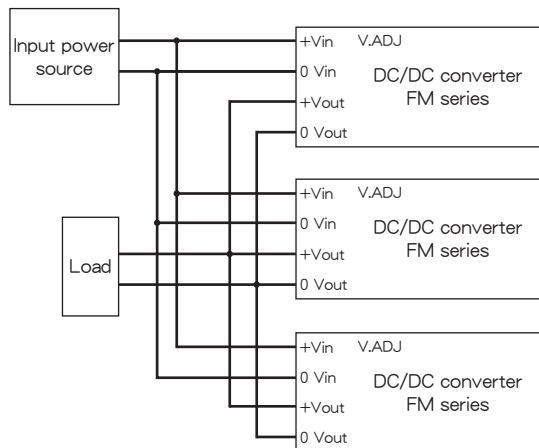


■ Parallel Operation

同機種を並列に動作させることにより、出力電流容量を増やすことができます。下図のように結線し、各コンバータ間の出力電圧を同じ電圧に調整することで、並列運転ができます。(Fig. 12を御参照ください)

It is possible to increase output current capacity by parallel operation of the same model. Please see the below figure for wiring instruction. Parallel operation is possible by each outputs to be same voltage.

Fig. 12 Parallel Operation Connection



KM SERIES

105~200W DC/DC CONVERTERS 並列運転可能 Parallel Operation

KMU type



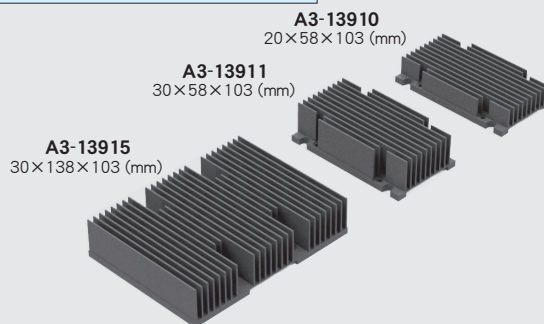
H20×W60×L135 (mm)

KMS type



H20×W60×L135 (mm)

■ Option Heat Sink



■ Features

- Built-in Input Filter
- Input-Output Isolation
- High Efficiency 87~91%
- Wide Input Voltage Range
- High Reliability
- Adjustable Output Volt. $\pm 10\%$
- Input Low Voltage Protection
- Input Over Voltage Protection
- Output Over Voltage Protection
- Thermal Protection
+110°C~+120°C
- Remote ON/OFF Control
- Possible Parallel Operation
up to 3 converters
- Operating Ambient Temperature
-40°C~+85°C
- Conformity to RoHS2 Directive
- Not built-in aluminum and
tantalum electrolytic capacitor
- 入力フィルタ内蔵
- 入出力間絶縁
- 高効率 87~91%
- 広範囲な入力電圧
- 高信頼性
- 可変出力電圧 $\pm 10\%$
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 出力過電圧保護回路内蔵
- 過熱保護回路内蔵
+110°C~+120°C
- リモートON/OFFコントロール
- 3台まで並列運転可能
- 動作周囲温度
-40°C~+85°C
- RoHS2指令対応
- アルミ電解コンデンサ及び
タンタルコンデンサ不使用

■ Selection Guide

Table 1

Model Number	Input Volt. (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (Typical)(%)		
				20% Load	50% Load	80% Load
KMU(KMS) 12- 3.3S 32A	12 (8~18) at 50% Load (9~18) at 100% Load	3.3	32	85	88	87
		5	28	86	90	88
		6	23.3	86	90	88
		12	13.4	87	90	89
		13.8	11.6	87	90	89
		15	10.7	87	90	89
		24	6.7	87	90	89
		28	5.8	87	90	89
		48	3.4	87	90	89
		3.3	40	88	91	90
		5	32	90	92	91
		6	26.6	90	92	91
KMU(KMS) 24- 5S 32A	24 (16~36)	5	28	86	90	88
		6	23.3	86	90	88
		12	13.4	87	90	89
		13.8	11.6	87	90	89
		15	10.7	87	90	89
		24	6.7	87	90	89
		28	5.8	87	90	89
		48	3.4	87	90	89
		3.3	40	88	91	90
		5	32	90	92	91
		6	26.6	90	92	91
		12	16.7	90	92	91
KMU(KMS) 48- 6S 26.6A	48 (36~76)	12	16.7	91	92	91
		13.8	14.5	91	92	91
		15	13.4	91	92	91
		24	8.4	91	92	91
		28	7.2	91	92	91
		48	4.2	91	92	91
		3.3	40	85	91	90
		5	32	87	92	91
		6	26.6	87	92	91
		12	16.7	87	92	91
		13.8	14.5	87	92	91
		15	13.4	87	92	91
KMU(KMS) 100- 15S 13.4A	100 (64~144)	15	13.4	87	92	91
		24	8.4	87	92	91
		28	7.2	87	92	91
		48	4.2	87	92	91
		3.3	40	85	91	90
		5	32	87	92	91
		6	26.6	87	92	91
		12	16.7	87	92	91
		13.8	14.5	87	92	91
		15	13.4	87	92	91
		24	8.4	87	92	91
		28	7.2	87	92	91
KMU(KMS) 140- 28S 7.2A	140 (90~200)	28	7.2	87	92	91
		48	4.2	87	92	91
		3.3	40	85	91	90
		5	32	87	92	91
		6	26.6	87	92	91
		12	16.7	87	92	91
		13.8	14.5	87	92	91
		15	13.4	87	92	91
		24	8.4	87	92	91
		28	7.2	87	92	91
		48	4.2	87	92	91
		3.3	40	85	91	90

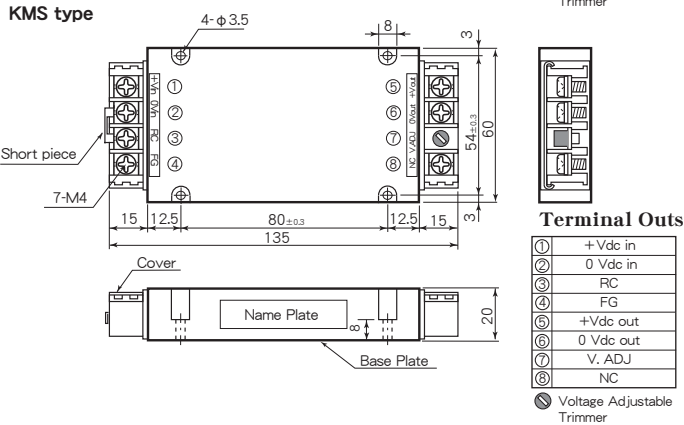
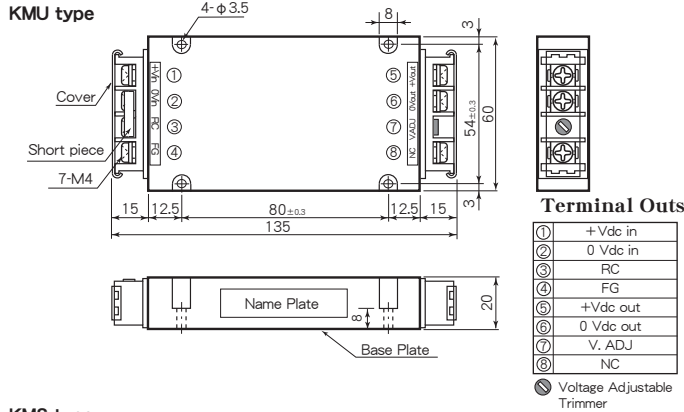
* 上記仕様以外にも対応可能ですのでお問い合わせください。
Please consult with us about other specification.

■ General Characteristics

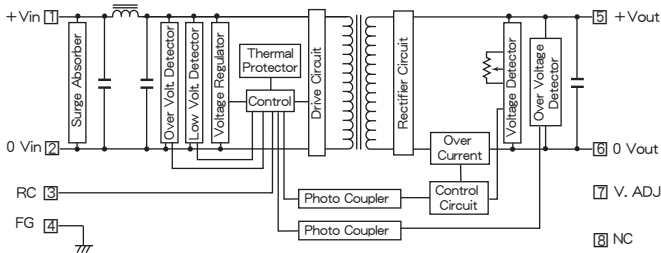
- Input Voltage, Range DC12, 24, 48, 100, 140V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Range $\pm 10\%$ Adjustable
- Efficiency See Table 1
- Line Regulation $\pm 0.3\%$ max. (at Vin Range)
- Load Regulation 3% max. (0~100% Load) (See Fig. 6)
- Reflected Input Ripple, Noise (5% Vin) Vp-p max.
- Output Ripple 80mVp-p max.
- Output Noise (0.5% Vout+100mV) p-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 5)
- Over Voltage Protection 115~140% Output Voltage
- Remote ON/OFF Control ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between terminal ② ~ ③)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- Max. Case Temperature +105°C
- Storage Temperature -55°C~+125°C
- Isolation Voltage AC2000V one minute
(Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V)
(Input-Output-Case)
- Weight Main Body : 350g max.
Heat Sink
A3-13910 : 135g max.
A3-13911 : 175g max.
A3-13915 : 425g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration 10~55Hz 98m/s²
(30minutes 3directions)
- Surface Structure Aluminum Case
- MTBF 400,000H
(Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

KM SERIES DATA SHEET

Terminal Outs & Dimensions ($\pm 0.5\text{mm}$)

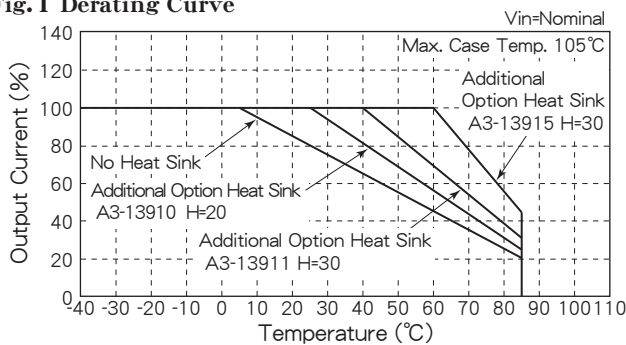


Block Diagram



Characteristic Curves

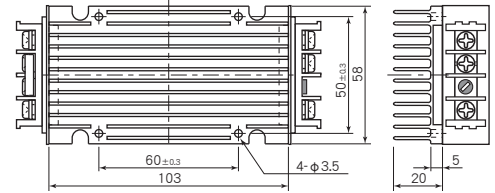
Fig. 1 Derating Curve



Option Heat Sink

Fig. 2 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13910



KMU24-12S16.7A Additional Heat Sink A3-13910
Ta=25°C, 100% Load, Vin=Nominal

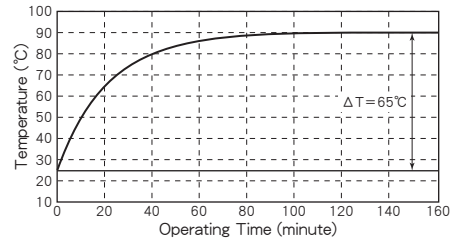
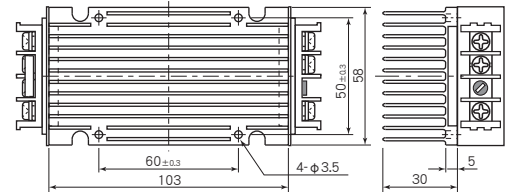


Fig. 3 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13911



KMU24-12S16.7A Additional Heat Sink A3-13911
Ta=25°C, 100% Load, Vin=Nominal

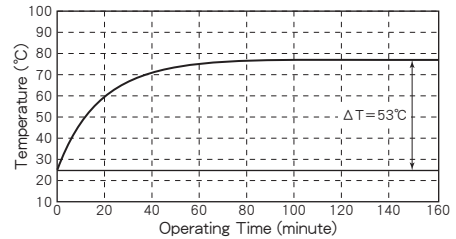
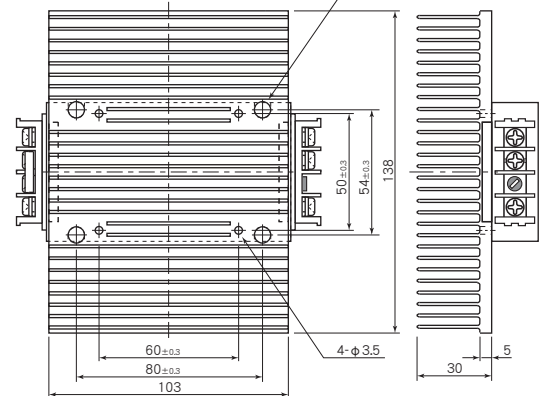
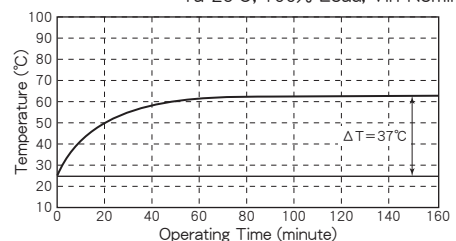


Fig. 4 Temperature Characteristic on Case Surface

* Option Heat Sink Model : A3-13915



KMU24-12S16.7A Additional Heat Sink A3-13915
Ta=25°C, 100% Load, Vin=Nominal



KM SERIES DATA SHEET

Characteristic Curves

Fig. 5 Short Circuit Operating Area

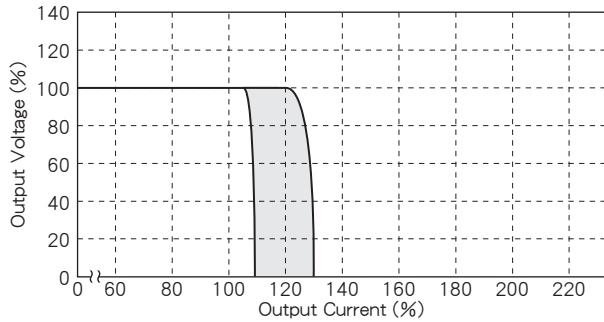
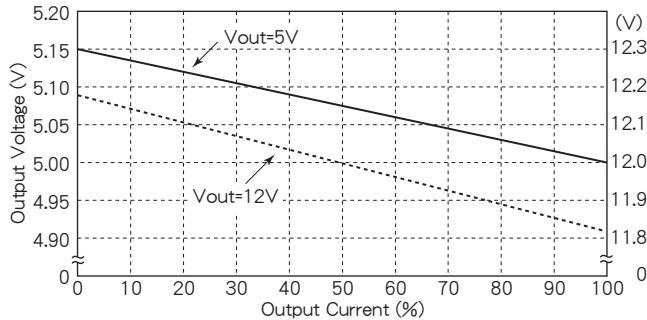


Fig. 6 Output Voltage vs. Output Current



* 並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。
Load Regulation is regulated large on purpose to equate
the each unit's output current at parallel operation.

Fig. 7 Efficiency vs. Output Current

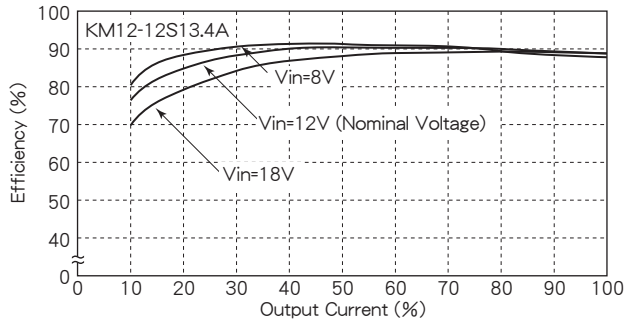


Fig. 8 Efficiency vs. Output Current

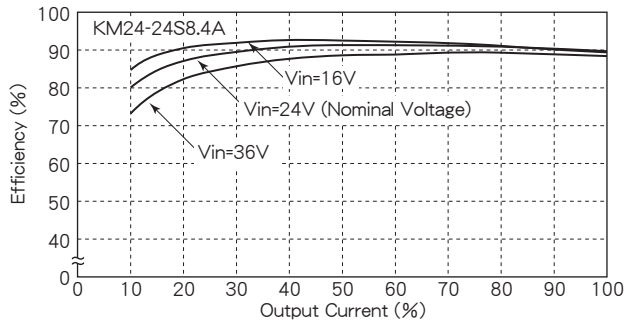


Fig. 9 Efficiency vs. Output Current

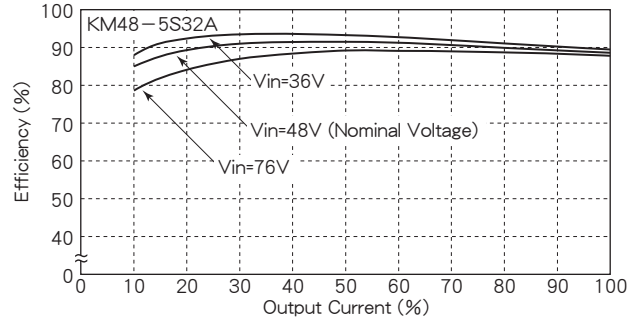


Fig. 10 Efficiency vs. Output Current

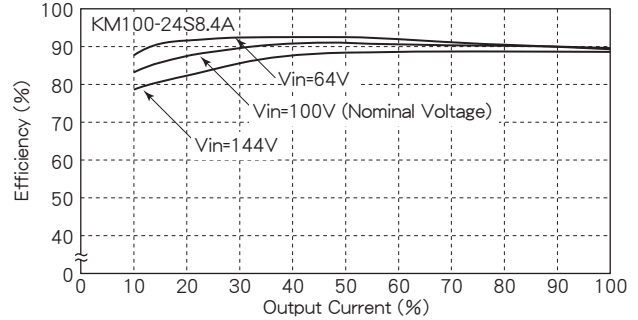
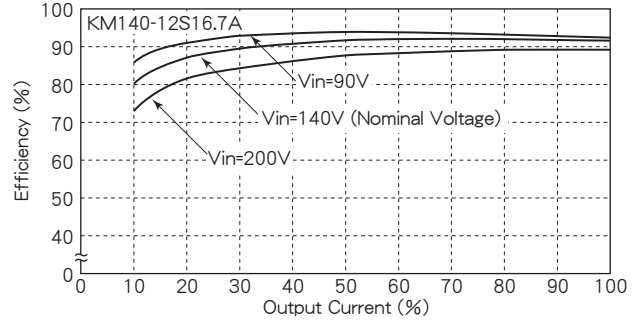


Fig. 11 Efficiency vs. Output Current

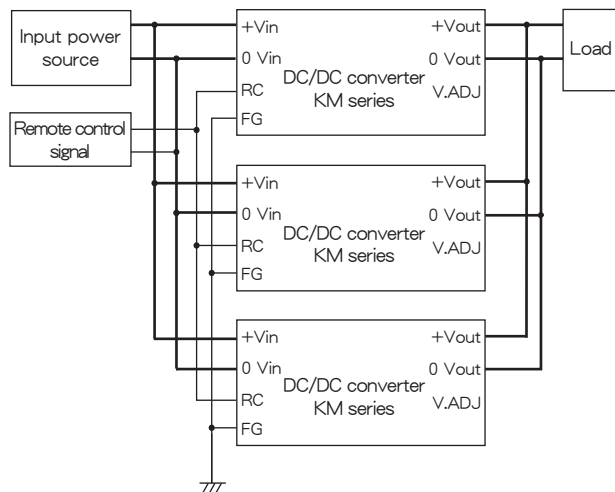


■ Parallel Operation

同機種を並列に動作させることにより、出力電流容量を増やすことができます。下図のように結線し、各コンバータ間の出力電圧を同じ電圧に調整することで、並列運転ができます。(Fig. 12を御参照ください)

It is possible to increase output current capacity by parallel operation of the same model. Please see the below figure for wiring instruction. Parallel operation is possible by each outputs to be same voltage.

Fig. 12 Parallel Operation Connection



PM シリーズ

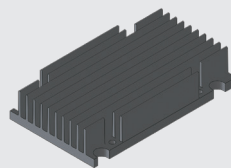
240~300W DC/DCコンバータ
並列運転可能

PMS(端子横向きタイプ)



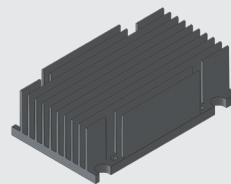
H20×W60×L120 (mm)

オプションヒートシンクA
A3-14777



H20×W58×L98(mm)

オプションヒートシンクB
A3-14778



H30×W58×L98(mm)

■特 長

- 入力フィルタ内蔵
- 入出力間絶縁(AC2000V)
- 高効率 91~93%
- 広範囲な入力電圧
- 高信頼性
- 可変出力電圧 ±10%
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 出力過電圧保護回路内蔵
- 過熱保護回路内蔵
+110℃~+120℃
- 3台まで並列運転可能
- 動作周囲温度
-40℃~+85℃
- RoHS2指令対応
- アルミ電解コンデンサ及び
タンタルコンデンサ不使用

■仕 様

- 入力電圧(範囲) (周囲温度: 25℃, 入力電圧: 定格, 負荷: 100%)
DC12, 24, 48, 100, 140V (表 1 参照)
- 出力電圧, 電流 表 1 参照
- 出力電圧調整範囲 ±10%
- 効率 表 1 参照
- 対入力変動率 ±0.3% max. (入力電圧範囲において)
- 対負荷変動率 3% max. (0~100%負荷において)
(図 4 参照)
- 入力リップル・ノイズ 表 2 参照
- 出力リップル・ノイズ 表 3 参照
- 出力過電流保護 有り(図 3 参照), 自動復帰
- 出力過電圧保護 出力電圧115~140%時, 手動復帰
- 出力電圧温度係数 0.02%/℃ max.
- 動作周囲温度範囲 -40℃~+85℃ (図 1 参照)
- 最大ケース温度 +105℃
- 保存周囲温度範囲 -55℃~+125℃
- 絶縁耐圧 AC2000V 1分間
(入力-出力-ケース)
100MΩ min. (DC1000Vにて)
(入力-出力-ケース)
- 絶縁抵抗 本体: 400g max.
オプションヒートシンク
A3-14777: 135g max.
A3-14778: 175g max.
- 質量
- 湿度 20~95% RH
- 衝撃 490m/s² (11ms X, Y, Z方向)
- 振動 10~55Hz 98m/s²
(30分間 X, Y, Z方向)
- 構造 アルミケース
- MTBF 220,000H
(周囲温度: 25℃, 入力電圧: 定格, 負荷: 80%)
- 無償保証期間 5年間

■型 式

表 1

型式	入力電圧 (電圧範囲) (V.DC)	出力電圧 (V.DC)	出力電流 (A)	効率 (typ.)(%)		
				20%負荷	50%負荷	80%負荷
PMS 12- 12S 20A	12 (8~18) 50%負荷時 (9~18) 100%負荷時	12	20	87	91	91
PMS 12-13.8S 17.4A		13.8	17.4	88	91	91
PMS 12- 15S 16A		15	16	88	91	91
PMS 12- 24S 10A		24	10	88	91	91
PMS 12- 28S 8.6A		28	8.6	88	91	91
PMS 12- 48S 5A		48	5	88	91	91
PMS 24- 12S 25A	24 (16~36)	12	25	89	93	93
PMS 24-13.8S 21.7A		13.8	21.7	89	93	93
PMS 24- 15S 20A		15	20	89	93	93
PMS 24- 24S 12.5A		24	12.5	89	93	93
PMS 24- 28S 10.7A		28	10.7	89	93	93
PMS 24- 48S 6.25A		48	6.25	89	93	93
PMS 48- 12S 25A	48 (36~76)	12	25	89	93	93
PMS 48-13.8S 21.7A		13.8	21.7	89	93	93
PMS 48- 15S 20A		15	20	89	93	93
PMS 48- 24S 12.5A		24	12.5	89	93	93
PMS 48- 28S 10.7A		28	10.7	89	93	93
PMS 48- 48S 6.25A		48	6.25	89	93	93
PMS 100- 12S 25A	100 (64~144)	12	25	89	93	93
PMS 100-13.8S 21.7A		13.8	21.7	89	93	93
PMS 100- 15S 20A		15	20	89	93	93
PMS 100- 24S 12.5A		24	12.5	89	93	93
PMS 100- 28S 10.7A		28	10.7	89	93	93
PMS 100- 48S 6.25A		48	6.25	89	93	93
PMS 140- 12S 25A	140 (90~200)	12	25	89	93	93
PMS 140-13.8S 21.7A		13.8	21.7	89	93	93
PMS 140- 15S 20A		15	20	89	93	93
PMS 140- 24S 12.5A		24	12.5	89	93	93
PMS 140- 28S 10.7A		28	10.7	89	93	93
PMS 140- 48S 6.25A		48	6.25	89	93	93

* 上記仕様以外にも対応可能ですのでお問い合わせください。

表 2 入力電圧リップル・ノイズ

入力電圧 (電圧範囲) (V.DC)	リップル (mVp-p max.)	ノイズ (mVp-p max.)
12 (9~18)	300	250
24 (16~36)	400	350
48 (36~76)	500	400
100 (64~144)	600	500
140 (90~200)	800	550

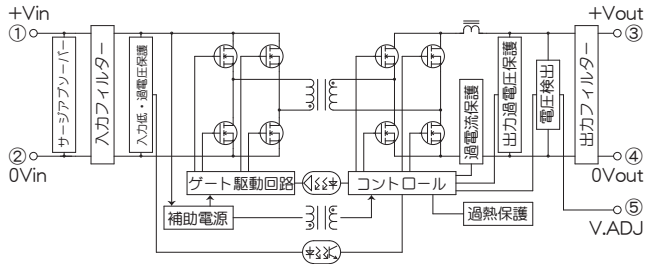
表 3 出力電圧リップル・ノイズ

出力電圧 (V.DC)	リップル (mVp-p max.)	ノイズ (mVp-p max.)
12	40	160
13.8	40	170
15	40	175
24	60	220
28	60	240
48	80	340

* 入力ラインは各1.5mツイスト線にて測定
* 使用環境によって異なります

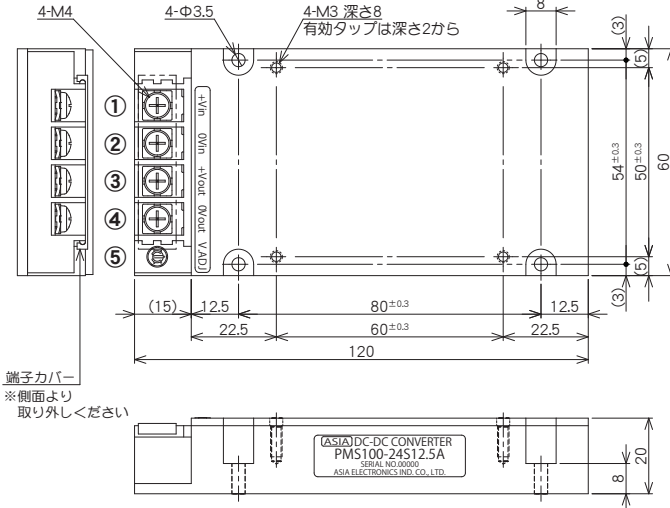
PM シリーズ データシート

■ブロック図



■端子配列及び外形寸法 (±0.5mm)

PMS(端子横向きタイプ)

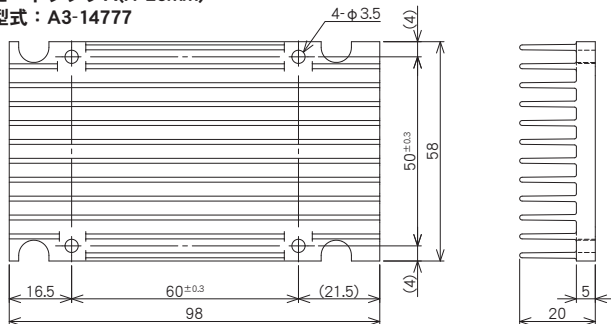


端子配列

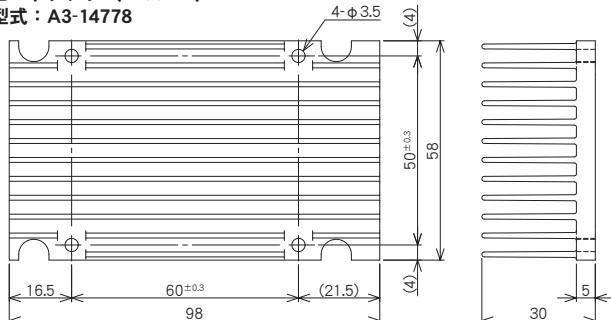
①	直流入力端子+Vin
②	直流入力端子 0 Vin
③	直流出力端子+Vout
④	直流出力端子 0 Vout
⑤	出力電圧調整ボリュームV.ADJ

■オプションヒートシンク (±0.5mm)

ヒートシンクA(H=20mm) 型式: A3-14777



ヒートシンクB(H=30mm) 型式: A3-14778



■特性データ

図1 ディレーティングカーブ

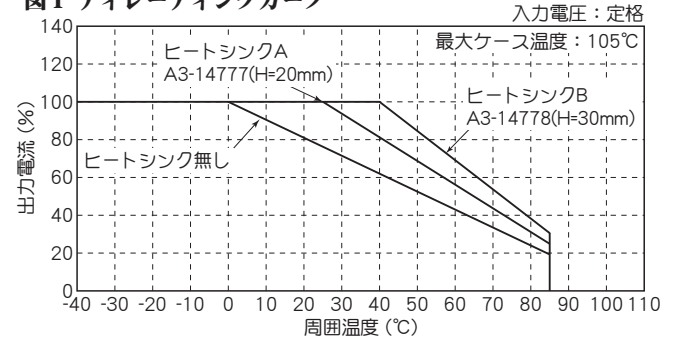


図2 温度上昇特性(ケース表面温度)【PMS100-24S12.5A】

図2.1 オプションヒートシンクを付けない場合

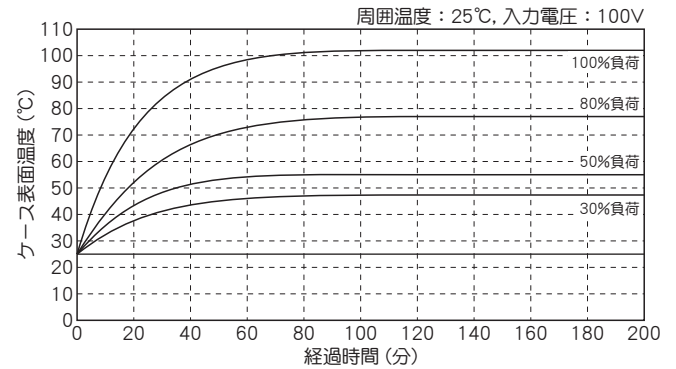


図2.2 オプションヒートシンクA(H=20mm) A3-14777 を付けた場合

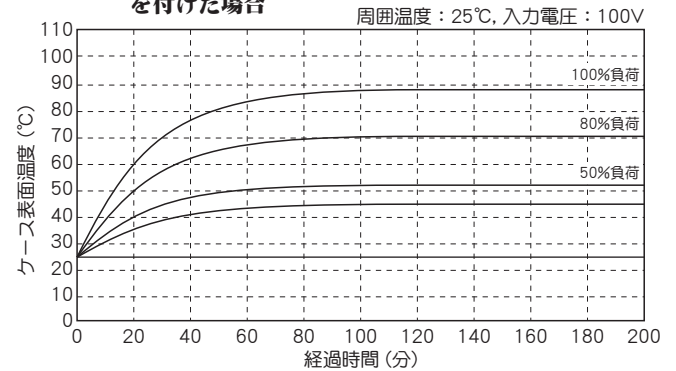
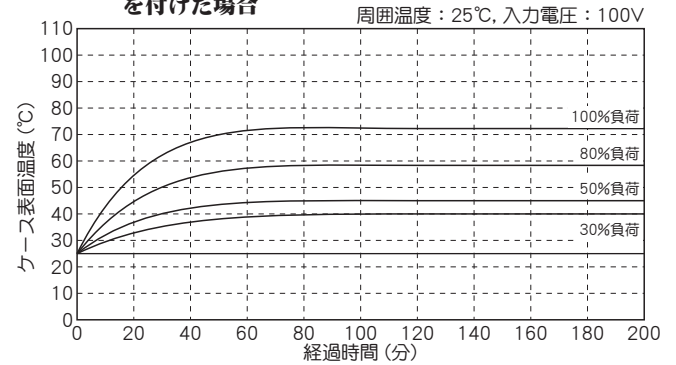


図2.3 オプションヒートシンクB(H=30mm) A3-14778 を付けた場合



PM シリーズ データシート

■特性データ

図3 出力過電流保護範囲

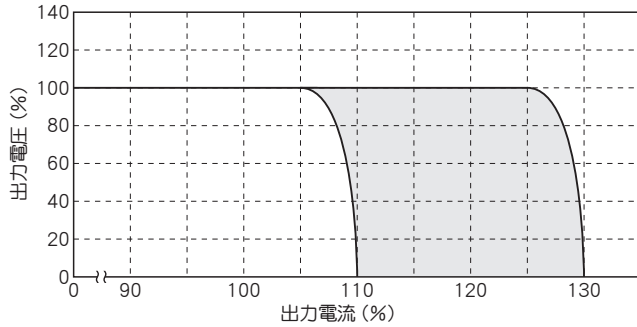
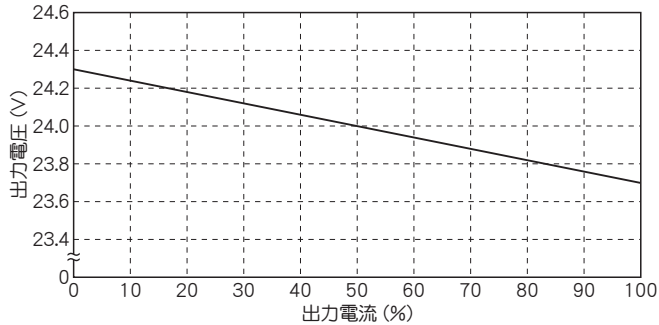


図4 出力電圧－出力電流特性【出力電圧：24V】



*並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。

図5 効率－出力電流特性【PMS100-24S12.5A】

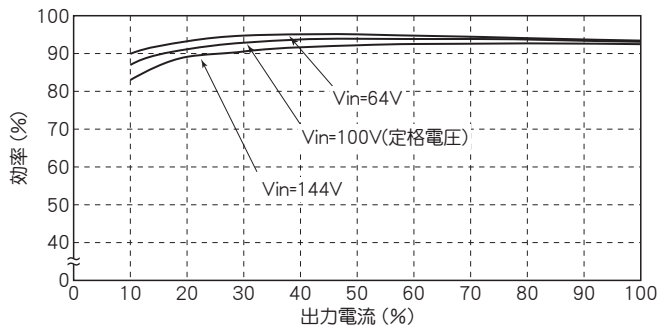


図6 入力電圧 リップル・ノイズ【PMS100-24S12.5A】

図6.1 入力電圧：64V，負荷：100%

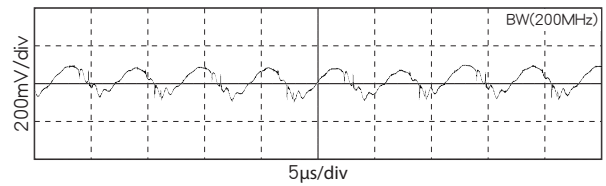


図6.2 入力電圧：100V，負荷：100%

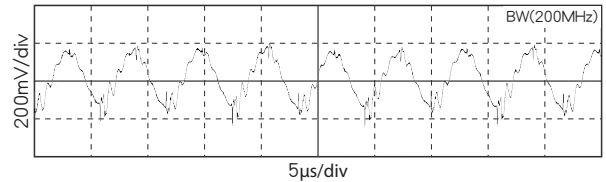


図6.3 入力電圧：144V，負荷：100%

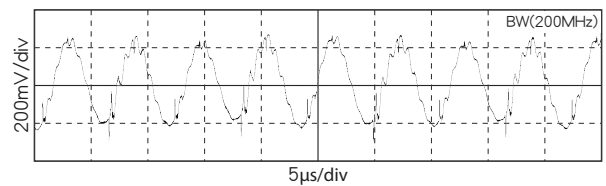


図7 出力電圧 リップル・ノイズ【PMS100-24S12.5A】

図7.1 入力電圧：64V，負荷：100%

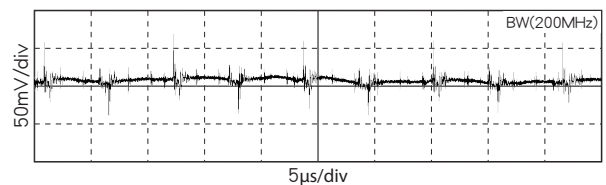


図7.2 入力電圧：100V，負荷：100%

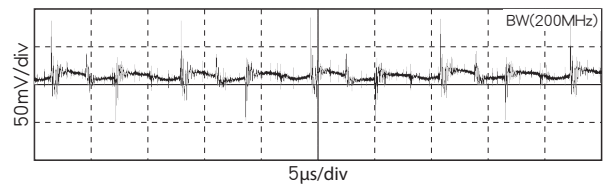
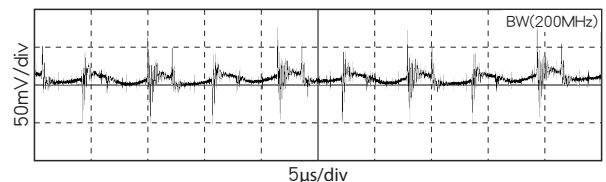


図7.3 入力電圧：144V，負荷：100%

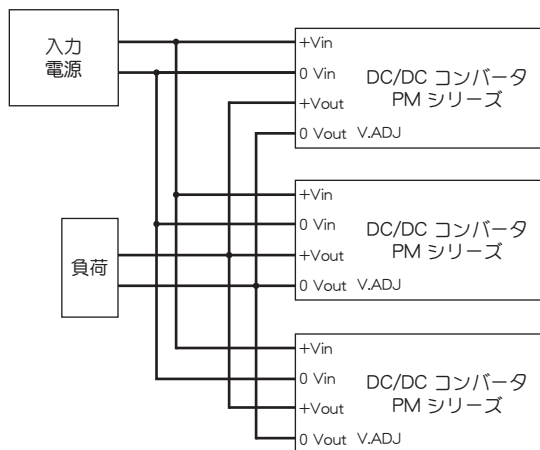


PM シリーズ データシート

■ 並列運転

同機種を並列に動作させることにより、出力電流容量を増やすことができます。下図のように結線し、各コンバータ間の出力電圧を同じ電圧に調整することで、並列運転ができます。図8を参照ください。

図8 並列運転時結線方法



RDP SERIES

130~250W DC/DC CONVERTERS Single Output

並列運転可能
Parallel Operation



H36×W100×L220 (mm)

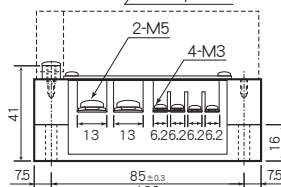
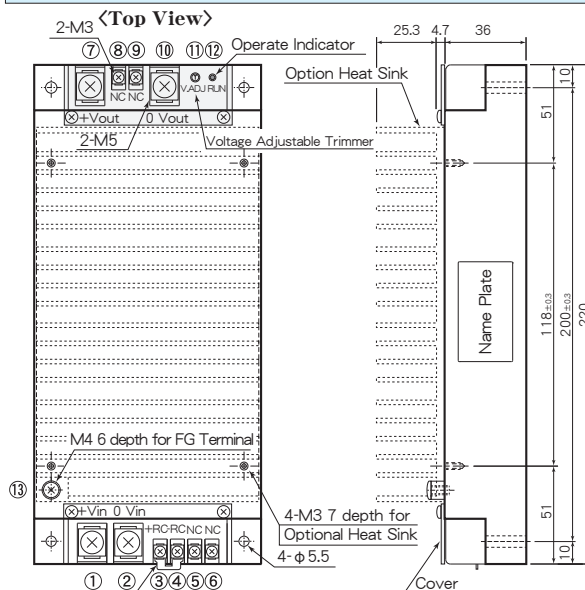
■ Features

- Wide Input Voltage Range
- High Efficiency 85%~92%
- Input-Output Isolation (AC2000V)
- Low Output Ripple and Noise
- Possible Parallel Operation up to 4 converters
- Remote ON/OFF Control
- Input Rush Current Protection
- Input Low Voltage Protection
- Input Over Voltage Protection
- Output Over Voltage Protection 120%~140% Operation
- Operating Ambient Temp -25°C~+71°C
- Max. Case Temperature +85°C
- Conformity to RoHS2 Directive
- 広範囲な入力電圧範囲
- 高効率 85%~92%
- 入出力間絶縁 (AC2000V)
- 出力リップルノイズが小さい
- 4台まで並列運転可能
- リモートON/OFFコントロール機能
- 入力突入電流保護回路内蔵
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 出力過電圧保護回路内蔵 120%~140%動作
- 動作周囲温度 -25°C~+71°C
- 最大ケース温度+85°C
- RoHS2指令対応

■ General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin)
DC 12, 24, 48, 96V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Adjustment -3~+10%
- Efficiency See Table 1
- Line Regulation 0.2% max. (at Vin Range)
- Load Regulation ±1.5% typ. (0~100% Load) (See Fig. 8)
- Output Ripple (0.1% Vout+50mV) p-p max.
- Output Noise (0.5% Vout+50mV) p-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Output Over Voltage Protection Built-in, Shut-down (120%~140% Vout)
- Remote ON/OFF Control ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between terminal ③ ~ ④)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -25°C~+71°C (See Fig. 1)
- Max. Case Temp. +85°C
- Storage Temp. -40°C~+85°C
- Isolation Voltage AC2000V one minute
(Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V)
(Input-Output-Case)
- Weight Main Body : 1.8kg max.
Heat Sink : 400g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration JIS E4031 Category 1 - Class B
- Surface Structure Aluminum Case
- MTBF 100,000H
(Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

■ Terminal Outs & Dimensions (±0.5mm)



* Option Heat Sink Model : A3-9023

Terminal Outs and Function

① +Vdc in	⑦ +Vdc out
② 0 Vdc in	⑧ NC
③ +RC	⑨ NC
④ -RC	⑩ 0 Vdc out
⑤ NC	⑪ V.ADJ
⑥ NC	⑫ Operate Indicator
	⑬ FG

■ Selection Guide

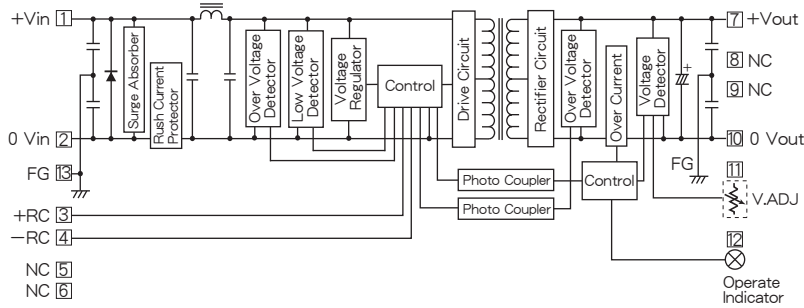
Table 1

Model Number	Input Voltage (Range) (V. DC)	Input Rush Current (max.)(A)	Output Voltage (V. DC)	Output Current (A)	Efficiency (typ.) (%)	
					20% Load	80% Load
RDP12 - 3.3S 40A	12 (9~18)	62	3.3	40	85	85
RDP12 - 5S 40A			5	40	86	87
RDP12 - 12S 20.8A			12	20.8	88	89
RDP12 - 13.8S 18.1A			13.8	18.1	88	89
RDP12 - 15S 16.7A			15	16.7	88	89
RDP12 - 24S 10.5A			24	10.5	89	89
RDP12 - 48S 5.3A			48	5.3	89	90
RDP12 - 100S 2.5A			100	2.5	89	90
RDP12 - 140S 1.8A			140	1.8	89	89
RDP12 - 200S 1.3A			200	1.3	89	90
RDP12 - 300S 0.85A			300	0.85	89	90
RDP24 - 3.3S 40A	24 (18~36)	31	3.3	40	86	87
RDP24 - 5S 40A			5	40	87	88
RDP24 - 12S 20.8A			12	20.8	88	91
RDP24 - 13.8S 18.1A			13.8	18.1	88	91
RDP24 - 15S 16.7A			15	16.7	88	90
RDP24 - 24S 10.5A			24	10.5	88	91
RDP24 - 48S 5.3A			48	5.3	89	91
RDP24 - 100S 2.5A			100	2.5	89	92
RDP24 - 140S 1.8A			140	1.8	90	91
RDP24 - 200S 1.3A			200	1.3	90	91
RDP24 - 300S 0.85A			300	0.85	91	92
RDP48 - 3.3S 40A	48 (36~72)	16	3.3	40	86	87
RDP48 - 5S 40A			5	40	88	90
RDP48 - 12S 20.8A			12	20.8	88	91
RDP48 - 13.8S 18.1A			13.8	18.1	88	91
RDP48 - 15S 16.7A			15	16.7	88	91
RDP48 - 24S 10.5A			24	10.5	88	91
RDP48 - 48S 5.3A			48	5.3	89	91
RDP48 - 100S 2.5A			100	2.5	89	91
RDP48 - 140S 1.8A			140	1.8	89	91
RDP48 - 200S 1.3A			200	1.3	89	91
RDP48 - 300S 0.85A			300	0.85	89	91
RDP96 - 3.3S 40A	96 (70~144)	8	3.3	40	86	87
RDP96 - 5S 40A			5	40	88	90
RDP96 - 12S 20.8A			12	20.8	88	91
RDP96 - 13.8S 18.1A			13.8	18.1	88	91
RDP96 - 15S 16.7A			15	16.7	88	91
RDP96 - 24S 10.5A			24	10.5	88	92
RDP96 - 48S 5.3A			48	5.3	88	92
RDP96 - 100S 2.5A			100	2.5	88	92
RDP96 - 140S 1.8A			140	1.8	89	91
RDP96 - 200S 1.3A			200	1.3	89	91
RDP96 - 300S 0.85A			300	0.85	89	91

※ 上記仕様以外にも対応可能ですのでお問い合わせ下さい。
Please consult with us about other specification.

RDP SERIES DATA SHEET

Block Diagram



Characteristic Curves

Fig. 1 Derating Curve

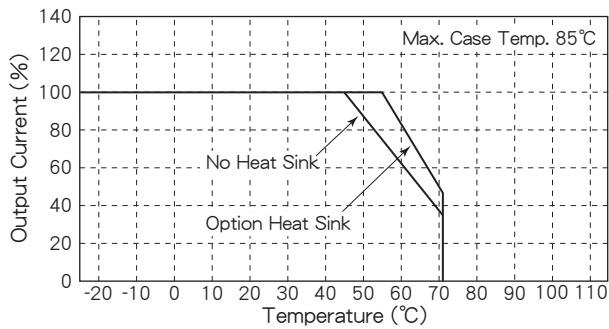


Fig. 2 Short Circuit Operating Area

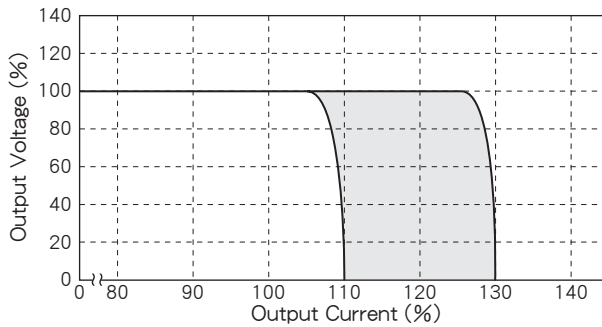


Fig. 3 Temperature Characteristic on Case Surface

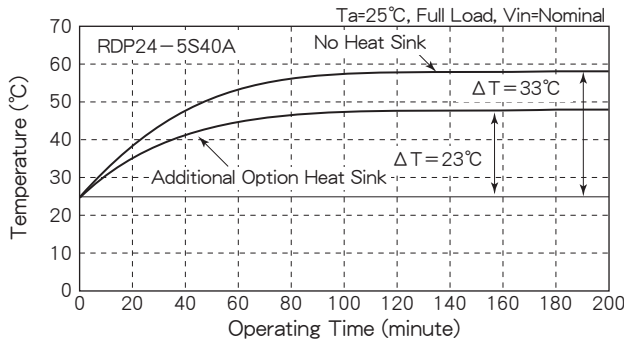


Fig. 4 Efficiency vs. Output Current

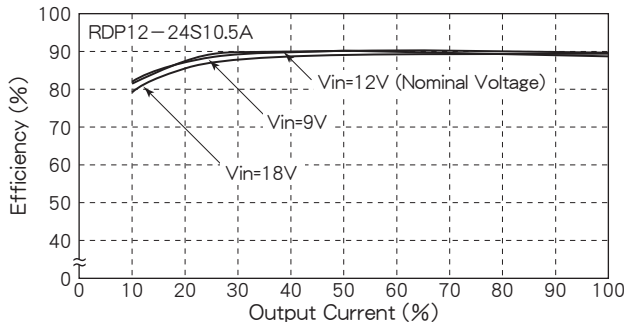


Fig. 5 Efficiency vs. Output Current

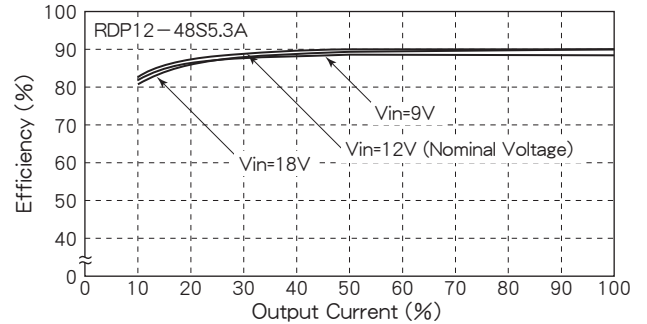


Fig. 6 Efficiency vs. Output Current

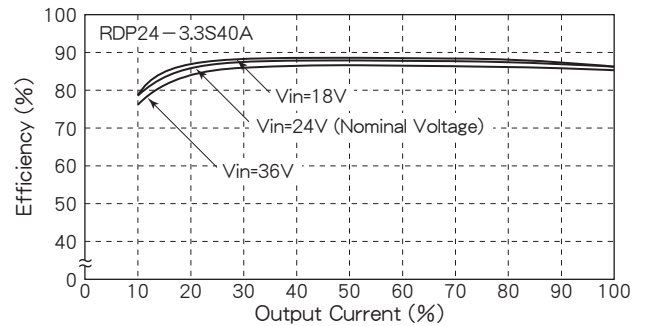


Fig. 7 Efficiency vs. Output Current

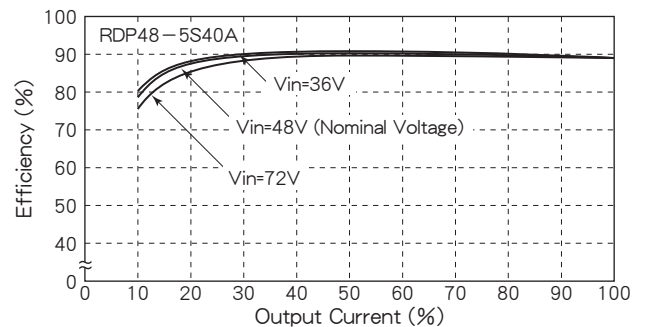
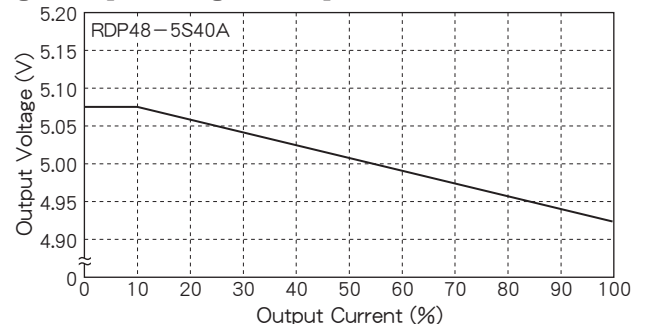


Fig. 8 Output Voltage vs. Output Current



* 並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。

Load Regulation is regulated large on purpose to equate
the each unit's output current at parallel operation.

RDP SERIES DATA SHEET

■ 主な機能及び注意事項 Function and direction in application

1. 入力低電圧保護、入力過電圧保護 Input low/over voltage protection
下記入力電圧にて出力電圧がOFFとなります。入力電圧を規定値内に戻すと自動復帰します。
Output will be shut down in the input voltages on the following table. Output will automatically be reset when the input voltage comes to within the specified value.

定格入力電圧 Rated input voltage	低電圧保護 Low voltage protection	過電圧保護 Over voltage protection
12V (9~18V)	6~8V	20~22V
24V (18~36V)	12~16V	40~44V
48V (36~72V)	24~32V	75~82V
96V (70~144V)	48~64V	150~165V

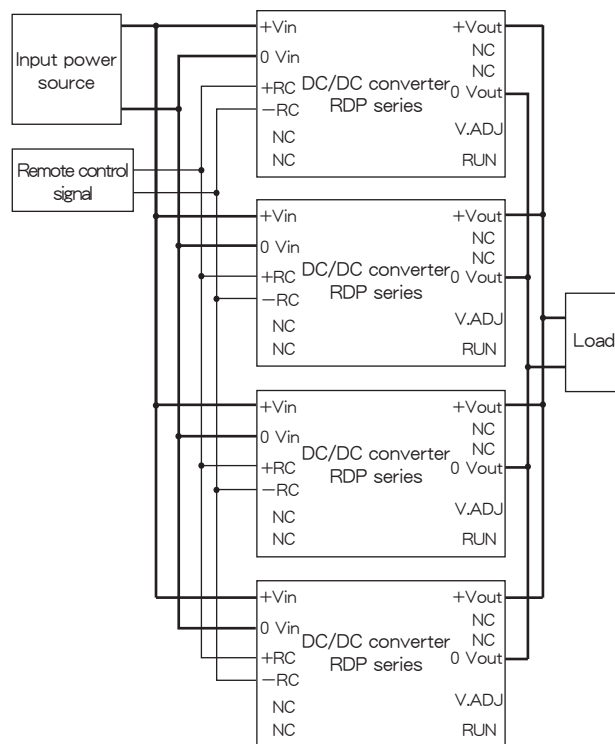
2. 出力電圧値 Output voltage
出力電圧値はボリューム(V.ADJ)を回転させることにより、定格出力電圧の約-3%~+10%可変することができます。
Output voltage will be adjusted to -3% - +10% of rated voltage by means of volume (V.ADJ).

3. 出力過電流保護 Output over current protection
負荷が短絡した場合など、過大な負荷電流が流れたときに負荷と本体を保護する機能です。定格出力電流の約105%~130%にて検出し作動します(Fig. 2 参照)。出力は定電流電圧垂下特性、入力電流はフの字特性となっています。また自動復帰特性を有しています。
This function is to protect a power supply and a load when excessive current flows in case of short-circuited load or such possible conditions. It will operate in 105 - 130% of rated output current (see Fig. 2). Output has constant current voltage limiting characteristic and input current has combined current limiting with fold-back protection. It also has automatic reset function.

4. 出力過電圧保護 Output over voltage protection
出力の過電圧から負荷側を保護する機能です。出力電圧値が定格値の約120~140%になると出力をOFFします。
This function is to protect a load from output over voltage. Output will be shut down when output voltage is 120 - 140% of rated voltage.

5. リモートON/OFFコントロール Remote ON/OFF control
リモートON/OFFコントロールを使用して、電源の出力をON/OFFすることができます。RC端子間をショートする事で出力電圧がON、RC端子間をオープンにする事で出力電圧がOFFになります。RC端子間にTTLレベルの電気信号を加える事により出力をON/OFFすることができます。RC端子は入力側にあり、入力電源回路とは絶縁されていません。ON/OFFコントロールを使用しないときは、+RC端子と-RC端子を付属のショートピンで短絡させて下さい。
Using remote ON/OFF control, ON/OFF of the power supply output is possible. The output voltage operates by a short between RC terminals, and the output voltage stops by open between RC terminals. ON/OFF of the output voltage is possible by adding the electrical signal of the TTL level between RC terminals. RC terminals are located on the input side and the circuit is not isolated from input power source circuit. In case you don't use ON/OFF control, please short-circuit +RC and -RC terminals by means of attached short-bar.

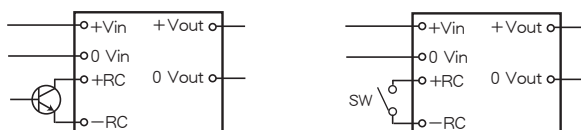
6. 並列運転 Parallel operation
同機種を並列に動作させることにより出力電流容量を増やすことができます。並列運転は4台まで接続可能です。
It is possible to increase output current capacity by means of parallel operation of the same model. Please see the figure below for wiring instructions.
Parallel operation is possible up to 4 converters.



7. 入力側ヒューズ Input side fuse
電源の破損に備えて、必ず入力側にヒューズ又はブレーカーを使用してください。電流容量は表1の突入電流値を参考にしてください。
Please insert a fuse or a circuit breaker to prevent possible damage of converter. Please refer to Table 1 (rush current) to select proper current capacity of fuse or circuit breaker.

* 回路構成例 Example of ON/OFF control circuit

●TRIによる例 Example by transistor ●SWによる例 Example by switch



RDP SERIES DATA SHEET

VD SERIES

500W DC/DC CONVERTERS Single Output

並列運転可能
Parallel Operation



H40×W100×L220 (mm)

■ Features

- High Output 500W
- High Efficiency 89%~93%
- Input-Output Isolation (AC2000V)
- Possible Parallel Operation up to 4 converters
- Remote ON/OFF Control
- Input Low Voltage Protection
- Input Over Voltage Protection
- Thermal Protection +110°C~+120°C
- Cooling by mounting on Chassis or using Heat Sink
- Conformity to RoHS2 Directive
- No built-in aluminum and tantalum electrolytic capacitor
- 高出力 500W
- 高効率 89%~93%
- 入出力間絶縁 (AC2000V)
- 4台まで並列運転可能
- リモートON/OFFコントロール
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 過熱保護回路内蔵 +110°C~+120°C
- シャーシ上又はヒートシンクの取付により放熱
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用

■ General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin)
DC 12, 24, 48, 96, 200, 300, 400V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Adjustment ±5%
- Efficiency See Table 1
- Line Regulation 0.3% max. (at Vin Range)
- Load Regulation 3.0% typ. (0~100% Load) (See Fig. 4)
- Output Ripple (1.0% Vout) p-p max.
- Output Noise (0.5% Vout+100mV) p-p max.
- Short Circuit Protection Built-in, Auto-restart (See Fig. 2)
- Output Over Voltage Protection Built-in, Shut-down (120%~140% Vout)
- Remote ON/OFF Control ON : Short or 0~0.8V
OFF : Open or 2~10V (Between terminal ③ ~ ④)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C (See Fig. 1)
- Max. Case Temp. +105°C
- Storage Temp. -40°C~+115°C
- Isolation Voltage AC2000V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight Main Body : 2.1kg max.
Heat Sink : 500g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration JIS E4031 Category 1 - Class B
- Surface Structure Aluminum Case
- MTBF 160,000H (Ta : 25°C, 80% Load, Nominal Vin)
- Warranty 5 years

■ Selection Guide

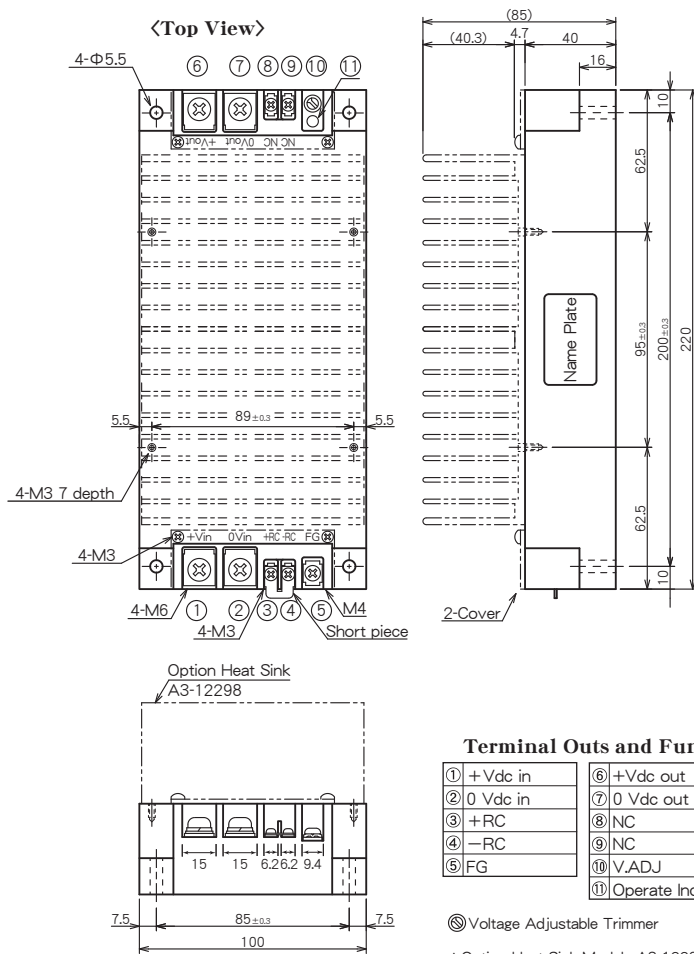
Table 1

Model Number	Input Voltage (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (typ.) (%)	
				20% Load	80% Load
VD12 - 12S 42A	12 (9~18)	12	42	91	90
VD12 - 13.8S 36A		13.8	36	91	90
VD12 - 15S 33A		15	33	91	89
VD12 - 24S 21A		24	21	91	89
VD12 - 28S 18A		28	18	91	89
VD12 - 48S 10.5A		48	10.5	91	91
VD12 - 100S 5A		100	5	90	91
VD12 - 140S 3.6A		140	3.6	90	90
VD12 - 200S 2.5A		200	2.5	90	90
VD12 - 300S 1.7A		300	1.7	89	89
VD12 - 400S 1.25A		400	1.25	89	89
VD24 - 12S 42A	24 (18~36)	12	42	91	91
VD24 - 13.8S 36A		13.8	36	91	91
VD24 - 15S 33A		15	33	91	90
VD24 - 24S 21A		24	21	91	90
VD24 - 28S 18A		28	18	91	90
VD24 - 48S 10.5A		48	10.5	91	92
VD24 - 100S 5A		100	5	91	92
VD24 - 140S 3.6A		140	3.6	90	91
VD24 - 200S 2.5A		200	2.5	90	91
VD24 - 300S 1.7A		300	1.7	89	90
VD24 - 400S 1.25A		400	1.25	89	90
VD48 - 12S 42A	48 (36~75)	12	42	89	91
VD48 - 13.8S 36A		13.8	36	89	91
VD48 - 15S 33A		15	33	89	90
VD48 - 24S 21A		24	21	89	91
VD48 - 28S 18A		28	18	89	91
VD48 - 48S 10.5A		48	10.5	89	93
VD48 - 100S 5A		100	5	88	93
VD48 - 140S 3.6A		140	3.6	88	92
VD48 - 200S 2.5A		200	2.5	88	92
VD48 - 300S 1.7A		300	1.7	88	91
VD48 - 400S 1.25A		400	1.25	88	91
VD96 - 12S 42A	96 (70~144)	12	42	89	91
VD96 - 13.8S 36A		13.8	36	89	91
VD96 - 15S 33A		15	33	89	90
VD96 - 24S 21A		24	21	89	91
VD96 - 28S 18A		28	18	89	91
VD96 - 48S 10.5A		48	10.5	89	93
VD96 - 100S 5A		100	5	88	93
VD96 - 140S 3.6A		140	3.6	88	92
VD96 - 200S 2.5A		200	2.5	88	92
VD96 - 300S 1.7A		300	1.7	88	91
VD96 - 400S 1.25A		400	1.25	88	91
VD200 - 12S 42A	200 (150~300)	12	42	89	91
VD200 - 13.8S 36A		13.8	36	89	91
VD200 - 15S 33A		15	33	89	90
VD200 - 24S 21A		24	21	89	91
VD200 - 28S 18A		28	18	89	91
VD200 - 48S 10.5A		48	10.5	89	93
VD200 - 100S 5A		100	5	88	93
VD200 - 140S 3.6A		140	3.6	88	92
VD200 - 200S 2.5A		200	2.5	88	92
VD200 - 300S 1.7A		300	1.7	88	91
VD200 - 400S 1.25A		400	1.25	88	91
VD300 - 12S 42A	300 (225~450)	12	42	88	91
VD300 - 13.8S 36A		13.8	36	88	91
VD300 - 15S 33A		15	33	88	90
VD300 - 24S 21A		24	21	88	91
VD300 - 28S 18A		28	18	88	91
VD300 - 48S 10.5A		48	10.5	88	93
VD300 - 100S 5A		100	5	87	93
VD300 - 140S 3.6A		140	3.6	87	92
VD300 - 200S 2.5A		200	2.5	87	92
VD300 - 300S 1.7A		300	1.7	87	91
VD300 - 400S 1.25A		400	1.25	87	91
VD400 - 12S 42A	400 (300~600)	12	42	87	91
VD400 - 13.8S 36A		13.8	36	87	91
VD400 - 15S 33A		15	33	87	90
VD400 - 24S 21A		24	21	87	91
VD400 - 28S 18A		28	18	87	91
VD400 - 48S 10.5A		48	10.5	87	93
VD400 - 100S 5A		100	5	86	93
VD400 - 140S 3.6A		140	3.6	86	92
VD400 - 200S 2.5A		200	2.5	86	92
VD400 - 300S 1.7A		300	1.7	86	91
VD400 - 400S 1.25A		400	1.25	86	91

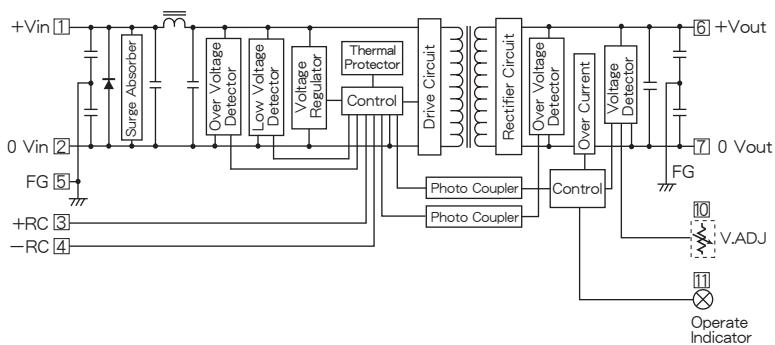
※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

VD SERIES DATA SHEET

Terminal Outs & Dimensions (±0.5mm)



Block Diagram



VD SERIES DATA SHEET

Characteristic Curves

Fig. 1 Derating Curve

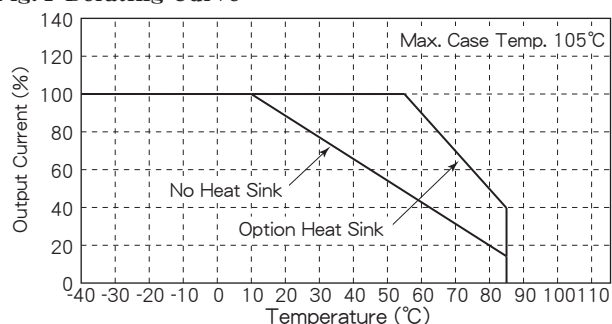


Fig. 2 Short Circuit Operating Area

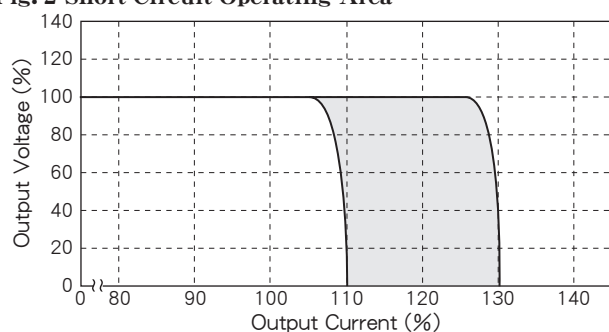


Fig. 3 Temperature Characteristic on Case Surface

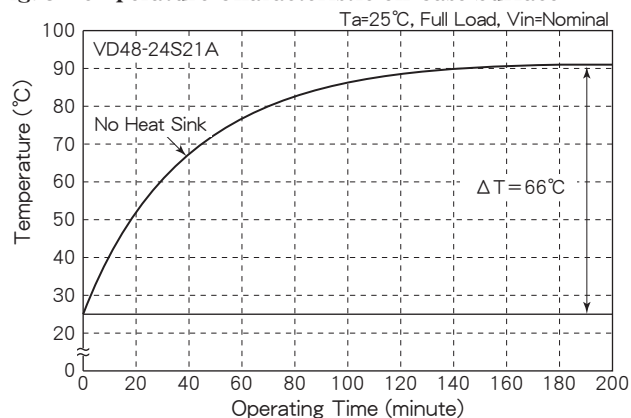
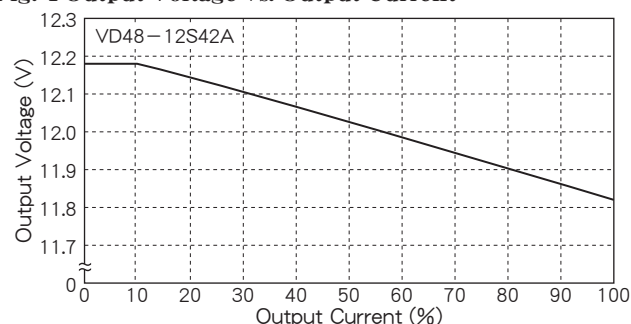


Fig. 4 Output Voltage vs. Output Current



*並列運転時に各モジュールの電流を平均化するため
負荷変動を大きくしてあります。
Load Regulation is regulated large on purpose to equate
the each unit's output current at parallel operation.

Fig. 5 Efficiency vs. Output Current

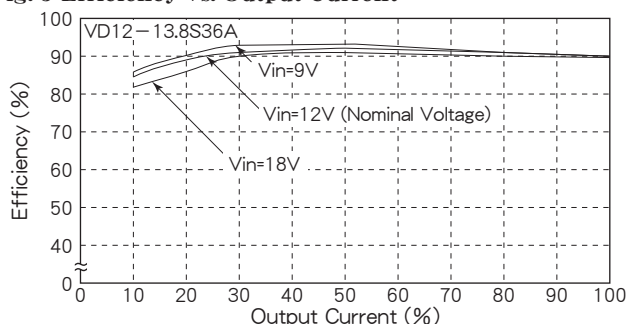


Fig. 6 Efficiency vs. Output Current

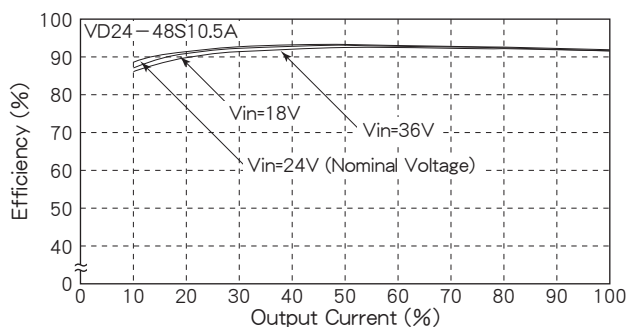


Fig. 7 Efficiency vs. Output Current

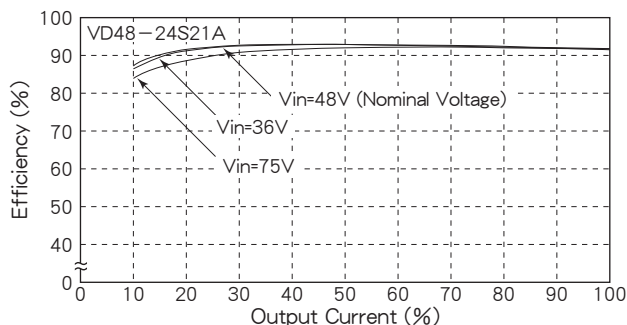
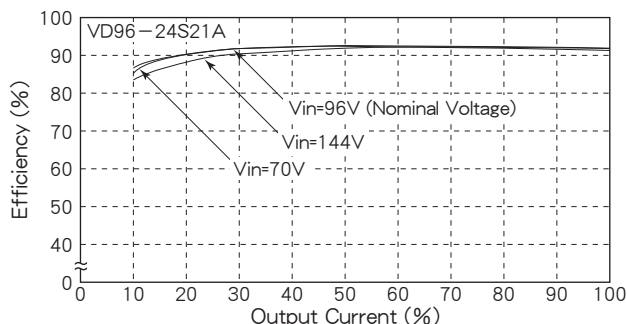


Fig. 8 Efficiency vs. Output Current

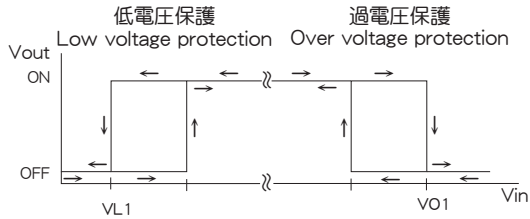


VD SERIES DATA SHEET

■ 主な機能及び注意事項 Function and direction in application

1. 入力低電圧保護、入力過電圧保護 Input low/over voltage protection
 入力定格範囲外になると出力を停止します。範囲内に戻ると自動復帰します。またヒステリシス特性を有しています。
 This function stops output if input is out of the rated voltage range and restarts output automatically in the rating voltage range. It also has hysteresis characteristic.

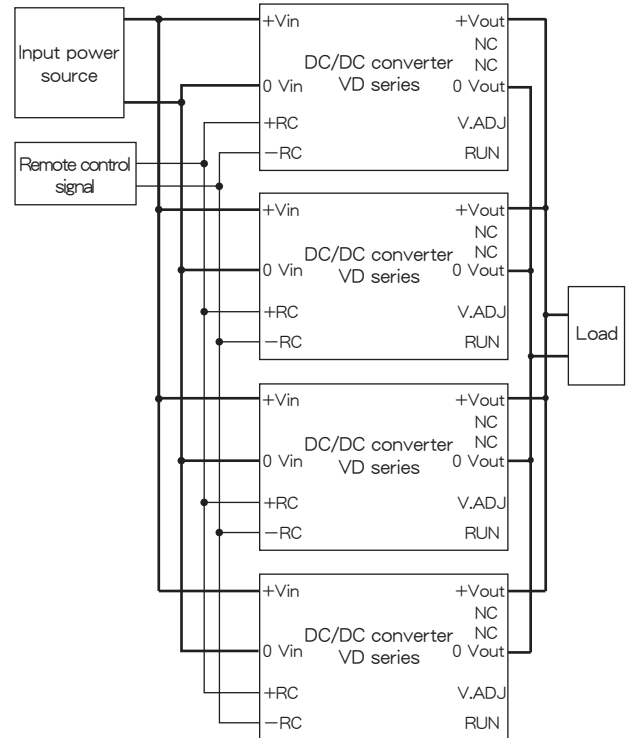
ヒステリシス特性 Hysteresis Characteristic



定格入力電圧 Rated input voltage	低電圧保護 Low voltage protection VL1	過電圧保護 Over voltage protection VO1
12V (9 ~ 18V)	6 ~ 8V	20 ~ 22V
24V (18 ~ 36V)	12 ~ 16V	40 ~ 44V
48V (36 ~ 75V)	24 ~ 32V	80 ~ 88V
96V (70 ~ 144V)	48 ~ 64V	152 ~ 160V
200V (150 ~ 300V)	100 ~ 133V	316 ~ 333V
300V (225 ~ 450V)	150 ~ 200V	474 ~ 500V
400V (300 ~ 600V)	200 ~ 266V	633 ~ 666V

2. 出力電圧値 Output voltage
 出力電圧値はボリューム(V.ADJ)を回転させることにより、定格出力電圧の約±5%可変することができます。
 Output voltage will be adjusted to ±5% of rated voltage by means of volume (V.ADJ).
3. 出力過電流保護 Output over current protection
 負荷が短絡した場合など、過大な負荷電流が流れたときに負荷と本体を保護する機能です。定格出力電流の約105%~130%にて検出し作動します(Fig. 2 参照)。出力は定電流電圧垂下特性、入力電流はフの字特性となっています。また自動復帰特性を有しています。
 This function is to protect a power supply and a load when excessive current flows in case of short-circuited load or such possible conditions. It will operate in 105 - 130% of rated output current (see Fig. 2). Output has constant current voltage limiting characteristic and input current has combined current limiting with fold-back protection. It also has automatic reset function.
4. 出力過電圧保護 Output over voltage protection
 出力の過電圧から負荷側を保護する機能です。出力電圧値が定格値の約120~140%になると出力をOFFします。
 This function is to protect a load from output over voltage. Output will be shut down when output voltage is 120 - 140% of rated voltage.

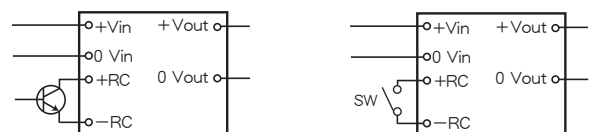
5. 並列運転 Parallel operation
 同機種を並列に動作させることにより出力電流容量を増やすことができます。
 並列運転は4台まで接続可能です。
 It is possible to increase output current capacity by means of parallel operation of the same model. Please see the figure below for wiring instructions.
 Parallel operation is possible up to 4 converters.



6. リモートON/OFFコントロール Remote ON/OFF control
 リモートON/OFFコントロールを使用して、電源の出力をON/OFFすることができます。RC端子間をショートする事で出力電圧がON、RC端子間をオープンにする事で出力電圧がOFFになります。RC端子間にTTLレベルの電気信号を加える事により出力をON/OFFすることができます。RC端子は入力側にあり、入力電源回路とは絶縁されていません。ON/OFFコントロールを使用しないときは、+RC端子と-RC端子を付属のショートピンで短絡させて下さい。
 Using remote ON/OFF control, ON/OFF of the power supply output is possible. The output voltage operates by a short between RC terminals, and the output voltage stops by open between RC terminals. ON/OFF of the output voltage is possible by adding the electrical signal of the TTL level between RC terminals. RC terminals are located on the input side and the circuit is not isolated from input power source circuit. In case you don't use ON/OFF control, please short-circuit +RC and -RC terminals by means of attached short-bar.

* 回路構成例 Example of ON/OFF control circuit

- TRによる例 Example by transistor ●SWによる例 Example by switch



並列運転可能
Parallel Operation



H55×W120×L280 (mm)

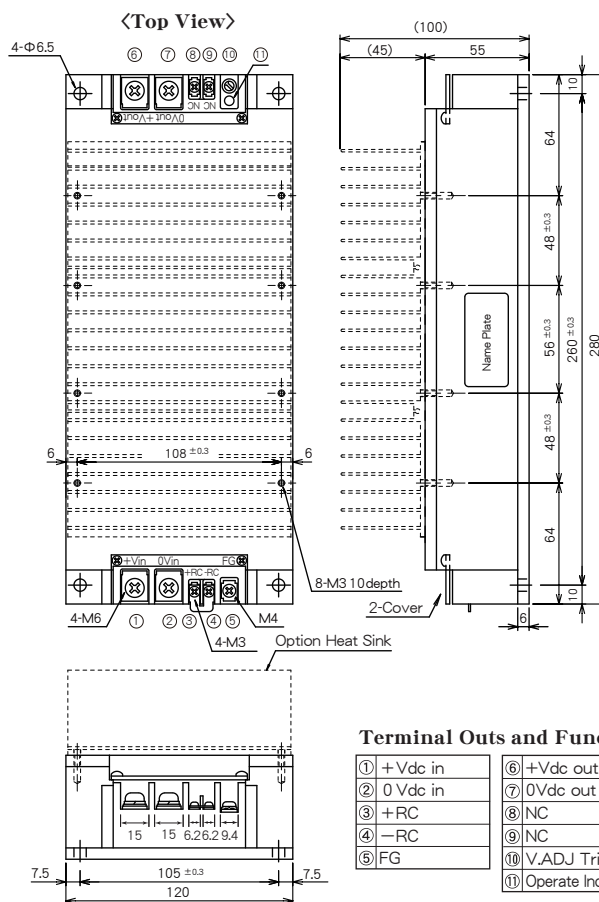
Features

- High Output 1000W
- High Efficiency 89%~93%
- Input-Output Isolation (AC2000V)
- Possible Parallel Operation up to 4 converters
- Remote ON/OFF Control
- Input Low Voltage Protection
- Input Over Voltage Protection
- Thermal Protection +110°C~+120°C
- Cooling by mounting on Chassis or using Heat Sink
- Conformity to RoHS2 Directive
- No aluminum electrolytic capacitor and no tantalum capacitor are used.
- Built-in Input Fuse
- 高出力 1000W
- 高効率 89%~93%
- 入出力間絶縁 (AC2000V)
- 4台まで並列運転可能
- リモートON/OFFコントロール
- 入力低電圧保護回路内蔵
- 入力過電圧保護回路内蔵
- 過熱保護回路内蔵 +110°C~+120°C
- シャーシ上又はヒートシンクの取付により放熱
- RoHS2指令対応
- アルミ電解コンデンサ及びタンタルコンデンサ不使用
- 入力ヒューズ内蔵

General Characteristics

- Input Voltage, Range (at Ta : 25°C, Full Load, Nominal Vin)
DC 100, 200, 300, 400, 600V (See Table 1)
- Output Voltage, Current See Table 1
- Output Voltage Adjustment ±5%
- Efficiency See Table 1
- Line Regulation 0.3% max. (at Vin Range)
- Load Regulation 3.0% typ. (0~100% Load)
- Output Ripple 200mV p-p max.
- Output Noise 500mV p-p max.
- Short Circuit Protection Built-in, Auto-restart
- Output Over Voltage Protection Built-in, Shut-down (120%~140% Vout)
- Remote ON/OFF Control ON : Short or 0~0.8V
OFF : Open or 2~10V
(Between terminal ③ ~ ④)
- Temperature Coefficient 0.02%/°C max.
- Operating Ambient Temp. -40°C~+85°C
- Max. Case Temp. +105°C
- Storage Temp. -40°C~+115°C
- Isolation Voltage AC2000V one minute (Input-Output-Case)
- Isolation Impedance 100MΩ min. (at DC1000V) (Input-Output-Case)
- Weight Main Body : 4.2kg max.
Heat sink : 600g max.
- Humidity 20~95% RH
- Shock 490m/s² (11msec 3directions)
- Vibration JIS E4031 Category 1 - Class B
- Surface Structure Aluminium Case
- MTBF 54,000H (JEITA RCR-9102B, G:Ground, Fixed)
- Warranty 5 years

Terminal Outs & Dimensions (±0.5mm)



Selection Guide

Table 1

Model Number	Input Voltage (Range) (V. DC)	Output Voltage (V. DC)	Output Current (A)	Efficiency (typ.) (%)	
				20% Load	80% Load
XD100 - 24S42A	100(70~144)	24	42	89	93
XD200 - 24S42A	200(150~300)	24	42	89	93
XD300 - 24S42A	300(225~450)	24	42	89	93
XD400 - 24S42A	400(300~600)	24	42	89	93
XD600 - 24S42A	600(420~730)	24	42	89	93

※ 上記仕様以外にも対応可能ですので お問い合わせ下さい。
Please consult with us about other specification.

