

SLB03-15 SERIES 3-15W, AC-DC CONVERTER

SLB series ---- is a compact size power converter offered by Schmid Multitech. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. It offers good EMC performance, meets IEC/EN61000-4, CISPR22/EN55022, UL60950, EN60950 standards, and is widely used in industrial, office and civil applications. For harsh EMC environment, this series of products must use the referred application circuit.

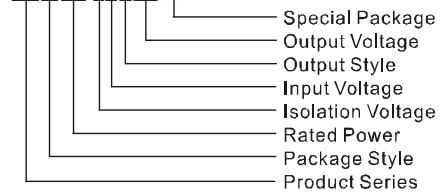
PRODUCT FEATURES

1. Universal Input :85 ~ 264VAC,50/60Hz
2. Regulated output, low ripple and noise
3. Efficiency up to 81%
4. Over-current, short circuit and over-temperature protection
5. Plastic case, meets UL94V-0
6. Meets: UL60950、EN60950
7. Mounting: PCB mounting, Chassis mounting with Screw Terminals, DIN-Rail mounting



PART NUMBER SYSTEM

SLB10-10B24A2



SELECTION GUIDE

Approval	Model	Package	Power	Output (Vo1/Io1)	Output	Ripple and Noise(Typ.)	Efficiency%(Typ.)
UL/CE	SLB03-10B03	48.5X36X20.5mm	3W	3.3V/1000mA		50mV	68
UL/CE	SLB03-10B05			5V/600mA			71
UL/CE	SLB03-10B09			9V/330mA			75
UL/CE	SLB03-10B12			12V/250mA			74
UL/CE	SLB03-10B15			15V/200mA			75
UL/CE	SLB03-10B24			24V/125mA			77
UL/CE	SLB05-10B03	55X45X21.0mm	5W	3.3V/1500mA		50mV	70
UL/CE	SLB05-10B05			5V/1000mA			73
UL/CE	SLB05-10B09			9V/600mA			75
UL/CE	SLB05-10B12			12V/450mA			76
UL/CE	SLB05-10B15			15V/350mA			78
UL/CE	SLB05-10B24			24V/230mA			79
UL/CE	SLB05-10A05			+5V/500mA	-5V/500mA		70
UL/CE	SLB05-10A12			+12V/210mA	-12V/210mA		74
UL/CE	SLB05-10A15			+15V/170mA	-15V/170mA		75
UL/CE	SLB05-10A24			+24V/100mA	-24V/100mA		77
UL/CE	SLB05-10D0505-01			+5V/900mA	+5V/100mA		70
UL/CE	SLB05-10D0512-01			+5V/750mA	+12V/100mA		74
UL/CE	SLB05-10D0515-01			+5V/700mA	+15V/100mA		74
UL/CE	SLB05-10D0524-01			+5V/600mA	+24V/100mA		75
	SLB10-10B03	62X45X22.5mm	10W	3.3V/3000mA		50mV	70
	SLB10-10B05			5V/2000mA			73
	SLB10-10B09			9V/1100mA			77
	SLB10-10B12			12V/900mA			78
	SLB10-10B15			15V/700mA			78
	SLB10-10B24			24V/450mA			80
	SLB10-10A05			+5V/1000mA	-5V/1000mA		73
	SLB10-10A12			+12V/450mA	-12V/450mA		78
	SLB10-10A15			+15V/350mA	-15V/350mA		79
UL/CE	SLB15-10B05	70X48X23.5mm	15W	5V/3000mA		50mV	74
UL/CE	SLB15-10B09			9V/1600mA			76
UL/CE	SLB15-10B12			12V/1250mA			79
UL/CE	SLB15-10B15			15V/1000mA			80
UL/CE	SLB15-10B24			24V/625mA			81

Note: SLB03-10AXX sample Vo2 for feedback;SLB05/10-10AXX sample positive and negative output for feedback; others sample Vo1 for feedback.

INPUT SPECIFICATIONS

Input voltage range		85~264VAC ,120~370VDC	
Input frequency		47~63Hz	
Input current	SLB03 models SLB05models SLB10 models SLB15 models	110VAC 60mA (typ) 100mA (typ) 200mA (typ) 280mA (typ)	230VAC 30mA (typ) 60mA (typ) 100mA (typ) 150mA (typ)
Inrush current	SLB03/05 models SLB10/15 models	110VAC 10A (typ) 10A (typ)	230VAC 20A (typ) 30A (typ)
Leakage current		0.3mA RMS typ. 230VAC/50Hz	
Recommended External Input Fuse (Special package series include fuse)	SLB03/05 models SLB10/15 models	1A/250V 2A/250V	Slow-Blow Slow-Blow

OUTPUT SPECIFICATIONS

Voltage set accuracy		±2%(main out)	
Input variation		±0.5%(main out) ±1.5%(others)	
Load variation (10%-100%)	Single output models Dual output models (symmetric load) Isolation & twin output (symmetric load)	±1% ±2% ±3%(main out) ±5%(others)	
Minimum load	Single output models Dual output models (symmetric load) Isolation & twin output (symmetric load)	0% 10% 10%	
Ripple& noise(p-p)	20MHz Bandwidth	50mV (typ)	100mV (max)
Short circuit protection		Continuous, and auto resume	
Over current protection		≥110% I _o	
Over output voltage protection	3.3 / 5VDC output 9VDC output 12 / 15VDC output 24VDC output 48VDC output	≤6.5VDC ≤12VDC ≤20VDC ≤30VDC ≤60VDC	

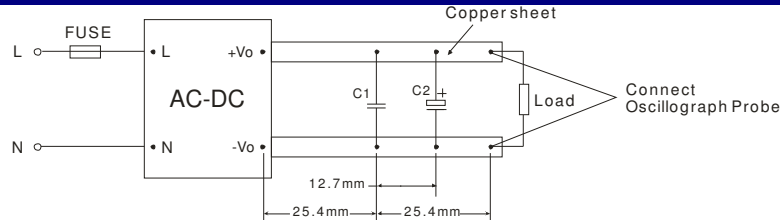
COMMON SPECIFICATIONS

Temperature ranges	Operating	-40°C ~ +70°C		
	Power derating	(55□~70°C)	3.75% / °C	
		(-40□~-10°C)	1.67% / °C	
	Storage	-40°C ~ +105°C		
Case temperature	+90°C max			
Hold-up time	(Vin:230VAC)	80ms(typ.)		
Humidity		85% (max.)		
Temperature coefficient		0.02% /°C (main out) 0.15% /°C(others)		
Switching frequency		60KHz (typ)		
I/O-isolation voltage		3000VAC/1Min		
EMC	EMI	RE	CISPR22/EN55022 CLASS B(without external circuit)	
		CE	CISPR22/EN55022 CLASS B(without external circuit)	
	EMS	ESD	IEC/EN61000-4-2 Contact ±6KV / Air±8KV	perf. Criteria B
		RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
		EFT	IEC/EN61000-4-4 ±2KV(without external circuit)	perf. Criteria B
			IEC/EN61000-4-4 ±4KV (with typical applications Figure 5)	perf. Criteria B
		Surge	IEC/EN61000-4-5 ±1KV/±2KV (without external circuit)	perf. Criteria B
			IEC/EN61000-4-5 ±2KV/±4KV (with typical applications Figure 5)	perf. Criteria B
		CS	IEC/EN61000-4-6 10 Vr.m.s	perf. Criteria A
		PFM	IEC/EN61000-4-8 10A/m	perf. Criteria A
Voltage dips、 short and interruptions	IEC/EN61000-4-11 0%-70%	perf. Criteria B		

Safety standards		IEC60950,EN60950,UL60950
Safety approvals		EN60950,UL60950
Safety Class	SLB10-10BXX	CLASS □
	Others	CLASS □
Case material		UL 94V-0
Install		PCB mounting, Chassis mounting with Screw Terminals, DIN-Rail mounting
MTBF		>300,000H @25°C

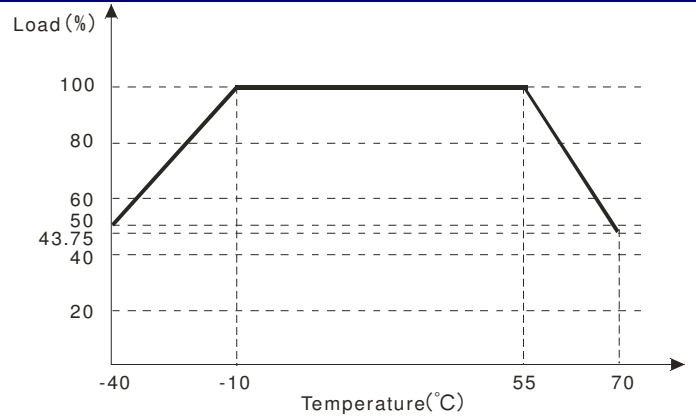
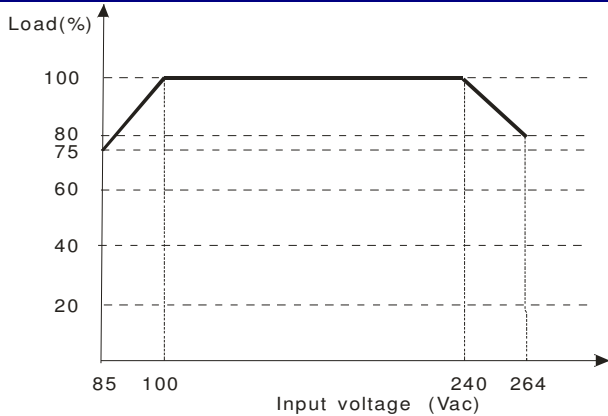
- Note:
1. Ripple and Noise were measured by the method of parallel lines;
 2. Unless otherwise specified, all specifications above are measured at rated input voltage and rated output load, TA=25°C, humidity < 75%;
 3. All specifications stated in this datasheet are subject to the above listed models only. For specifications of non-standard models, please contact our technical support team.

PARALLEL LINES MEASURE



Note: C1: 1µF (ceramic capacitor) C2: 10µF (electrolytic capacitor)

INPUT VOLTAGE VS LOAD TEMPERATURE VS LOAD

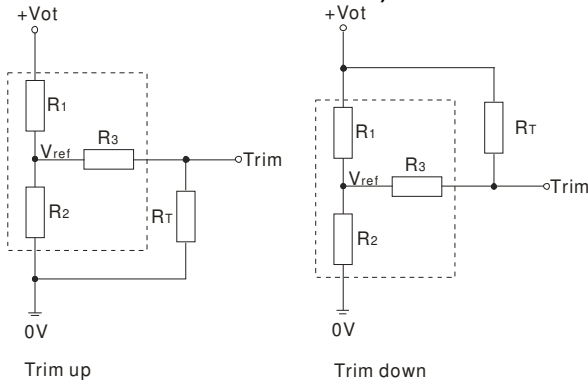


The relationship of dc and ac is as follows while input voltage is dc:
 $V_{dc} = 1.414 \cdot V_{ac} - 20$.

TRIM APPLICATION & TRIM CALCULATION

Application circuit for TRIM

(Part in broken line is the interior of models)



Formula for resistance of Trim

$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \quad a = \frac{V_{ref}}{V_{ot} - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \quad a = \frac{V_{ot} - V_{ref}}{V_{ref}} \cdot R_2$$

Note: Value for R1, R2, R3, and Vref refer to the following table.

R_T: Resistance of Trim

a: User-defined parameter, no actual meanings.

Vo(V)	5	9	12	15	24
Resistance					
R1(KΩ)	3.3	7.5	3.83	7.5	8.66
R2(KΩ)	3.3	2.87	1	1.5	1
R3(KΩ)	1	1	1	1	1
Vref(V)	2.5	2.5	2.5	2.5	2.5
Vot(V)	Output voltage of Trim, variation ≤ ±10%				

TYPICAL APPLICATIONS

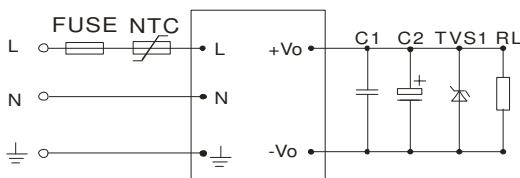


Figure 1: SLBXX-10B** (single Output)

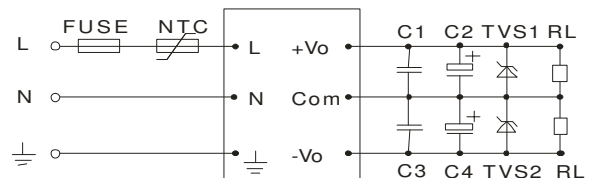


Figure 2: SLBXX-10A** (Dual output)

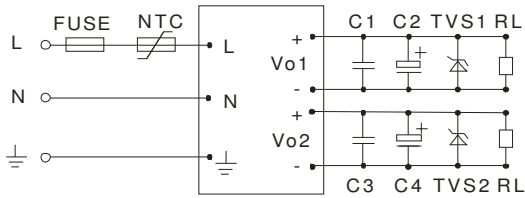


Figure 3: SLBXX-10D** (Isolate Twin Output)

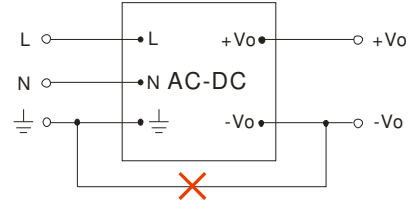


Figure 4: Note: This application is not supported for this series.

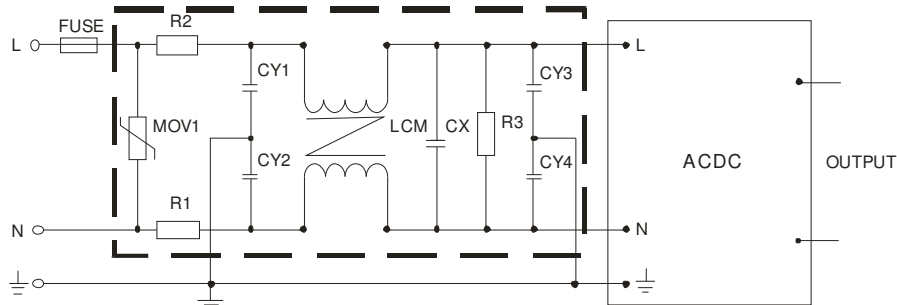


Figure 5: SLB03-15 series Recommended circuit for application require higher EMC standard (external circuit output same as above)

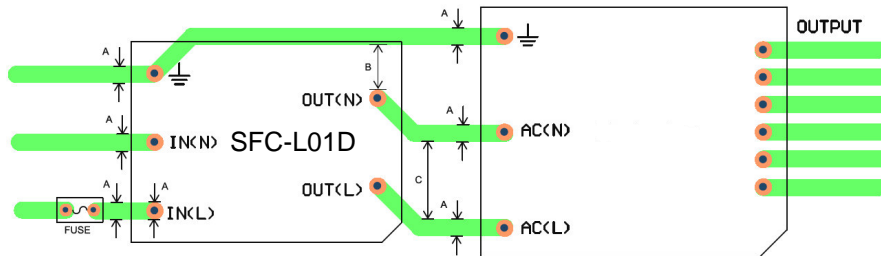
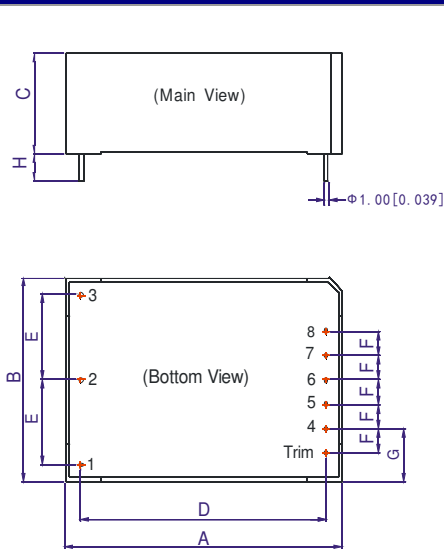


Figure 6: EMC application circuit PCB layout
Safety and recommend wiring: linewidth $A \geq 3\text{mm}$, $B \geq 6\text{mm}$, $C \geq 9\text{mm}$
EXTERNAL TYPICAL VALUE (UNIT: μF)

MODEL	C2	C4	TVS1	TVS2	MODEL	C2	C4	TVS1	TVS2
SLB03-10B03	220		SMBJ7.0A		SLB05-10D0524-01	220	47	SMBJ7.0A	SMBJ30A
SLB03-10B05	220		SMBJ7.0A		SLB10-10B03	470		SMBJ7.0A	
SLB03-10B09	120		SMBJ12A		SLB10-10B05	330		SMBJ7.0A	
SLB03-10B12	120		SMBJ20A		SLB10-10B09	120		SMBJ12A	
SLB03-10B15	68		SMBJ20A		SLB10-10B12	120		SMBJ20A	
SLB03-10B24	10		SMBJ30A		SLB10-10B15	120		SMBJ20A	
SLB05-10B03	330		SMBJ7.0A		SLB10-10B24	68		SMBJ30A	
SLB05-10B05	330		SMBJ7.0A		SLB10-10A05	220	220	SMBJ7.0A	SMBJ7.0A
SLB05-10B09	120		SMBJ12A		SLB10-10A12	120	120	SMBJ20A	SMBJ20A
SLB05-10B12	120		SMBJ20A		SLB10-10A15	47	47	SMBJ20A	SMBJ20A
SLB05-10B15	68		SMBJ20A		SLB15-10B05	330		SMBJ7.0A	
SLB05-10B24	68		SMBJ30A		SLB15-10B09	470		SMBJ12A	
SLB05-10A05	120	120	SMBJ7.0A	SMBJ7.0A	SLB15-10B12	220		SMBJ20A	
SLB05-10A12	68	68	SMBJ20A	SMBJ20A	SLB15-10B15	220		SMBJ20A	
SLB05-10A15	47	47	SMBJ20A	SMBJ20A	SLB15-10B24	68		SMBJ30A	
SLB05-10A24	10	10	SMBJ30A	SMBJ30A					
SLB05-10D0505-01	220	68	SMBJ7.0A	SMBJ7.0A					
SLB05-10D0512-01	220	68	SMBJ7.0A	SMBJ20A					
SLB05-10D0515-01	220	47	SMBJ7.0A	SMBJ20A					

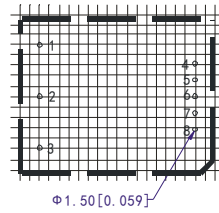
- Note:
- Output filtering capacitor C2 and C4 are electrolytic capacitor. It is recommended to use high frequency and low resistance electrolytic capacitor. For capacitance and current of the capacitor please refer to suppliers' specifications. Voltage derating of capacitor should be 80% or above. C1 and C3 eliminate high frequency noise, advice use $1\mu\text{F}/50\text{V}$. TVS is a recommended component to protect post-circuits (when converter fails). External input NTC is recommended to use 5D-9.
 - For standard EMC requirement, please refer to figure 1 or figure 2, if higher EMC requirement, please refer to figure 5.
MOV: Varistor, model: 561KD14, it is used to protect the device under surge;
R1, R2: $2\Omega/3\text{W}$ Winding resistor;
R3: $1\text{M}\Omega/2\text{W}$;
CY1, CY2, CY3, CY4: $102\text{M}/400\text{VAC}$;
CX: $0.22\mu\text{F}/275\text{VAC}$;
LCM: $10\text{mH}-30\text{mH}$;
SFC-L01D: Schmid-M 2KV/4KV Surge protector.
 - FUSE: SLB03/05 is recommended to use $1\text{A}/250\text{V}$, SLB10/15 is recommended to use $2\text{A}/250\text{V}$.

PCB MOUNTING WITH SOLDER PINS

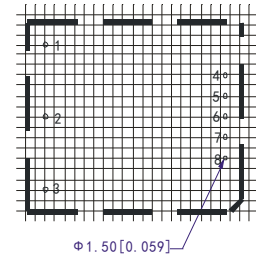


Note:
Unit:mm[inch]
Pin length(H) $\geq 6.00\text{mm}[0.236\text{inch}]$
Pin diameter tolerances: $\pm 0.10\text{mm}[\pm 0.004\text{inch}]$
General tolerances: $\pm 0.50\text{mm}[\pm 0.020\text{inch}]$

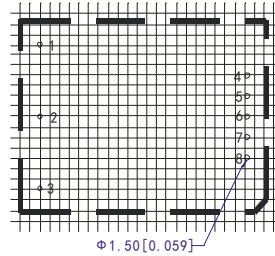
SLB03 series



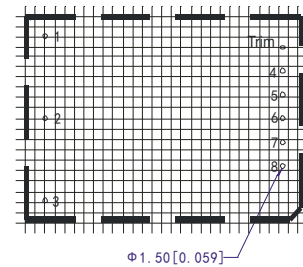
SLB05 series



SLB10 series



SLB15 series



Note: grid:2.54*2.54mm

OUTLINE AND DIMENSIONS (Unit: mm)

NO.	SLB03	SLB05	SLB10	SLB15
A	48.50	55.00	62.00	70.00
B	36.00	45.00	45.00	48.00
C	20.50	21.00	22.50	23.50
D	40.50	47.00	54.00	62.00
E	12.50	17.50	17.50	20.00
F	4.00	5.00	5.00	5.75
G	10.00	12.50	12.50	12.50

MODELS WEIGHT

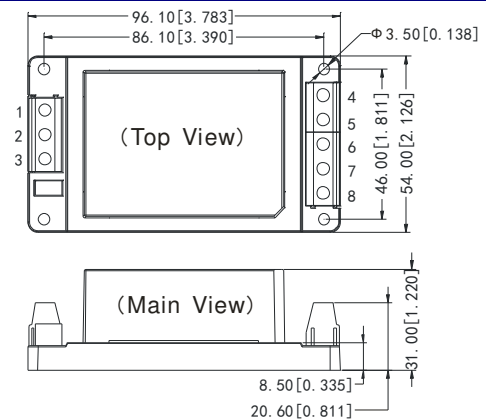
WEIGHT	SLB03	SLB05	SLB10	SLB15
(Typ.)	50g	70g	80g	120g

FOOTPRINT DETAILS

Pin	SLBXX-10B	SLBXX-10A	SLBXX-10D
1			
2	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)
4	-Vo	-Vo	-Vo1
5	No Pin	No Pin	+Vo1
6	No Pin	COM	No Pin
7	No Pin	No Pin	-Vo2
8	+Vo	+Vo	+Vo2
Trim	Trim**	No Pin	No Pin

There is no pin "1" on SLB10-10BXX
Trim**: only for SLB15-10BXX Series.

SLBXXA2 CHASSIS MOUNTING WITH SCREW TERMINALS



Note:
Unit: mm[inch]
General tolerances: $\pm 0.50\text{mm}[\pm 0.020\text{inch}]$

*The figure above is related to SLB10 series, the height of other series is different.

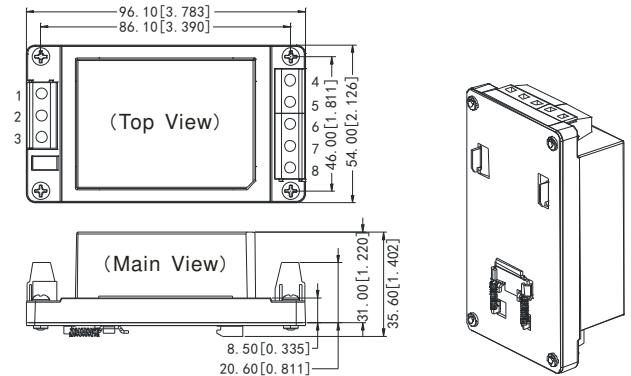
OUTLINE AND DIMENSIONS (Unit: mm)	
MODEL	DIMENSIONS
SLB03XXA2	96.1x54x29mm
SLB05XXA2	96.1x54x29.5mm
SLB10XXA2	96.1x54x31mm
SLB15XXA2	96.1x54x32mm

MODELS WEIGHT				
WEIGHT	SLB03	SLB05	SLB10	SLB15
Typ.	100g	120g	130g	170g

FOOTPRINT DETAILS			
Pin	SLBXX-10B	SLBXX-10A	SLBXX-10D
1			
2	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)
4	-Vo	-Vo	-Vo1
5	NC	NC	+Vo1
6	NC/Trim**	COM	NC
7	NC	NC	-Vo2
8	+Vo	+Vo	+Vo2

There is no pin "1" on SLB10-10BXXA2.
 NC/Trim** : The pin is Trim on SLB15-10BXXA2 ,
 The pin is not connected on other single output products.

SLBXXA4 DIN-RAIL MOUNTING



MODELS WEIGHT				
WEIGHT	SLB03	SLB05	SLB10	SLB15
Typ.	140g	160g	170g	210g

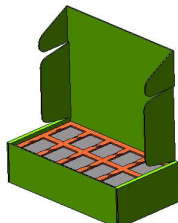
* The figure above is related to SLB10 series, the height of other series is different.
 **Footprint Details are the same as Chassis mounting with Screw Terminals'.

OUTLINE AND DIMENSIONS (Unit: mm)	
MODEL	DIMENSIONS
SLB03XXA4	96.1x54x33.6
SLB05XXA4	96.1x54x34.1
SLB10XXA4	96.1x54x35.6
SLB15XXA4	96.1x54x36.6

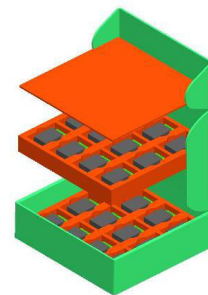
PACKAGE DIAGRAM

PCB mounting Series
 (SLB05 series) (Other series)

Special Package Series



Inner packaging box dimensions: L*W*H=355*192*93mm
 Packaging quantity: 20pcs (SLB03 series: 40pcs)
 Outer packaging box dimensions: L*W*H=405*380*305mm
 quantity: 120pcs (SLB03 series: 240pcs)



Inner packaging box dimensions: L*W*H=365*350*105mm
 Packaging quantity: 24pcs
 Outer packaging box dimensions: L*W*H=390*360*245mm
 Packaging quantity: 48pcs