

DATASHEET SCHMID-MULTITECH GmbH

SLHXX-10XXX SERIES

5-25W,AC-DC CONVERTER

SLH---- are high efficiency green power modules with various packaging provided by SCHMID. The features of this series are: wide input voltage, DC and AC all in one, high efficiency, high reliability, low loss, safety isolation etc. They are widely used in industrial, office and civil equipments. EMC and safety standards meet international standards IEC61000 UL60950 and IEC60950. and Multi-certificate is in processing.

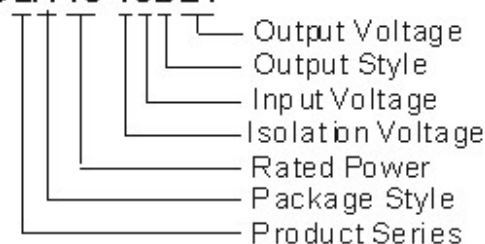


PRODUCT FEATURES

1. Universal Input :85 to 264VAC,50/60Hz
2. AC and DC all in one (input from the same terminal)
3. Low Ripple and Noise
4. Overload protection and short circuit protection
5. High efficiency, High power density
6. Low loss, green power
7. Multiple models available
8. industrial level specifications
9. 3 years warranty

MODEL SELECTION

SLH 10-10B24



PRODUCT PROGRAM

Approval	Model	Package	Power	Output (Vo1/Io1)	Output (Vo2/Io2)	Ripple and Noise (TYP)	Efficiency (%) (TYP)
UL/CE	SLH05-10B03	48.5X36X20.5mm	4W	3.3V/1250mA		50mV	70
UL/CE	SLH05-10B05		5W	5V/1000mA			76
UL/CE	SLH05-10B09			9V/550mA			
UL/CE	SLH05-10B12			12V/420mA			
UL/CE	SLH05-10B15			15V/330mA			
UL/CE	SLH05-10B24			24V/230mA			
	SLH05-10A05			5W	+5V/500mA		
	SLH05-10A12		+12V/210mA		-12V/210mA		
	SLH05-10A15		+15V/160mA		-15V/160mA		
	SLH05-10A24		+24V/100mA		-24V/100mA		
	SLH05-10C0505-01	5W	5V/800mA	±5V/100mA	76		
	SLH05-10C0512-01		5V/600mA	±12V/100mA			
	SLH05-10C0515-01		5V/600mA	±15V/80mA			
	SLH05-10C0524-01		5V/600mA	±24V/50mA			
	SLH05-10D0505-01	5W	5V/900mA	5V/100mA	76		
	SLH05-10D0512-01		5V/750mA	12V/100mA			
	SLH05-10D0515-01		5V/700mA	15V/100mA			
	SLH05-10D0524-01		5V/600mA	24V/100mA			
UL/CE	SLH10-10B03	55X45X21.0mm	6.6W	3.3V/2000mA		50mV	70
UL/CE	SLH10-10B05		10W	5V/2000mA			78
UL/CE	SLH10-10B09			9V/1100mA			
UL/CE	SLH10-10B12			12V/900mA			
UL/CE	SLH10-10B15			15V/700mA			
UL/CE	SLH10-10B24			24V/450mA			
UL/CE	SLH10-10A05			10W	+5V/1000mA		
UL/CE	SLH10-10A12		+12V/450mA		-12V/450mA		
UL/CE	SLH10-10A15		+15V/350mA		-15V/350mA		
UL/CE	SLH10-10A24		+24V/200mA		-24V/200mA		
	SLH10-10C0505-04*	10W	5V/1200mA	±5V/400mA	78		
	SLH10-10C0512-02		5V/1000mA	±12V/200mA			
	SLH10-10C0515-02		5V/900mA	±15V/200mA			
	SLH10-10C0524-01*		5V/1000mA	±24V/100mA			
UL/CE	SLH10-10D0505-02	10W	5V/1800mA	5V/200mA	78		
UL/CE	SLH10-10D0512-02		5V/1500mA	12V/200mA			
UL/CE	SLH10-10D0515-02		5V/1400mA	15V/200mA			
UL/CE	SLH10-10D0524-02		5V/1000mA	24V/200mA			

Approval	Model	Package	Power	Output (Vo1/Io1)	Output (Vo2/Io2)	Ripple and Noise (TYP)	Efficiency (%) (TYP)
UL/CE	SLH15-10B03	62x45x22.5mm	9.9W	3.3V/3000mA		50mV	73
UL/CE	SLH15-10B05		15W	5V/2800mA			80
UL/CE	SLH15-10B09			9V/1600mA			
UL/CE	SLH15-10B12			12V/1250mA			
UL/CE	SLH15-10B15			15V/1000mA			
UL/CE	SLH15-10B24			24V/625mA			
UL/CE	SLH15-10B48	48V/320mA					
	SLH15-10A05 SLH15-10A12 SLH15-10A15		15W	+5V/1500mA +12V/650mA +15V/500mA	-5V/1500mA -12V/650mA -15V/500mA		
	SLH15-10C0505-05 SLH15-10C0512-02 SLH15-10C0515-02 SLH15-10C0524-01*			5V/2000mA 5V/2000mA 5V/1800mA 5V/2000mA	±5V/500mA ±12V/200mA ±15V/200mA ±24V/100mA		
	SLH15-10D0505-08 SLH15-10D0512-04 SLH15-10D0515-03* SLH15-10D0524-02			5V/2200mA 5V/2000mA 5V/2000mA 5V/2000mA	5V/800mA 12V/400mA 15V/300mA 24V/200mA		
UL/CE	SLH20-10B03	70x48x23.5mm	20W	3.3V/4100mA		50mV	82
UL/CE	SLH20-10B05			5V/3500mA			
UL/CE	SLH20-10B12			12V/1600mA			
UL/CE	SLH20-10B15			15V/1300mA			
UL/CE	SLH20-10B24			24V/850mA			
UL/CE	SLH20-10A05 SLH20-10A12 SLH20-10A15						
	SLH20-10C0505-05* SLH20-10C0512-04 SLH20-10C0515-03 SLH20-10C0524-02			5V/2500mA 5V/2000mA 5V/2000mA 5V/2000mA	±5V/500mA ±12V/400mA ±15V/300mA ±24V/200mA		
	SLH20-10D0505-10* SLH20-10D0512-06 SLH20-10D0515-05* SLH20-10D0524-03			5V/3000mA 5V/2500mA 5V/2500mA 5V/2500mA	5V/1000mA 12V/600mA 15V/500mA 24V/300mA		
UL/CE	SLH25-10B05	70x48x23.5mm	25W	5V/4100mA		50mV	85
UL/CE	SLH25-10B12			12V/2100mA			
UL/CE	SLH25-10B15			15V/1600mA			
UL/CE	SLH25-10B24			24V/1100mA			
UL/CE	SLH25-10B48			48V/500mA			

Remarks :

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.
4. Model numbers marked with "*" are in developing.

INPUT SPECIFICATIONS

Input voltage range		85- 264VAC, 120- 370VDC
Input frequency		47- 63Hz
Input current	SLH05 models SLH10 models SLH15 models SLH20 models SLH25 models	110VAC 120mA , typ 230mA , typ 250mA , typ 330mA , typ 420mA , typ 230VAC 70mA , typ 120mA , typ 140mA , typ 180mA , typ 230mA , typ
Inrush current	SLH05 models SLH10 models SLH15 models SLH20/SLH25 models	110VAC 10A, typ 10A, typ 10A, typ 16A, typ 230VAC 20A, typ 20A, typ 20A, typ 30A, typ
External input fuse(recommended)	SLH05 models SLH10/SLH15 models SLH20/SLH25 models	1A/250V slow blow 2A/250V slow blow 3.15A/250V slow blow

OUTPUT SPECIFICATIONS

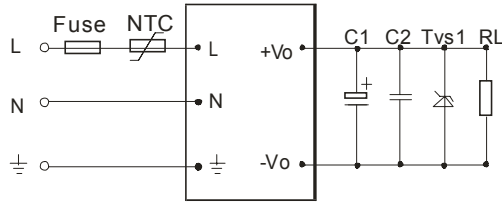
Voltage set accuracy		±2% (main output)
Input variation		±0.5% (main output) ±1.5% (supplement output)
Load variation (10-100%)	Single output models Dual output models (balanced load) Isolated triple output (balanced load) Isolated and separated twin output (balanced load)	±1% ±2% Vo1 ±3% (main output) ±Vo2 ±5% (supplement output) Vo1 ±3% (main output) Vo2 ±5% (supplement output)
Minimum load	single output models Dual output models Isolated and separated twin output Isolated triple output	0% 10% (main output) 10% (main output) 10% (main output)
Ripple & noise (p-p)	20MHz Bandwidth	≤100mV (main output)
Short circuit protection		Continuous, and auto resume
Over current protection		≥110% I _o
Over output voltage protection	3.3 / 5VDC models 9VDC models 12 / 15VDC models 24VDC models 48VDC models	≤6.5VDC ≤12VDC ≤20VDC ≤30VDC ≤60VDC

COMMON SPECIFICATIONS

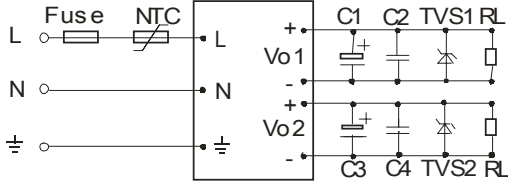
Temperature ranges	Operating : Power derating above 55°C: SLH20-10B05 above 50°C Storage: Case temperature:	-25°C to +70°C 3.75% / °C 2.25% / °C -25°C to +105°C +90°C max
Hold-up time	(Vin=230VAC)	80ms(typ)
Humidity (non condensing)		85%(max)
Temperature coefficient		0.02%/°C (main output) 0.15%/°C (supplement output)
Switching frequency		150kHz max
Efficiency		78% typ
I/O-isolation voltage		3000VAC/1Min
Leakage current		0.3mA RMS typ. 230VAC/50Hz
EMI/RFI conducted		EN55022, level B
EMC compliance	Electrostatic discharge ESD RF field susceptibility Electrical fast transients/bursts on mainsline Surge	IEC/EN 61000-4-2 level 3 6kV/8kV IEC/EN 61000-4-3 IEC/EN 61000-4-4 level 3 2kV IEC/EN 61000-4-5 level 3 1kV / 2kV
Safety standards		IEC60950, EN60950, UL60950
Safety approvals		EN60950, IEC60950, UL60950
Safety Class		CLASS I (CLASS II WHILE SLH15)
Case material		UL 94V-0
Install		PCB
MTBF		>200,000h @25°C

TYPICAL APPLICATIONS

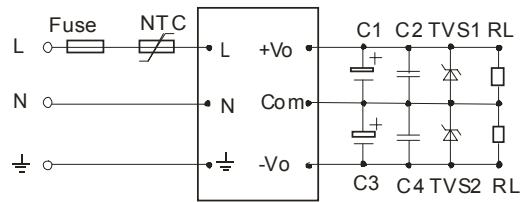
SLH**-10B**(single Output)



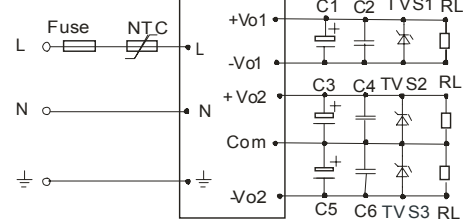
SLH**-10D**(Isolate Twin Output)



SLH**-10A**(Dual output)



SLH**-10C**(Triple Output)



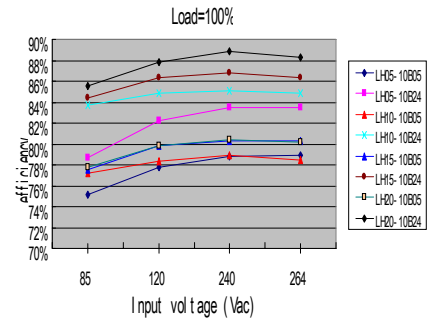
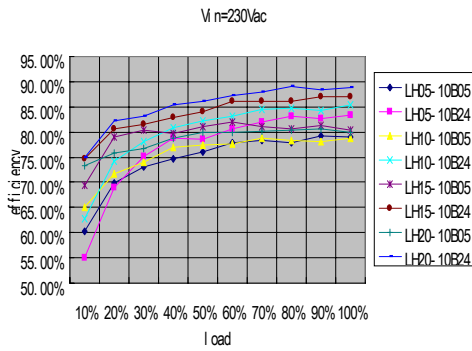
EXTERNAL CAPACITORS TYPICAL VALUE(Unit: μ F)

MODEL	C1	C3	C5	MODEL	C1	C3	C5
SLH05-10B03	330			SLH15-10B03	680		
SLH05-10B05	330			SLH15-10B05	680		
SLH05-10B09	120			SLH15-10B09	470		
SLH05-10B12	120			SLH15-10B12	220		
SLH05-10B15	68			SLH15-10B15	220		
SLH05-10B24	68			SLH15-10B24	68		
				SLH15-10B48	33		
SLH05-10A05	120	120		SLH15-10A05	470	470	
SLH05-10A12	68	68		SLH15-10A12	220	220	
SLH05-10A15	47	47		SLH15-10A15	120	120	
SLH05-10A24	10	10					
SLH05-10C0505-01	220	22	22	SLH15-10C0505-05	470	220	220
SLH05-10C0512-01	120	22	22	SLH15-10C0512-02	470	120	120
SLH05-10C0515-01	120	22	22	SLH15-10C0515-02	470	120	120
SLH05-10C0524-01	120	22	22	SLH15-10C0524-01	470	47	47
SLH05-10D0505-01	220	22		SLH15-10D0505-08	470	470	
SLH05-10D0512-01	220	22		SLH15-10D0512-04	470	220	
SLH05-10D0515-01	120	22		SLH15-10D0515-03	470	120	
SLH05-10D0524-01	120	22		SLH15-10D0524-02	470	47	
SLH10-10B03	470						
SLH10-10B05	330			SLH20-10B03	330		
SLH10-10B09	120			SLH20-10B05	330		
SLH10-10B12	120			SLH20-10B12	220		
SLH10-10B15	120			SLH20-10B15	220		
SLH10-10B24	68			SLH20-10B24	220		
SLH10-10A05	220	220		SLH20-10A05	470	470	
SLH10-10A12	120	120		SLH20-10A12	120	120	
SLH10-10A15	47	47		SLH20-10A15	68	68	
SLH10-10A24	33	33		SLH20-10C0505-05	330	220	220
SLH10-10C0505-04	220	120	120	SLH20-10C0512-04	330	120	120
SLH10-10C0512-02	220	68	68	SLH20-10C0515-03	330	120	120
SLH10-10C0515-02	220	47	47	SLH20-10C0524-02	330	47	47
SLH10-10C0524-01	220	47	47	SLH20-10D0505-10	330	330	
SLH10-10D0505-02	220	68		SLH20-10D0512-06	330	220	
SLH10-10D0512-02	220	68		SLH20-10D0515-05	330	220	
SLH10-10D0515-02	220	47		SLH20-10D0524-03	330	120	
SLH10-10D0524-02	220	47		SLH25-10B05	330		
				SLH25-10B12	330		
				SLH25-10B15	330		
				SLH25-10B24	120		
				SLH25-10B48	68		

Remark:

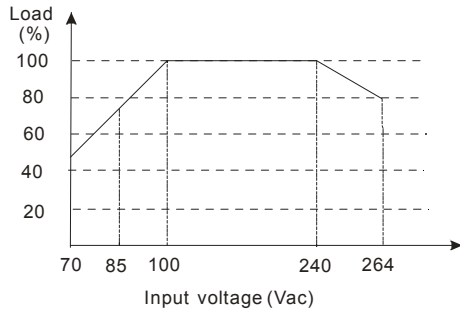
- Output filtering capacitors C1, C2 and C3 are electrolytic capacitors. It is recommended to use high frequency and low impedance electrolytic capacitors. For capacitance and current of capacitor please refer to manufacture's datasheet. Voltage derating of capacitor should be 80% or above. C2,C4,C6 are use to filter high frequency noise. TVS is recommended component to protect post-circuits (when converter fails).
- External input NTC is recommended to use 5D-9 (Only SLH10 models and SLH15 models)

TYPICAL EFFICIENCY CURVE

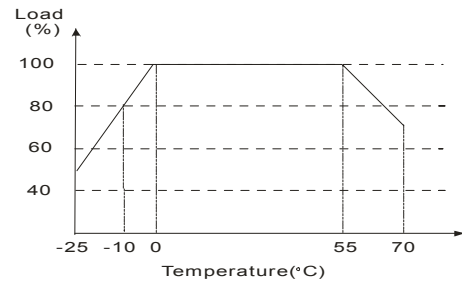


*Note: When input DC, $V_{dc}=1.414V_{ac}-20V_{dc}$.

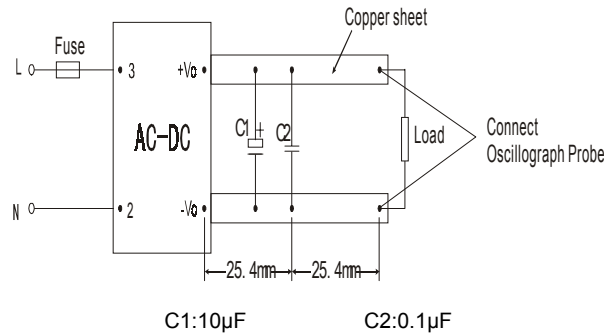
INPUT VOLTAGE VS LOAD



TEMPERATURE VS LOAD

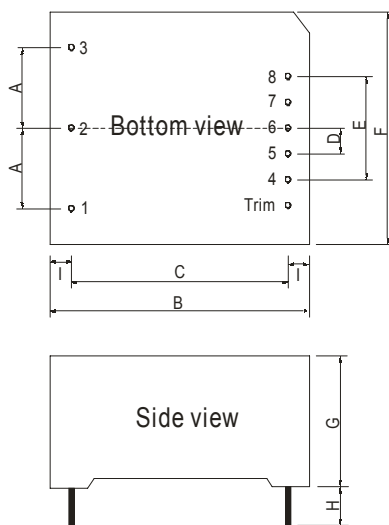


PARALLEL LINES MEASURE



OUTLINE AND DIMENSIONS

First Angle Projection



Note:
 Unit:mm(inch)
 Pin section:1.00mm(0.039inch)
 Pin Length(H): $\geq 6.00mm(\geq 0.236inch)$
 Pin tolerances: $\pm 0.1mm(\pm 0.004inch)$
 General tolerances: $\pm 0.5mm(\pm 0.020inch)$

OUTLINE AND DIMENSIONS

NO.	LH05	LH10	LH15	LH20	LH25
A	12.5	17.5	17.5	20.0	20.0
B	48.5	55.0	62.0	70.0	70.0
C	40.5	47.0	54.0	62.0	62.0
D	4.0	5.0	5.0	5.75	5.75
E	16.0	20.0	20.0	23.0	23.0
F	36.0	45.0	45.0	48.0	48.0
G	20.5	21.0	22.5	23.5	23.5
I	4.0	4.0	4.0	4.0	4.0

FOOTPRINT DETAILS

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

There is no Pin 1* \perp on LH15-10BXX.

Trim**:Only For LH20/25-10BXXSeries.

MODLES WEIGHT

WEIGHT (TYP)	LH05	LH10	LH15	LH20	LH25
	50g	70g	80g	120g	120g