SLHE10-20x__R

Product Feature

- Universal Input：85-264VAC/100-370VDC
- Package Type：DIP
- Operating temperature range：-40℃ - +70℃
- Isolation voltage：4000VAC
- High efficiency up to：84%（Type）
- Output short-circuit protection, overcurrent protection, overvoltage protection
- Product application：Electricity, industrial control, etc

Selection Guide

Part No.	Input Voltage (VAC)	Output Power (W)	Output Voltage(VDC) Output Current (mA)Max.				Full Load Efficiency %(Typ.)	Capacitive Load(μF) Max.	
			Vo1	Io1	Vo2	Io2		Vo1	Vo2
SLHE10-20S03R	85-264	6.6	3.3	2000	--	--	70	26400	--
SLHE10-20S05R	85-264	10	5	2000	--	--	76	9440	--
SLHE10-20S09R	85-264	10	9	1100	--	--	78	3600	--
SLHE10-20S12R	85-264	10	12	900	--	--	80	2400	--
SLHE10-20S15R	85-264	10	15	700	--	--	81	1170	--
SLHE10-20S24R	85-264	10	24	450	--	--	82	370	--
SLHE10-20D05R	85-264	10	+5	1000	-5	1000	76	8800	8800
SLHE10-20D12R	85-264	10	+12	450	-12	450	80	1970	1970
SLHE10-20D15R	85-264	10	+15	350	-15	350	81	1970	1970
SLHE10-20D24R	85-264	10	+24	200	-24	200	84	660	660
SLHE10-20T0512R	85-264	10	5	1000	±12	200	75	3200	260
SLHE10-20T0515R	85-264	10	5	900	±15	200	75	2160	80
SLHE10-20D0505R	85-264	10	5	1800	5	200	75	8000	540
SLHE10-20D0512R	85-264	10	5	1500	12	200	79	4400	260
SLHE10-20D0515R	85-264	10	5	1400	15	200	79	4400	170
SLHE10-20D0524R	85-264	10	5	1000	24	200	81	4000	170

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Input characteristics

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage	AC input	85	--	264	VAC
	DC input	100	--	370	VDC
Input Current	115VAC	--	--	0.26	A
	230VAC	--	--	0.16	
Leakage current	0.3mA RMS typ./230VAC/50Hz				
Shock current	115VAC	--	10	--	A
	230VAC	--	20	--	
Input Filter	Capacitance Filter				
Hot Plug	Unavailable				

Output characteristics

Item	Operating Conditions			Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Vo1			--	±2	--	%
	Vo2			--	±5	--	
Linear Regulation	Full load	Vo1		--	±0.5	--	%
		Vo2		--	±1.5	--	
Load regulation	10% - 100%load	Single output		--	±1	--	%
		Positive and negative dual output (balanced load)		--	±2	--	
		Triple Output (load balancing)	Vo1	--	±3	--	%
			Vo2	--	±5	--	
		Isolated dual non common ground output (balanced load)	Vo1	--	±3	--	%
			Vo2	--	±5	--	
Ripple noise	20MHz Bandwidth			--	50	100	mV
Temperature Coefficient	Main Road			--	±0.02	--	%/℃
Short Circuit protection	Continuous, Self-Recovery						
Overcurrent protection	≥110%Io Self-recovery						
Over-voltage protection	Main Road	3.3/5VDC Output		≤7.5VDC			
		9VDC Output		≤13VDC			
		12/15VDC Output		≤20VDC			
		24VDC Output		≤30VDC			
Min load	Single output			0	--	--	%
	Positive and negative dual output (balanced load)			10	--	--	
	Isolated dual non common ground output (balanced load)			10	--	--	
	Triple Output (load balancing)			10	--	--	
Power-down hold time	115VAC Input			--	15	--	ms
	230VAC Input			--	80	--	

SLHE10-20x__R

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, test time 1 minute, leakage current<5mA	4000	--	--	VAC
Operating temperature	SLHE10-20D24R	-25	--	70	℃
	Other	-40	--	70	
Storage temperature	SLHE10-20D24R	-25	--	105	℃
	Other	-40	--	105	
Storage temperature		--	--	95	%RH
Welding temperature	Wave soldering	260± 5℃; Time：5~ 10s			
	Manual welding	360± 10℃; Time：3~5s			
Switching frequency	SLHE10-20x__R	--	100	--	kHz
	Other	--	65	--	
Power reduction	-40℃-- -10℃	2.0	--	--	%/℃
	55℃-70℃	4.0	--	--	
MTBF	MIL-HDBK-217F@25℃	>300,000 h			

Mechanical Specification

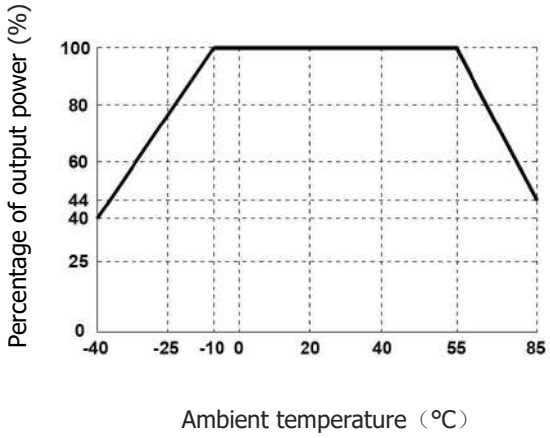
Shell material	Black flame retardant and heat resistant plastic (UL94-V0)
Package dimensions	55.00 x 45.00 x 21.00mm
Weight	80g（Typ.）
Cooling mode	Natural air-cooling

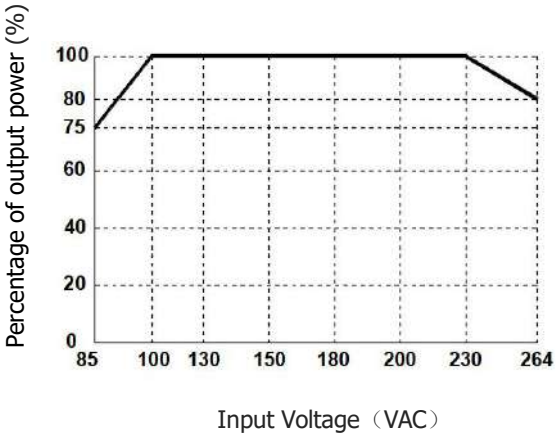
EMC Specifications

EMI	Conduction harassment	CISPR22/EN55022, CLASS B	
	Radiation Harassment	CISPR22/EN55022, CLASS B	
EMS	Electrostatic discharge	IEC/EN 61000-4-2 ±6KV / ±8KV	Perf. Criteria B
	Radiation immunity	EC/EN 61000-4-3 10V/m	perf. Criteria A
	Group immunity of pulses	IEC/EN 61000-4-4 ±2KV	Perf. Criteria B
		IEC/EN 61000-4-4 ±4KV(The recommended circuit is shown in figure 5)	Perf. Criteria B
	Surge immunity	IEC/EN 61000-4-5 ±1KV/±2KV	Perf. Criteria B
		IEC/EN 61000-4-5 ±2KV/±4KV(The recommended circuit is shown in figure 5)	Perf. Criteria B
	Conducted disturbance immunity	IEC/EN61000-4-6 10 Vr.m.s	perf. Criteria A
	Immunity to power frequency magnetic field	IEC/EN61000-4-8 10A/m	perf. Criteria A
	Immunity to voltage sags, drops and short interruptions	IEC/EN61000-4-11 0%-70%	Perf. Criteria B

Typical Characteristic Curves

Temperature derating curve chart	Input voltage derating curve graph

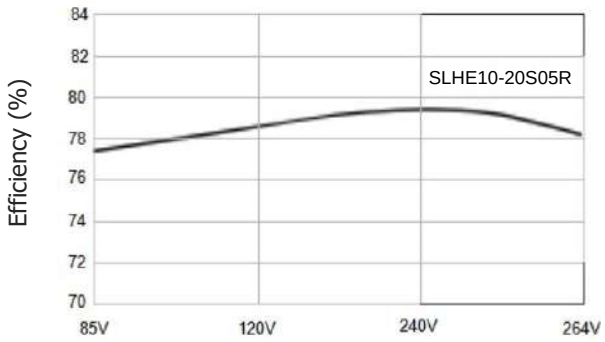


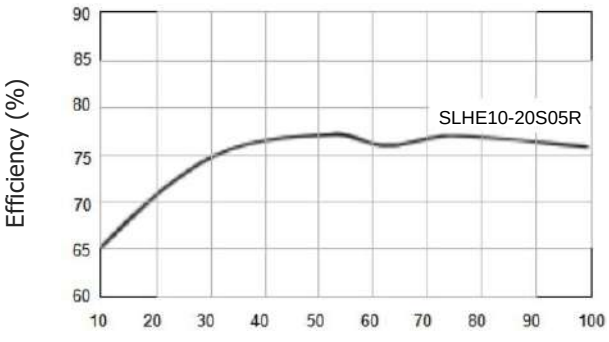


Note:

1. For input voltages of 85-100VAC/240-264VAC/100-120VDC/340-370VDC, voltage derating should be performed on the basis of temperature derating;
2. The minimum operating temperature of SLHE10-20D24R is -25 ℃.

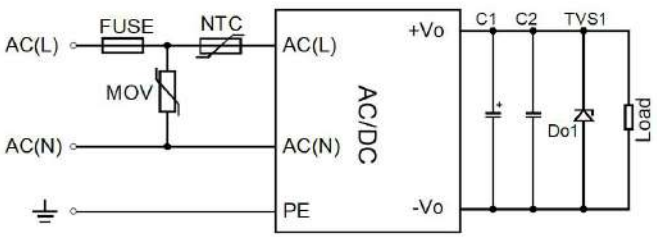
Efficiency Vs input voltage（Full Load）	Efficiency Vs output load（Vin=230VAC）





Typical Circuit Design And Application

Figure 1:SLHE10-20x__R (single)	Figure 2: SLHE10-20D__R (Positive and negative output)



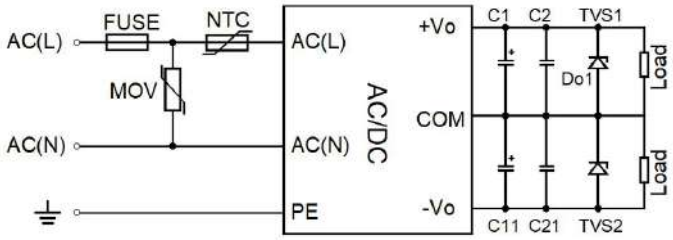


Figure 3: SLHE10-20D__R（Dual isolation dual channel)

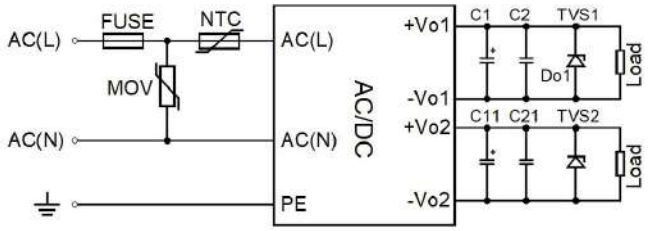
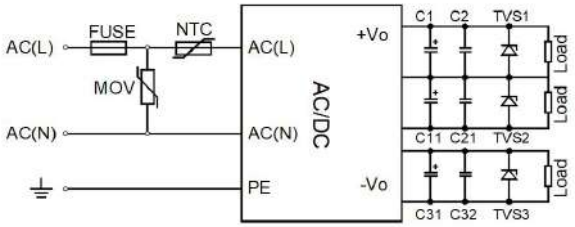


Figure 4:SLHE10-20T__R (Triple Output)



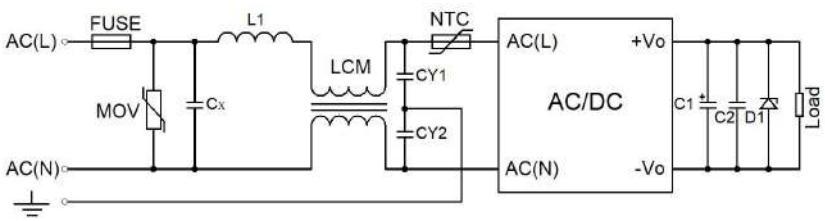
Part No.	C2(μF)	C4(μF)	C6(μF)	TVS1	TVS2	TVS3
SLHE10-20S03R	470			SMBJ7.0A		
SLHE10-20S05R	330			SMBJ7.0A		
SLHE10-20S09R	120			SMBJ12A		
SLHE10-20S12R	120			SMBJ20A		
SLHE10-20S15R	120			SMBJ20A		
SLHE10-20S24R	68			SMBJ30A		
SLHE10-20D05R	220	220		SMBJ7.0A		
SLHE10-20D12R	120	120		SMBJ20A	SMBJ20A	
SLHE10-20D15R	47	47		SMBJ20A	SMBJ20A	
SLHE10-20D24R	33	33		SMBJ30A	SMBJ30A	
SLHE10-20T0512R	220	68	68	SMBJ7.0A	SMBJ20A	SMBJ20A
SLHE10-20T0515R	220	47	47	SMBJ7.0A	SMBJ20A	SMBJ20A
SLHE10-20D0505R	220	68		SMBJ7.0A	SMBJ7.0A	
SLHE10-20D0512R	220	68		SMBJ7.0A	SMBJ20A	
SLHE10-20D0515R	220	47		SMBJ7.0A	SMBJ20A	
SLHE10-20D0524R	220	47		SMBJ7.0A	SMBJ30A	

Note:

1. The output filtering capacitors C2, C4, and C6 are electrolytic capacitors. It is recommended to use high-frequency low resistance electrolytic capacitors. Please refer to the technical specifications provided by each manufacturer for the capacity and current flowing through them.
2. The voltage withstand rating of the capacitor drops by more than 80%.
3. C1, C3, and C5 are ceramic capacitors that remove high-frequency noise.
4. TVS tube is recommended to protect the downstream circuit when the module is abnormal.
5. Recommended external NTC thermistor, model: 5D-9.
6. Recommended external FUSE fuse, model: 1A/250V slow break;
7. Recommended external MOV varistor, model: 14D471K.

EMC Solution - Recommended Circuit

EMC solution-recommended circuit (Figure 5)

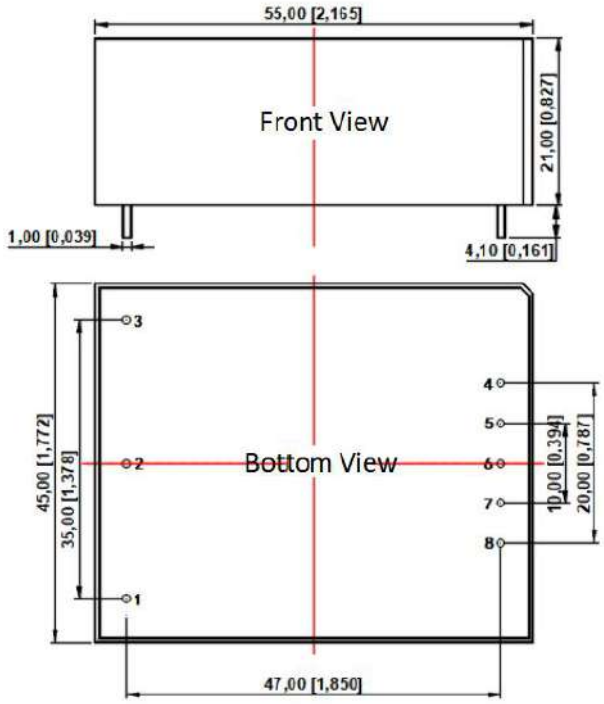


EMI Recommended Parameter Table

MOV	14D417K
CY1 、CY2	1000pF/400VAC
CX	0. 1μF/275VAC
LCM	10mH
L1	4.7μH/2A
NTC	5D-9
FUSE	2A/250V ， A slow break is inevitable

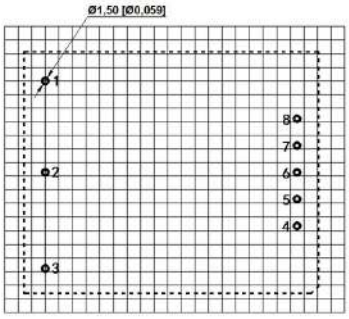
Dimensions and Recommended Layout

Dimensions



Note:
Unit: mm[inch]
Pin section tolerances:±0.10[±0.004]
General tolerances:±0.50[±0.020]

PCB Printing Layout



Grid size：2.54 x 2.54mm

Pin Function Table

Pin	Function			
	Sxx	Dxx	Dxxxx	Txxxx
1	⏚	⏚	⏚	⏚
2	AC（N）	AC（N）	AC（N）	AC（N）
3	AC（L）	AC（L）	AC（L）	AC（L）
4	+Vo	+Vo	+Vo2	+Vo2
5	No Pin	No Pin	-Vo2	COM
6	No Pin	COM	No Pin	-Vo2
7	No Pin	No Pin	+Vo1	+Vo1
8	-Vo	-Vo	-Vo1	-Vo1

Note:

- The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
- It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
- Suggested Multi channel output module load imbalance: ≤ ± 5%. If it exceeds ± 5%, it cannot be guaranteed that the product performance meets all performance indicators in this manual;
- The maximum capacitive load is tested within the input voltage range and under full load conditions;
- Unless otherwise specified, all indicators in this manual are measured at Ta=25 °C, humidity<75% RH, nominal input voltage, and output rated load;
- All indicator testing methods in this manual are based on our company's corporate standards;
- Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel;
- Product specifications are subject to change without prior notice.