AC/DC Converter
SLHE05-20A/C/Dxx Series

5W, AC-DC converter

FEATURES

- Universal Input : 85 - 264VAC/100 - 370VDC
- Operating temperature range: -30℃ to +70℃
- High isolation voltage up to 4K VAC
- Regulated output, Low ripple & noise
- Output short circuit, over-current, over-voltage protection
- High efficiency, high reliability
- Plastic case, meets UL94V-0
- EMI performance meets CISPR32 / EN55032 CLASS B

slhe05-20a/c/dxx series -----a compact size multipath output power converter offered by schmid-m. 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, and it's widely used in industrial, office and civil applications. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

Selection Guide

Part No.*	Output Power	Nominal Output Voltage and Current		Efficiency (230VAC, %/Typ.)	Max. Capacitive Load(μF)	
		(Vo1/Io1)	(Vo2/Io2)		Vo1	Vo2
SLHE05-20A05**	5W	+5V/500mA	-5V/500mA	73	1500	1500
SLHE05-20A12**		+12V/210mA	-12V/210mA	77	220	220
SLHE05-20A15**		+15V/160mA	-15V/160mA	77	220	220
SLHE05-20C0505-01	5.4W	5V/800mA	±5V/100mA	70	2400	370
SLHE05-20C0512-01		5V/600mA	±12V/100mA	73	1600	170
SLHE05-20C0515-01		5V/600mA	±15V/80mA	74	1760	80
SLHE05-20D0505-01	5W	5V/900mA	5V/100mA	70	3400	400
SLHE05-20D0512-01		5V/750mA	12V/100mA	72	2500	220
SLHE05-20D0515-01		5V/700mA	15V/100mA	72	2200	220
SLHE05-20D0524-01	5.4W	5V/600mA	24V/100mA	74	3100	100

Note:*Part No. with suffix of "A2" means chassis mounting and suffix of "A4" means DIN-Rail mounting (e.g. SLHE05-20D0505-01A2 means chassis mounting; SLHE05-20D0505-01A4 means DIN-Rail mounting)
**About SLHE05-20Axx, we use Vo2 as sampling feedback; and all others use Vo1 as sampling feedback and define the primary output.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	264	VAC
	DC input	100	--	370	VDC
Input frequency		47	--	63	Hz
Input current	115VAC	--	--	0.125	A
	230VAC	--	--	0.08	
Inrush current	115VAC	--	10	--	
	230VAC	--	20	--	
Recommended External Input Fuse		1A/250V, slow fusing, necessary			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Primary output		--	±2	--	%
	Secondary output		--	±10	--	
Line Regulation	Full load	Primary output	--	±0.5	--	
		Secondary output	--	±1.5	--	
Load Regulation	10%-100% load (balanced load)	Primary output	--	±2	--	
		Secondary output	--	±5	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	Primary output	--	50	100	mV
		Secondary output	--	100	200	
Temperature Coefficient	Primary output		--	±0.02	--	%/°C

Short Circuit Protection			Continuous, self-recovery			
Over-current Protection	SLHE05-20Axx		⩾130%Io self-recovery			
	SLHE05-20C/Dxx		⩾150%Io self-recovery			
Over-voltage Protection	Primary output	5VDC Output	≤7.5VDC			
		12VDC Output	≤20VDC			
		15VDC Output	≤22VDC			
Min. Load			10	--	--	%
Hold-up Time	115VAC input		10	15	--	ms
	230VAC input		65	80	--	
Note: * Ripple and noise are measured by "parallel cable" method, please see AC-DC Converter Application Notes for specific operation.						

General Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	SLHE05-20A/C/Dxx	Test time: 1min (leakage current＜5mA)	4000	--	--	VAC
	Input-⏚			2500	--	--	
	Vo1- Vo2	SLHE05-20C/Dxx		500	--	--	VDC
Operating Temperature				-30	--	+70	℃
Storage Temperature				-40	--	+85	
Storage Humidity				--	--	95	%RH
Welding Temperature		Wave-soldering		260 ± 5℃; time：5 - 10s			
		Manual-welding		360 ± 10℃; time：3 - 5s			
Power Derating		-30℃ to -25℃		2.0	--	--	%/℃
		+55℃ to +70℃		2.5	--	--	
		85VAC-100VAC		1.33	--	--	%/VAC
		240VAC-264VAC		0.83	--	--	
Safety Standard				IEC62368/EN62368/UL62368			
Safety Class				CLASS I			
MTBF				MIL-HDBK-217F@25°C > 300,000 h			

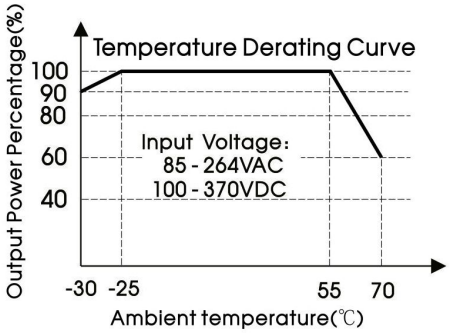
Physical Specifications

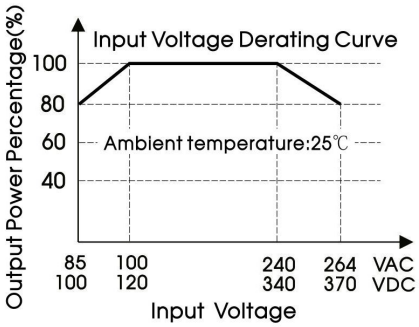
Casing Material		Black flame-retardant and heat-resistant plastic (UL94V-0)
Dimension	Horizontal package	48.50*36.00*20.50 mm
	A2 chassis mounting	96.10*54.00*29.00 mm
	A4 Din-Rail mounting	96.10*54.00*33.60 mm
Weight	Horizontal package	55g (Typ.)
	A2 chassis mounting	100g (Typ.)
	A4 Din-Rail mounting	140g (Typ.)
Cooling method		Free air convection

EMC Specifications

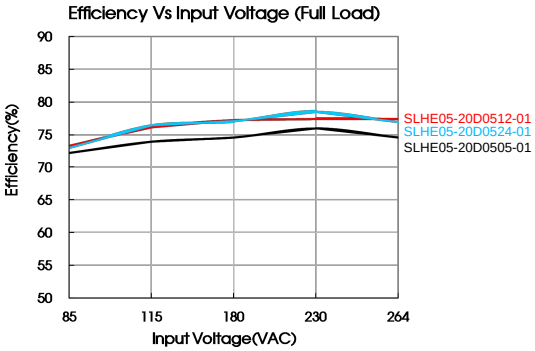
EMI	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
EMS	ESD	IEC/EN 61000-4-2	Contact ±6KV / Air ±8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria B
		IEC/EN61000-4-4	±4KV (See Fig. 4 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±1KV/line to ground ±2KV	perf. Criteria B
		IEC/EN61000-4-5	line to line ±2KV/line to ground ±4KV (See Fig. 4 for recommended circuit)	perf. Criteria B
EMS	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
	Voltage dips, short interruptions and voltage variations	IEC/EN61000-4-11	0%,70%	perf. Criteria B

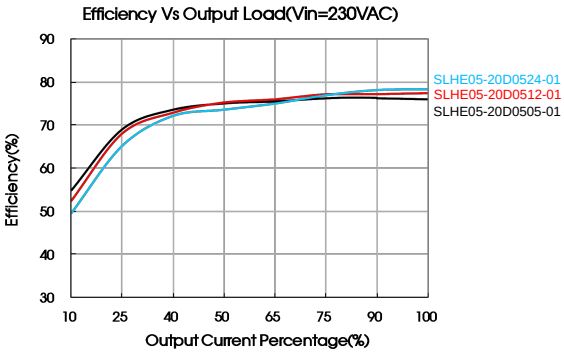
Product Characteristic Curve

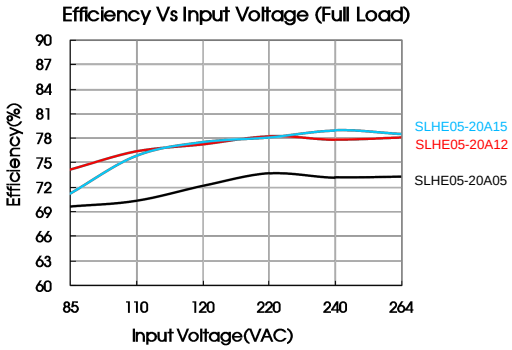


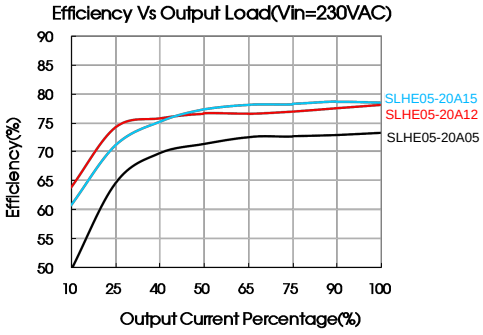


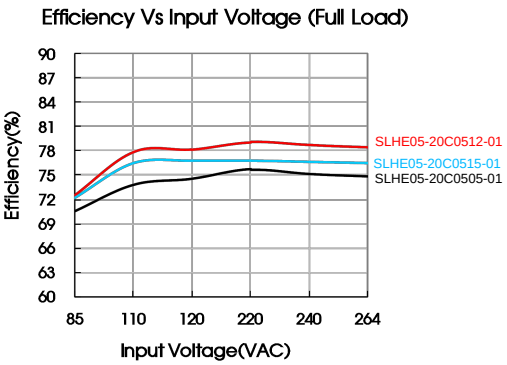
Note: ①When input 85-100VAC/240-264VAC/100-120VDC/340-370VDC, it need to be voltage derated on basis of temperature derating;
②This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.

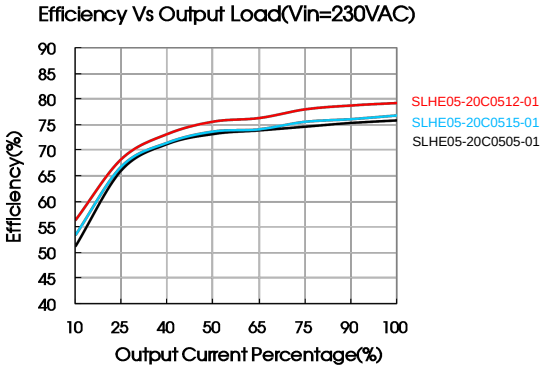












Design Reference

1. Typical application circuit

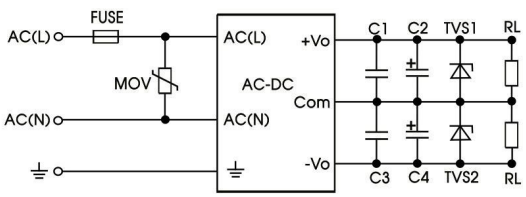


Fig. 1 SLHE05-20Axx series

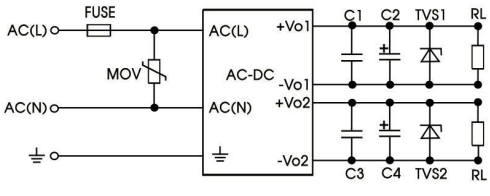


Fig. 2 SLHE05-20Dxx series

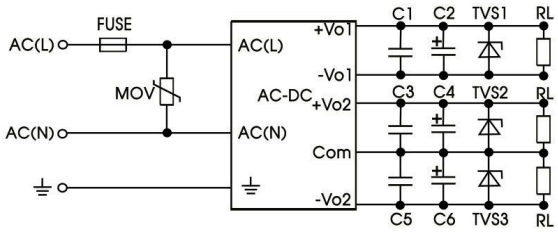


Fig. 3 SLHE05-20Cxx series

Model	FUSE	MOV	C1/C3/C5	C2(μF)	C4(μF)	C6(μF)	TVS1	TVS2	TVS3
SLHE05-20A05	1A/250V slow fusing, necessary	S14K300	0.1μF/50V	68	68	--	SMBJ7.0A	SMBJ7.0A	--
SLHE05-20A12				47	47	--	SMBJ20A	SMBJ20A	--
SLHE05-20A15				10	10	--	SMBJ20A	SMBJ20A	--
SLHE05-20C0505-01				220	22	22	SMBJ7.0A	SMBJ7.0A	SMBJ7.0A
SLHE05-20C0512-01				120	22	22	SMBJ7.0A	SMBJ20A	SMBJ20A
SLHE05-20C0515-01				120	22	22	SMBJ7.0A	SMBJ20A	SMBJ20A
SLHE05-20D0505-01				220	22	--	SMBJ7.0A	SMBJ7.0A	--
SLHE05-20D0512-01						--	SMBJ7.0A	SMBJ20A	--
SLHE05-20D0515-01						--	SMBJ7.0A	SMBJ20A	--
SLHE05-20D0524-01						--	SMBJ7.0A	SMBJ30A	--

Note:
Output filtering capacitors C2, C4, C6 are electrolytic capacitors, it is recommended to use high frequency and low impedance electrolytic capacitor. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitor voltage reduced to at least 80%. C1, C3, C5 are ceramic capacitors, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails.

2. EMC solution-recommended circuit

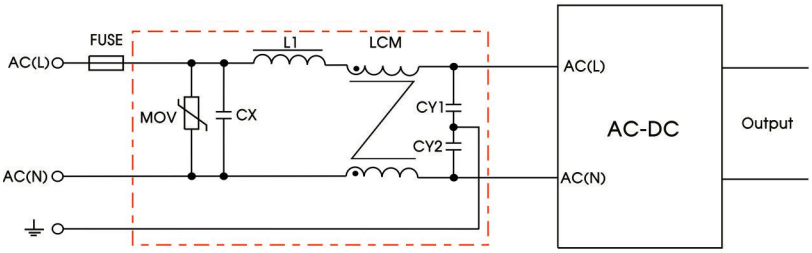
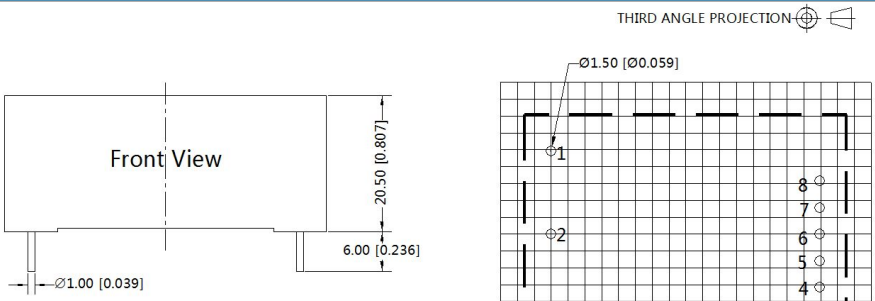


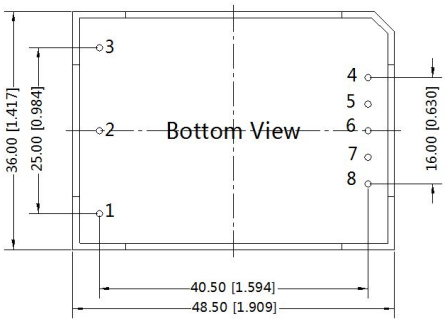
Fig 3: EMC Recommended circuit with higher requirements

Element model	Recommended value
MOV	S14K300
CY1 , CY2	1000pF/400VAC
CX	0.1μF/275VAC
LCM	10mH, recommended to use SCHMID-M 's SFL2D-Z5-103
L1	4.7μH/2A
FC-LX1D	2KV/4KV EMC filter
FUSE	2A/250V slow fusing, necessary

Dimensions and Recommended Layout



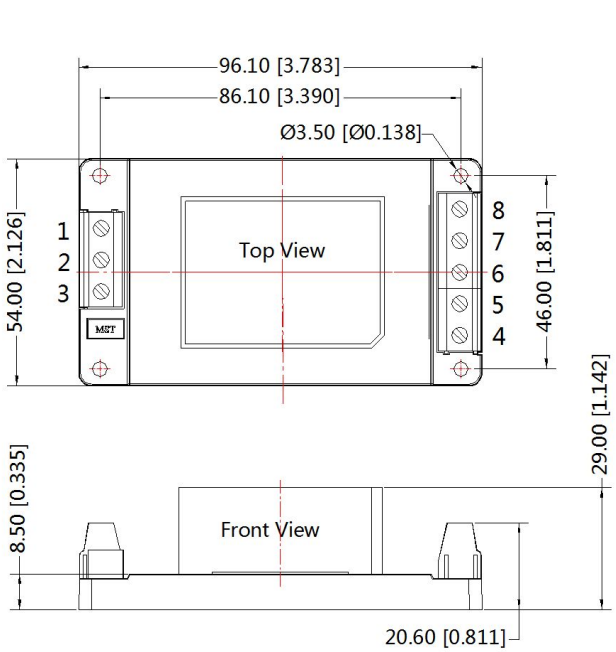
Note : Grid 2.54*2.54mm



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

Pin-Out			
PIN	LHE05-20A	LHE05-20C	LHE05-20D
1	⏚	⏚	⏚
2	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)
4	+Vo	+Vo2	+Vo2
5	No Pin	COM	-Vo2
6	COM	-Vo2	No Pin
7	No Pin	+Vo1	+Vo1
8	-Vo	-Vo1	-Vo1

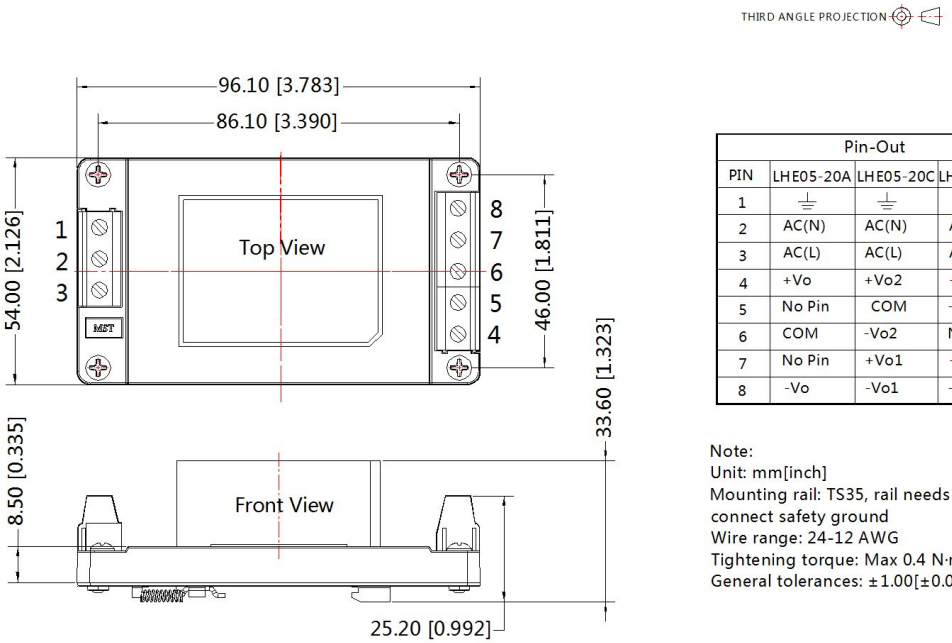
A2 Dimensions



Pin-Out			
PIN	LHE05-20A	LHE05-20C	LHE05-20D
1	⏚	⏚	⏚
2	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)
4	+Vo	+Vo2	+Vo2
5	No Pin	COM	-Vo2
6	COM	-Vo2	No Pin
7	No Pin	+Vo1	+Vo1
8	-Vo	-Vo1	-Vo1

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

A4 Dimensions



Pin-Out			
PIN	LHE05-20A	LHE05-20C	LHE05-20D
1	⏚	⏚	⏚
2	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)
4	+Vo	+Vo2	+Vo2
5	No Pin	COM	-Vo2
6	COM	-Vo2	No Pin
7	No Pin	+Vo1	+Vo1
8	-Vo	-Vo1	-Vo1

Note:
Unit: mm[inch]
Mounting rail: TS35, rail needs to connect safety ground
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

Note:

1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% with nominal input voltage and rated output load;
2. All index testing methods in this datasheet are based on our Company's corporate standards;
3. We can provide product customization service, please contact our technicians directly for specific information;
4. Products are related to laws and regulations: see "Features" and "EMC";
5. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.