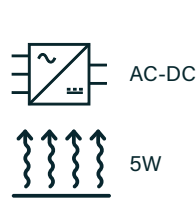


LD05-23BxxR2 SERIES



DIMENSIONS:



PCB: 1.0 x 1.0 x 0.693" (25.4 x 25.4 x 17.6mm)
 A2S: 2.99 x 1.24 x 1.039" (76 x 31.5 x 26.4mm)
 A4S: 2.99 x 1.24 x 1.079" (76 x 31.5 x 27.4mm)



85 - 305 VAC

-40 TO 85°C
OPERATION

4000 VAC ISOLATION

Part numbers

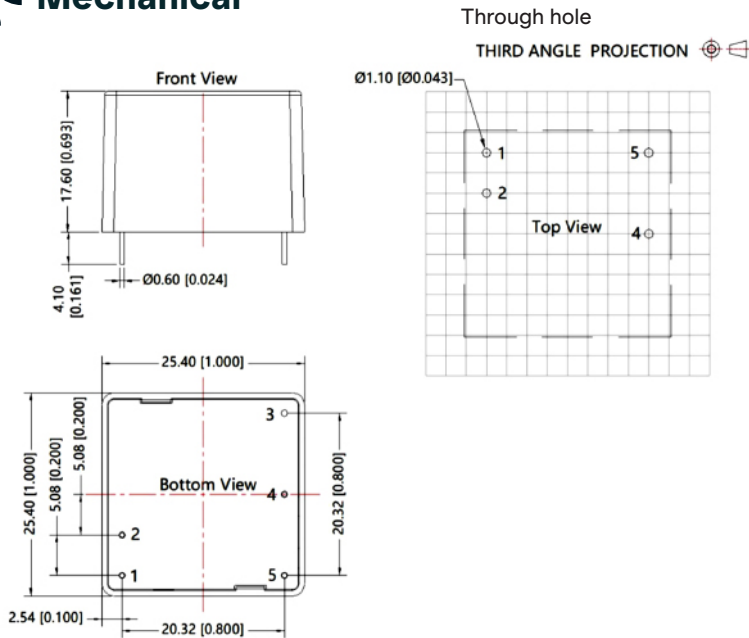
LD05	-23B	12	R2
Series	Input voltage	Output voltage	Version
	85-305VAC	03 = 3.3VDC 05 = 5VDC 09 = 9VDC 12 = 12VDC 15 = 15VDC 24 = 24VDC	

Key specifications

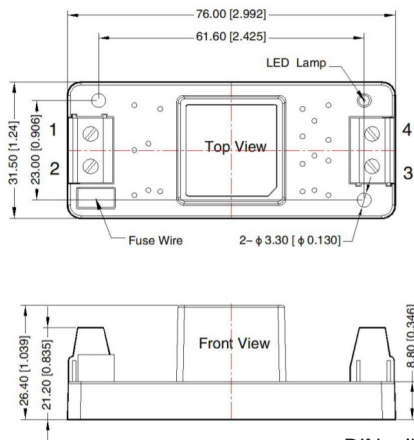
Input range	Safety certification	Efficiency	Environmental performance
85-305VAC	UL / EN 62368-1, Designed to meet IEC / EN 60335-1, CE	71.5-81.5%	-40 to 85°C

LD05-23BxxR2 SERIES

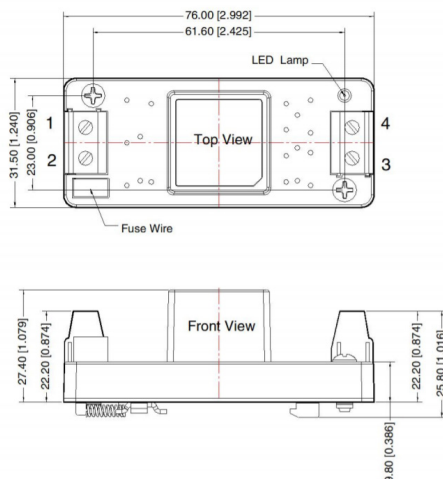
Mechanical



Chassis mount



DIN rail mount



Pin	Function
1	AC IN (N)
2	AC IN (L)
3	No pin
4	-DC OUT
5	+DC OUT

Notes

1. All dimensions shown in mm
2. Pin diameter ± 0.1 [± 0.004]
3. General tolerance ± 0.5 [± 0.02]

Pin	Function
1	AC IN (N)
2	AC IN (L)
3	-DC OUT
4	+DC OUT

Weight

Through hole	A2S	A4S
18g	38g	58g

LD05-23BxxR2 SERIES

Models & Ratings

Model Number (1)	Output Power	Output Voltage	Output current	Efficiency (2)	Max Capacitive Load
LD05-23B03R2	5W	3.3V	1.515A	71.5%	4000uF
LD05-23B05R2	5W	5V	1A	77.5%	3000uF
LD05-23B09R2	5W	9V	0.555A	80.5%	1200uF
LD05-23B12R2	5W	12V	0.416A	80.5%	1200uF
LD05-23B15R2	5W	15V	0.333A	81.5%	680uF
LD05-23B24R2	5W	24V	0.208A	81.5%	220uF

1. Add A2S for chassis mount and A4S for DIN rail mount
2. Typical efficiency at 230VAC

3. Unless stated, figures are at 25°C <75RH and nominal line/ load.

Input

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Input voltage	85		305	VAC	100-430 VDC slow blow fuse required. See page 6 for derating curve
Input frequency	47		63	Hz	
Power factor					EN61000-3-2 class A
Input current	130		70	mA rms	130mA 115VAC / 70mA at 230VAC
Inrush current	15		25	A	15A at 115VAC and 25A at 230VAC. Cold start at 25°C
No load input power			0.1	W	
Leakage current			0.25	mA	277VAC 50Hz

Output

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Output voltage	3.3		24	VDC	See Models & Ratings table
Set point accuracy		±2	±3	%	±3 for 3.3V output only
Line regulation		±0.5		%	
Load regulation		±1		%	0 to 100% load
Minimum load	0			%	
Ripple and noise		50	100	mV pk-pk	All models measured with 10uF and 0.1uF capacitor. 20 MHz bandwidth
Hold up time	5		50	mS	5ms for 115VAC and 50ms for 230VAC

LD05-23BxxR2 SERIES

Protections

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Overload	130			%	Trip and restart. Automatic recovery
Short circuit					Trip and restart. Automatic recovery
Over voltage			7.5 15 16 20 30	VDC	3.3 / 5V units 9V units 12V units 15V units 24V units

Safety

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Safety standards	IEC/EN/UL62368-1/EN60335				
Isolation: Input to output	4000			VAC	

EMC: Immunity

	Standard	Test level	Criteria	Notes/Conditions
ESD	EN61000-4-2	2,3	B	6kV contact, 8kV air
Radiated	EN61000-4-3	3	A	10V/m
EFT	EN61000-4-4	2	B	±2kV Circuit 1
	EN61000-4-4	3	B	±4kV Circuit 2
	EN61000-4-4	3	A	±4kV Circuit 3
	EN55014-2		B	
Surges	EN61000-4-5	Installation class 2	B	±1kV Circuit 1
	EN61000-4-5	Installation class 3	B	±2kV Circuit 2
	EN61000-4-5	Installation class 3	A	±2kV Line-Line, ±4kV Line-Ground Circuit 3
	EN55014-2		B	
Conducted	EN61000-4-6	2	A	10Vrms
	EN55014-2		A	
PFMF	EN61000-4-8	1	A	V1A/m
Voltage dips and interruptions	EN61000-4-11	0% interruptions 70% dips performance criteria B		
	EN55014-2	Performance criteria B		

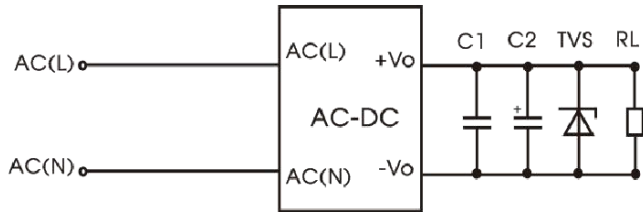
EMC: Emissions

	Standard	Test level	Criteria	Notes/Conditions
Conducted	EN55014	B		
Radiated	EN55014	B		
Harmonic current	EN61000-3-2	Class A		
Voltage flicker	EN61000-3-3			

LD05-23BxxR2 SERIES

Application Notes

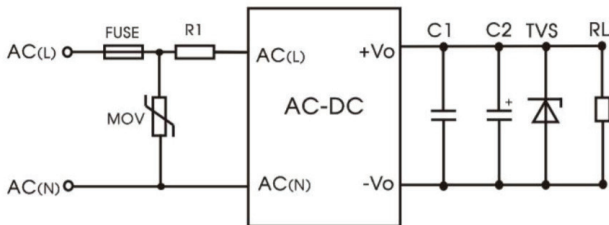
Typical Application: Circuit 1



1. For a typical application we recommend placing these additional components close to the converter
2. In circuit 1, C1 should be a ceramic cap for HF noise and C2 an electrolytic with low ESR
3. Both caps should have a minimum 20% voltage margin on the output voltage
4. The TVS is placed to protect the load should the converter fail

Part no	C1	C2	Fuse	R1	TVS	MOV
LD05-23B03R2	1UF	150uF	1A slow blow	12Ω/3W (wire wound resistor required)	SMBJ7.0A	S10K350
LD05-23B05R2		150uF			SMBJ7.0A	
LD05-23B09R2		120uF			SMBJ12A	
LD05-23B12R2		120uF			SMBJ20A	
LD05-23B15R2		120uF			SMBJ20A	
LD05-23B24R2		68uF			SMBJ30A	

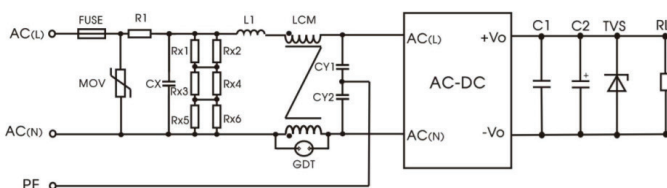
Suggested EMC: Circuit 2



1. The neighbouring circuit 2 is recommended to pass EMC emission and immunity.
2. Place components as close to the converter as possible
3. For better EMC performance increase R1 to 33Ω/3W, MOV to S14K350 and fuse to 2A/300W slow blow

Suggested EMC for class I systems: Circuit 3

1. Circuit 3 is recommended to pass EMC emission and immunity
2. Place components as close to the converter as possible



Component	Recommended value
Fuse	2A/300V slow blow
MOV	S14K350
CX	334K/305VAC
R1	33Ω/3W (wire round resistor required)
L1	1.2mH/0.3A
CY1/2	1nF/400VAC
GDT	300V/1KA
LCM	20mH P/N FL2D-10-203

Rx1-6 bleed resistor for CX discharge 1.5M/150VDC

Environmental

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Operating temperature	-40		85	°C	See derating curve
Storage temperature	-40		105	°C	
Altitude	2000		5000	m	Derate from 2km 6.7%/km
Temperature coefficient			±0.02	%/°C	
Storage Humidity	0		95	% RH	
MBTF	>2.6			MHrs	As per MIL-HDBK-217F, 25°C GB

