LD15-23BxxR2 SERIES

AC-DC

15W

DIMENSIONS:

PCB: 1.874 x 1.055 x 0.925" (47.6 x 26.8 x 23.5mm)
A2S: 2.992 x 1.24 x 1.272" (76 x 31.5 x 32.3mm)
A4S: 2.992 x 1.24 x 1.311" (76 x 31.5 x 36.9mm)

85 - 305 VAC

-40 TO 85°C OPERATION

4000 VAC ISOLATION

Part numbers

LD15	-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	82-86%	-40 to 85°C

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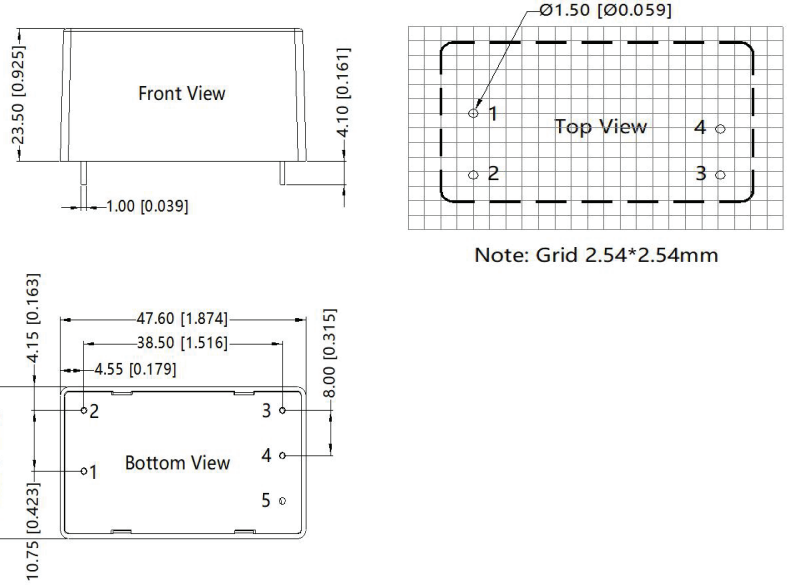
Mechanical

Through hole

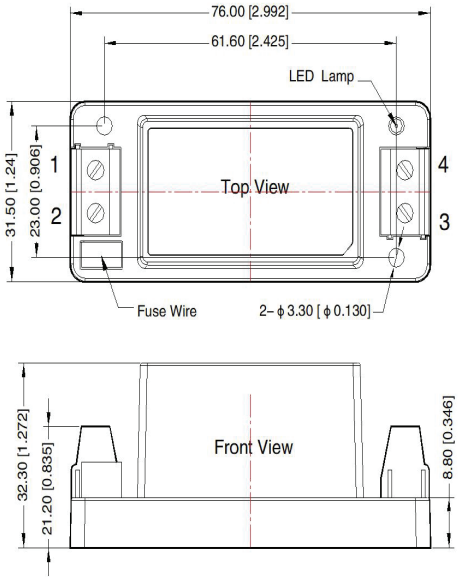


Pin	Function
1	AC IN (N)
2	AC IN (L)
3	-DC OUT
4	+DC OUT
5	No pin

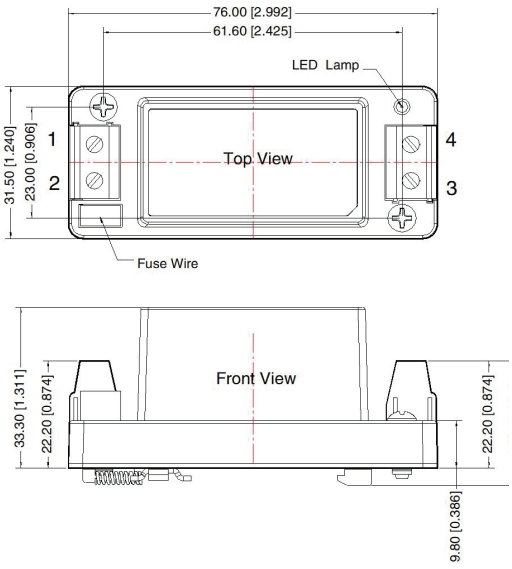
Notes

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

Chassis mount



DIN rail mount



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

Weight		
Through hole	A2S	A4S
48g	68g	88g

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Models & Ratings

Model Number (1)	Output Power	Output Voltage	Output current	Efficiency (2)	Max Capacitive Load
LD15-23B03R2	13.2W	3.3V	4A	82%	6600uF
LD15-23B05R2	15W	5V	3A	85%	5000uF
LD15-23B09R2	15W	9V	1.67A	84%	3000uF
LD15-23B12R2	15W	12V	1.25A	85%	2000uF
LD15-23B15R2	15W	15V	1A	85%	1500uF
LD15-23B24R2	15W	24V	0.625A	86%	680uF

1. Add A2S for chassis mount and A4S for DIN rail mount
2. Typical efficiency at 240VAC
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	300		450	mA rms	450mA 115VAC / 300mA at 230VAC
Inrush current	30		60	A	30A at 115VAC and 60A at 230VAC. Cold start at 25°C
No load input power		0.1	0.3	W	0.3W for 24V version only
Leakage current			0.1	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		%	
Line regulation		±0.5		%	
Load regulation		±1		%	0 to 100% load
Minimum load	0			%	
Ripple and noise		70	120	mV pk-pk	All models measured with 10uF and 0.1uf capacitor. 20 MHz bandwidth
Hold up time	10		55	mS	10ms for 115VAC and 55ms for 230VAC

LD15-23BxxR2 SERIES

Protections

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Overload	110			%	Trip and restart. Automatic recovery
Short circuit					Trip and restart. Automatic recovery
Over voltage			7.5 15 20 30	VDC	3.3 / 5V units 9V units 12 / 15V units 24V units

Safety

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

EMC: Immunity

	Standard	Test level	Criteria	Notes/Conditions
ESD	EN61000-4-2	4	B	8kV contact
	EN55014-2		B	
Radiated	EN61000-4-3	3	A	10V/m
	EN55014-2		A	
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	1A/m
Voltage dips and interruptions	EN61000-4-11	0% interruptions 70% dips performance criteria B		
	EN55014-2	Performance criteria B		

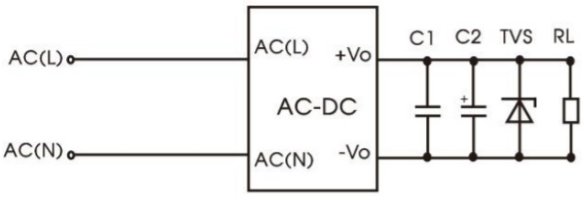
EMC: Emissions

	Standard	Test level	Criteria	Notes/Conditions
Conducted	EN55032	B		
Radiated	EN55032	B		
Harmonic current	EN61000-3-2	Class A		
Voltage flicker	EN61000-3-3			

LD15-23BxxR2 SERIES

Application Notes

Circuit 1

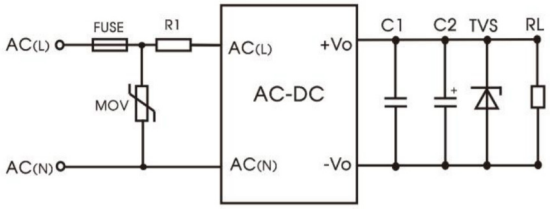


Typical Application: Circuit 1

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 TVR is placed to protect the load should the converter fail

Part no	C1	C2	TVS
LD15-23B03R2	1uF/50V	220uF/16V	SMBJ7.0A
LD15-23B05R2		220uF/16V	SMBJ7.0A
LD15-23B09R2		100uF/25V	SMBJ12A
LD15-23B12R2		100uF/25V	SMBJ20A
LD15-23B15R2		100uF/25V	SMBJ20A
LD15-23B24R2		100uF/25V	SMBJ30A

Circuit 2



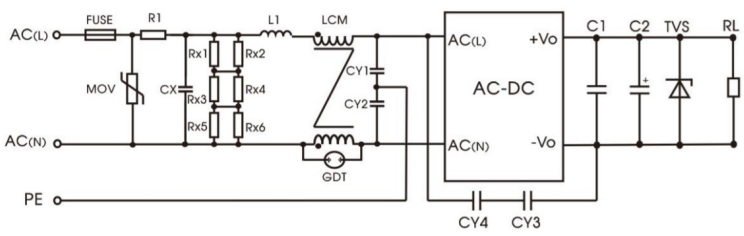
Suggested EMC: Circuit 2

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 6.8Ω/3W, MOV to S14K350 and 3.15A/300V fuse

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

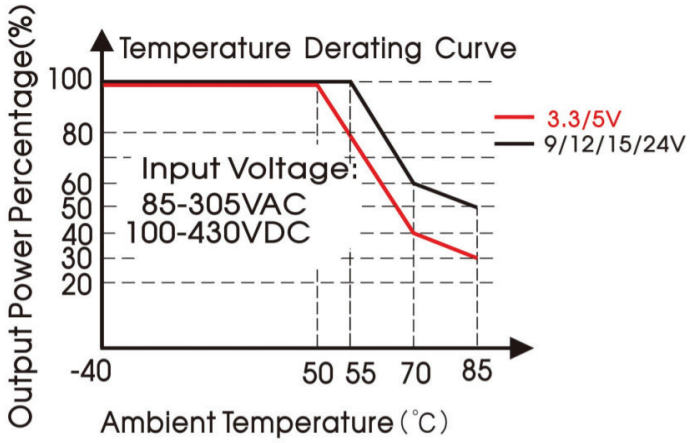
Circuit 3

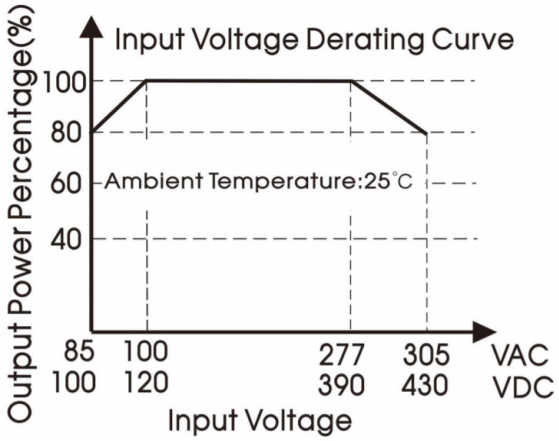


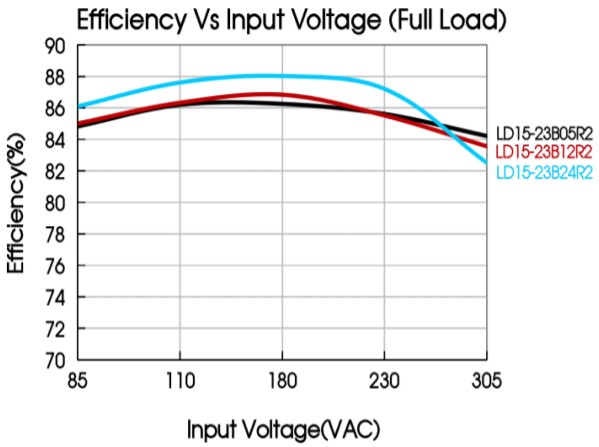
Component	Recommended value
Fuse	3.15A/300V slow blow
MOV	S14K350
CX	334K/305VAC
R1	12Ω/5W (wire round resistor required)
L1	1.2mH/0.5A
CY1/2	2.2nF/400VAC
CY3/4	1nF/400VAC
GDT	300V/1KA
LCM	20mH
Rx1-6 bleed resistor for CX discharge 1.5M/150VDC	

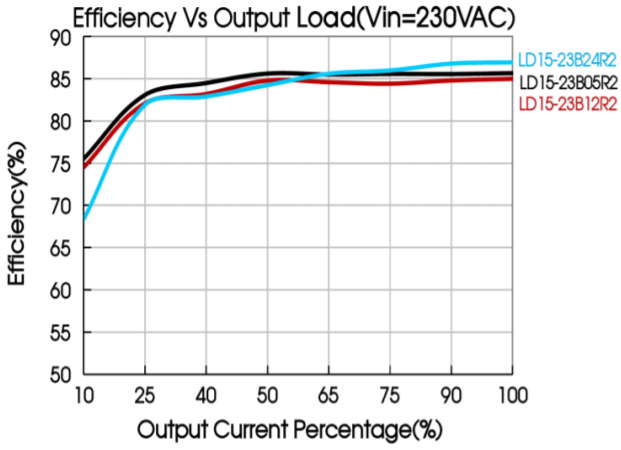
Environmental

Parameter	Min	Typical	Max	Unit	Notes/Conditions
Operating temperature	-40		85	°C	See derating curve
Storage temperature	-40		85	°C	
Altitude	2000		5000	m	Derate from 2km 6.7%/km
Temperature coefficient			±0.02	%/°C	
Storage Humidity	0		95	% RH	
MBTF	>3.2			MHrs	As per MIL-HDBK-217F, 25°C GB









11th October 2023