AST10-2324D-M

- Ultra-wide 85 - 305VAC and
  100 - 430VDC input voltage range
- Operating ambient temperature range:
  -40℃ to +85℃
- Up to 85% efficiency
- No-load power consumption < 0.1W
- 5000m altitude application

RoHS

3 YEAR WARRANTY

3-Year Warranty

Description

AST10-23XXD-M series AC-DC converters features ultra-wide AC input and at the same time accepts DC input voltage, low power consumption, low ripple & noise, high efficiency, high reliability, reinforced isolation. It offers good EMC performance compliant to IEC/EN61000-4 and CISPR32/EN55032 and meets IEC/EN/UL62368/EN60335/ EN61558/IEC/EN60601-1/ANSI/AAMI ES60601-1 standards. The converters are widely used in industrial, power, medical treatment, home appliances, instrumentation, communication and civil applications. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Selection Guide

Certification	Part No.	Output Power	Peak Power	Nominal Output Voltage and Current (Vo/Io)	Peak Current	Efficiency at 230VAC (%) Typ.	Capacitive Load (uF) Max.
/	AST10-2303D-M	10W	13.2W	3.3V/3000mA	4000mA	82	6600
	AST10-2305D-M		15W	5V/2000mA	3000mA	85	5000
	AST10-2309D-M			9V/1100mA	1670mA	84	3000
	AST10-2312D-M			12V/830mA	1250mA	85	2000
	AST10-2315D-M			15V/660mA	1000mA	85	1500
	AST10-2324D-M			24V/410mA	625mA	86	680

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	AC input	85	--	305	VAC
	DC input	100	--	430	VDC
Input Frequency		47	--	63	Hz
Input Current	115VAC	--	--	0.45	A
	230VAC	--	--	0.3	
Inrush Current	230VAC	--	60	--	
Leakage Current	277VAC/50Hz	0.1mA RMS Max.			
Built In Fuse		2A/300V, slow-blow			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			--	±2	--	%
Line Regulation	Full load		--	±0.5	--	
Load Regulation	0%-100% load		--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)		--	70	120	mV
Stand-by Power Consumption	230VAC	3.3/5/9/12/15V	--	--	0.10	W
		24V	--	--	0.12	
Temperature Coefficient			--	±0.02	--	%/°C
Short Circuit Protection			Hiccup, continuous, self-recovery			
Over-current Protection			≥110%Io, self-recovery			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Over-voltage Protection	3.3/5V	≤7.5VDC (Output voltage clamp or hiccup)			
	9 V	≤15VDC (Output voltage clamp or hiccup)			
	12/15V	≤20VDC (Output voltage clamp or hiccup)			
	24V	≤30VDC (Output voltage clamp or hiccup)			
Minimum Load		0	--	--	%
Hold-up Time	115VAC	--	10	--	ms
	230VAC	--	55	--	

Note: *The “Tip and barrel method” is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 1uF ceramic capacitor, please refer to AC-DC Converter Application Notes for specific information.

General Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input-Output	Electric Strength Test for 1min., leakage current <5mA		4000	--	--	VDC
Insulation Resistance	Input - output	At 500VDC		100	--	--	MΩ
Operating Temperature				-40	--	+85	℃
Storage Temperature				-40	--	+85	
Storage Humidity				--	--	95	%RH
Soldering Temperature		Wave-soldering		260 ± 5℃; time：5 - 10s			
		Manual-welding		360 ± 10℃; time：3 - 5s			
Switching Frequency				--	65	--	kHz
Power Derating		+50℃ to +70℃	3.3/5V	3.00	--	--	%/℃
		+55℃ to +70℃	9/12/15/24V	2.67	--	--	
		+70℃ to +85℃		0.66	--	--	

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Power Derating	85VAC - 100VAC	1.33	--	--	%/VAC
	277VAC - 305VAC	0.71	--	--	
	2000 - 5000m	0.67	--	--	%/Km
Safety Standard		IEC/UL62368-1, EN61558-1, EN60335-1 Safety Approval & EN62368-1 (Report);			
Safety Class		CLASS I I			
MTBF		MIL-HDBK-217F@25° C > 3200,000 h			
Designed Life	230VAC Ta：25℃ 100% load	＞130x103 h			
	230VAC Ta：55℃ 100% load	＞27x103 h			

Mechanical Specifications

Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimensions	47.60 x 26.80 x 23.50 mm
Weight	48g (Typ.)
Cooling Method	Free air convection

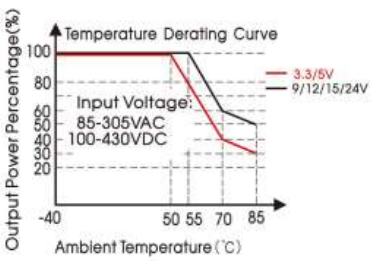
Electromagnetic Compatibility (EMC)

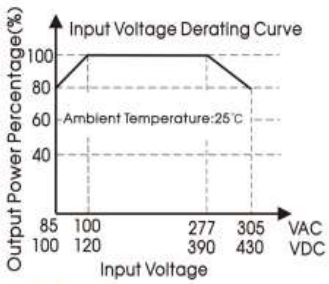
Emissions	CE	CISPR32/EN55032 CLASS B
		CISPR11/EN55011 CLASS B
	RE	EN55014-1
		CISPR32/EN55032 CLASS B
		CISPR11/EN55011 CLASS B
		EN55014-1
Immunity	ESD	IEC/EN 61000-4-2 Contact ±8KV perf. Criteria B
		IEC/EN55014-2 perf. Criteria B

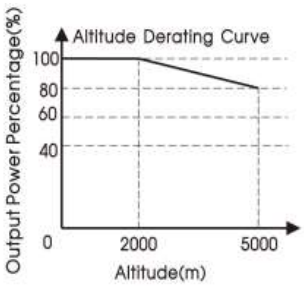
EMC Specifications

Immunity	RS	IEC/EN61000-4-3 10V/m perf. Criteria A
		IEC/EN55014-2 perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2KV perf. Criteria B
		IEC/EN61000-4-4 ±4KV (See Fig.1 for typical application circuit) perf. Criteria B
		IEC/EN55014-2 perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±1KV perf. Criteria B
		line to line ±2KV (See Fig.1 for typical application circuit)
		IEC/EN55014-2 perf. Criteria B
	CS	IEC/EN61000-4-6 10Vr.m.s perf. Criteria A
		IEC/EN55014-2 perf. Criteria A
	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11 0%, 70% perf. Criteria B
		IEC/EN55014-2 perf. Criteria B

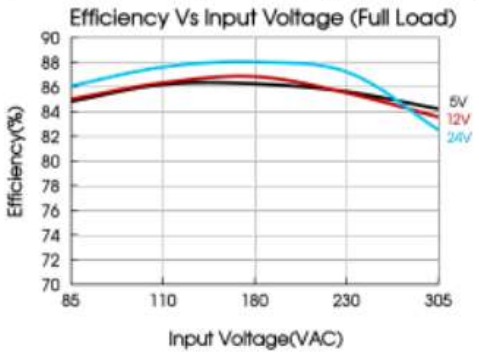
Product Characteristic Curves

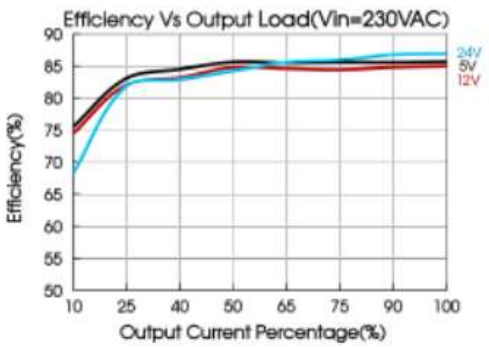






Note: ① The product takes peak power (15W) as the starting point for derating.
② With an AC input between 85-100V/277-305VAC and a DC input between 100-120V/390-430VDC, the output power must be derated as per temperature derating curves;
③ his product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.





Design Reference

1. Typical application

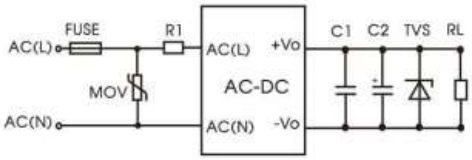
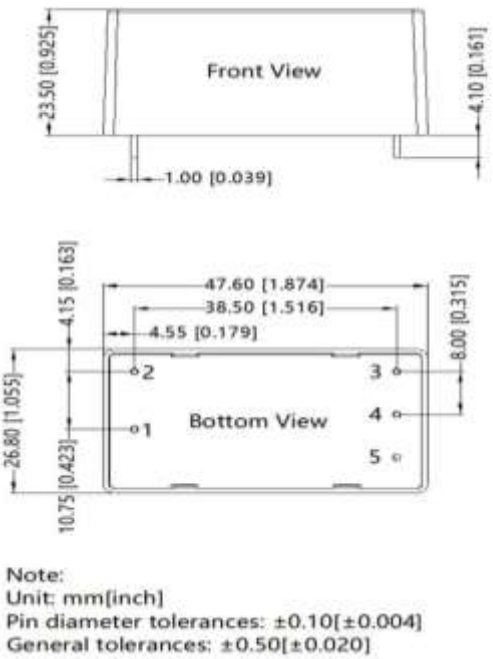


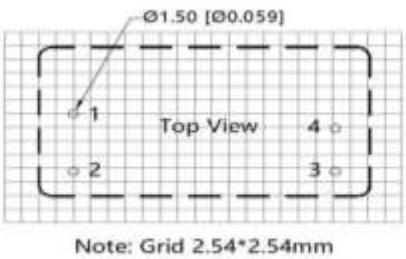
Fig. 1: Typical circuit diagram

Part No.	FUSE	MOV	R1	C1	C2	TVS
AST10-2303D-M	3.15A/300V, slow-blow, required	S14K350	6.8Ω/3W (wire-wound resistor, required)	1uF/50V	220uF/16V	SMBJ7.0A
AST10-2305D-M					220uF/16V	SMBJ7.0A
AST10-2309D-M					100uF/25V	SMBJ12A
AST10-2312D-M					100uF/25V	SMBJ20A
AST10-2315D-M					100uF/25V	SMBJ20A
AST10-2324D-M					100uF/35V	SMBJ30A

Output Filter Components:
We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor used for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

Dimensions and Recommended Layout





Pin-Out	
Pin	Function
1	AC(L)
2	AC(N)
3	-Vo
4	+Vo
5	No Pin

Note:

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet; Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
2. All index testing methods in this datasheet are based on our company corporate standards;