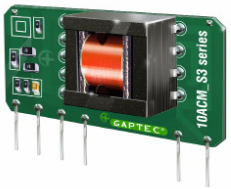


10ACM_S3 series

10W- Single Output AC-DC Converter - Universal Input - Isolated & Regulated

AC-DC Converter 10 Watt

- Universal Input: 85 - 305VAC/100 - 430VDC
- Operating temperature range: -40°C to +85°C
- Isolation voltage up to 3kVAC
- Low power consumption, green power
- Short circuit protection (SCP)
- Over voltage protection
- Over current protection
- High power density, high reliability
- Designed to meet IEC/EN/UL60335 safety standards
- IEC/EN/UL62368 approved

The 10ACM_S3 series is a highly efficient green power AC-DC Converter series. They feature ultra-wide wide input range accepting either AC or DC voltage, high efficiency, low power consumption and CLASS II reinforced insulation. All models are particularly suitable for industrial control, electric power, instrumentation and smart home applications which don't have high requirement for dimension. A variety of EMC external circuits meet the needs of multiple industries.

SHORT CIRCUIT PROTECTED · 100% RoHS compliant 6/6 · c UL us UL-62368-1 (E347551) · CE

Approval	Model	Power [W]	Output voltage [V]	Output current [mA, max]	Efficiency [%, typ]	Capacitive load [µF, max]
UL/CE/CB	10ACM_03S3	6.6	3.3	2000	70	1500
UL/CE/CB	10ACM_05S3	10	5	2000	76	1500
UL/CE/CB	10ACM_09S3	10	9	1100	78	1000
UL/CE/CB	10ACM_12S3	10	12	830	80	680
UL/CE/CB	10ACM_15S3	10	15	670	81	470
UL/CE/CB	10ACM_24S3	10	24	420	82	330

Input specifications		
Input voltage range	85~305VAC, 100~430VDC	
Input frequency	47~63Hz	
Input current	115VAC • 0.3A (typ)	230VAC • 0.15A (typ)
Inrush current	115VAC • 15A (typ)	230VAC • 30A (typ)
Hot plug	Unavailable	
Recommended external input fuse	1A	slow blow, required

Example:
10ACM_05S3
10 = 10Watt; AC = AC-DC; M = case style; 5Vout; S = Single Output; 3 = 3kVAC isolation

Output specifications	
Voltage accuracy	3.3V output: ±1.5% (typ); ±3% (max) Others: ±1% (typ); ±2% (max)
Minimum load	0%
Line regulation (full load)	±0.5% (typ); ±1% (max)
Load regulation (0% to 100%)	±1% (typ); ±1.5% (max)
Ripple & Noise* 20MHz bandwidth (peak-peak value)	80mV (typ) 150mV (max)
Short circuit protection	Hiccup, continuous, self-recovery
Over current protection	≥110%Io self-recovery
Over voltage protection (Output voltage clamp or hiccup)	• 3.3VDC/5VDC: ≤9VDC • 9VDC: ≤15VDC • 12VDC/15VDC: ≤25VDC

* Ripple and noise are measured by "parallel cable" method.

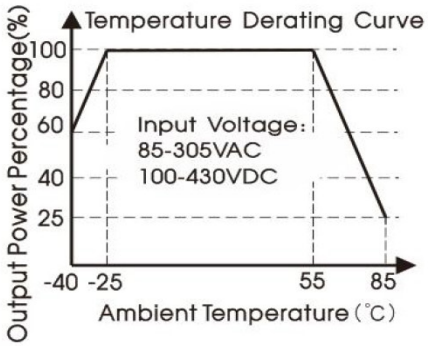
Note:

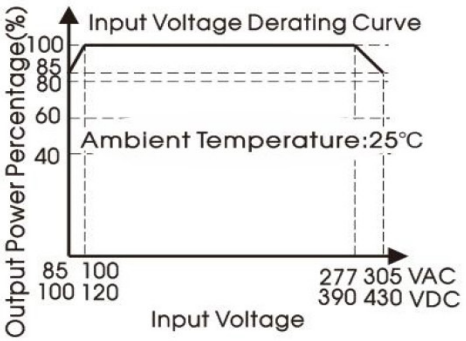
1. External electrolytic capacitors are required to modules, more details refer to typical applications.
2. This part is open frame, at least 6.4mm safety distance between the primary and secondary external components of the module is needed to meet the safety requirement.
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity <75%, nominal input voltage (115V and 230V) and rated output load.
4. In order to improve the efficiency at light load, there will be audible noise generated, but it does not affect product performance and reliability.
5. Module required dispensing fixed after assembled.
6. All index testing methods in this datasheet are based on our company corporate standards.
7. We can provide product customization service, please contact our technicians directly for specific information.
8. Products are related to laws and regulations: see „Features" and „EMC".
9. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

GAPTEC-Electronic GmbH & Co. KG
sales@gaptec-electronic.com – www.gaptec-electronic.com

Common specifications			
Operating temperature range	-40°C ~ +85°C		
Storage temperature range	-40°C ~ +105°C		
Case temperature range	+95°C MAX		
Storage humidity	95%RH MAX		
Welding temperature	• Wave-soldering: 260 ± 5°C; time: 5 - 10s • Manual-welding: 360 ± 10°C; time: 3 - 5s		
Temperature coefficient	0.02%/°C		
Switching frequency	100kHz TYP		
Power derating	• -40°C to -25°C: 2.67%/°C MN • +55°C to +85°C: 2.5%/°C MIN • 85VAC-100VAC: 1.0%/VAC MIN • 277VAC-305VAC: 0.54%/VAC MIN		
I/O-isolation voltage	3000VAC/1Min		
EMC / EMI / CE	CISPR32/EN55032 CISPR32/EN55032	CLASS A (recommended circuit 1, 4) CLASS B (recommended circuit 2, 3)	
EMC / EMI / RE	CISPR32/EN55032 CISPR32/EN55032	CLASS A (recommended circuit 1, 4) CLASS B (recommended circuit 2, 3)	
EMC / EMS / ESD	IEC/EN 61000-4-2	Contact ±6KV	perf. Criteria B
EMC / EMS / RS	IEC/EN 61000-4-3	10V/m	perf. Criteria A
EMC / EMS / EFT	• IEC/EN 61000-4-4 • IEC/EN 61000-4-4	± 2kV (recommended circuit 1, 4) ± 4kV (recommended circuit 2, 3)	perf. Criteria B perf. Criteria B
EMC / EMS / Surge	• IEC/EN 61000-4-5 • IEC/EN 61000-4-5 • IEC/EN 61000-4-5	line to line ±1KV (recommended circuit 1, 2) line to line ±2KV (recommended circuit 3, 4) line to line ±4KV (recommended circuit 4)	perf. Criteria B perf. Criteria B perf. Criteria B
EMC / EMS / CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A
EMC / EMS / Voltage dips, short and interruptions immunity	IEC/EN61000-4-11	0%-70%	perf. Criteria B
Safety standards	IEC/EN/UL62368, IEC/EN/UL60335		
Safety certification	IEC/EN/UL62368		
Safety class	CLASS II		
MTBF	>300,000h @25°C (MIL-HDBK-217F)		
Cooling method	Free air convection		
Weight	11g		
Dimensions	44.50 x 24.00 x 15.00mm		

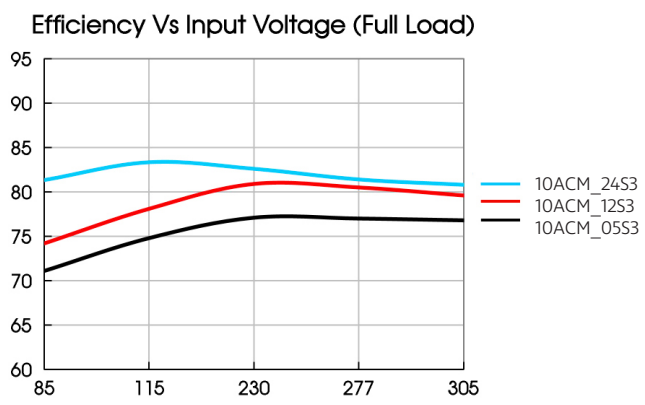
Typical characteristics

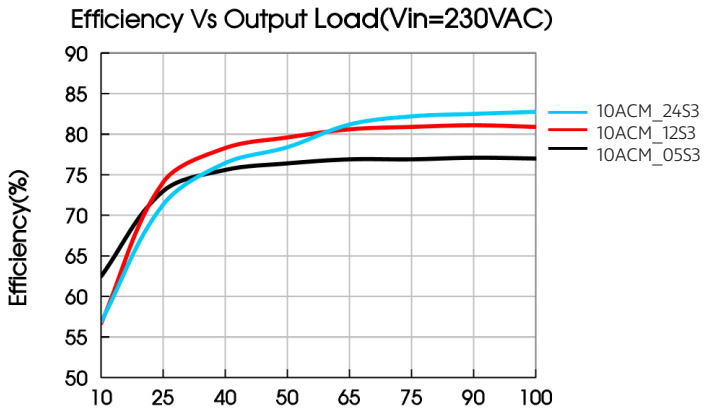




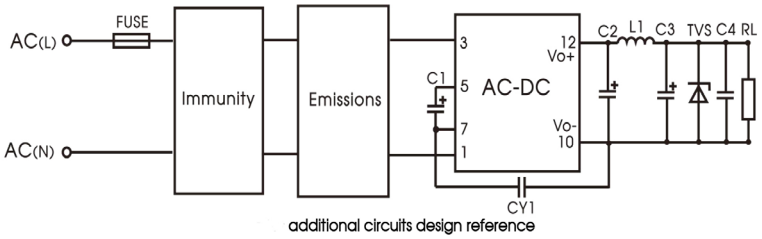
Note:
① With an AC input between 85 -100VAC/277- 305VAC and a DC input between 100 - 120VDC/390 - 430VDC, the output power must be derated as per temperature derating curves;
② This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory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

Efficiency

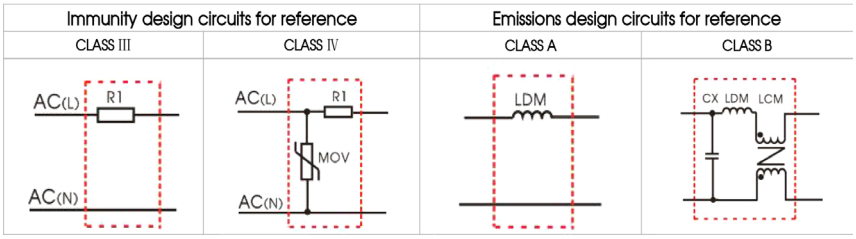




Additional circuits design reference



additional circuits design reference



Additional components selection guide

Model	FUSE (required)	C1 (required)	C2 (required)	L1 (required)	C3 (required)	C4	CY1 (required)
10ACM_03S3	1A/300V	22μF/450V	470μF/16V (solid-state capacitor)	4.7μH	150μF/35V	0.1μF/50V	1.0nF/400VAC
10ACM_05S3					150μF/35V		
10ACM_09S3			270μF/16V (solid-state capacitor)		100μF/35V		
10ACM_12S3					100μF/35V		
10ACM_15S3			470μF/35V		47μF/35V		
10ACM_24S3			220μF/35V		47μF/35V		

Note:
1. C1: input capacitors, C2: output storage capacitors, they must be connected externally.
2. We recommend using an electrolytic capacitor with high frequency and low ESR rating for C3 (refer to manufacture's datasheet). Combined with C2, L1, they form a pi-type filter circuit. Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C4 is a ceramic capacitor, used for filtering high frequency noise. A suppressor diode (TVS) is a recommended to protect the application in case of a converter failure and specification should be 1.2 times of the output voltage.

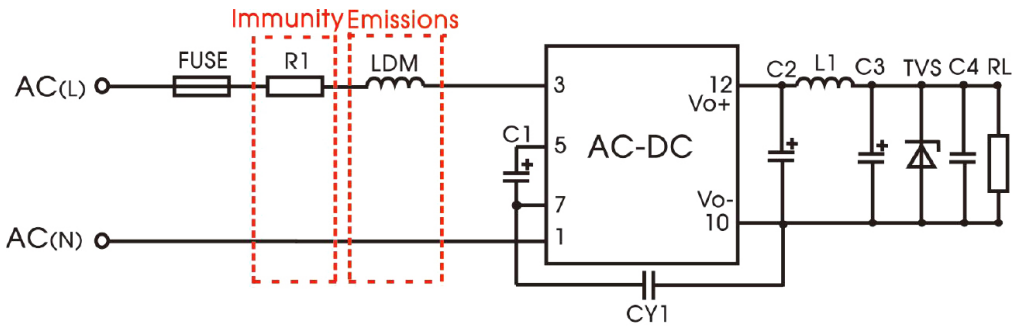
Environmental application EMC solution

Environmental application EMC solution selection table

Recommended circuit	Application environmental	Typical industry	Input voltage range	Environment temperature	Emissions	Immunity
1	Basic application	None	85~305VAC	-40°C~+85°C	CLASS A	CLASS III
2	Indoor civil environment	Smart home/Home appliances (2Y)		-25°C~+55°C	CLASS B	CLASS III
	Indoor general environment	Intelligent building/Intelligent agriculture				
3	Indoor industrial environment	Manufacturing workshop		-25°C~+55°C	CLASS B	CLASS IV
4	Outdoor general environment	ITS/Video monitoring/ Charging point/ Communication/Security and protection		-40°C~+85°C	CLASS A	CLASS IV
	Outdoor harsh environment	On-line power meter Communication base station		-40°C~+85°C	CLASS A	> CLASS IV Surge: line to ground ±4KV EFT: CLASS IV

Electromagnetic compatibility solution-recommended circuit

Recommended circuit 1 - basis application

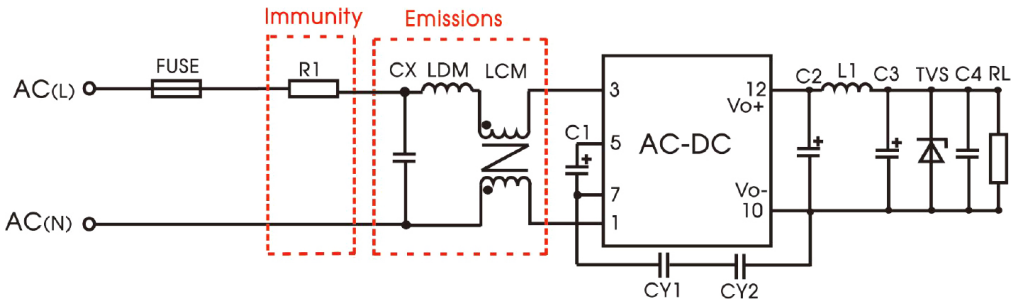


Application environmental	Ambient temperature range	Immunity class	Emissions Class
Basic application	-40°C~+85°C	CLASS III	CLASS A

Component	Recommended value
R1	12Ω/3W
LDM	4.7μH

Electromagnetic compatibility solution-recommended circuit

Recommended circuit 2 - Indoor civil /Universal system recommended circuits for general environment

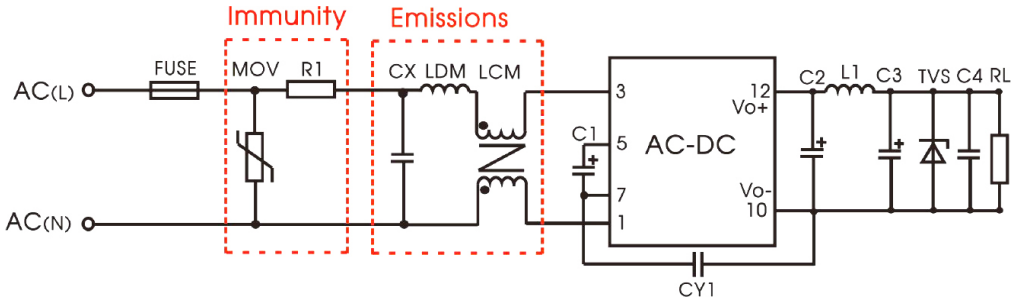


Application environmental	Ambient temperature range	Immunity class	Emissions Class
Indoor civil/general	-25°C~+55°C	CLASS III	CLASS B

Component	Recommended value
R1	12Ω/3W
CY1 (CY2)	1.0nF/400VAC
LCM	3.5mH
LDM	0.33mH
CX	0.1μF/310VAC
FUSE (required)	1A/300V, slow-blow

Note:
In the home appliance application environment, the two Y capacitors of the primary and secondary need to be externally connected (CY1/CY2, value at 2.2nF/400VAC), which can meet the EN60335 certification. In other industries, only one Y capacitor is needed.

Recommended circuit 3 - Universal system recommended circuits for indoor industrial environment

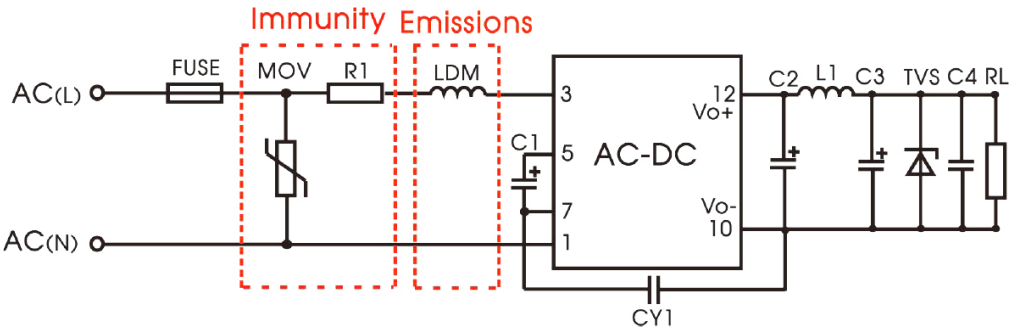


Application environmental	Ambient temperature range	Immunity class	Emissions Class
Indoor industrial	-25°C~+55°C	CLASS IV	CLASS B

Component	Recommended value
MOV	12Ω/3W
C1	450V/22μF
CY1	2.2nF/400VAC
CX	0.1μF/310VAC
LCM	3.5mH
LDM	0.33mH
R1	12Ω/3W
FUSE (required)	2A/300V, slow-blow

Electromagnetic compatibility solution-recommended circuit

Recommended circuit 4 - Universal system recommended circuits for outdoor general/harsh environment



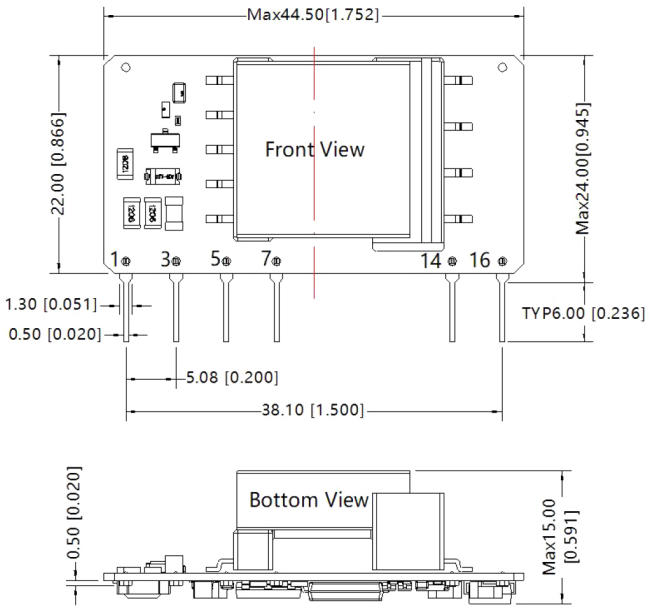
Application environmental	Ambient temperature range	Immunity class	Emissions Class
Outdoor general	-40°C~+85°C	CLASS IV	CLASS A

Component	Recommended value
MOV	S14K350
C1	450V/22uF
LDM	4.7mH
R1	12Ω/3W
FUSE (required)	2A/300V, slow-blow

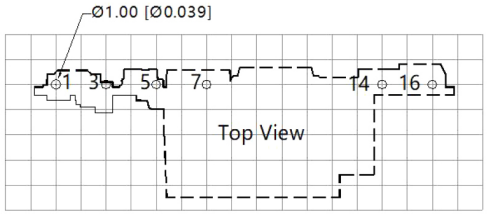
Application environmental	Ambient temperature range	Immunity class	Emissions Class
Outdoor harsh	-40°C~+85°C	>CLASS IV Surge: line to ground ±4KV EFT: CLASS IV	CLASS A

Component	Recommended value
MOV	S20K350
C1	450V/33uF (surge protection priority)
LDM	4.7mH
R1	33Ω/5W
FUSE (required)	6.3A/300V, slow-blow

Mechanical dimensions



Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]
The layout of the device is for reference only, please refer to the actual product



Note:Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	AC(N)
3	AC(L)
5	+V(cap)
7	-V(cap)
14	-Vo
16	+Vo

1.It is necessary to add C1 between pin5 and pin7.
2.It is necessary to add circuit to the output, such as the recommended circuit 1.