

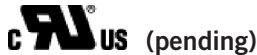
3ACM_S3 Series

3W- Single Output AC-DC Converter - Universal Input - Isolated & Regulated

AC-DC Converter

3 Watt

- ⊕ Ultra wide input voltage: 85~264VAC/70~400VDC
- ⊕ Over current protection
- ⊕ Short circuit protection (SCP)
- ⊕ High efficiency, high power density
- ⊕ Low power consumption, green power
- ⊕ Industrial grade
- ⊕ Open frame, ultra small size
- ⊕ Flexible design of peripheral circuit reduces layout problems
- ⊕ Meets IEC60950/EN60950/UL60950



The 3ACM_S3 series is a high efficiency green power modules provided by GAPTEC. The features of this series are: Accept either AC or DC input, wide input voltage, high efficiency, low power consumption, safety isolation etc. All models are particularly suitable for the applications such as industrial, electric power, instrumentation, smart home which do not have high requirement on EMC. EMC application circuit must be added if the products need to be applied to EMC harsh environment.

Common specifications

Short circuit protection:	Continuous, automatic recovery
Temperature rise at full load:	25°C TYP
Cooling:	Free air convection
Operation temperature range:	-40°C ~ +85°C
Storage temperature range:	-40°C ~ +105°C
Lead temperature	300°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	< 85%
Power derating:	-40°C ~ -20°C: 2%/°C MIN 55°C ~ 85°C: 1.33%/°C MIN
Safety standard:	IEC60950/EN60950/UL60950
Safety-regulated certification:	IEC60950/EN60950/UL60950
Safety class:	Class II
Hot plug:	Unavailable
Case material:	Plastic [UL94-V0]
MTBF (MIL-HDBK-217F@25°C):	>300,000 hours
Weight:	6g

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input voltage range	• AC Input	85		264	VAC
	• DC Input	70		400	VDC
Input frequency		47		440	Hz
Input current	• 115VAC			0.12	A
	• 230VAC			0.06	A
Inrush current	• 115VAC		13		A
	• 230VAC		23		A

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input-Output, tested for 1 minute	3000			VAC

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy*	• 3.3V output			±8	%
	• Others			±5	%
Line regulation	Full load		±1.5		%
Load regulation	5% to 100% load		±2.5		%
Temperature drift	100% full load		±0.15		%/°C
Ripple & Noise*	20MHz Bandwidth (peak-peak value)		70	150	mV
		• 3.3V, 5V	50	150	mV
		• Others			
Stand-by Power				0.5	W
Over-current Protection	≥110%Io self-recovery				
Min. load		10			%
Switching frequency	Full load, nominal input			60	KHz

* When 3ACM_03S3 and 3ACM_05S3 working in -20°C ~ -40°C and 55°C ~ 85°C temperature range output filter capacitor C2 needs 270µF/16V solid-state capacitor.

** Test ripple and noise by "parallel cable" method. See application notes for detailed operation instructions.

Model selection:

WTC_yyN##

W= Watt; T= Type; C= Case; yy= Vout; N= Numbers of Output;

##= Isolation (kVAC)

Example:

3ACM_05S3

3= 3Watt; AC= AC-DC; M= case style; 5Vout; S= Single Output;

3= 3kVAC

Note:

- External electrolytic capacitors are required to modules, more details refer to typical applications;
- This part is open frame, at least 6.4mm safety distance between the the primary and secondary external components of the module is needed to meet the safety requirement;
- All specifications were measured at Ta=25°C, humidity<75%, nominal input voltage (115VAC or 230VAC)and rated output load unless otherwise specified;
- In order to increase the conversion efficiency of the product with light load in the design, the product will have audio noise when it is operating, but don't affect the product's reliability and performance;
- Module required dispensing fixed after assembled;
- Recommends placing the insulation sheet between the bottom of the curved legs Module and the PCB board, recommended materials for the FR700, thickness is more than 0.4mm.
- All index testing methods in this datasheet are based on our Company's corporate standards;
- We can provide product customization service;
- Specifications of this product are subject to changes without prior notice.

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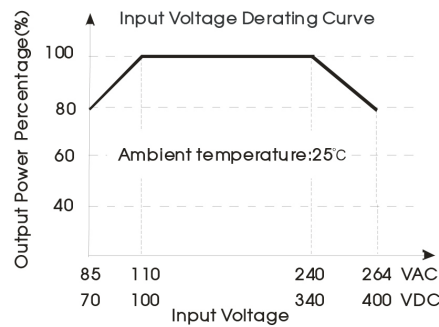
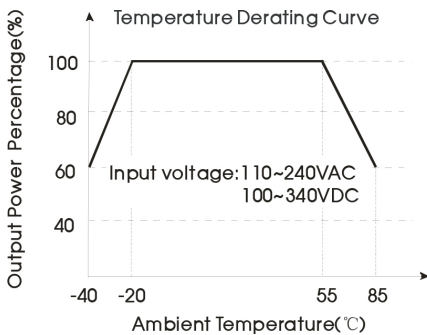
Approval	Model	Power [W]	Output [Vo]	Output [Io]	Ripple and Noise [mV, typ]	Efficiency [%, typ]	Capacitive load [μ F, max]	Standby Power [W, typ]
UL/CE	3ACM_03S3	1.65	3.3V	500mA	150	63	470	0.5
UL/CE	3ACM_05S3	2.5	5V	500mA	150	68	470	0.5
UL/CE	3ACM_09S3	3	9V	333mA	120	75	150	0.5
UL/CE	3ACM_12S3	3	12V	250mA	120	77	100	0.5
UL/CE	3ACM_15S3	3	15V	200mA	120	78	100	0.5
UL/CE	3ACM_24S3	3	24V	125mA	120	78	100	0.5

Add suffix „L“ for 90° bend pins, for example 3ACM_03S3L.

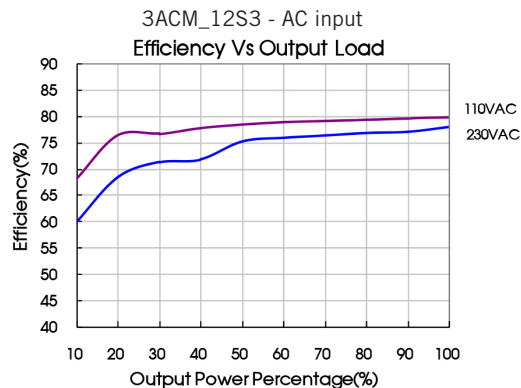
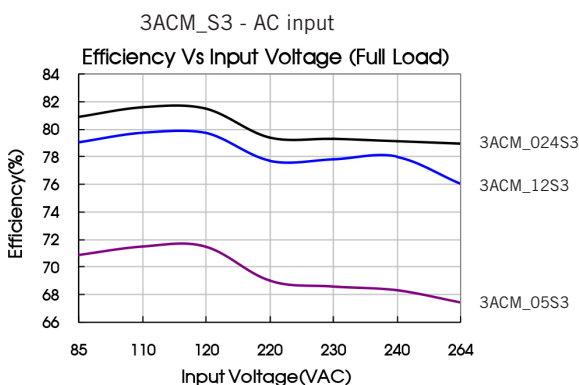
EMC specifications

EMC / EMI / Conducted disturbance	CISPR22/EN55022, CISPR22/EN55022,	CLASS A (see Typical application circuit) CLASS B (see EMC solution-recommended circuit)
EMC / EMI / Radiated emission	CISPR22/EN55022, CISPR22/EN55022,	CLASS A (see Typical application circuit) CLASS B (see EMC solution-recommended circuit)
EMC / EMS / Electrostatic discharge	IEC/EN 61000-4-2	± 4 kV perf. Criteria B
EMC / EMS / Radiation Immunity	IEC/EN 61000-4-3	10V/m (see EMC solution-recommended circuit) perf. Criteria A
EMC / EMS / EFT	IEC/EN 61000-4-4 IEC/EN 61000-4-4	± 2 kV (see Typical application circuit) ± 4 kV (see EMC solution-recommended circuit) perf. Criteria B perf. Criteria B
EMC / EMS / Surge Immunity	IEC/EN 61000-4-5	± 2 kV/ ± 4 kV (see Typical application circuit or EMC solution-recommended circuit) perf. Criteria B
EMC / EMS / Conducted disturbance	IEC/EN 61000-4-6	10 Vr.m.s perf. Criteria A
EMC / EMS / Immunity for power	IEC/EN 61000-4-8	10A/m perf. Criteria A
EMC / EMS / Voltage dips, short and drop interruptions immunity	IEC/EN 61000-4-11	0%-70% perf. Criteria B

Product typical curve

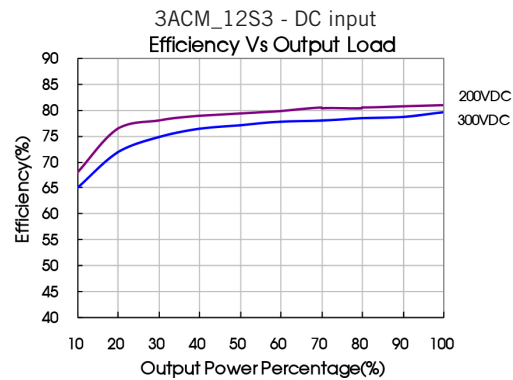
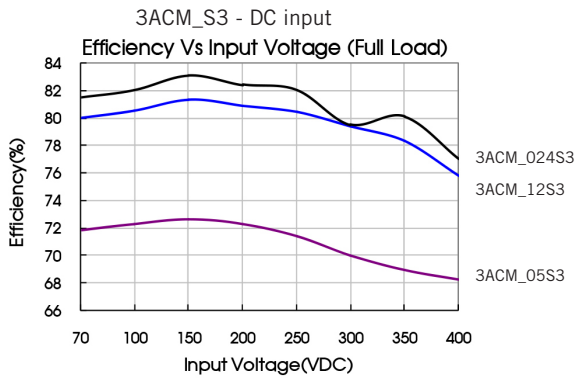


Efficiency

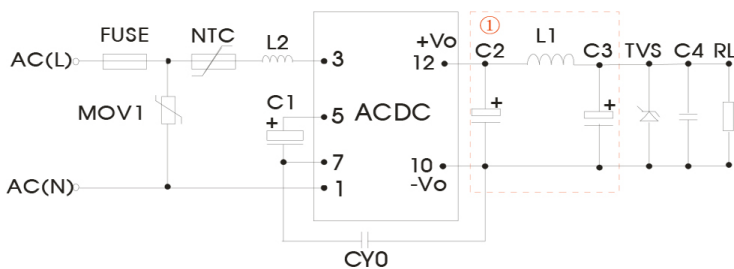


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Typical application circuit



Note: ① is PI filter circuit.

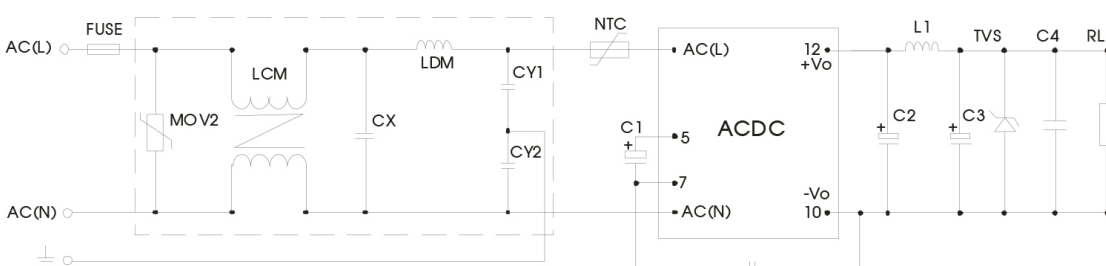
Model	Fuse (required)	C1 (required)	L2	C2 (required)	L1 (required)	C3 (required)	C4	CY0	TVS
3ACM_03S3	1A/250V	10 μ F/400V	4.7mH	330 μ F/25V	2.2 μ H	120 μ F/25V	0.1 μ F/50V	1nF/400VAC	SMBJ7.0A
3ACM_05S3	1A/250V	10 μ F/400V	4.7mH	330 μ F/25V	2.2 μ H	68 μ F/35V	0.1 μ F/50V	1nF/400VAC	SMBJ7.0A
3ACM_09S3	1A/250V	10 μ F/400V	4.7mH	330 μ F/25V	2.2 μ H	68 μ F/35V	0.1 μ F/50V	1nF/400VAC	SMBJ12A
3ACM_12S3	1A/250V	10 μ F/400V	4.7mH	150 μ F/35V	2.2 μ H	68 μ F/35V	0.1 μ F/50V	1nF/400VAC	SMBJ20A
3ACM_15S3	1A/250V	10 μ F/400V	4.7mH	150 μ F/35V	2.2 μ H	68 μ F/35V	0.1 μ F/50V	1nF/400VAC	SMBJ20A
3ACM_24S3	1A/250V	10 μ F/400V	4.7mH	100 μ F/35V	2.2 μ H	68 μ F/35V	0.1 μ F/50V	1nF/400VAC	SMBJ30A

Note:

C1: AC input, C1 is input filter capacitor (which is required); DC input, is a filtering capacitor in EMC Filter, the value of C1 is 10 μ F/400V (when input voltage is above 370VDC, and the value of C1 is 10 μ F/450V).

C2 and C3 are output filter capacitors (which is required), C2, C3 and L1 form a pi-type filter circuit, they are recommended to be high frequency and low impedance electrolytic capacitors. Capacitance and rated ripple current of capacitors refer to the datasheets provided by the manufactures. Voltage derating of capacitors should be 80% or above. C4 is a ceramic capacitor, which is used to filter high frequency noise. Current of L1 and L2 refer to the datasheets provided by the manufactures, current derating should be 80% or above. TVS is a recommended component to protect post-circuits (if converter fails). External input NTC model is recommended to use 13D-5. External input MOV model is recommended to use S14K320.

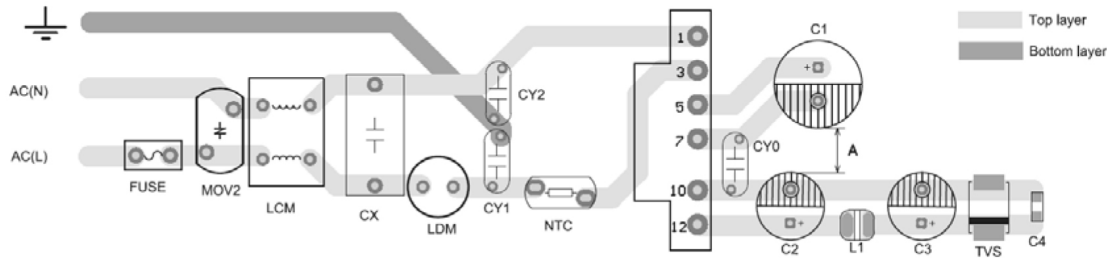
EMC recommended circuit



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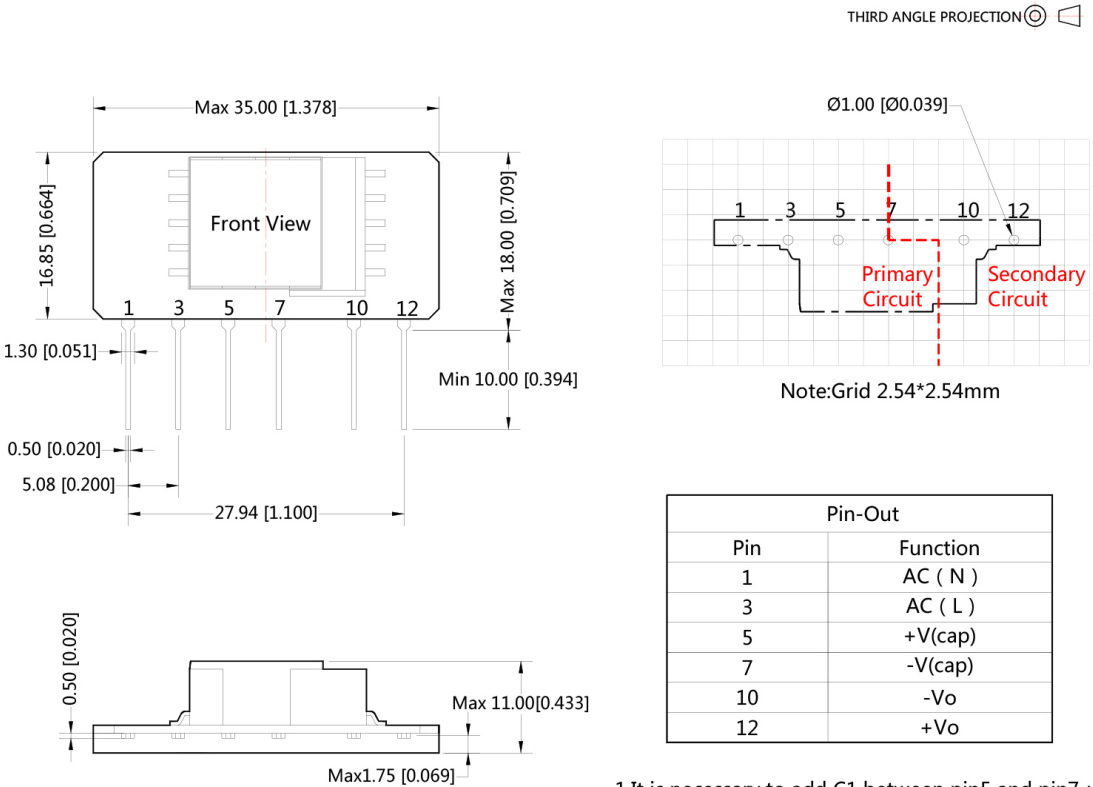
EMC recommended circuit PCB layout



Suggestions for safety regulation and wiring width: wire width $\geq 3\text{mm}$, distance between wires $\geq 6\text{mm}$, and distance between wire and ground $\geq 6\text{mm}$, $A \geq 6.4\text{mm}$

Components	Recommended parameter
MOV2	S14K350
CY1	1nF/400VAC
CY2	1nF/400VAC
CX	0.1 μ F/275VAC
LCM	3.5mH
LDM	0.33mH
NTC	13D-5
Fuse (required)	1A/250V, slow fusing

Mechanical dimensions



Note:
 Unit :mm[inch]
 Pin diameter tolerances : $\pm 0.10[\pm 0.004]$
 General tolerances: $\pm 0.50[\pm 0.020]$

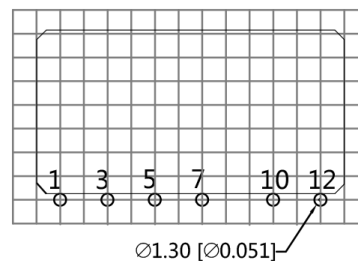
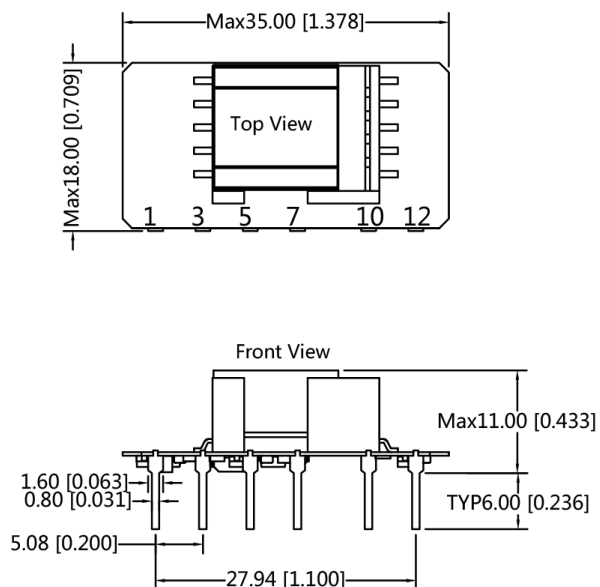
- 1.It is necessary to add C1 between pin5 and pin7 ;
- 2.It is necessary to add pi-type filter circuit to the output,such as the typical application of Figure 1;
- 3.It is needed to have distance $\geq 6.4\text{mm}$ for safety between external componets in primary circuit and secondary circuit.

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Mechanical dimensions, 90° bend

THIRD ANGLE PROJECTION 



Note: Grid 2.54*2.54mm

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

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

1.It is necessary to add C1 between pin5 and Pin7 ;
 2.It is necessary to add pi-type filter circuit to the output,such as the typical application of Figure 1.