



15ACB Series

15W - Single/Dual Output AC-DC Converter - Universal Input - Isolated & Regulated

AC-DC Converter

15 Watt

- ⊕ Universal input: 85~264VAC, 50/60Hz
- ⊕ Regulated output, low ripple and noise
- ⊕ High efficiency up to 85%
- ⊕ Plastic case, meets UL94V-0
- ⊕ Output current protection
- ⊕ Short circuit protection (SCP)
- ⊕ Over temperature protection
- ⊕ Meet EN60950, UL 60950
- ⊕ Mounting: PCB Mounting & Chassis Mounting with Screw Terminals

The 15ACB series is a compact size power converter offered by GAPTEC. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. It offers good EMC performance, meets IEC/EN61000-4, CISPR22/EN55022, UL60950 and EN60950 standards, and is widely used in industrial, office and civil applications.



Approval	Model*	Power [W]	Output [Vo]	Output [Io]	Capacitive Load [μF, max]	Efficiency [%, typ]
UL/CE	15ACB_03S3	15	3.3V	3000mA	72000	73
UL/CE	15ACB_05S3	15	5V	2800mA	44800	76
UL/CE	15ACB_09S3	15	9V	1600mA	13760	78
UL/CE	15ACB_12S3	15	12V	1250mA	5200	80
UL/CE	15ACB_15S3	15	15V	1000mA	5120	80
UL/CE	15ACB_24S3	15	24V	625mA	880	84
UL/CE	15ACB_48S3	15	48V	320mA	370	85
	15ACB_05D3	15	±5V	1500mA	12800	76
	15ACB_12D3	15	±12V	650mA	2350	81
	15ACB_15D3	15	±15V	500mA	3120	83
	15ACB_24D3	15	±24V	310mA	400	83

* Add suffix CM for Chassis mounting with screw terminals (f.ex. 15ACB_03S3CM), see different package measurements at common specifications

Input specifications

Input voltage range	85~264VAC, 120~370VDC	
Input frequency	47~63Hz	
Input current	115VAC • 0.37A (typ)	230VAC • 0.22A (typ)
Inrush current	115VAC • 10A (typ)	230VAC • 20A (typ)
Leakage current	0.3mA RMS typ./230VAC/50Hz	
Recommended External Input Fuse (special package series include fuse)	• 2A/250V	• Slow-Blow

Note:

- Ripple and Noise are measured by the method of parallel lines.
- Unless otherwise specified, all specifications are measured at rated input voltage and rated output load, TA = 25°C, humidity < 75%.

Example:

15ACB_05S3
 15 = 15 Watt; AC = AC-DC; B = series; 5Vout; S = single output;
 3 = 3kVAC

Output specifications

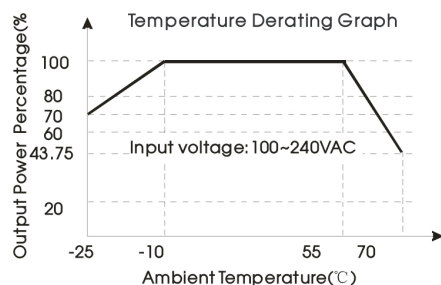
Voltage set accuracy	±2%
Input variation	±0.5% (main output) ±1.5% (supplement output)
Load variation (10% to 100%)	
• Single output models	• ±1%
• Dual output models (balanced load)	• ±2%
Minimum load	
• Single output models	• 0%
• Dual output models (balanced load)	• 10%
Ripple & Noise (p-p)	20MHz Bandwidth: 50mV (typ), 150mV (max)
Short circuit protection	Continuous, and auto resume
Over current protection	≥110% I _O
Output over-voltage protection	
• 3.3/5VDC models	• ≤7.5VDC
• 9VDC models	• ≤12VDC
• 12/15VDC models	• ≤20VDC
• 24VDC models	• ≤30VDC
Hold-up time	Vin=115VAC: 15ms TYP Vin=230VAC: 80ms TYP
Temperature coefficient	0.02%/°C

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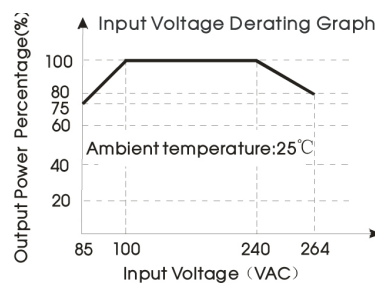
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Common specifications			
Operating temperature range	-40°C ~ +70°C		
Power derating temperature range	55°C ~ 70°C: -40°C ~ -10°C:	3.75%/°C 2%/°C	
Storage temperature range	-40°C ~ +105°C		
Case temperature range	+90°C MAX		
Humidity (non-condensing)	95% MAX		
Welding Temperature	Wave-soldering: 260±5°C, time:5~10s Manual-welding: 360±10°C, time:3~5s		
Switching frequency	65kHz TYP		
Cooling	Free air convection		
I/O-isolation voltage	3000VAC/1Min		
EMC / EMI / CE	CISPR22/EN55022,	CLASS B (without external circuit)	
EMC / EMI / RE	CISPR22/EN55022,	CLASS B (without external circuit)	
EMC / EMS / ESD	IEC/EN 61000-4-2	Contact ±6KV / Air ±8KV	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 (without external circuit) ± 4kV	perf. Criteria B perf. Criteria B
EMC / EMS / Surge	• IEC/EN 61000-4-5 • IEC/EN 61000-4-5	±1KV/±2KV (without external circuit) ±2KV/±4KV	perf. Criteria B perf. Criteria B
EMC / EMS / Conducted disturbance immunity	IEC/EN 61000-4-6	10Vr.m.s	perf. Criteria A
EMC / EMS / Immunity für power frequency magnetic field	IEC/EN 61000-4-8	10A/m	perf. Criteria A
EMC / EMS / Immunities of voltage dip, drop and short interruption	IEC/EN 61000-4-11	0%-70%	perf. Criteria B
Safety standards	IEC60950, EN60950, UL60950		
Safety approvals	EN60950, UL60950		
Safety class	CLASS II		
Case material	UL94V-0		
Install	PCB mounting, Chassis mounting with Screw Terminals		
MTBF	>300,000h @25°C		
Package	• 62x45x22.5mm (PCB mounting) • 96.1x54x31mm (Chassis mounting with Screw Terminals)		
Weight	• 80g (PCB mounting) • 130g (Chassis mounting with Screw Terminals)		

Typical characteristics



Note: Input voltage should be derated based on temperature derating when it is 85~100VAC/240~264VAC.

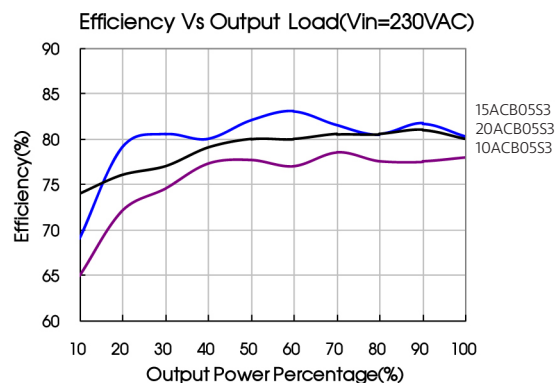
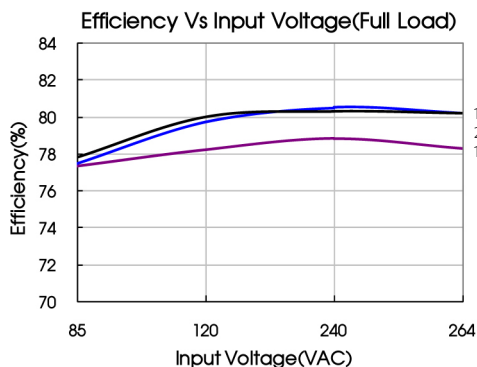


Note: When input DC, VDC=1.414*VAC-20.

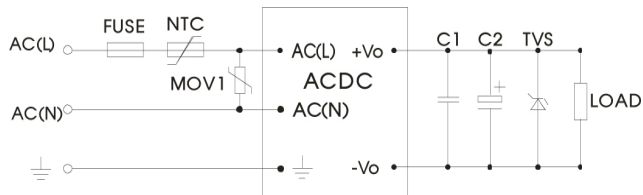
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Efficiency



Typical application circuit

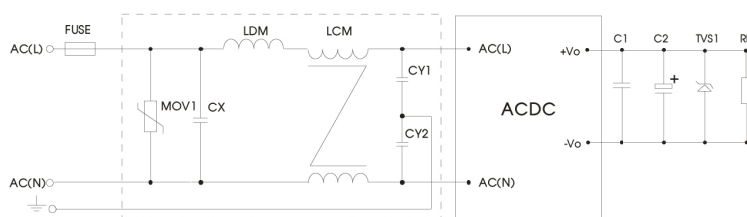


Note:

Output filtering capacitor C2, C4, C6 is electrolytic capacitor, it is recommended to apply electrolytic capacitor with high frequency and low resistance. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitance withstand voltage derating should be 80% or above. C1, C3, C5 is ceramic capacitor, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails. External input NTC is recommended to use 5D-9.

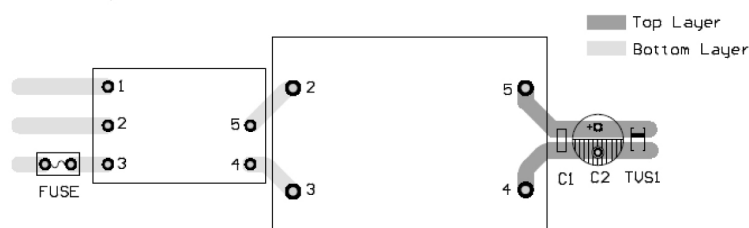
External circuit parameters				
Model	C2 (μF)	C4 (μF)	TVS1	TVS2
15ACB_03S3	680		SMBJ7.0A	
15ACB_05S3	680		SMBJ7.0A	
15ACB_09S3	470		SMBJ12A	
15ACB_12S3	220		SMBJ20A	
15ACB_15S3	220		SMBJ20A	
15ACB_24S3	68		SMBJ30A	
15ACB_48S3	33		SMBJ64A	
15ACB_05D3	470	470	SMBJ7.0A	SMBJ7.0A
15ACB_12D3	220	220	SMBJ20A	SMBJ20A
15ACB_15D3	120	120	SMBJ20A	SMBJ20A
15ACB_24D3	68	68	SMBJ30A	SMBJ30A

EMC solution recommended circuit



Recommend Parameter For Higher EMC Standard Circuit	
Components	Recommend Parameter
MOV1	S14K350
CY1, CY2	1000pF/400VAC
CX	0.1μF/275VAC
LCM	10mH
LDM	5uH

EMC recommended circuit with higher requirements

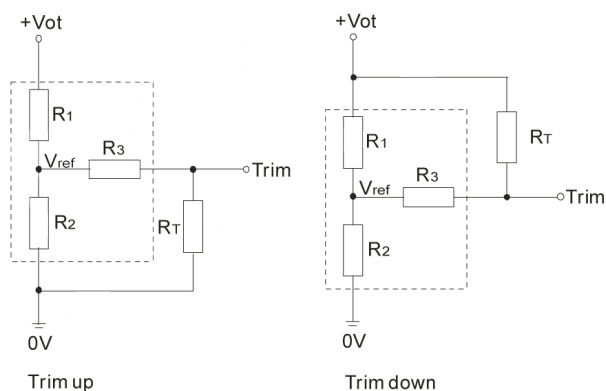


EMC recommended circuit - PCB layout

Safety and recommend wiring: line-width $\geq 3\text{mm}$, line-line distance $\geq 6\text{mm}$, line-ground distance $\geq 6\text{mm}$

Trim application & trim calculati-

Application circuit for TRIM (Part in broken line is the interior of models)



Formula for resistance of Trim

$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \quad a = \frac{V_{ref}}{V_{ot} - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \quad a = \frac{V_{ot} - V_{ref}}{V_{ref}} \cdot R_2$$

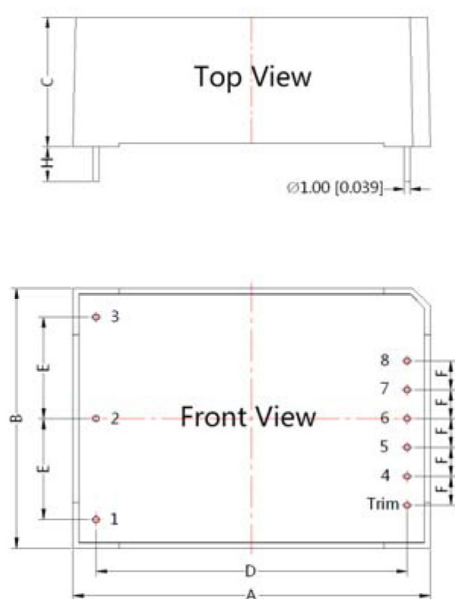
Note: Value for R1, R2, R3, and Vref refer to the following table.

R_T: Resistance of Trim

a: User-defined parameter, no actual meanings.

Vo(V)	3.3	5	9	12	15	24
Resistance						
R1(KΩ)	2	3.3	7.5	3.8	7.5	8.6
R2(KΩ)	1.2	3.3	2.8	1	1.5	1
R3(KΩ)	1	1	1	1	1	1
Vref(V)	1.2	2.5	2.5	2.5	2.5	2.5
Vot(V)	Output voltage of Trim, variation ≤ ±10%					

PCB mounting with solder pins



Note:

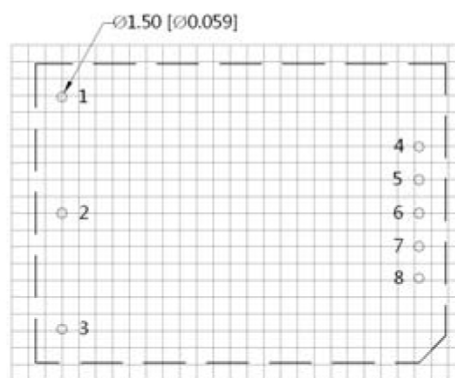
Unit: mm[inch]

Pin length (H): ≥6.00mm[0.236inch]

Pin diameter tolerances: ±0.10mm[±0.004inch]

General tolerances: ±0.50mm[±0.020inch]

- A: 62.00mm
- B: 45.00mm
- C: 22.50mm
- D: 54.00mm
- E: 17.50mm
- F: 5.00mm
- G: 12.50mm



FOOTPRINT DETAILS

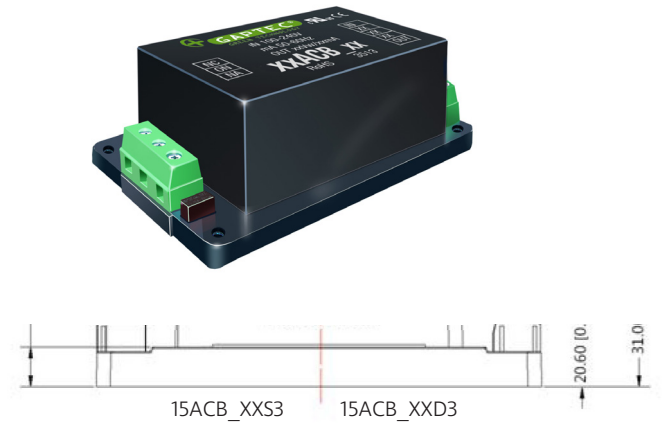
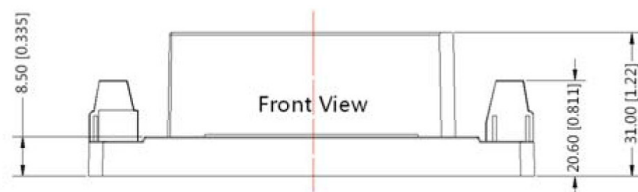
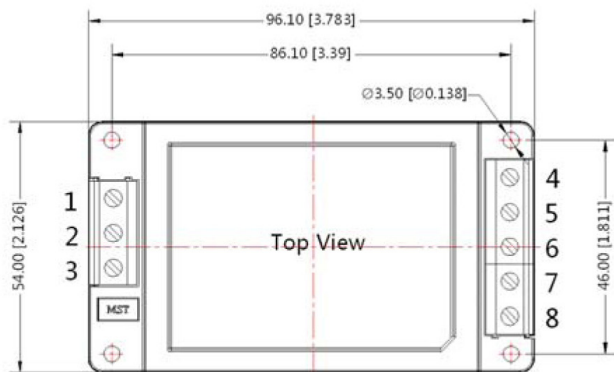
Pin	15ACB_XXS3	15ACB_XXD3
1	No Pin	No Pin
2	AC(N)	AC(N)
3	AC(L)	AC(L)
4	-Vo	-Vo
5	No Pin	No Pin
6	No Pin	COM
7	No Pin	No Pin
8	+Vo	+Vo
Trim	Trim	No Pin

(without Trim Pin optional)

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Chassis mounting with screw terminals



15ACB_XXS3