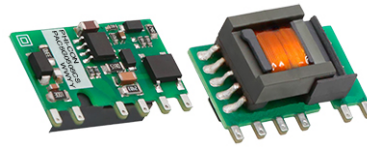


5 W AC-DC Power Supply PAC5GxxCS-Series

- 85 ... 305 V_{AC} / 70 ... 430 V_{DC} universal input range
- Continuously short circuit and over current protected
- Output short circuit and over current protection
- EN 62368-1, IEC 62368-1 and UL 62368-1
- Designed to meet EN-, IEC 60335-1 and EN-, IEC 61558-1
- Very small outlines



Model guide

Type	Output voltage [V _{DC}]	Output current [mA] max.	Output Power [W]	Efficiency typ. @ full load, V _{in} 230 V _{AC} [%] typ.	Capacitive load [μF] max.
PAC5G03CS	3.3	1000	3.3	69	2200
PAC5G05CS	5.0	1000	5	76	1500
PAC5G09CS	9.0	560	5	77	680
PAC5G12CS	12	420	5	79	470
PAC5G15CS	15	340	5	79	330
PAC5G24CS	24	210	5	81	100

Specifications

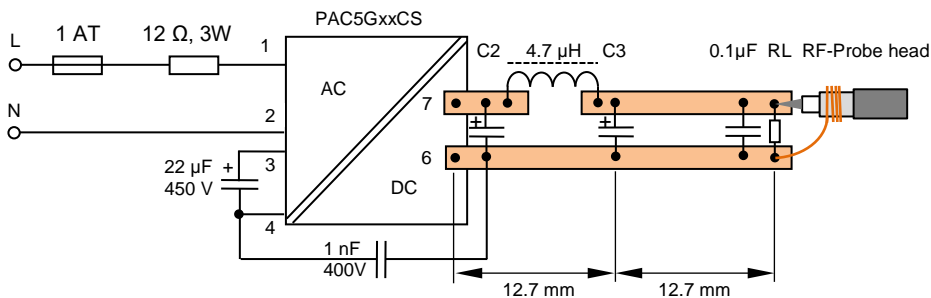
Input	
Voltage range	85...305 V _{AC} or 70...430 V _{DC} Power derating see diagram
Frequency	47...63 Hz
Full load input current	≤ 200 mA @ 115 V _{AC} ≤ 100 mA @ 230 V _{AC}
No load power consumption	≤ 0.15 W
Inrush current	20 A @ 115 V _{AC} typ. 40 A @ 230 V _{AC} typ.
Recommended fuse	1 A, time delayed type
Hold up time	≥ 150 ms @ 230 V _{AC}
Isolation	
Isolation voltage (input to output)	3600 V _{AC} test 1 minute at < 5 mA 5000 V _{DC} test 1 minute
Safety	Class II
Output	
Voltage tolerance	± 5 % at 10...100 % load
Line regulation	±1.5 %, typ. @ 100 % load
Minimum load	10 %
Load regulation	±3 %, typ. @ 10 ... 100 % load
Ripple & noise BW 20 MHz	≤ 150 mVp-p, (see Figure A)
Temperature coefficient	0.15 % / °C, typ.
Protection	
Short circuit	Continuous, auto recovery
Over current protection	≥110 % of full load
Over temperature	No
General	
Safety standard	EN-, IEC-, UL 62368-1
Designed to meet the standards	EN-, IEC 61558-1 & 60335-1
Reliability MTBF (MIL-HDBK-217 @ 25 °C)	≥ 1 Mio. h
Switching frequency	65 kHz, typ.

EMC		
CE	EN 55032, CISPR 32)	Class A (see Figure 1&4)
	EN 55032, CISPR 32)	Class B (see Figure 2&3)
RE	EN 55032, CISPR 32)	Class A (see Figure 1&4)
	EN 55032, CISPR 32)	Class B (see Figure 2&3)
ESD	EN-, IEC 61000-4-2	Contact ± 6 kV perf. criteria B
RS	EN-, IEC 61000-4-3	10 V/m perf. criteria A
EFT	EN-, IEC 61000-4-4	± 2 kV perf. criteria B (see Figure 1&2)
		± 4 kV perf. criteria B (see Figure 3&4)
Surge	EN-, IEC 61000-4-5	Line to line ± 1 kV perf. criteria B (see Figure 1&2)
		Line to line ± 2 kV perf. criteria B (see Figure 3&4)
CS	EN-, IEC 61000-4-6	10 Vrms perf. criteria A
Voltage dips, short interruption and voltage variation		0%, 70% perf. criteria B
EN-, IEC 61000-4-11		
Environmental		
Operating ambient temperature		-40 ... 85 °C see derating diagram
Storage temperature		-40 ... 105 °C
Storage humidity		≤ 95 %
Cooling		Free air convection, ≥ 35 LFM
Physical		
Dimensions		26.4 x 14.73 x 11 mm
Weight		5.2 g
PCB material		UL94V-0
Mounting		On PCB
Soldering temperature		Wave: ≤ 265 °C, duration ≤ 10 s Manual: ≤ 370 °C, duration ≤ 5 s

Note:

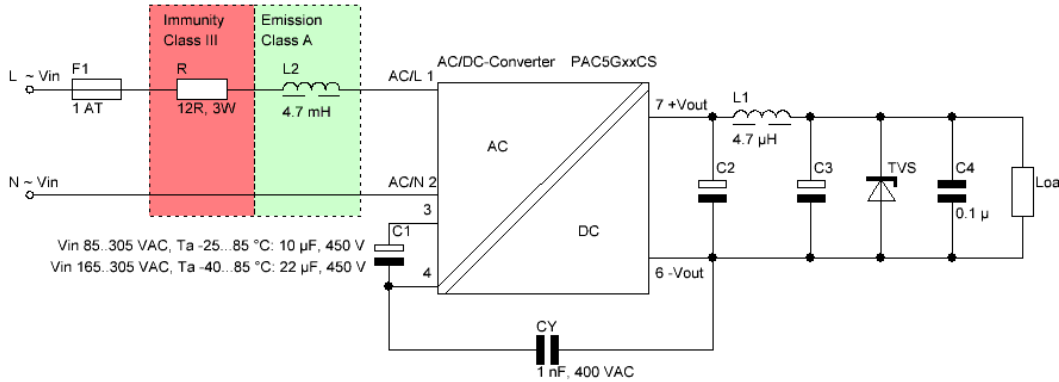
1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta 25 °C, humidity < 75 %, nominal input voltage (115 V_{AC} and 230 V_{AC}) and rated output current.
2. The product is able to work with 0 % ... 10 % load and with stable output.
3. The nominal output voltage refers to the voltage applied to the load terminal after adding external circuits.
4. If the product is used in a severe vibration application, it needs to be glued and fixed.
5. This part is open frame, at least 6.4 mm creepage distance between the primary and secondary external components of the module is needed to meet the safety requirement, refer to the recommended welding hole design in the external dimension drawing;

Figure A The "parallel cable" method is used for ripple and noise test, please refer to AC/DC Converter



5 W AC-DC Power Supply PAC5GxxCS-Series

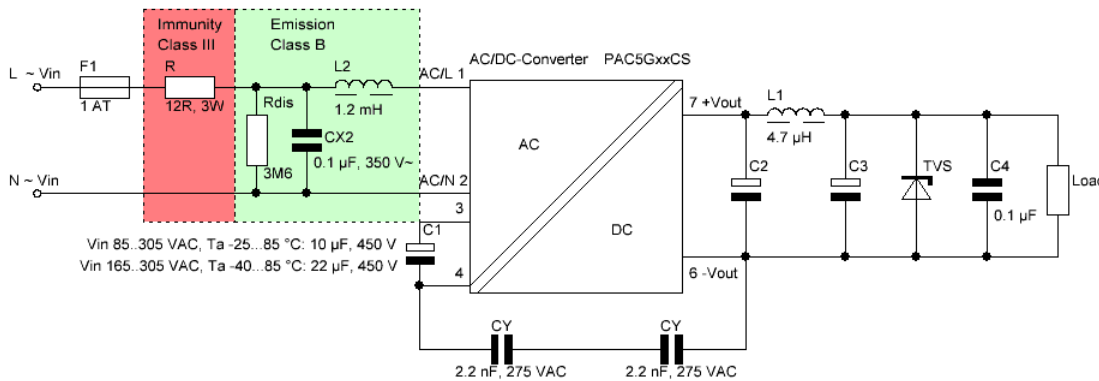
Figure 1 Basic application, Ta -40...85 °C, Immunity Class III, Emission Class A



Recommended component table for Figure 1

Type	R	L2	C2	L1	C3	TVS
PAC5G03CS	12 Ω, 3W, wire wound	4.7 mH, ≤15 Ω, ≥0.2 A	820 μF, 6.3 V	4.7 μH, 60 mΩ, 2.2 A	100 μF, 35 V	SMBJ7.0A
PAC5G05CS	12 Ω, 3W, wire wound	4.7 mH, ≤15 Ω, ≥0.2 A	470 μF, 16 V	4.7 μH, 60 mΩ, 2.2 A	100 μF, 35 V	SMBJ7.0A
PAC5G09CS	12 Ω, 3W, wire wound	4.7 mH, ≤15 Ω, ≥0.2 A	270 μF, 16 V	4.7 μH, 60 mΩ, 2.2 A	47 μF, 35 V	SMBJ12A
PAC5G12CS	12 Ω, 3W, wire wound	4.7 mH, ≤15 Ω, ≥0.2 A	270 μF, 16 V	4.7 μH, 60 mΩ, 2.2 A	47 μF, 35 V	SMBJ20A
PAC5G15CS	12 Ω, 3W, wire wound	4.7 mH, ≤15 Ω, ≥0.2 A	220 μF, 35 V	4.7 μH, 60 mΩ, 2.2 A	47 μF, 35 V	SMBJ20A
PAC5G24CS	12 Ω, 3W, wire wound	4.7 mH, ≤15 Ω, ≥0.2 A	220 μF, 35 V	4.7 μH, 60 mΩ, 2.2 A	47 μF, 35 V	SMBJ30A

Figure 2 Indoor civil an general environment application for smart home (2Y), home appliances, intelligent building and agriculture, Ta -25...55 °C, Immunity Class III, Emission Class B



Recommended component table for Figure 2

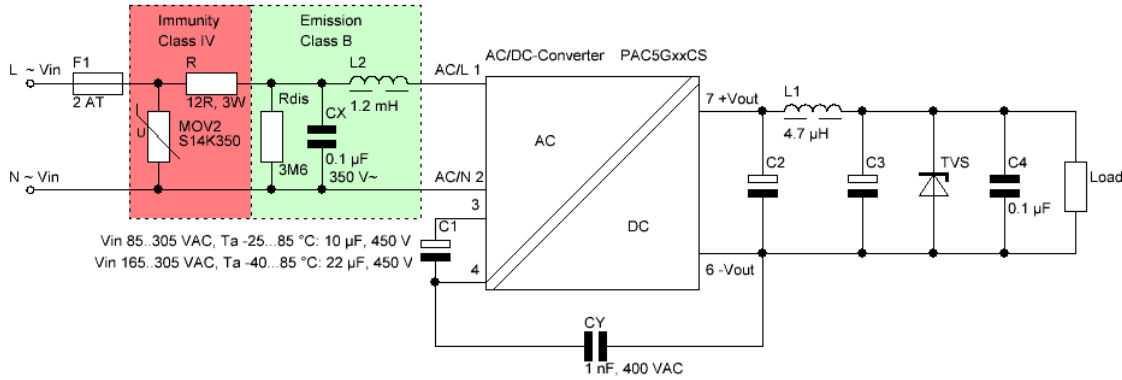
Type	R	L2	C2	L1	C3	TVS
PAC5G03CS	12 Ω, 3W, wire wound	1.2 mH, ≤4 Ω, ≥0.2 A	820 μF, 6.3 V	4.7 μH, 60 mΩ, 2.2 A	100 μF, 35 V	SMBJ7.0A
PAC5G05CS	12 Ω, 3W, wire wound	1.2 mH, ≤4 Ω, ≥0.2 A	470 μF, 16 V	4.7 μH, 60 mΩ, 2.2 A	100 μF, 35 V	SMBJ7.0A
PAC5G09CS	12 Ω, 3W, wire wound	1.2 mH, ≤4 Ω, ≥0.2 A	270 μF, 16 V	4.7 μH, 60 mΩ, 2.2 A	47 μF, 35 V	SMBJ12A
PAC5G12CS	12 Ω, 3W, wire wound	1.2 mH, ≤4 Ω, ≥0.2 A	270 μF, 16 V	4.7 μH, 60 mΩ, 2.2 A	47 μF, 35 V	SMBJ20A
PAC5G15CS	12 Ω, 3W, wire wound	1.2 mH, ≤4 Ω, ≥0.2 A	220 μF, 35 V	4.7 μH, 60 mΩ, 2.2 A	47 μF, 35 V	SMBJ20A
PAC5G24CS	12 Ω, 3W, wire wound	1.2 mH, ≤4 Ω, ≥0.2 A	220 μF, 35 V	4.7 μH, 60 mΩ, 2.2 A	47 μF, 35 V	SMBJ30A

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 2.2 nF, 275 VAC), which can meet the EN 60335 standard.
- According to the certification requirements, the X capacitor needs to be connected in parallel with the bleeder resistance, the recommended resistance value is less than 3.8 MΩ, and the actual need to be selected according to the certification standard.

5 W AC-DC Power Supply PAC5GxxCS-Series

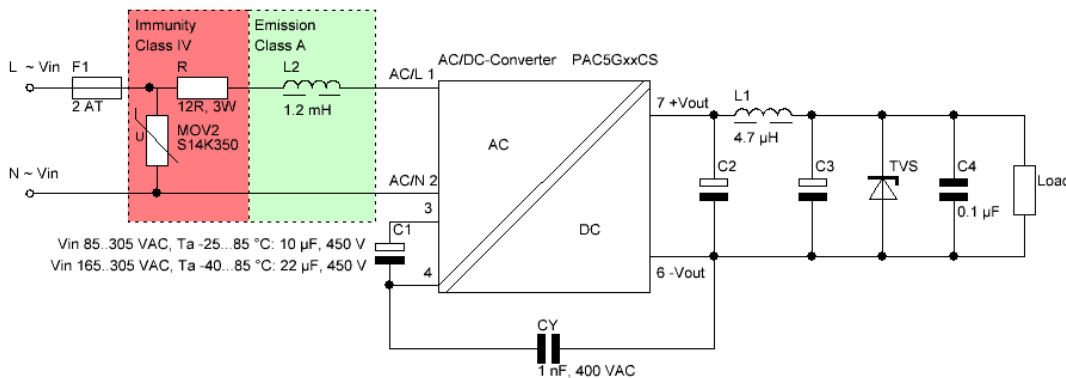
Figure 3 Indoor industrial environment application for manufacturing workshop, Ta -25...55 °C, Immunity Class IV, Emission Class B



Recommended component table for Figure 3

Type	R	L2	C2	L1	C3	TVS
PAC5G03CS	12 Ω, 3W, wire wound	1.2 mH, ≤ 4 Ω, ≥ 0.2 A	820 µF, 6.3 V	4.7 µH, 60 mΩ, 2.2 A	100 µF, 35 V	SMBJ7.0A
PAC5G05CS	12 Ω, 3W, wire wound	1.2 mH, ≤ 4 Ω, ≥ 0.2 A	470 µF, 16 V	4.7 µH, 60 mΩ, 2.2 A	100 µF, 35 V	SMBJ7.0A
PAC5G09CS	12 Ω, 3W, wire wound	1.2 mH, ≤ 4 Ω, ≥ 0.2 A	270 µF, 16 V	4.7 µH, 60 mΩ, 2.2 A	47 µF, 35 V	SMBJ12A
PAC5G12CS	12 Ω, 3W, wire wound	1.2 mH, ≤ 4 Ω, ≥ 0.2 A	270 µF, 16 V	4.7 µH, 60 mΩ, 2.2 A	47 µF, 35 V	SMBJ20A
PAC5G15CS	12 Ω, 3W, wire wound	1.2 mH, ≤ 4 Ω, ≥ 0.2 A	220 µF, 35 V	4.7 µH, 60 mΩ, 2.2 A	47 µF, 35 V	SMBJ20A
PAC5G24CS	12 Ω, 3W, wire wound	1.2 mH, ≤ 4 Ω, ≥ 0.2 A	220 µF, 35 V	4.7 µH, 60 mΩ, 2.2 A	47 µF, 35 V	SMBJ30A

Figure 4 Outdoor general environment application for ITS, Video monitoring, Charging point, Communication, Security and protection Ta -40...85 °C, Immunity Class IV, Emission Class A



Recommended component table for Figure 4

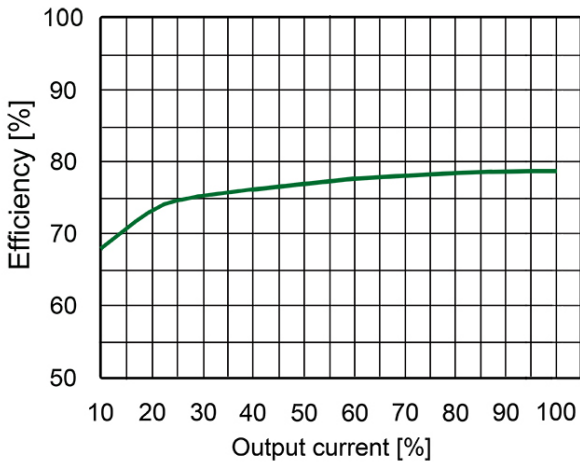
Type	R	L2	C2	L1	C3	TVS
PAC5G03CS	12 Ω, 3W, wire wound	1.2 mH, ≤ 4 Ω, ≥ 0.2 A	820 µF, 6.3 V	4.7 µH, 60 mΩ, 2.2 A	100 µF, 35 V	SMBJ7.0A
PAC5G05CS	12 Ω, 3W, wire wound	1.2 mH, ≤ 4 Ω, ≥ 0.2 A	470 µF, 16 V	4.7 µH, 60 mΩ, 2.2 A	100 µF, 35 V	SMBJ7.0A
PAC5G09CS	12 Ω, 3W, wire wound	1.2 mH, ≤ 4 Ω, ≥ 0.2 A	270 µF, 16 V	4.7 µH, 60 mΩ, 2.2 A	47 µF, 35 V	SMBJ12A
PAC5G12CS	12 Ω, 3W, wire wound	1.2 mH, ≤ 4 Ω, ≥ 0.2 A	270 µF, 16 V	4.7 µH, 60 mΩ, 2.2 A	47 µF, 35 V	SMBJ20A
PAC5G15CS	12 Ω, 3W, wire wound	1.2 mH, ≤ 4 Ω, ≥ 0.2 A	220 µF, 35 V	4.7 µH, 60 mΩ, 2.2 A	47 µF, 35 V	SMBJ20A
PAC5G24CS	12 Ω, 3W, wire wound	1.2 mH, ≤ 4 Ω, ≥ 0.2 A	220 µF, 35 V	4.7 µH, 60 mΩ, 2.2 A	47 µF, 35 V	SMBJ30A

5 W AC-DC Power Supply PAC5GxxCS-Series

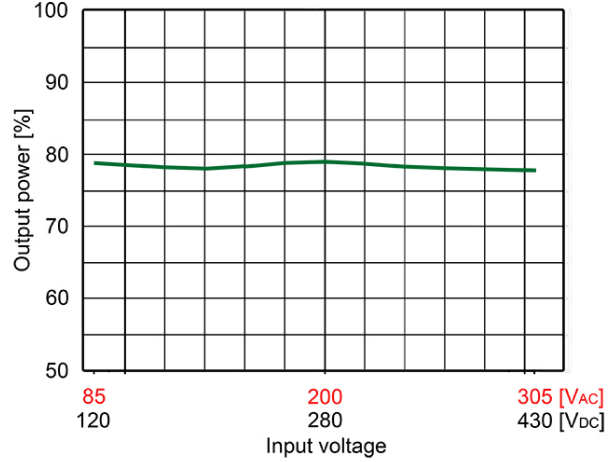


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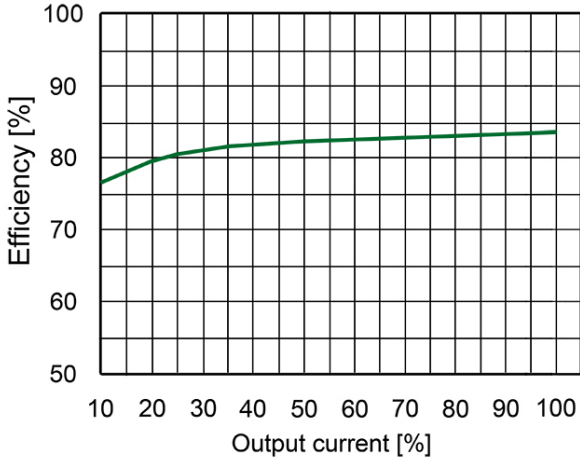
PAC5G05CS Efficiency vs output load at 230 V_{AC}



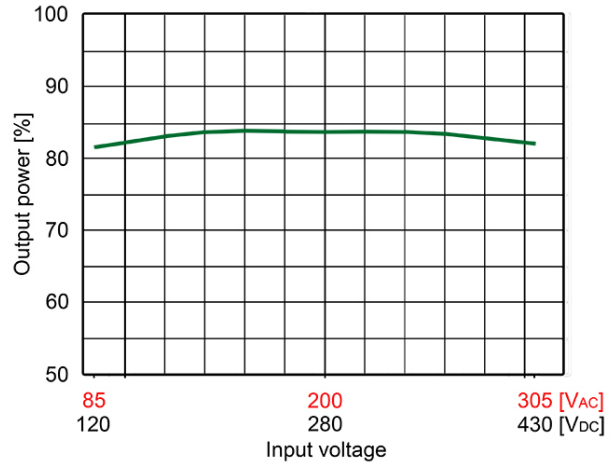
PAC5G05CS Efficiency vs input Voltage at full load



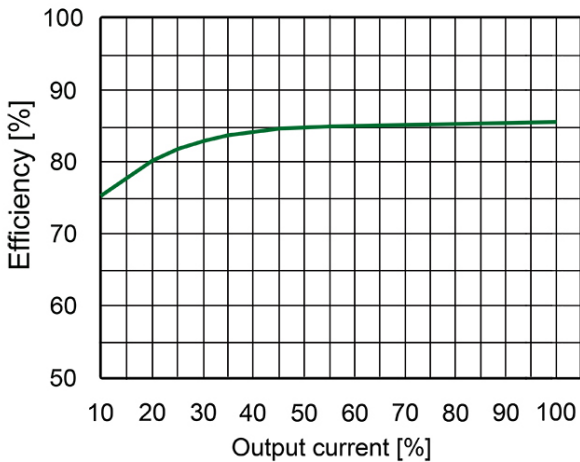
PAC5G12CS Efficiency vs output load at 230 V_{AC}



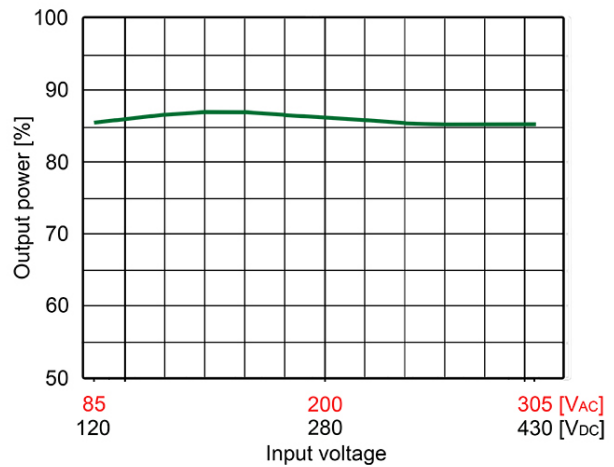
PAC5G12CS Efficiency vs input Voltage at full load



PAC5G24CS Efficiency vs output load at 230 V_{AC}

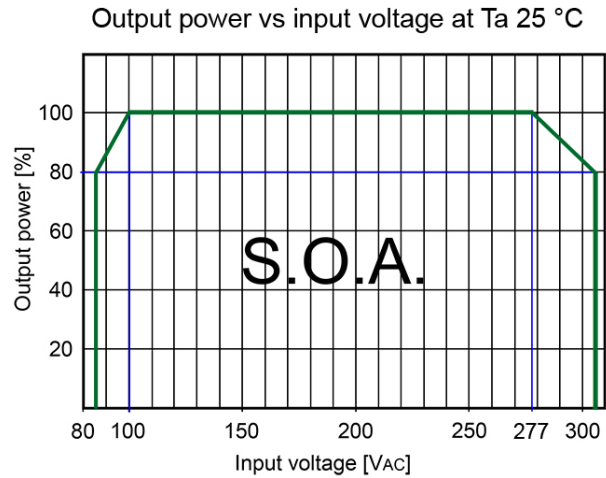
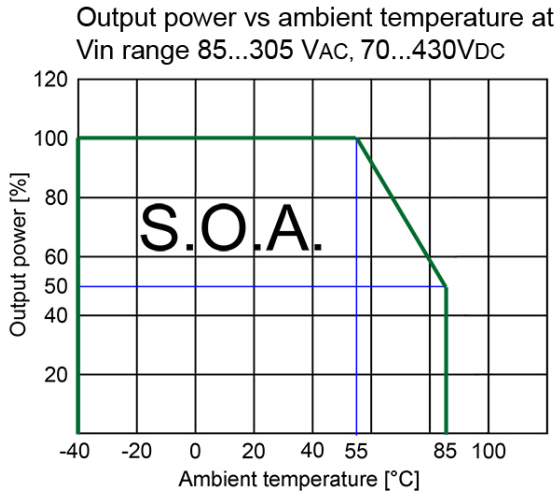


PAC5G24CS Efficiency vs input Voltage at full load



5 W AC-DC Power Supply PAC5GxxCS-Series

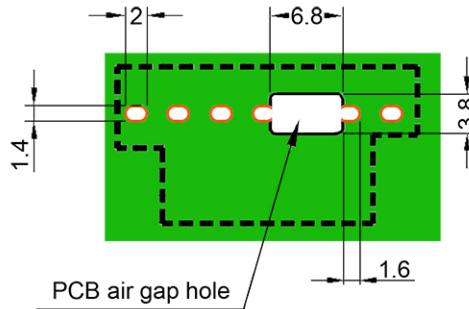
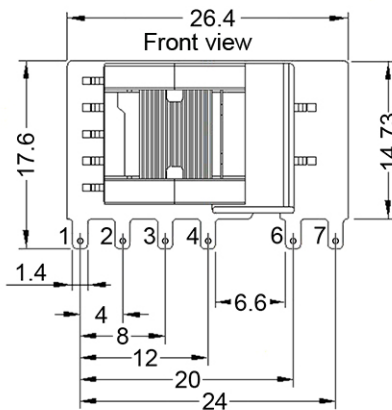
Derating diagrams



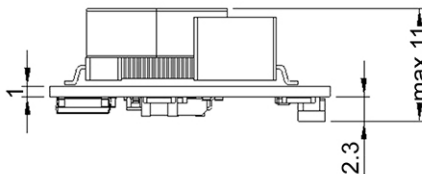
Note:

- With an AC input voltage between 85 ... 100 V_{AC} and 277... 305 V_{AC} and a DC input voltage between 70 ... 120 V_{DC} and 390 ... 430V_{DC}, the output power must be derated as per temperature derating curves.
- This product is suitable for applications using free air cooling ≥ 35 LFM.

Mechanical dimensions



Top view



Pin assignment	
1	AC In (L) or +Vin
2	AC In (N) or -Vin
3	+ Capacitor (C1)
4	- Capacitor (C1)
6	- DC Out
7	+ DC Out

Note:
All dimensions in mm
General tolerances ± 1 mm

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