cPCI AC/DC Converter 80 Watt

80 PCB 220 Q05 E10

$V_{IN\ Nom}$ = 220 V_{AC} $V_{O1\ Nom}$ = 5.05 V $I_{O1\ Nom}$ = 10.0 A $V_{O2\ Nom}$ = 3.3 V $I_{O2\ Nom}$ = 5 A
$V_{O3\ Nom}$ = 12 V $I_{O3\ Nom}$ = 0.5 A $V_{O4\ Nom}$ = - 12 V $I_{O4\ Nom}$ = - 0.5 A

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
INPUT						
V_{IN}	Input Voltage Range	Continuously	176	220	264	V_{AC}
$V_{IN\ low}$	Switch ON Switch OFF		167 165		176 166	V_{AC} V_{AC}
$V_{IN\ high}$		*Protecting semiconductors*	267	270	285	V_{AC}
λ	Power Factor	V_{IN} = 220 V_{AC} ∑ P_O = 80 W	0.95	0.98		
f	Input line frequency		47	50	63	Hz
I_{leak}	Leakage current			1	3	mA
I_{IN}	Input Current No-load Nominal Load Nominal Load	V_{IN} = 264 V_{AC} ∑ P_O = 0 W V_{IN} = 220 V_{AC} ∑ P_O = 80 W V_{IN} = 176 V_{AC} ∑ P_O = 80 W		15 0.45	20 0.6	mA A_{rms} A_{rms}
	Switch ON Input Current Integral	V_{IN} = 264 V_{AC}			10	A^2s
	Input Fuse			4 A		
C_{IN}	Input Capacity Converter				1.5	µF
	Maximum External Line Inductivity				50	µH

OUTPUT POWER		176 V_{AC} ≤ V_{IN} ≤ 264 V_{AC}				
$P_{O\ Nom}$	Continuously	∑ P_O		80		W
V_{O1}	Voltage Factory Adjust		5.00	5.05	5.15	V_{DC}
Δ V_{O1}	Regulation Accuracy V_{O1} static (V_{IN} I_o T_A t)	0 W ≤ P_{O1} ≤ 80 W	≤ 2 % $V_{O1\ Nom}$			
$V_{O\ 2}$	Voltage Factory Adjust		3.25	3.33	3.40	V_{DC}
Δ V_{O2}	Regulation Accuracy V_{O2} static (V_{IN} I_o T_A t)	0 W ≤ P_{O2} ≤ 17 W	≤ 2 % $V_{O2\ Nom}$			
V_{O3}	Voltage Factory Adjust		11.9	12.0	12.1	V_{DC}
Δ V_{O3}	Regulation Accuracy V_{O3} static (V_{IN} I_o T_A t)	0 W ≤ P_{O3} ≤ 6 W	≤ 3 % $V_{O3\ Nom}$			
V_{O4}	Voltage Factory Adjust		- 11.9	- 12.0	- 12.1	V_{DC}
Δ V_{O4}	Regulation Accuracy V_{O4} static (V_{IN} I_o T_A t)	0 W ≤ P_{O4} ≤ 6 W	≤ 3.0 % $V_{O4\ Nom}$			
$V_{O\ pp}$	Ripple & Noise referred to $V_{O\ Nom}$	$V_{O1\ -\ O4}$: Nominal Load BW 20 MHz			1.8	%
t_{ON}	Set Up Time $V_{O1\ -\ O4}$	0 W ≤ P_O ≤ 80 W		1250	2000	ms
t_H	Hold Up Time @ Input Voltage Interruption	P_O : 80 W	20	25		ms
I_{O1}	Output Current	V_{O1} : 5.05 V		10.0	12.5*)	A
I_{O2}	Output Current	V_{O2} : 3.33 V		5.0		A
I_{O3}	Output Current	V_{O3} : + 12 V		0.5	1.0**)	A
I_{O4}	Output Current	V_{O4} : - 12 V		- 0.5	- 1.0**)	A
I_{CL}	Threshold Output Current Limit $I_{O1\ /\ O2\ /\ O3\ /O4}$		≤ 150 % x $I_{O1\ /\ O2\ /\ O3\ /\ O4\ Nom}$			
I_{OSC}	Output Short Circuit Current		≤ 165 % x $I_{O1\ /\ O2\ /\ O3\ /\ O4\ Nom}$			

*) The total output power of 80W must not be exceeded
**) max combined current is 1A, i.e. the complementary output must not be loaded

AMBIENT CONDITIONS						
T_A	Operating temperature range	See derating curve page 3	- 40		+ 85	°C
T_{St}	Storage temperature Range		- 40		+ 85	°C
	Cooling		free convection			
	Humidity		75% averaged per year 95% 30 days			
	Vibration / Shock	IEC 61373, IEC 68-2-27, BN 411002 Kat. I 3 Shocks each Axis	50 m / s² , 30 ms			

GENERAL INFORMATIONS						
f1	Switching Frequency	PFC converter		65		kHz
f2		Step Down converter		100		kHz
η	Efficiency	P_O ≥ 0.7 x $P_{O\ Nom}$	81	83		%
	MTBF (SN 29500)	V_{IN} = 220 V_{AC}, P_O = 80 W, T_A = + 40 °C		400 000		h
	Expected life time, used Al caps: 7'000h	$L\vartheta = L0 * 2^{\Delta T/10K}$ (Arrhenius law)		112 000		h
	No load & Short Circuit Approved		continuously			

Life Time: mainly limited by used Al-caps. L0 = OEM guaranteed life (h) at defined temperature here + 105°C.
$L\vartheta$ is expected life (h) at desired ambient temperature
Example: L for 105°C Al capacitor = 7'000h → $L\vartheta$ (+ 55°C) = 7'000h * $2^{(105°C - 65°C)/10K}$ = 112'000h
$\vartheta cap = T_A$ = + 40°C + ϑ(internal heat) = 25K = + 65°C

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SAFETY / DIMENSIONS						
	Creepage, Clearance OV2 Port 10 Pollution Degree PD2 PCB FR4, V0, T_G = + 140°C	Primary | Secondary Primary | Chassis Secondary | Chassis	4.0 2.0 2.0			mm mm mm
	Isolation Piece Test: Ramp Function: 2s – 3s – 2s Type Test: 1 Min.	Primary | Secondary Primary | Chassis Secondary | Chassis			3'500 2'100 1'500	V_{DC} V_{DC} V_{DC}
	Connector	Positronic	PCIH47M400A1/11			
		Required female plug:	PCIH47F300A1/AA			
	Protection Class, Protection Degree		I, IP 20			
	Dimensions incl. Front Plate	w x h x d (3RU / 8HP, 19" rack)	128.4 x 40.6 x 169.4			mm
	Weight			750		g

EMC

	Radiation *)	Line & Radiated	EN 61000 – 6 – 4 A	
	Immunity *)	ESD EN 61000 - 4 - 2	6 kV / 8 kV Performance Criteria - A -	
		High Frequency Field EN 61000 - 4 - 3	20 V / m 80 MHz ... 2,5 GHz - Performance Criteria - A -	*)
		Burst EN 61000 - 4 - 4	Level 4 asym., sym. Performance Criteria - A -	
		Surge EN 61000 - 4 – 5	2 kV asym. / 1 kV sym. Performance Criteria - A -	
		HF – Injection EN 61000 - 4 - 6	10 V_{rms} , R_i = 150 Ω Performance Criteria - A -	

STANDARDS

	Applied Standards:	SN 29500	VDE 0106-1	EN 50124 - 1: 1996	EN 61000 - 4 - 2…6	EN 50529
		IEC/EN 60255-5	IEC/EN 60255-6	EN 50125 - 1	EN 60068 - 2 - 6, 2…32	IEC/EN60707
		IEC 60255-11	IEC 61373: 1999	EN 60721 - 3 - 5	IEC 60068-2-1 / 2 / 14	IEC 61373

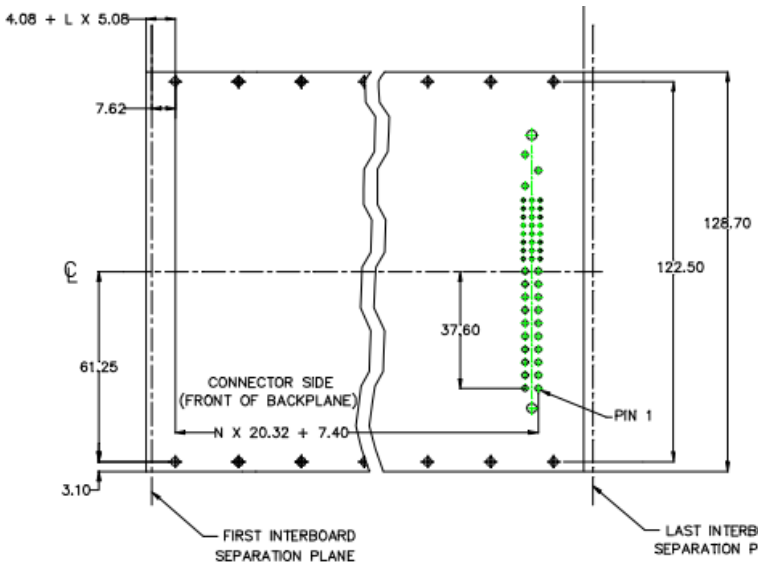
Technical data referenced at: - 40° C ≤ T_A ≤ + 60° C, 176 V_{AC} ≤ V_{IN} ≤ 265 V_{AC}, if not otherwise specified.
Temperature reference point: 10 cm below dc/dc converter unit. Please, consider free air convection is possible
*) In closed housing, emission: radiated @ EN 50121-3-2, conducted @ EN 50121-3-2
**) 1400 MHz – 2100MHz 10V/m 2100MHz – 2500MHz 5V/m 2000MHz – 2700MHz 1V/m

Pin assignment

Pin	Signals Output
1-4	V_{O1} (+ 5V)
5-12	V_{O1} and V_{O2} Return
13-18	V_{O2} (+ 3,3V)
19	V_{O3} Return
20	V_{O3} (+ 12V)
21	V_{O4} (- 12V)
22	Signal Return
24	V_{O4} Return
27	EN# (Enable)
29	V_{O1} Adjust
30	V_{O1} Sense
32	V_{O2} Adjust
33	V_{O2} Sense
34	Sense Return
36	V_{O3} Sense
38	reserved
39	INH# (Inhibit)
42	FAL# (Fail Signal)
	Signals Input and PE
45	PE (chassis ground)
46	AC Input (N)
47	AC Input (L)

Pin 23,25,26,28,31,35,37,40,41,43,44: n.c.

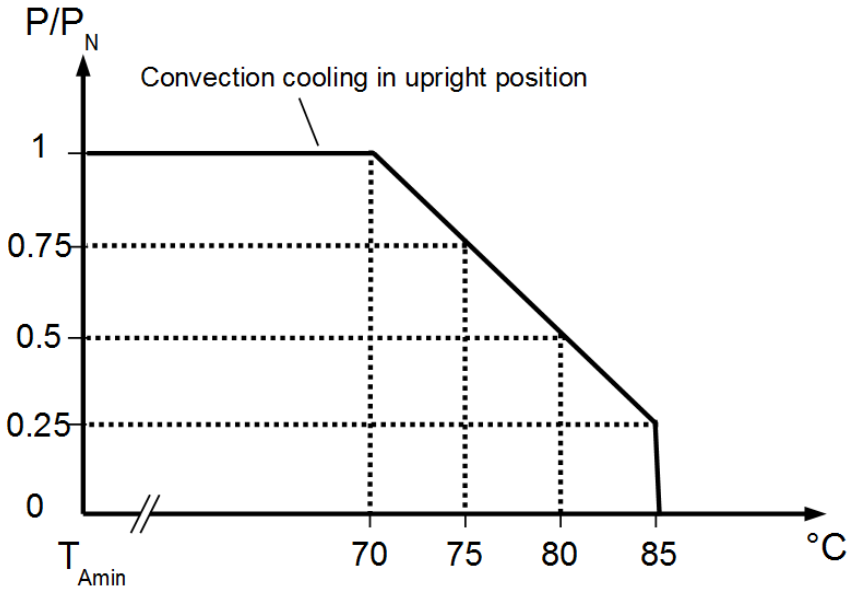
Mechanical drawing backplane



Note, that the slot in the card guide and injector/ejector PCB mounting surface are shifted 2.54 mm to the right with respect to the front panel keying and alignment pin

110 PCB 220 Q05 E10

DERATING



Output power versus temperature T_A at $V_{in\ Nom}$

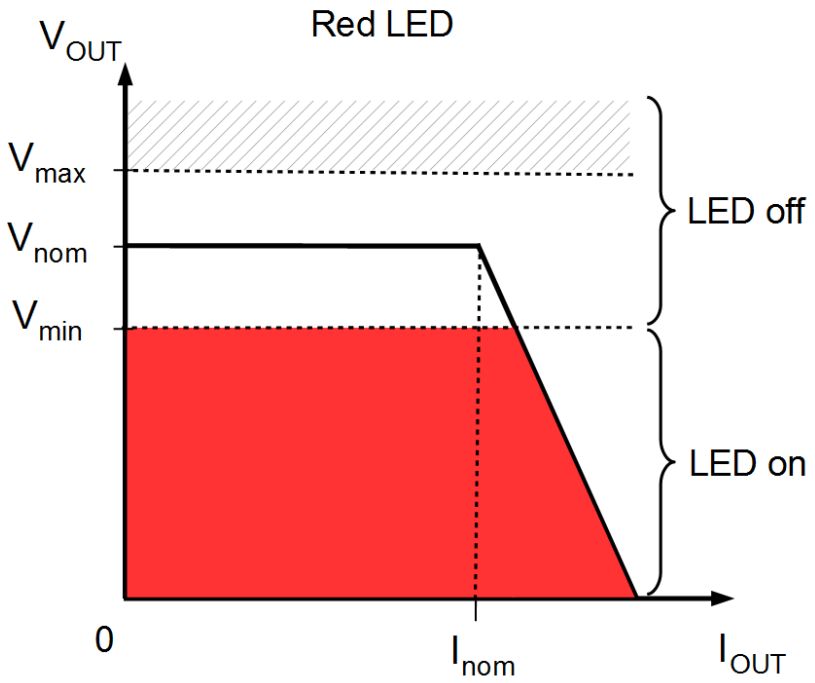
SIGNALING & CONTROL

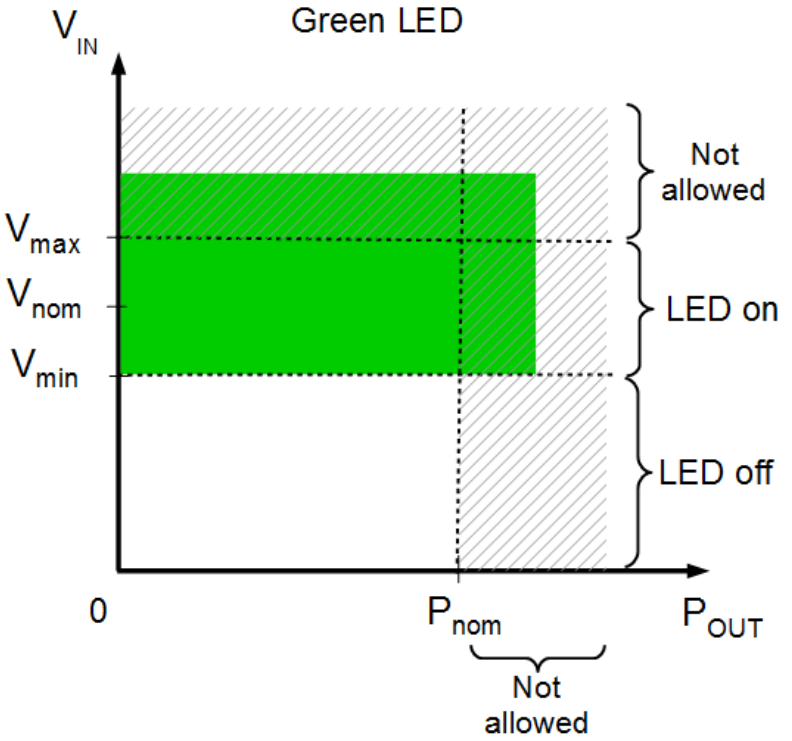
Item / LED		Conjunction	Output				Control Input	
			+5V	+3.3V	+12V	-12V	#Enable	#Inhibit
Red (equal to #Fail Output)	On	OR[1)]	≤ 4.4V	≤ 2.8V	≤ 10.3V	≥ -10.1V	Open	0V
	Off	AND[2)]	> 4.5V	> 2.9V	> 10.6V	< -10.4V	0V	Open
Green	On	V_{IN} ≥ 176VAC	x[3)]					
	Off	V_{IN} < 166VAC						

[1)] Red LED will be on, if any of the output voltages get into overload condition ($I_{OUT} > I_{CL}$) or #Enable is open or #Inhibit is set as long as green LED is on

[2)] Red LED will be off, if all output voltages are OK (only lower limit is supervised) and #Enable is set and #Inhibit is open

[3)] Don't care.


Red LED
V OUT
V max
V nom
V min
LED off
LED on
0
I nom
I OUT


V IN
Green LED
Not allowed
V max
V nom
V min
LED on
LED off
0
P nom
P OUT
Not allowed