

# FNP300 Series AC-DC Power Supplies

## 12V, 24V, 48V Output, 300 W



### Key Features & Benefits

- RoHS lead free solder and lead solder exempted products are available
- Wide input voltage range 85-264 VAC
- Two outputs (one high current output)
- Low conducted and radiated EMI (EN 55022 class B)
- Safety approved to UL/CSA60950-1, EN60950-1 and IEC60950-1
- High density design 4" x 1.58" x 8.5" cassette
- Highly-efficient topology
- I<sup>2</sup>C interface
- Overtemperature, output overvoltage, and output overcurrent protection
- Supervisory signaling
- Included ORing diode for true redundant operation

The FNP300 Series provides highly-efficient AC-DC power supplies, each with one high current output and an additional standby output, which can be used in a wide range of applications.

Passive current share along with internal ORing diodes allow the FNP300 to be used in redundant, hot-swap applications.

All models meet international safety standards and display the CE Mark for the low Voltage Directive.

### Applications

- Telecommunication Equipment

#### North America

+1-866.513.2839

#### Asia-Pacific

+86.755.29885888

#### Europe, Middle East

+353 61 225 977

tech.support@psbel.com  
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# FNP300 Series

## MODEL SELECTION

MODEL	INPUT VOLTAGE VAC	OUTPUT 1		OUTPUT 2		RATED POWER W
		V <sub>O NOM</sub> VDC	I <sub>O MAX</sub> ADC	V <sub>O NOM</sub> VDC	I <sub>O MAX</sub> ADC	
FNP300-1012G	85-264	12	25	12	0.7	310
FNP300-1024G	85-264	24	12.5	12	0.7	310
FNP300-1048G	85-264	48	6.25	12	0.7	310

OPTIONS	SUFFIXES TO ADD TO PART NUMBER
RoHS lead solder exemption	No RoHS character required.
RoHS compliant for all 6 substances	Add "G" as the last character of the part number.

## ABSOLUTE MAXIMUM RATINGS

Stresses in excess of the absolute maximum ratings may cause performance degradation, adversely affect long-term reliability, and cause permanent damage to the converter.

PARAMETER	CONDITIONS/DESCRIPTION	MIN	MAX	UNITS
Input Voltage	Continuous		264	VAC
	Transient, 60 ms		300	VAC
Operating Temperature	Ambient; $V_{I \min}$ - $V_{I \max}$ , $I_{O \text{ nom}}$ , cooling by internal fan	0	55	°C
Storage Temperature	Non-operational	-40	85	°C

## ISOLATION SPECIFICATIONS

The electric strength test is performed in the factory as routine test in accordance with EN 550116, IEC/EN 60950, and UL 1950 and should not be repeated in the field. Bel Power Solutions will not honor any warranty claims resulting from electric strength field tests.

PARAMETER	CONDITIONS/DESCRIPTION	MIN	NOM	MAX	UNITS
Insulation Safety Rating	Input/Case		Basic		
	Input/Output		Reinforced		
	Output/Case		Functional		
Electric Strength Test Voltage	Input/Case	2121			VDC
	Input/Output	4242			
	Output/Case	500			

## EMC SPECIFICATIONS

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

PARAMETER	DESCRIPTION	CRITERION
Electrostatic Discharge	IEC/EN 61000-4-2, level 4 (contact/air)	8/15 kV, criterion B
Electromagnetic Field	IEC/EN 61000-4-3, level 3	10 V/m, criterion A
Electrical Fast Transients / Burst	IEC/EN 61000-4-4, level 4 (direct/capacitive)	2/1 kV, criterion B
Surge	IEC/EN 61000-4-5, level 3 (L/L, L/C)	1/2 kV, criterion B
Voltage Dips and Interruptions	IEC/EN 61000-4-11	Criterion B
RF Conducted Immunity	IEC/EN 61000-4-6	10 VAC, AM 80%, 1 kHz, criterion A
Emissions Radiated/Conducted	CISPR 22/EN 55022/EN 61204	Class B
Harmonics	IEC/EN 61000-3-2	Class B
Voltage Fluctuation and Flicker	IEC/EN 61000-3-3	Pass

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## INPUT SPECIFICATIONS

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

PARAMETER	CONDITIONS/DESCRIPTION	MIN	NOM	MAX	UNITS
Input Voltage		85	115/230	264	VAC
Turn-On Input Voltage	Ramping up	70	-	85	VAC
Turn-Off Input Voltage	Ramping down	70	-	85	VAC
Input Frequency		47	50/60	63	Hz
Inrush Current Limitation	115/230 VAC			15/20	A
Power Factor	$V_{i\text{nom}}, I_{o\text{nom}}$	0.96			
Efficiency	$V_i = 230\text{ VAC}, I_{o\text{nom}}$	FNP300-1012G	83		%
		FNP300-1024G	86		
		FNP300-1048G	88		

## OUTPUT SPECIFICATIONS

All specifications apply over specified input voltage, output load, and temperature range unless otherwise noted.

PARAMETER	CONDITIONS/DESCRIPTION	MIN	NOM	MAX	UNITS
Output Voltage Setpoint Accuracy FNP300-1012G	$V_i = 230\text{ VAC}, I_{o1} @ 12.5\text{ ADC}, T_c = 25\text{ }^\circ\text{C}$	-0.5		0.5	% $V_{o\text{nom}}$
Output Voltage Setpoint Accuracy FNP300-1024G	$V_i = 230\text{ VAC}, I_{o1} @ 3.125\text{ ADC}, T_c = 25\text{ }^\circ\text{C}$	-0.5		0.5	% $V_{o\text{nom}}$
Output Voltage Setpoint Accuracy FNP300-1048G	$V_i = 230\text{ VAC}, I_{o1} @ 12.5\text{ ADC}, T_c = 25\text{ }^\circ\text{C}$	-0.5		0.5	% $V_{o\text{nom}}$
Output Current V1	FNP300-1012G	0	25	25	ADC
Output Current V2	FNP300-1012G	0	0.7	0.7	ADC
Output Current V1	FNP300-1024G	0	12.5	12.75	ADC
Output Current V2	FNP300-1024G	0	0.7	0.7	ADC
Output Current V1	FNP300-1048G	0	6.25	6.4	ADC
Output Current V2	FNP300-1048G	0	0.7	0.7	ADC
Static Line Regulation V1	$V_{i\text{min}} - V_{i\text{max}}, V_{i\text{nom}}, 5-100\% I_{o\text{nom}}$	-0.5		0.5	% $V_{o\text{nom}}$
Static Load Regulation V1 (Droop Characteristic)	$V_{i\text{min}} - V_{i\text{max}}, V_{i\text{nom}}, 5-100\% I_{o\text{nom}}$	-5		5	% $V_{o\text{nom}}$
Hold-Up Time	Starting at $V_i = 230\text{ VAC}, P_{o\text{nom}}$	20			ms
Dynamic Load Regulation	Load change = $\pm 33\%$ , $dI_o/dt = 2A/\mu\text{s}$ voltage deviation recovery time	-2		2 400	% $V_{o\text{nom}}$ $\mu\text{s}$
Start-Up Time	$V_{i\text{nom}}, I_{o\text{nom}}$			1	s
Output Voltage Ripple and Noise	$V_{i\text{nom}}, I_{o\text{nom}}, 20\text{ MHz bandwidth}$			120	mVpp

## PROTECTION

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

PARAMETER	CONDITIONS/DESCRIPTION	MIN	NOM	MAX	UNITS
Input Fuse	Not user accessible			6.3AT	
Input Transient Protection	With varistor				
Output	No-load and short circuit proof				% $I_{o\text{nom}}$
	short circuit proof				% $I_{o\text{nom}}$
	overload (latch style)	110		130	% $I_{o\text{nom}}$
Overvoltage Protection	Latch style	115	FNP300-1012G	130	% $V_{o\text{nom}}$
	Latch style	115	FNP300-1024G	130	% $V_{o\text{no}}$
	Latch style	115	FNP300-1048G	122	% $V_{o\text{no}}$
Overtemperature Protection	Automatic power shutdown at $T_c = 95\text{ }^\circ\text{C}$				

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## CONTROL

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

PARAMETER	CONDITIONS/DESCRIPTION
I <sup>2</sup> C Digital Bus	Reports information and monitors alarm functions
PS Seated Signal	Contact closure to GND
PS Remote Shutdown	TTL compatible signal, open collector. Power supply enabled at Low or TTL "0" (e.g. by connecting of pin 22 to 0V or GND), and inhibited to latching mode** at High or TTL "1", or leave it open.
AC fail pre-warning (I <sup>2</sup> C & OC)*	Supervisory AC input voltage; Pre-warning time >6 ms
DC fail (I <sup>2</sup> C & OC)*	Supervisory under- and overvoltage pre-ORing diode of V1
Temperature Warning (I <sup>2</sup> C & OC)*	Indicates if unit is operating normally or in overtemperature, Pre-warning time >10 ms
Fan OK (I <sup>2</sup> C & OC)*	Indicates if fan is operating or has failed
Current Share	Droop load characteristic for V1 and V2
Status Indication	LEDs: DC OK (green), AC OK (green)

### NOTE:

\* Signal provided by I<sup>2</sup>C interface or by open collector (OC)

\*\* (1) Standard FNP300 models (without "H" at the end of part number) have latching inhibit function, i.e., once PSU is inhibited, it needs input power re-cycle to allow using enable state again.

(2) FNP300 variants marked with "H" character do have non-latching inhibit function so there's no need to re-cycle input power when enabling unit after inhibit state.

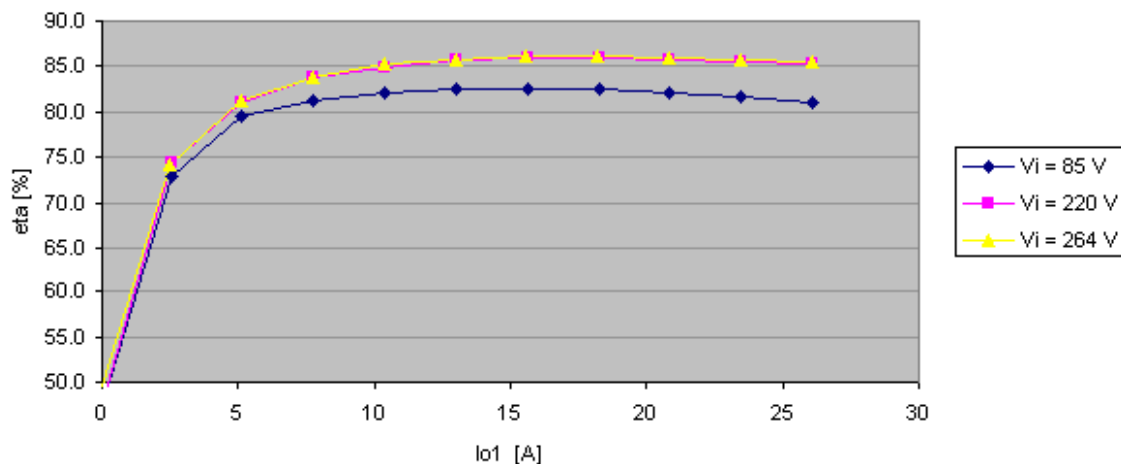
## FEATURES

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

PARAMETER	CONDITIONS/DESCRIPTION
Fan speed control	4 fan speed levels depending on inlet temperature Fan speed level and temperature information available on I <sup>2</sup> C digital bus
μC supply voltage in-/output (Pin 10)	If unit is operating: 5 to 7V is provided at pin 10. If unit is NOT operating, pin 10 is input from a parallel connected unit for μC supply.

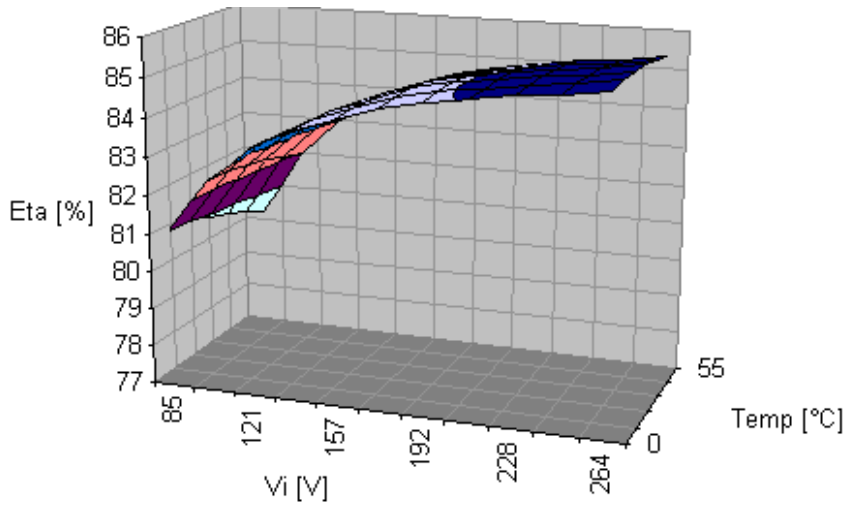
## CHARACTERISTIC CURVES

Figure 1 - Efficiency vs. Output Load



# FNP300 Series

Figure 2 - Efficiency vs. Input Voltage and Ambient Temperature,  $I_o = I_{o,nom}$

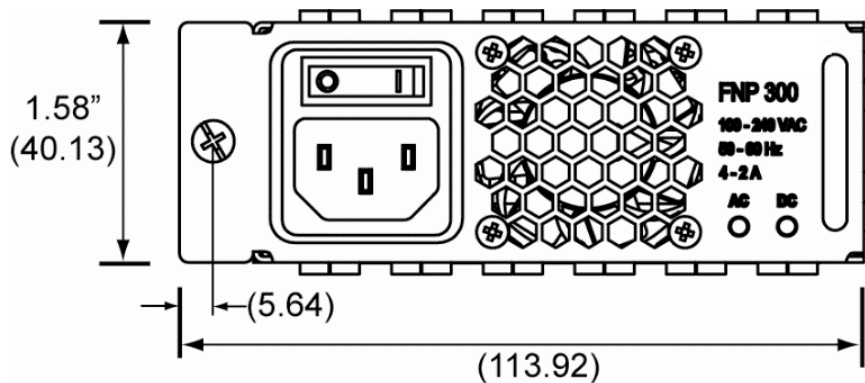


## ENVIRONMENTAL, MECHANICAL, & RELIABILITY SPECIFICATIONS

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

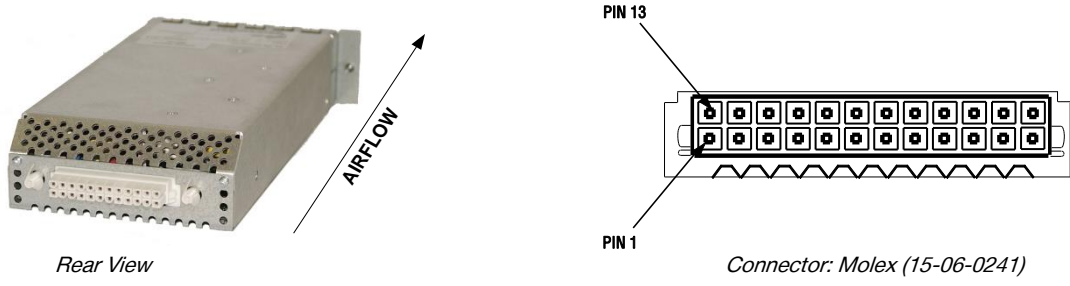
PARAMETER	CONDITIONS/DESCRIPTION	MIN	NOM	MAX	UNITS
Mechanical Data (H, W, D)	4" (101.6 mm) x 1.58" (40.1 mm) x 8.5" (215.9 mm)				
Weight	2.205 lb (1 kg)				
Operating Humidity	Relative humidity, non-condensing	10		90	%
Storage Humidity	Relative humidity, non-condensing	5		95	%
Shock	IEC/EN 60068-2-27, 11 ms			30	$g_n$
Sinusoidal Vibration	IEC/EN 60068-2-6				
	2-8 Hz		7.5		mil
	8-200 Hz		2		$g_n$
	200-500 Hz		4		$g_n$
MTBF	MIL-HDBK-217F Notice 2, $G_B$ , 25 °C	200			kh

Figure 3 - Mechanical Dimension



# FNP300 Series

Figure 4 - Output Connector Descriptions



OUTPUT CONNECTOR DESCRIPTION	PIN LOCATION	REFERENCE NAME
12V Output	4,5,6,16,17,18	Vo1
24V Output	4,5,6,16,17,18	Vo1
48V Output	4,5,6,16,17,18	Vo1
12V Output RTN	1,2,3,13,14,15	Vo1 RTN
24V Output RTN	1,2,3,13,14,15	Vo1 RTN
48V Output RTN	1,2,3,13,14,15	Vo1 RTN
AC-fail, DC-fail, Temp.-fail	9	PS_FAIL
Power Supply Present Signal	23	PS_PRSNT_L
Serial Data Line	11	SDA
Serial Clock Line	12	SCL
Address Input Line A0	21	AO
Address Input Line A1	20	A1
5 to 7V	10	µC supply voltage bus
FAN OK	24	FAN_FAIL
PS Remote Shut Down	22	PS_RSD_H
12V Standby RTN	7	Vo2 RTN / Logic Ground / 5 to 7V RTN
12V Standby	19	Vo2
Address Input Line A2	8	A2

For more information on these products consult: [tech.support@psbel.com](mailto:tech.support@psbel.com)

**NUCLEAR AND MEDICAL APPLICATIONS** - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.

**TECHNICAL REVISIONS** - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.

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