

- ◆ Wide Input Voltage Range of 36-130V
- ◆ High efficiency for Extended Operating Range
- ◆ Input-Output Isolation
- ◆ Short Circuit Protection for Each Output
- ◆ 90 Days Warranty
- ◆ Compact Size
- ◆ UL1950, CSA22.2-950 and EN60950 Approved
- ◆ Pin to pin Compatible with the PD-NPM-0305¹



- ◆ HDSL/xDSL Systems
- ◆ Pair Gain Systems
- ◆ Remote Power Feeding Communications Systems
- ◆ Wide Input Range DC/DC Applications
- ◆ 5Vdc and 3.3Vdc Power Supply from 48Vdc TNV Line

The PD-NPM-0305EP module is a wide range input voltage DC/DC converter. The module employs advanced power topology that enables high efficiency, a wide input range and compact size. It is especially designed to work as the remote (NTU) power module in remotely fed HDLSL systems. The module has a shutdown mode, which when activated ("High" level on Inhibit pin), reduces the input current to sleep-mode level of approximately 1mA. The module is designed to perform optimally while working in conjunction with PowerDsine PD-LPM-0xxx module series, but may also be used in a wide range of other DC/DC applications. One of the PD-NPM-0305EP's most valuable features is its ability to work with input voltages as low as 36Vdc. This feature enables the use of the module in systems, which are locally powered from a TNV 48Vdc line. In these cases, there is no need to use any additional DC/DC converters for logic circuits supply power, thereby reducing system costs and complexity.

The PD-NPM-0305EP offers enhanced efficiency and an extended temperature range, commonly required for HDSL/xDSL repeater applications. The Module also includes an adjustable output voltage range of $\pm 100\text{mV}$ and features a plastic cover thereby reducing unit weight. Reducing the Module's output voltage level by a few mVolts may reduce the logic circuits and overall RT modem's power consumption.

Remote Feeding Line
36-130Vdc

Vin+ Vin RTN

+5V

Inhibit On Off

DGND

6 Vin
7 Inhibit
8 Vin RTN

PD-NPM-0305EP

ADJ 5
NC 4
Output 2 3
Output 1 2
Output 1, 2 RTN 1

R_{ADJ}

V_{out} + V_{out} -

+3.3V +5V RTN

C₀₁ C₀₂ C_{in}

C₀₁ = 0-100µF
C₀₂ = 0-220µF
C_{in} = 10-47µF

¹ The "EP" suffix to the part number indicates an enhanced efficiency and extended temperature range. All versions have the same pinout and physical dimensions.



ABSOLUTE MAXIMUM RATINGS*

Input Voltage	- 0.5 to 140V
Inhibit Input Voltage	- 0.5 to 130V
Storage Temperature	- 40°C to 100°C
Isolation Voltage (Input to Output1, Output 2)	1500V

* These are stress ratings. Exposure of the device to any of these conditions may adversely effect long-term reliability. Proper operation other than as specified in the PERFORMANCE / FUNCTIONAL SPECIFICATIONS is not implied.

PERFORMANCE / FUNCTIONAL SPECIFICATIONS

Unless otherwise indicated, the data below applies to the specified operating input voltage, load (resistive), and temperature range. $C_{in}=10\mu F$.

Parameter	Conditions	Min	Typ	Max	Units
Input Data					
Input Voltage ⁴		36		130	V
Inhibit Threshold		0.4		2.4	V
Input Current	At Minimum Input Voltage, Full Load			280	mA
Input Reflected Ripple	Measured on 10 μ F ESR $\leq 1\Omega$ external capacitor. BW=20MHz			200	mV
Output Data					
Output 1 Voltage ¹	Maximum Load	4.95	5.05	5.15	Vdc
Output 2 Voltage ¹	Maximum Load	3.2	3.3	3.4	Vdc
Total Output Power				6.5	W
Output 1 Current		0.22		1.1	A
Output 2 Current		0.03		0.3	A
Total Regulation ²					
Line/Load/Temperature	Outputs are proportionally loaded: $I_{min} < I_{load} < I_{max}$			± 1	%
Output 1	$I_{min} < I_{load} < I_{max}$			± 2	%
Output 2					
Output 1 Cross Regulation	Output1=Full Load, $I_{min} \leq \text{Output 2} \leq I_{max}$			± 2.0	%
Output 2 Cross Regulation	Output2=Full Load, $I_{min} \leq \text{Output 1} \leq I_{max}$			± 2.5	%
Ripple and Noise ⁵	Measured on 0.1 μ F ceramic capacitor BW=20MHz @25°C				
Output 1	Ambient Temperature		50	70	mVp-p
Output 2			50	70	mVp-p
Hold-Up Time	Measured with external input capacitor $C_{in} = 47\mu F$, Output Power = 6W. $V_{in} \text{ Min} = 70V$, Maximum Load	10			mSec
Efficiency	$V_{in} = 72V$, Load = 6.5W $V_{in} = 72V$, Load = 3.5W		80 77		% %
Switching Frequency			125		KHz
Output Short Protection	Safe period for short circuit on either or both outputs.			∞	Sec
Reliability					
MTBF	Continuous Operation @30°C Ambient Temperature. Prediction method: Bellcore TR-332 Issue 5, Method 1 Case III Software Version 5.30	1,000,000			Hours
Environmental Data					
Ambient Temperature ⁵	Continuous Operation. No Derating	-40		+85	°C
Relative Humidity	Non-Condensing, Per IEC 68-2-56			93	%

1. The PD-NPM-0305EP allows for up to $\pm 100mV$ output voltage adjustment for both Output 1 and Output 2. Connecting a resistor, R_{ADJ} , between Pin 5 and Pin 1 will increase the output voltage of Output 1 and Output 2. Connecting a resistor, R_{ADJ} , between Pin 5 and Pin 2 will decrease the output voltage of Output 1 and Output 2.

$$V_{out} = V_{out - Typical} \pm \frac{6.25}{51 + R_{ADJ}(K\Omega)}$$

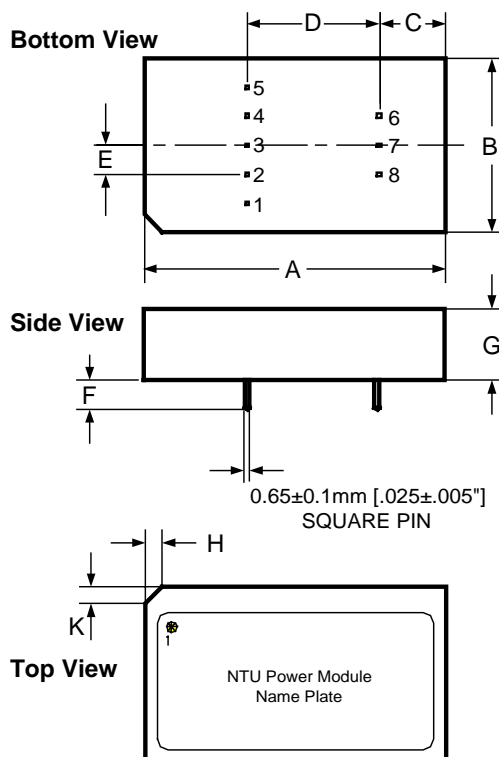
2. Output currents below the minimum rate may cause total regulation to divert from rated specifications. In cases where Output 1 or Output 2 is not in use, the unused output should be loaded for minimal current consumption with a resistor.
3. The unit is designed to meet EN55022 Class B Standard with an external EMI filter. For filter design recommendations, refer to the PowerDsine xDSL Power Modules Application Note.
4. In order to comply with the EN60950 standard in telecommunication networks, the unit's input voltage must not exceed 120Vdc.
5. In order to comply with the EN60950 standard, the maximum operating ambient temperature must be 85°C.
6. Output ripple may reach 150mV at ambient temperatures below -10°C.
7. When the Inhibit function is not used it is recommended to permanently connect the Inhibit terminal to Vin RTN (pin 8).



PD-NPM-0305EP

DSL NTU POWER MODULE: 36-130V_{DC} INPUT, 5V_{DC} and 3.3V_{DC} OUTPUT

MECHANICAL DETAILS



DIMENSIONS

	mm	Inch
A	52.00±0.50	2.05"±0.02"
B	30.00±0.50	1.18"±0.02"
C	11.42±0.50	.45"±0.02"
D	22.86±0.25	.90"±0.01"
E	5.08±0.25	.20"±0.01"
F	5.00±0.50	.196"±0.02"
G	12.50 MAX	.492" MAX
H	3.00±0.25	0.117"±0.01"
K	3.00±0.25	0.117"±0.01"

PIN CONNECTIONS

Pin #	Function	Description
1	Output 1, 2 RTN	Return line for Output 1 and Output 2
2	Output 1	Primary output, regulated, 5.05V/1.1 Amp maximum
3	Output 2	Secondary output, regulated, 3.3V/0.3 Amp maximum
4	NC	Not connected
5	ADJ (NC)	Output Voltage Adjustment
6	Vin	Positive supply terminal. Typically feeds from the line through bridge rectifier to prohibit voltage reversal.
7	Inhibit	Logic input, relative to Vin RTN (pin 8) with an internal pull down resistor. High logic level will inhibit operation of the module, and the device's current consumption will drop to an idle level. Leaving this pin unconnected, or connecting it to a low logic level, will enable the outputs. When the Inhibit function is not used it is recommended to permanently connect the Inhibit terminal to Vin RTN (pin 8).
8	Vin RTN	Negative supply terminal pin. Typically feeds from the line through the bridge rectifier prohibit voltage reversal.

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