



PD-LPM-0102EP

DSL LTU POWER MODULE: 36-72V_{DC} INPUT, DUAL 120V_{DC}/60mA OUTPUT

FEATURES

- ◆ Designed for Span Powering of ETSI HDSL Systems
- ◆ High Efficiency
- ◆ Input to Output Isolation
- ◆ Two Outputs with Independent Protection Mechanism
- ◆ Outputs can be Paralleled for Current Sharing, i.e. 120V/120mA
- ◆ Adjustable Output Voltage (105 to 120Vdc)
- ◆ Wide Input Voltage Range
- ◆ Output Unbalanced Indication
- ◆ 90 days warranty
- ◆ UL1950, CSA22.2-950 and EN60950 Approved
- ◆ Backward compatible with the PD-LPM-0102¹



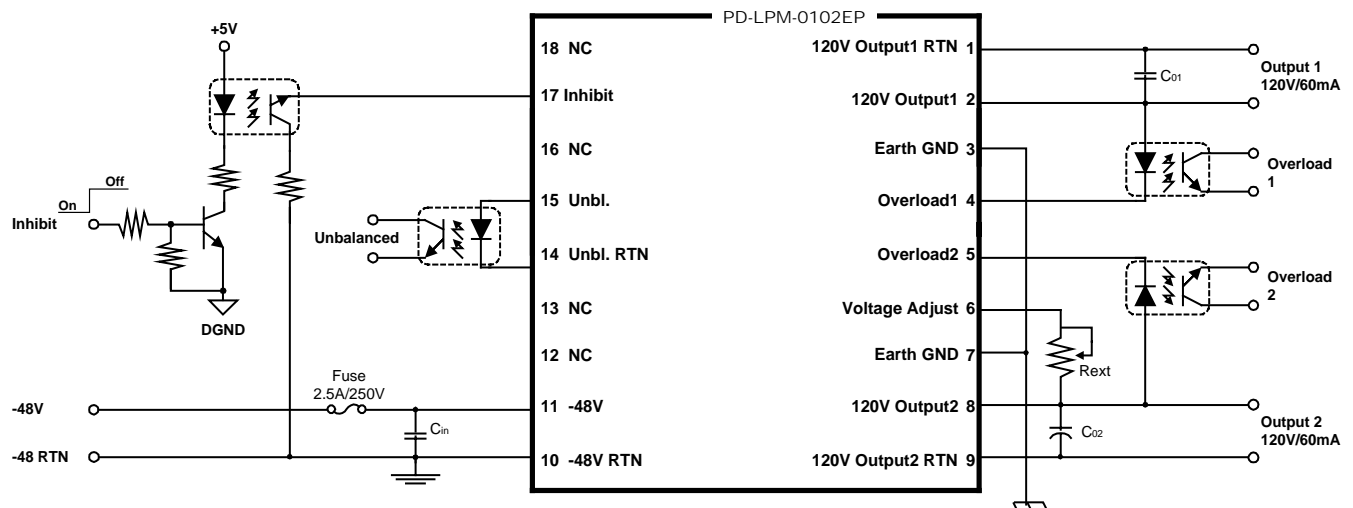
APPLICATIONS

- ◆ HDSL/xDSL Systems
- ◆ Voice Pair-Gain Systems
- ◆ Supports Single and Dual Loop Configurations
- ◆ General Remote Power Feeding Communications Applications
- ◆ 48Vdc, 60Vdc Telecommunications Systems
- ◆ ETSI Remotely Fed Systems

DESCRIPTION

The PD-LPM-0102EP is a 15 Watt DC/DC converter module especially designed for HDSL/xDSL remote power feeding applications (on LTU). The module operates from 36 to 72Vdc input voltage and provides two independent balanced outputs of 120V/60mA, isolated from the input. The output voltage can be reduced, in the range of 105-120V, by adding an external resistor. Reduction of the output voltage to 105-120V may be required in order to allow for HDSL communication signal superimposing, without exceeding the maximum 120V standard limitation. A high precision current limiting circuit is implemented on each output. This feature enables delivery of maximum power through the line while maintaining the TNV safety requirements of maximum 60mA current. The module also provides report lines, which deliver information regarding unbalanced outputs (deviation of more than 20%) and overload condition of each output. The overload protection circuits on each output are independent, and allow for one output to work normally while the other is overloaded. The PD-LPM-0102EP is designed to work optimally while working in conjunction with the PowerDsign PD-NPM-03xx module series. Designed for ETSI specific requirements, the PD-LPM-0102EP simplifies integration and reduces overall system dimensions, cost and time to market.

TYPICAL APPLICATION



Recommended values for C_{in} , C_{01} , C_{02} 10μF Aluminum electrolytic capacitor in parallel to a 1μF film capacitor.

¹ The "EP" suffix to the part number indicates an open frame module, without epoxy potting, as well as enhanced efficiency and extended temperature range.



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ABSOLUTE MAXIMUM RATINGS*

Input Voltage	- 0.5 to 100V
Inhibit Input voltage	- 0.5 to 30V
Storage Temperature	- 40°C to 100°C
Isolation Voltage (Input to Output1, Output2)	1500Vdc

*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}=10μF.

Parameter	Conditions	Min	Typ	Max	Unit
Input					
Input Voltage		36.0		72.0	V
Input Current				0.55	A
Input Reflected Ripple	Measured on Cin = 10μF, ESR≤1Ω External Capacitor			500	mV _{p-p}
Output					
Total Output Power				15	W
Output Voltage Set, Note 3, 4	Full Load, Rext = Not Connected	115	118	120	V
Output Ripple & Noise, Note 3	Measured @ 25°C ambient on external output capacitor: 10μF<Co<47μF, ESR≤0.3Ω BW=200KHz (internal switching frequency ripple) BW=20MHz			100 150	mV _{p-p} mV _{p-p}
Output voltage setting, Note 4	Expressed as percentage of output voltage	88		100	%
Total output voltage regulation (line/load/temperature/cross)	Load: 10 to 56mA Load: 0 to 56mA			±2.5 ±5	% %
Output current range				60	mA
Current limit	Per output	56	57.5	60	mA
Efficiency	At full range of input voltage At Vin=48V	79	80 82		% %
Control					
Inhibit Input High (Off)	Referenced to -48V input (Pin 11)	2.4			V
Inhibit Input Low (On)	Referenced to -48V input (Pin 11)			0.5	V
Inhibit Input Current	V _{inh} = 0V V _{inh} = 5V	140	0 160	200	μA μA
Telemetry					
Overload 1, Note 5	Current threshold	56.0	57.5	60.0	mA
Overload 2, Note 5	Current threshold	56.0	57.5	60.0	mA
Unbalance	Deviation from balance condition		20		%
Protection Circuit					
Input Under-Voltage Trip Point				35	V
Input Over-Voltage Trip Point		75			V
Overload/Short Circuit Protection	Foldback type, Notes 6				
Reliability					
MTBF	Continuous Operation @30°C Ambient Temperature. Prediction method: Bellcore TR-332 Issue 5, Method 1 Case III Relax Bellcore Software Version 5.30	600,000			Hours
Ambient Temperature					
	Continuous Operation. No Derating	-40		+65	°C
	Continuous Operation. Derated from +65°C by 280mW/°C	-40		+85	°C
Relative Humidity	Non-Condensing, Per IEC 68-2-56			93	%
Internal Switching Frequency			150		KHz



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NOTES

1. Outputs Overload 1 and Overload 2 are designed to drive 1mA for an opto-coupler LED (no additional resistor is needed). High impedance load on this terminal may develop high voltage up to 120Vdc.
2. Outputs Unbl. and Unbl. RTN are designed to drive 1mA for an opto-coupler LED (no additional resistor is needed). High impedance load on this terminal may develop up to 13Vdc.
3. Unless otherwise stated, data refers to both Output 1 and Output 2.
4. Connecting a resistor, Rext, between pin 6 and 8 sets the output voltage. For output voltages of 110V, Rext = 11.5K Ω resistor. When left open (Rext = ∞), the output voltage is set to its maximum value. Setting effects both Output 1 and Output 2.
5. The output stage acts as a current source. When output current reaches the threshold, an overload circuit will detect 5-8V drop below the nominal set value.
6. The output stage acts as a current source when it reaches the current limit level. When output voltage falls below a threshold level, the output stage is disconnected in order to reduce heat dissipation. The unit reverts to normal operation once the overload condition is removed. Overload condition on one output does not effect the other output.
7. The module 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.
8. When connecting the two outputs in parallel to achieve a single 120V/120mA output, automatic recovery from overload shutdown will occur only after the total consumed output current drops below 60mA.

SAFETY INSTRUCTIONS (According to UL1950, CSA C22.2 No. 950 and EN60950 requirements)

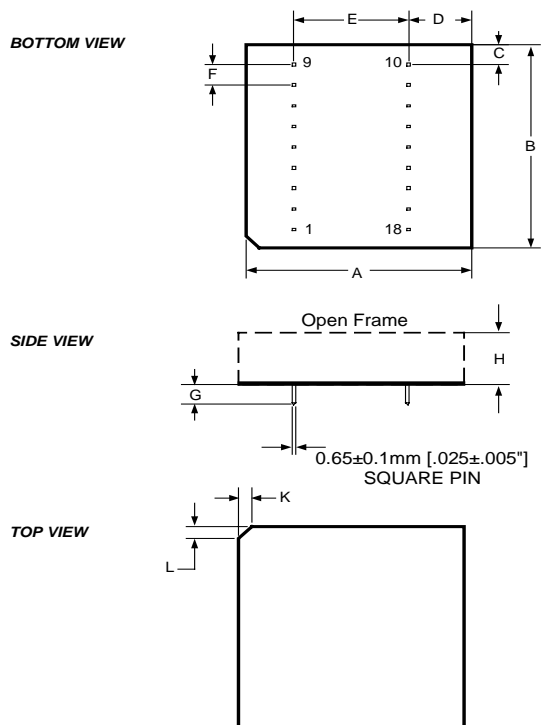
1. For North America, input voltage (nominal 48Vdc, tolerance 36-60Vdc) must be applied by isolated DC source complying with the earthed SELV or TNV requirements of the UL1950, Third edition.
For other countries, input voltage (nominal 48Vdc, tolerance 36-72Vdc) must be supplied by isolated DC source complying with the earthed SELV or TNV requirements of the latest version of EN60950.
2. DC input must be protected by UL Listed fuse rated maximum T2.5A, 250V (slow-blow 2.5A, 250V fuse).
3. When applicable, protection from excessive voltage on the output should be tested in end-use equipment.



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MECHANICAL DETAILS



DIMENSIONS

	mm	Inch
A	50.00±0.50	1.97"±0.02"
B	50.00±0.50	1.97"±0.02"
C	4.80±0.50	.1875"±0.02"
D	12.30±0.50	.484"±0.02"
E	25.40±0.25	1.00"±0.01"
F	5.08±0.25	.20"±0.01"
G	4.00±0.50	.158"±0.02"
H	12.50 MAX	.492" MAX
K	3.00±0.25	.117"±0.01"
L	3.00±0.25	.117"±0.01"

PIN CONNECTIONS

Pin #	Function	Description
1	120V Output1 RTN	Output power ground #1.
2	120V Output1	Output power #1. To ensure proper operation under large load changes, a minimum 10μF Aluminum electrolytic capacitor in parallel to a 1μF film capacitor must be connected.
3	Earth GND	Pin 3 should be connected to system GND. Output power is balanced in reference to pin 3.
4	Overload 1	Report line, active when output #1 is in overload or short circuit condition. See Note 1.
5	Overload 2	Report line, active when output #2 is in overload or short circuit condition. See Note 1.
6	Voltage Adjust	Connection of a resistor between pin 6 and 8 enables reducing both output voltages simultaneously in the range of 105-120V. The resistor needs to be 1/8W rated or higher.
7	Earth GND	Pin 7 should be connected to system GND. Output power is balanced in reference to pin 3.
8	120V Output2	Output power #2. To ensure proper operation under large load changes, a minimum 10μF capacitor (electrolytic or other) must be connected.
9	120V Output2 RTN	Output power ground #2.
10	-48V RTN	Positive Input line connection.
11	-48V Input	Negative Input line connection.
12,13,16,18	NC	Not connected.
14	Unbl. RTN	Return line for Unbl. See Note 2.
15	Unbl.	Report line. Active when output voltage (either or both) become unbalanced in reference to the GND Ground. This may occur when there is an unwanted current path to ground (leakage). Note 2.
17	Inhibit	Logic input, referenced to the -48V input (Pin 11). Voltage above the specified threshold will inhibit the operation of the unit, and current consumption on input will drop to a very low level. Leaving this input unconnected or tied to a low logic level will enable the unit.

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