DC-DC CONVERTERS

REGULATED, 4:1 WIDE INPUT RANGE UP TO 15 WATTS

LOW PROFILE, SINGLE & DUAL OUTPUT

LPB15 SERIES

FEATURES

- 4:1 Ultra Wide Input Voltage Range
- No Minimum Load Required
- High Efficiency Up to 92%
- Extra Small Low Profile Package: 1.0" × 1.0" × 0.39"
- Six Sided Continuous Shield
- Safety Meets UL60950-1, EN60950-1 and IEC60950-1
- CE Mark
- Compliant to RoHS & Reach

SELECTION GUIDE All specifications are typical at nominal input, full load and 25°C, unless otherwise noted.

Input Voltage Range Vdc	Output Voltage Vdc	Output Current at Full Load mA	Input Current at No Load mA	Efficiency %	Model Number	Maximum Capacitor Load[1] µF
9 - 36	3.3	4000	45	86	LPB15-24S33	12000
9 - 36	5	3000	70	86	LPB15-24S5	6000
9 - 36	12	1300	20	87	LPB15-24S12	1000
9 - 36	15	1000	20	87	LPB15-24S15	660
18 - 75	3.3	4000	25	86	LPB15-48S33	12000
18 - 75	5	3000	35	87	LPB15-48S5	6000
18 - 75	12	1300	12	87	LPB15-48S12	1000
18 - 75	15	1000	12	87	LPB15-48S15	660
9 - 36	±5	±1500	20	85	LPB15-24-5	±3000
9 - 36	±12	±625	20	87	LPB15-24-12	±520
9 - 36	±15	±500	20	88	LPB15-24-15	±330
18 - 75	±5	±1500	12	85	LPB15-48-5	±3000
18 - 75	±12	±625	15	86	LPB15-48-12	±520
18 - 75	±15	±500	20	87	LPB15-48-15	±330

LPB15 SERIES

Input Specifications

Operating input voltage range, Vdc	9 Min., 24 Typ., 36 Max.	24Vin(nom)
	18 Min., 48 Typ., 75 Max.	48Vin(nom)
Start up voltage, Vdc	9 Max.	24Vin(nom)
	18 Max.	48Vin(nom)
Shutdown voltage, Vdc	8 Typ.	24Vin(nom)
	16 Typ.	48Vin(nom)
Start up time, ms		Constant resistive load
	30 Max.	Power up
	30 Max.	Remote ON/OFF
Input surge voltage, Vdc		100ms, max.
	50 Max.	24Vin(nom)
	100 Max.	48Vin(nom)
Input reflected ripple current, mAp-p	30 Typ.	Nominal input and Full load
Input filter	Pi type	
Remote ON/OFF		Referred to -Vin pin
	Open or 3 - 15 Vdc	Positive logic, DC-DC ON
	Short or 0 - 1.2 Vdc	(Option), DC-DC OFF
	Short or 0 - 1.2 Vdc	Negative logic, DC-DC ON
	Open or 3 - 15 Vdc	(Standard), DC-DC OFF
	-0.5 Min., 1 Max., mA	Input current of Ctrl pin
	2.5 mA Typ.	Remote off input current

Output Specifications

Voltage accuracy, %	-1.0 Min., +1.0 Max	
Line regulation, %		Low Line to High Line at Full Load
	-0.2 Min., +0.2 Max.	Single
	-0.5 Min., +0.5 Max.	Dual
Load regulation, %	-0.2 Min., +0.2 Max.	No Load to Full Load, Single
	-1.0 Min., +1.0 Max.	No Load to Full Load, Dual
Cross regulation, %	-5.0 Min., +5.0 Max.	Asymmetrical load 25%/100%FL, Dual
Voltage and adjustability[2], %	-10 Min., +10 Max.	Single Output
Ripple and noise, mVp-p		Measured by 20MHz bandwidth; With a 1μF/25V M/C X7R and a 10μF T/C
	75 Typ.	Single, 3.3Vout, 5Vout
	100 Typ.	Others
	100 Typ.	Dual, All
Temperature coefficient, %/°C	-0.02 Min., -0.02 Max.	
Transient response recovery time, μs	250 Typ.	25% load step change
Over voltage protection, Vdc	3.7 Min., 5.4 Max.	3.3Vout
	5.6 Min., 7.0 Max.	5Vout
	13.5 Min., 19.6 Max.	12Vout
	16.8 Min., 20.5 Max.	15Vout
Over load protection, %	150 Typ.	% of Iout rated; Hiccup mode
Short circuit protection	Continuous, automatics recovery	

General Specifications

Isolation voltage, Vdc	1 minute	Input to Output	1600 Min.		
	1 minute	Input (Output) to Case	1000 Min.		
Isolation resistance, GΩ	500Vdc		1 Min.		
Isolation capacitance, pF					1000 Max.
Switching frequency, kHz			360 Min.	400 Typ.	440 Max.

Environmental Specifications

Operating ambient temperature, °C	Without derating	-40 Min.		+60 Max.
	With derating	+60 Min.		+105 Max.
Maximum case temperature, °C				+105 Max.
Storage temperature range, °C		-55 Min.		+125 Max.
Thermal impedance, °C/W	Vertical direction by natural convection (20LFM)			
	Without heat-sink		+18.2 Typ.	
	With heat-sink		+15.8 Typ.	
Thermal shock		MIL-STD-810F		
Vibration		MIL-STD-810F		
Relative humidity		5% to 95% RH		

Physical Specifications

Design meet safety standard	UL60950-1, EN60950-1, IEC60950-1
Case material	Nickel-coated copper
Base material	FR4 PCB
Potting material	Epoxy (UL94 V-0)
Weight	15g (0.53oz)
MTBF	1.459×10⁶ hrs, MIL-HDBK-217F, Full load

EMC Specifications

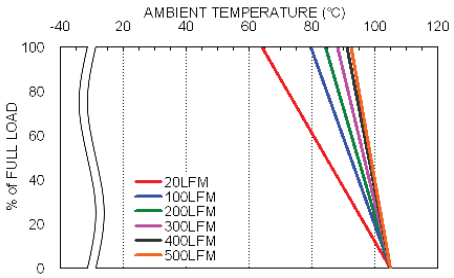
Specifications	Conditions		Level
EMI[3]	EN55022		Class A
			Class B
ESD	EN61000-4-2	Air ±8kV and Contact ±6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	10V/m	Perf. Criteria A
Fast transient[4]	EN61000-4-4	±2kV	Perf. Criteria A
Surge[4]	EN61000-4-5	±1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6	3Vr.m.s	Perf. Criteria A

Note:

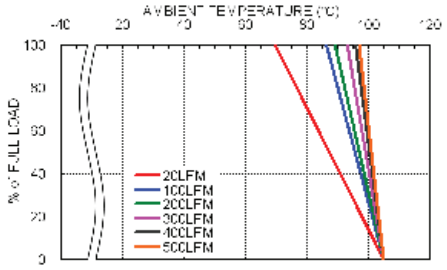
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either the +Vout pin or the -Vout pin.
3. The standard modules meet EN55022 Class A and Class B with external components.
   For further information, please contact Polytron Devices.
4. An external input filter capacitor is required if the module has to meet EN6100-4-4. EN61000-4-5.
   Recommended 2 pcs of aluminum electrolytic capacitor (Nippon Chemi-con KY series, 220μF/100V) to connect in parallel.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

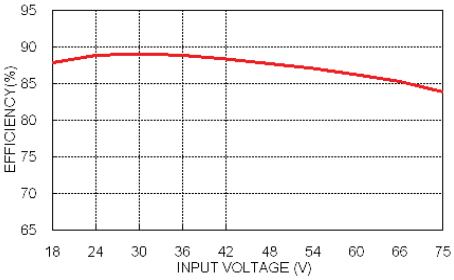
Characteristic Curve



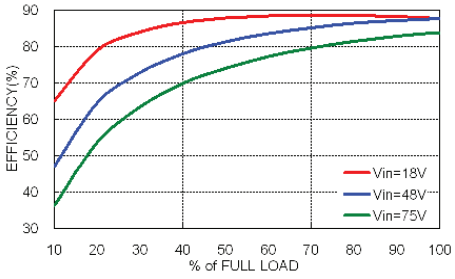
LPB15-48S5 Derating Curve



LPB15-48S5 Derating Curve With Heat-sink

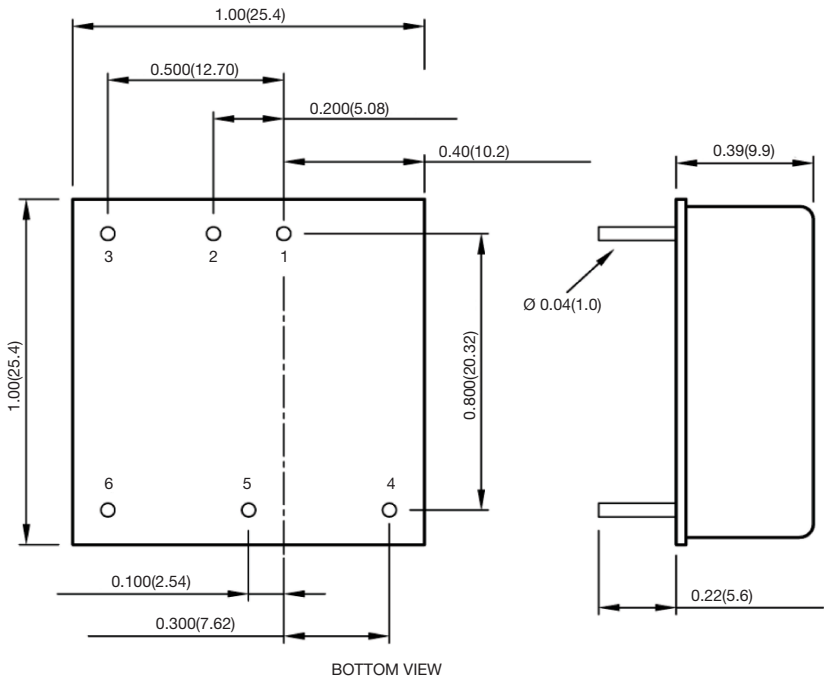


LPB15-48S5 Efficiency vs. Input Voltage



LPB15-48S5 Efficiency vs. Output Load

Mechanical Drawing

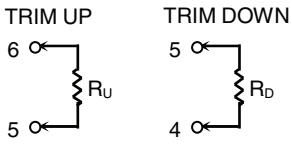


PIN CONNECTION

PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	Ctrl	Ctrl
4	+Vout	+Vout
5	Trim	Common
6	-Vout	-Vout

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method shown below.



1. All dimensions in inch (mm)
2. Tolerance: x.xx±0.02 (x.x±0.5)x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)