



DC-DC CONVERTERS

REGULATED, 4:1 WIDE INPUT RANGE UP TO 20 WATTS

LOW PROFILE, SINGLE & DUAL OUTPUT
LPB20 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	4500	10	89	LPB20-24S33	7000
9 - 36	5	4000	10	89	LPB20-24S5	5000
9 - 36	12	1670	6	89	LPB20-24S12	850
9 - 36	15	1330	6	89	LPB20-24S15	700
18 - 75	3.3	4500	10	90	LPB20-48S33	7000
18 - 75	5	4000	10	90	LPB20-48S5	5000
18 - 75	12	1670	4	89	LPB20-48S12	850
18 - 75	15	1330	4	90	LPB20-48S15	700
9 - 36	±12	±833	6	89	LPB20-24-12	±500
9 - 36	±15	±667	6	90	LPB20-24-15	±350
18 - 75	±12	±833	4	89	LPB20-48-12	±500
18 - 75	±15	±667	4	90	LPB20-48-15	±350



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Input Specifications			Output Specifications			
Operating input voltage range, Vdc	9 Min., 24 Typ., 36 Max.	24Vin(nom)	Voltage accuracy, %	-1.0 Min., +1.0 Max		
	18 Min., 48 Typ., 75 Max.	48Vin(nom)	Line regulation, %	-0.2 Min., +0.2 Max.	Single	
Input reflected ripple current, mAp-p	30 Typ.	Nominal input and Full load		-0.5 Min., +0.5 Max.	Dual	
Start up voltage, Vdc	9 Max.	24Vin(nom)	Load regulation, %	-0.2 Min., +0.2 Max.	No Load to Full Load, Single	
	18 Max.	48Vin(nom)		-1.0 Min., +1.0 Max.	No Load to Full Load, Dual	
Shutdown voltage, Vdc	8 Typ.	24Vin(nom)		-0.1 Min., +0.1 Max.	10% Load to 90% Load, Single	
	16 Typ.	48Vin(nom)	-0.8 Min., +0.8 Max.	10% Load to 90% Load, Dual		
Start up time, ms		Constant resistive load	Cross regulation, %	-5.0 Min., +5.0 Max.	Asymmetrical load 25%/100%FL, Dual	
	30 Max.	Power up	Voltage and adjustability ⁽²⁾ , %	-10 Min., +10 Max.	Single Output	
	30 Max.	Remote ON/OFF	Ripple and noise, mVp-p		Measured by 20MHz bandwidth with a 1µF M/C X7R and a 10µF T/C	
Input surge voltage, Vdc		1 second, max.		75 Typ.	3.3Vout, 5Vout	
	50 Max.	24Vin(nom)		100 Typ.	12Vout, 15Vout	
Input filter	Pi type		Temperature coefficient, %/°C	-0.02 Min., +0.02 Max.		
			Referred to -Vin pin	Transient response recovery time, µs	250 Typ.	25% load step change
Remote ON/OFF		Open or 3 - 15 Vdc	Over voltage protection, Vdc	3.7 Min., 5.4 Max.	3.3Vout	
		Short or 0 - 1.2 Vdc		(Option), DC-DC OFF	5.6 Min., 7.0 Max.	5Vout
		Short or 0 - 1.2 Vdc		Negative logic, DC-DC ON	13.5 Min., 19.6 Max.	12Vout
		Open or 3 - 15 Vdc	(Standard), DC-DC OFF	16.8 Min., 20.5 Max.	15Vout	
		-0.5 Min., 1.0 Max., mA	Input current of Ctrl pin	Over load protection, %	150 Typ.	% of lout rated; Hiccup mode
		2.0 mA Typ.	Remote off input current	Short circuit protection	Continuous, automatic 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			1500 Max.		
Switching frequency, kHz	3.3Vout, 5Vout		248 Min.	275 Typ.	303 Max.
	Others		297 Min.	330 Typ.	363 Max.

Environmental Specifications					
Operating ambient temperature, °C	Without derating		-40 Min.	+60 Max.	
	With derating		+60 Min.	+101 Max.	
Maximum case temperature, °C			+105 Max.		
Storage temperature range, °C	Others		-55 Min.	+125 Max.	
Thermal impedance, °C/W	Vertical direction by natural convection (20LFM)				
	Without heat-sink		+17.6 Typ.		
Thermal shock			MIL-STD-810F		
Vibration			MIL-STD-810F		
Relative humidity			5% to 95% RH		

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Physical Specifications

Design meet safety standard	UL60950-1, EN60950-1, IEC60950-1
Case material	Nickel-coated copper
Base material	FR4 PCB
Potting material	Silicone (UL94 V-0)
Weight	15g (0.53oz)
MTBF	1.469×10 ⁶ hrs, MIL-HDBK-217F, Full load

EMC Specifications

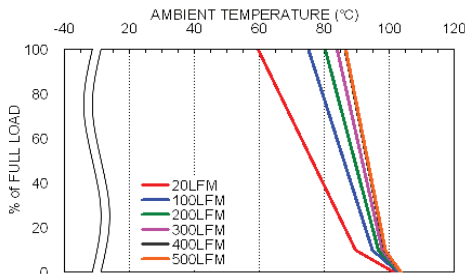
Specifications	Conditions	Level
EMI ⁽³⁾	EN55022	Class A
		Class B
ESD	EN61000-4-2 Air ±8kV and Contact ±6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10V/m	Perf. Criteria A
Fast transient ⁽⁴⁾	EN61000-4-4 ±2kV	Perf. Criteria A
Surge ⁽⁴⁾	EN61000-4-5 ±2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6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

Note:

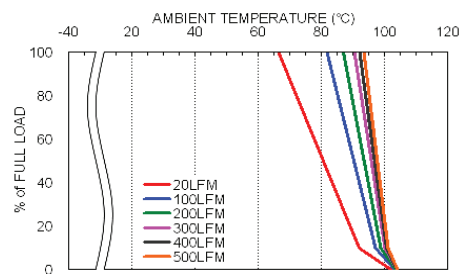
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either the +Vout pin or the -Vout pin.
3. The standard modules meet EN55022 Class A without external components and meet 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.

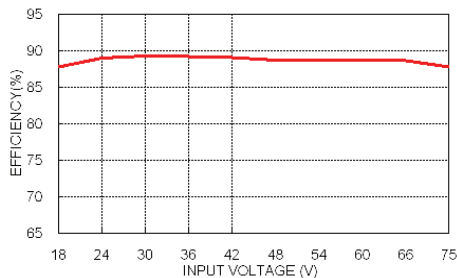
Characteristic Curve



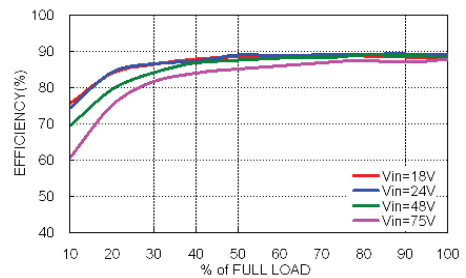
LPB20-48S5 Derating Curve



LPB20-48S5 Derating Curve With Heat-sink

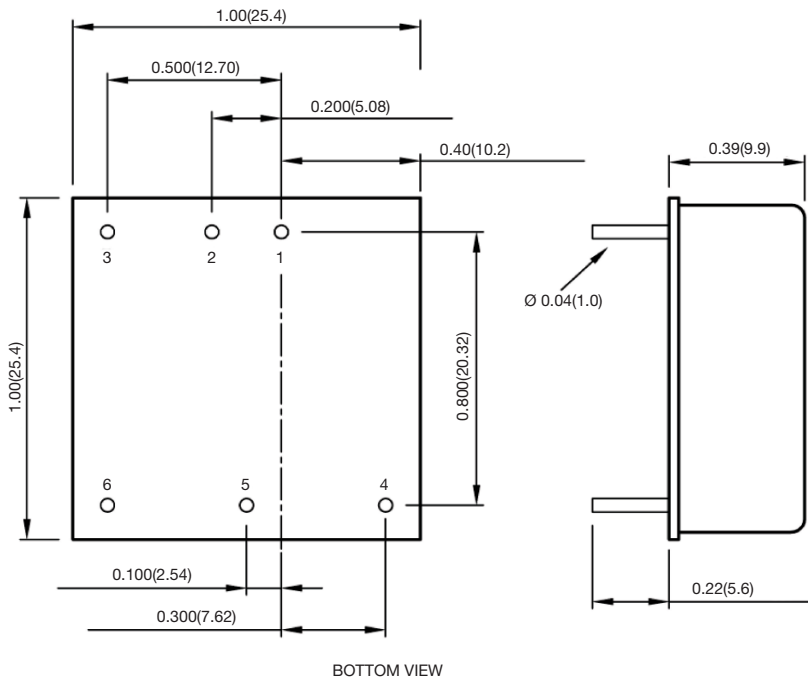


LPB20-48S5 Efficiency vs. Input Voltage



LPB20-48S5 Efficiency vs. Output Load

Mechanical Drawing

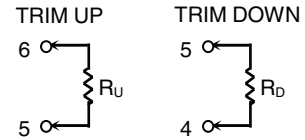


PIN CONNECTION

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: $x.xx \pm 0.02$ ($x.x \pm 0.5$) $x.xxx \pm 0.01$ ($x.xx \pm 0.25$)
3. Pin pitch tolerance ± 0.01 (0.25)
4. Pin dimension tolerance ± 0.004 (0.1)