



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

*Use Suffix after Model Number:

- Standard Negative logic remote ON/OFF
- Suffix "A" Positive logic remote ON/OFF
- Suffix "B" Without Ctrl pin
- Suffix "C" Negative Logic Remote ON/OFF without trim pin
- Suffix "D" Without Control and Trim Pin
- Suffix "E" Positive logic remote ON/OFF without Trim pin
- Suffix "HS" Heat Sink
- Suffix "HC" Heat Sink with clamp

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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, %		Low Line to High Line at Full Load	
Input reflected ripple current, mAp-p	30 Typ.	Nominal input and Full load		-0.2 Min., +0.2 Max.	Single	
Start up voltage, Vdc	9 Max.	24Vin(nom)	-0.5 Min., +0.5 Max.	Dual		
	18 Max.	48Vin(nom)	Load regulation, %	-0.2 Min., +0.2 Max.	No Load to Full Load, Single	
Shutdown voltage, Vdc	8 Typ.	24Vin(nom)		-1.0 Min., +1.0 Max.	No Load to Full Load, Dual	
	16 Typ.	48Vin(nom)		-0.1 Min., +0.1 Max.	10% Load to 90% Load, Single	
Start up time, ms		Constant resistive load	-0.8 Min., +0.8 Max.	10% Load to 90% Load, Dual		
	30 Max.	Power up	Cross regulation, %	-5.0 Min., +5.0 Max.	Asymmetrical load 25%/100%FL, Dual	
30 Max.	Remote ON/OFF	Voltage and adjustability ⁽²⁾ , %		-10 Min., +10 Max.	Single Output	
Input surge voltage, Vdc			1 second, max.	Ripple and noise, mVp-p		Measured by 20MHz bandwidth with a 1µF M/C X7R and a 10µF T/C
	50 Max.	24Vin(nom)	75 Typ.		3.3Vout, 5Vout	
Input filter	Pi type		100 Typ.	12Vout, 15Vout		
			Temperature coefficient, %/°C	-0.02 Min., +0.02 Max.		
Remote ON/OFF		Referred to -Vin pin		Transient response recovery time, µs	250 Typ.	25% load step change
	Open or 3 - 15 Vdc	Positive logic, DC-DC ON	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, 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			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.
	With heat-sink			+14.8 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

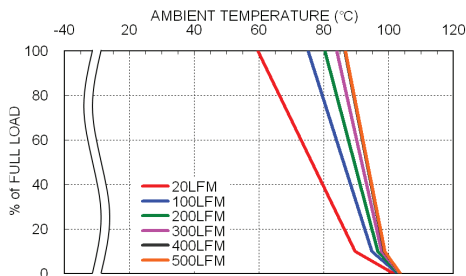
EMC Specifications			
Specifications	Conditions		Level
EMI ⁽³⁾	EN55022		Class A
			Class B
ESD	EN61000-4-2	Air ±8kV and Contact ±6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	10V/m	Perf. Criteria A
Fast transient ⁽⁴⁾	EN61000-4-4	±2kV	Perf. Criteria A
Surge ⁽⁴⁾	EN61000-4-5	±2kV	Perf. Criteria A
Conducted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

Note:

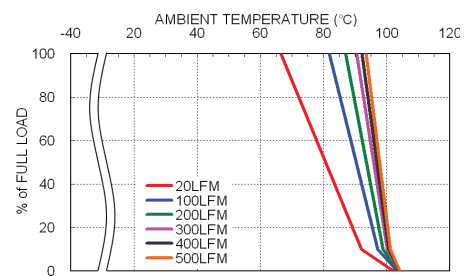
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either the +Vout pin or the -Vout pin.
3. The standard modules meet EN55022 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.

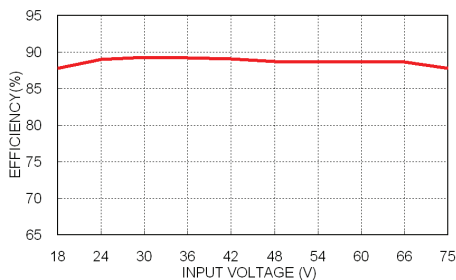
Characteristic Curve



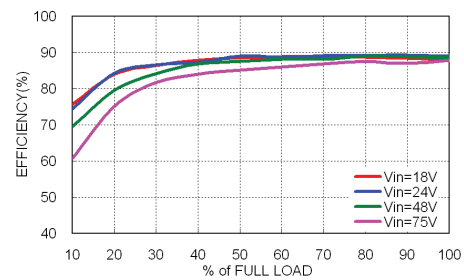
LPB20-48S5 Derating Curve



LPB20-48S5 Derating Curve With Heat-sink



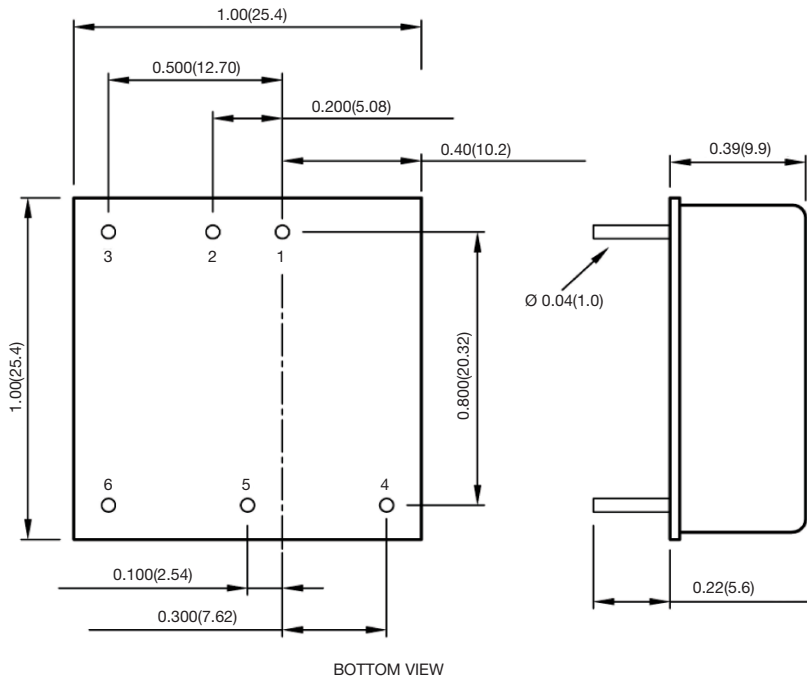
LPB20-48S5 Efficiency vs. Input Voltage



LPB20-48S5 Efficiency vs. Output Load

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Mechanical Drawing

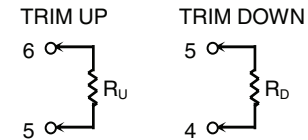


PIN CONNECTION

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)