



DC-DC CONVERTERS

REGULATED, 4:1 WIDE INPUT RANGE UP TO 10 WATTS

LOW PROFILE, SINGLE & DUAL OUTPUT

LPB10 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	3000	6	85	LPB10-24S33	3500
9 - 36	5	2000	6	87	LPB10-24S5	2500
9 - 36	12	830	6	90	LPB10-24S12	430
9 - 36	15	670	6	91	LPB10-24S15	350
9 - 36	24	416	6	90	LPB10-24S24	125
18 - 75	3.3	3000	4	85	LPB10-48S33	3500
18 - 75	5	2000	4	87	LPB10-48S5	2500
18 - 75	12	830	4	90	LPB10-48S12	430
18 - 75	15	670	4	90	LPB10-48S15	350
18 - 75	24	416	4	90	LPB10-48S24	125
9 - 36	±5	±1000	6	87	LPB10-24-5	±1440
9 - 36	±12	±416	6	89	LPB10-24-12	±250
9 - 36	±15	±333	6	89	LPB10-24-15	±180
18 - 75	±5	±1000	4	87	LPB10-48-5	±1440
18 - 75	±12	±416	4	89	LPB10-48-12	±250
18 - 75	±15	±333	4	89	LPB10-48-15	±180



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Input Specifications			Output Specifications			
Operating input voltage range, Vdc	9 Min., 24 Typ., 36 Max.	24Vin(nom)	Output power, W	11 Max.	Output voltage trimmed up 10%	
	18 Min., 48 Typ., 75 Max.	48Vin(nom)		12 Max.	Output voltage trimmed up 20%	
Start up voltage, Vdc	9 Max.	24Vin(nom)	Voltage accuracy, %	-1.0 Min., +1.0 Max		
	18 Max.	48Vin(nom)		Line regulation, %	Low Line to High Line at Full Load	
Shutdown voltage, Vdc	8 Typ.	24Vin(nom)	Load regulation, %		-0.2 Min., +0.2 Max.	Single
	16 Typ.	48Vin(nom)		-0.5 Min., +0.5 Max.	Dual	
Start up time, ms	Constant resistive load		Cross regulation, %	-0.2 Min., +0.2 Max.	No Load to Full Load, Single	
	30 Max.	Power up		-1.0 Min., +1.0 Max.	No Load to Full Load, Dual	
	30 Max.	Remote ON/OFF		-0.1 Min., +0.1 Max.	10% Load to 90% Load, Single	
Input surge voltage, Vdc	1 second, max.		Voltage and adjustability ⁽²⁾ , %	-0.8 Min., +0.8 Max.	10% Load to 90% Load, Dual	
	50 Max.	24Vin(nom)		-5.0 Min., +5.0 Max.	Asymmetrical load 25%/100%FL, Dual	
Input reflected ripple current, mAp-p	30 Typ.	Nominal input and Full load	Ripple and noise, mVp-p	-10 Min., +10 Max.	Single Output, 3.3Vout, 12Vout	
	100 Max.	48Vin(nom)		-10 Min., +20 Max.	Others	
Remote ON/OFF	Referred to -Vin pin		Temperature coefficient, %/°C	Measured by 20MHz bandwidth		
	Open or 3 - 15 Vdc	Positive logic, DC-DC ON		Transient response recovery time, µs	40 Typ.	With a 10µF/25V X7R 1206 MLCC, 3.3Vout, 5Vout
	Short or 0 - 1.2 Vdc	(Option), DC-DC OFF	60 Typ.		With a 10µF/25V X7R 1206 MLCC, 12Vout, 15Vout	
	Short or 0 - 1.2 Vdc	Negative logic, DC-DC ON	60 Typ.	With a 1µF/25V X7R 1206 MLCC, 24Vout		
	Open or 3 - 15 Vdc	(Standard), DC-DC OFF	Over voltage protection, Vdc	-0.2 Min., -0.2 Max.		
	-0.5 Min., 1 Max., mA	Input current of Ctrl pin		250 Typ.	25% load step change	
	2.5 mA Typ.	Remote off input current		3.7 Min., 5.4 Max.	3.3Vout	
			Over load protection, %	6.3 Min., 7.4 Max.	5Vout	
				Short circuit protection	13.5 Min., 19.6 Max.	12Vout
					18.3 Min., 22.0 Max.	15Vout
					29.1 Min., 32.5 Max.	24Vout
			150 Typ. % of lout rated; Hiccup mode			
			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			297 Min. 330 Typ. 363 Max.

Environmental Specifications

Operating ambient temperature, °C	Without derating	-40 Min.	+81 Max.
	With derating	+81 Min.	+105 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		+16.18 Typ.
Thermal shock	With heat-sink		+15.13 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	Copper
Base material	FR4 PCB
Potting material	Epoxy (UL94 V-0)
Weight	16.5g (0.58oz)
MTBF	3.376×10 ⁶ hrs, MIL-HDBK-217F, Full load

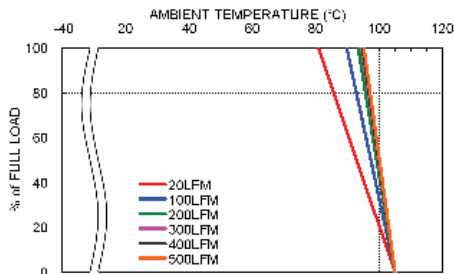
EMC Specifications		
Specifications	Conditions	Level
EMI ⁽³⁾	EN55022	Class A
		Class B
ESD	EN61000-4-2	Air ±8kV and Contact ±6kV
Radiated immunity	EN61000-4-3	10V/m
Fast transient ⁽⁴⁾	EN61000-4-4	±2kV
Surge ⁽⁴⁾	EN61000-4-5	±1kV
Conducted immunity	EN61000-4-6	3Vr.m.s

Note:

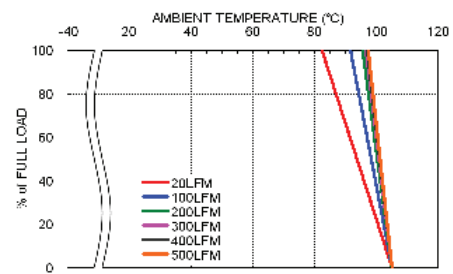
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either the +Vout pin or the -Vout pin.
3. The standard modules meet EN55022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

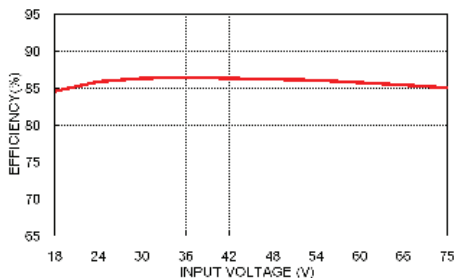
Characteristic Curve



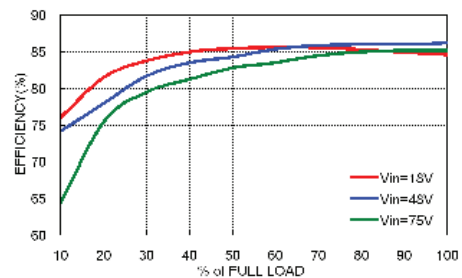
LPB10-48S5 Derating Curve



LPB10-48S5 Derating Curve With Heat-sink

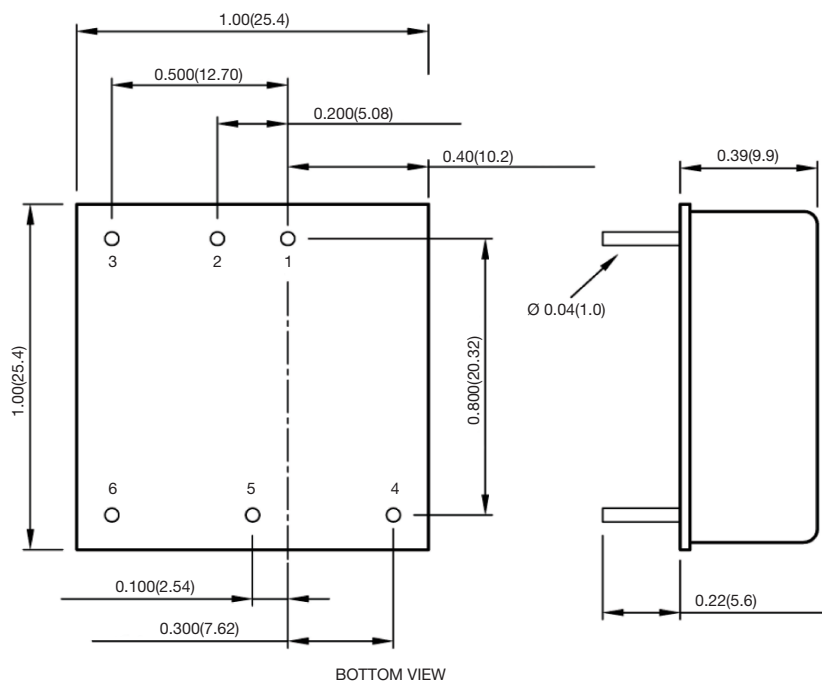


LPB10-48S5 Efficiency vs. Input Voltage



LPB10-48S5 Efficiency vs. Output Load

Mechanical Drawing

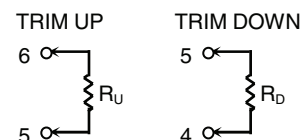


PIN CONNECTION

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)