



DC-DC CONVERTERS

REGULATED, 4:1 WIDE INPUT RANGE UP TO 30 WATTS

LOW PROFILE, SINGLE & DUAL OUTPUT

LPB30 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 Approvals 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	7000	10	88	LPB30-24S33	10000
9 - 36	5	6000	10	89	LPB30-24S5	7200
9 - 36	12	2500	10	89	LPB30-24S12	1200
9 - 36	15	2000	10	89	LPB30-24S15	1000
9 - 36	24	1250	10	90	LPB30-24S24	375
18 - 75	3.3	7000	10	88	LPB30-48S33	10000
18 - 75	5	6000	10	90	LPB30-48S5	7200
18 - 75	12	2500	8	90	LPB30-48S12	1200
18 - 75	15	2000	8	91	LPB30-48S15	1000
18 - 75	24	1250	8	92	LPB30-48S24	375
9 - 36	±12	±1250	10	89	LPB30-24-12	±750
9 - 36	±15	±1000	10	91	LPB30-24-15	±500
9 - 36	±24	±625	12	91	LPB30-24-24	±180
18 - 75	±12	±1250	8	91	LPB30-48-12	±750
18 - 75	±15	±1000	8	92	LPB30-48-15	±500
18 - 75	±24	±625	10	92	LPB30-48-24	±180



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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		1 second, max.
	50 Max.	24Vin(nom)
	100 Max.	48Vin(nom)
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., 1.0 Max., mA	Input current of Ctrl pin
	2.0 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
	-0.1 Min., +0.1 Max.	10% Load to 90% Load, Single
	-0.8 Min., +0.8 Max.	10% Load to 90% Load, Dual
Cross regulation, %	-5.0 Min., +5.0 Max.	Asymmetrical load 25%/100%FL, Dual
Voltage and adjustability ⁽²⁾ , %	-10 Min., +20 Max.	Single Output, 15Vout, 24Vout
	-10 Min., +10 Max.	Others
Ripple and noise, mVp-p		Measured by 20MHz bandwidth, 3.3Vout, 5Vout
	75 Typ.	With a 22μF/25V X7R MLCC, Single, 3.3Vout, 5Vout
	75 Typ.	With 2 pcs of 22μF/25V X7R MLCC, Single, 12Vout, 15Vout
	75 Typ.	With 2 pcs of 6.8μF/50V X7R MLCC, Single, 24Vout
	60 Typ.	With a 10μF/25V X7R MLCC for each output, Dual, 12Vout, ±15Vout
	75 Typ.	With a 4.7μF/50V X7R MLCC for each output, Dual, 24Vout
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
	18.3 Min., 22.0 Max.	15Vout
	29.1 Min., 32.5 Max.	24Vout
Over load protection, %	170 Typ.	% of Iout rated; Hiccup mode
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.

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Environmental Specifications				
Operating ambient temperature, °C	Without derating	-40 Min.		+50 Max.
	With derating	+50 Min.		+100 Max.
Maximum case temperature, °C				+105 Max.
Over temperature protection, °C			+115 Typ.	
Storage temperature range, °C		-55 Min.		+125 Max.
Thermal impedance, °C/W	Vertical direction by natural convection (20LFM)			
	Without heat-sink		+15 Typ.	
	With heat-sink		+13.8 Typ.	
Thermal shock		MIL-STD-810F		
Vibration		MIL-STD-810F		
Relative humidity		5% to 95% RH		

Physical Specifications		EMC Specifications			
Design meet safety standard	UL60950-1, EN60950-1, IEC60950-1	Specifications	Conditions		Level
Case material	Copper	EMI ⁽³⁾	EN55032	With external components	Class A
					Class B
Base material	FR4 PCB	ESD	EN61000-4-2	Air ±8kV and Contact ±6kV	Perf. Criteria A
Potting material	Silicone (UL94 V-0)	Radiated immunity	EN61000-4-3	10V/m	Perf. Criteria A
Weight	16.5g (0.58oz)	Fast transient ⁽⁴⁾	EN61000-4-4	±2kV	Perf. Criteria A
		Surge ⁽⁴⁾	EN61000-4-5	±2kV	Perf. Criteria A
MTBF	1.259×10 ⁶ hrs, MIL-HDBK-217F, Full load	Conducted immunity	EN61000-4-6	10Vr.m.s	Perf. Criteria A

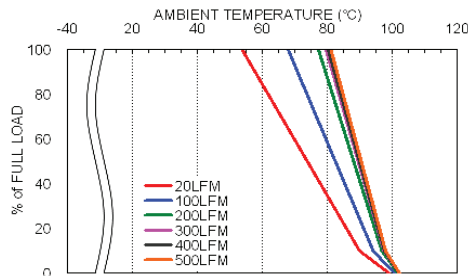
Note:

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 and Class B with external components. For further information, please contact Polytron Devices.
4. The external input components are required if the module has to meet EN6100-4-4. EN61000-4-5. The LPB30-24XXX recommended an aluminum electrolytic capacitor (Nippon Chemi-con KY series, 220µF/100V) and a TVS (SMDJ58A, 58V, 300Watt peak pulse power) to connect in parallel. The LPB30-48XXX recommended an aluminum electrolytic capacitor (Nippon Chemi-con KY series, 220µF/100V).

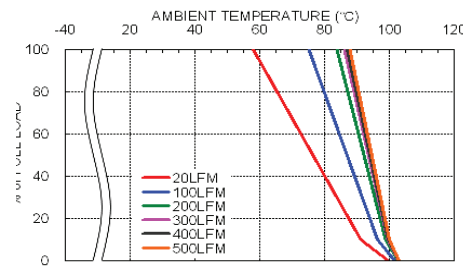
CAUTION: This power module is not internally fused. An input line fuse must always be used.

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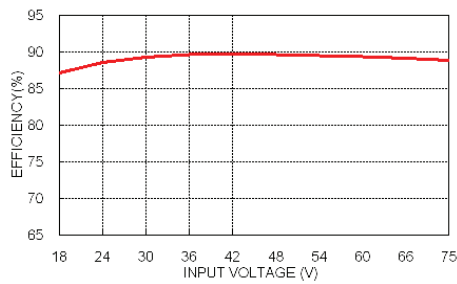
Characteristic Curve



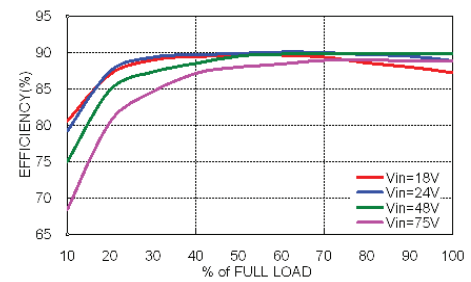
LPB30-48S5 Derating Curve



LPB30-48S5 Derating Curve With Heat-sink

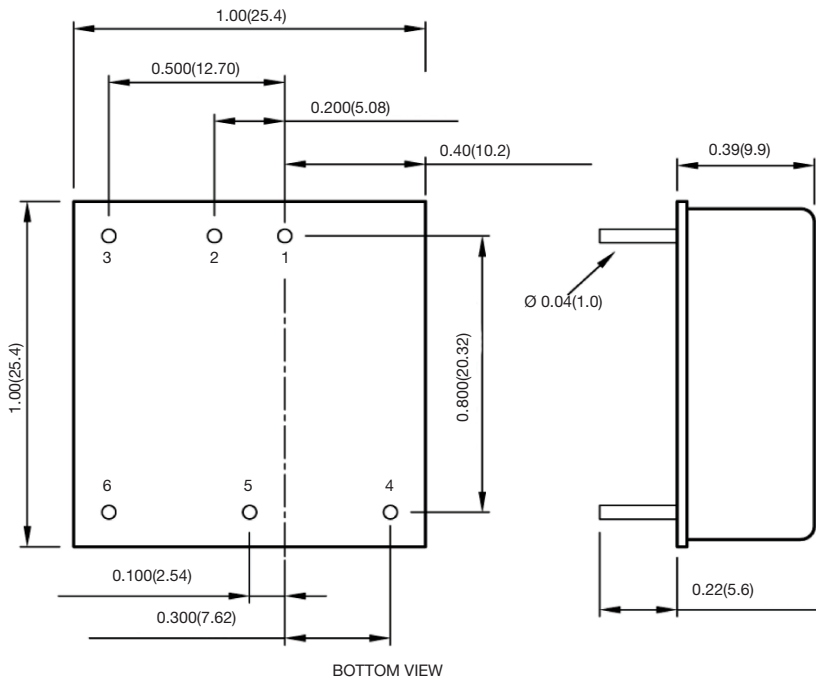


LPB30-48S5 Efficiency vs. Input Voltage



LPB30-48S5 Efficiency vs. Output Load

Mechanical Drawing

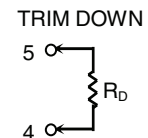
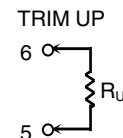


PIN CONNECTION

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)