

DC-DC CONVERTERS

REGULATED, 2:1 WIDE INPUT RANGE, 30 WATTS

LOW PROFILE, SINGLE & DUAL OUTPUT

LPA30 SERIES



FEATURES

- 2:1 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 - 18	3.3	7000	10	87	LPA30-12S33	10000
9 - 18	5	6000	10	89	LPA30-12S5	7200
9 - 18	12	2500	12	89	LPA30-12S12	1200
9 - 18	15	2000	12	89	LPA30-12S15	1000
9 - 18	24	1250	12	90	LPA30-12S24	375
18 - 36	3.3	7000	10	87	LPA30-24S33	10000
18 - 36	5	6000	10	90	LPA30-24S5	7200
18 - 36	12	2500	10	91	LPA30-24S12	1200
18 - 36	15	2000	10	91	LPA30-24S15	1000
18 - 36	24	1250	10	93	LPA30-24S24	375
36 - 75	3.3	7000	10	88	LPA30-48S33	10000
36 - 75	5	6000	10	90	LPA30-48S5	7200
36 - 75	12	2500	8	90	LPA30-48S12	1200
36 - 75	15	2000	8	91	LPA30-48S15	1000
36 - 75	24	1250	8	92	LPA30-48S24	375
9 - 18	±12	±1250	12	89	LPA30-12-12	±750
9 - 18	±15	±1000	12	90	LPA30-12-15	±500
9 - 18	±24	±625	14	90	LPA30-12-24	±180
18 - 36	±12	±1250	10	91	LPA30-24-12	±750
18 - 36	±15	±1000	10	91	LPA30-24-15	±500
18 - 36	±24	±625	12	92	LPA30-24-24	±180
36 - 75	±12	±1250	8	91	LPA30-48-12	±750
36 - 75	±15	±1000	8	92	LPA30-48-15	±500
36 - 75	±24	±625	10	92	LPA30-48-24	±180

*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

LPA30 SERIES

Input Specifications		
Operating input voltage range, Vdc	9 Min., 12 Typ., 18 Max.	12Vin(nom)
	18 Min., 24 Typ., 36 Max.	24Vin(nom)
	36 Min., 48 Typ., 75 Max.	48Vin(nom)
Start up voltage, Vdc	9 Max.	12Vin(nom)
	18 Max.	24Vin(nom)
	36 Max.	48Vin(nom)
Shutdown voltage, Vdc	8 Typ.	12Vin(nom)
	16 Typ.	24Vin(nom)
	33 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.
	25 Max.	12Vin(nom)
	50 Max.	24Vin(nom)
	100 Max.	48Vin(nom)
Input filter		Pi type
Input reflected ripple current, mA _{p-p}	30 Typ.	Nominal input and Full load
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
	2.0 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, mV _{p-p}		Measured by 20MHz bandwidth
	75 Typ.	With a 22μF/25V X7R MLCC, 3.3Vout, 5Vout, Single
	75 Typ.	With 2 pcs. of 22μF/25V X7R MLCC, 12Vout, 15Vout, Single
	75 Typ.	With 2pcs. of 6.8μF/50V X7R MLCC, 24Vout, Single
	60 Typ.	With a 10μF/25V X7R MLCC per output, 12Vout, 15Vout, Dual
75 Typ.	With a 4.7μF/50V X7R MLCC per output, 24Vout, Dual	
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 Max.	5Vout
	13.5 Min., 19.6 Max.	12Vout
	18.3 Min., 22 Max.	15Vout
	29.1 Min., 32.5 Max.	24Vout
Over load protection, %	140 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.
Design meet safety standard	UL60950-1, EN60950-1, IEC60950-1			

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	
Case material	Copper
Base material	FR4 PCB
Potting material	Silicone (UL94 V-0)
Weight	16.5g (0.58oz)
MTBF	1.303×10 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

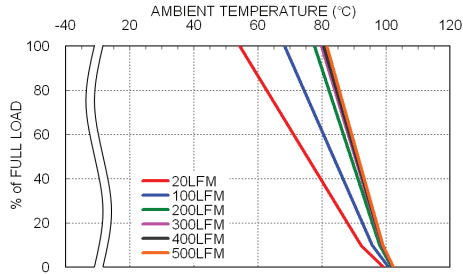
- Note:**
1. Test by minimum input and constant resistive load.
 2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either the +Vout pin or the -Vout pin.
 3. The standard modules meet EN55022 Class A without external components and meet Class B with external components. For further information, please contact Polytron Devices.

An external input components are required if the module has to meet EN6100-4-4. EN61000-4-5.
 The LPA30-12XXX recommended an aluminum electrolytic capacitor (Nippon Chemi-con KY series, 220µF/100V) and a TVS (SMDJ58A, 58V, 3000Watt peak pulse power) to connect in parallel.
 The LPA30-24XXX and LPA30-48XXX recommended an aluminum electrolytic capacitor (Nippon Chemi-con KY series, 220µF/100V).

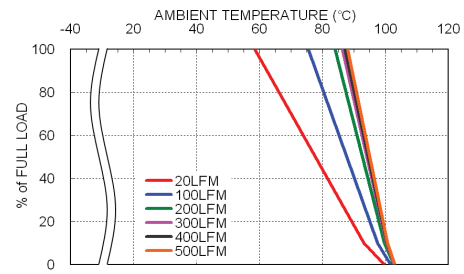
CAUTION: This power module is not internally fused. An input line fuse must always be used.

LPA30 SERIES

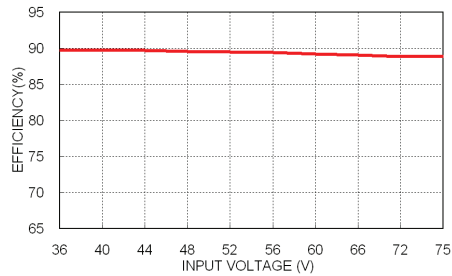
Characteristic Curve



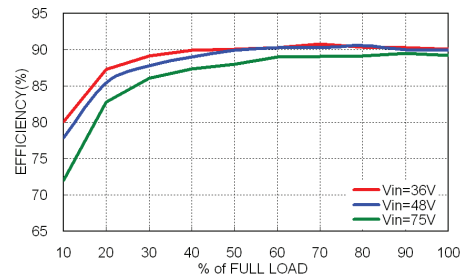
LPA30-48S5 Derating Curve



LPA30-48S5 Derating Curve With Heat-sink

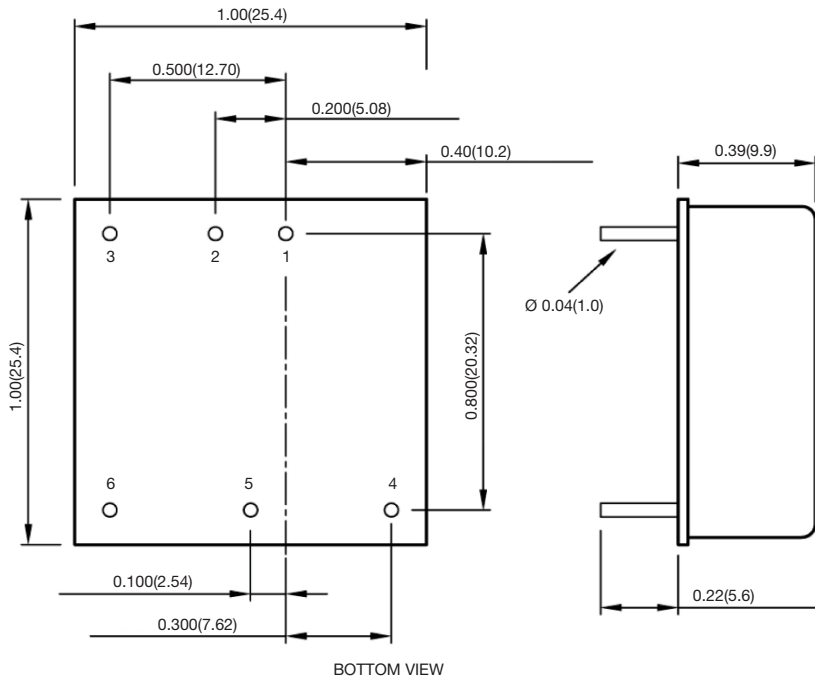


LPA30-48S5 Efficiency vs. Input Voltage



LPA30-48S5 Efficiency vs. Output Load

Mechanical Drawing

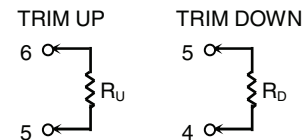


PIN CONNECTION

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)