

DC-DC CONVERTERS

REGULATED, 2:1 WIDE INPUT RANGE, 10 WATTS

LOW PROFILE, SINGLE & DUAL OUTPUT
LPA10 SERIES



FEATURES

- 2:1 Wide Input Voltage Range
- No Minimum Load Required
- High Efficiency Up to 91%
- 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	3000	10	83	LPA10-12S33	3500
9 - 18	5	2000	10	86	LPA10-12S5	2500
9 - 18	12	830	10	89	LPA10-12S12	430
9 - 18	15	670	10	90	LPA10-12S15	350
9 - 18	24	416	10	91	LPA10-12S24	125
18 - 36	3.3	3000	6	85	LPA10-24S33	3500
18 - 36	5	2000	6	86	LPA10-24S5	2500
18 - 36	12	830	6	91	LPA10-24S12	430
18 - 36	15	670	6	90	LPA10-24S15	350
18 - 36	24	416	6	91	LPA10-24S24	125
36 - 75	3.3	3000	4	85	LPA10-48S33	3500
36 - 75	5	2000	4	87	LPA10-48S5	2500
36 - 75	12	830	4	90	LPA10-48S12	430
36 - 75	15	670	4	90	LPA10-48S15	350
36 - 75	24	416	4	91	LPA10-48S24	125
9 - 18	±5	±1000	10	86	LPA10-12-5	±1440
9 - 18	±12	±416	10	89	LPA10-12-12	±250
9 - 18	±15	±333	10	99	LPA10-12-15	±180
18 - 36	±5	±1000	6	86	LPA10-24-5	±1440
18 - 36	±12	±416	6	90	LPA10-24-12	±250
18 - 36	±15	±333	6	90	LPA10-24-15	±180
36 - 75	±5	±1000	4	87	LPA10-48-5	±1440
36 - 75	±12	±416	4	91	LPA10-48-12	±250
36 - 75	±15	±333	4	90	LPA10-48-15	±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

LPA10 SERIES

Input Specifications			Output Specifications			
Operating input voltage range, Vdc	9 Min., 12 Typ., 18 Max.	12Vin(nom)	Output power, W	11 Max.	Output voltage trimmed up 10%	
	18 Min., 24 Typ., 36 Max.	24Vin(nom)		12 Max.	Output voltage trimmed up 20%	
	36 Min., 48 Typ., 75 Max.	48Vin(nom)	Voltage accuracy, %	-1.0 Min., 1.0 Max		
Start up voltage, Vdc	9 Max.	12Vin(nom)	Line regulation, %	-0.2 Min., 0.2 Max.	Single	
	18 Max.	24Vin(nom)		-0.5 Min., 0.5 Max.	Dual	
	36 Max.	48Vin(nom)	Load regulation, %	-0.2 Min., 0.2 Max.	No Load to Full Load, Single	
Shutdown voltage, Vdc	8 Typ.	12Vin(nom)		-1.0 Min., 1.0 Max.	No Load to Full Load, Dual	
	16 Typ.	24Vin(nom)		-0.1 Min., 0.1 Max.	10% Load to 90% Load, Single	
	33 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, 3.3Vout, 12Vout
	30 Max.	Remote ON/OFF	-10 Min., 20 Max.		Others	
Input surge voltage, Vdc		1 second, max.	Ripple and noise, mVp-p		Measured by 20MHz bandwidth	
	25 Max.	12Vin(nom)		40 Typ.	With a 10µF/25V X7R 1206 MLCC, 3.3Vout, 5Vout	
	50 Max.	24Vin(nom)		60 Typ.	With a 10µF/25V X7R 1206 MLCC, 12Vout, 15Vout	
	100 Max.	48Vin(nom)		60 Typ.	With a 1µF/25V X7R 1206 MLCC, 24Vout	
Input reflected ripple current, mA _{p-p}	30 Typ.	Nominal input and Full load	Temperature coefficient, %/°C	-0.2 Min., -0.2 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			6.3 Min., 7.4 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			18.3 Min., 22.0 Max.	15Vout
-0.5 Min., 1 Max., mA		Input current of Ctrl pin		29.1 Min., 32.5 Max.	24Vout	
2.5 mA Typ.		Remote off input current	Over load protection, %	150 Typ.	% of lout 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			297 Min.	330 Typ.	363 Max.
Design meet safety standard	UL60950-1, EN60950-1, IEC60950-1				

LPA10 SERIES

Environmental Specifications

Operating ambient temperature, °C	Without derating	-40 Min.	78 Max.
	With derating	+78 Min.	105 Max.
Maximum case temperature, °C			105 Max.
Storage temperature range, °C		-55 Min.	125 Max.
Thermal impedance, °C/W	Vertical direction by natural convection (20LFM)		
	Without heat-sink		16.18 Typ.
	With heat-sink		15.13 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	Epoxy (UL94 V-0)
Weight	16.5g (0.58oz)
MTBF	3.308×10 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 ±1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 3Vr.m.s	Perf. Criteria A

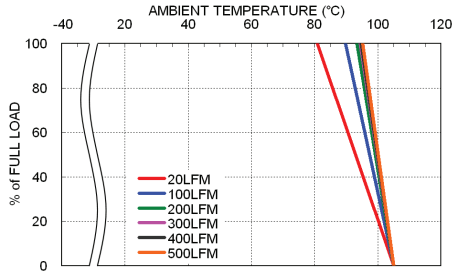
Note:

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.

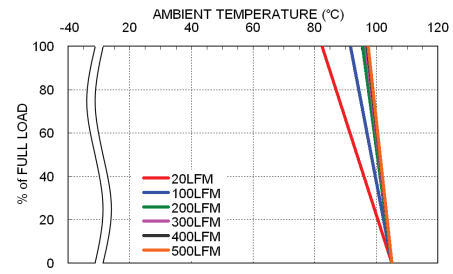
CAUTION: This power module is not internally fused. An input line fuse must always be used.

LPA10 SERIES

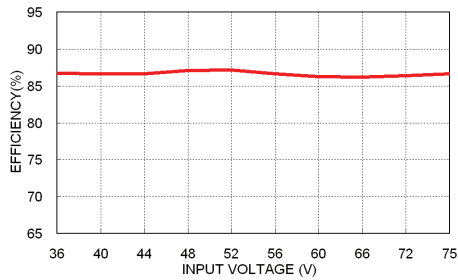
Characteristic Curve



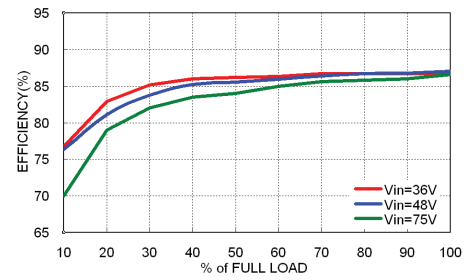
LPA10-48S5 Derating Curve



LPA10-48S5 Derating Curve With Heat-sink

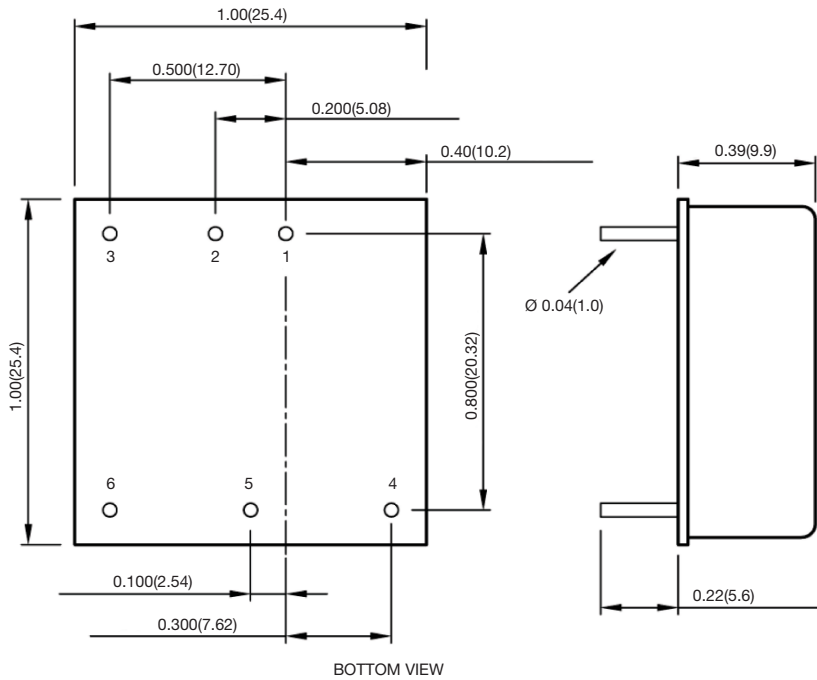


LPA10-48S5 Efficiency vs. Input Voltage



LPA10-48S5 Efficiency vs. Output Load

Mechanical Drawing

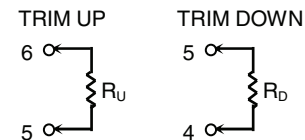


PIN CONNECTION

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)