

## Features

## ICE Technology\*

- Up to 100°C Ambient with no derating
- 120°C Maximum Case Temperature
- -45°C Minimum Operating Temperature
- Built-in FCC/EN55022 Class B Filter
- UL Certified
- 2:1 Input Voltage Range
- Six Sided Shielded Enclosure
- Compact 40.6x25.4x11.7mm Package
- Efficiency to 89%
- 2kVDC Isolation
- Fully Protected
- Low Quiescent Current

### Description

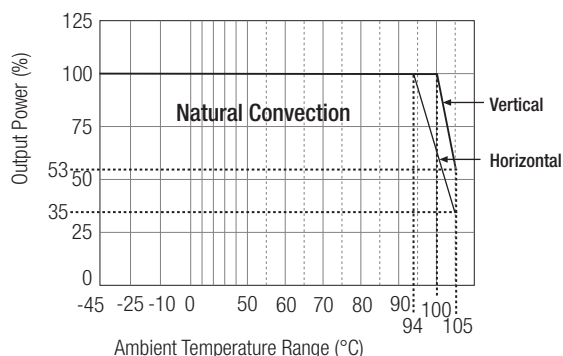
The RPP20 series 2:1 input range DC/DC converters are ideal for high end industrial applications and COTS Military applications where a very high ambient operating temperature converter is required. They are UL-60950-1 certified. Although the case size is compact, the converter contains a built-in filter EN55022 Class B / FCC Level B without the need for any external components.

### Selection Guide 12V, 24V and 48V Input Types

Part Number	Input Range VDC	Output Voltage VDC	Output Current mA	Input <sup>(1)</sup> Current mA	Efficiency <sup>(2)</sup>	Max <sup>(3)</sup> Operating Temp
RPP20-123.3S	9-18	3.3	6000	71/1860	88.8%	96°C
RPP20-1205S	9-18	5	4000	57/1850	90.2%	99°C
RPP20-1212S	9-18	12	1666	26/1890	88.0%	94°C
RPP20-1215S	9-18	15	1333	24/1880	88.8%	96°C
RPP20-243.3S	18-36	3.3	6000	40/930	88.7%	96°C
RPP20-2405S	18-36	5	4000	57/920	90.4%	99°C
RPP20-2412S	18-36	12	1666	15/930	90.2%	99°C
RPP20-2415S	18-36	15	1333	16/930	90.3%	99°C
RPP20-483.3S	36-75	3.3	6000	23/458	90.7%	99°C
RPP20-4805S	36-75	5	4000	23/458	90.8%	100°C
RPP20-4812S	36-75	12	1666	10/469	88.8%	96°C
RPP20-4815S	36-75	15	1333	10/462	90.2%	99°C
RPP20-1212D	9-18	±12	±833	24/1900	89.7%	98°C
RPP20-1215D	9-18	±15	±666	27/1840	90.4%	99°C
RPP20-2412D	18-36	±12	±833	17/950	88.9%	96°C
RPP20-2415D	18-36	±15	±666	18/910	90.1%	99°C
RPP20-2424D	18-36	±24	±416	34/940	89.0%	96°C
RPP20-4812D	36-75	±12	±833	10/469	89.0%	96°C
RPP20-4815D	36-75	±15	±666	12/458	89.7%	98°C
RPP20-4824D	36-75	±24	±416	21/479	87.5%	94°C

### Derating Graph (Ambient Temperature)

#### RPP20-4805S



Derating graphs are valid only for the shown part number. Please contact Technical Support for more information: [info@recom-development.att](mailto:info@recom-development.att)

### \* ICE Technology

**ICE (Innovation in Converter Excellence) uses state-of-the-art techniques to minimise internal power dissipation and to increase the internal temperature limits to extend the ambient operating temperature range to the maximum. Refer to end of section for more details.**

## POWERLINE+ DC/DC-Converter

# RECOM

## 15-20 Watt Single & Dual Output



**UL-60950-1 Certified  
E224736**

## RPP20

**Specifications** (typical at nominal input and 25°C unless otherwise noted)

Input Voltage Range	12V nominal input	9-18VDC	
	24V nominal input	18-36VDC	
	48V nominal input	36-75VDC	
Under Voltage Lockout	12V input	DC-DC ON (min.)	8.5VDC
		DC-DC OFF (max.)	8VDC
	24V input	DC-DC ON (min.)	17.5VDC
		DC-DC OFF (max.)	17VDC
	48V input	DC-DC ON (min.)	35VDC
		DC-DC OFF (max.)	34VDC
Input Filter	Common Mode EMC Filter		
Input Voltage Variation dv/dt (Complies with ETS300 132 part 4.4)	5V/ms max		
Input Surge Voltage (100 ms max.)	12V, 24V Input	50VDC	
	48V Input	100VDC	
Input Reflected Ripple	nominal Vin and full load	20mAp-p	
Start Up Time	nominal Vin and constant resistor load	2ms typ., 5ms max.	
Remote ON/OFF <sup>(4)</sup>	DC-DC ON	Open or 3.0V < Vr < 5.5V	
	DC-DC OFF	Short or 0V < Vr < 1.2V	
Remote OFF input current	Nominal input	2mA typ.	
Output Power	20W max.		
Output Voltage Accuracy	50% Load and nominal Vin	±1.5%	
Voltage Adjustability	Single Output only	±10%	
Minimum Load	0%		
Line Regulation	low line, high line at full load	±0.3%	
Load Regulation	10% to 100% full load	±0.5%	
Cross Regulation (10% <> 100% Load)	Dual Outputs only	3% typ. / 5% max.	
Ripple and Noise (20MHz bandwidth limited) (measured with 1µF capacitor across outputs)	3.3V, ±24V	75mV-100mVp-p typ.	
	All others	40mV-60mVp-p typ.	
Temperature Coefficient	±0.04%/°C max.		
Transient Response	25% load step change	800µs	
Over Load Protection	% of full load at nominal Vin	120% min.	
Short Circuit Protection	Current limit, automatic recovery		
Output Over Voltage Protection (refer to block diagram in Application Notes)	Converter shutdown if Vout > Vout nominal + 20%		
Isolation Voltage	Rated at 1600VDC/1 minute, Flash tested at 2000VDC/1 second		
Isolation Resistance	10MΩ min.		
Isolation Capacitance (refer to block diagram in Application Notes)	1500pF max.		
Operating Frequency	260kHz ± 40kHz		
Operating Temperature Range	Ambient, Free Convection	-45°C to +100°C (without derating)	
		-45°C to +105°C (with derating)	
Maximum Case Temperature	+120°C		
Storage Temperature Range	-55°C to +125°C		
Over Temperature Protection (refer to block diagram in Application Notes)	internal thermistor		
Thermal Impedance (Natural convection)	Vertical	7.5°C/Watt	
	Horizontal	11.5°C/Watt	
Relative Humidity	5% to 95% RH		
Case Material <sup>(7)</sup>	Aluminium		
Potting Material	Silicone (UL94-V0)		

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# POWERLINE+

## DC/DC-Converter

# RPP20-S\_D Series

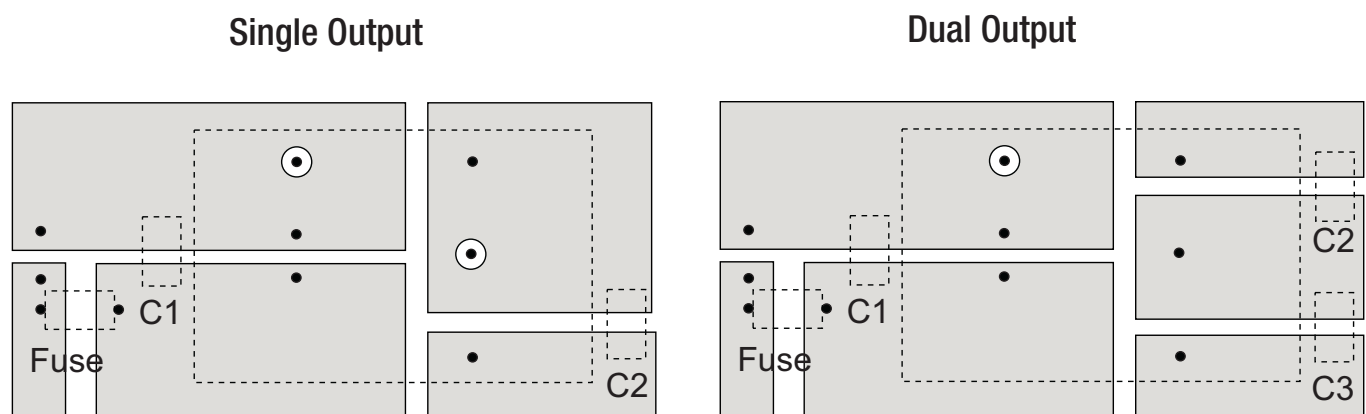
### Specifications (typical at nominal input and 25°C unless otherwise noted)

Weight		26g
Packing Quantity	Refer to App Notes for tube dimensions	8 pcs per Tube
Dimensions		1.6" x 1" x 0.48" (40.6 x 25.4 x 11.7mm)
Safety Standards		UL-60950-1 Pending
Thermal Cycling		complies with MIL-STD-810F
Vibration		10-55Hz, 12G, 30 Min. along X, Y and Z
Conducted Emissions	EN55022	Class B
Radiated Emissions	EN55022	Class B
ESD	EN61000-4-2	Perf. Criteria B
Radiated Immunity	EN61000-4-3	Perf. Criteria A
Fast Transient <sup>(5)</sup>	EN61000-4-4	Perf. Criteria B
Surge <sup>(5)</sup>	EN61000-4-5	Perf. Criteria B
Conducted Immunity	EN61000-4-6	Perf. Criteria A
MTBF calculated according to BELLCORE TR-NWT-000332 <sup>(6)</sup>		2195 x 10 <sup>3</sup> hours

### Notes :

1. Typical values at nominal input voltage and no load/full load.
2. Typical values at nominal input voltage and full load.
3. Typical values at nominal input voltage and full load in vertical orientation and with Eurocard-sized PCB ground planes to assist in heat dissipation. For horizontal orientation, reduce the maximum temperatures by 10°C.
4. The ON/OFF control function can be positive or negative logic. The pin voltage is referenced to negative input.
  - Positive logic ON/OFF is standard, no suffix (Ex. RPP20-2405S)
  - Negative logic ON/OFF option has suffix /N (Ex. RPP20-2405S/N)
5. Requires an external 100µF/100V low ESR capacitor to meet EN61000-4-4 and EN61000-4-5
6. Case I: 50% Stress, Temperature at 50°C (Ground Benign).
7. To ensure a good all-round electrical contact, the baseplate is pressed firmly into place within the aluminium housing. The hydraulic press can leave tooling marks and deformations to both the housing and baseplate. The case is anodised aluminium, so there will be natural variations in the case colour and the aluminium is not scratch resistant. Any resultant marks, scratches and colour variations are cosmetic only and do not affect the operation or performance of the converters.

### Recommended PCB Layout



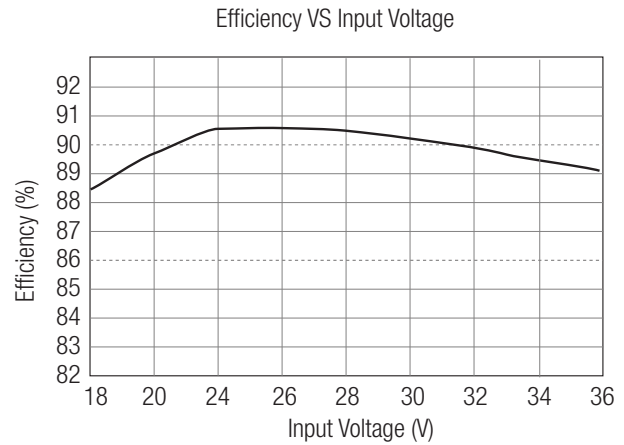
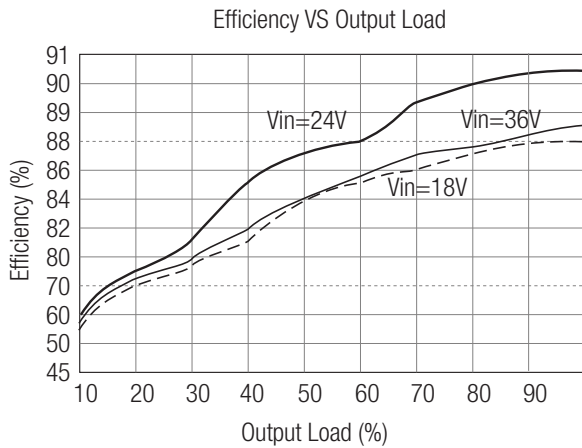
Input Fuse is recommended, but optional. Recommended fuse rating = double maximum input current, time delay type.

Input Capacitor, C1, is required to meet EN61000 Surge and Fast Transient, otherwise it is not required for normal operation.

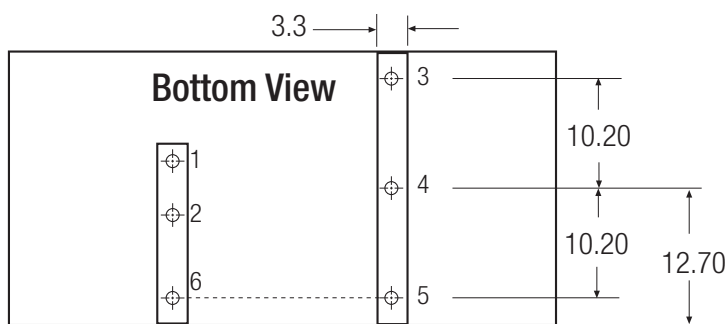
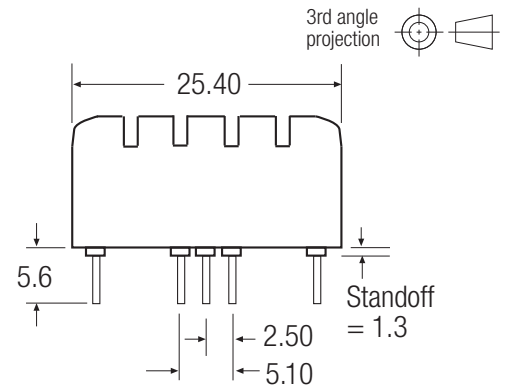
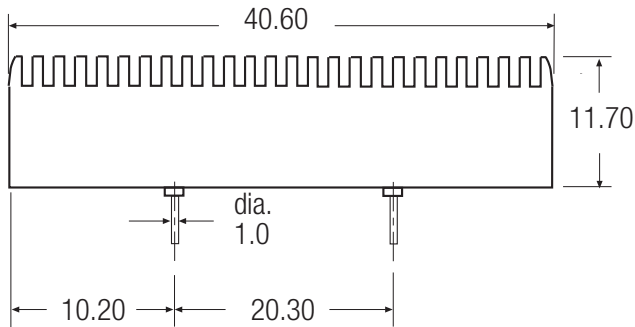
Output Capacitors C2/C3 are recommended, but not required for normal operation. Typical capacitor values are 1µF/100V MLCC

To ensure optimum thermal performance, use large areas of copper on the PCB to assist with heat dissipation and mount the converter vertically.

**RPP20-2405S**



Package Style and Pinning (mm)



Pin Connections

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	Trim	Com
5	-Vout	-Vout
6	CTRL	CTRL

Pin Pitch Tolerance  $\pm 0.35$  mm

**External Output Trimming**  
Refer To Application Notes for recommended resistor Values

