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

POWERLINE+
DC/DC-Converter

RECOM

15-20 Watt Single & Dual Output

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.

RoHS 2002/95/EC 6/6

cULus

UL-60950-1 Certified
E224736

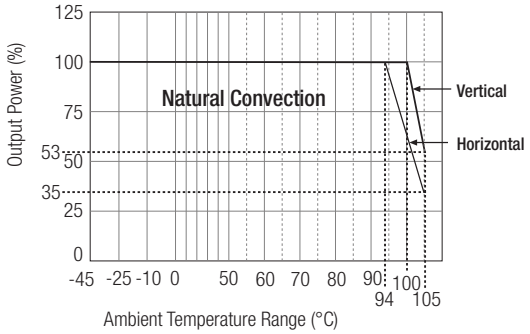
RPP20

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

Part Number	Input Range VDC	Output Voltage VDC	Output Current mA	Input[1] Current mA	Efficiency[2]	Max[3] 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

*** 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.

Refer to Application Notes

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 [4]	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 bandwith limited)	3.3V, ±24V		75mV-100mVp-p typ.
(measured with 1µF capacitor across outputs)	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	Vertical		7.5°C/Watt
(Natural convection)	Horizonzal		11.5°C/Watt
Relative Humidity			5% to 95% RH
Case Material[7]			Aluminium
Potting Material			Silicone (UL94-V0)

continued on next page

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

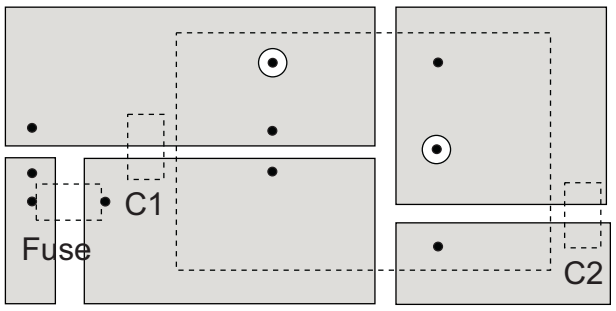
Weight		26g
Packing Quantity	Refer to App Notes for tube dimensions	8 pcs per Tube
Dimensions		1.6" x 1" x 0.48" (40.6 x 25.4 x 11.7mm)
Safety Standards		UL-60950-1 Pending
Thermal Cycling		complies with MIL-STD-810F
Vibration		10-55Hz, 12G, 30 Min. along X, Y and Z
Conducted Emissions	EN55022	Class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

Notes :

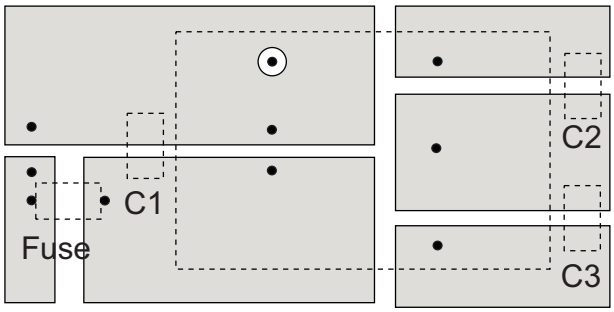
1. Typical values at nominal input voltage and no load/full load.
2. Typical values at nominal input voltage and full load.
3. Typical values at nominal input voltage and full load in vertical orientation and with Eurocard-sized PCB ground planes to assist in heat dissipation. For horizontal orientation, 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 varations are cosmetic only and do not affect the operation or performance of the converters.

Recommended PCB Layout

Single Output



Dual Output

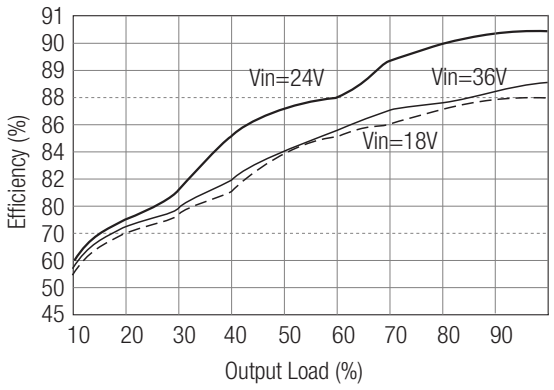


Input Fuse is recommended, but optional. Recommended fuse rating = double maximum input current, time delay type.
Input Capacitor, C1, is required to meet EN61000 Surge and Fast Transient, otherwise it is not required for normal operation.
Output Capacitors C2/C3 are recommended, but not required for 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.

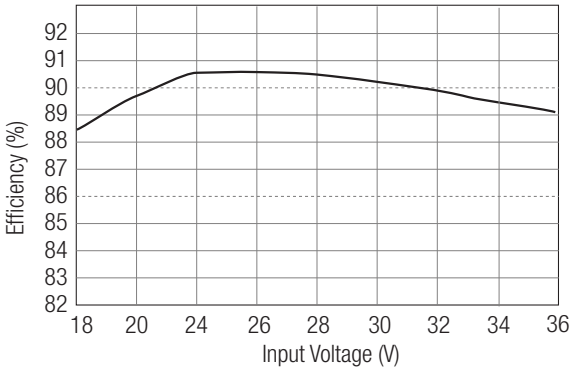
Typical Characteristics

RPP20-2405S

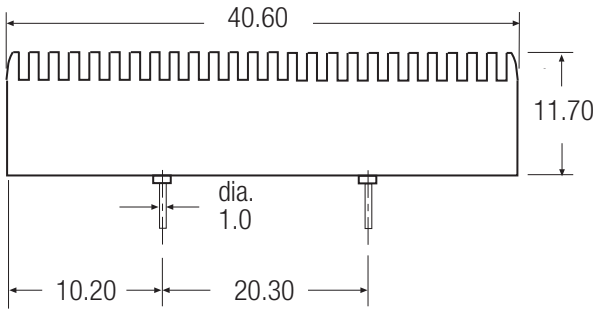
Efficiency VS Output Load

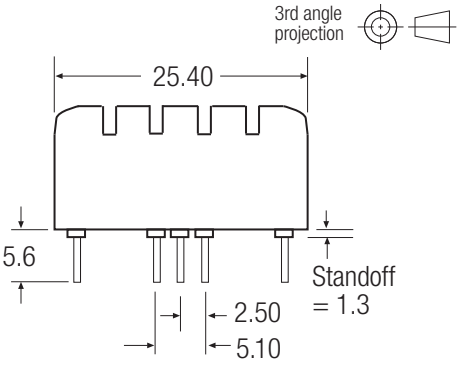


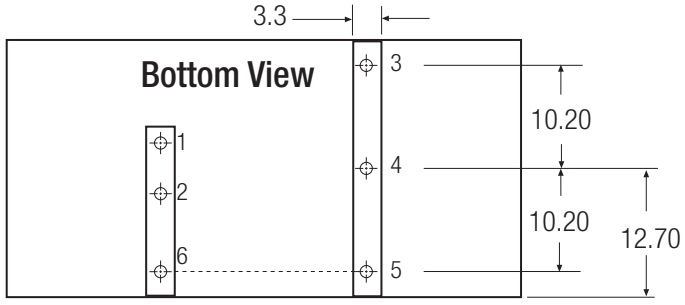
Efficiency VS Input Voltage



Package Style and Pinning (mm)







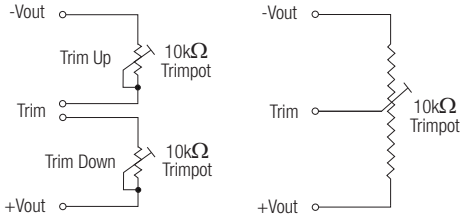
Pin Connections

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

Pin Pitch Tolerance ±0.35 mm

External Output Trimming

Refer To Application Notes for recommended resistor Values



Features

ICE Technology*

- Up to 97°C Ambient, no derating
- 120°C Maximum Case Temperature
- -45°C Minimum Operating Temperature
- UL Certified
- Built-in FCC/EN55022 Class B Filter
- 4:1 Wide Input Voltage Range
- Six Sided Shielded Enclosure
- Compact 40.6x25.4x11.7mm Package
- Efficiency to >89%
- 2kVDC Isolation
- Fully Protected
- Low Quiescent Current

POWERLINE+
DC/DC-Converter

RECOM

20 Watt Single & Dual Output

Description

The RPP20-W series 4:1 input range DC/DC converters are ideal for high end industrial applications and COTS Military applications where a 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 EN55022 Class B / FCC Level B EMC filter without the need for any external components.

Selection Guide 24V and 48V 4:1 Input Types

Part Number	Input Range VDC	Output Voltage VDC	Output Current mA	Input[1] Current mA	Efficiency[2]	Max[3] Operating Temp
RPP20-243.3SW	9-36	3.3	6000	59/955	87.2%	93°C
RPP20-2405SW	9-36	5	4000	65/946	88.1%	95°C
RPP20-2412SW	9-36	12	1666	23/946	88.1%	95°C
RPP20-2415SW	9-36	15	1333	25/931	89.5%	97°C
RPP20-483.3SW	18-75	3.3	6000	28/465	89.6%	97°C
RPP20-4805SW	18-75	5	4000	33/465	89.6%	97°C
RPP20-4812SW	18-75	12	1666	13/470	88.6%	96°C
RPP20-4815SW	18-75	15	1333	12/466	89.3%	97°C
RPP20-2405DW	9-36	±5	±2000	23/946	88.1%	95°C
RPP20-2412DW	9-36	±12	±833	28/930	89.6%	97°C
RPP20-2415DW	9-36	±15	±666	24/946	88.0%	95°C
RPP20-4805DW	18-75	±5	±2000	13/470	88.6%	96°C
RPP20-4812DW	18-75	±12	±833	16/472	88.2%	95°C
RPP20-4815DW	18-75	±15	±666	13/466	89.4%	97°C

RoHS 2002/95/EC 6/6

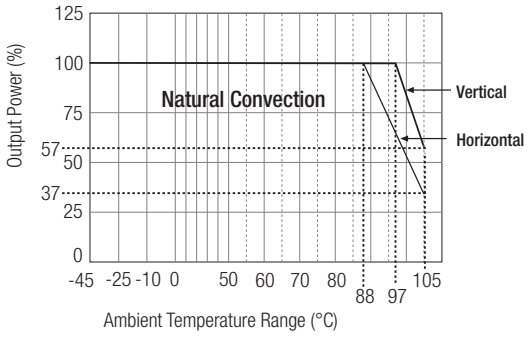
c UL us

UL-60950-1 Certified
E224736

RPP20-W

Derating Graph (Ambient Temperature)

RPP20-2405SW



Derating graphs are valid only for the shown part number.
Please contact Technical Support for more information:
info@recom-development.at

*** 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.

Refer to Application Notes

RPP20-S_DW Series

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

Input Voltage Range	24V nominal input	9-36VDC
	48V nominal input	18-75VDC
Under Voltage Lockout	24V input DC-DC ON (min.)	8.5VDC
	DC-DC OFF (max.)	8VDC
	48V input DC-DC ON (min.)	17.5VDC
	DC-DC OFF (max.)	17VDC
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.)	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 [4]	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	±5%
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 bandwith limited)	3.3V	100mVp-p typ.
(measured with 1µF capacitor across outputs)	All others	40mV-75mVp-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% typ.
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 +97°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	Vertical	7.5°C/Watt
(Natural convection)	Horizontal	11.5°C/Watt
Relative Humidity		5% to 95% RH
Case Material [7]		Aluminium
Potting Material		Silicone (UL94-V0)

continued on next page

RPP20-S_DW Series

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

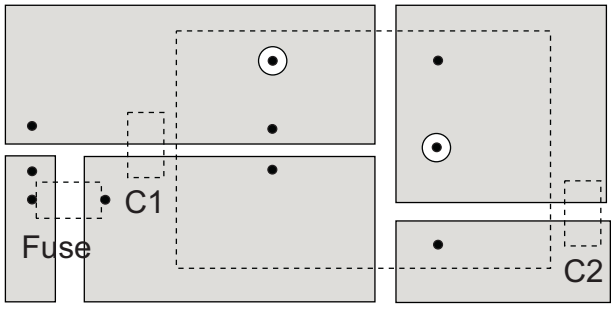
Weight		26g
Packing Quantity	Refer to App Notes for tube dimensions	8 pcs per Tube
Dimensions		1.6" x 1" x 0.48" (40.6 x 25.4 x 11.7mm)
Safety Standards		UL-60950-1 Pending
Thermal Cycling		complies with MIL-STD-810F
Vibration		10-55Hz, 12G, 30 Min. along X, Y and Z
Conducted Emissions	EN55022	Class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

Notes :

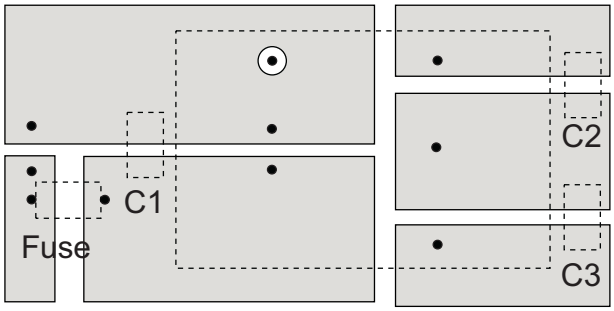
1. Typical values at nominal input voltage and no load/full load.
2. Typical values at nominal input voltage and full load.
3. Typical values at nominal input voltage and full load in vertical orientation and with Eurocard-sized PCB ground planes to assist in heat dissipation. For horizontal orientation, 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. RPP20-2405SW)
   Negative logic ON/OFF option has suffix /N (Ex. RPP20-2405SW/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 varations are cosmetic only and do not affect the operation or performance of the converters.

Recommended PCB Layout

Single Output



Dual Output

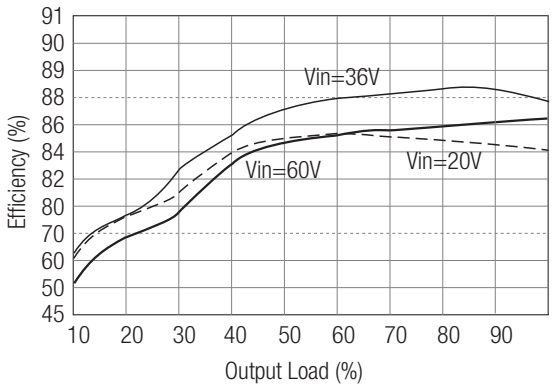


Input Fuse is recommended, but optional. Recommended fuse rating = double maximum input current, time delay type.
Input Capacitor, C1, is required to meet EN61000 Surge and Fast Transient, otherwise it is not required for normal operation.
Output Capacitors C2/C3 are recommended, but not required for 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.

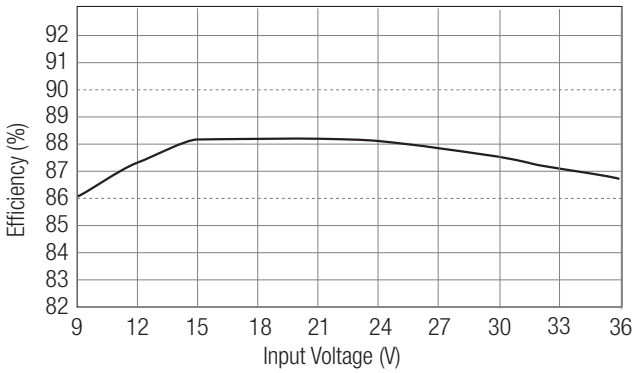
Typical Characteristics

RPP20-2405SW

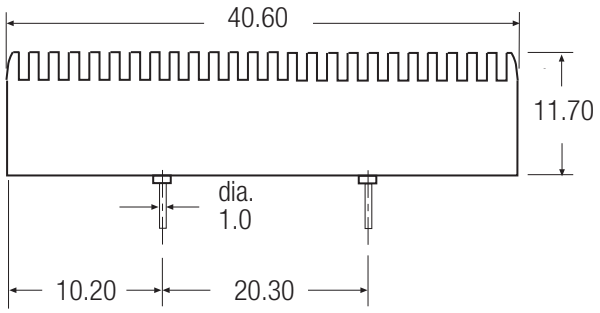
Efficiency VS Output Load

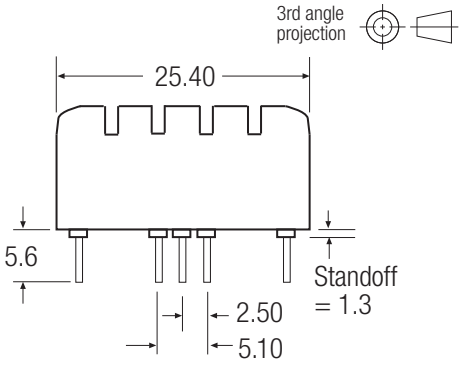


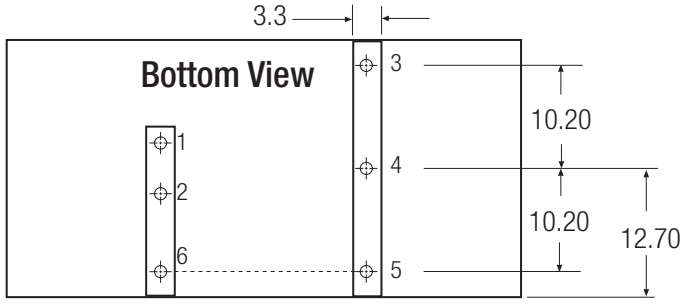
Efficiency VS Input Voltage



Package Style and Pinning (mm)







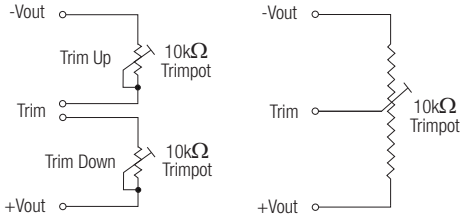
Pin Connections

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

Pin Pitch Tolerance ±0.35 mm

External Output Trimming

Refer To Application Notes for recommended resistor Values



Features

ICE Technology*

- Up to 96°C ambient, no derating
- 120°C Maximum Case Temperature
- -45°C Minimum Operating Temperature
- UL Certified
- Built-in FCC/EN55022 Class B Filter
- 2:1 Wide Input Voltage Range
- Six Sided Shielded Enclosure
- Compact 50.8x30.5x11.7mm Package
- Efficiency to 92%
- 3kVDC Isolation
- Fully Protected
- Low Quiescent Current

POWERLINE+
DC/DC-Converter

RECOM

30 Watt Single & Dual Output

Description

The RPP30 series 2:1 input range DC/DC converters are ideal for high end industrial applications and COTS Military applications where a 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 EN55022 Class B / FCC Level B EMC filter 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[1] Current mA	Efficiency[2]	Max[3] Operating Temp
RPP30-123.3S	9-18	3.3	8500	78/2666	87.5%	86°C
RPP30-1205S	9-18	5	6000	109/2768	90.3%	91°C
RPP30-1212S	9-18	12	2500	26/2784	89.8%	89°C
RPP30-1215S	9-18	15	2000	31/2775	90.1%	91°C
RPP30-243.3S	18-36	3.3	8000	59/1394	89.7%	89°C
RPP30-2405S	18-36	5	6000	62/1372	91.1%	93°C
RPP30-2412S	18-36	12	2500	18/1400	90.4%	91°C
RPP30-2415S	18-36	15	2000	18/1380	91.4%	94°C
RPP30-483.3S	36-75	3.3	8000	24/697	89.6%	89°C
RPP30-4805S	36-75	5	6000	37/680	92.0%	96°C
RPP30-4812S	36-75	12	2500	11/687	91.0%	94°C
RPP30-4815S	36-75	15	2000	12/682	91.6%	94°C
RPP30-1212D	9-18	±12	±1250	29/2790	89.6%	89°C
RPP30-1215D	9-18	±15	±1000	33/2784	89.8%	89°C
RPP30-2412D	18-36	±12	±1250	20/1300	88.4%	86°C
RPP30-2415D	18-36	±15	±1000	10/1392	89.8%	89°C
RPP30-2424D	18-36	±24	±600	10/1384	90.3%	91°C
RPP30-4812D	36-75	±12	±1250	11/647	88.8%	87°C
RPP30-4815D	36-75	±15	±1000	12/689	90.7%	94°C
RPP30-4824D	36-75	±24	±550	26/622	88.4%	86°C

RoHS 2002/95/EC 6/6

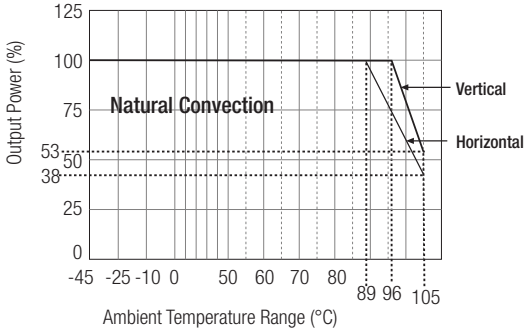
c UL us

UL-60950-1 Certified
E224736

RPP30

Derating Graph (Ambient Temperature)

RPP30-4805S



Derating graphs are valid only for the shown part numbers.
Please contact Technical Support for more information
info@recom-development.at

*** 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.

Refer to Application Notes

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 EMCType
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		30mAp-p
Start Up Time	nominal Vin and constant resistor load		2ms typ., 5ms max.
Remote ON/OFF [4]	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			30W 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 bandwith limited)	3.3V, 5V		60mVp-p typ.
(measured with 1µF capacitor across outputs)	All others		25mV-45mVp-p max.
Temperature Coefficient			±0.04%/°C max.
Transient Response	25% load step change		800µs
Over Load Protection	% of full load at nominal Vin		120% typ.
Short Circuit Protection			Hiccup, automatic recovery
Output Over Voltage Protection (refer to block diagram in Application Notes)			Converter shutdown if Vout > Vout nominal + 20%
Isolation Voltage			Rated at 2250VDC/1 minute, Flash tested at 3000VDC/1 second
Isolation Resistance			10MΩ min.
Isolation Capacitance (refer to block diagram in Application Notes)			3000pF max.
Operating Frequency			260kHz ± 40kHz
Operating Temperature Range	Ambient, Free Convection		-45°C to +96°C max (without derating)
			-45°C to +105°C max (without 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	Vertical		7.3°C/Watt
(Natural convection)	Horizontal		10°C/Watt
Relative Humidity			5% to 95% RH
Case Material [7]			Aluminium
Potting Material			Silicone (UL94-V0)

continued on next page

RPP30

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

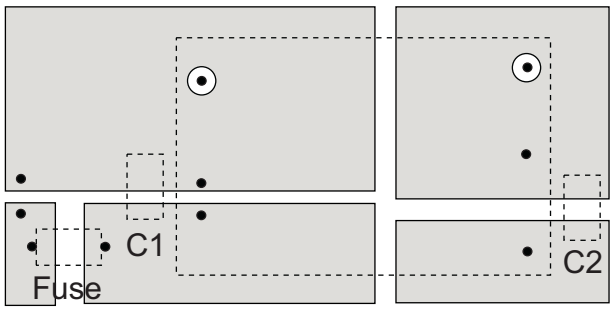
Weight		34g
Packing Quantity	Refer to App Notes for tube dimensions	7 pcs per Tube
Dimensions		2" x 1.2" x 0.48" (50.8 x 30.5 x 11.7mm)
Safety Standards		UL-60950-1 Pending
Thermal Cycling		complies with MIL-STD-810F
Vibration		10-55Hz, 12G, 30 Min. along X, Y and Z
Conducted Emissions	EN55022	Class B
Radiated Emissions	EN55022	Class B
ESD	EN61000-4-2	Perf. Criteria B
Radiated Immunity	EN61000-4-3	Perf. Criteria A
Fast Transient(5)	EN61000-4-4	Perf. Criteria B
Surge(5)	EN61000-4-5	Perf. Criteria B
Conducted Immunity	EN61000-4-6	Perf. Criteria A
MTBF calculated according to BELLCORE TR-NWT-000332(6)		2195 x 10^3 hours

Notes :

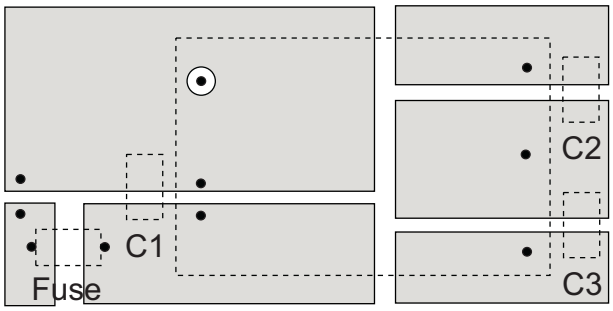
1. Typical values at nominal input voltage and no load/full load.
2. Typical values at nominal input voltage and full load.
3. Typical values at nominal input voltage and full load in vertical orientation and with Eurocard-sized PCB ground planes to assist in heat dissipation. For horizontal orientation, 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 varations are cosmetic only and do not affect the operation or performance of the converters.

Recommended PCB Layout

Single Output



Dual Output

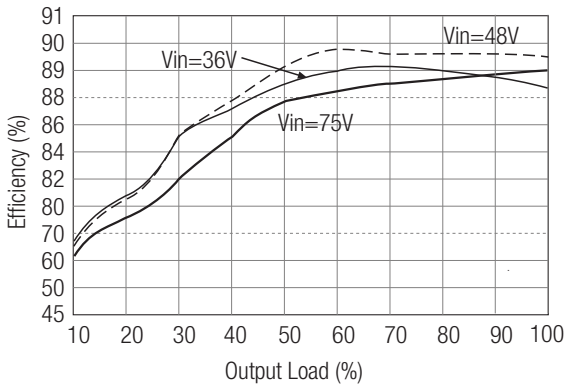


Input Fuse is recommended, but optional. Recommended fuse rating = double maximum input current, time delay type.
Input Capacitor, C1, is required to meet EN61000 Surge and Fast Transient, otherwise it is not required for normal operation.
Output Capacitors C2/C3 are recommended, but not required for 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.

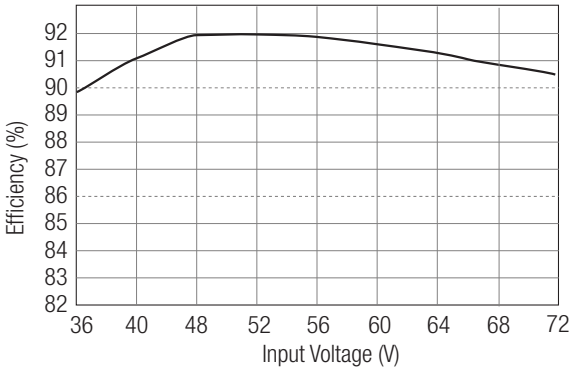
Typical Characteristics

RPP30-4805S

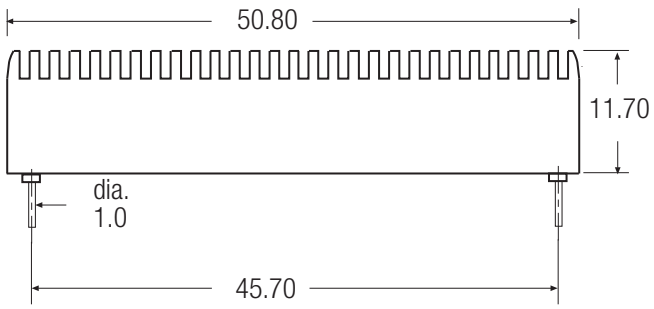
Efficiency VS Output Load

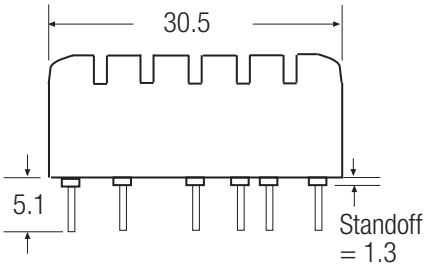


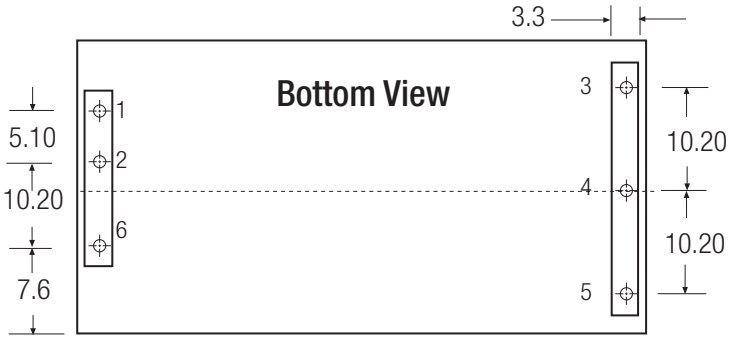
Efficiency VS Input Voltage



Package Style and Pinning (mm)







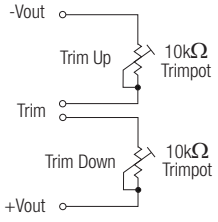
Pin Connections

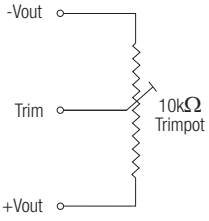
Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	-Vout	Com
5	Trim	-Vout
6	CTRL	CTRL

Pin Pitch Tolerance ±0.35 mm

External Output Trimming

Refer to Application Notes for suggested resistor values





Features

ICE Technology*

- >85°C Ambient Temperature, no derating
- 120°C Maximum Case Temperature
- -45°C Minimum Operating Temperature
- UL Certified
- Built-in FCC/EN55022 Class B Filter
- 4:1 Wide Input Voltage Range
- Six Sided Shielded Enclosure
- Compact 50.8x30.5x11.7mm Package
- Efficiency to >89%
- 3kVDC Isolation
- Fully Protected
- Low Quiescent Current

POWERLINE+
DC/DC-Converter

RECOM

30 Watt Single & Dual Output

Description

The RPP30-W series 4:1 input range DC/DC converters are ideal for high end industrial applications and COTS Military applications where a 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 EN55022 Class B / FCC Level B EMC filter without the need for any external components.

RoHS 2002/95/EC 6/6

UL-60950-1 Certified
E224736

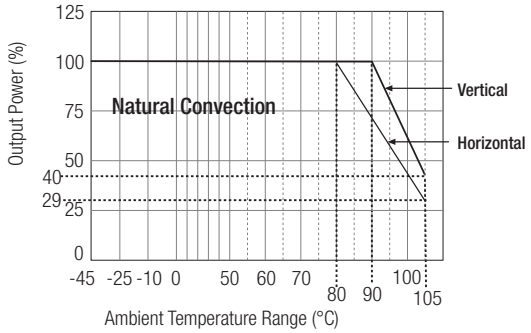
Selection Guide 24V and 48V 4:1 Input Types

Part Number	Input Range VDC	Output Voltage VDC	Output Current mA	Input[1] Current mA	Efficiency[2]	Max[3] Ambient Temp
RPP30-243.3SW	9-36	3.3	8400	57/1326	87.1%	85°C
RPP30-2405SW	9-36	5	6000	62/1397	89.5%	89°C
RPP30-2412SW	9-36	12	2500	27/1420	88.0%	85°C
RPP30-2415SW	9-36	15	2000	31/1436	89.7%	90°C
RPP30-483.3SW	18-75	3.3	9000	46/704	87.6%	84°C
RPP30-4805SW	18-75	5	6000	38/710	89.7%	90°C
RPP30-4812SW	18-75	12	2500	15/727	87.8%	85°C
RPP30-4815SW	18-75	15	2000	19/718	89.3%	89°C
RPP30-2412DW	9-36	±12	±1250	32/1453	89.2%	89°C
RPP30-2415DW	9-36	±15	±1000	30/1436	87.2%	85°C
RPP30-4812DW	18-75	±12	±1250	18/727	87.5%	85°C
RPP30-4815DW	18-75	±15	±1000	20/718	89.1%	89°C

RPP30-W

Derating Graph (Ambient Temperature)

RPP30-4805SW



Derating graphs are valid only for the shown part number.
Please contact Technical Support for more information:
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.

Refer to Application Notes

RPP30-S_DW Series

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

Input Voltage Range	24V nominal input	9-36VDC
	48V nominal input	18-75VDC
Under Voltage Lockout	24V input DC-DC ON (min.)	8.5VDC
	DC-DC OFF (max.)	8VDC
	48V input DC-DC ON (min.)	17.5VDC
	DC-DC OFF (max.)	17VDC
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.)	24V Input	50VDC
	48V Input	100VDC
Input Reflected Ripple	nominal Vin and full load	30mAp-p
Start Up Time	nominal Vin and constant resistor load	2ms typ., 5ms max.
Remote ON/OFF [4]	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		30W max.
Output Voltage Accuracy	50% Load and nominal Vin	±1.5%
Voltage Adjustability	Single Output only	±5%
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 bandwith limited)	3.3V, 5V	80mVp-p typ.
(measured with 1µF capacitor across outputs)	All others	27mV-60mVp-p max
Temperature Coefficient		±0.04%/°C max.
Transient Response	25% load step change	800µs
Over Load Protection	% of full load at nominal Vin	120% typ.
Short Circuit Protection		hiccup, automatic recovery
Output Over Voltage Protection (refer to block diagram in Application Notes)		Converter shutdown if Vout > Vout nominal +20%
Isolation Voltage		Rated at 2250VDC/1 minute, Flash tested at 3000VDC/1 second
Isolation Resistance		10MΩ min.
Isolation Capacitance (refer to block diagram in Application Notes)		3000pF max.
Operating Frequency		300kHz ± 30kHz
Operating Temperature Range	Ambient, Free Convection	-45°C to +90°C max (without derating)
		-45°C to +105°C max (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	Vertical	7.3°C/Watt
(Natural convection)	Horizontal	10°C/Watt
Relative Humidity		5% to 95% RH
Case Material [7]		Aluminium
Potting Material		Silicone (UL94-V0)
Weight		34g
Packing Quantity	Refer to App Notes for tube dimensions	7 pcs per Tube
Dimensions		2" x 1.2" x 0.48" (50.8 x 30.5 x 11.7mm)

continued on next page

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

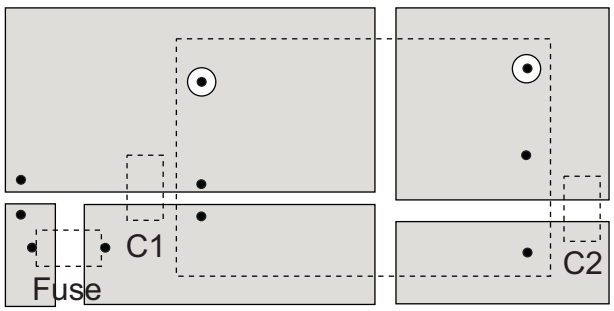
Safety Standards		UL-60950-1 Pending
Thermal Cycling		complies with MIL-STD-810F
Vibration		10-55Hz, 12G, 30 Min. along X, Y and Z
Conducted Emissions	EN55022	Class B
Radiated Emissions	EN55022	Class B
ESD	EN61000-4-2	Perf. Criteria B
Radiated Immunity	EN61000-4-3	Perf. Criteria A
Fast Transient (5)	EN61000-4-4	Perf. Criteria B
Surge (5)	EN61000-4-5	Perf. Criteria B
Conducted Immunity	EN61000-4-6	Perf. Criteria A
MTBF calculated according to BELLCORE TR-NWT-000332 (6)		2195 x 10^3 hours

Notes :

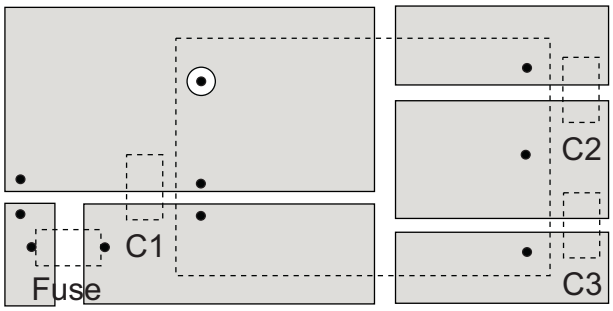
1. Typical values at nominal input voltage and no load/full load.
2. Typical values at nominal input voltage and full load.
3. Typical values at nominal input voltage and full load in vertical orientation and with Eurocard-sized PCB ground planes to assist in heat dissipation. For horizontal orientation, 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. RPP30-2405SW)
   Negative logic ON/OFF option has suffix /N (Ex. RPP30-2405SW/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 varations are cosmetic only and do not affect the operation or performance of the converters.

Recommended PCB Layout

Single Output



Dual Output

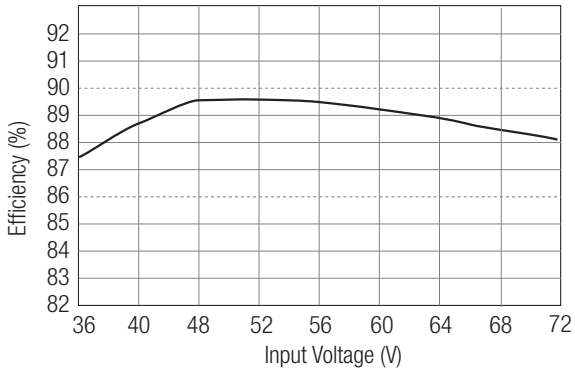


Input Fuse is recommended, but optional. Recommended fuse rating = double maximum input current, time delay type.
Input Capacitor, C1, is required to meet EN61000 Surge and Fast Transient, otherwise it is not required for normal operation.
Output Capacitors C2/C3 are recommended, but not required for 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.

Typical Characteristics

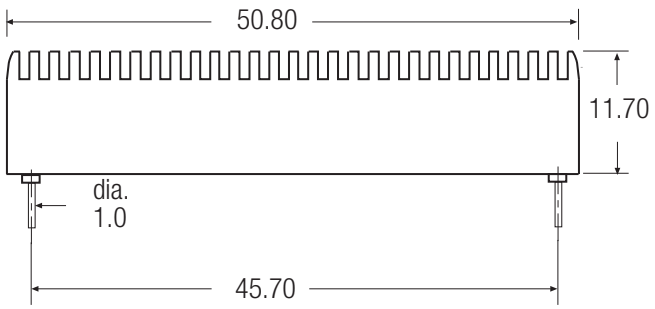
RPP30-4805SW

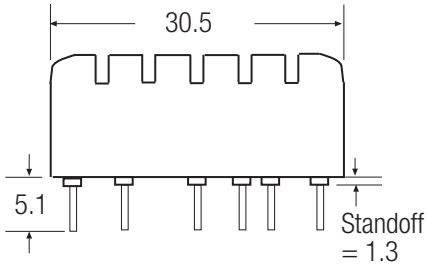
Efficiency VS Input Voltage

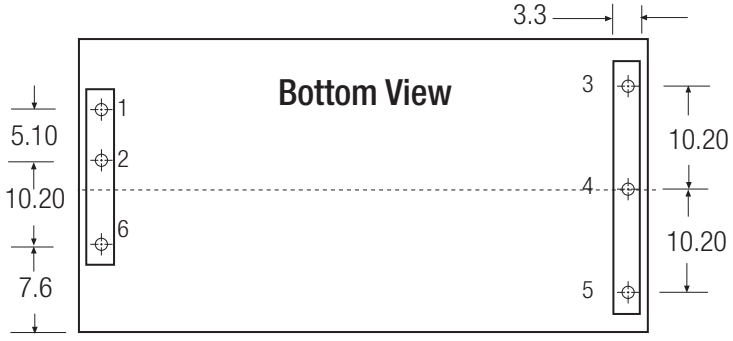


Package Style and Pinning (mm)

3rd angle projection





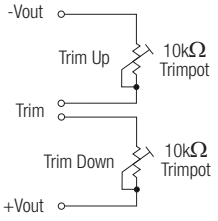


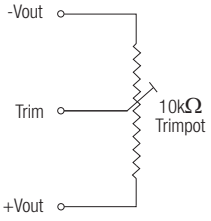
Pin Connections

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

Pin Pitch Tolerance ±0.35 mm

External Output Trimming





Features

ICE Technology*

- Up to 89°C Ambient, no derating (40W)
- 120°C Maximum Case Temperature
- -45°C Minimum Operating Temperature
- UL certified
- Built-in FCC/EN55022 Class B Filter
- 2:1 Wide Input Voltage Range
- 40/50 Watts Output Power
- Compact 50.8x30.5x11.7mm Package
- Efficiency to 92%
- 3kVDC Isolation
- Fully Protected
- Low Quiescent Current

POWERLINE+
DC/DC-Converter

RECOM

40/50 Watt Single Output

Description

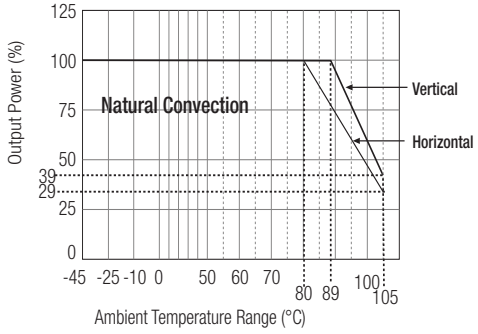
The RPP40 and RPP50 series 2:1 input range DC/DC converters are ideal for high end industrial applications and COTS Military applications where a high ambient operating temperature converter is required. They are UL-60950-1 certified. Although the case size is compact, the converters contains a built-in EN55022 Class B / FCC Level B EMC filter without the need for any external components.

Selection Guide 24V and 48V Input Types

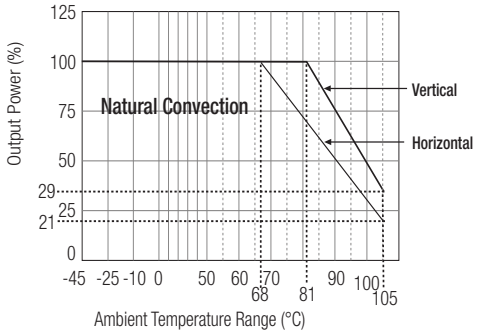
Part Number	Input Range VDC	Output Voltage VDC	Output Current A	Input[1] Current mA	Efficiency[2]	Max[3] Operating Temp
RPP40-243.3S	18-36	3.3	12	58/1885	88.4%	77°C
RPP40-2405S	18-36	5	8	60/1831	91.0%	86°C
RPP40-2412S	18-36	12	3.33	100/1875	87.8%	75°C
RPP40-2415S	18-36	15	2.67	100/1870	89.5%	81°C
RPP40-483.3S	36-75	3.3	12	42/923	90.2%	84°C
RPP40-4805S	36-75	5	8	37/906	92.0%	89°C
RPP40-4812S	36-75	12	3.33	5/930	88.9%	78°C
RPP40-4815S	36-75	15	2.67	5/930	89.7%	81°C
RPP50-243.3S	18-36	3.3	15	58/2405	86.6%	58°C
RPP50-2405S	18-36	5	10	60/2315	90.0%	74°C
RPP50-2412S	18-36	12	4.16	18/2370	88.3%	66°C
RPP50-2415S	18-36	15	3.33	18/2315	90.0%	74°C
RPP50-483.3S	36-75	3.3	15	42/1177	88.6%	68°C
RPP50-4805S	36-75	5	10	37/1140	91.4%	81°C
RPP50-4812S	36-75	12	4.16	11/1165	89.4%	72°C
RPP50-4815S	36-75	15	3.33	11/1141	91.2%	81°C

Derating Graph (Ambient Temperature)

RPP40-4805S



RPP50-4805S



Derating graphs are valid only for the shown part numbers.
Please contact Technical Support for more information info@recom-development.at

RoHS 2002/95/EC 6/6

UL-60950-1 Certified
E224736

RPP40/ RPP50

*** 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 temp range to the maximum. Refer to end of section for more details.

Refer to Application Notes

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

Input Voltage Range	24V nominal input	18-36VDC
	48V nominal input	36-75VDC
Under Voltage Lockout	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.)	24V Input	50VDC
	48V Input	100VDC
Input Reflected Ripple	nominal Vin and full load	30mAp-p
Start Up Time	nominal Vin and constant resistor load	2ms typ., 5ms max.
Remote ON/OFF [4]	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		50W max.
Output Voltage Accuracy	10% Load and nominal Vin	±1%
Voltage Adjustability		±10%
Minimum Load		0%
Line Regulation	low line, high line at full load	±0.3%
Load Regulation	10% to 100% full load	±0.5%
Ripple and Noise (20MHz bandwith limited)	3.3V, 5V	60mVp-p typ.
(measured with 1µF capacitor across output)	All others	40mVp-p typ.
Temperature Coefficient		±0.04%/°C max.
Transient Response	25% load step change	200µs
Over Load Protection	% of full load at nominal Vin	120% typ.
Short Circuit Protection		Hiccup, automatic recovery
Output Over Voltage Protection (refer to block diagram in Application Notes)		Converter shutdown if Vout > Vout nominal + 20%
Isolation Voltage		Rated at 2250VDC/1 minute, Flash tested at 3000VDC/1 second
Isolation Resistance		10MΩ min.
Isolation Capacitance (refer to block diagram in Application Notes)		3000pF max.
Operating Frequency		260kHz ± 40kHz
RPP40 Operating Temperature Range	Ambient, Free Convection	-45°C to +89°C max (without derating)
RPP50 Operating Temperature Range	Ambient, Free Convection	-45°C to +81°C max (without derating)
		-45°C to +105°C max (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	Vertical	7.3°C/Watt
(Natural convection	Horizontal	10°C/Watt
Relative Humidity		5% to 95% RH
Case Material [7]		Aluminium
Potting Material		Silicone (UL94-V0)
Weight		39g
Packing Quantity	Refer to App Notes for tube dimensions	7 pcs per Tube
Dimensions		2" x 1.2" x 0.48" (50.8 x 30.5 x 11.7mm)

continued on next page

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

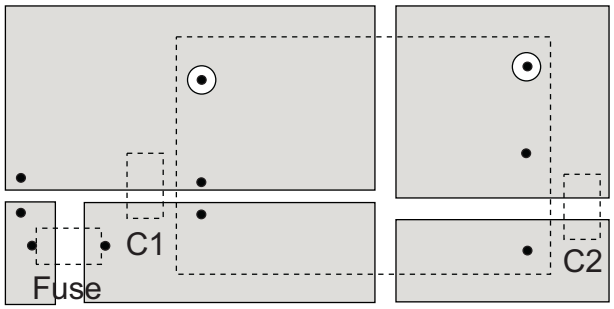
Safety Standards		UL-60950-1 Pending
Thermal Cycling		complies with MIL-STD-810F
Vibration		10-55Hz, 12G, 30 Min. along X, Y and Z
Conducted Emissions	EN55022	Class B
Radiated Emissions	EN55022	Class B
ESD	EN61000-4-2	Perf. Criteria B
Radiated Immunity	EN61000-4-3	Perf. Criteria A
Fast Transient (5)	EN61000-4-4	Perf. Criteria B
Surge (5)	EN61000-4-5	Perf. Criteria B
Conducted Immunity	EN61000-4-6	Perf. Criteria A
MTBF calculated according to BELLCORE TR-NWT-000332 (6)		1989 x 10^3 hours

Notes :

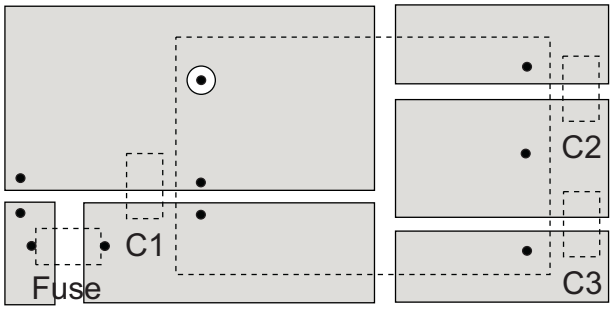
1. Typical values at nominal input voltage and no load/full load.
2. Typical values at nominal input voltage and full load.
3. Typical values at nominal input voltage and full load in vertical orientation and with Eurocard-sized PCB ground planes to assist in heat dissipation. For horizontal orientation, 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. RPP50-2405S)
   Negative logic ON/OFF option has suffix /N (Ex. RPP50-2405S/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 varations are cosmetic only and do not affect the operation or performance of the converters.

Recommended PCB Layout

Single Output



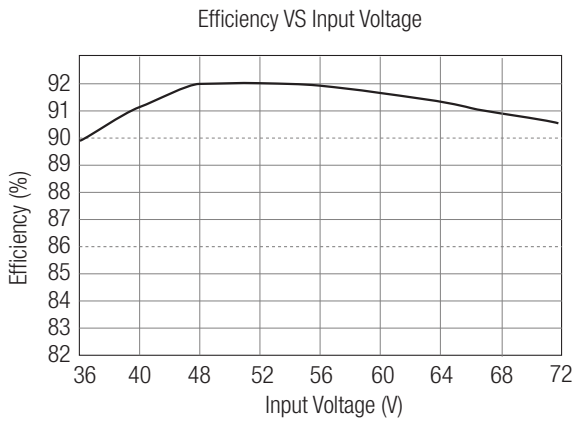
Dual Output



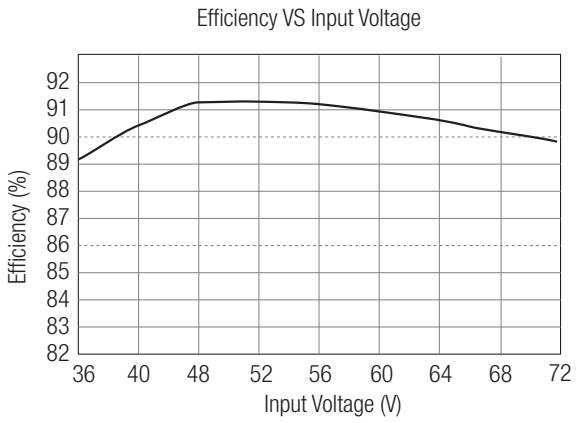
Input Fuse is recommended, but optional. Recommended fuse rating = double maximum input current, time delay type.
Input Capacitor, C1, is required to meet EN61000 Surge and Fast Transient, otherwise it is not required for normal operation.
Output Capacitors C2/C3 are recommended, but not required for 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.

Typical Characteristics

RPP40-4805SW

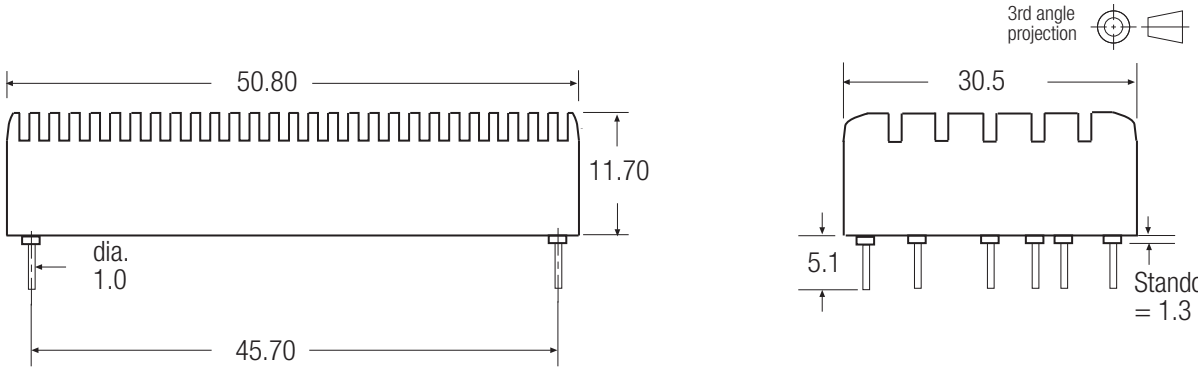


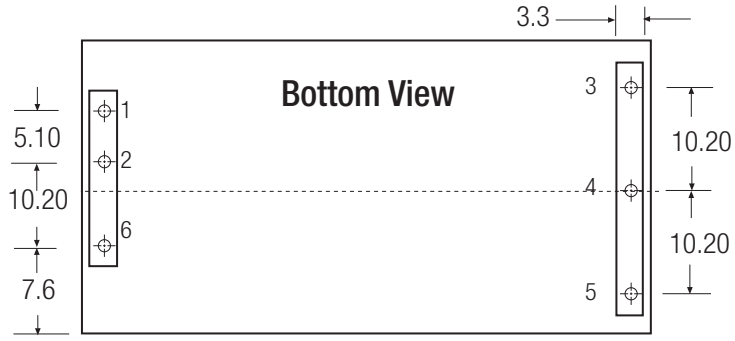
RPP50-4805SW



Package Style and Pinning (mm)

RPP40
RPP50





Pin Connections

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

Pin Pitch Tolerance ±0.35 mm

External Output Trimming

Refer to Application Notes for suggested Resistor Values