

# Regulated Converters

- Wide 4:1 Input Voltage Range
- 1.6kVDC Isolation for 24Vin and 48Vin, 3kVDC Isolation for 110Vin
- Efficiency up to 92%
- Six-Sided Continuous Shield
- UL60950-1 AM2 Certified, EN50155 Certified

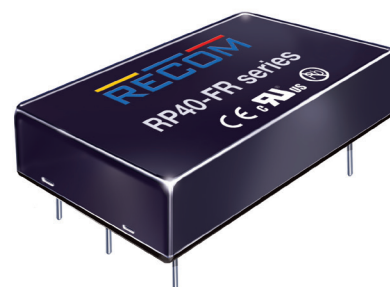


# RP40-FR

## 40 Watt

**2" x 1"**

## Single & Dual Output



## Selection Guide

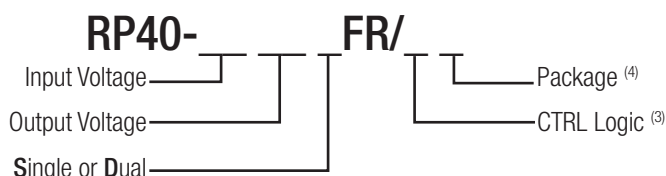
| Part Number                     | Input<br>Voltage Range<br>[VDC] | Output<br>Voltage<br>[VDC] | Output<br>Current<br>[mA] | Input <sup>(1)</sup><br>Current<br>[mA] | Efficiency <sup>(1)</sup><br>typ.<br>[%] | Max. Capacitive<br>Load <sup>(2)</sup><br>[μF] |
|---------------------------------|---------------------------------|----------------------------|---------------------------|-----------------------------------------|------------------------------------------|------------------------------------------------|
| RP40-243.3SFR <sup>(3,4)</sup>  | 9-36                            | 3.3                        | 10000                     | 1528                                    | 90                                       | 26600                                          |
| RP40-2405SFR <sup>(3,4)</sup>   | 9-36                            | 5                          | 8000                      | 1832                                    | 91                                       | 20000                                          |
| RP40-2412SFR <sup>(3,4)</sup>   | 9-36                            | 12                         | 3333                      | 1811                                    | 92                                       | 3900                                           |
| RP40-2415SFR <sup>(3,4)</sup>   | 9-36                            | 15                         | 2666                      | 1811                                    | 92                                       | 2600                                           |
| RP40-2424SFR <sup>(3,4)</sup>   | 9-36                            | 24                         | 1666                      | 1831                                    | 91                                       | 1300                                           |
| RP40-483.3SFR <sup>(3,4)</sup>  | 18-75                           | 3.3                        | 10000                     | 764                                     | 90                                       | 26600                                          |
| RP40-4805SFR <sup>(3,4)</sup>   | 18-75                           | 5                          | 8000                      | 916                                     | 91                                       | 20000                                          |
| RP40-4812SFR <sup>(3,4)</sup>   | 18-75                           | 12                         | 3333                      | 906                                     | 92                                       | 3900                                           |
| RP40-4815SFR <sup>(3,4)</sup>   | 18-75                           | 15                         | 2666                      | 906                                     | 92                                       | 2600                                           |
| RP40-4824SFR <sup>(3,4)</sup>   | 18-75                           | 24                         | 1666                      | 915                                     | 91                                       | 1300                                           |
| RP40-1103.3SFR <sup>(3,4)</sup> | 43-160                          | 3.3                        | 10000                     | 341                                     | 88                                       | 26600                                          |
| RP40-11005SFR <sup>(3,4)</sup>  | 43-160                          | 5                          | 8000                      | 409                                     | 89                                       | 20000                                          |
| RP40-11012SFR <sup>(3,4)</sup>  | 43-160                          | 12                         | 3333                      | 402                                     | 90.5                                     | 3900                                           |
| RP40-11015SFR <sup>(3,4)</sup>  | 43-160                          | 15                         | 2666                      | 400                                     | 91                                       | 2600                                           |
| RP40-11024SFR <sup>(3,4)</sup>  | 43-160                          | 24                         | 1666                      | 404                                     | 90                                       | 1300                                           |
| RP40-2412DFR <sup>(3,4)</sup>   | 9-36                            | ±12                        | ±1666                     | 1851                                    | 90                                       | ±2600                                          |
| RP40-2415DFR <sup>(3,4)</sup>   | 9-36                            | ±15                        | ±1333                     | 1851                                    | 90                                       | ±1600                                          |
| RP40-2424DFR <sup>(3,4)</sup>   | 9-36                            | ±24                        | ±833                      | 1830                                    | 91                                       | ±650                                           |
| RP40-4812DFR <sup>(3,4)</sup>   | 18-75                           | ±12                        | ±1666                     | 925                                     | 90                                       | ±2600                                          |
| RP40-4815DFR <sup>(3,4)</sup>   | 18-75                           | ±15                        | ±1333                     | 741                                     | 90                                       | ±1600                                          |
| RP40-4824DFR <sup>(3,4)</sup>   | 18-75                           | ±24                        | ±833                      | 572                                     | 91                                       | ±650                                           |
| RP40-11012DFR <sup>(3,4)</sup>  | 43-160                          | ±12                        | ±1666                     | 408                                     | 89                                       | ±2600                                          |
| RP40-11015DFR <sup>(3,4)</sup>  | 43-160                          | ±15                        | ±1333                     | 408                                     | 89                                       | ±1600                                          |
| RP40-11024DFR <sup>(3,4)</sup>  | 43-160                          | ±24                        | ±833                      | 400                                     | 91                                       | ±650                                           |

Notes:

Note1: Values at nominal input voltage and full load

Note2: Test by minimum  $V_{in}$  and constant resistor load.

## Model Numbering



## Ordering Examples

RP40-2405SFR/P = 24V Input, 5V Output, Positive Logic CTRL pin and Trim pin fitted

RP40-2415SFR/N = 24V Input, 15V Output, Negative Logic CTRL pin and Trim pin fitted

Notes:

Note3: standard part is with suffix "P" for positive logic (1=ON, 0=OFF)  
or add suffix "N" instead for negative logic (0=ON, 1=OFF)

Note4: add suffix “-HC” for premounted Heat-sink with clamps

**EN50155 Certified**

**UL60950-1 AM2 Certified**

**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

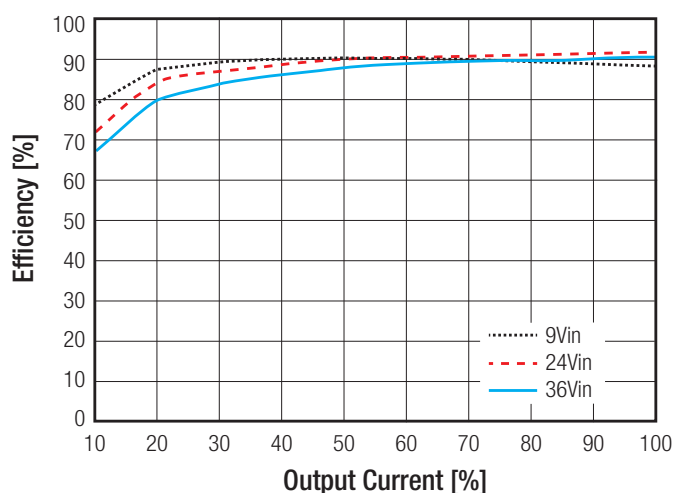
| BASIC CHARACTERISTICS              |                                                                |                                                                                                          |                                                    |                                                                     |                                                                      |
|------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------|
| Parameter                          | Condition                                                      |                                                                                                          | Min.                                               | Typ.                                                                | Max.                                                                 |
| Input Voltage Range                | nom. Vin = 24V<br>nom. Vin = 48V<br>nom. Vin = 110V            |                                                                                                          | 9VDC<br>18VDC<br>43VDC                             | 24VDC<br>48VDC<br>110VDC                                            | 36VDC<br>75VDC<br>160VDC                                             |
| Under Voltage Lockout (UVLO)       | Vin = 24V                                                      | DC-DC ON<br>DC-DC OFF                                                                                    |                                                    | 8VDC                                                                | 9VDC                                                                 |
|                                    | Vin = 48V                                                      | DC-DC ON<br>DC-DC OFF                                                                                    |                                                    | 16VDC                                                               | 18VDC                                                                |
|                                    | Vin = 110V                                                     | DC-DC ON<br>DC-DC OFF                                                                                    |                                                    | 40VDC                                                               | 43VDC                                                                |
| Input Filter                       |                                                                |                                                                                                          | Pi-Type                                            |                                                                     |                                                                      |
| Input Reflected Ripple Current     | nominal Vin and full load                                      |                                                                                                          |                                                    | 30mA <sub>p-p</sub>                                                 |                                                                      |
| Input Surge Voltage                | Vin =24V, 1s max.<br>Vin = 48V, 1s max.<br>Vin = 110V, 1s max. |                                                                                                          |                                                    |                                                                     | 50VDC<br>100VDC<br>170VDC                                            |
| Start-up time                      | Power up<br>Remote ON/OFF                                      |                                                                                                          |                                                    | 60ms<br>60ms                                                        |                                                                      |
| Internal Operating Frequency       |                                                                |                                                                                                          | 225kHz                                             | 250kHz                                                              | 275kHz                                                               |
| Ripple and Noise                   | measured by 20MHz bandwidth<br>with a 1μF/50V X7R MLCC         | 3.3V <sub>out</sub> , 5V <sub>out</sub><br>12V <sub>out</sub> , 15V <sub>out</sub><br>24V <sub>out</sub> |                                                    | 75mV <sub>p-p</sub><br>100mV <sub>p-p</sub><br>150mV <sub>p-p</sub> | 100mV <sub>p-p</sub><br>125mV <sub>p-p</sub><br>200mV <sub>p-p</sub> |
| ON/OFF CTRL <sup>(5)</sup>         | Positive Logic                                                 | DC-DC ON<br>DC-DC OFF                                                                                    | Open or 3.0V < Vr < 12V<br>Short or 0V < Vr < 1.2V |                                                                     |                                                                      |
|                                    | Negative Logic                                                 | DC-DC ON<br>DC-DC OFF                                                                                    | Short or 0V < Vr < 1.2V<br>Open or 3.0V < Vr < 12V |                                                                     |                                                                      |
| Input current of Remote pin (CTRL) |                                                                | DC-DC OFF                                                                                                |                                                    | 3mA                                                                 |                                                                      |
|                                    |                                                                | DC-DC ON                                                                                                 | -0.5mA                                             |                                                                     | 0.5mA                                                                |

**Notes:**

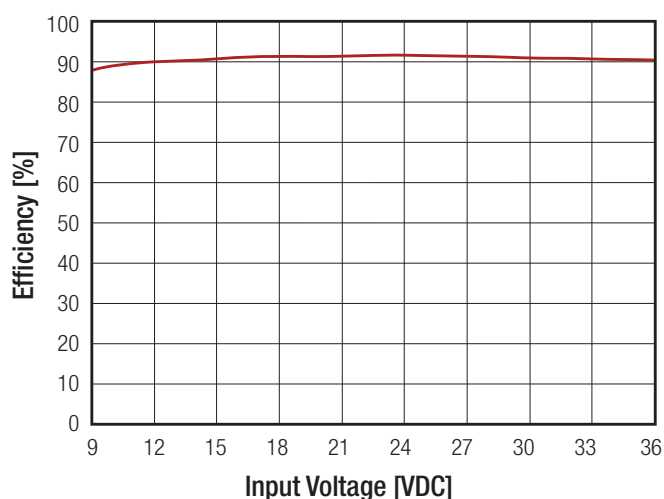
Note5: The pin voltage is referenced to -Vin pin.

### RP40-2405SFR

**Efficiency vs. Output Current**



**Efficiency vs. Input Voltage**

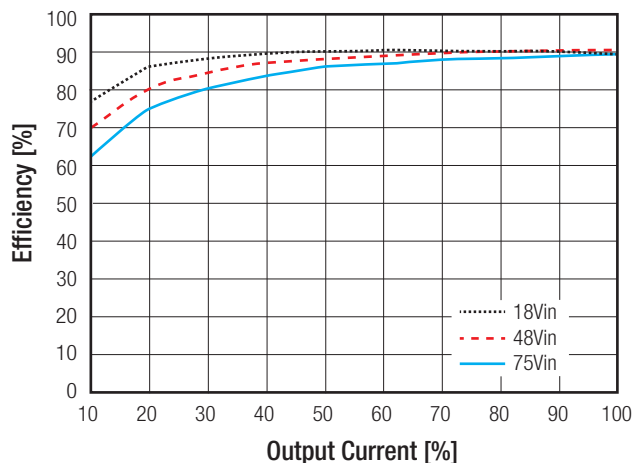


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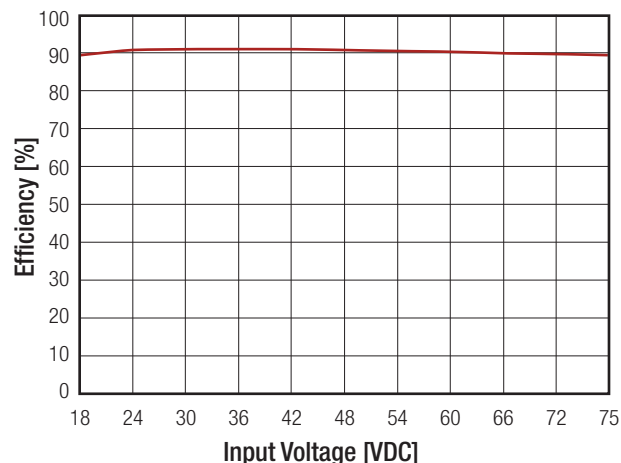
Specifications (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

### RP40-4805SFR

Efficiency vs. Output Current

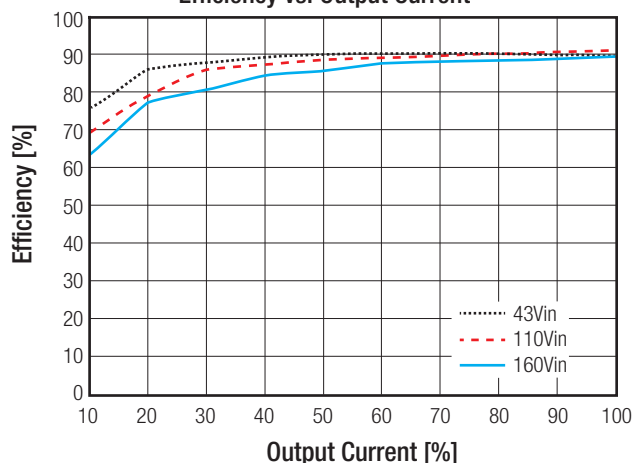


Efficiency vs. Input Voltage

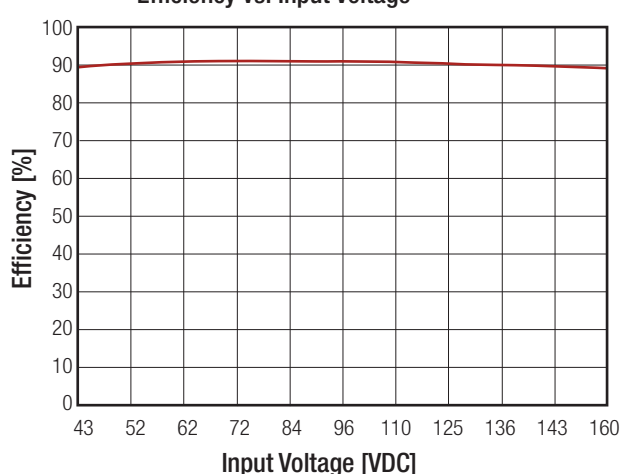


### RP40-11005SFR

Efficiency vs. Output Current



Efficiency vs. Input Voltage



### REGULATIONS

| Parameter               | Condition                          |                                           | Value                      |
|-------------------------|------------------------------------|-------------------------------------------|----------------------------|
| Output Accuracy         | full load and nominal Vin          |                                           | $\pm 1.0\%$                |
| Output Voltage Trimming | Single                             | 3.3Vout, 5 Vout, 12Vout<br>15Vout, 24Vout | $\pm 10\%$<br>-10% to +20% |
| Line Regulation         | low line to high line at full load |                                           | $\pm 0.2\%$                |
| Load Regulation         | 0% to 100% load                    | Single<br>Dual                            | $\pm 0.5\%$<br>$\pm 1.0\%$ |
| Cross Regulation        | asymmetrical 25% <> 100% load      |                                           | $\pm 5.0\%$                |
| Transient Response      | 25% load step change               |                                           | 250 $\mu\text{s}$ typ.     |

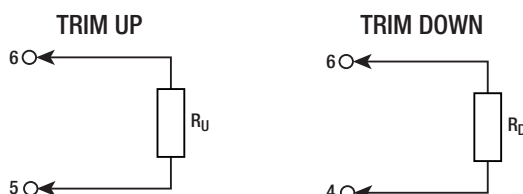
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**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

### External Output Trimming

#### Output Voltage Trimming

Single output Powerline converters offer the feature of trimming the output voltage over a certain range around the nominal value by using external trim resistors. No general equation can be given for calculating the trim resistors, but the following trimtables give typical values for choosing these trimming resistors. If voltages between the given trim points are required, extrapolate between the two nearest given values to work out the resistor required or use a variable resistor to set the output voltage. Output can be externally trimmed by using the method shown below.



#### RP40-xx3.3SFR

| Trim up   | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10   | %     |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| Vout =    | 3.333 | 3.366 | 3.399 | 3.432 | 3.465 | 3.498 | 3.531 | 3.564 | 3.597 | 3.63 | Volts |
| $R_U =$   | 57.93 | 26.17 | 15.57 | 10.28 | 7.11  | 4.98  | 3.48  | 2.34  | 1.46  | 0.75 | kOhms |
|           |       |       |       |       |       |       |       |       |       |      |       |
| Trim down | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10   | %     |
| Vout =    | 3.267 | 3.234 | 3.201 | 3.168 | 3.135 | 3.102 | 3.069 | 3.036 | 3.003 | 2.97 | Volts |
| $R_D =$   | 69.47 | 31.24 | 18.49 | 12.12 | 8.29  | 5.75  | 3.92  | 2.56  | 1.50  | 0.65 | kOhms |

#### RP40-xx05SFR

| Trim up   | 1      | 2      | 3      | 4     | 5    | 6     | 7     | 8     | 9    | 10    | %     |
|-----------|--------|--------|--------|-------|------|-------|-------|-------|------|-------|-------|
| Vout =    | 5.05   | 5.10   | 5.15   | 5.20  | 5.25 | 5.30  | 5.35  | 5.4   | 5.45 | 5.50  | Volts |
| $R_U =$   | 36.57  | 16.58  | 9.92   | 6.89  | 4.59 | 3.25  | 2.30  | 1.59  | 1.03 | 0.59  | kOhms |
|           |        |        |        |       |      |       |       |       |      |       |       |
| Trim down | 1      | 2      | 3      | 4     | 5    | 6     | 7     | 8     | 9    | 10    | %     |
| Vout =    | 4.95   | 4.90   | 4.85   | 4.80  | 4.75 | 4.70  | 4.65  | 4.60  | 4.55 | 4.50  | Volts |
| $R_D =$   | 45.533 | 20.612 | 12.306 | 8.152 | 5.66 | 3.999 | 2.812 | 1.922 | 1.23 | 0.676 | kOhms |

#### RP40-xx12SFR

| Trim up   | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10    | %     |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| Vout =    | 12.12  | 12.24  | 12.36  | 12.48  | 12.60  | 12.72  | 12.84  | 12.96  | 13.08  | 13.20 | Volts |
| $R_U =$   | 367.91 | 165.95 | 98.636 | 64.977 | 44.782 | 31.318 | 21.701 | 14.488 | 8.879  | 4.391 | kOhms |
|           |        |        |        |        |        |        |        |        |        |       |       |
| Trim down | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10    | %     |
| Vout =    | 11.88  | 11.76  | 11.64  | 11.52  | 11.40  | 11.28  | 11.16  | 11.04  | 10.92  | 10.8  | Volts |
| $R_D =$   | 460.99 | 207.95 | 123.6  | 81.423 | 56.118 | 39.249 | 27.199 | 18.162 | 11.132 | 5.509 | kOhms |

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**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

| RP40-xx15SFR |        |        |        |        |        |        |        |        |        |        |       |
|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| Trim up      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | %     |
| Vout =       | 15.15  | 15.3   | 15.45  | 15.60  | 15.75  | 15.90  | 16.05  | 16.20  | 16.35  | 16.50  | Volts |
| $R_U =$      | 419.81 | 199.91 | 126.60 | 89.95  | 67.96  | 53.30  | 42.83  | 34.98  | 28.87  | 23.98  | kOhms |
|              |        |        |        |        |        |        |        |        |        |        |       |
| Trim up      | 11     | 12     | 13     | 14     | 15     | 16     | 17     | 18     | 19     | 20     | %     |
| Vout =       | 16.650 | 16.800 | 16.950 | 17.100 | 17.250 | 17.400 | 17.550 | 17.700 | 17.850 | 18.000 | Volts |
| $R_U =$      | 19.98  | 16.65  | 13.83  | 11.42  | 9.32   | 7.49   | 5.87   | 4.43   | 3.15   | 1.99   | kOhms |
|              |        |        |        |        |        |        |        |        |        |        |       |
| Trim down    | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | %     |
| Vout =       | 14.85  | 14.70  | 14.55  | 14.40  | 14.25  | 14.1   | 13.95  | 13.8   | 13.65  | 13.5   | Volts |
| $R_D =$      | 284.89 | 128.68 | 76.61  | 50.58  | 34.96  | 24.55  | 17.11  | 11.53  | 7.19   | 3.72   | kOhms |
|              |        |        |        |        |        |        |        |        |        |        |       |
| RP40-xx24SFR |        |        |        |        |        |        |        |        |        |        |       |
| Trim up      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | %     |
| Vout =       | 24.240 | 24.480 | 24.720 | 24.960 | 25.200 | 25.440 | 25.680 | 25.920 | 26.160 | 26.400 | Volts |
| $R_U =$      | 1275.2 | 606.60 | 383.73 | 272.30 | 205.44 | 160.87 | 129.03 | 105.15 | 86.58  | 71.72  | kOhms |
|              |        |        |        |        |        |        |        |        |        |        |       |
| Trim up      | 11     | 12     | 13     | 14     | 15     | 16     | 17     | 18     | 19     | 20     | %     |
| Vout =       | 26.640 | 26.880 | 27.120 | 27.360 | 27.600 | 27.840 | 28.080 | 28.320 | 28.560 | 28.800 | Volts |
| $R_U =$      | 59.56  | 49.43  | 40.86  | 33.51  | 27.15  | 21.57  | 16.66  | 12.29  | 8.38   | 4.86   | kOhms |
|              |        |        |        |        |        |        |        |        |        |        |       |
| Trim down    | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | %     |
| Vout =       | 23.760 | 23.520 | 23.280 | 23.040 | 22.800 | 22.560 | 22.320 | 22.080 | 21.840 | 21.600 | Volts |
| $R_D =$      | 838.15 | 376.78 | 222.98 | 146.09 | 99.95  | 69.19  | 47.22  | 30.74  | 17.93  | 7.68   | kOhms |

**PROTECTIONS**

| Parameter                         | Condition         |                                  | Value                          |
|-----------------------------------|-------------------|----------------------------------|--------------------------------|
| Short Circuit Protection (SCP)    |                   |                                  | continuous, automatic recovery |
| Over Voltage Protection (OVP)     | Zener Diode Clamp | 3.3Vout                          | 3.9VDC                         |
|                                   |                   | 5Vout                            | 6.2VDC                         |
|                                   |                   | 12Vout                           | 15VDC                          |
|                                   |                   | 15Vout                           | 20VDC                          |
|                                   |                   | 24Vout                           | 30VDC                          |
| Over Load Protection (OLP)        | % Iout rated      |                                  | 150% typ., Hiccup Mode         |
| Over Temperature Protection (OTP) |                   |                                  | 115°C                          |
| Isolation Voltage                 | 24Vin, 48Vin      | I/P to O/P<br>I/P to O/P to Case | 1.6kVDC/1min.<br>1.6kVDC/1min. |
|                                   | 110Vin            | I/P to O/P<br>I/P to O/P to Case | 3kVDC/1min.<br>1.6kVDC/1min.   |
| Isolation Resistance              | 500VDC            |                                  | 1GΩ min.                       |
| Isolation Capacitance             |                   |                                  | 1500pF max.                    |

**Notes:**

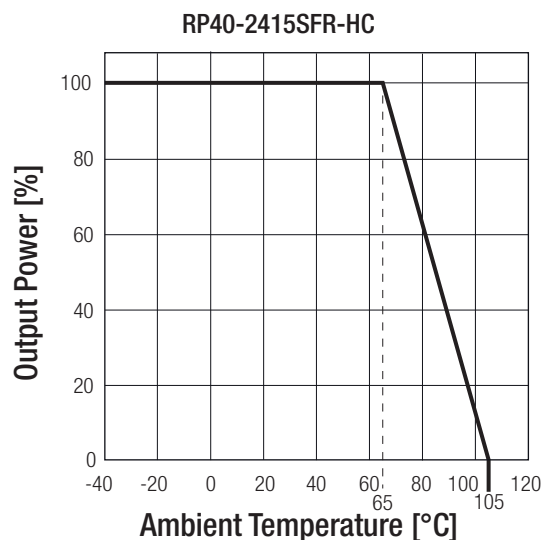
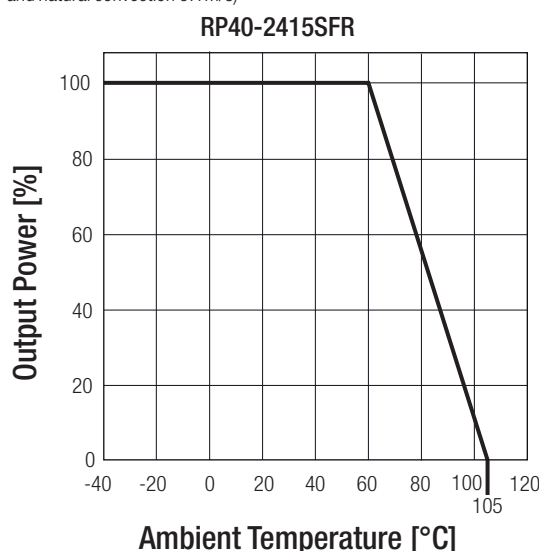
Note6: This power module is not internally fused. An input line fuse must always be used.

**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

| ENVIRONMENTAL                       |                                                                             |                                                                                           |
|-------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Parameter                           | Condition                                                                   | Value                                                                                     |
| Operating Temperature Range         | without derating, without Heat-Sink<br>with derating                        | $-40^\circ\text{C}$ to $+60^\circ\text{C}$<br>$-40^\circ\text{C}$ to $+105^\circ\text{C}$ |
| Maximum Case Temperature            |                                                                             | $+105^\circ\text{C}$                                                                      |
| Temperature Coefficient             |                                                                             | $\pm 0.02\%/^\circ\text{C}$ max.                                                          |
| Thermal Impedance                   | Natural convection, without Heat-sink<br>Natural convection, with Heat-sink | $10.8^\circ\text{C/W}$<br>$10.3^\circ\text{C/W}$                                          |
| Operating Humidity                  |                                                                             | 5% - 95% RH                                                                               |
| Shock                               |                                                                             | EN61373, MIL-STD-810F                                                                     |
| Thermal Shock                       |                                                                             | MIL-STD-810F                                                                              |
| Vibration                           |                                                                             | EN61373, MIL-STD-810F                                                                     |
| Fire protection on railway vehicles |                                                                             | according to EN45545-2, 2013 standard                                                     |
| MTBF                                | according to MIL-HDBK-217F standard                                         | $907.3 \times 10^3\text{h}$                                                               |

### Derating Graph<sup>(7)</sup>

(@ Chamber and natural convection 0.1 m/s)



### Notes:

Note7: Derating graphs are valid only for the shown part numbers. If you need detailed derating-information about a part-number not shown here please contact our technical support service at [techsupportAT@recom-power.com](mailto:techsupportAT@recom-power.com)

## SAFETY AND CERTIFICATIONS

| Certificate Type (Safety)                                         | Report / File Number | Standard                                                      |
|-------------------------------------------------------------------|----------------------|---------------------------------------------------------------|
| Information Technology Equipment, General Requirements for Safety | E196683              | UL60950-1, 2nd Edition AM:2, 2014<br>CSA C22.2 No. 60950-1-07 |
| Railway Applications - Electrical Equipment used on rolling stock | 15A100702E-C         | EN50155, 2007                                                 |

| EMI Compliance                                                                                                                                | Condition                                         | Standard / Criterion                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------|
| Industrial, scientific and medical equipment - Radio frequency disturbance characteristics - Limits and methods of measurement <sup>(8)</sup> | with external filter                              | EN50121-3-2, Class A<br>EN55011, Class A or B |
| ESD Electrostatic discharge immunity test                                                                                                     | Air $\pm 8\text{kV}$ and Contact $\pm 6\text{kV}$ | EN61000-4-2, Criteria A                       |
| Radiated, radio-frequency, electromagnetic field immunity test                                                                                | 20 V/m                                            | EN61000-4-3, Criteria A                       |
| Fast Transient and Burst Immunity <sup>(9)</sup>                                                                                              | $\pm 2\text{kV}$                                  | EN61000-4-4, Criteria A                       |
| Surge Immunity <sup>(9)</sup>                                                                                                                 | $\pm 2\text{kV}$                                  | EN61000-4-5, Criteria A                       |
| Immunity to conducted disturbances, induced by radio-frequency fields                                                                         | 10 Vr.m.s                                         | EN61000-4-6, Criteria A                       |
| Power Magnetic Field Immunity                                                                                                                 | 100A/m continuous; 1000A/m 1s                     | EN61000-4-8, Criteria A                       |

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**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

**Notes:**

Note8: The standard module meets EMI Class A or Class B with external components.

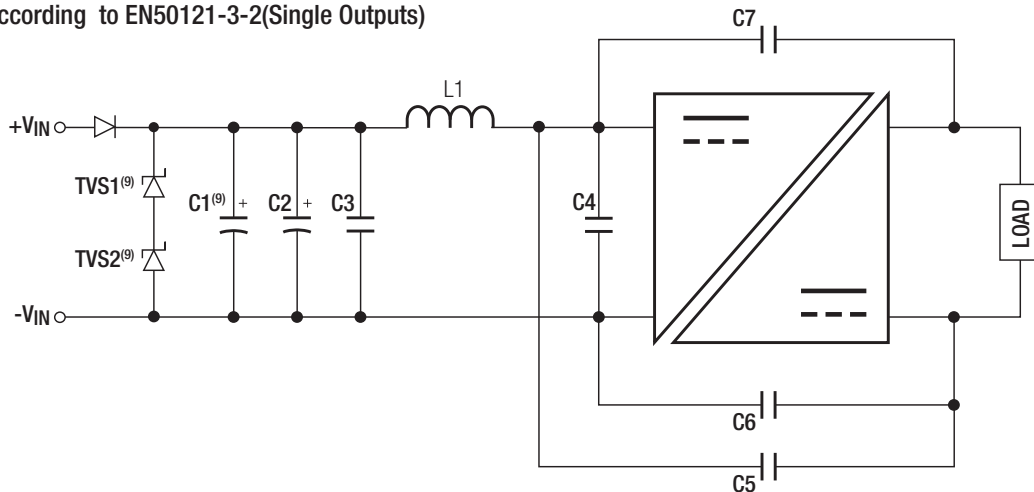
Note9: An external input filter capacitor is required if the module has to meet EN61000-4-4 and -4-5.

**The RP40-24xxFR** requires an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220 $\mu\text{F}$ /100V) and a TVS (SMDJ58A, 58V, 3000Watt peak pulse power) connected in parallel.

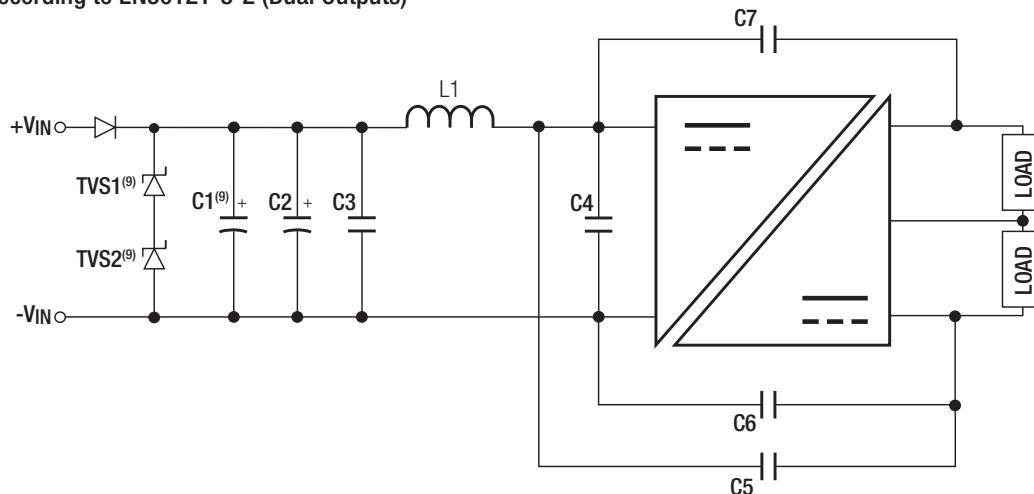
**The RP40-48xxFR** requires an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220 $\mu\text{F}$ /100V) and a TVS (SMDJ120A, 120V, 3000Watt peak pulse power) connected in parallel.

**The RP40-110xxFR** requires 3pcs aluminum electrolytic capacitor in parallel (Ruby-con BXF series, 68 $\mu\text{F}$ /200V) and two TVS (SMDJ90A, 90V, 3000Watt peak pulse power) in series, connected in parallel.

**EMC Filtering according to EN50121-3-2(Single Outputs)**



**EMC Filtering according to EN50121-3-2 (Dual Outputs)**

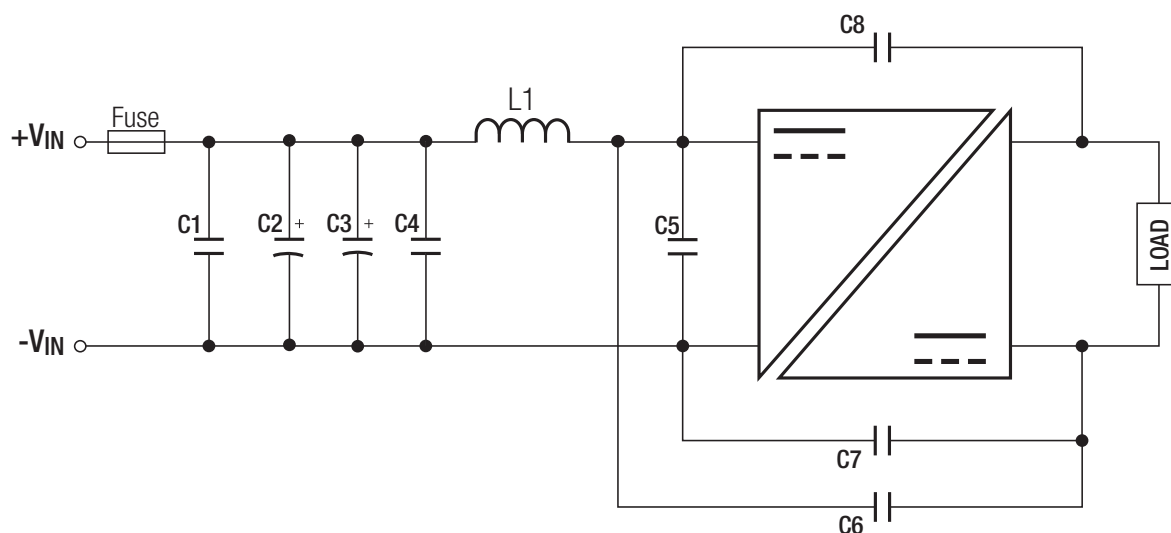


| MODEL           | TVS1                                        | TVS2                                      | C1 <sup>(9)</sup>                       | C2                                                            | C3                                 | C4                                   | C5, C6, C7                    | L1                                    |
|-----------------|---------------------------------------------|-------------------------------------------|-----------------------------------------|---------------------------------------------------------------|------------------------------------|--------------------------------------|-------------------------------|---------------------------------------|
| RP40-24xxS_DFR  | SMDJ58A<br>58V, 3000W<br>peak pulse power   | N/A                                       | 220 $\mu\text{F}$ /100V                 | N/A                                                           | N/A                                | 10 $\mu\text{F}$ /50V<br>1210 MLCC   | 680pF/3kV<br>1808 MLCC        | 2.2 $\mu\text{H}$ 11A<br>SMD-Inductor |
| RP40-48xxS_DFR  | SMDJ120A<br>120V, 3000W<br>peak pulse power |                                           |                                         |                                                               |                                    | 4.7 $\mu\text{F}$ /100V<br>1210 MLCC |                               | 12 $\mu\text{H}$ 4A<br>SMD-Inductor   |
| RP40-110xxS_DFR | SMDJ90A<br>90V, 3000W<br>peak pulse power   | SMDJ90A<br>90V, 3000W<br>peak pulse power | 68 $\mu\text{F}$ /200V<br>3 in parallel | 33 $\mu\text{F}$ /250V<br>Al Cap. (lie down)<br>Chemi-con KXJ | 1 $\mu\text{F}$ /250V<br>1812 MLCC | 1 $\mu\text{F}$ /250V<br>1812 MLCC   | 1000pF<br>TDK CD series<br>Y1 | 22 $\mu\text{H}$ 1.5A<br>SMD-Inductor |

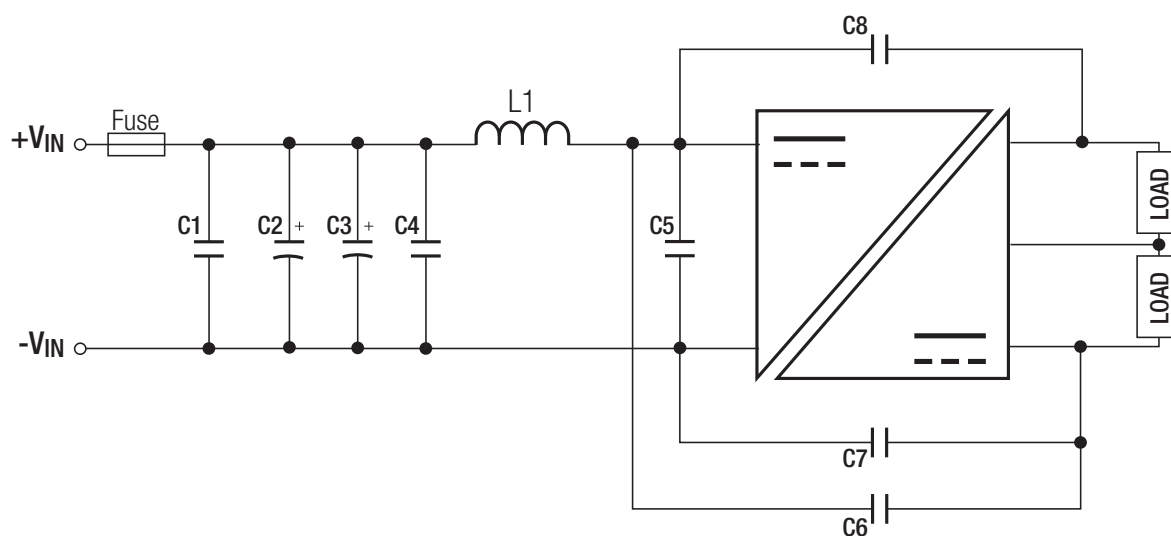
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**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

## EMC Filtering according to EN55022 Class A (Single Outputs)



## EMC Filtering according to EN55022 Class A (Dual Outputs)

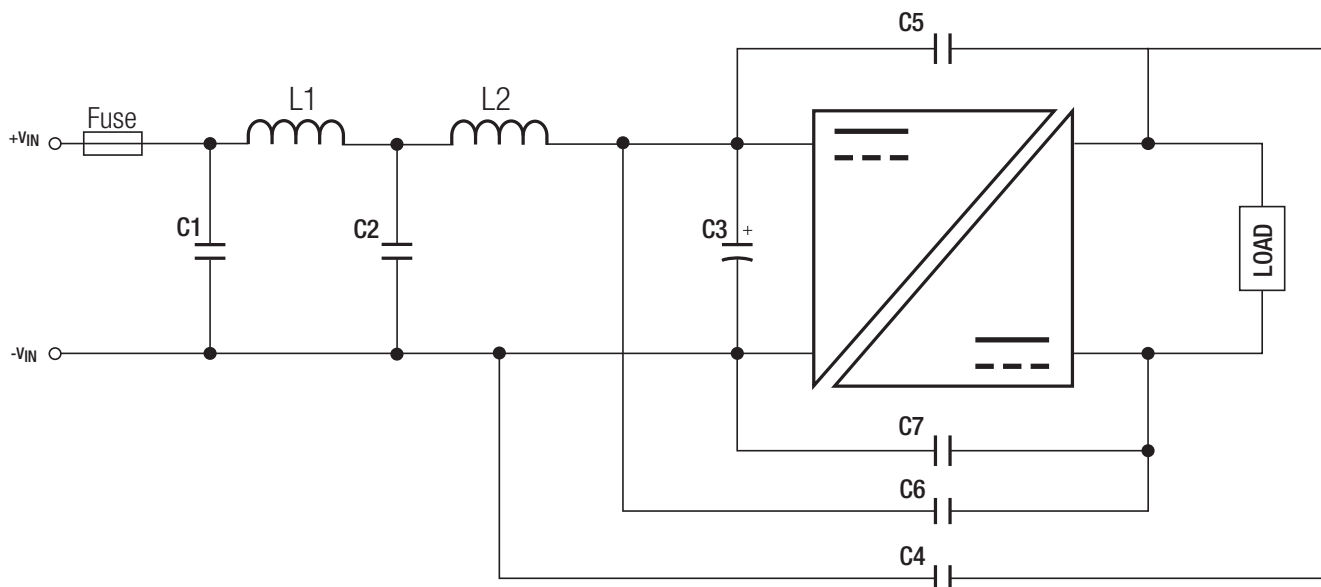


| MODEL           | C1                      | C2                                               | C3  | C4  | C5                      | C6                            | C7 | C8 | L1                        |
|-----------------|-------------------------|--------------------------------------------------|-----|-----|-------------------------|-------------------------------|----|----|---------------------------|
| RP40-24xxS_DFR  | 10μF/50V<br>1210 MLCC   | N/A                                              | N/A | N/A | 10μF/50V<br>1210 MLCC   | 680pF/3kV<br>1808 MLCC        |    |    | 2.2μH 11A<br>SMD Inductor |
| RP40-48xxS_DFR  | 4.7μF/100V<br>1210 MLCC |                                                  |     |     | 4.7μF/100V<br>1210 MLCC |                               |    |    | 12μH 4A<br>SMD Inductor   |
| RP40-110xxS_DFR | N/A                     | 33μF/250V<br>Al Cap. (lie down)<br>Chemi-con KXJ |     |     | 1μF/250V<br>1812 MLCC   | 1000pF<br>TDK CD series<br>Y1 |    |    | 22μH 1.5A<br>SMD Inductor |

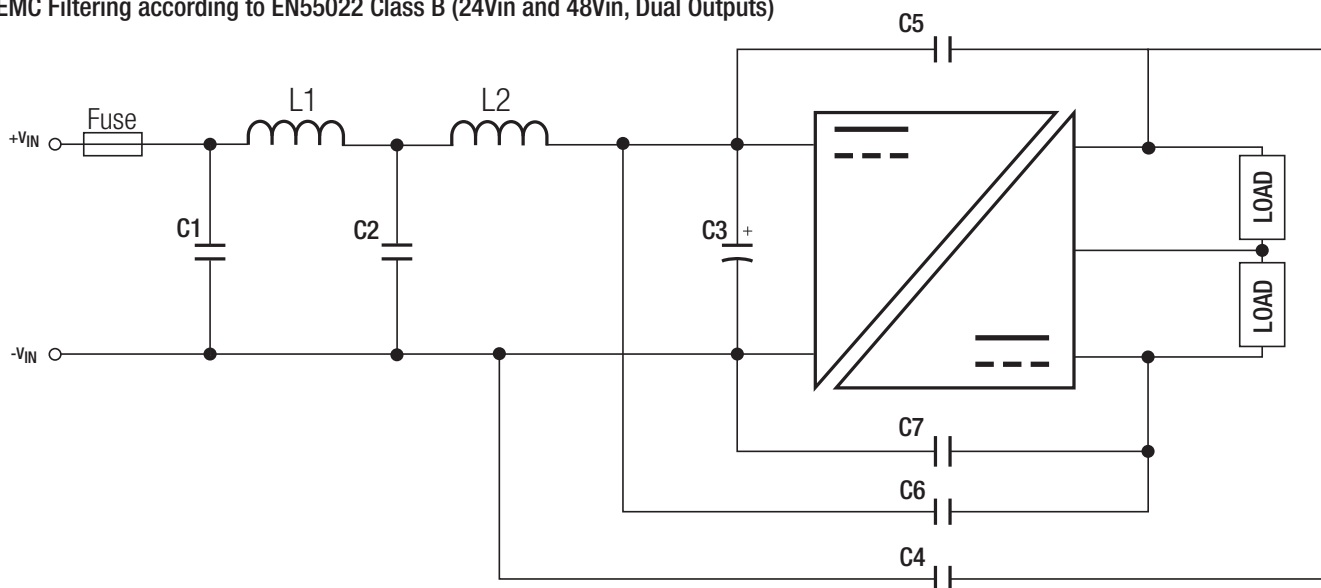
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**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

EMC Filtering according to EN55022 Class B (24Vin and 48Vin, Single Outputs)



EMC Filtering according to EN55022 Class B (24Vin and 48Vin, Dual Outputs)

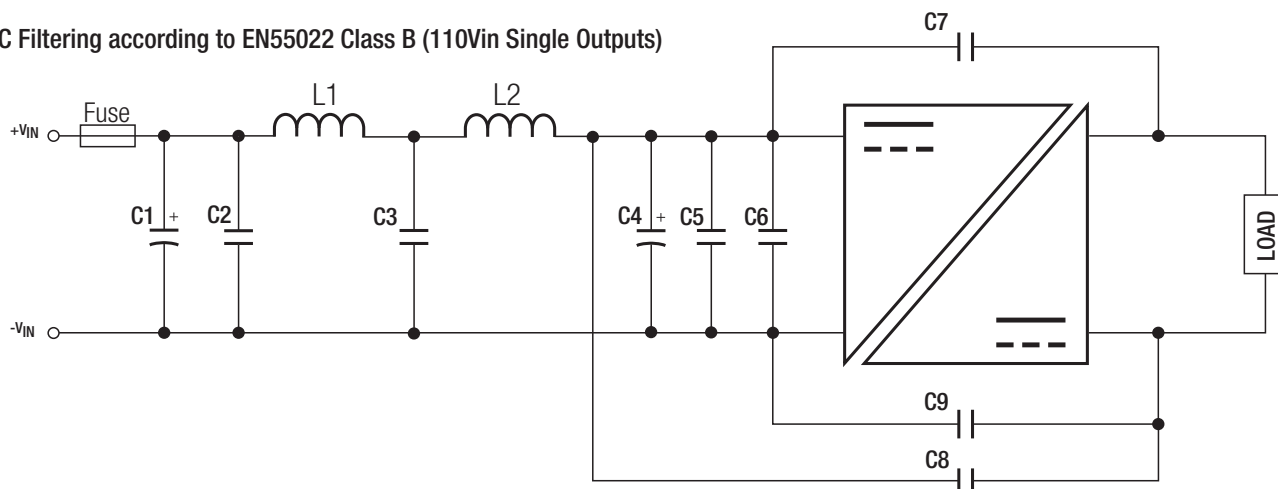


| MODEL          | C1/C2                                | C3                                                           | C4/C6                   | C5/C7                   | L1/L2                                 |
|----------------|--------------------------------------|--------------------------------------------------------------|-------------------------|-------------------------|---------------------------------------|
| RP40-24xxS_DFR | 10 $\mu\text{F}$ /50V<br>1210 MLCC   | 82 $\mu\text{F}$ /100V<br>Al Cap. (lie down)<br>Chemi-con KJ | 1000pf/3kV<br>1808 MLCC | 2200pf/3kV<br>1808 MLCC | 3.3 $\mu\text{H}$ 10A<br>SMD Inductor |
| RP40-48xxS_DFR | 4.7 $\mu\text{F}$ /100V<br>1210 MLCC |                                                              |                         |                         | 12 $\mu\text{H}$ 4A<br>SMD Inductor   |

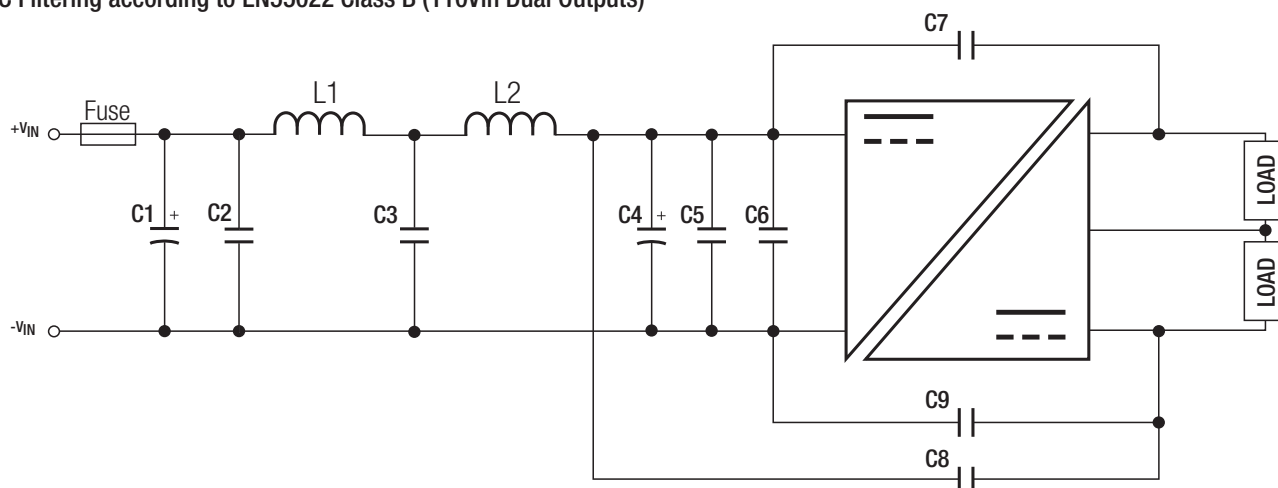
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**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

## EMC Filtering according to EN55022 Class B (110Vin Single Outputs)



## EMC Filtering according to EN55022 Class B (110Vin Dual Outputs)



| MODEL           | C1                                                            | C2/C3                              | C4                                                            | C5/C6                              | C7/C8/C9                   | L1/L2                                 |
|-----------------|---------------------------------------------------------------|------------------------------------|---------------------------------------------------------------|------------------------------------|----------------------------|---------------------------------------|
| RP40-110xxS_DFR | 33 $\mu\text{F}$ /250V<br>Al Cap. (lie down)<br>Chemicon -KXJ | 1 $\mu\text{F}$ /250V<br>1812 MLCC | 33 $\mu\text{F}$ /250V<br>Al Cap. (lie down)<br>Chemicon -KXJ | 1 $\mu\text{F}$ /250V<br>1812 MLCC | 2200pF<br>TDK CD series Y1 | 22 $\mu\text{H}$ 1.5A<br>SMD Inductor |

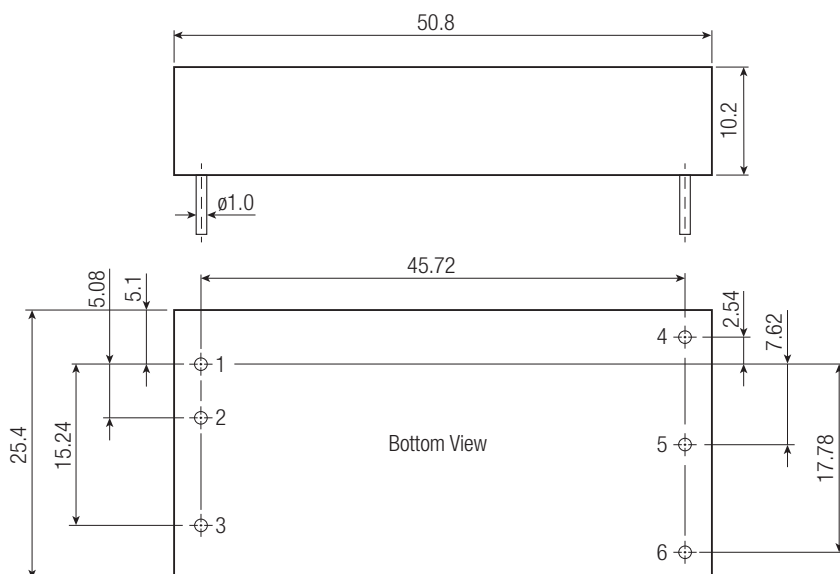
## DIMENSIONS and PHYSICAL CHARACTERISTICS

| Parameter                   | Type              | Value                |
|-----------------------------|-------------------|----------------------|
| Material                    | Case              | Copper Alloy CuZn33  |
|                             | Base              | FR4 PCB              |
|                             | Potting           | Silicone (UL94V-0)   |
| Packaging Dimension (LxWxH) | without Heat-sink | 50.8 x 25.4 x 10.2mm |
|                             | with Heat-sink    | 56.8 x 25.4 x 16.8mm |
| Packaging Weight            | without Heat-sink | 32g                  |
|                             | with Heat-sink    | 43g                  |

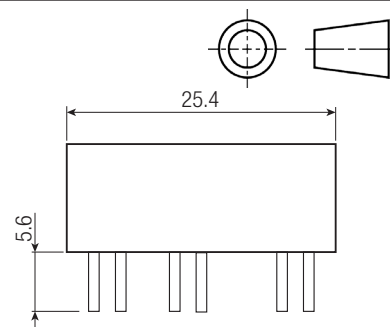
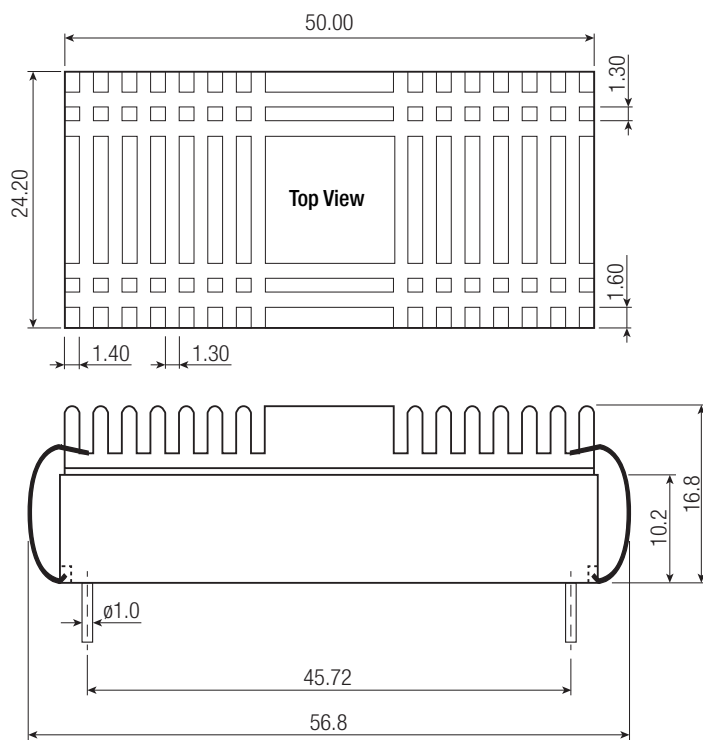
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**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

### Dimension Drawing (mm)



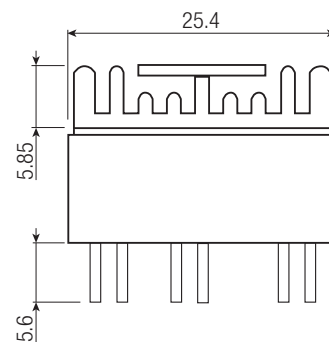
### Dimension Drawing with Heat-sink (mm)



## Pin Connections

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

Pin Pitch Tolerance  $\pm 0.25\text{mm}$   
Pin dimension tolerance  $\pm 0.1\text{mm}$   
XX.X  $\pm 0.5\text{mm}$   
XX.XX  $\pm 0.25\text{mm}$



## PACKAGING INFORMATION

| Parameter                 | Type              |      | Value           |
|---------------------------|-------------------|------|-----------------|
| Packaging Quantity        | without Heat-sink | Tube | 9pcs            |
|                           | with Heat-sink    | Tray | 20pcs           |
| Storage Temperature Range |                   |      | -55°C to +125°C |
| Storage Humidity          |                   |      | 5% - 95% RH     |

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