



Наличие и актуальные цены на

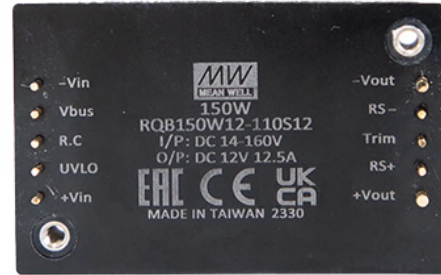
RQB150W12-110S48

<https://www.mean-well.ru/store/RQB150W12-110S48/>



150W Quarter Brick 14~160Vdc wide Input Railway DC-DC Converter

RQB150W12 series



(Bottom View)



■ Features

- Quarter-brick(2.28" x 1.45" x 0.5") with industrial standard pin-out
- Compliance with railway standard EN50155
- 12:1(14~160Vdc) wide input range
- Wide operating temperature range -40 ~ +90°C
- No minimum load required
- Full encapsulated
- Protections: Short circuit (Continuous) / Overload / Over temperature / Over voltage / Input under voltage lockout
- 3KVAC I/O isolation
- Remote ON/OFF control and remote sense
- Trimming output($\pm 10\%$)
- 3 years warranty

■ Applications

- Bus, tram, metro or railway system
- Telecom/datacom system
- Wireless network
- Industrial control facility
- Instrument
- Analyzer
- Highly vibrating, heavily dusty, extremely low or high temperature harsh environment

■ GTIN CODE

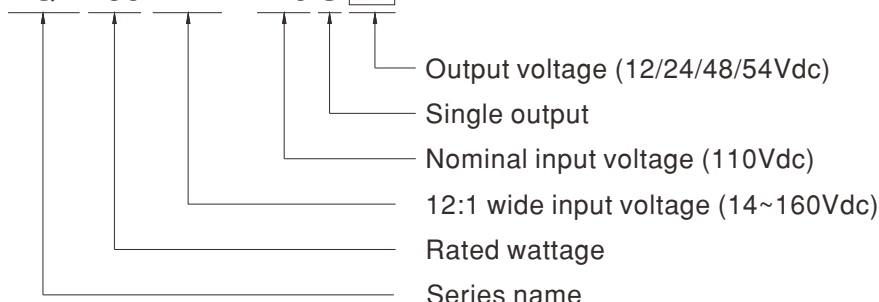
MW Search: <https://www.meanwell.com/serviceGTIN.aspx>

■ Description

RQB150W12 series is 150W module type DC-DC reliable railway with quarter brick package. It features international standard pins, a high efficiency up to 88%, wide working temperature range -40~+90°C, 3KVAC I/P-O/P isolation voltage, meet EN50155 with external circuits, continuous-mode short circuit protection, etc. The models input for 14~160VDC 12:1 wide input range, and various output voltage, 12V/24V/48V/54V for single output, which are suitable for railway, trams, buses and also can be used in the harsh environment with high vibration, high dust, extremely low or high temperature, etc.

■ Model Encoding

RQB 150 W12 – 110 S 12





| MODEL SELECTION TABLE | | | | | | | |
|-----------------------|--|---------------|-----------|-------------------|-------------------|----------------------|--------------------------|
| ORDER NO. | INPUT | | | OUTPUT | | EFFICIENCY (Typ.) | CAPACITOR LOAD (MAX.) |
| | INPUT VOLTAGE (RANGE) | INPUT CURRENT | | OUTPUT VOLTAGE | OUTPUT CURRENT | | |
| | | NO LOAD | FULL LOAD | | | | |
| RQB150W12-110S12 | Nominal 24V,36V,48V,72V,96V,110V (14 ~ 160V) | 10mA | 1.55A | 12V | 12.5A | 88% | 5000μF |
| RQB150W12-110S24 | | 10mA | 1.55A | 24V | 6.25A | 87.5% | 2000μF |
| RQB150W12-110S48 | | 10mA | 1.55A | 48V | 3.125A | 87.5% | 1000μF |
| RQB150W12-110S54 | | 10mA | 1.55A | 54V | 2.778A | 88% | 1000μF |

| SPECIFICATION | | | | |
|---------------------------|---|---|--|---|
| INPUT | VOLTAGE RANGE | 14 ~ 160Vdc | | |
| | SURGE VOLTAGE (0.1s max.) | 200Vdc | | |
| | FILTER | Pi type | | |
| | PROTECTION | 15A/250Vac time delay fuse | | |
| | SETUP TIME | 300ms max. (100% Load at Nominal Vin) | | |
| OUTPUT | VOLTAGE ACCURACY | ± 1.0% | | |
| | RATED POWER | 150W | | |
| | RIPPLE & NOISE Note.2 | 12V/24V=240mVp-p, 48V/54V=480mVp-p | | |
| | LINE REGULATION Note.3 | ± 0.2% | | |
| | LOAD REGULATION Note.4 | ± 0.5% | | |
| | SWITCHING FREQUENCY (Typ.) | 250KHz | | |
| | EXTERNAL TRIM ADJ. RANGE (Typ.) | ± 10% | | |
| | HOLD UP TIME | Please refer to page 5 Hold up time | | |
| PROTECTION | SHORT CIRCUIT | Protection type : Continuous, automatic recovery | | |
| | OVERLOAD | 120 ~ 200% rated output power | | |
| | | Protection type : Recovers automatically after fault condition is removed | | |
| | OVER VOLTAGE | 110 ~ 150% rated output voltage | | |
| | | Protection type : Shutdown (latch) | | |
| | OVER TEMPERATURE | +115℃ thermal shutdown, recovers automatically after fault condition is removed | | |
| FUNCTION | REMOTE CONTROL | Power ON: R.C ~ -Vin > 3 ~ 12Vdc or open circuit | | |
| | | Power OFF: R.C ~ -Vin < 1.2Vdc or short | | |
| ENVIRONMENT | COOLING | Natural convection | | |
| | WORKING TEMP. | -40 ~ +90℃ (Refer to "Derating Curve") | | |
| | CASE TEMPERATURE | +115℃ max. | | |
| | WORKING HUMIDITY | 5% ~ 90% RH non-condensing | | |
| | STORAGE TEMP., HUMIDITY | -55 ~ +125℃, 10 ~ 95% RH non-condensing | | |
| | TEMP. COEFFICIENT | 0.05% / °C (0 ~ 65℃) | | |
| | SOLDERING TEMPERATURE | 1.5mm from case of 3 ~ 5sec./260℃ max. | | |
| | VIBRATION | EN61373 | | |
| | OPERATING ALTITUDE | 4000 meters | | |
| SAFETY & EMC (Note.6) | SAFETY STANDARDS | LVD IEC62368-1, EAC TP TC 020/2011 approved | | |
| | WITHSTAND VOLTAGE | I/P-O/P:3KVAC | I/P-CASE:1.5KVAC | |
| | ISOLATION RESISTANCE | I/P-O/P:1000M Ohms / 500VDC / 25℃/ 70% RH non-condensing | | |
| | ISOLATION CAPACITANCE (Typ.) | 3000pF | | |
| | EMC EMISSION | Parameter | Standard | Test Level / Note |
| | | Conducted | BS EN/EN55032 | Class A/B with external components |
| | | Radiated | BS EN/EN55032 | Class A/B with external components |
| | EMC IMMUNITY | Parameter | Standard | Test Level / Note |
| | | ESD | BS EN/EN61000-4-2 | Level 3, ± 6KV contact |
| | | Radiated Susceptibility | BS EN/EN61000-4-3 | Level 3, 10V/m |
| | | EFT/Bursts(Note.5) | BS EN/EN61000-4-4 | Level 3, On power input port, ± 2KV external input capacitor required |
| | | Surge(Note.5) | BS EN/EN61000-4-5 | Level 3, On power input port, ± 2KV external input capacitor required |
| | | Conducted | BS EN/EN61000-4-6 | Level 3, 10V/m(r.m.s.) |
| | | Magnetic Field | BS EN/EN61000-4-8 | Level 3, 10A/m |
| | | RAILWAY STANDARD | EN50155 including EN61373 for shock & vibration, EN50121-3-2 for EMC | |
| | OTHERS | MTBF | 185Khrs MIL-HDBK-217F(25℃) | |
| | | DIMENSION (L*W*H) | 57.9*36.8*12.7mm (2.28*1.45*0.5 inch) | |
| CASE MATERIAL | | Aluminum base plate with plastic case | | |
| PACKING | | 75g ; 11pcs/per tube, 132pcs/12 tube/per carton | | |
| NOTE | 1.All parameters are specified at normal input(110Vdc), rated load, 25℃ 70% RH ambient. 2.Ripple & noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1µf & 47µf capacitor. 3.Line regulation is measured from low line to high line at rated load. 4.Load regulation is measured from 0% to 100% rated load. 5.External input capacitor required 100µF/200V x 3 . 6.The final equipment must be re-confirm that it still meet EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.”(as available on http://www.meanwell.com) ※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx | | | |

External Output Trimming

In order to trim the voltage up or down, one needs to connect the trim resistor either between the trim pin and -Vout for trim_up or between trim pin and +Vout for trim_down. The output voltage trim range is -10% to +10%. This is shown in Figures 1 and 2:

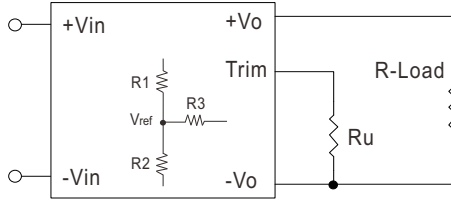


Figure 1. Trim_up Voltage Setup

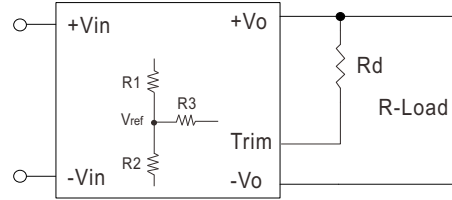


Figure 2. Trim_down Voltage Setup

1. The value of Rtrim_up defined as:

$$A = \frac{V_{ref}}{V_o' - V_{ref}} \times R1$$

$$R_{trim_up} = \frac{AR2}{R2 - A} - R3$$

For example, to trim_up the output voltage of 12V module (RQB150W12-110S12) by 10% to 13.2V, Rtrim_up is calculated as follows:

$$V_{o,nom} = 12V$$

$$V_o' = 13.2V$$

$$V_{ref} = 2.5V$$

$$R1 = 38K\Omega$$

$$R2 = 10K\Omega$$

$$R3 = 68K\Omega$$

$$A = \frac{V_{ref}}{V_o' - V_{ref}} \times R1$$

$$= \frac{2.5}{13.2 - 2.5} \times 38 = 8.878$$

$$R_{trim_up} = \frac{AR2}{R2 - A} - R3$$

$$= \frac{8.878 \times 10}{10 - 8.878} - 68$$

$$= 11.126K\Omega$$

Table 1 – Trim_up and Trim_down Resistor Values

| Model Number | Vo,nom (V) | Vref (V) | R1 (KΩ) | R2 (KΩ) | R3 (KΩ) |
|------------------|------------|----------|---------|---------|---------|
| RQB150W12-110S12 | 12 | 2.5 | 38 | 10 | 68 |
| RQB150W12-110S24 | 24 | 2.5 | 86 | 10 | 76.8 |
| RQB150W12-110S48 | 48 | 2.5 | 182 | 10 | 80.6 |
| RQB150W12-110S54 | 54 | 2.5 | 206.1 | 10 | 82 |

Note:

1. Rtrim_up, Rtrim_down is mean trim resistor, please check the formula.

2. A & B: user define parameter, no actual meanings.

3. Vo' is target trim voltage.

4. Value for R1, R2, R3 and Vref refer to above table.

2. The value of Rtrim_down defined as:

$$A = \frac{V_o' - V_{ref}}{V_{ref}} \times R2$$

$$R_{trim_down} = \frac{AR1}{R1 - A} - R3$$

For example, to trim_down the output voltage of 12V module (RQB150W12-110S12) by 10% to 10.8V, Rtrim_down is calculated as follows:

$$V_{o,nom} = 12V$$

$$V_o' = 10.8V$$

$$V_{ref} = 2.5V$$

$$R1 = 38K\Omega$$

$$R2 = 10K\Omega$$

$$R3 = 68K\Omega$$

$$A = \frac{V_o' - V_{ref}}{V_{ref}} \times R2$$

$$= \frac{10.8 - 2.5}{2.5} \times 10 = 3.32 \times 10 = 33.2$$

$$R_{trim_down} = \frac{AR1}{R1 - A} - R3$$

$$= \frac{33.2 \times 38}{38 - 33.2} - 68$$

$$= 194.83K\Omega$$

■ Hold-up Time

During the transition of different power source, the electric power on the train become unstable in a short time. Such as a sudden voltage drop or a short-term power failure. Under this situation, hold-up time circuit is suitable for this situation.

Figure 3 shows the external circuit. One is Cbus, an electrolytic cap (Cbus) about 220 μ F connected between Vbus and -Vin is necessary.

The Cbus can provide or absorb transient power and make the converter operating stable. The other one is hold-up time circuit comprises R1, D1 and Chold.

The capacity of Chold decides the hold-up time during interruption of input power Table 2 shows the table for Chold with different input voltage.

For example, if input voltage is 110V, and output load is full load. The Chold need 470 μ F for hold-up 10ms.

During start up, R1 endures a high pulse power, and should be selected carefully. The power is related to Vbus and Chold. We recommend to use 25 Ω /10W resistor.

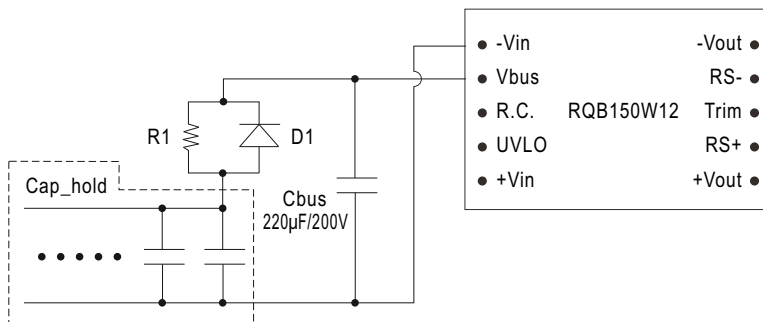


Figure 3 Hold-Up Time Circuit

Table 2 – Cap_hold table (Hold up time)

| Nominal Vin | 24V | 48V | 72V | 96V | 110V |
|-------------|--------------|--------------|--------------|--------------|--------------|
| 10ms(S2) | 1800 μ F | 1800 μ F | 1800 μ F | 600 μ F | 500 μ F |
| 20ms(S3) | 3600 μ F | 3600 μ F | 3600 μ F | 1200 μ F | 820 μ F |
| 30ms(C2) | 4800 μ F | 4800 μ F | 4800 μ F | 1800 μ F | 1200 μ F |

Figure 4 shows the relationship of Vbus voltage and input voltage. When input voltage is below 60Vdc, the Vbus voltage will keep at 70V. As the input voltage increase and over 64V, the Vbus and Vin will had the same voltage level.

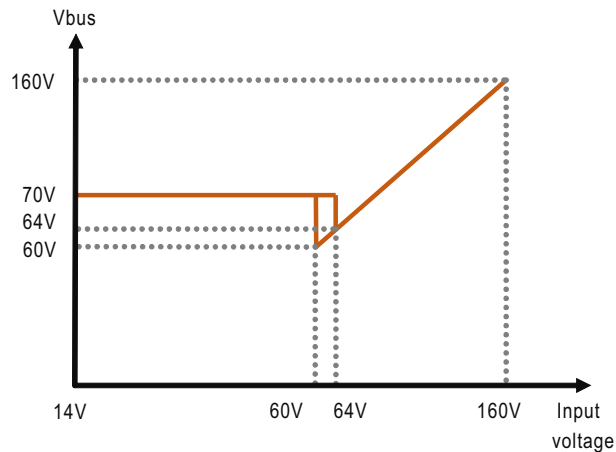
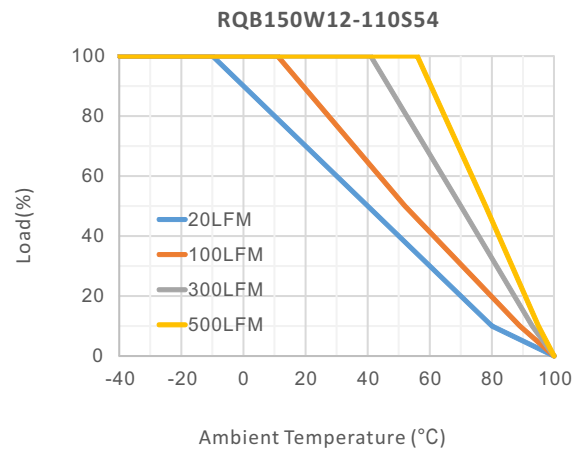
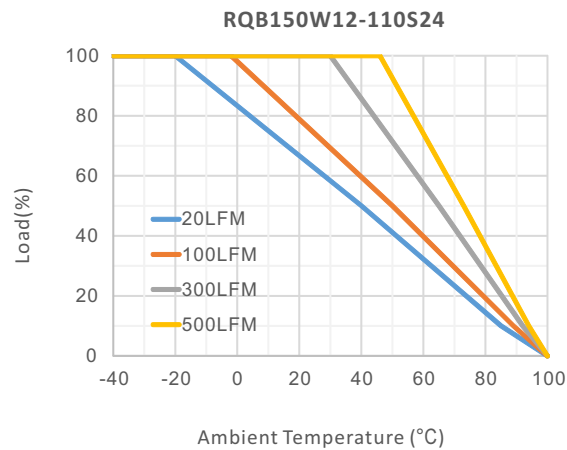
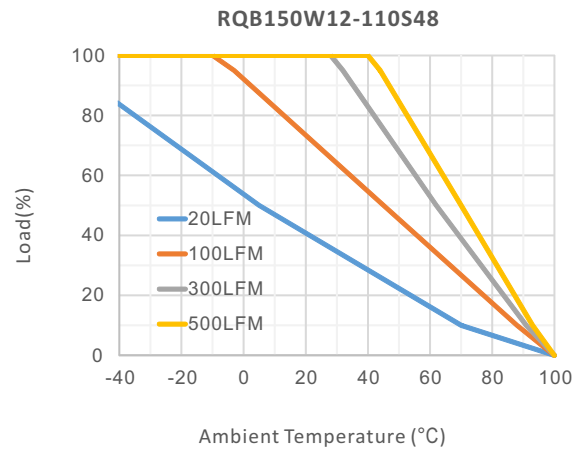
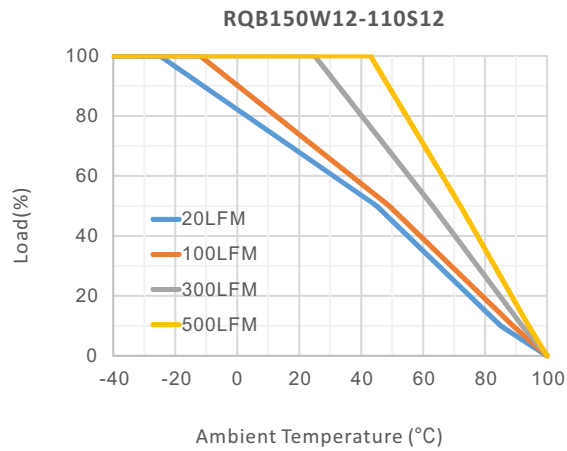


Figure 4 Input and Vbus Voltage Relationship

Derating Curve



Note 1. The de-rating curve was measured at 110Vdc input with natural convection.

Note 2. In order to meet higher "derating curve" requirements, the heat dissipation can be increased by increasing the air flow (LFM) to meet the requirements.

The recommended thermal resistance formula is as follows :

The derating curve of the converter's output load with the ambient temperature. Above derating curve shows the operating ambient temperature range is from -40°C to 100°C. The output load should derating when ambient temperature over -25°C. And the environmental convection is below 20LFM.

When the ambient temperature over -25°C, RQB150W12 should derating to certain load. For example, if the ambient temperature is about 45°C, the RQB150W12 output load should derating to 50% of full load.

The thermal resistor can be calculated by below formula. Take RQB150W12 as an example, which operating at nominal voltage and output load at full load. And the power dissipation (Pd)

$$P_d = P_{in} - P_o = \frac{P_o(1-\text{eff})}{\text{eff}}$$

$$P_d = 12 \times 12.5 \times (1 - 0.87) / 0.87 = 22.4W$$

So, the power dissipation (Pd) is about 22.4W at ambient temperature 0°C. The thermal resistance (Rca) from case to ambience is 5.75(°C/W).

$$\Delta T = P_d \times R_{ca} = 22.4W \times 5.75 (^\circ C/W) = 128.8^\circ C$$

$$\text{The maximum case temperature is } T_a = T_c - \Delta T = 105^\circ C - 128.8^\circ C = -23.8^\circ C$$

So, the Ta for full load is around -25°C

Power Derating PCB Layout Suggestion

Power module can operate in variety of thermal environments. However, sufficient cooling should be provided to ensure the reliable operation of the unit. Heat can be removed by conduction, convection, and radiation to the surrounding environment.

Figure 5 is the PCB layout, which to measure RQB150W12 thermal performed, the dimension is 137 * 88 * 1.6mm, 2 OZ. There copper can help RQB150W12 to conduct heat through the body to the PCB.

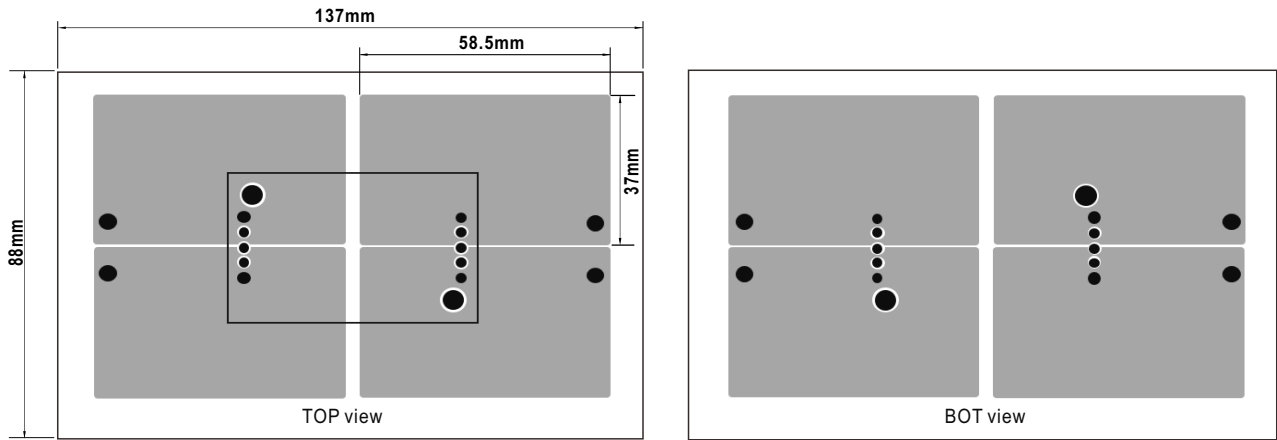
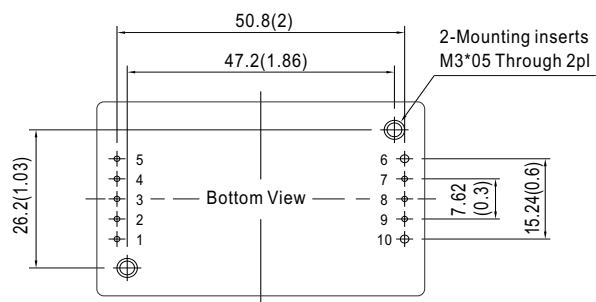
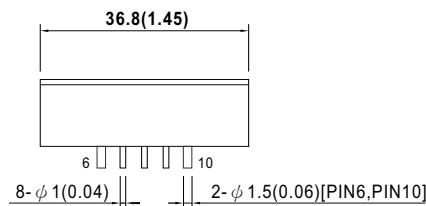
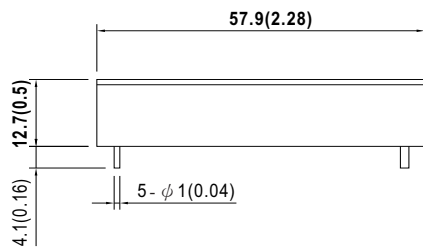


Figure 5

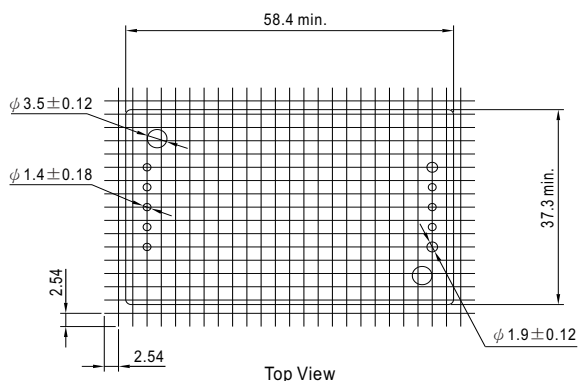
Mechanical Specification

- All dimensions in mm(inch)
- Tolerance: $x.x \pm 0.5\text{mm}$ ($x.x \pm 0.02"$)
 $x.xx \pm 0.25\text{mm}$ ($x.xx \pm 0.01"$)
- Pin size is: $1.x \pm 0.1\text{mm}$ ($0.04" \pm 0.005"$)



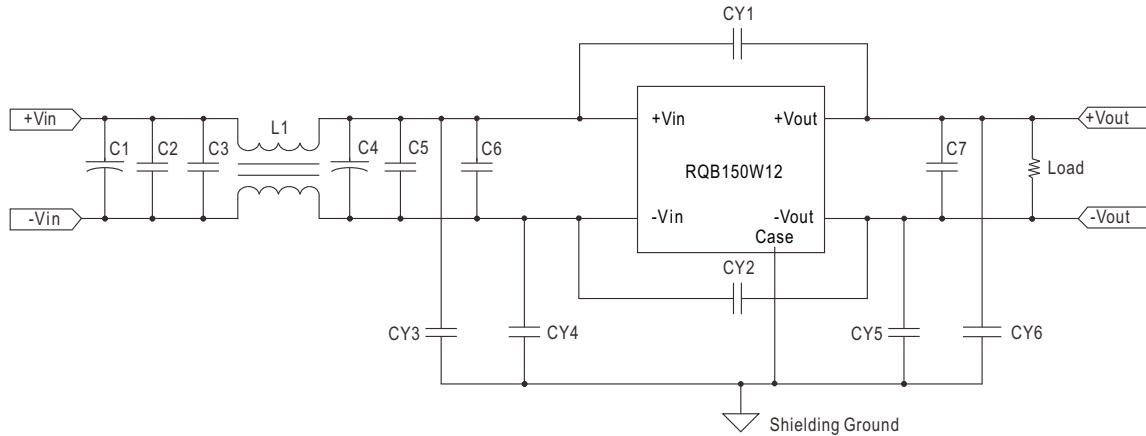
Plug Assignment

| Pin-Out | | | |
|---------|---------------|---------|--------|
| Pin No. | Output | Pin No. | Output |
| 1 | +Vin | 6 | -Vout |
| 2 | UVLO | 7 | RS- |
| 3 | Remote ON/OFF | 8 | Trim |
| 4 | Vbus | 9 | RS+ |
| 5 | -Vin | 10 | +Vout |



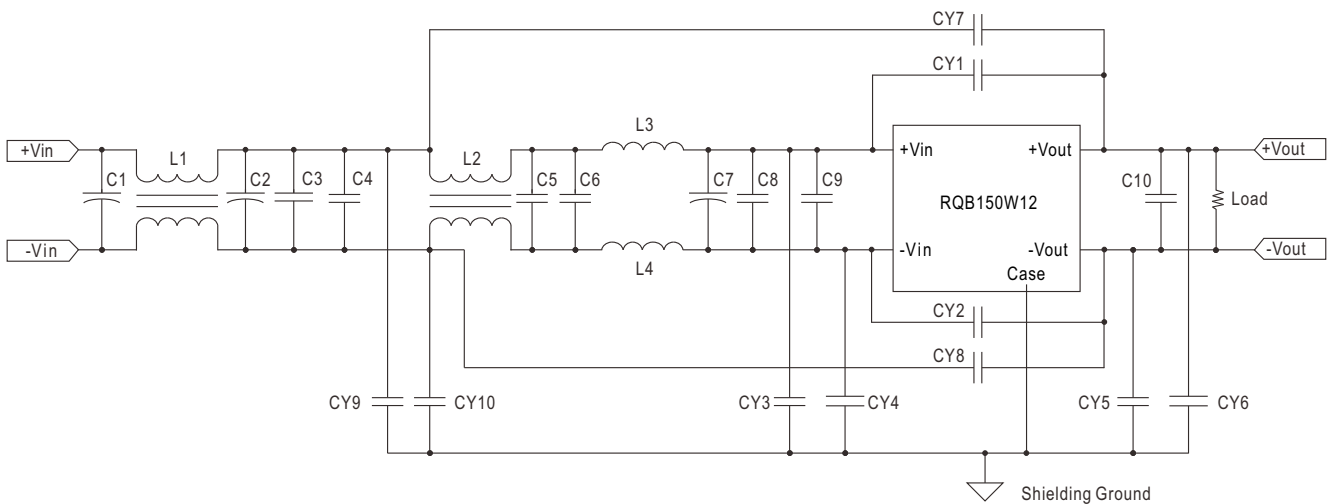
■ EMC Suggestion Circuit

※ EMI Test standard: BS EN/EN55032 Class A with external circuit. Below figure shows the suggestion circuit for Class A.
(Test Condition: Input Voltage: 110Vdc, Output Load: Full Load)



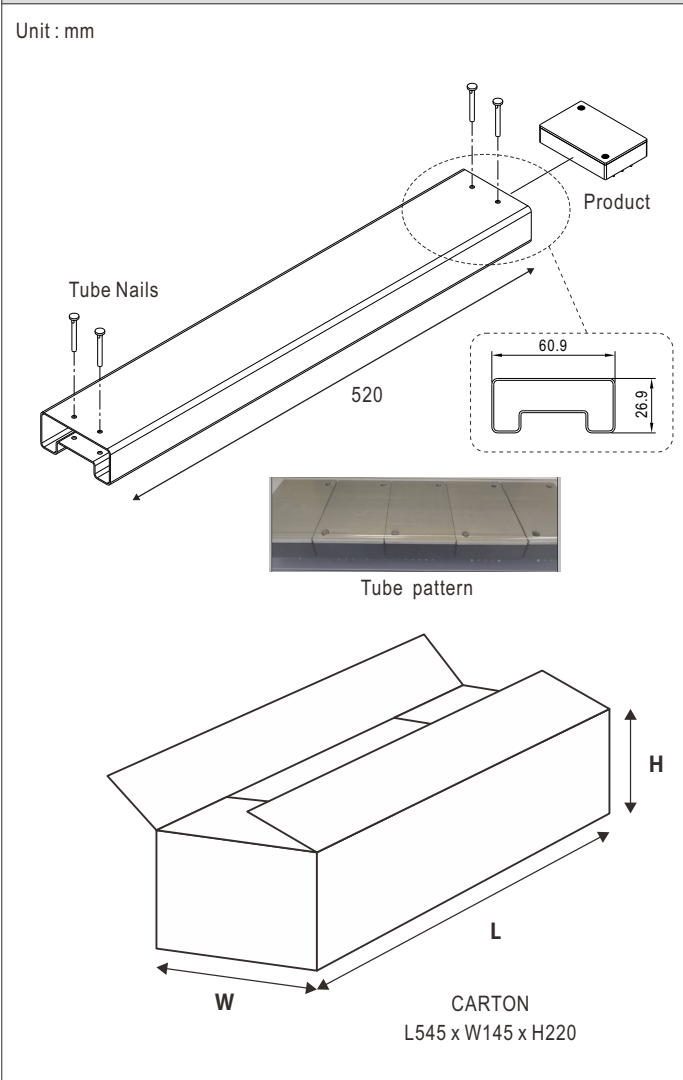
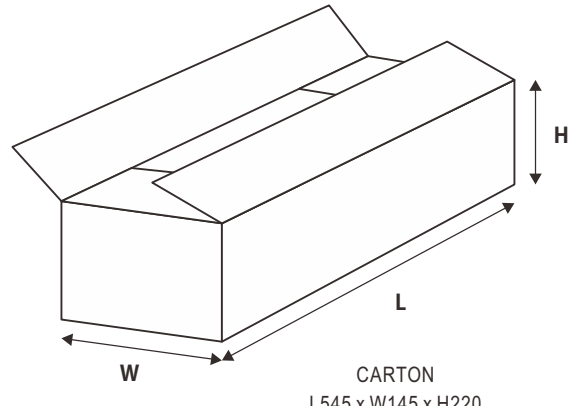
| Model No. | BS EN/EN55032 Class A | | | | | |
|------------------|-----------------------|-------------|-------|------------|-----------------|--------------|
| | C1,C4 | C2,C3,C5,C6 | L1 | CY1,CY2 | CY3,CY4,CY5,CY6 | C7 |
| RQB150W12-110S12 | 100μF/200V | 0.68μF/250V | 2.0mH | 1000pF/5KV | 1200pF/3KV*4 | 4.7μF/100V*6 |
| RQB150W12-110S24 | 220μF/200V | | | | 1200pF/3KV*5 | |
| RQB150W12-110S48 | | | | | | |
| RQB150W12-110S54 | | | | | | |

※ EMI Test standard: BS EN/EN55032 Class B with external circuit. Below figure shows the suggestion circuit for Class B.
(Test Condition: Input Voltage: 110Vdc, Output Load: Full Load)



| Model No. | BS EN/EN55032 Class B | | | | | | | | |
|------------------|-----------------------|-------------------|-------|-------|--------------|--------------|-----------------|-----------|--------------|
| | C1,C2,C7 | C3,C4,C5,C6,C8,C9 | L1,L2 | L3,L4 | CY1 | CY2 | CY3,CY4,CY5,CY6 | CY7,CY8 | C10 |
| RQB150W12-110S12 | 100μF/200V | 0.68μF/250V | 2.0mH | 4.7μH | 2200pF / 5KV | 1000pF / 5KV | 2200pF/3KV*4 | 470pF/5KV | 4.7μF/100V*6 |
| RQB150W12-110S24 | | | | | | | | | |
| RQB150W12-110S48 | | | | | | | | | |
| RQB150W12-110S54 | | | | | | | | | |

Packing

| Standard Tube Packing | MPQ Per Tube (PCS) | One Tube G.W. | Max. Q'TY/ Carton(PCS) | One Carton G.W. |
|--|--------------------------|------------------|---------------------------|--------------------|
| <p>Unit : mm</p>  <p>Product</p> <p>Tube Nails</p> <p>520</p> <p>60.9</p> <p>26.9</p> <p>Tube pattern</p>  <p>CARTON L545 x W145 x H220</p> | 11 | 955g | 132 | 12.5Kg |

Installation Manual

Please refer to : <http://www.meanwell.com/manual.html>