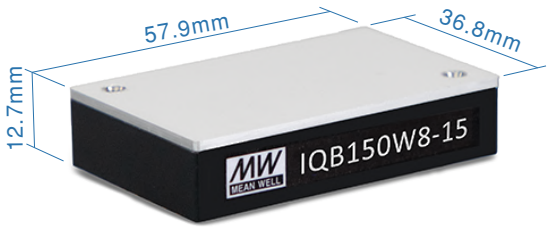


(Bottom View)

TPTC020

Automate Industrial Security Network Telecom

Features

- Quarter-brick(2.28" x 1.45" x 0.5") with industrial standard pin-out
- 8:1(9~75Vdc) ultra-wide input range
- Wide operating temperature range -40 ~ +90℃
- No minimum load required
- Full encapsulated
- Protections: Short circuit (Continuous) / Overload / Over temperature / Over voltage / Input under voltage lockout
- 1.6KVac or 2.2kvdc I/O isolation
- Remote ON/OFF control and remote sense
- Triming output (±10%)
- 3 years warranty

Applications

- Telecom/datacom system
- Wireless network
- Industrial control facility
- Instrument
- Analyzer
- Highly vibrating, heavily dusty, exteremely low or high temperature harsh environment

GTIN CODE

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

Description

IQB150W8 series is 150W isolated and regulated module type DC-DC converter with quarter brick package. It features international standard pins, a high efficiency up to 89%, wide working temperature range -40~+90℃ , continuous-mode short circuit, overload, over voltage, input under voltage protection, remote ON/OFF and trimmable output voltage etc. The models account for 9~75Vdc 8:1 ultra-wide input range, and various output voltage, 5V/12V/15V/24V/48V for single output , which are suitable for all kinds of systems, such as industrial control, telecommunication field, distributed power architecture, and so on.

Model Encoding

IQB 150 W8 – 15

- 15 — Output voltage (5/12/15/24/48Vdc)
- W8 — 8:1 wide input voltage (9~75Vdc)
- 150 — Rated wattage
- IQB — Series name

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				
IQB150W8-05	Nominal 12V,24V,36V,48V,72V (9~ 75V)	50mA	2.39A	5V	20A	87%	7000μF
IQB150W8-12		50mA	3.51A	12V	12.5A	89%	5000μF
IQB150W8-15		50mA	3.51A	15V	10A	89%	5000μF
IQB150W8-24		50mA	3.63A	24V	6.25A	86%	2000μF
IQB150W8-48		50mA	3.59A	48V	3.125A	87%	1000μF

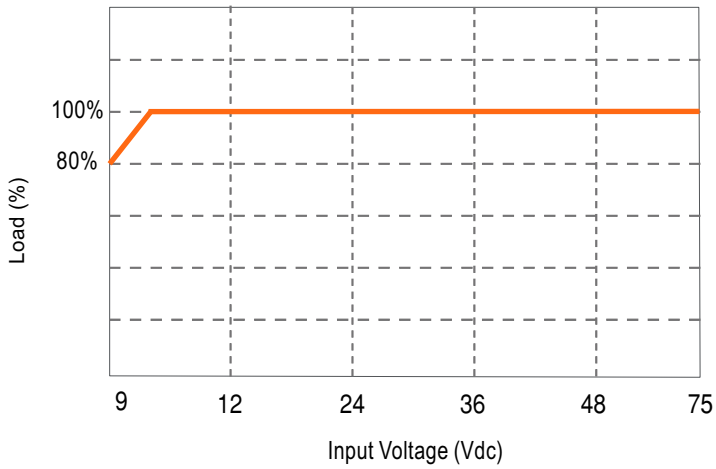
SPECIFICATION				
INPUT				
VOLTAGE RANGE		9 ~ 75Vdc		
SURGE VOLTAGE (0.1s max.)		80Vdc		
FILTER		Pi type		
PROTECTION		15A/250Vac time delay fuse		
SETUP TIME		100ms max. (100% Load at Nominal Vin)		
OUTPUT				
VOLTAGE ACCURACY		±1.0%		
RATED POWER		150W		
RIPPLE & NOISE	Note.2	5V=120mVp-p, 12V/15V=150mVp-p,24V=240mVp-p,48V=480mVp-p		
LINE REGULATION	Note.3	±0.2%		
LOAD REGULATION	Note.4	±0.5%		
SWITCHING FREQUENCY (Typ.)		5V:250KHZ ;12V/15V:300KHz ;48V:200KHz		
EXTERNAL TRIM ADJ. RANGE (Typ.)		±10% (48V for -10%/+15%)		
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 ~ 170% rated output voltage		
		Protection type : keep voltage		
OVER TEMPERATURE		+110℃ thermal shutdown, recovers automatically after fault condition is removed		
UNDER VOLTAGE LOCKOUT(Typ.)		Start-up voltage	9V	
		Shutdown voltage	7V	
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		+90℃ max.		
WORKING HUMIDITY		5% ~ 90% RH non-condensing		
STORAGE TEMP., HUMIDITY		-55 ~ +125℃, 10 ~ 95% RH non-condensing		
TEMP. COEFFICIENT		0.05% / ℃ (0 ~ 90℃)		
SOLDERING TEMPERATURE		1.5mm from case of 3 ~ 5sec./260℃ max.		
VIBRATION		MTL-STD-202G		
OPERATING ALTITUDE		2000 meters		
SAFETY &EMC (Note.6)				
SAFETY STANDARDS		LVD IEC62368-1, EAC TP TC 020/2011 approved		
WITHSTAND VOLTAGE		I/P-O/P:1.6KVac or 2.25KVdc I/P -Case:1KVac or 1.41KVdc O/P-Case:1KVac or 1.41KVdc		
ISOLATION RESISTANCE		I/P-O/P:1000M Ohms / 500Vdc / 25℃/ 70% RH non-condensing		
ISOLATION CAPACITANCE (Typ.)		3500pF		
EMC EMISSION		**Parameter**	**Standard**	**Test Level / Note**
		Conducted	BS EN/EN55032	Class A with external components
		Radiated	BS EN/EN55032	Class A with external components
EMC IMMUNITY		**Parameter**	**Standard**	**Test Level / Note**
		ESD	BS EN/EN61000-4-2	Level 3, ±6KV contact, Air 8KV
		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
OTHERS				
MTBF		>1500Khrs 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		
Potting material		Silcon		
PACKING		75g ; 11pcs/per tube, 132pcs/12 tube/per carton		

NOTE

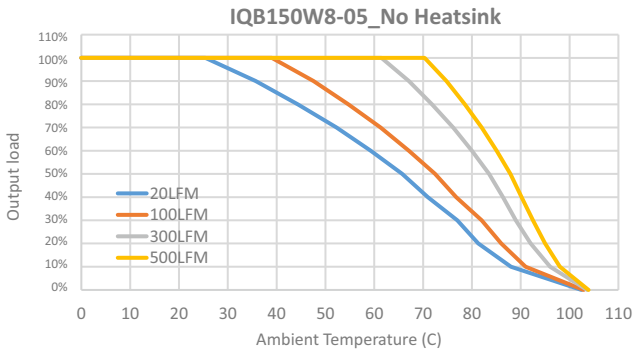
1.All parameters are specified at normal input(48Vdc), rated load, 25℃ 70% RH ambient.
2.Ripple & noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1μf & 47μf capacitor.
3.Line regulation is measured from low line to high line at rated load.
4.Load regulation is measured from 0% to 100% rated load.
5.External input capacitor required 1000μF.
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)

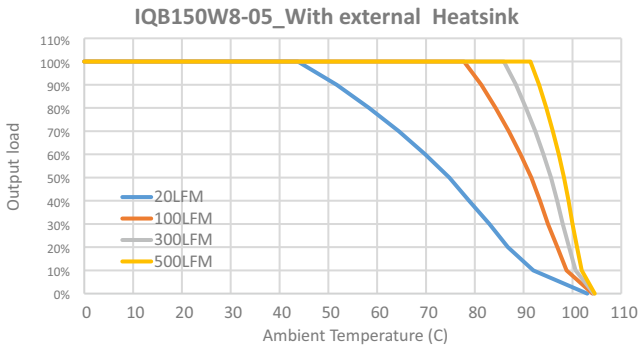
※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

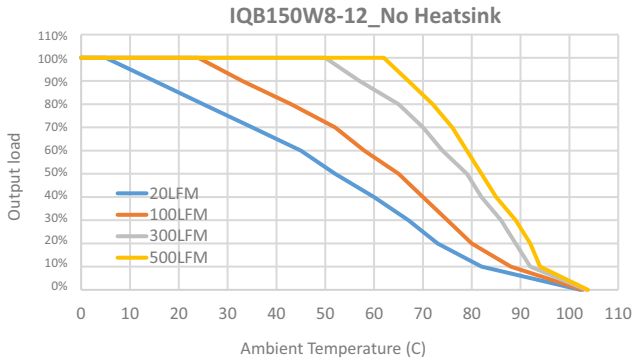
■ Output derating VS input voltage

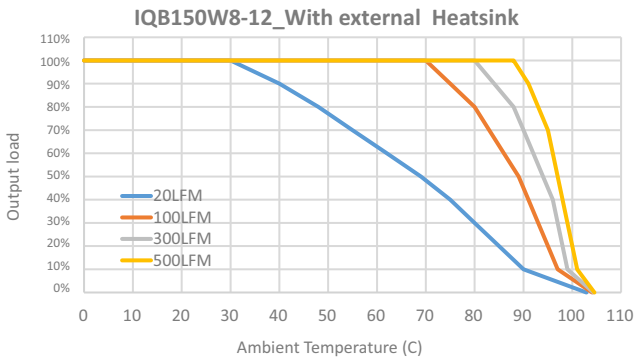


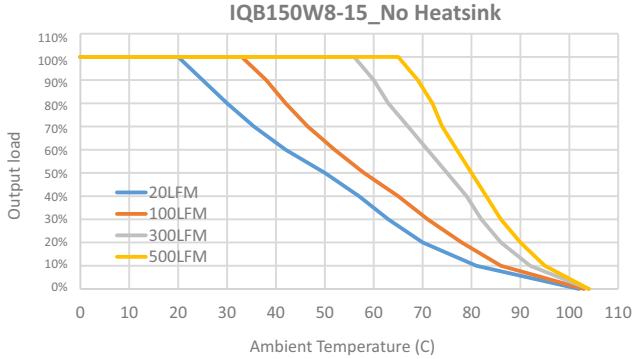
■ Derating Curve

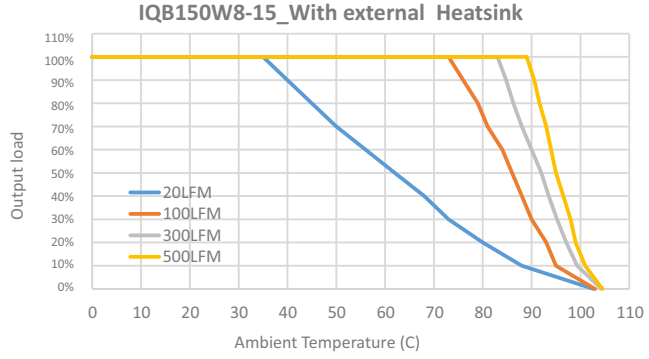


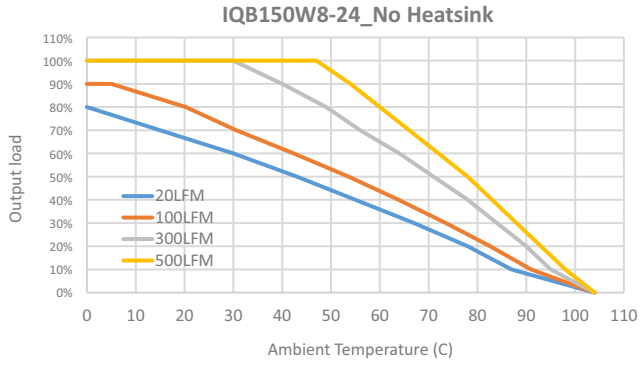


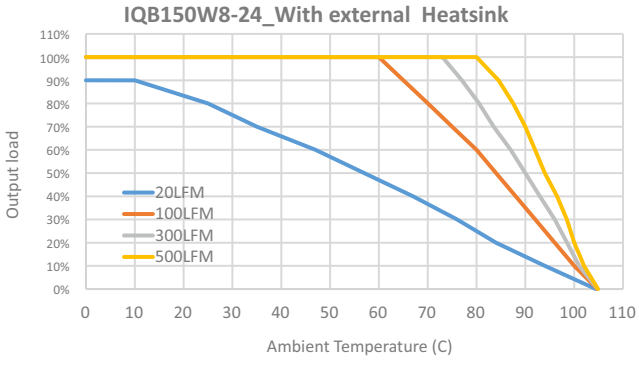


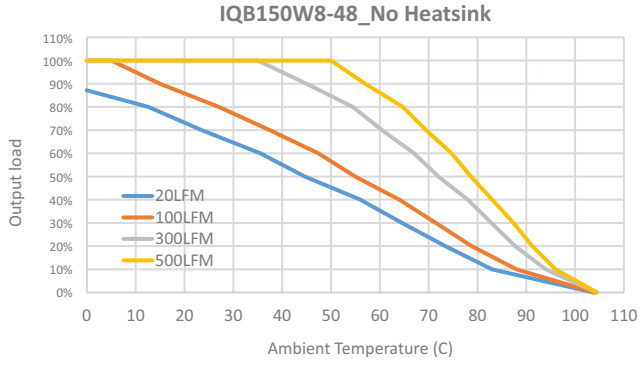


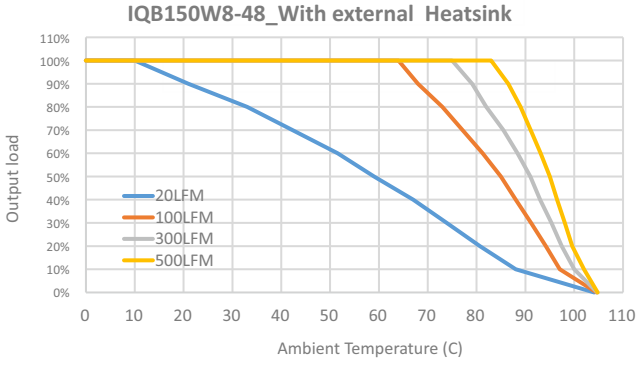












Note 1. The de-rating curve was measured at 48Vdc input with natural convection.
Note 2. In order to meet higher "derating curve" requirements, the heat dissipation can be increased by increasing the air flow (LFM) to meet the requirements.The recommended thermal resistance formula is as follows：

The derating curve of the converter's output load with the ambient temperature.
Above derating curve shows the operating ambient temperature range is from 0℃ to 105℃. The output load should derating when ambient temperature over 30℃ with heat sink. And the environmental convection is below 20LFM. When the ambient temperature over 30℃, IQB150W8 should derating to certain load. For example, if the ambient temperature is about 70℃, the IQB150W8 output load should derating to 50% of full load.The thermal resistor can be calculated by below formula. Take IQB150W8 as an example, which operating at nominal voltage and output load at full load.And the power dissipation (Pd)

Pd =Vo*Io*(1-Eff)/Eff
Pd = 12*12.5*(1-0.9)/0.9 = 16.66W

So, the power dissipation (Pd) is about 16.66W at ambient temperature 30℃.
The thermal resistance (Rca) from case to ambience is 4.5(℃/W) [20lfm with heat sink]
The maximum case temperature rise is ΔT = Pd Rca = 16.66W * 4.5 (℃/W) = 74.97℃
The maximum case temperature is Ta = Tc - ΔT = 105℃ -74.97℃ =30.03℃
So, the Ta for full load is around 30℃

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 IQB150W8 thermal performed, the dimension is 137 * 88 * 1.6mm, 2 OZ. There copper can help IQB150W8 to conduct heat through the body to the PCB.

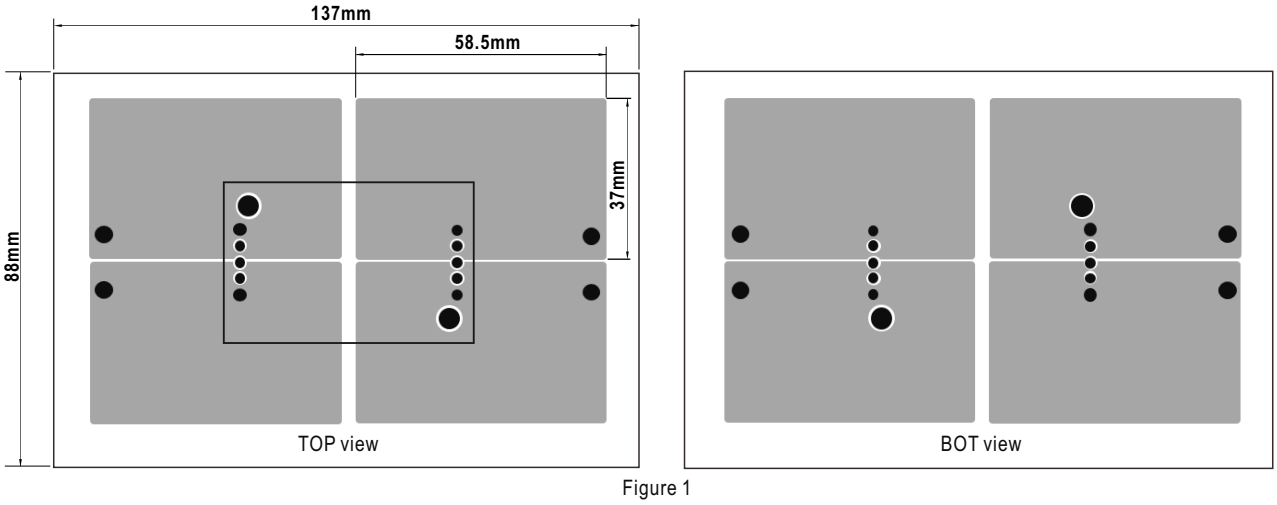


Figure 1

■ 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 2and 3:

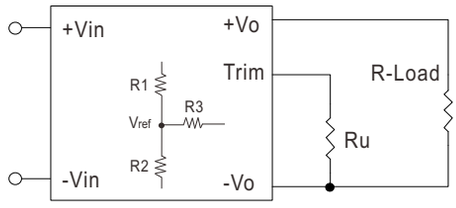


Figure 2. Trim_up Voltage Setup

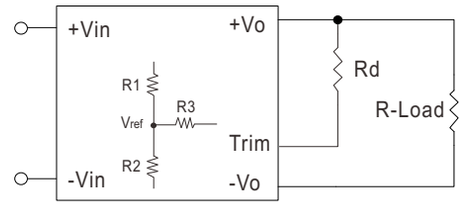


Figure 3. Trim_down Voltage Setup

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 (IQB150W8-12) by 10% to 13.2V, R_{trim_up} is calculated as follows:

$V_{o,nom}$ = 12V
V_o' = 13.2V
V_{ref} = 2.5V
R1 = 38KΩ
R2 = 10 KΩ
R3 = 68KΩ

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

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

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

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

$$= 11.126K\Omega$$

Table 1 – Trim_up and Trim_down Resistor Values

Model Number	Vo,nom (V)	Vref (V)	R1 (KΩ)	R2 (KΩ)	R3 (KΩ)
IQB150W8-05	5	1.24	15.47	5.1	33
IQB150W8-12	12	2.5	38	10	68
IQB150W8-15	15	2.5	50	10	73.2
IQB150W8-24	24	2.5	86	10	76.8
IQB150W8-48	48	2.5	182	10	56

Note:
1.R_{trim_up},R_{trim_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 (IQB150W8-12) by 10% to 10.8V, R_{trim_down} is calculated as follows:

$V_{o,nom}$ = 12V
V_o' = 10.8V
V_{ref} = 2.5V
R1 = 38 KΩ
R2 = 10 KΩ
R3 = 68 KΩ

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

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

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

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

$$= 194.83K\Omega$$

■ EMC Suggestion Circuit

※Required external components to meet BS/EN En55032 Conducted/Radiated class A emission as below:

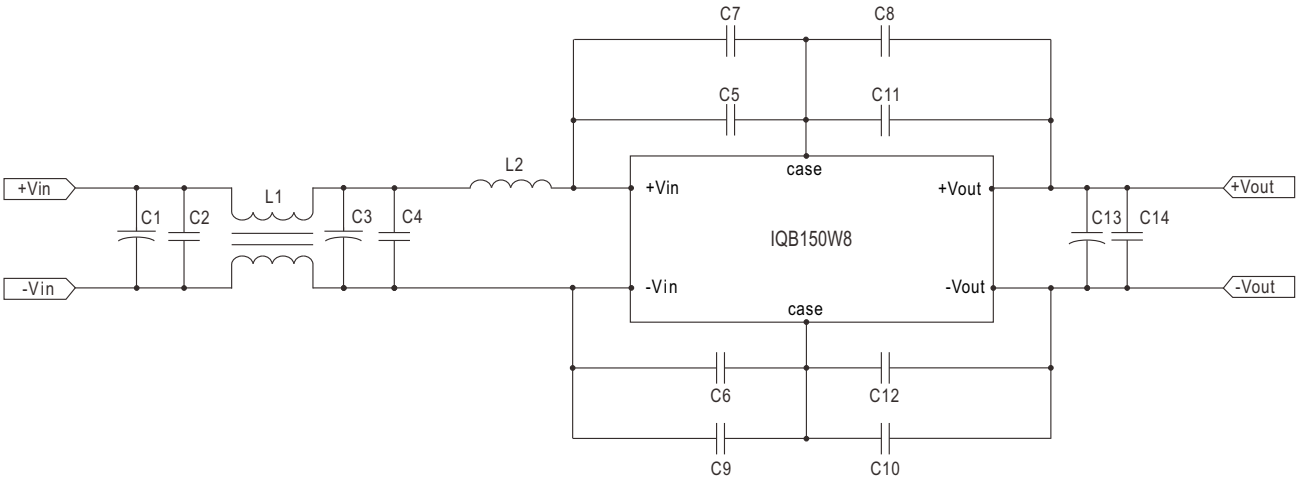


Figure 4

※The "case" connection points shown in the schematic diagram in Figure 4 correspond directly to the metal mounting holes on the physical module.

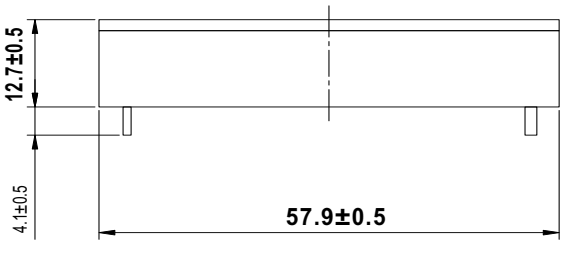
Model No.	BS EN/EN55032 Conducted/Radiated Class A									
	C1	C2	L1	C3	L2	C4	C5 C6 C11 C12	C7 C8 C9 C10	C13	C14
IQB150W8-05	220μF	2.2μF	2.2mH	220μF	2.2μH	2.2μF	2200pF*5	2200pF*2	22μF/25V*6	1μF
IQB150W8-12										
IQB150W8-15									4.7μF/100V*2	
IQB150W8-24										
IQB150W8-48										

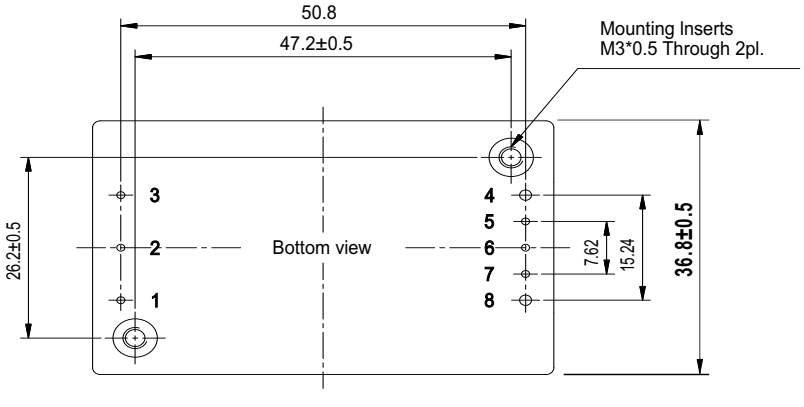
■ Mechanical Specification

- All dimensions in mm(inch)
- Tolerance: x.x±0.5mm (x.x±0.02")
  x.xx±0.25mm(x.xx±0.01")
- Pin 1~3 & 5~7 size is:1.x±0.1mm (0.04"±0.005")
- Pin 4 & 8 size is: 1.5±0.1mm (0.04"±0.005")

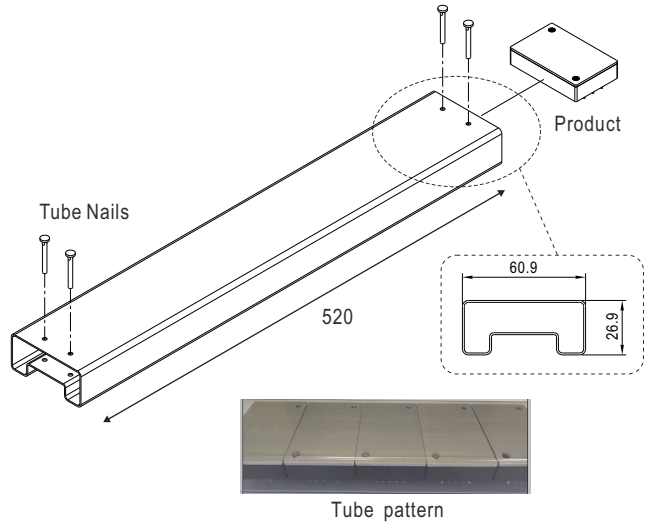
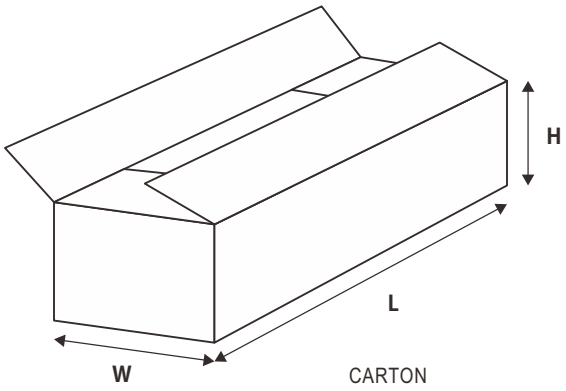
■ Pin Assignment

Pin-Out			
Pin No.	Output	Pin No.	Output
1	+Vin	5	RS-
2	R.C	6	Trim
3	-Vin	7	RS+
4	-Vout	8	+Vout





■ Packing

Standard Tube Packing	MPQ Per Tube (PCS)	One Tube G.W.	Max. Q'TY/ Carton(PCS)	One Carton G.W.
Unit : mm  Tube pattern  CARTON L545 x W145 x H220	11	955g	132	12.3Kg

■ Installation Manual

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