**Features:**

- Industry standard 1/4 brick package & footprint
- High efficiency
- 2: 1 input voltage range
- Low output noise & ripple
- Remote sense
- Constant frequency
- Over-temperature protection: Auto-recovery
- Output over-voltage protection: locked
- Dual adjustable output voltage: +10%/-20%
- Output over-current/voltage protection
- EN60950-1 recognized
- RoHS (2002/95/EC) complaint

**Options:**

- Positive/Negative Remote on/off

## Numbering Convention

**QSR 05–48 D 12–L - G**

① ② ③ ④ ⑤ ⑥ ⑦

| NO | Features | Descriptions |
|---|---|---|
| ① | Product Series | Industry standard 1/4 brick |
| ② | Output Current | Total output current of 2 outputs: 5A |
| ③ | Typical Input Voltage | Input Voltage: 48V |
| ④ | Number of Outputs | S - Single Output |
| | | D - Dual Output |
| ⑤ | Typical Output Voltage | Voltage Output: ±12V |
| ⑥ | Remote on/off Logic | L - Negative Logic |
| | | H or Default - Positive Logic |
| ⑦ | ROHS | G - lead-free, ROHS6 |





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## 1 Description

The power modules output Voltage +12V and -12V、Two-way load distribution，Each rated output current of 2.5A；Industry standard 1/4brick shape ； Full open ， Devices are surface-mount，High power density；With REM on/off 、thermal shutdown protection、Over-current Function.

## 2 Technical Specifications

| Parameter | | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **2.1 Absolute Maximum Ratings** | | | | | | |
| Input Voltage (Vi) | | no operating, continuous | — | — | 80 | Vdc |
| Input transient Voltage（Vit） | | transient (100ms) | — | — | 100 | Vdc |
| Max Output Power (Pomax) | | allowable operating conditions | — | — | 72 | W |
| **2.2 Input Specifications** | | | | | | |
| Typical Input Voltage (Vinom) | | ----- | -- | 48 | -- | Vdc |
| Input Voltage Range① | | ----- | 36 | -- | 75 | Vdc |
| Input Under-voltage Protection | Shutdown | Ionom | 31 | -- | 35 | Vdc |
| | Recovery | | 32 | -- | 36 | Vdc |
| Maximum Input current (Iimax) | | Vimin, Vonom,Ionom | -- | -- | 1.938 | A |
| No-load Input Current (Iio) | | Vinom, Io＝0A | -- | 20 | 30 | mA |
| Quiescent Input Current (Iiof) | | Vinom, remote output shutdown | -- | 3 | 10 | mA |
| Remote | On | Rem <0.8V (referenced to GND) or shorted to -Vin | | | | |
| | Off | 3.6V<Rem<= 75V(referenced to GND) or open circuit | | | | |
| **2.3 Output Specifications②** | | | | | | |
| Output voltage Set-point | Vo1nom | Vinom,Io1nom, Io2nom | 11.88 | 12.00 | 12.12 | Vdc |
| | Vo2nom | | -11.88 | -12.00 | -12.12 | |
| Un-balanced Load Regulation | Vo1 | Vinom，Io1＝0.2A—2.5A Io2=(-2.5A)—(-0.2A) | 11.40 | 12.00 | 12.60 | Vdc |
| | Vo2 | | -11.40 | -12.00 | -12.60 | |
| Typical Output Current | Io1nom | ---- | -- | 2.5 | -- | A |
| | Io2nom | | -- | -2.5 | -- | |
| Output Current Range | Io1 | Po≤Pmax | 0.2 | -- | 2.5 | A |
| | Io2 | | -2.5 | -- | -0.2 | |





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| Parameter | | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Line Regulation (Vov) | | Vimin-Vimax | -- | -- | ±0.2 | %Vo1 |
| | | Io1nom，Io2nom | -- | -- | ±0.2 | %Vo2 |
| Load Regulation (Vol) | | 0-100%Io1nom/Io2nom | -- | -- | ±0.5 | %Vo1 |
| | | \| \|Io1\|-\|Io2\| \| < 0.05A | -- | -- | ±0.5 | %Vo2 |
| Output Voltage Trim Range (Voadj)③ | | Io≤Ionom,Po≤Pmax | -- | -- | ±10 | %Vo1 /2 |
| Output Over-voltage Protection | | Po<Pomax | 120 | -- | 140 | %Vo1 /2 |
| Output Over-current Protection | Protection Mode | Vinom<br>\| \|Io1\|-\|Io2\| \| < 0.05A | Hiccup, Auto-recovery | | | |
| | Threshold | | 2.75 | -- | 3.75 | A |
| Output Short-circuit Protection | Protection Mode | Hiccup, Auto-recovery | | | | |
| Dynamic Load Response | Peak Deviation | 25%-50%-25%Ionom<br>50%-75%-50%Ionom<br>ΔIo/Δt=0.1A/μS,Vinom④ | – | – | ±3 | %Vo |
| | Settling Time | | -- | -- | 200 | μs |
| Output Ripple & Noise | Vrp1 | Vinmin-Vinmax，Ionom<br>20MHz，by side⑤ | -- | -- | 150 | mV |
| | Vrp2 | | -- | -- | 150 | mV |
| External Output Capacitance (Co) | | Vo1,Vo2 | 220 | -- | 4700 | μF |
| Turn-on/off Peak Deviation | | Vo1,Vo2 | -- | -- | ±5 | %Vo1 /2 |
| **2.4 Safety Specifications** | | | | | | |
| Isolation voltage | Input to output | Leak Current≤1mA, 1min | 1500 | -- | -- | Vdc |
| Isolation Resistance ($R_{ISO}$) | | ----- | 50 | -- | -- | MΩ |
| Safety Certificate | | EN 60950—1 Recognized | | | | |
| **2.5 Reliability** | | | | | | |
| Vibration Test(sine) | | ΔIo/Δt=: 10~55Hz<br>Amplitude: 0.35mm<br>Acceleration: 10m/s$^2$<br>Cycle: X,Y,Z 30min each axis | After being tested, no damage to the converter and its components, the appearance, output voltage and output ripple and noise (p-to-p) meet the data sheet requirements. | | | |
| Impact Test (half-sine) | | Peak Acceleration: 300m/s$^2$<br>Duration: 6ms<br>6 times for three perpendicular directions | After being tested, no damage to the converter and its components, the appearance, output voltage and output ripple and noise (p-to-p) meet the data sheet requirements. | | | |
| MTBF | | $2\times10^6$ h Bellcore TR-332 | | | | |
| **2.6 Environmental Specifications** | | | | | | |





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| Parameter | | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Relative Humidity | | （40±2）℃， No dew | — | — | 90 | %RH |
| Cooling | | ⑥ | Forced-air cooling or heat sink | | | |
| Operating Temperature | Baseplate Temperature (Tc) | ⑥ | -40 | -- | +100 | ℃ |
| | Ambient Temperature (Ta) | | -40 | | +85 | ℃ |
| Over-temperature protection⑦ | | ----- | Output will be off when baseplate temperature exceeds 105℃, and recovers automically when baseplate temperature is 1010℃ than the threshold. | | | |
| Storage Temperature (Tst) | | no operating conditions | -55 | -- | +125 | ℃ |
| **2.7 General Specifications** | | | | | | |
| Switching Frequency | | ---- | -- | 300 | -- | k Hz |
| Temperature Coefficient (Tcoeff) | | ---- | -- | -- | ±0.02 | %/℃ |
| Efficiency (η) | | Vinom,Ionom | 88 | 90 | -- | % |
| Weight | | | | 35 | | g |
| RoHS | | RoHs (2002/95/EC) Directive | | | | |

Note：

①Input Voltage up to 80Vdc for long time or reverse input polarity would cause the module damaged；

②Special instructions are at an ambient temperature 25℃, |Io1|=|Io2|=0.5|Ionom|measured under;

③Tow voltage at same time on the way down;

④The load connected to Vo1, Vo2 at both ends of test；

⑤Testing required in the corresponding output pin Vo1(7pin)，Vo2（4pin）to COM（5pin）between Resectively plus a 220μF low ESR electrolytic capacitors,and 1μF monolithic capacitor ；

⑥See Temperature Derating Curve；

⑦Auto-recovery，See behind the test point diagram.

## 3 Basic Application Circuit and Considerations

### 3.1 Typical Application





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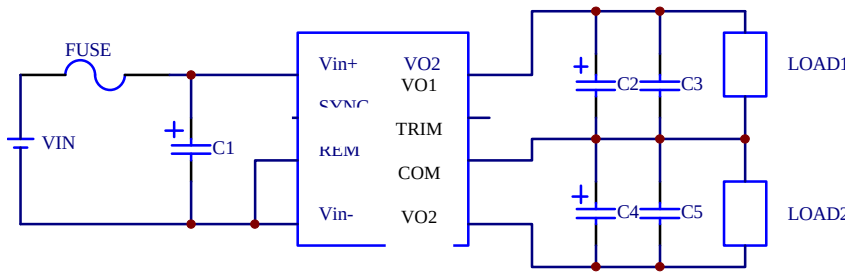



Figure above：FUSE：5A

C1 is 100V/33μF low ESR capacitor；C2,C4 is electrolytic capacitors 220μF；C3,C5 is 1μF Monolithic capacitors.If you have high electromagnetic compatibility or be certified by the relevant ,Need to set the appropriate module input and output common mode and differential-mode filter circuit.

### 3.2 Instruction for Use

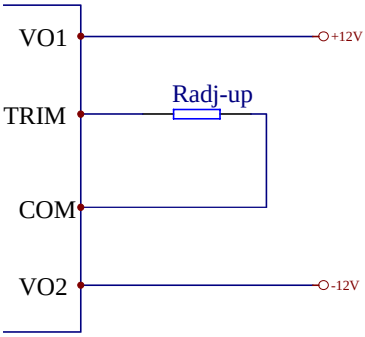
（1）Input control terminal (REM)is low (as opposed to-Vin) or in connection with-Vin shorted,Output Open ； Input control terminal (Rem) is high or floating, the output off.

（2）Input Voltage up to 80Vdc for long time or reverse input polarity would cause the module damaged；

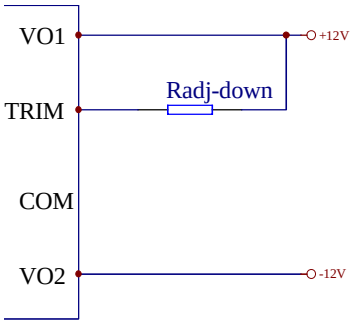
（3）When you need to adjust the output please refer to section 4 of the output voltage regulation means,without conditioned TRIM should be left vacant.

## 4 Output Voltage Trim

### 4.1 Output Voltage Trim Circuit




Trim up




Trim-down

### 4.2 Adjustment formula

Trim Up Resistance Calculation Formula

$$R_{adj-up}(K\Omega)=\frac{138.37-9.53V_o}{2(V_o-V_e)}-3$$

Trim-down Resistance Calculation Formula

$$R_{adj-down}(K\Omega)=\frac{91}{2(V_e-V_o)}-12.53$$

Where $Vo$ is the hope that regulate voltage， $Ve$ nominal output voltage,the module is12V.

## 5 Efficiency Curve (Ta＝＋25℃)





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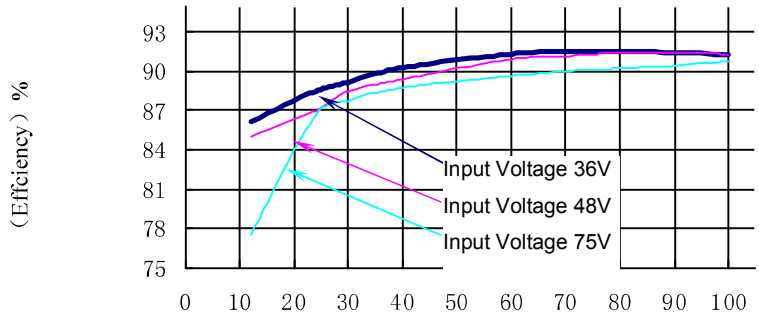
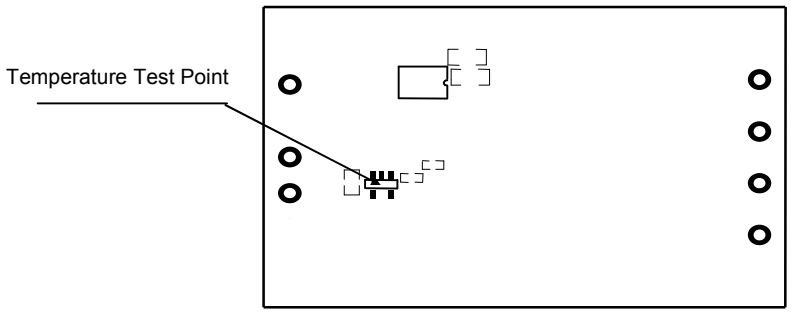
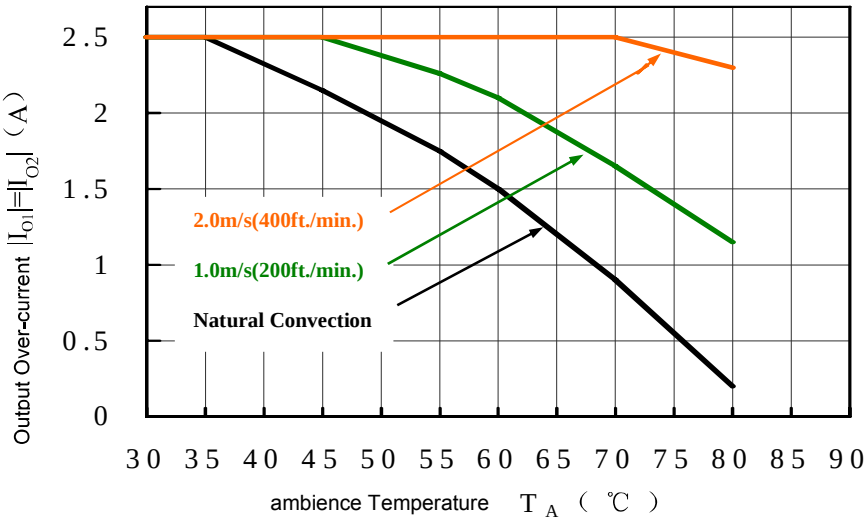



## 6 Temperature Test Point




（Bottom View）

## 7 **Thermal Derating Curve**




Vin＝48.0V Thermal Derating Curve

Note：Natural cooling is the wind speed at 0.05m/ S and 0.1m/S between.





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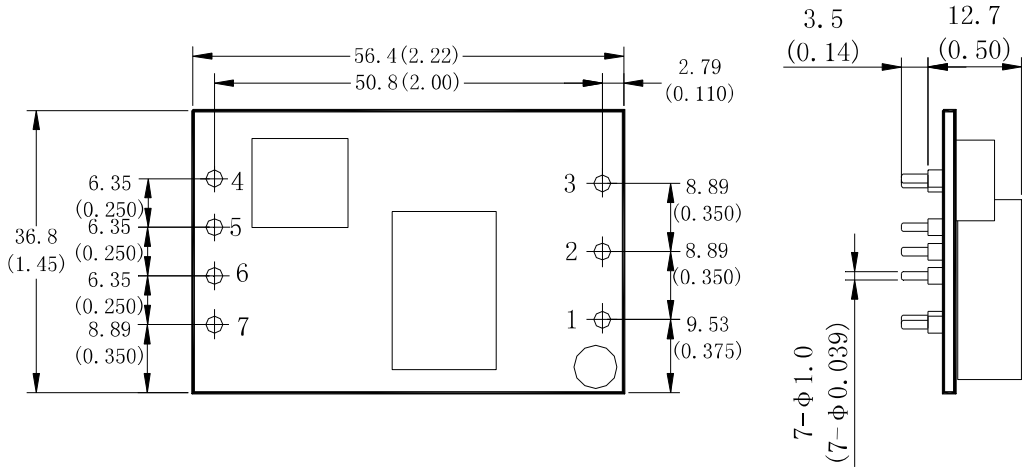
## 8 Dimensions and Pin definition

### 8.1 Dimensions

Unit:mm（inch.） Tolerance: .X±0.5（.XX±0.02）; .XX±0.13（.XXX±0.005）




### 8.2 Pin Definition：

| No | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Symbol | +Vin | Rem | -Vin | +Vo2 | COM | Trim | +Vo1 |
| Definition | Positive Input | Remote | Negative Input | Positive Vo1I | Common Terminal | Trim (Vo1I) | Positive Vo1 |





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