Features:

- Industry standard1/4 brick package and footprint
- Operating temperature range:-40～85°C
- 2:1 input voltage range: 36～75Vdc
- Output voltage trim: -10% ～+10%
- Basic insulation, isolation voltage:1500Vdc
- High efficiency: 91%
- High power density
- Low output noise & ripple
- Remote sense
- Input under-voltage protection
- Output short-circuit protection
- Output over-voltage protection
- Output over-current protection
- Thermal Shutdown Range
- UL60950-1 Certified
- RoHS (2002/95/EC) complaint

Numbering Convention:

QSR 15 – 48 S 3V3 G
1 2 3 4 5 6

NO	Features	Descriptions
1	Product Series	QSR 1/4 brick Series
2	Typical Output Current	15 -Typical Output current: 15A
3	Typical Input Voltage	48 -Typical Input Voltage: 48V
4	Number of Outputs	S - Single Output
		D - Dual Output
5	Typical Output Voltage	3.3 -Typical Output Voltage: 3.3V
6	RoHS	G - lead-free,ROHS6

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1 Description

The QSR15-48S3V3G series power modules are open frame DC-DC converters in an industry package and footprint, and can provide up to 3.3V output voltage and 15A output current. All devices are surface mounted. The converters feature high power density, remote on/off, over-temperature protection and over-current protection.

2 Technical Specifications (Unless otherwise stated, all specifications are typical at nominal input, full load, 25°C and airflow of 1m/S (200ft./min.))

Parameter		Test Condition	Min	Typ	Max	Unit
2.1 Absolute Maximum Ratings						
Input Voltage (Vin)		Non-operating, continuous	0	—	80	Vdc
Input Transient Voltage (Vit)		100ms	—	—	100	Vdc
Max Output Power (Pomax)		Allowable operating conditions	—	—	49.5	W
2.2 Input Specifications						
Typical Input Voltage(Vinom)		——	—	48	—	Vdc
Input Voltage Range		——	36	—	75	Vdc
Input Under-voltage Protection		Ionom	31	—	35	Vdc
Maximum Input Current (Iimax)		Vimin, Vonom,Ionom	—	—	1.6	A
No-load Input Current (Iio)		Vinom, Io=0A	—	—	70	mA
Quiescent Input Current (Iiof)		Vinom, remote output shutdown	—	—	10	mA
Remote	On	High Level (2.4V to 48V, or open circuit referenced to –Vin)				
	Off	Low Level (≤0.4V referenced to –Vin) or connected to -Vin				
2.3 Output Specifications						
Output Voltage Set-point (Vonom)		Vinom, Ionom	3.27	3.3	3.33	Vdc
Typical Output Current (Ionom)		——	—	—	15	A
Output Current Range (Io)		Po≤49.5W	0	—	15	A
Line Regulation (Vov)		Vimin-Vimax, Ionom	—	—	±0.2	%Vo
Load Regulation (Vol)		10%-100%Ionom,Vinom	—	—	±0.5	%Vo
Output Voltage Adjustment Range(Voadj)			-10	—	+10	%Vo
Output Over-voltage Protection		Po<Pomax	120	—	140	%Vo
Output Over-current Protection	Protection Mode	——	Hiccup, Auto-recovery			—
	Threshold	Vinom	105		140	%Ionom
Output Short-circuit Protection	Protection Mode	——	Hiccup, Auto-recovery			—
Dynamic Load Response	Peak Deviation	25%-50%-25%Ionom 50%-75%-50%Ionom ΔIo/Δt=0.1A/μS,Vinom	—	3	—	%Vo
	Settling Time		—	100	—	μs

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Parameter		Test Condition		Min	Typ	Max	Unit
Output Ripple and Noise (Vp-p)		Vinom, 20MHz, externally add a 10μF tantalum capacitor and a 1μF ceramic capacitor to output		—	—	100	mV
External Output Capacitance(Co)		——		0	—	10000	μF
Turn-on/off Peak Overshoot Amplitude		Vinom,Ionom		—	—	±10	%Vo
Turn-on Delay Time		Vinom, Ionom		20	—	200	mS
Turn-on Rise Time		Vinom,Ionom,10%～90%Vout		0	—	10	mS
2.4 Safety Specifications							
Isolation Voltage	Input to output	Leak Current≤1mA, 1min		1500	—	—	Vdc
Isolation Resistance (R_{ISO})		——		50	—	—	MΩ
Safety Certificate		EN60950-1 Recognized					
2.5 Reliability							
Vibration Test(sine)		Frequency: 10~55Hz Amplitude: 0.35mm Acceleration: 10m/s^2 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-p) meet the data sheet requirements.			
Impact Test (half-sine)		Peak Acceleration: 300m/s^2 Duration: 6ms 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-p) meet the data sheet requirements.			
2.6 Environmental Specifications							
Relative Humidity		(40±2) ℃, No dew	—	—		90	%RH
Cooling		——		Forced-air cooling			
Operating Ambient Temperature		See the derating curve		-40	—	+85	℃
Over-temperature Protection		——		+105℃(Auto-recovery, see Figure 7)			
Storage Temperature (Tst)		Non-operating, continuous		-40	—	+125	℃
2.7 General Specifications							
Switching Frequency		——	—	300		—	k Hz
Weight		——	—	34		—	g
Temperature Coefficient (Tcoeff)		——	—	—		±0.02	%/℃
Efficiency (η)		Vinom,Ionom	90	91		—	%
RoHS		RoHs (2002/95/EC) Directive					

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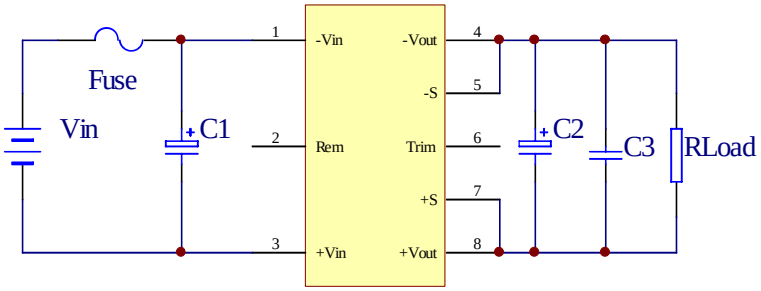
3 Basic Application Circuit and Considerations

3.1 Typical Application (Negative logic)



C1 ≥33μF/100V; C2: 10μF tantalum capacitor; C3: 1μF Ceramic Capacitors; Fuse: 5.0A (recommended)

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

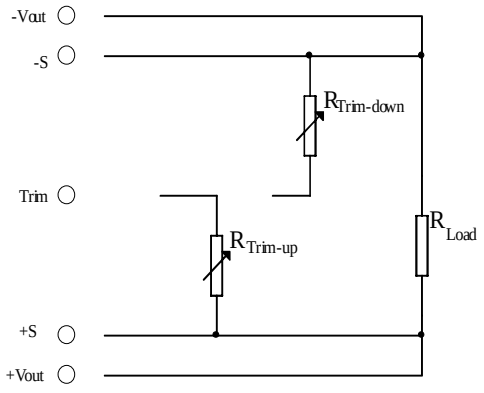
3.3 Output will be on when Rem is at high level or keeps open circuit referenced to –Vin; output will be off when Rem is at low level or connected to –Vin.

3.4 The output short-circuit protection mode is hiccup, auto-recovery. But it is not recommended to keep the module work in this state for long time.

3.5 Output Trim: Exceed the maximum output power (trim up) or the maximum output current (trim down) may cause the converter operates abnormally. The output voltage shall not exceed 3.63V (trim up) or be lower than 2.805V (trim down), or the converter can't work well. See "4 Output Voltage Adjustment (Trim)" for details.

4 Output Voltage Adjustment (Trim)

4.1 Output Voltage Trim Circuit



Trim up Trim Down

4.2 Output Trim Equations

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Trim Up: $$R_{Trim-up}=\left(\frac{5.11\times Vo(100(\%)+\Delta(\%))}{1.225\times\Delta(\%)}-\frac{5.11\times100(\%)}{\Delta(\%)}-10.22\right)(k\Omega)$$

Trim Down: $$R_{Trim-down}=\left(\frac{5.11\times100(\%)}{\Delta(\%)}-10.22\right)(k\Omega)$$

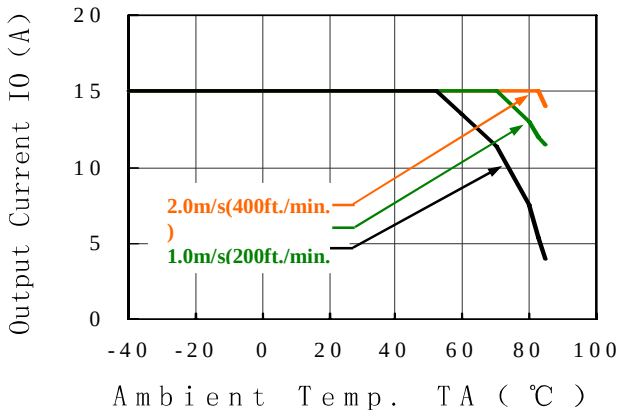
Where V_O: Nominal output voltage(Units: Vdc);

$\Delta(\%)$: The ration of output voltage changes to nominal output voltage;

$R_{Trim-up}$、$R_{Trim-down}$: External adjusting resistor (Units: kΩ).

5 Thermal Derating Curve

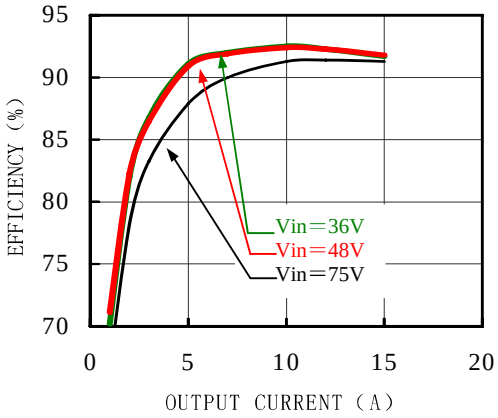
When operating at high ambient temperature, the module shall use the derating curve as follow:



Derating Curve at Vin=48.0V

Note: Natural cooling: wind speed at 0.05m/S to 0.1m/S between.

6 Efficiency Curve (Ta=+25℃, wind speed=1m/S (200ft./min.))



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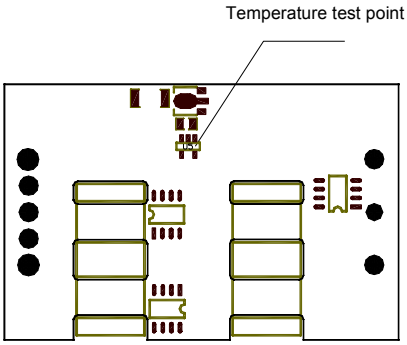
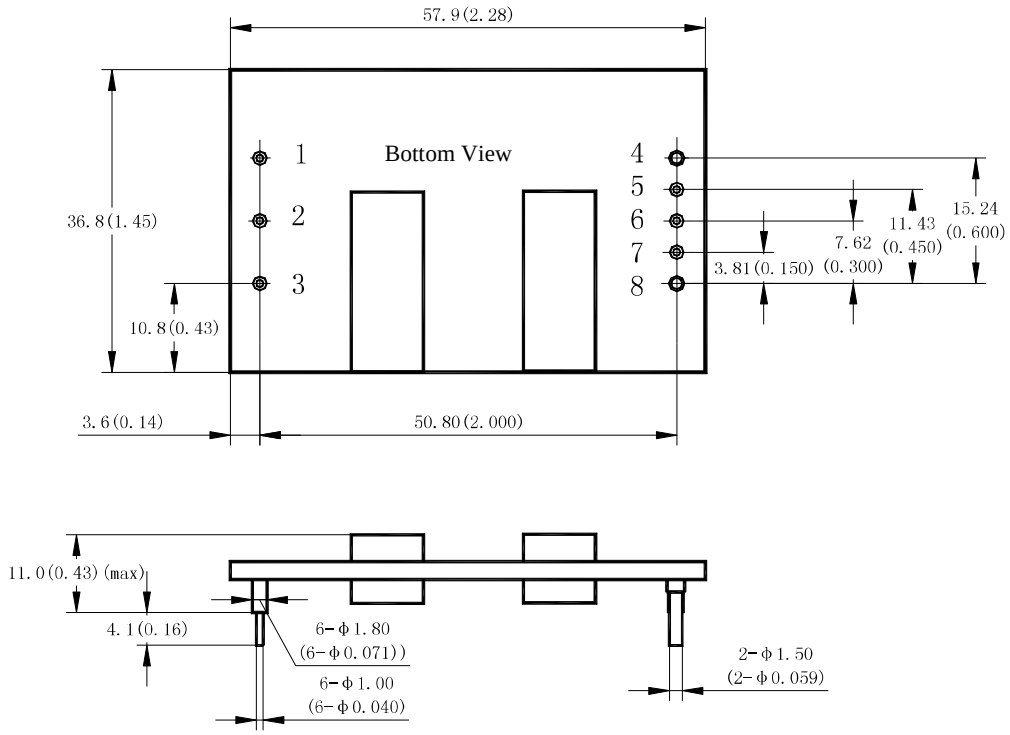
7 Temperature Test Point



8 Dimensions and Pin definition

8.1 Dimensions



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

8.2 Pin Definition

No	1	2	3	4	5	6	7	8
Symbol	-Vin	Rem	+Vin	-Vout	-S	Trim	+S	+Vout
Definition	Negative Input	Remote	Positive Input	Negative Output	Negative Remote Sense	Trim	Positive Remote Sense	Positive Output

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