

**200W** Baseplate cooled

DC-DC converters

The QSB200 series offers a compact 200W DC-DC converter solution in an industry standard ½ brick package, with integral baseplate for conduction cooling. Available in two input ranges, covering 9V to 36VDC & 18V to 75VDC.

Standard features are: output voltage trim, remote sense, remote On/Off, a wide operating temperature range and includes protection for over current, over temperature and over voltage.

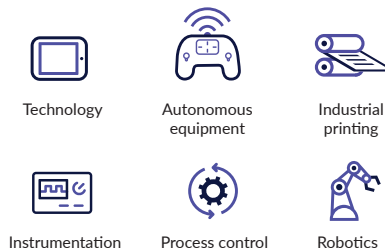
The QSB200 is highly suited to telecommunications, distributed power architectures, battery operated equipment, industrial electronics, mobile equipment and many other applications.



## Features

- ▶ Regulated single outputs 5V to 48VDC
- ▶ 4:1 input ranges 10V to 36VDC & 18V to 75VDC
- ▶ Baseplate cooled ½ brick package
- ▶ 1.5kVDC isolation
- ▶ Output trim ±10%
- ▶ Remote sense
- ▶ Remote On/Off
- ▶ -40°C to +100°C operating temperature
- ▶ 3 year warranty

## Applications



## Dimensions

57.9 x 61.0 x 12.7mm (2.28" x 2.4" x 0.5")  
½ brick package

## Models & ratings

Model number <sup>(3)</sup>	Input voltage	Output voltage	Output current	Input current <sup>(4)</sup>		Efficiency
				No load	Full load	
QSB20024S3V3 <sup>(6)</sup>	10-36 VDC (24VDC nominal)	3.3VDC	50.0A	150mA	7.90A	87.0%
QSB20024S05		5.0VDC	40.0A	150mA	9.58A	87.0%
QSB20024S12		12.0VDC	16.7A	100mA	9.71A	86.0%
QSB20024S15		15.0VDC	13.3A	100mA	9.67A	86.0%
QSB20024S24		24.0VDC	8.3A	100mA	9.54A	87.0%
QSB20024S48		48.0VDC	4.2A	60mA	9.77A	86.0%
QSB20048S3V3 <sup>(6)</sup>	18-75 VDC (48VDC nominal)	3.3VDC	40.0A	80mA	3.13A	88.0%
QSB20048S05		5.0VDC	40.0A	80mA	4.69A	89.0%
QSB20048S12		12.0VDC	16.7A	60mA	4.74A	88.0%
QSB20048S15		15.0VDC	13.3A	60mA	4.72A	88.0%
QSB20048S24		24.0VDC	8.3A	60mA	7.72A	88.0%
QSB20048S48		48.0VDC	4.2A	50mA	4.83A	87.0%

### Notes:

1. Ripple & noise is measured with a 10µF tantalum capacitor and 1.0µF ceramic capacitor across output.
2. Logic compatibility: Ref to -ve input. Module On = open circuit. Module Off = <0.8VDC.
3. Add suffix 'N' to the model number to receive the unit with negative logic Remote On/Off.
4. Input current specified at 24VDC for 10-36VDC models and 48VDC for 18-75VDC models.
5. Add an external capacitor of 100µF minimum to the output terminals, in order to maintain the specified regulation.
6. Models no longer available to order.

## Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage range	10		36	VDC	24VDC
	18		75		48VDC
Undervoltage lockout		9.6		VDC	On (24VDC)
		8.8			Off (24VDC)
		17			On (24VDC)
		16			Off (48VDC)
Input surge		50		VDC	24VDC (for 100ms)
		100			48VDC (for 100ms)
Input current	See models and ratings table				
Input reverse voltage protection	None				
Input filter	Pi type				

## Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage trim		±10		%	See application notes
Initial set accuracy			±1.5	%	
Line regulation			±0.2	%	Measured from high line to low line
Load regulation			±0.2	%	Measured from 0-100% load
Transient response			5	%	Maximum deviation, recovery to within 1% in 500µs, 25% step load change
Start up delay		100		ms	
Ripple and noise			100	mV pk-pk	3.3 & 5VDC, 20MHz bandwidth
			150		12 & 15VDC, 20MHz bandwidth
			240		24VDC, 20MHz bandwidth
			480		48VDC, 20MHz bandwidth
Overvoltage protection	115		140	%	
Short circuit protection	Continuous				
Thermal shutdown		>100		°C	Baseplate temperature
		<70			Restart
Temperature coefficient		±0.03		%/°C	
Current limit	110		150		Of nominal output
Remote On/Off	See models and ratings notes				
Remote Sense	Compensates up to 10% of Vout nominal, total of output trim and remote sense				

## General

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency	See models & ratings table				
Isolation: input to output	1500			VDC	
Isolation: input to case	1500			VDC	
Isolation: output to case	1500			VDC	
Isolation resistance	10 <sup>7</sup>			Ω	
Isolation capacitance		2000		pF	
Switching frequency		250		kHz	
Power density		4.2 (70.3)		W/cm <sup>2</sup> (W/in <sup>2</sup> )	
Mean time between failure		1		Mhrs	MIL-HDBK-217F, +25°C GB

## Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating base plate temperature	-40		+100	°C	See derating curve
Storage temperature	-55		+105	°C	
Operating humidity			90	%RH	Non-condensing
Cooling	Baseplate cooled				

## EMC: emissions

Phenomenon	Standard	Test level	Notes & conditions
Conducted	EN55032	A	With external components
Radiated	EN55032	A	With external components

## EMC: Immunity

Phenomenon	Standard	Test level	Criteria	Notes & conditions
ESD immunity	EN61000-4-2	2	B	
Radiated	EN61000-4-3	3V/m	A	
EFT/burst	EN61000-4-4	Level 1	A	
Surges	EN61000-4-5	Level 1	A	
Conducted	EN61000-4-6	3Vrms	A	

## Safety approvals

Safety agency	Standard	Test level	Notes & conditions
UL	UL60950-1		
EN	EN62368-1		
CE	Meets all applicable directives		
UKCA	Meets all applicable legislation		

## Application notes

### Output Voltage Trim

#### Voltage trim down

Connect trim resistor Rtrim between Trim pin and -Sense pin.

$$R \text{ trim down} = \left( \frac{511}{\Delta\%} - 10.22 \right) \text{ k}\Omega$$

Where:  $\Delta\% = \left( \frac{V_{nom} - V_{des}}{V_{nom}} \right) \times 100$

For Vo: 48V

$$R \text{ trim down} = \left( \frac{2000}{\Delta\%} - 40 \right) \text{ k}\Omega$$

#### Voltage trim up

Voltage trim up, Connect trim resistor Rtrim between Trim pin and +Sense pin

$$R \text{ trim up} = \left( \frac{5.11 V_{nom} (100 + \Delta\%)}{1.225 \times \Delta\%} - \frac{511}{\Delta\%} - 10.22 \right) \text{ k}\Omega$$

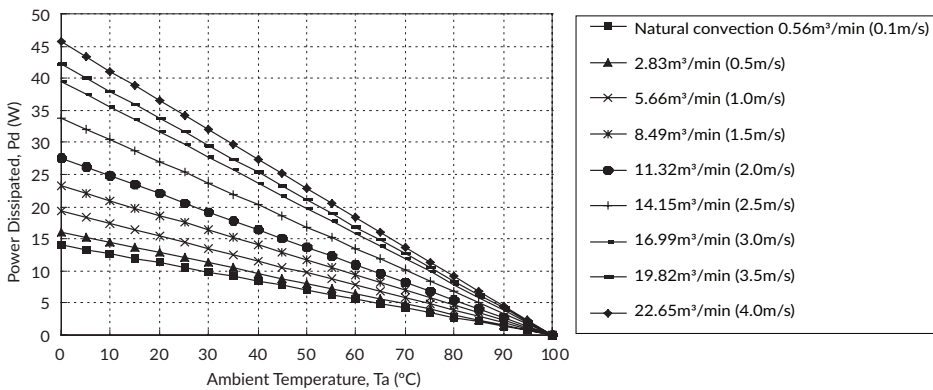
Where:  $\Delta\% = \left( \frac{V_{des} - V_{nom}}{V_{nom}} \right) \times 100$

For Vo: 48V

$$R \text{ trim up} = \left( \frac{20 V_{nom} (100 + \Delta\%)}{1.225 \times \Delta\%} - \frac{2000}{\Delta\%} - 40 \right) \text{ k}\Omega$$

### Derating curve

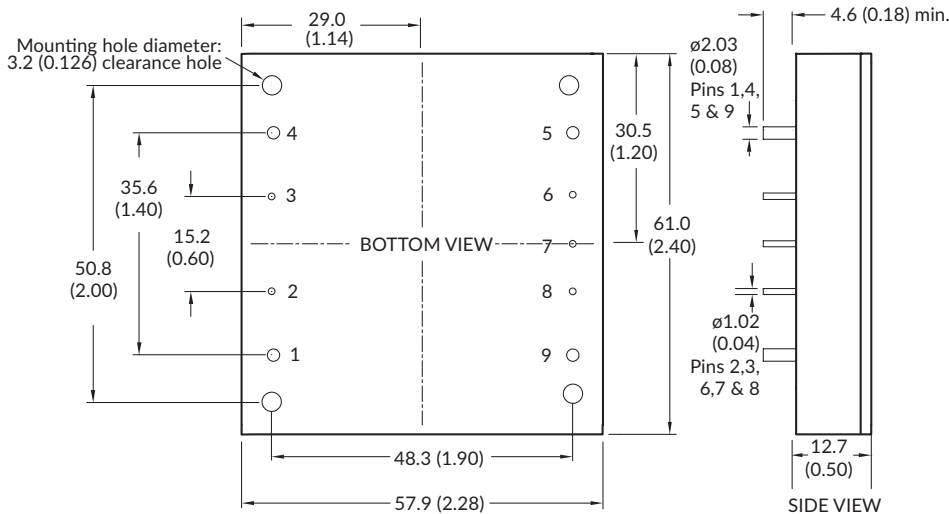
Maximum Power Dissipation vs Ambient Temperature and Air Flow without heatsink



Air Flow Rate	Typical Rca
Natural Convection 0.56m³/min (0.1m/s)	7.12°C/W
2.83m³/min (0.5m/s)	6.21°C/W
5.66m³/min (1.0m/s)	5.17°C/W
8.49m³/min (1.5m/s)	4.29°C/W
11.32m³/min (2.0m/s)	3.64°C/W
14.15m³/min (2.5m/s)	2.96°C/W
16.99m³/min (3.0m/s)	2.53°C/W
19.82m³/min (3.5m/s)	2.37°C/W
22.65m³/min (4.0m/s)	2.19°C/W

Rca = Thermal resistance from case to ambient

## Mechanical details



Pin connections	
Pin	Function
1	+Vin
2	Remote On/Off
3	Case
4	-Vin
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

### Notes:

- Dimensions are in mm (inches)
- Tolerances: x.xx (x.x) = ±0.5 (±0.02), x.xxx (x.xxx) = ±0.25 (±0.01)

- Weight: 114g (0.25lbs) approx.

Specifications subject to change without notice.