QSB150 series

XP Power

150W Baseplate cooled

DC-DC converters

The QSB150 series offers a compact 150W 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 QSB150 is highly suited to telecommunications, distributed power architectures, battery operated equipment, industrial electronics, mobile equipment and many other applications.

Features

- Regulated single outputs 3.3V to 24VDC
- 4:1 input ranges 9V 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

Technology

Autonomous equipment

Industrial printing

Instrumentation

Process control

Robotics

Dimensions

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

More resources

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Models & ratings

Model number[3]	Input voltage	Output voltage	Output current	Input current[4]		Efficiency
				No load	Full load	
QSB15024S3V3	9-36VDC (24VDC nominal)	3.3VDC	30.00A	200mA	4.75A	87.0%
QSB15024S05		5.0VDC	30.00A	200mA	7.19A	87.0%
QSB15024S12		12.0VDC	12.50A	100mA	7.10A	88.0%
QSB15024S15		15.0VDC	10.00A	100mA	7.19A	87.0%
QSB15024S24		24.0VDC	6.50A	100mA	7.34A	88.0%
QSB15048S3V3	18-75VDC (48VDC nominal)	3.3VDC	30.00A	100mA	2.34A	88.0%
QSB15048S05		5.0VDC	30.00A	100mA	3.47A	90.0%
QSB15048S12		12.0VDC	12.50A	50mA	3.44A	91.0%
QSB15048S15		15.0VDC	10.00A	50mA	3.47A	90.0%
QSB15048S24		24.0VDC	6.50A	50mA	3.61A	90.0%

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.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage range	9		36	VDC	24VDC
	18		75		48VDC
Undervoltage lockout		8.8		VDC	On (24VDC)
		8.0			Off (9-36VDC)
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
			280		24VDC, 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		140	%	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				

QSB150 series

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	10^7			Ω	
Isolation capacitance		100		pF	
Switching frequency		250		kHz	
Power density		3.4 (57.2)		W/cm³ (W/in³)	
Mean time between failure		1		Mhrs	MIL-HDBK-217F, +25°C GB

Environmental

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

EMC: emissions

Phenomenon	Standard	Test level	Notes & conditions
Conducted	EN55022	A	With external components
Radiated	EN55022	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 up
Connect trim resistor Rtrim between Trim pin and -Sense pin.

$$\text{R trim up} = \left(\frac{R1\left(Vr - Vf\left(\frac{R2}{R2+R3}\right)\right)}{Vdes - Vnom}\right) - \frac{R2 \times R3}{R2+R3}\ (k\Omega)$$

Voltage trim down
Connect trim resistor Rtrim between Trim pin and +Sense pin

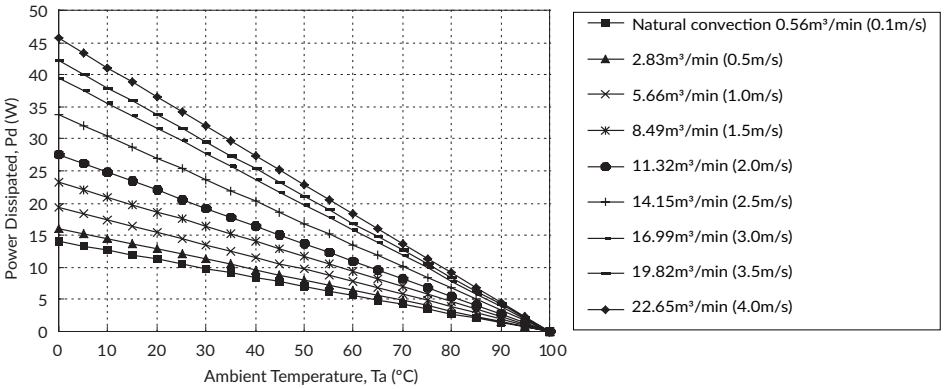
$$\text{R trim down} = \frac{R1 \times (Vdes - Vr)}{Vnom - Vdes} - R2\ (k\Omega)$$

Where: R trim up/down is the external resistor in kΩ. Vnom is the nominal output voltage. Vdes is the desired output voltage. R1, R2, R3 and Vr are internal to the unit and are defined in the table below.

Output Voltage (V)	R1(kΩ)	R2 (kΩ)	R3 (kΩ)	Vr (V)	Vf (V)
3.3VDC	3.00	12.0	4.3	1.24	0.46
5.0VDC	2.32	3.3	0.0	2.5	0.00
12.0VDC	9.10	51.0	5.1	2.5	0.46
15.0VDC	12.0	56.0	8.25	2.5	0.46
24.0VDC	20.0	100.0	7.5	2.5	0.46

Derating curve

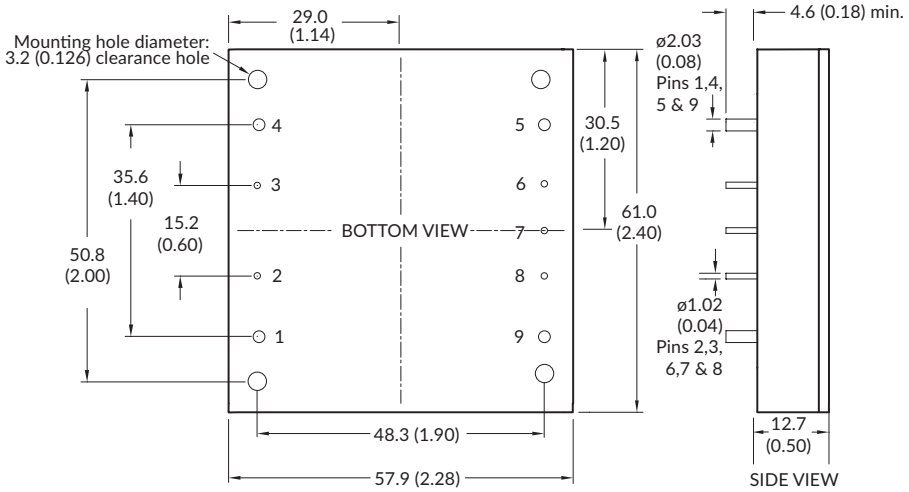
Maximum Power Dissipation vs Ambient Temperature and Air Flow without heatsink



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:

1. Dimensions are in mm (inches)
2. Tolerances: x.xx (x.x) = ±0.5 (±0.02). x.xxx (x.xx) = ±0.25 (±0.01)
3. Weight: 114g (0.25lbs) approx.