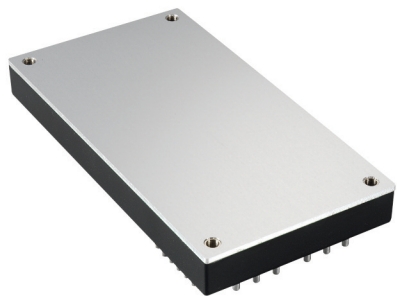


400 Watts

QSB Series



- Up to 89% Efficiency
- Industry Standard Full Brick Package
- -40 °C to +100 °C Operating Temperature
- High Power Density
- Baseplate-cooled
- Remote On/Off & Remote Sense
- 3 Year Warranty

Specification

Input

Input Voltage Range	• 24 V (9-36 V), 48 V (18-75 V)
Input Current	• See table
Idle Current	• 50 mA
Input Reverse Voltage Protection	• None
Input Filter	• Pi network
Undervoltage Lockout	• 24 Vin: turn on 8.5 V, turn off 7.5 V 48 Vin: turn on 17.0 V, turn off 15.0 V

Output

Output Voltage Trim	• -80%, +110%, see application notes
Initial Set Accuracy	• $\pm 1.5\%$ max
Line Regulation	• $\pm 0.2\%$ max measured from high line to low line
Load Regulation	• $\pm 0.5\%$ max measured from 0-100% load
Start Up Time	• 120 ms typical
Transient Response	• 5% max deviation, recovery to within 1% in 500 μ s, 25% step load change
Ripple & Noise	• 5 V models: 100 mV pk-pk, other models 1% pk-pk, 20 MHz bandwidth (see note 1)
Overvoltage Protection	• 115-140%
Short Circuit Protection	• Continuous, trip and restart, auto recovery
Over Load Protection	• 110-150% nominal output
Thermal Shutdown	• Case temperature > 110 °C typical
Temperature Coefficient	• $\pm 0.03\%/^{\circ}\text{C}$
Remote On/Off	• Referenced to -ve input, Module on: 1-10 mA. Internal 1k Ω resistor fitted. Module off: < 1 mA or open circuit
Remote Sense	• Compensates up to 10% of Vout nominal, total of output trim and remote sense
Current Share	• Parallel up to 4 modules using the parallel pin $\pm 10\%$ load share accuracy from 50% to 100% load
Auxiliary Output	• 10 V ± 3 V/20 mA max

General

Efficiency	• See tables
Isolation Voltage	• 1500 VDC Input to Output 1500 VDC Input to Case 1500 VDC Output to Case
Isolation Resistance	• 10 7 Ω
Isolation Capacitance	• 4000 pF typical
Switching Frequency	• 230 kHz typical
DC OK Signal	• DC OK open collector signal (see note 4)
Power Density	• 79 W/in 3
MTBF	• 300 kHrs typical to MIL-HDBK-217F at 25 °C, GB

Environmental

Operating Base Plate Temperature	• -40 °C to +100 °C, see derating curve
Storage Temperature	• -55 °C to +105 °C
Operating Humidity	• Up to 90% non-condensing
Cooling	• Baseplate-cooled, see derating curve

EMC & Safety

Emissions	• EN55022, level A conducted, with external components. Contact sales for details.
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Models & Ratings

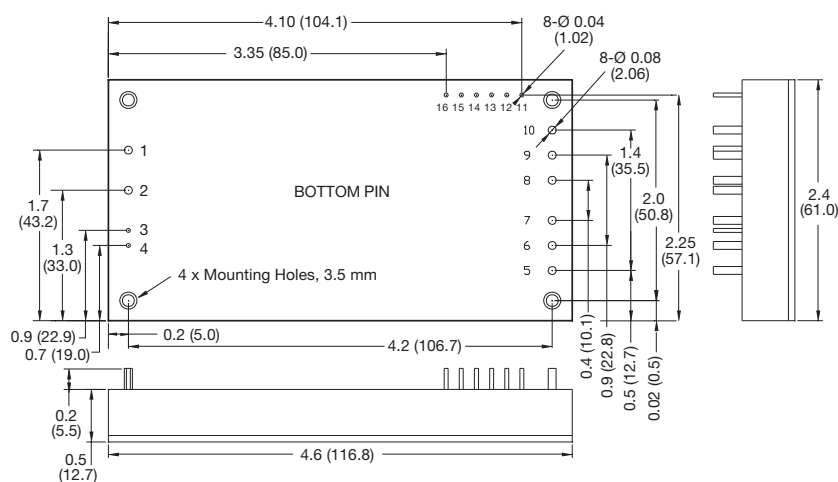
QSB400 **XP**

Input Voltage	Output Voltage	Output Current	Input Current		Efficiency	Max Capacitive Load	Model Number ⁽²⁾
			No Load	Full Load			
9-36 V	5.0 V	80.0 A	600 mA	19.05 A	87.5%	10000 μ F	QSB40024S05
	12.0 V	33.3 A	120 mA	19.36 A	86.0%	10000 μ F	QSB40024S12
	24.0 V	16.6 A	120 mA	19.19 A	87.0%	4700 μ F	QSB40024S24
	28.0 V	14.3 A	120 mA	19.19 A	87.0%	4700 μ F	QSB40024S28
	48.0 V	8.30 A	120 mA	19.19 A	86.5%	2200 μ F	QSB40024S48
18-75 V	5.0 V	80.0 A	300 mA	9.36 A	89.0%	10000 μ F	QSB40048S05
	12.0 V	33.3 A	60 mA	9.41 A	88.5%	10000 μ F	QSB40048S12
	24.0 V	16.6 A	60 mA	9.28 A	90.0%	4700 μ F	QSB40048S24
	28.0 V	14.3 A	60 mA	9.27 A	90.0%	4700 μ F	QSB40048S28
	48.0 V	8.30 A	60 mA	9.27 A	89.5%	2200 μ F	QSB40048S48

Notes

- Output Ripple and Noise measured with 10 μ F tantalum and 1 μ F ceramic capacitor across output.
- Add suffix 'P' to the model number to receive the unit with positive logic Remote On/Off.
- Minimum of 330 μ F capacitance required on output to maintain regulation. Except S05 models which require 680 μ F
- Open collector signal is pulled low when DC is OK, floating when DC is NOT OK WRT-Sense pin. Maximum current is 20 mA

Mechanical Details



PIN CONNECTIONS	
Pin	Function
1	-Vin
2	+Vin
3	-On/Off
4	+On/Off
5-7	+Vout
8-10	-Vout
11	-Sense
12	+Sense
13	Trim
14	Parallel
15	DC OK
16	Aux

Notes

- All dimensions are in inches (mm)
- Weight: 0.57 lbs (260 g) approx
- Tolerances: X.XX = ± 0.02 (X.X = ± 0.5)
X.XXX = ± 0.01 (X.XX = ± 0.25)

Output Voltage Adjustment

The trim pin permits the user to adjust the output voltage up or down according to the trim range specification (80% to 110% of nominal output). This is accomplished by connecting resistor R_v between the +Vout and +Sense pins and a resistor R_{trim} between the trim and -Sense pins. See longform datasheet for connection diagram. The trim pin should be left open if trimming is not being used. The trim resistor can be determined by the following equations:

$$V_f = \frac{1.24 \times \left(\frac{R_{trim} \times 33}{R_{trim} + 33} \right)}{7.68 + \frac{R_{trim} \times 33}{R_{trim} + 33}}$$

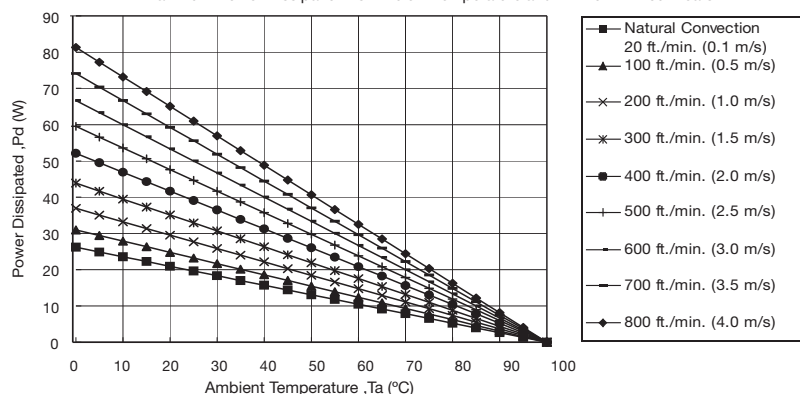
$$V_{trim} = (V_o + R_v) \times V_f$$

R_v : Variable Resistor, K Ω
 R_{trim} : K Ω , 6.2 k Ω recommended
 V_o : Nominal Output Voltage

Thermal Resistance Information

Derating Curve

Maximum Power Dissipation vs Ambient Temperature and Air Flow without heatsink



Air Flow Rate	Typical R_{ca}
Natural Convection	3.82 °C/W
20 ft./min (0.1 ms)	3.23 °C/W
100 ft./min (0.5 ms)	2.71 °C/W
200 ft./min (1.0 ms)	2.28 °C/W
300 ft./min (1.5 ms)	1.92 °C/W
400 ft./min (2.0 ms)	1.68 °C/W
500 ft./min (2.5 ms)	1.50 °C/W
600 ft./min (3.0 ms)	1.35 °C/W
700 ft./min (3.5 ms)	1.23 °C/W
800 ft./min (4.0 ms)	1.23 °C/W

R_{ca} = Thermal resistance from case to ambient