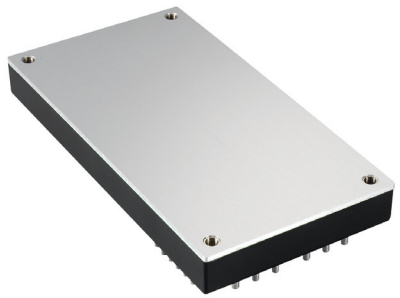
600 Watts

QSB Series



- Up to 92% 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 (18-36 V), 48 V (36-75 V)
Input Current	• See table
Idle Current	• 50 mA
Input Reverse Voltage Protection	• None
Input Filter	• Pi network
Undervoltage Lockout	• 24 Vin: turn on 17.0 V, turn off 16.0 V 48 Vin: turn on 35.0 V, turn off 33.0 V

Output

Output Voltage Trim	• 60% to 110% of nominal output, see application notes
Initial Set Accuracy	• ±1.5% max
Line Regulation	• ±0.2% max measured from high line to low line
Load Regulation	• ±0.5% max measured from 0-100% load
Transient Response	• 5% max deviation, recovery to within 1% in 500 µs, 25% step load change
Ripple & Noise	• 12 V models: 120 mV pk-pk 28 V models: 280 mV max pk-pk 32 V models: 320 mV max pk-pk 48 V models: 480 mV max pk-pk 20 MHz bandwidth (see note 1)
Overvoltage Protection	• 115-140%
Short Circuit Protection	• Continuous
Current Limit	• 110-150% nominal output
Thermal Shutdown	• Case temperature >110 °C typical
Temperature Coefficient	• ±0.03%/°C
Remote On/Off	• Isolated input, can be controlled via primary or secondary side. Module on 1-10 mA. Internal 1KΩ 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 PC pin

General

Efficiency	• See tables
Isolation Voltage	• 1500 VDC Input to Output 1500 VDC Input to Case 1500 VDC Output to Case
Isolation Resistance	• $10^7\Omega$
Isolation Capacitance	• 4000 pF typical
Switching Frequency	• 48 Vin: 12 V, 28 V, 32 V: 300 kHz typical Others: 250 kHz
DC OK Signal	• DC OK TTL low, not OK TTL high, connect IOC pin to Aux pin through a resistor (see note 3)
Power Density	• 108.7 W/in^3
MTBF	• 381 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
Safety	• UL62368-1 (Pending), Evaluated to EN62368-1

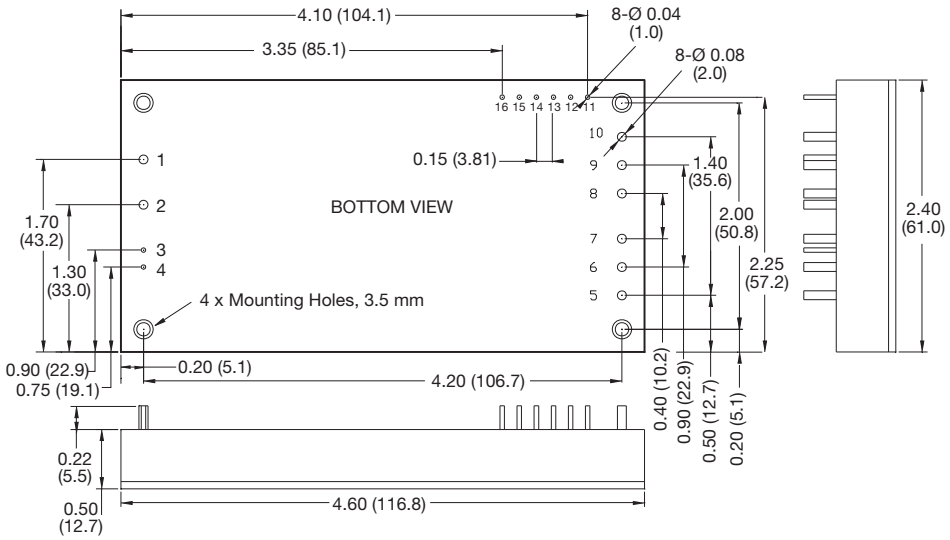
Models & Ratings

Input Voltage	Output Voltage	Output Current	Input Current		Efficiency	Model Number[2]
			No Load	Full Load		
18-36 V	12.0 V	50.0 A	150 mA	28.09 A	89.0%	QSB60024S12
	28.0 V	21.5 A	150 mA	27.87 A	90.0%	QSB60024S28
	32.0 V	19.0 A	150 mA	27.84 A	91.0%	QSB60024S32
	48.0 V	12.5 A	200 mA	27.47 A	91.0%	QSB60024S48
36-75 V	12.0 V	50.0 A	90 mA	13.89 A	90.0%	QSB60048S12
	28.0 V	25.0 A	105 mA	16.03 A	91.0%	QSB60048S28
	32.0 V	19.0 A	90 mA	13.77 A	92.0%	QSB60048S32
	48.0 V	12.5 A	130 mA	13.59 A	92.0%	QSB60048S48

Notes

1. *Output Ripple and Noise measured with 10 µF tantalum and 1 µF ceramic capacitor across output.*
2. *Add suffix 'P' to the model number to receive the unit with positive logic Remote On/Off.*
3. *The auxiliary supply output is within 7-13 V with max of 20 mA (auxiliary pin 16). Ground reference is -Sense.*

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	PC
15	IOC
16	Aux

Notes

1. All dimensions are in inches (mm)
2. Weight: 0.49 lbs (220 g) approx
3. Tolerances: X.XX = ±0.02 (X.X = ±0.5)
   X.XXX = ±0.01 (X.XX = ±0.25)
4. Small or large pin diameter: ±0.004 (±0.1)
5. Small pin pitch 0.15 (3.81)

Output Voltage Adjustment – QSB600

The trim pin permits the user to adjust the output voltage up or down according to the trim range specification (60% to 110% of nominal output). This is accomplished by connecting resistor R_V between the +Vout and +Sense pins and a resistor R_{trim} of value 6.8kΩ 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:

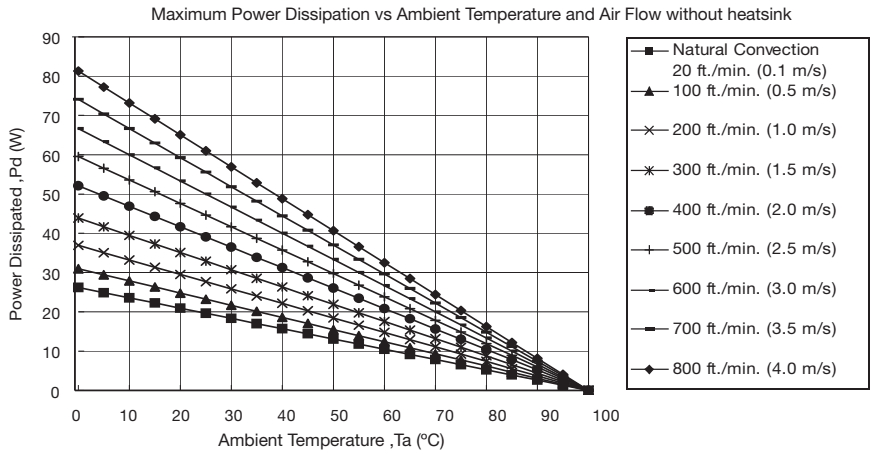
$$Vf = \frac{1.24 \times \left(\frac{6.8 \times 33}{6.8 + 33}\right)}{7.68 + \frac{6.8 \times 33}{6.8 + 33}}$$

$$Vtrim = (Vo + R_v) \times Vf$$

R_v : Variable Resistor, KΩ
Rtrim: KΩ, 6.8 kΩ recommended
Vo: Nominal Output Voltage
Vtrim: Desired Output Voltage

Thermal Resistance Information

Derating Curve



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

R_{ca} = Thermal resistance from case to ambient

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