300 Watts

- Up to 90% Efficiency
- 4:1 Input Range
- Industry Standard Half Brick Package
- -40 °C to +100 °C Operating Temperature
- Baseplate-cooled
- Remote On/Off & Remote Sense
- 3 Year Warranty

This specification describes the features and functions of QSB300 series of isolated DC-DC Converters. These are highly efficient, reliable and compact, high power density, single output DC/DC converters. The modules can be used in a wide range of applications from telecommunications, data communications, wireless communications to servers.

Dimensions:

QSB:
2.4 x 2.28 x 0.5"(60.9 x 57.9 x 12.7 mm)

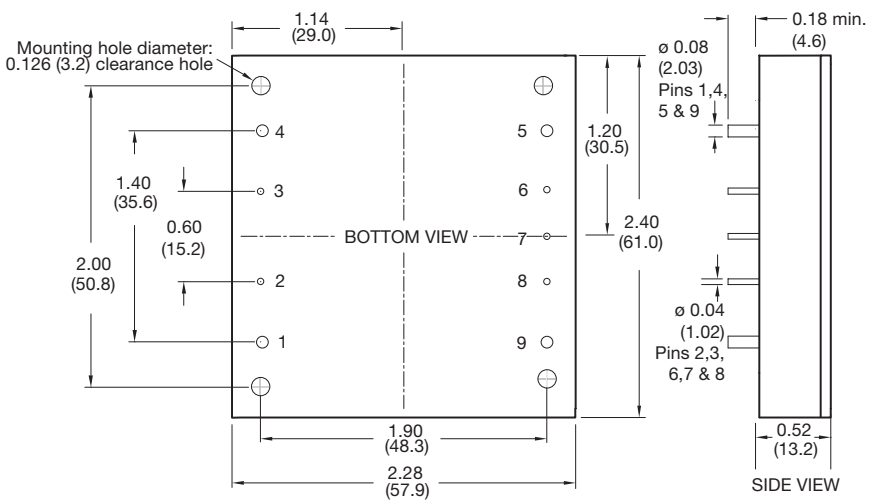
Models & Ratings

Input Voltage	Output Voltage	Output Current		Input Current		Efficiency[3]	Max. Capacitive Load	Model Number[1]
		Nom.	Peak[4]	No Load	Full Load			
24V (9-36V)	5.0 V	60.0A	70.00A	200mA	14.21A	88.0%	10000 µF	QSB30024S05[6]
	12.0V	25.0A	29.16A	200mA	13.89A	90.0%	10000 µF	QSB30024S12[6]
	24.0V	12.5A	14.58A	100mA	14.21A	88.0%	4700 µF	QSB30024S24[5]
	28.0V	10.7A	12.50A	100mA	14.11A	88.0%	4700 µF	QSB30024S28[5]
	48.0V	6.25A	7.29A	100mA	14.37A	87.0%	2200 µF	QSB30024S48[5]
48V (18-75 V)	5.0V	60.0A	70.00A	100mA	6.94A	90.0%	10000 µF	QSB30048S05
	12.0V	25.0A	29.16A	100mA	6.94A	90.0%	10000 µF	QSB30048S12
	24.0V	12.5A	14.58A	80mA	6.98A	89.0%	4700 µF	QSB30048S24
	28.0V	10.7A	12.50A	80mA	6.94A	90.0%	4700 µF	QSB30048S28
	48.0V	6.25A	7.29A	80mA	7.02A	89.0%	2200 µF	QSB30048S48[5]

Notes

1. *Add suffix 'N' to the model number to receive the unit with negative logic Remote On/Off.*
2. *Minimum of 1000µF for 24Vin and 220µF for 48 Vin required on input.*
3. *Measured at nominal input voltage.*
4. *Peak Current is for max duration of 3s with 10% duty cycle. Average output power not to exceed 300W.*
5. *Models require minimum 220 µF capacitor across output rails to maintain regulation.*
6. *QSB30025S05 requires minimum 470µF and QSB30024S12 requires minimum 330µF across output rails to maintain regulation.*

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. All dimensions are in inches (mm)
2. Weight: 0.25 lbs (114 g)approx
3. Tolerances: X.XX = ±0.02 (X.X = ±0.5)
   X.XXX = ±0.01 (X.XX = ±0.25)

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage	9/18		36/75	VDC	24 V/48 V
Input Current					See Models and Ratings table
Input Reverse Voltage Protection					None
Input Filter					Pi Network
Undervoltage Lockout	Turn On: 8.8 Turn On: 17.0		Turn Off: 8.0 Turn Off: 16.0	V	24 Vin 48 Vin
Input Surge		50 VDC for 100 ms 100 VDC for 100 ms		V	24 Vin 48 Vin

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage Trim		±10		%	See Application Notes
Initial Set Accuracy			±1.5	%	At full load
Start Up Time		120		ms	
Line Regulation			±0.2	%	Measured from high line to low line
Load Regulation			±0.2	%	Measured from 0-100% load
Transient Response			5	%	Deviation, recovery to within 1% in 500 µs, 25% step load change
Ripple & Noise		100 120 280 480		mV pk-pk	3.3 & 5 V models 12 V models 24 & 28 V models 48 V models, 20 MHz bandwidth (see note 1)
Overvoltage Protection	115		140	%	
Short Circuit Protection					Continuous
Thermal Shutdown	Case temperature >105 °C typical				
Temperature Coefficient		±0.03		%/°C	
Current Limit	120		140	%	Nominal Output

Notes

1. Output Ripple and Noise measured with 10 µF tantalum and 1 µF ceramic capacitor across output.

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	87		90	%	See Models and Ratings table
Isolation: Input to Output			1500	VDC	Functional insulation
Input to Case			1500	VDC	
Output to Case			1500	VDC	
Isolation Resistance		10		MΩ	
Isolation Capacitance		2000		pF	
Switching Frequency		220		kHz	
Power Density		109		W/in^3	
Mean Time Between Failure		300		kHrs	MIL-HDBK-217F at 25 °C GB
Weight		0.25 (114)		lb (g)	

Signals and Controls

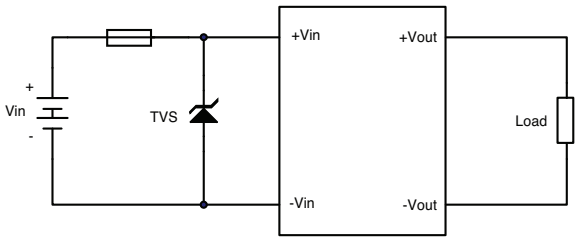
Phenomenon	Standard	Test Level	Notes & Conditions
Remote On/Off	Output is off if pin 2 is low (<1.8 V) and on if high (≥3.5 V) or open circuit, Reference to -ve input pin 4		
Remote Sense	Compensates up to 10% of Vout nominal, total of output trim and remote sense		

EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55022, level A conducted, with external components. See application notes.		

Application Notes

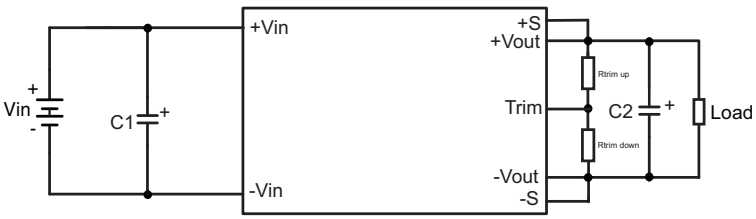
Input Fusing and Safety Considerations



The QSB300 series converters have no internal fuse. In order to achieve maximum safety and system protection, always use an input line fuse. We recommended a 60A time delay fuse for 24Vin models, and 30A for 48Vin models. It is recommended that the circuit have a transient voltage suppressor diode TVS (24 Vin SMCJ40A: 48 Vin, SMCJ78A) across the input terminal to protect the unit against surge or spike voltage and input reverse voltage (as shown).

Output Voltage Adjustment

The Trim input permits the user to adjust the output voltage up or down according to the trim range specification (±10% of nominal output). This is accomplished by connecting an external resistor between the +Vout, +Sense and trim pin for trim up and between the trim and -Vout, -Sense pin for trim down, see figure. The trim pin should be left open if trimming is not required.



C1 >220 µF / 100 V
For C2 see note 5 & 6 or max capacitive load in Models and Ratings table. A low ESR electrolytic capacitor is recommended.

Voltage trim down - Connect trim resistor Rtrim between Trim pin , -Vout and –Sense pin

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

Where:

$$\triangle\% = \left(\frac{Vnom - Vdes}{Vnom}\right) \times 100$$

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

$$R\ trim\ up = \left(\frac{5.11\ Vnom\ (100 + \triangle\%)}{1.24 \times \triangle\%} - \frac{511}{\triangle\%} - 10.22\right) k\Omega$$

Where:

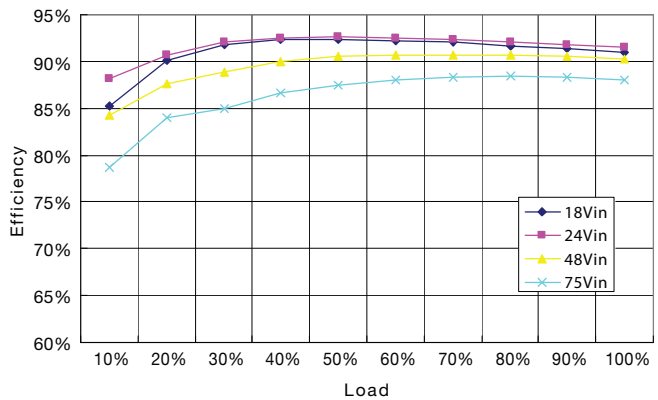
$$\triangle\% = \left(\frac{Vdes - Vnom}{Vnom}\right) \times 100$$

Output Voltage Sensing

The module will automatically trim the output voltage via the sense pins to the default values either locally or at the load. If not required, the sense pins should be connected locally as indicated in the above example circuit.

Efficiency vs Load

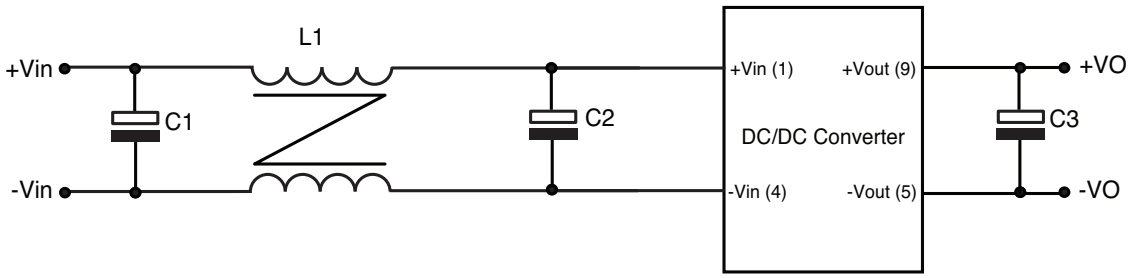
QSB30048S28



Application Notes

EMC Considerations

Suggested Circuits for Conducted EMI Class A



C1	C2	C3	L1
220 µF/100V	220 µF/100V	220 µF	1.5 mH

Notes

220 µF/100V NIPPON CHEMI-CON KMF series aluminum capacitors.
C3 >220 µF or as per Models and Ratings table
L1: Common mode choke, core p/n SM CM20 x 12 x 10