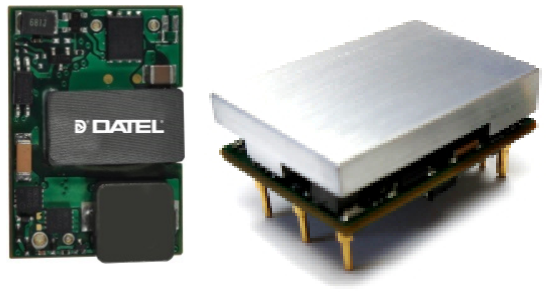
DATEL
INNOVATION and EXCELLENCE

SB Series Sixteenth - Brick
Up to 100 Watt DC-DC Converter



PRODUCT OVERVIEW

This SB series of DC-DC converters is an open frame sixteenth-brick DC-DC converter that conforms to industry standard specifications. These converters operate over the input voltage range of 9 to 18, 18 to 36 or 36 to 75 VDC and provide tightly regulated output voltages. The high efficiency of this SB series allows operation over a wide ambient temperature range of – 40°C to +123°C with minimal derating. All standard models come with 2,250 Volts of DC isolation, while option I model offers much higher isolation of 2,828 volts. The standard feature set includes remote On/Off (positive or negative enable), input under-voltage lockout, output overvoltage protection, overcurrent and short circuit protection, output voltage trim, remote sense and over-temperature shutdown with hysteresis.

FEATURES

- DOSA – Standard Form, Fit & Function
- Industry standard 1/16th brick footprint
- 2:1 input voltage range: 9-18, 18- 36 or 36 – 75Vin
- Efficiency up to 93%
- No minimum load required
- -40 °C to +123 °C operation
- Withstands 100 V input transients
- Fixed-frequency operation
- Full protection for OTP, OCP, OVP, UVLO and auto-restart
- Remote ON/OFF - positive or negative and Remote sense
- Output voltage trim range: +10% / -20%
- On-board input differential LC filter
- ROHS II Directive 2011/65/EU Compliant
- Meets UL94, V-0 flammability rating
- Compliant to REACH (EC) No 1907/2006
- Designed to meet UL/CSA60950-1, TUV per IEC/EN60950-1, 2nd edition (pending)
- Designed to meet Class B conducted emissions per EN55022

APPLICATIONS:

- Distributed Power Architectures
- Instrumentation
- Data and Wireless Communications
- Servers
- “Bus” Converter Applications

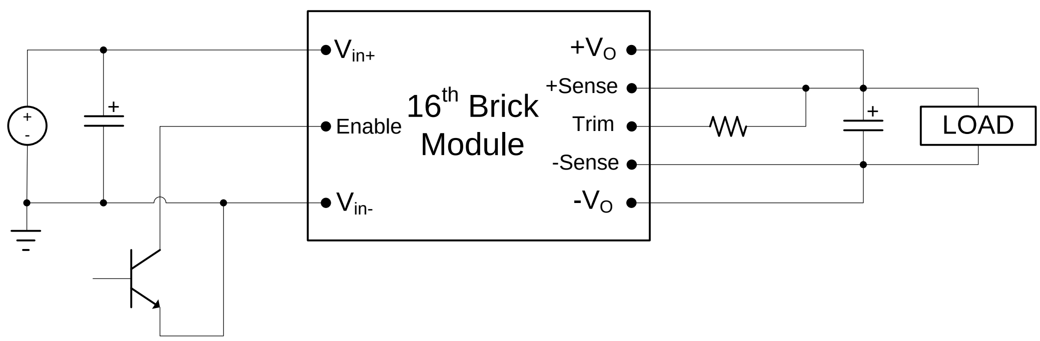
AVAILABLE OPTIONS

- Customizable Input / Output voltages
- SMT or Thru-Hole Mounting
- Higher Power
- Ultra-wide 4:1 Input
- Optional Baseplate

Contact DATEL for other series of 1/16th - Brick footprint, optimized for Cost Savings or higher performance

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT MAX	EFFICIENCY %	LOAD REGULATION	OPTIONS
SB12S5-10	9 – 18 VDC	5 VDC	10 A	89	± 0.1 %	B, S, N, P, I
SB24S5-15	18 – 36 VDC	5 VDC	15 A	90	± 0.1 %	B, S, N, P, I
SB24S12-7	18 – 36 VDC	12 VDC	7 A	91	± 0.1 %	B, S, N, P, I
SB24S15-1	18 – 36 VDC	15 VDC	1 A	90	± 0.1 %	B, S, N, P, I
SB48S2.5-20	36 – 75 VDC	2.5 VDC	20 A	88	± 0.2 %	B, S, N, P, I
SB48S3.3-20	36 – 75 VDC	3.3 VDC	20 A	90	± 0.1 %	B, S, N, P, I
SB48S5-20	36 – 75 VDC	5 VDC	20 A	92	± 0.1 %	B, S, N, P, I
SB48S12-8.3	36 – 75 VDC	12 VDC	8.3 A	92	± 0.1 %	B, S, N, P, I
SB48S15-5.5	36 – 75 VDC	15 VDC	5.5 A	93	± 0.1 %	B, S, N, P, I

CONNECTION DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Parameters	Conditions	Model	Min.	Typical	Max.	Units
Input Voltage						
Continuous	DC	$12V_{in}$ $24V_{in}$ $48V_{in}$	0 0 0		18 36 75	Volts
Operating Ambient Temperature	With Derating	All	-40		+123	°C
Storage Temperature		All	-55		+125	°C

Stresses above the absolute maximum ratings can cause permanent damage to the device.

ELECTRICAL SPECIFICATIONS

Note: All specifications are typical at nominal input, full load at 25°C, Airflow=300 LFM, Vin = Nominal, Cin=33 μ F, unless otherwise noted

INPUT CHARACTERISTICS

Parameters	Conditions	Model	Min.	Typical	Max.	Units
Operating Input Voltage		12Vin 24Vin $48V_{in}$	9 18 36	12 24 48	18 36 75	Volts
Input Under Voltage Lockout						
Turn-On Voltage Threshold		$12V_{in}$ $24V_{in}$ $48V_{in}$	9.2 17.2 34.2	9.6 17.6 35	10 18 35.9	Volts
Turn-Off Voltage Threshold		$12V_{in}$ $24V_{in}$ $48V_{in}$	8.1 15.8 32.4	8.5 16.2 33.2	8.9 16.6 34.1	Volts
Input Voltage Transient	100 ms	$12V_{in}$ $24V_{in}$ $48V_{in}$		25 50 100		Volts
Maximum Input Current	100% Load, V_{in} =9V	12Vin			6400	mA
	100% Load, V_{in} =18V	24Vin			9300	
	100% Load, V_{in} =36V	48Vin			5300	
No-Load Input Current	V_{in} =Nominal input	SB12S5-10 SB24S5-15 SB24S12-7 SB24S15-1 SB48S2.5-20 SB48S3.3-20 SB48S5-20 SB48S12-8.3 SB48S15-5.5		75 75 75 40 30 40 40 60 70	100 100 120 60 50 60 70 80 90	mA
Off Converter Input Current	Shutdown input idle current	All		2	5	mA
Short Circuit Input Current	RMS	All		30		mA
Input Voltage Ripple Rejection	120HZ			50		dB
Inrush Current (I^2t)	As per ETS300 132-2	All			0.01	A^2s
Input Reflected-Ripple Current	5Hz to 50MHz	All		15	30	mA_{PK-PK}

OUTPUT CHARACTERISTIC

Parameters	Conditions	Model	Min.	Typical	Max.	Units
Output Voltage Set Point	V_{in} =Nominal V_{in} , $I_o = I_{o\_max}$, Tc=25°C	Vo=2.5 Vo=3.3 Vo=5.0 Vo=12 Vo=15	2.462 3.2505 4.925 11.82 14.775	2.5 3.3 5 12 15	2.538 3.3495 5.075 12.18 15.225	Volts
Output Voltage Regulation						
Line Regulation	V_{in} =High line to Low line Full Load	Vo=2.5 Others			±0.2 ±0.1	%
Load Regulation	I_o = Full Load to min. Load	Vo=2.5 Others			±0.2 ±0.1	%
Output Voltage Ripple and Noise	5Hz to 20MHz bandwidth					
Peak-to-Peak	Full Load, 20MHz bandwidth 10uF tantalum and 1uF ceramic capacitor	Vo=2.5V Vo=3.3V Vo=5V Vo=12V Vo=15V			60 80 120 150 60	mV
Operating Output Current Range		SB12S5-10 SB24S5-15 SB24S12-7 SB24S15-1 SB48S2.5-20 SB48S3.3-20 SB48S5-20 SB48S12-8.3 SB48S15-5.5	0 0 0 0 0 0 0 0 0		10000 15000 7000 1000 20000 20000 20000 8300 5500	mA
Peak Short Circuit Current	10mΩ Short	SB12S5-10 SB24S5-15 SB24S12-7 SB24S15-1 SB48S2.5-20 SB48S3.3-20 SB48S5-20 SB48S12-8.3 SB48S15-5.5			20 28 15 5 35 30 33 25 20	A
RMS Short Circuit Current	10mΩ Short (RMS)	SB12S5-10 SB24S5-15 SB24S12-7 SB24S15-1 SB48S2.5-20 SB48S3.3-20 SB48S5-20 SB48S12-8.3 SB48S15-5.5			2.5 3.0 2.0 0.7 2.5 3.0 3.0 2.5 2.5	A
Output DC Current-Limit Inception	Output Voltage=90% $V_{O,\ nominal}$		110	140	170	%
Maximum Output Capacitance	Full load, Resistance	SB12S5-10 SB24S5-10 SB24S12-7 SB24S15-1 SB48S2.5-20 SB48S3.3-20 SB48S5-20 SB48S12-8.3 SB48S15-5.5			6800 10000 3300 3300 10000 10000 10000 4700 10000	μF

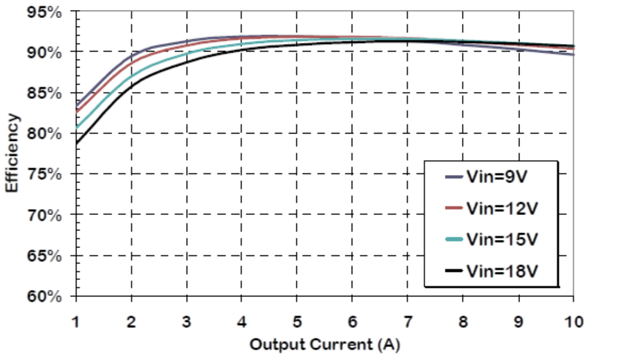
FEATURE CHARACTERISTICS

Parameter	Conditions	Model	Min	Typ	Max	Unit
Switching Frequency		SB12S5-10 SB24S5-10 SB24S12-7 SB24S15-1 SB48S2.5-20 SB48S3.3-20 SB48S5-20 SB48S12-8.3 SB48S15-5.5		430 480 500 480 480 480 480 480 430		kHz
Output Voltage Trim Range[1]		SB12S5-10 Others	-10 -20		+10 +10	%
Remote Sense Compensation[1]		All			+10	%
Output Over-voltage Protection	Non-latching	All	115	120	140	%
Over-temperature Protection	Average PCB temp, non-latching	All		135		°C
Peak Backdrive Output Current during startup into pre-biased output	C_{OUT}=220μF, aluminum Sinking current from external voltage source equal to V_{OUT} – 0.6V and connected to the output via 1Ω resistor.	All		400	500	mA
Backdrive Output Current in OFF state	Converter disabled			0	5	mA
Enable to Output Turn-ON Time	V_{OUT} = 0.9*V_{OUT_NOM}			20		ms
Output Enable ON/OFF Negative Enable Converter ON Converter OFF Positive Enable Converter ON Converter OFF Enable Pin Current Source/Sink	All voltages are WRT – Vin. Converter has internal pull-up of approx. 5V		-0.5 2.4 2.4 -0.5	0.25	0.8 20 20 0.8 1	VDC VDC VDC VDC mA
Output Voltage Overshoot @ startup				0	2	%Vo
Auto-Restart Period	With all protection features			100		ms
Efficiency Full Load		SB12S5-10 SB24S5-10 SB24S12-7 SB24S15-1 SB48S2.5-20 SB48S3.3-20 SB48S5-20 SB48S12-8.3 SB48S15-5.5		89 90 91 90 88 90 92 92 93		%

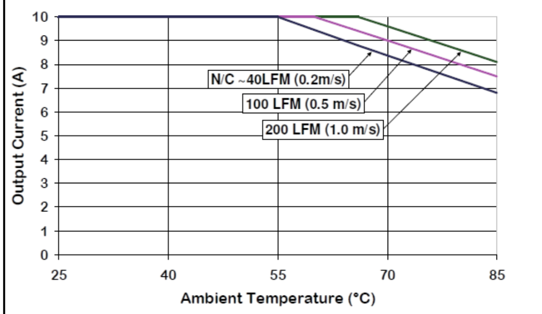
Parameter	Conditions	Models	Min	Typ.	Max	Unit
Load Change 50%-75% or 25% to 50% of Iout Max, di/dt = 0.1 A/µs	Co = 1 µF ceramic and 10 µF tantalum	All		100	300	mV
Settling Time to 1% of Vout		All		50		µs
Load Change 50%-75% or 25% to 50% of Iout Max, di/dt = 1.0 A/µs	Co = 1 µF ceramic and 330 µF Tantalum	All		100	200	mV
Settling Time to 1% of Vout		All		100		µs
Isolation Capacitance				1000		pF
Isolation Resistance			10			MΩ
Isolation Voltage–Input to Output (Standard)		Standard model	2250			V
Isolation Voltage–Input to Output (Option I)		Option I model	2828			V
Isolation Voltage – Input to Baseplate			1500			V
Isolation Voltage –Output to baseplate			1000			V
RELIABILITY						
Per Telcordia SR-332, Issue 2: Method I, Case 3 (I_O=80% of I_{O}_max, T_A=40°C, airflow = 200 lfm, 90% confidence)	MTFB	SB12S5-10 SB24S5-10 SB24S12-7 SB24S15-1 SB48S2.5-20 SB48S3.3-20 SB48S5-20 SB48S12-8.3 SB48S15-5.5		3,237,658 3,072,521 2,544,826 4,700,608 3,358,741 2,997,578 2,783,036 3,282,833 TBD		Hours
	FITs (failures in 10^9 hours)	SB12S5-10 SB24S5-10 SB24S12-7 SB24S15-1 SB48S2.5-20 SB48S3.3-20 SB48S5-20 SB48S12-8.3 SB48S15-5.5		309 325 393 213 298 334 359 305 TBD		$/10^9$ Hours

Notes: 1) Combination of trim + remote sense cannot exceed 10% of V_{O_nom}

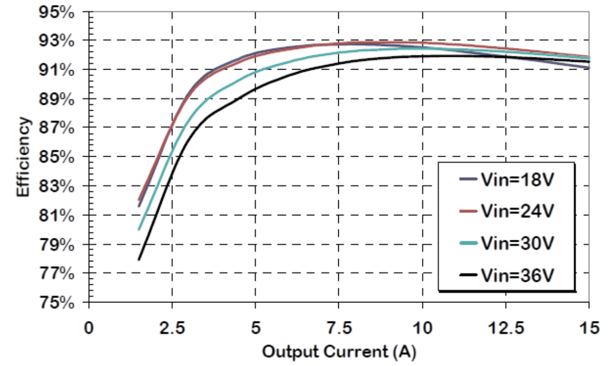
Efficiency vs. Load and Characteristic Curves



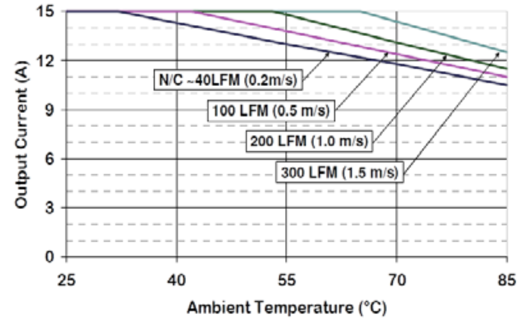
SB12S5-10 Efficiency vs Output Current, 300lfm airflow, 25°C ambient.



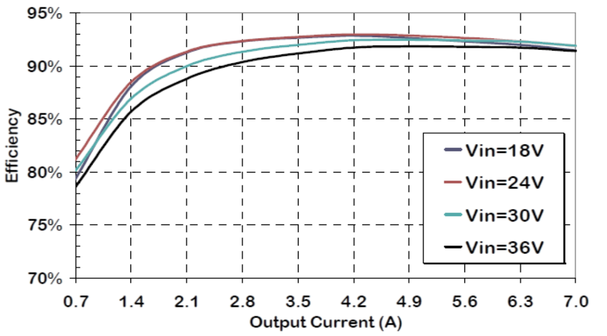
SB12S5-10 Output Current Derating vs Ambient Temperature & Airflow (converter mounted vertically with air flowing from pin 3 to pin 1, Vin = 12 V.) (EST.)



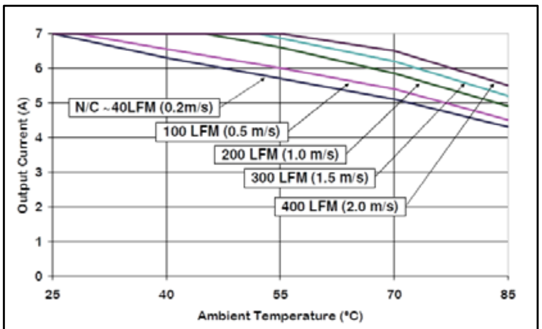
SB24S5-15 Efficiency vs Output Current, 300lfm airflow, 25°C ambient.



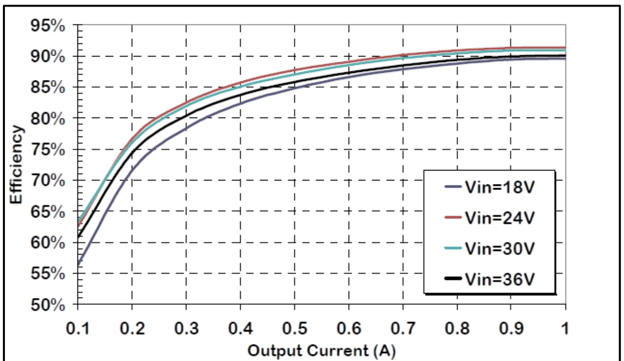
SB24S5-15 Output Current Derating vs Ambient Temperature & Airflow (converter mounted vertically with air flowing from pin 3 to pin 1, Vin = 24 Volts



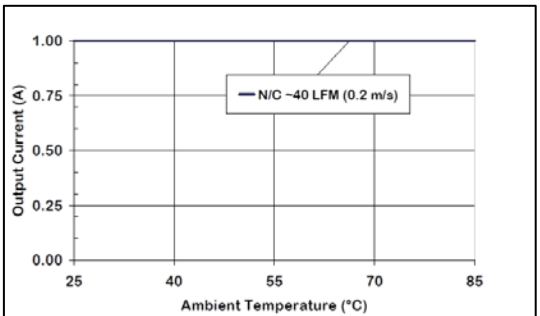
SB24S12-7 Efficiency vs Output Current, 300lfm airflow, 25°C ambient.



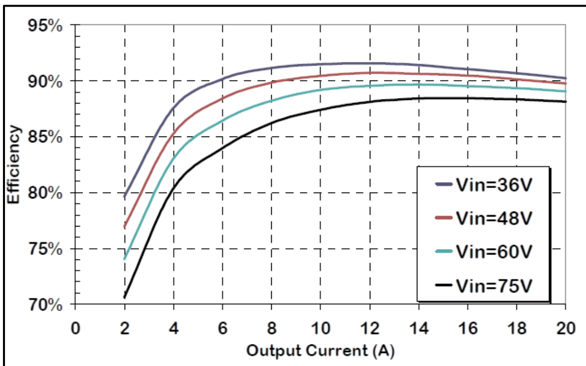
SB24S12-7 Output Current Derating vs Ambient Temperature & Airflow (converter mounted vertically with air flowing from pin 3 to pin 1), Vin = 24 Volts



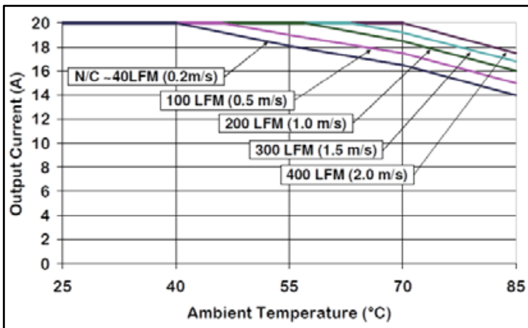
SB24S15-1 Efficiency vs Output Current, 300lfm airflow, 25°C ambient.



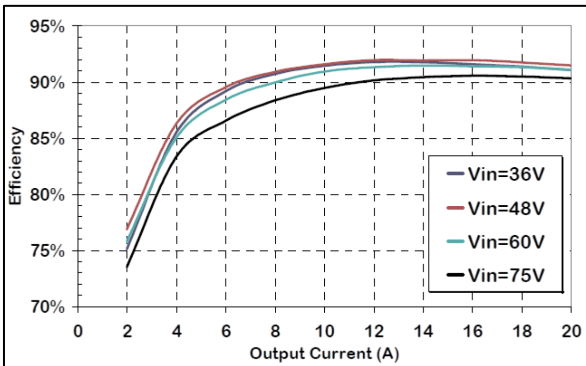
SB24S15-1 Output Current Derating vs Ambient Temperature & Airflow (converter mounted vertically air flowing from pin 3 to pin 1, Vin = 18-36 V



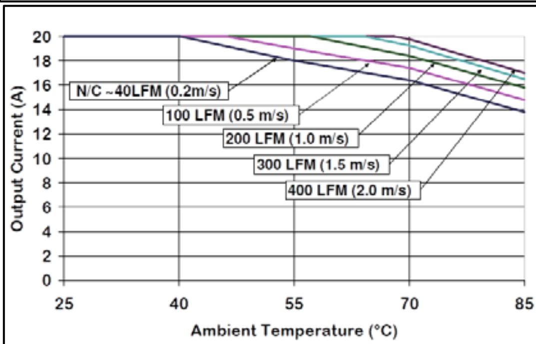
SB48S2.5-20 Efficiency vs Output Current, 300lfm airflow, 25°C ambient.



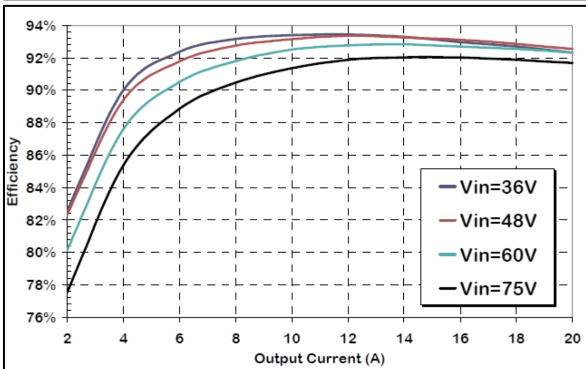
SB48S2.5-20 Output Current Derating vs Ambient Temperature & Airflow (converter mounted vertically with air flowing from pin 3 to pin 1, Vin = 48 V.)



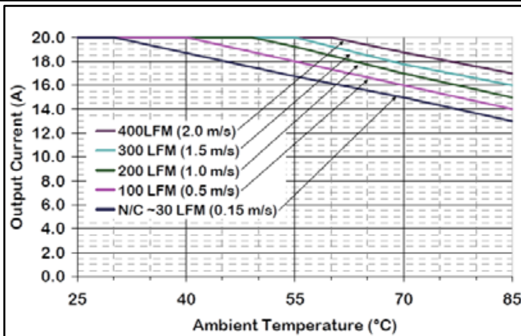
SB48S3.3-20 Efficiency vs Output Current, 300lfm airflow, 25°C ambient.



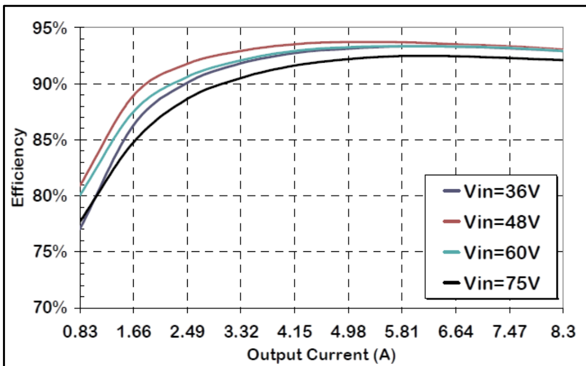
SB48S3.3-20 Output Current Derating vs Ambient Temperature & Airflow (converter mounted vertically with air flowing from pin 3 to pin 1, Vin = 48 V.)



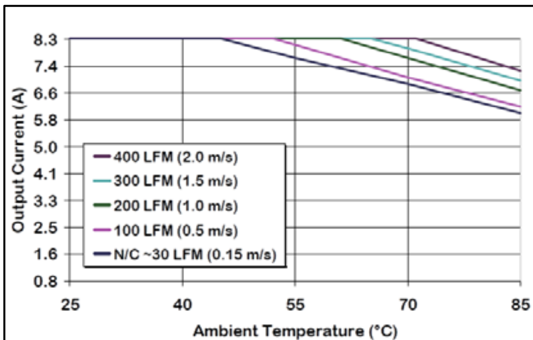
SB48S5-20 Efficiency vs Output Current, 300lfm airflow, 25°C ambient.



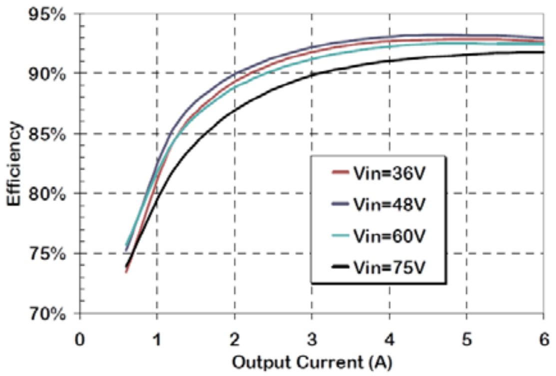
SB48S5-20 Output Current Derating vs Ambient Temperature & Airflow (converter mounted vertically with air flowing from pin 3 to pin 1, Vin = 48 Volts



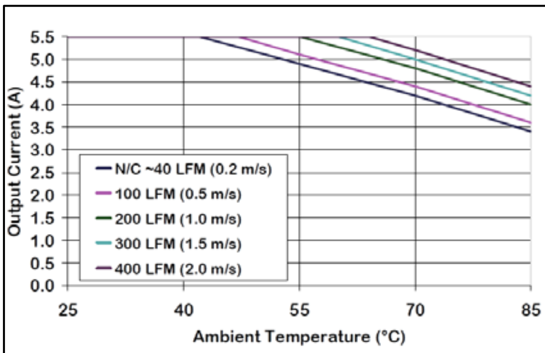
SB48S12-8.3 Efficiency vs Output Current, 300lfm airflow, 25°C ambient.



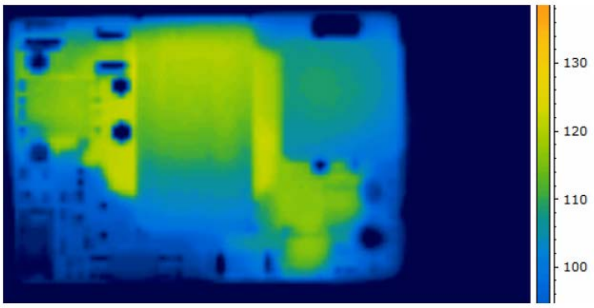
SB48S12-8.3 Output Current Derating vs Ambient Temperature & Airflow (converter mounted vertically with air flowing from pin 3 to pin 1, Vin = 48 V.)



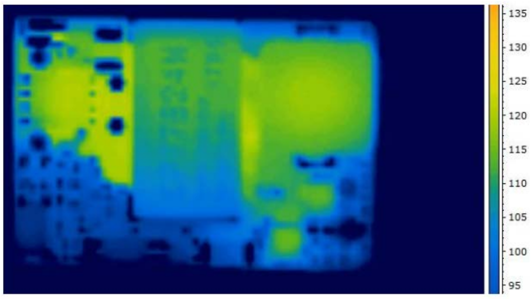
SB48S15-5.5 Efficiency vs Output Current, 300lfm airflow, 25°C ambient.



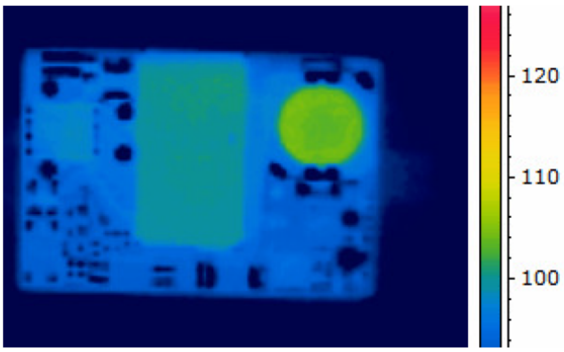
SB48S15-5.5 Output Current Derating vs Ambient Temperature & Airflow (converter mounted vertically air flowing from pin 3 to pin 1, Vin = 48 V)



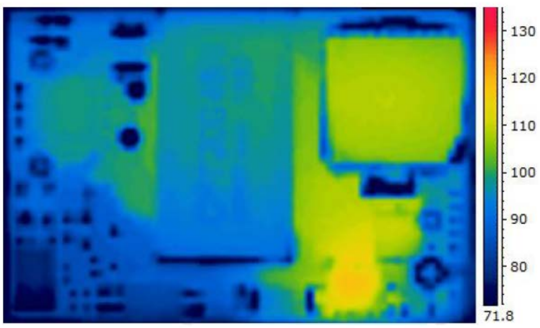
SB24S5-15 Thermal Image 15A output, 55C Ambient, 200LFM, Vin = 24V, (airflow from pin 3 to pin 1, T_{max} = 125°C)



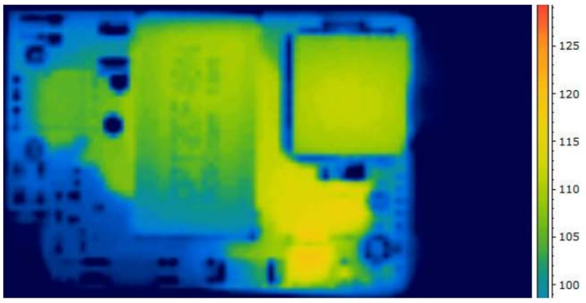
SB24S12-7 Thermal Image of **EB24S5-15** 7A output, 45C Ambient, 200LFM, Vin = 24V, airflow from pin 3 to pin 1, T_{max} = 123°C



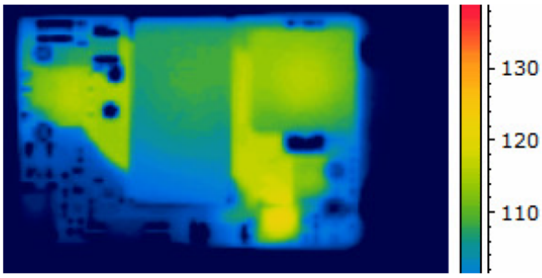
SB24S15-1 Thermal Image 1A output, 85C Ambient, Natural Convection Vin = 24V, (airflow from pin 3 to pin 1, T_{max} = 105°C)



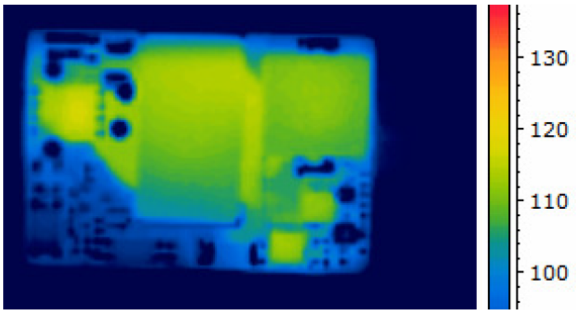
SB48S2.5-20 Thermal Image 20A output, 55C Ambient, 200lfm airflow, Vin = 48V, airflow from pin 3 to pin 1, T_{max} = 119°C



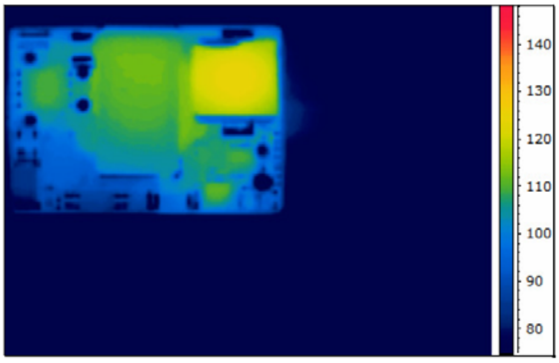
SB48S3.3-20 Thermal Image (20A output, 55C Ambient, 200lfm airflow, Vin = 48V, airflow from pin 3 to pin 1, T_{max} = 120°C)



SB48S5-20 Thermal Image 20A output, 55C Ambient, 300LFM, Vin = 48V, (airflow from pin 3 to pin 1, T_{max} = 123°C)



SB48S12-8.3 Thermal Image 8.3A output, 55C Ambient, 200lfm airflow, Vin = 48V, airflow from pin 3 to pin 1, T_{max} = 116°C

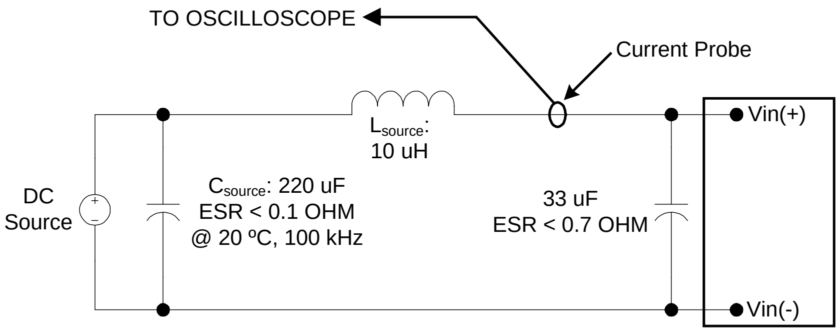


SB48S15-5.5 Thermal Image (5.5A output, 55C Ambient, 200lfm airflow, Vin = 48V, airflow from pin 3 to pin 1, T_{max} = 124°C)

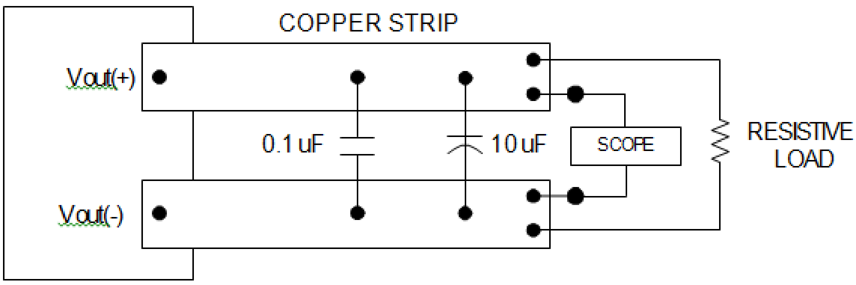
INPUT REFLECTED RIPPLE TEST SETUP:

Note: Measure input reflected-ripple current with a simulated source inductance (Ltest) of 10 uH. Capacitor CS offsets possible source impedance.

Input Reflected-ripple Current Test Setup.



OUTPUT RIPPLE TEST SETUP:



Note: Use a 0.1µF X7R ceramic capacitor and a 10µF @ 25V tantalum capacitor. Scope measurement should be made using a BNC socket. Position the load 3 in. [76mm] from module.

Peak-to-Peak Output Noise Measurement Test Setup.

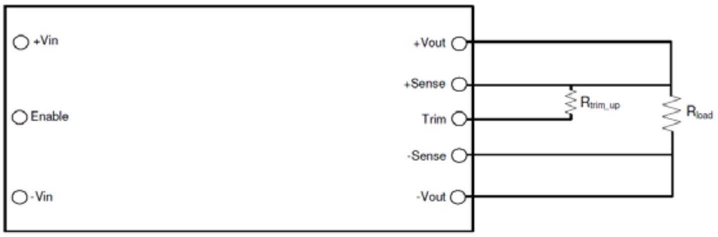
OUTPUT VOLTAGE TRIM

Output voltage adjustment is accomplished by connecting an external resistor between the Trim Pin and either the +Sense or –Sense pins.

- **TRIM UP EQUATION**:

Where Rtrim_up is the resistance value in k-ohms and Δ% is the percent change in the output voltage. E.g. to trim the output up 10%,

$$R_{trim\_up} = \left[\frac{5.1 \times Vo\_nom \times (100 + \Delta\%)}{1.225 \times \Delta\%} - \frac{510}{\Delta\%} - 10.2 \right] \times k\Omega$$

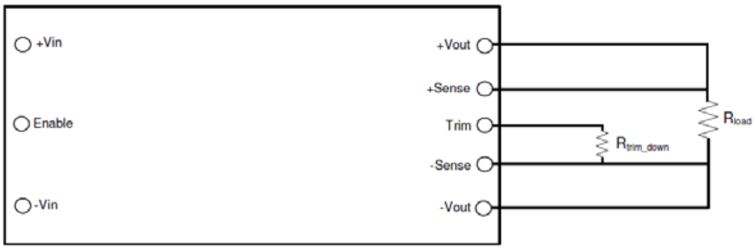


Trim UP circuit configuration

- **TRIM DOWN EQUATION:**

$$R_{trim\_down} = \left(\frac{510}{\Delta\%} - 10.2 \right) \times k\Omega$$

Where **Rtrim_down** is the resistance value in k ohms and Δ% is the percent change in the output voltage.



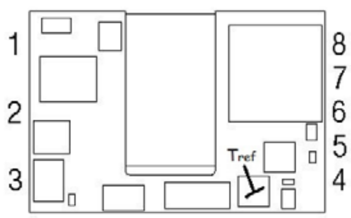
Trim DOWN circuit configuration

THERMAL DERATING

- It is preferable that the DC-DC module has an unobstructed flow of air across the unit for best thermal performance. Components taller than ~ 2mm in front of the module can deflect airflow and possibly create hotspots.

- Significant cooling is achieved through conductive flow from the modules I/O pins to the host PCB. Sufficiently large traces connecting the dc-dc converter to the source and load will help ensure thermal derating performance will meet or exceed the derating curves published in this datasheet. Solder flow-through that contacts standoff of output pins is essential for proper derating performance, especially on models with greater than 10A output current.

- If the module is expected to be operated near the load limits defined in the derating curves, in-system verification of module derating performance should be performed to ensure long-term system reliability. Peak temperatures are to be measured using infrared thermography or by gluing a fine gauge (AWG #40) thermocouple at the TREF location(s) shown below. Temperature at the specified location is not to exceed 123ºC in order to maintain converter reliability. For baseplate models, TBP should not exceed 115ºC.



INPUT UNDERVOLTAGE LOCKOUT

- The converter is disabled until the input voltage has exceeded the UVLO turn-on threshold.
  Once the input voltage exceeds this level (see Input Under-Voltage Lock-out in Electrical Specifications table) the module will commence soft-start. Hysteresis of 2-3 volts minimizes the likelihood of pulling the input voltage below the turn-off threshold during startup which could create an undesirable on/off cycling condition. Once started, the converter will continue to operate until the input voltage subsequently falls below the UVLO turn-off threshold.

ENABLE PIN FUNCTION

- The module has a remote enable function that allows it to be turned on or off remotely. The Enable pin is referenced to the negative input pin (-Vin) of the converter. Modules can be ordered with either negative or positive enable.

- With the negative enable option, the converter will not turn on unless the enable pin is connected to –Vin. The positive enable option allows the converter to turn on as soon as voltage sufficient to exceed the UVLO threshold of the converter has been applied to the input terminals. In this case the module is turned off by connecting the Enable pin to –Vin. On/off thresholds are shown in the Electrical Specifications table.

OUTPUT OVERVOLTAGE PROTECTION

- The module has an independent feedback loop that will disable the output of the converter if a voltage greater than about 125% of the nominal set point is detected. When this threshold is reached, the converter will shut down and remain off for the amount of time specified by the Auto-Restart Period. The converter will attempt a restart once this period of time has elapsed.

OUTPUT OVER-TEMPERATURE PROTECTION

- To provide protection under certain fault conditions, the unit is equipped with a thermal shutdown circuit. The unit will shut-down if the average PCB temperature exceeds approx. 135ºC. Keep in mind that thermal shutdown is not intended as a guarantee that the unit will survive temperatures beyond its rating. The module will automatically restart once it has cooled below the shutdown temperature minus hysteresis (typically 20°C.)

SMT VERSION LAYOUT CONSIDERATIONS (IF APPLICABLE)

- Copper traces with sufficient cross-section must be provided for all output & input pins. SMT pads tied to internal power/ground planes must have multiple vias around each SMT pad to couple expected current loads from module pins into internal traces/planes. One 0.024” (0.6mm) diameter via for each 4A of expected source or load current must be provided as close to the termination as possible, preferably in the direction of current flow from SMT pad to load. Vias must be at least 0.024” (0.6 mm) away from the SMT pad to prevent solder from flowing into the vias.

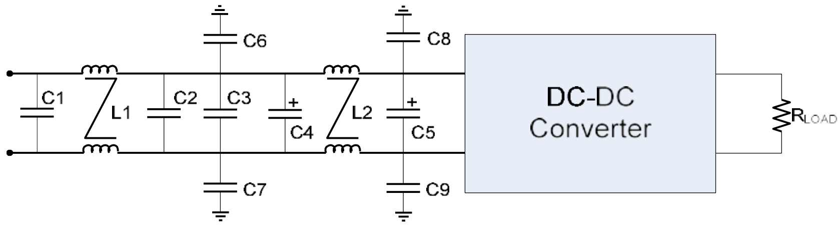
- SMT pads on the host card are to be 0.110” (2.79mm) diameter. Solder paste screen opening should be 0.105” diameter and the screen should be 0.006” (0.15 mm) thick (other thicknesses are possible; 0.006” provides a good compromise between solder volume and co-planarity compensation.)

PARALLELING CONVERTERS

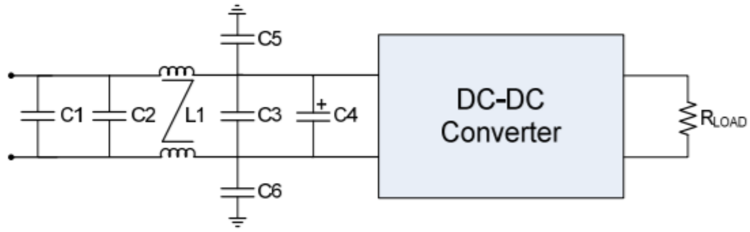
- Modules may be paralleled but it is recommended that the total power draw not exceed the output power rating of a single module. External sharing controllers are recommended for reliability and to ensure equal distribution of the load to the converters. In lower current applications, ORing diodes can be used to prevent converter interactions and improve current sharing.

EMC COMPLIANCE:

To meet Class B compliance for EN55022 (CISPR 22) or FCC part 15 sub part j, the following input filter is required:



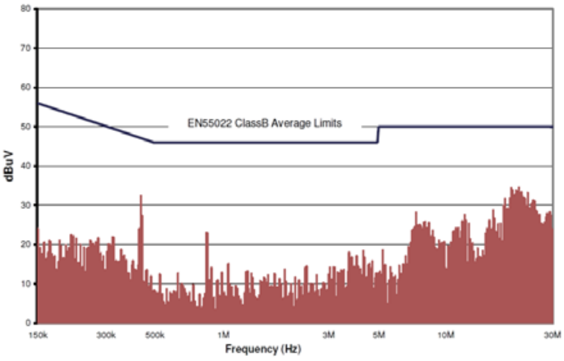
EMI Filter for SB12S5-10, SB24S5-15, SB24S12-7, SB48S5-20, SB48S12-8.3 & SB48S15-5.5



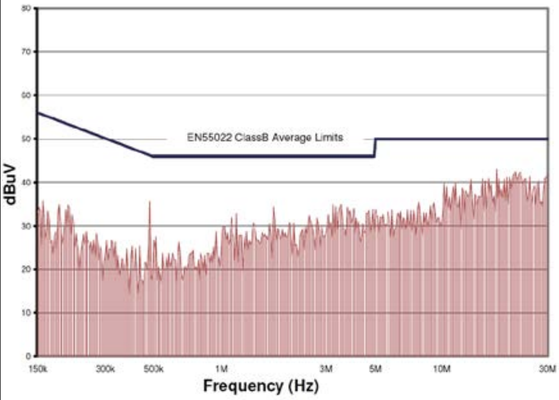
EMI Filter for SB24S15-1, SB48S2.5-20 SB48S3.3-20

Model No.	C1, C2, C3	C4	C5	C6	C7, C8, C9	L1	L2
SB12S5-10	4.7µF Ceramic	Not Used	100µF Electrolytic	8.2 nF	8.2 nF	0.59mH	0.59mH
SB24S5-15	4.7µF Ceramic	Not Used	100µF Electrolytic	8.2 nF	8.2 nF	0.59mH	0.59mH
SB24S12-7	2.2µF Ceramic	Not Used	100µF Electrolytic	8.2 nF	8.2 nF	0.59mH	0.59mH
SB24S15-1	2.2µF Ceramic	100µF Electrolytic	10 nF	10 nF	Not Used	1.32mH	Not Used
SB48S2.5-20	2.2µF Ceramic	100µF Electrolytic	10 nF	10 nF	Not Used	1.32mH	Not Used
SB48S3.3-20	2.2µF Ceramic	100µF Electrolytic	10 nF	10 nF	Not Used	1.32mH	Not Used
SB48S5-20	2.2µF Ceramic	Not Used	100µF Electrolytic	8.2 nF	8.2 nF	0.59mH	0.59mH
SB48S12-8.3	2.2µF Ceramic	Not Used	100µF Electrolytic	8.2 nF	8.2 nF	0.59mH	0.59mH
SB48S15-5.5	TBD	TBD	TBD	TBD	TBD	TBD	TBD

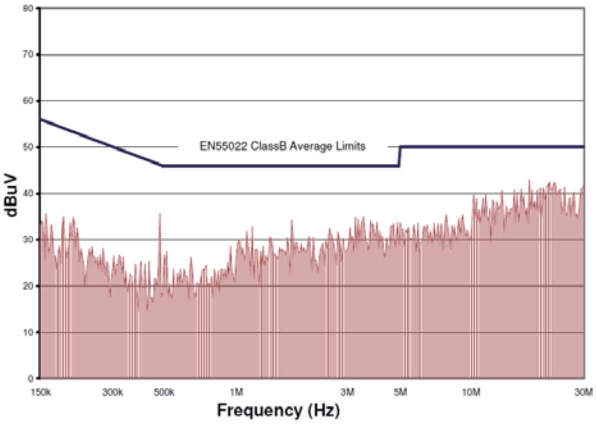
Conducted Emissions using the specified input filter



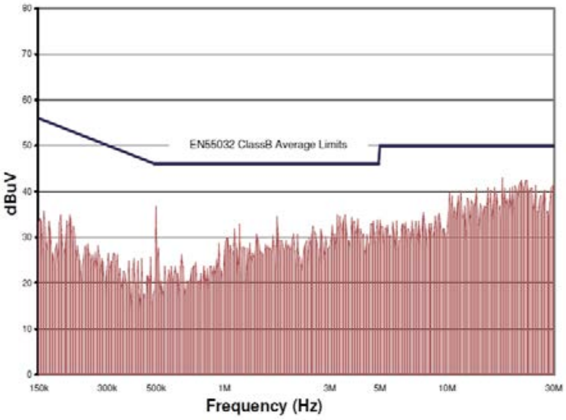
SB12S5-10 Conducted Emissions using specified input filter.
Vin = 12V and Full Resistive Load



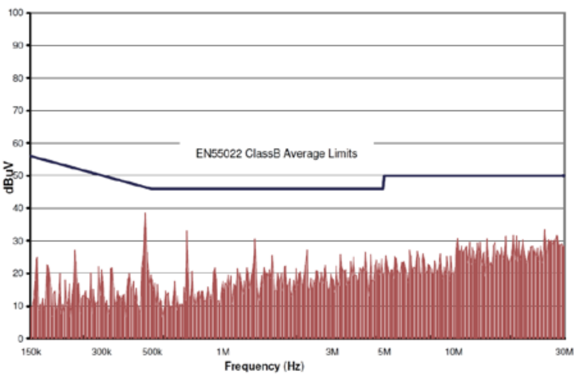
EB24S5-15 Conducted Emissions using above specified input filter.
Vin = 24V, Full Resistive Load



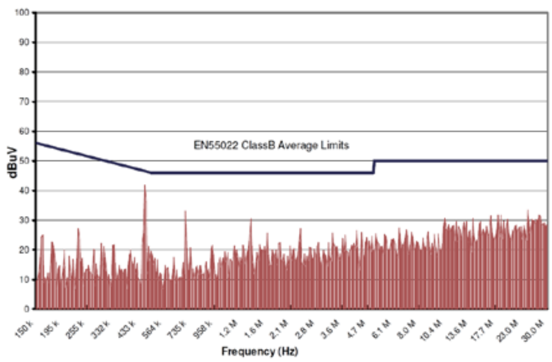
SB24S5-15 Conducted Emissions using above specified input filter.
Vin = 24V, Full Resistive Load



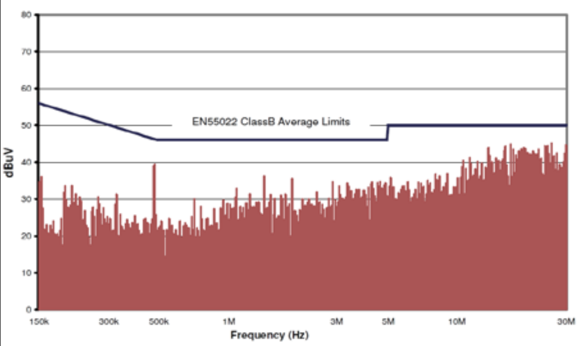
SB24S12-7 Conducted Emissions using specified input filter. Vin = 24V, Full Resistive Load



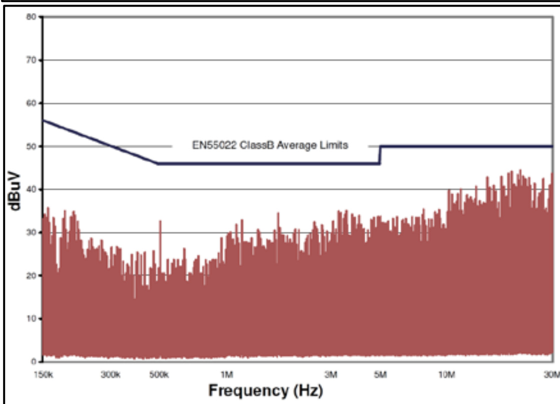
SB48S2.5-20 Conducted Emissions using specified input filter,
Vin = 48V, Full Resistive Load



SB48S3.3-20 Conducted Emissions using specified input filter.
Vin = 48V, Full Resistive Load

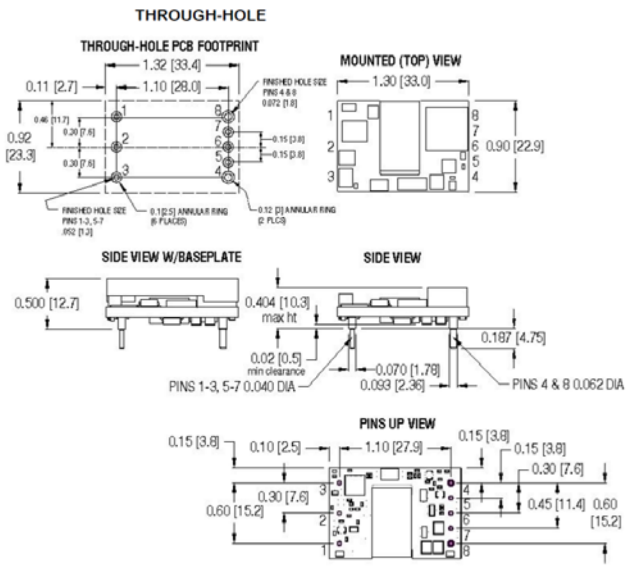


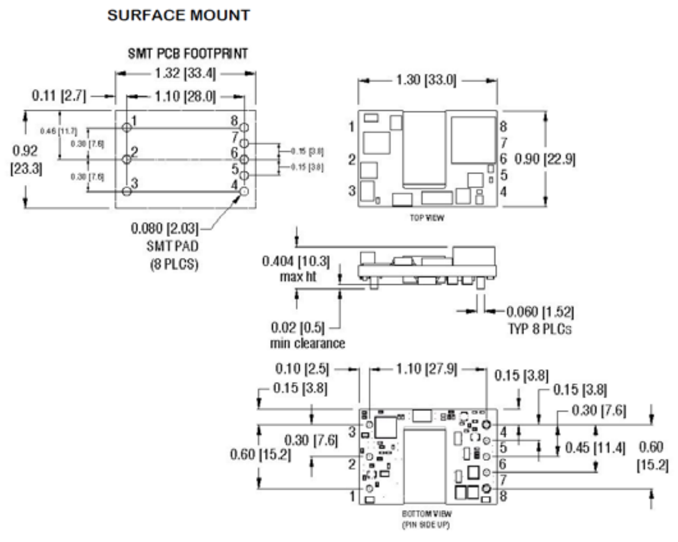
SB48S5-20 Conducted Emissions using specified input filter.
Vin = 48V, Full Resistive Load



SB48S12-8.3 Conducted Emissions using specified input filter,
Vin = 48V, Full Resistive Load

MECHANICAL SPECIFICATIONS





Note: All dimensions are in inches (millimeters). Tolerance: x.xx ±0.02 in. (0.5mm), x.xxx ±0.010 in. (0.25 mm) unless otherwise noted

PIN CONNECTIONS

PIN #	DESIGNATION	NOTES
1	V_{IN} (+)	1) All dimensions in inches [mm] Tolerances: .xx ± 0.02 [.x ± .5] .xxx ± 0.010 [.xx ± .25] 2) Input, on/off control and sense/trim pins are Ø 0.040" [1.02] ± 0.002" [0.05] with Ø 0.070" [1.77] standoff shoulders. 3) Output pins 4 & 8 are Ø 0.062" [1.57] ± 0.003" [0.08] with Ø 0.093" [2.36] standoff shoulders 4) All pins are gold plated with nickel under plating. 5) Weight: 12.8 g (0.45 oz.) 6) Workmanship: Meets or exceeds IPC-A-610 Class II
2	On/Off	
3	V_{IN} (-)	
4	V_{OUT} (-)	
5	Sense (-)	
6	Trim	
7	Sense (+)	
8	V_{OUT} (+)	

PART NUMBER ORDERING INFORMATION

Family, Form Factor Package	Nominal Input Voltage	Number of Outputs	Voltage Output		Current Output (A)	Options
SB	**24**	**S**	**5**	—	**20**	**B, N, P, S, I**

Nominal Input Voltage:
(9-18) 12 Volts
(18-36) 24 Volts
(36-75) 48 Volts

Number of Outputs:
S- Single

Voltage Output:
2.5 Volts
3.3 Volts
5 Volts
12 Volts
15 Volts

Current Output (A):
2.5 Volts- 20 A
3.3 Volts - 20A
5 Volts – 15A
5 Volts – 20A
12 Volts – 7A
12 Volts – 8.3A
15 Volts – 1A
15 Volts – 5.5A

Options:
N - Negative On/Off control
P - Positive On/Off control
B - Baseplate
S – SMT Construction
I – 2,828 Volts Isolation

Note: For proper part ordering, enter option suffixes in order listed in table above

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