SBW-6W Series

6W 4:1 Regulated Single & Dual output

Features

- Highest Power Density In 8 Pin SIL Package
- Wide 4:1 Input Range
- Smallest Footprint 6W Converter
- No Minimum Load Required
- 1500 VDC Isolation , Up to 3000VDC (Optional)
- Continuous Short Circuit Protection
- Efficiency up to 88%
- -40°C ~+ 71°C Operation Temperature Range
- Remote on/off Control

The SBW-6W series is a family of high performanced 6W single & dual output DC-DC converters. These converters are built in non-conductive black plastic package in a 8-pin SIL miniature compact case with high performance features wide range devices operate over 4:1 input voltage range providing stable output voltage which is much smaller than package of DIL 24- Same power rating but only 43% of the traditional volume. Devices are encapsulated using flame retardant resin. Input voltages are 24Vdc and 48Vdc with output voltage of 3.3, 5, 9, 12, 15, 24, ±5, ±12, ±15 Vdc. Featuring new PWM construction, no minimum load required and precise 1% output voltage accuracy.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS

Voltage Accuracy	±1%
Maximun Output Current	See table
Line Regulation	±0.2%,max.
Load Regulation	Single ±0.5%,max.
(From 0% to 100% Load)	Output 3.3V & 5V & Dual ±1.0%,max.
Cross Regulation (Dual Output) (1)	±5%
Ripple & Noise (20 MHz bandwidth)(2)	125mVpp,max.
Short Circuit Protection	Indefinite (Automatic Recovery)
Temperature Coefficient	±0.02%/°C
Capacitive Load(3)	See table
Transient Recovery Time (4)	250us, typ.
Transient Response Deviation(4)	±3%, max.
	Output 3.3V&5V : ±5%, max.

INPUT SPECIFICATIONS

Voltage Range	See table
Start up Time(Nominal Vin and constant resistive load)	30mS, typ.
Max. Input Current	See table
No-Load Input Current	See table
Input Filter	Capacitor
Input Reflected Ripple Current(5)	24Vin : 20mApk-pk, typ.
	48Vin : 40mApk-pk, typ.
Remote on/off	
ON:	Open or high impedance
OFF:	2-4mA input current (via 1KΩ).
Off stand by input current(Nominal Vin)	2.5mA, typ.

GENERAL SPECIFICATIONS

Efficiency	See table,typ.
I/O Isolation Voltage (60sec)	1500~3000Vdc
I/O Isolation Capacity	50 pF,max.
I/O Isolation Resistance	1G Ohm,min.
Switching Frequency	580kHz,typ.
Humidity	95%relH
Reliability Calculated MTBF (MIL-HDBK-217 F)	>800 Khrs
Safety Standard(designed to meet)	IEC60950-1

PHYSICAL SPECIFICATIONS

Case Material	Non conductive black plastic
Potting Material	Epoxy (UL94V-0 rated)
Pin Material	C5191R-H Solder-coated
Weight	4.5g,typ.
Dimensions	0.86"x0.36"x0.44"

ENVIRONMENT SPECIFICATIONS

Operating Temperature	-40°C~71°C
Maximum Case Temperature	100°C
Storage Temperature	- 55°C~125°C
Cooling(6)	Nature Convection

ABSOLUTE MAXIMUM RATINGS(7)

These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

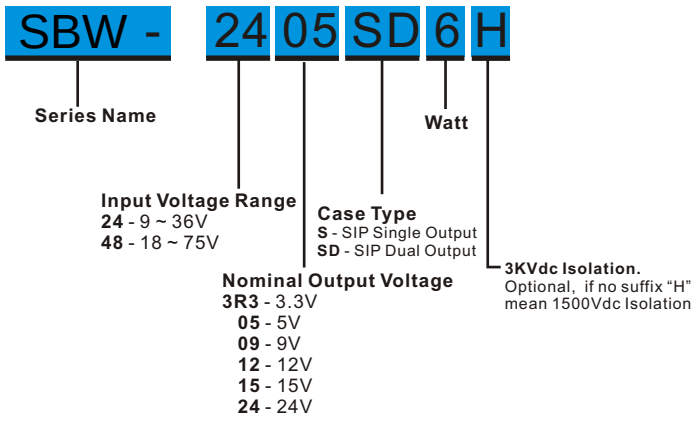
Input Surge Voltage(100ms max)	
24 Models	50Vdc,max.
48 Models	100Vdc,max.
Soldering Temperature (1.5mm from case 10sec max.)	260°C max.

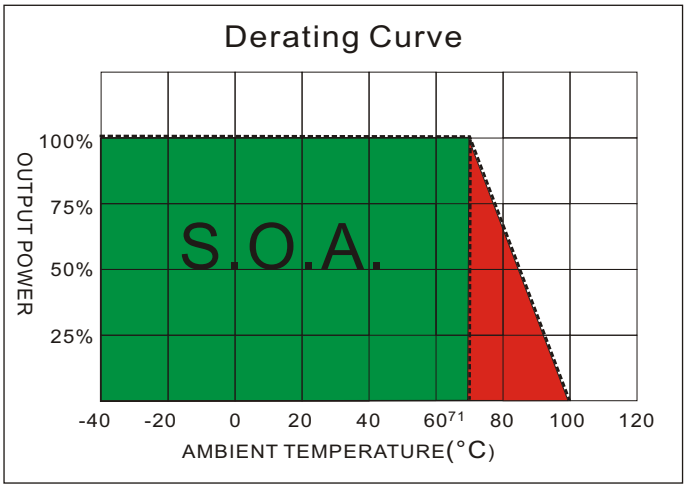
EMC SPECIFICATIONS

Radiated Emissions	EN55022	CLASS A
Conducted Emissions (8)	EN55022	CLASS A
ESD	IEC 61000-4-2	Perf. Criteria A
RS	IEC 61000-4-3	Perf. Criteria A
EFT (9)	IEC 61000-4-4	Perf. Criteria A
Surge (9)	IEC 61000-4-5	Perf. Criteria A
CS	IEC 61000-4-6	Perf. Criteria A
PFMF	IEC 61000-4-8	Perf. Criteria A

SBW-6W 4:1 Regulated Single & Dual output

PART NUMBER STRUCTURE





MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current No-Load (mA)	INPUT Current Full Load (mA)	OUTPUT Voltage (Vdc)	OUTPUT Current Min. load (mA)	OUTPUT Current Full load (mA)	EFFICIENCY @FL(%)	Capacitor Load(uF)
SBW-243R3S6	9-36	6	261	3.3	0	1500	79	4700uF
SBW-2405S6	9-36	6	298	5	0	1200	84	2200uF
SBW-2409S6	9-36	6	290	9	0	666	86	1000uF
SBW-2412S6	9-36	6	287	12	0	500	87	470uF
SBW-2415S6	9-36	6	287	15	0	400	87	220uF
SBW-2424S6	9-36	6	287	24	0	250	87	100uF
SBW-2405SD6	9-36	6	298	±5	0	±600	84	±330uF
SBW-2412SD6	9-36	6	291	±12	0	±250	86	±220uF
SBW-2415SD6	9-36	6	287	±15	0	±200	87	±100uF
SBW-483R3S6	18-75	6	131	3.3	0	1500	79	4700uF
SBW-4805S6	18-75	6	151	5	0	1200	83	2200uF
SBW-4809S6	18-75	6	147	9	0	666	85	1000uF
SBW-4812S6	18-75	6	144	12	0	500	87	470uF
SBW-4815S6	18-75	6	144	15	0	400	87	220uF
SBW-4824S6	18-75	6	144	24	0	250	87	100uF
SBW-4805SD6	18-75	6	152	±5	0	±600	82	±330uF
SBW-4812SD6	18-75	6	147	±12	0	±250	85	±220uF
SBW-4815SD6	18-75	6	145	±15	0	±200	86	±100uF

Suffix "H" means 3KVdc isolation

NOTE

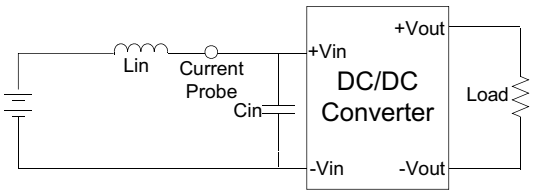
1. One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
2. Measured with a 0.1uF ceramic capacitor.
3. Test by minimal Vin and constant resistive load.
4. Test by normal Vin and 100%-25% load,25% load step change.
5. Measured Input reflected ripple current with a simulated source inductance of 12uH and a source capacitor Cin(47uF, ESR<1.0Ω at 100KHz).
6. "Nature Convection" is usually about 30-65 LFM but is not equal to still air (0 LFM).
7. Exceeding the absolute ratings of the unit could cause damage. It's not allowed for continuous operating ratings.
8. Input filter components are be required to help meet conducted emission class A, which application refer to the EMI Filter of design & feature configuration.
9. An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.

The filter capacitor SCHMID-M suggest: 24V in models : Nippon - chemi - con KY series, 330uF/100V and a TVS,3KW,75V.
48Vin models : Nippon - chemi - con KY series, 470uF/100V and a TVS,3KW,130V.

TEST CONFIGURATIONS

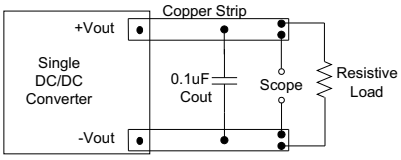
Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor Lin(12uH) and a source capacitor Cin(47uF, ESR<1.0Ω at 100KHz) at nominal input and full load.



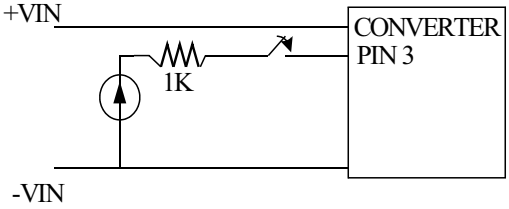
Output Ripple & Noise Measurement Test

Use a capacitor Cout(0.1uF) measurement.
The Scope measurement bandwidth is 0-20MHz.



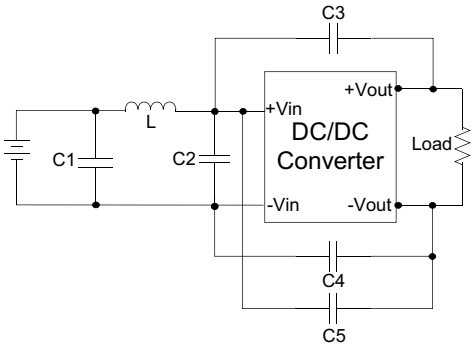
CTRL Module ON / OFF

ON: open or high impedance
OFF: 2-4mA input current (via 1K)



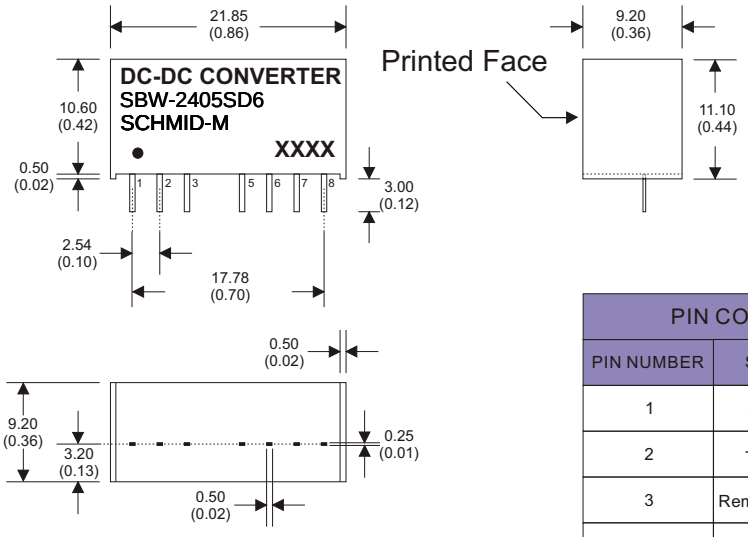
EMI Filter

Input filter components (C1,C2,C3,C4,C5, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	C1 &C2	L	C3 & C4	C5
SBW-24YYO6	MLCC 10uF/35V	12uH	MLCC 470pF/3KV	
SBW-48YYO6	MLCC 2.2uF/100V	12uH	MLCC 1000pF/3KV	MLCC 1000pF/3KV

MECHANICAL SPECIFICATIONS



8 Pin SIL Package

Notes : All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5±0.05 (0.02±0.002)
2. Pin pitch and length tolerance: ±0.35 (±0.014)
3. Pin to case tolerance: ±0.5 (±0.02)
4. Case Tolerance: ±0.5 (±0.02)
5. Stand-off tolerance: ±0.1 (±0.004)

PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	-V Input	-V Input
2	+V Input	+V Input
3	Remote On/Off	Remote On/Off
5	N.C.	N.C.
6	+V Output	+V Output
7	-V Output	Common
8	N.C	-V Output

PIN CONNECTIONS		
PIN NUMBER	SINGLE + H	DUAL + H
1	-V Input	-V Input
2	+V Input	+V Input
3	Remote On/Off	Remote On/Off
5	N.P.	N.P.
6	+V Output	+V Output
7	-V Output	Common
8	N.C	-V Output