POLYTRON DEVICES

DATA SHEET

DC-DC CONVERTERS

4:1 WIDE INPUT RANGE UP TO 9 WATTS

SINGLE AND DUAL OUTPUT, SIP PACKAGE

SWB9 SERIES

FEATURES

- 4:1 Ultra Wide Input Range
- Output Current up to 2000 mA
- Miniature SIP (Single-In-Line) Package, 0.86" × 0.36" × 0.44"
- Fixed Switching Frequency
- High Efficiency (up to 89%)
- Input/ Output Isolation up to 1600Vdc
- Continuous Short Circuit Protection
- External On/ Off Control
- Safety Meets UL60950-1, EN60950-1 & IEC60950-1
- CE Marked
- RoHS Compliant to EU Directive 2011/65/EU
- Available in Plastic or Metal Case

SELECTION GUIDE All specifications are typical at nominal input, full load and 25°C, unless otherwise noted.

Input Voltage Range Vdc	Output Voltage Vdc	Output Current at Full Load A	Input Current at No Load mA	Efficiency %	Model Number	Maximum Capacitor Load µF
9 - 36	3.3	2000	9	82	SWB9-24S33	2600
9 - 36	5	1600	9	85	SWB9-24S5	1300
9 - 36	9	1000	9	86	SWB9-24S9	800
9 - 36	12	750	9	88	SWB9-24S12	560
9 - 36	15	600	9	89	SWB9-24S15	560
9 - 36	24	375	9	89	SWB9-24S24	200
18 - 75	3.3	2000	5	82	SWB9-48S33	2600
18 - 75	5	1600	5	85	SWB9-48S5	1300
18 - 75	9	1000	5	86	SWB9-48S9	800
18 - 75	12	750	5	89	SWB9-48S12	560
18 - 75	15	600	5	88	SWB9-48S15	560
18 - 75	24	375	5	88	SWB9-48S24	200
9 - 36	±5	±800	9	85	SWB9-24-5	±800
9 - 36	±12	±375	9	88	SWB9-24-12	±390
9 - 36	±15	±300	9	88	SWB9-24-15	±200
18 - 75	±5	±800	5	85	SWB9-48-5	±800
18 - 75	±12	±375	5	87	SWB9-48-12	±390
18 - 75	±15	±300	5	87	SWB9-48-15	±200

***Use suffix "M" for Metal Case. Without suffix, plastic case**

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Input Specifications

Operating input voltage range, Vdc	9 Min., 24 Typ., 36 Max.	24Vin(nom)
	18 Min., 48 Typ., 75 Max.	48Vin(nom)
Start up time, ms	50 Typ.	Constant resistive load, Power up
	50 Typ.	Constant resistive load, Remote ON/OFF
Input surge voltage, Vdc	50 Max.	1 second, Max., 24Vin(nom)
	100 Max.	1 second, Max., 48Vin(nom)
Input filter	Capacitor type	
Remote ON/OFF, mA	Open or high impedance	DC-DC ON
	2 Min., 3 Typ., 4 Max.	Ctrl pin applied current via 1kΩ, DC-DC OFF
	3 Max.	Remote off input current, SWB9-24XX
	2.5 Max.	Remote off input current, SWB9-48XX

Output Specifications

Voltage accuracy, %	-1 Min., +1 Max.	
Line regulation, %	-0.2 Min., +0.2 Max.	Low Line to High Line at Full Load
Load regulation, %	-1 Min., +1 Max.	No Load to Full Load, Single
	-1 Min., +1 Max.	Dual
Cross regulation, %	-5 Min., +5 Max.	Asymmetrical load 25%/100% FL, Dual
Ripple and noise, mVp-p		Measured by 20MHz bandwidth with a 1µF/50V X7R MLCC
	50 Typ.	3.3Vout, 5Vout, 9Vout
	75 Typ.	12Vout, 15Vout, 24Vout
Temperature coefficient, %/°C	-0.02 Min., +0.02 Max.	
Transient response recovery time, µs	250 Typ.	25% load step change
Over load protection, %	180 Typ.	% of Iout rated; Hiccup mode
Short circuit protection	Continuous, automatics recovery	

General Specifications

Isolation voltage, Vdc	1 minute, Input to Output	Standard Type	1600 Min.		
	Input (Output) to Case	Suffix “M”	1000 Min.		
Isolation resistance, GΩ	500Vdc		1 Min.		
Isolation capacitance, pF		Standard Type			50 Max.
		Suffix “M”			50 Max.
Switching frequency, kHz		Single		400 Typ.	
		Dual		500 Typ.	

Environmental Specifications

Operating ambient temperature, °C	3.3 Vout, Standard Type	Without derating	-40 Min.		+45 Max.
		With derating	+45 Min.		+100 Max.
	Suffix “M”	Without derating	-40 Min.		+50 Max.
		With derating	+50 Min.		+100 Max.
	Others, Standard type	Without derating	-40 Min.		+55 Max.
		With derating	+55 Min.		+100 Max.
	Suffix “M”	Without derating	-40 Min.		+60 Max.
		With derating	+60 Min.		+100 Max.
Storage temperature range, °C			-55 Min.		+125 Max.
Thermal shock			MIL-STD-810F		
Vibration			MIL-STD-810F		
Relative humidity			5% to 95% RH		

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SWB9 SERIES

Physical Specifications

Design meet safety standard	IEC60950-1, UL60950-1, EN60950-1, EN62368-1, UL62368-1, IEC62368-1	
Case material	Standard Type	Non-conductive black plastic
	Suffix "M"	Copper
Base material	None	
Potting material	Silicone (UL94 V-0)	
Dimensions	0.86 × 0.36 × 0.44 inch (21.84 × 9.14 × 11.18mm)	
Weight	Standard Type	4.8g (0.17oz)
	Suffix "M"	5.9g (0.21oz)
MTBF	2.696E+06 hrs, MIL-HDBK-217F, Full load, Standard type	
	2.939E+06 hrs, Suffix "M"	

EMC Specifications

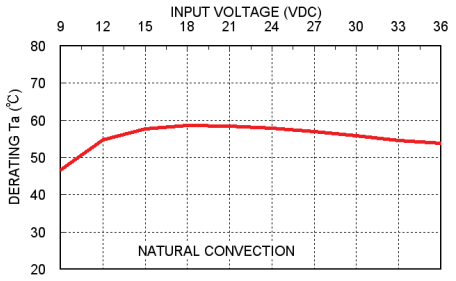
Specifications	Conditions		Level
EMI[1]	EN55022		Class A, Class B
ESD	EN61000-4-2	Air ±8kV and Contact ±6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	20 V/m	Perf. Criteria A
Fast transient[2]	EN61000-4-4	±2kV	Perf. Criteria A
Surge[2]	EN61000-4-5	±2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8	100A/m continuous; 1000A/m 1 second	Perf. Criteria A

Note:

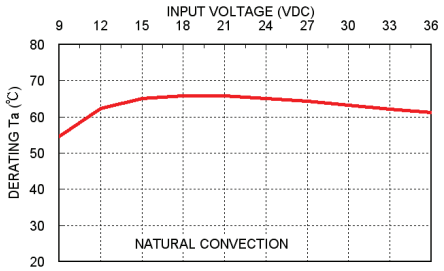
1. The standard modules meet either EMI Class A or Class B with external components. For further information, please contact Polytron Devices, Inc.
2. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter suggested:
   The SWB9-12XX and SWB9-24XX recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220μF/100V) and a TVS (SMDJ70A, 70V, 3000Watt peak pulse power) to connect in parallel.
   The SWB9-48XX recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220μF/ 100V) and a TVS (SMDJ120A, 120V, 3000Watt peak pulse power) to connect in parallel.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

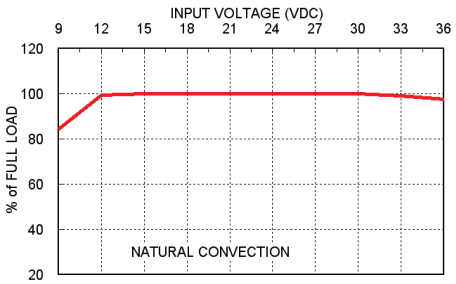
Characteristic Curve



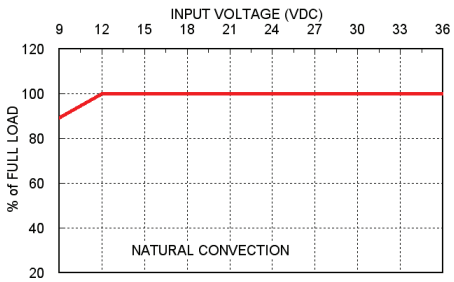
SWB9-24S12 Derating Ta vs. Input Voltage (at Full Load)



SWB9-24S12M Derating Ta vs. Input Voltage (at Full Load)

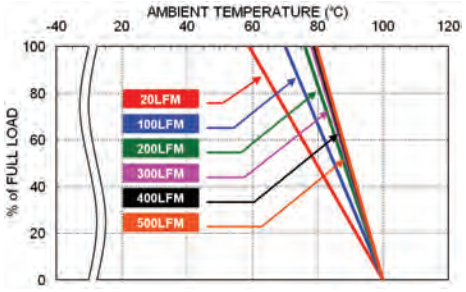


SWB9-24S12 Load Derating vs. Input Voltage (at TA = 55ºC)

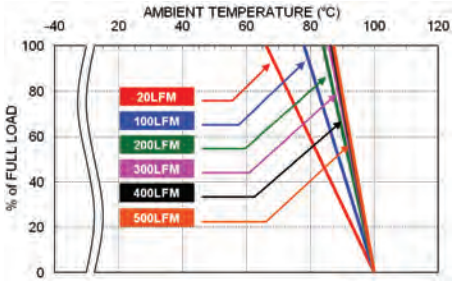


SWB9-24S12M Load Derating vs. Input Voltage (at TA = 60ºC)

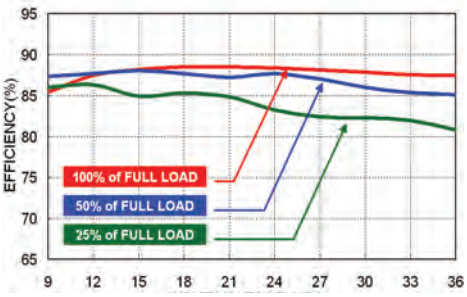
Characteristic Curve (cont.)



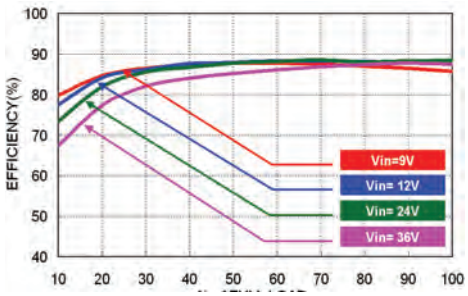
SWB9-24S12 Derating Curve



SWB9-24S12M Derating Curve



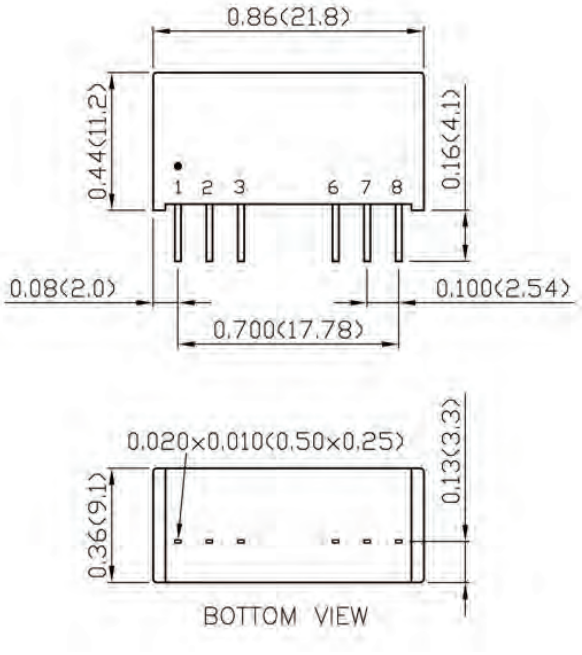
SWB9-24S12 Efficiency vs. Input Voltage



SWB9-24S12 Efficiency vs. Output Load

Mechanical Drawing

Standard Type



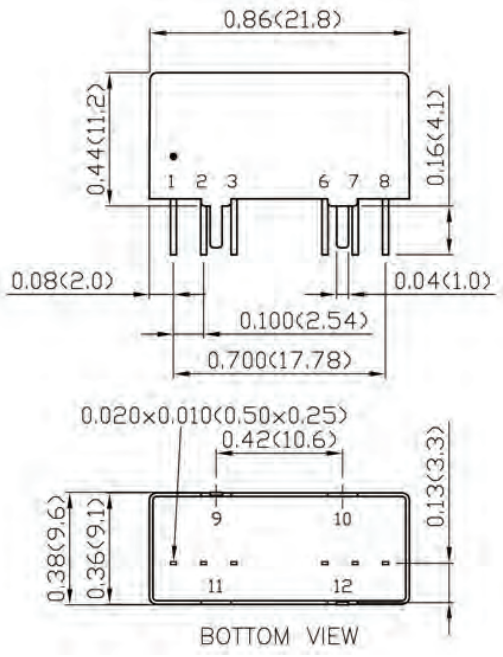
PIN CONNECTION

PIN	SINGLE	DUAL
1	-Vin	-Vin
2	+Vin	+Vin
3	Ctrl	Ctrl
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout

1. **All dimensions in inch (mm)**
2. **Tolerance :x.xx±0.02 (x.x±0.5) x.xxx±0.01 (x.xx±0.25)**
3. **Pin pitch tolerance ±0.01 (0.25)**
4. **Pin dimension tolerance ±0.004(0.1)**

Mechanical Drawing

Suffix "M"



PIN CONNECTION

PIN	SINGLE	DUAL
1	-Vin	-Vin
2	+Vin	+Vin
3	Ctrl	Ctrl
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout
9	Case	Case
10	Stand off	Stand off
11	Stand off	Stand off
12	Case	Case

1. **All dimensions in inch (mm)**
2. **Tolerance :x.xx±0.02 (x.x±0.5) x.xxx±0.01 (x.xx±0.25)**
3. **Pin pitch tolerance ±0.01 (0.25)**
4. **Pin dimension tolerance ±0.004(0.1)**