



Polytron Power Supplies

DABURN

DC-DC CONVERTERS

4:1 WIDE INPUT RANGE UP TO 6 WATTS

MINIATURE SIP PACKAGE

RAILWAY APPLICATIONS

SWBR6 SERIES



FEATURES

- 4:1 Ultra Wide Input Range
- Miniature SIP Package: 0.86" × 0.36" × 0.44"
- High Efficiency: Up to 83%
- Low Ripple and Noise: 50mV p-p Typ.
- Input to Output Isolation: 3000Vdc
- Remote ON/Off Control
- Continuous Short Circuit and Over Current Protection
- Low Standby Power
- No Min. Load Required
- EN50155, EN45545-2
- UL, CB, CE Marked

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	1500	4	81	SWBR6-24S33	2200
9 - 36	5	1200	4	84	SWBR6-24S5	1100
9 - 36	9	666	4	86	SWBR6-24S9	680
9 - 36	12	500	4	87	SWBR6-24S12	470
9 - 36	15	400	4	88	SWBR6-24S15	470
9 - 36	24	250	4	87	SWBR6-24S24	180
18 - 75	3.3	1500	4	81	SWBR6-48S33	2200
18 - 75	5	1200	4	84	SWBR6-48S5	1100
18 - 75	9	666	4	85	SWBR6-48S9	680
18 - 75	12	500	4	87	SWBR6-48S12	470
18 - 75	15	400	4	87	SWBR6-48S15	470
18 - 75	24	250	4	87	SWBR6-48S24	180
43 - 160	3.3	1500	2	80	SWBR6-110S33	2200
43 - 160	5	1200	2	83	SWBR6-110S5	1100
43 - 160	9	666	2	85	SWBR6-110S9	680
43 - 160	12	500	2	86	SWBR6-110S12	470
43 - 160	15	400	2	86	SWBR6-110S15	470
43 - 160	24	250	2	86	SBBR3-110S24	180
9 - 36	±5	±600	6	84	SWBR6-24-5	±680
9 - 36	±12	±250	6	87	SWBR6-24-12	±330
9 - 36	±15	±200	8	87	SWBR6-24-15	±180
18 - 75	±5	±600	6	84	SWBR6-48-5	±680
18 - 75	±12	±250	6	87	SWBR6-48-12	±330
18 - 75	±15	±200	8	87	SWBR6-48-15	±180
43 - 160	±5	±600	2	83	SWBR6-110-5	±680
43 - 160	±12	±250	2	86	SWBR6-110-12	±330
43 - 160	±15	±200	2	86	SWBR6-110-15	±180

*For wide input range of -55 to +100 degrees C, use suffix "W3"

DABURN

DABURN ELECTRONICS & CABLE

44 Richboynton Road, Dover, New Jersey 07801 U.S.A.

Tel: (973)328-3200 Fax: (973)328-3130 - Email: daburn@daburn.com - Website: www.daburn.com

Ver 1.0

SWBR6 SERIES

Input Specifications			Output Specifications		
Operating input voltage range, Vdc	9 Min., 24 Typ., 36 Max.	24Vin(nom)	Voltage accuracy, %	-1 Min., +1 Max.	
	18 Min., 48 Typ., 75 Max.	48Vin(nom)	Line regulation, %	-0.2 Min., +0.2 Max.	Low Line to High Line at Full Load
	43 Min., 110 Typ., 160 Max.	110Vin(nom)	Load regulation, %	-0.5 Min., +0.5 Max.	No Load to Full Load, Single
Start up time, ms	50 Typ., 75 Max.	Constant resistive load, Power up	Cross regulation, %	-1 Min., +1 Max.	Dual
	50 Typ., 75 Max.	Constant resistive load, Remote ON/OFF		-5 Min., +5 Max.	Asymmetrical load 25%/100% FL, Dual
Input surge voltage, Vdc	50 Max.	1 second, Max., 24Vin(nom)	Ripple and noise, mVp-p	50 Typ., 75 Max.	Measured by 20MHz bandwidth with a 1μF/50V X7R MLCC
	100 Max.	1 second, Max., 48Vin(nom)	Temperature coefficient, %/°C	-0.02 Min., +0.02 Max.	
	85 Max.	1 second, Max., 110Vin(nom)	Transient response recovery time, μs	250 Typ.	
Input filter	Capacitor type		Over load protection, %	180 Typ.	% of Iout rated; Hiccup mode
Remote ON/OFF, mA	Open or 0 - 0.5 Vdc	Referred to –Vin pin, DC-DC ON	Short circuit protection	Continuous, automatics recovery	
	3 - 12 Vdc	DC-DC OFF			
	2 Min., 4 Max.	Input current of Ctrl pin			
	2.5 Typ.	Remote off input current			

General Specifications					
Isolation voltage, Vdc	1 minute	Input to Output	3000 Min.		
		Input (Output) to Case	1500 Min.		
Isolation resistance, GΩ	500Vdc		1 Min.		
Isolation capacitance, pF					100 Max.
Switching frequency, kHz		110Vin	270 Min.	300 Typ.	330 Max.
		Others	520 Min.	580 Typ.	640 Max.

Environmental Specifications					
Operating ambient temperature, °C		With derating	-40 Min.		+100 Max.
	M3 Version	With derating	-55 Min.		+100 Max.
Maximum case temperature, °C					+100 Max.
Storage temperature range, °C			-55 Min.		+125 Max.
Thermal shock			MIL-STD-810F		
Shock			EN61373, MIL-STD-810F		
Vibration			EN61373, MIL-STD-810F		
Relative humidity			5% to 95% RH		



SWBR6 SERIES

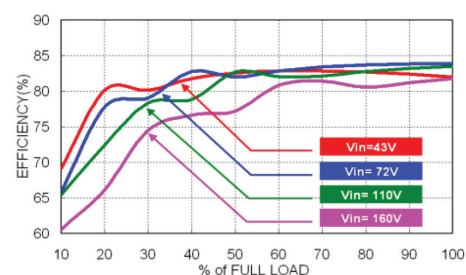
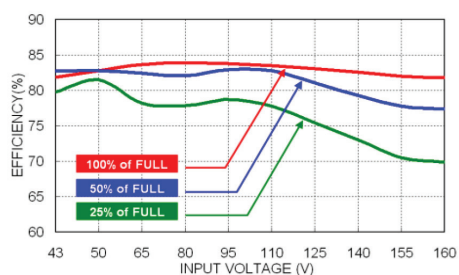
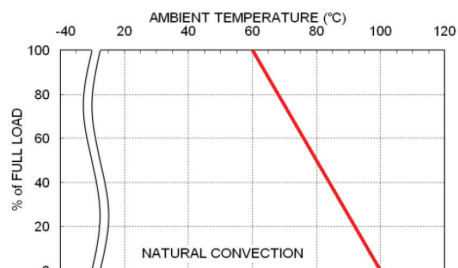
Physical Specifications			EMC Specifications		
Design meet safety standard	IEC/UL/EN60950-1, UL:E193009, IEC/UL/EN62368-1, CB:UL(Demko), EN50155, EN45545-2		Specifications	Conditions	Level
Case material	Copper		EMI ⁽¹⁾	EN55011, EN55032 With external components	Class A, Class B
Base material	None		ESD	EN61000-4-2 Air ±8kV and Contact ±6kV	Perf. Criteria A
Potting material	Silicone (UL94 V-0)		Radiated immunity	EN61000-4-3 20 V/m	Perf. Criteria A
Dimensions	0.86" × 0.36" × 0.44" (21.84 × 9.14 × 11.18mm)		Fast transient ⁽²⁾	EN61000-4-4 ±2kV	Perf. Criteria A
Weight	5.9g (0.21oz)		Surge ⁽²⁾	EN61000-4-5 ±2kV	Perf. Criteria A
MTBF	2.948 × 10 ⁶ hrs, MIL-HDBK-217F, Full load		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:

- The standard modules meet either EMI Class A or Class B with external components. For further information, please contact Polytron Devices.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter suggested:
 The SWBR6-12XX 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 SWBR6-48XX 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.
 The SWBR6-110XX recommended an aluminum electrolytic capacitor (Nippon chemi-con KXJ series, 150μF/ 200V) and a TVS (SMB250A, 250V, 600Watt 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



SWBR6 SERIES

Fuse Consideration

Modules	Fuse Rating (A)	Fuse Type
SWBR6-24XX	1.25	Slow-Blow
SWBR6-48XX	0.63	Slow-Blow
SWBR6-110XX	0.315	Slow-Blow

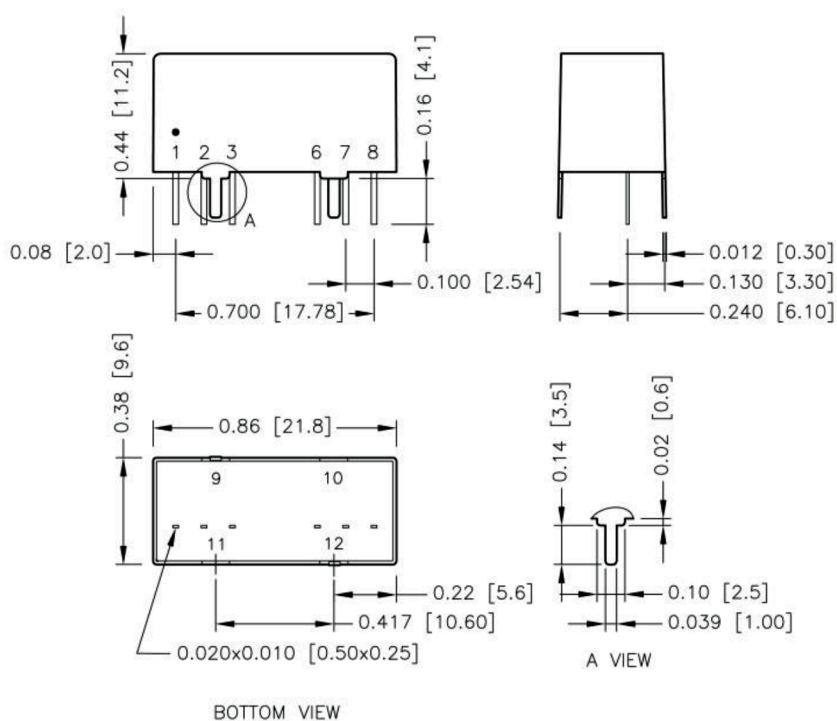
This power module is not internally fused. An input line fuse must always be used.

This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture.

To maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system production, always use an input line fuse.

The table based on the information provided in this data sheet on inrush energy and maximum DC input current at low Vin.

Mechanical Drawing



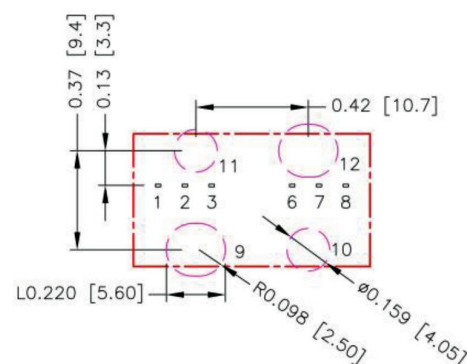
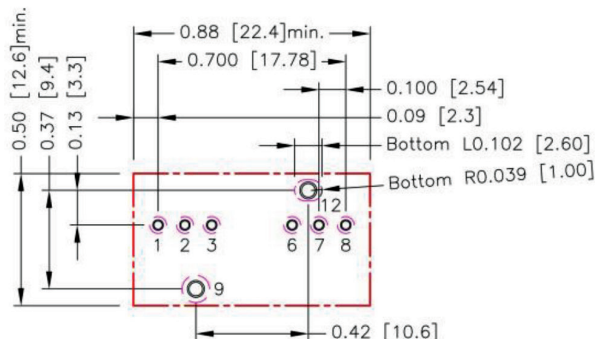
PIN CONNECTION

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 dimension tolerance ±0.004(0.1)

SWBR6 SERIES

Recommended Pad Layout



1. All dimensions in inch (mm)
2. Pad size (lead free recommended)
3. Through hole 1.2.3.6.7.8: $\Phi 0.031(0.80)$
Through hole 9.12: $\Phi 0.051(1.30)$
4. Top view pad 1.2.3.6.7.8: $\Phi 0.039(1.00)$
Top view pad 9.12: $\Phi 0.064(1.63)$
5. Bottom view pad 1.2.3.6.7.8: $\Phi 0.063(1.60)$
Bottom view pad 9: $\Phi 0.201(2.60)$
Bottom view pad 12: Groove R0.039(1.00)
L0.102(2.60)
6. Area 9.10.11.12: Don't lay out
Area 10.11 size: $\Phi 0.159(4.05)$
Area 9.12 size: Groove R0.098(2.50)
L0.220(5.60)
7. The layout distance between Pin3 and Pin6 is at least 3mm

* We recommend putting PCB trace on bottom side.

Thermal Considerations

The power module operates in a variety of thermal environments.

However, sufficient cooling should be provided to help ensure reliable operation of the unit.

Heat is removed by conduction, convection and radiation to the surrounding environment.

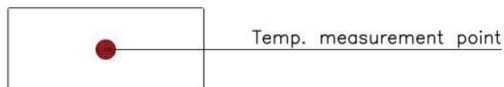
Proper cooling can be verified by measuring the point as the figure below.

The temperature at this location should not exceed "Maximum case temperature"

When operating, adequate cooling must be provided to maintain the test point temperature at or below "Maximum case temperature".

You can limit this temperature to a lower value for extremely high reliability.

- Thermal test condition with vertical direction by natural convection (20LFM).



TOP VIEW