



Product Specification for The SIS03V

PSP-SIS03V

Revision: 002

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REV	DESCRIPTION OF CHANGE	Effective DATE	Change Order #	CHANGED BY
000		8/14/02	B02-802	Hailong Xu
001	Mechanical drawing mistake, release	2/25/03	B02-1000	Hailong Xu
002	Update mechanical drawing, current design not compatible with industrial standard, page 5 & 6: Fig.1,3 Temperature operation range change to -10 to 70C. Remove thermal consideration on page 7	4/17/03	B03-0139	Hailong Xu

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Power One
Advanced Power Solution Division

DOCUMENT NUMBER

PSP-SIS03V

Description:

The **SIS03V** series converters are thru-hole-mount, low-cost, non-isolated single-output DC/DC converters. The products provide point of load conversion of a single 5V input voltage into a regulated low output voltage with up to 3A of output current. The converters also feature remote ON/OFF and output trim functions. High efficiency, low cost, high reliability and board-saving vertical mounting option make these converters excellent choice for powering ASICs in distributed power architecture.

Applications

- Distributed power architectures
- ASICs
- Data and Telecommunications Equipment

Family models

MODELS	INPUT VOLTAGE (v)	OUTPUT VOLTAGE (v)	EFFICIENCY (%) Typical at $I_{o,rated}$
SIS03VE	4.5-5.5	3.3	93
SIS03VD	4.5-5.5	2.5	91
SIS03V2.1	4.5-5.5	2.1	90
SIS03VB	4.5-5.5	1.8	88
SIS03VA	4.5-5.5	1.5	86
SIS03VY	4.5-5.5	1.2	84

Table 1. Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings may cause performance degradation, adversely effect long-term reliability and cause permanent damage to the converter.

Parameter	Conditions/Description	Min	Max	Units
Input Voltage		4.5	5.5	VDC
Operating Temperature	Full Load	-10 ¹	+70	°C
Storage Temperature		-40	+125	°C
ON/OFF Control Voltage	Referenced to GND		5.5	VDC

¹ Note: A minimum 4.7uF input Ceramic capacitor is needed to operate the converters down to -10C. For 0C and above operation, A 4.7uF Ceramic capacitor is recommended near the input pin of the unit to enhance the performance although the unit will not be damaged (by the input ripple current) without the capacitor.

Environmental and Mechanical Specifications

All specifications apply over specified input voltage, output load and temperature range, unless otherwise noted.

Parameter	Conditions/Description	Min	Nom	Max	Units
Shock	Half sine wave, 3 axes		50		g
Sinusoidal Vibration	GR-63-Core, Section 5.A.2		1		
Water Washing	Standard process		Yes		
MTBF	Per Bell core TR-NWT-000332		5.4		MHrs

Isolation Specifications

The SIS03V series does not provide input to output isolation.

Electrical Specifications

All specifications apply over specified input voltage, output load and temperature range, unless otherwise noted.

Table 2. Input Specifications

Parameter	Conditions/Description	Min	Nom	Max	Units
Input Voltage (continuous)		4.5	5.0	5.5	VDC
Turn-On Input Voltage		4.19	4.3	4.5	VDC
Under Voltage Lock out		2.0		4.19	VDC
Turn-On Time	To Output Regulation Band 100% Resistive Load		12	15	mS
Inrush Transient	Vin=Vin.max. Io=3A		0.04		A ² s
External Capacitor (required)	ESR < 0.1 Ohm	4.7 ²			μF

Table 3 Output Specifications.

All specifications apply over specified input voltage, output load and temperature range, unless otherwise noted.

Parameter	Conditions/Description	Min	Nom	Max	Units
Output Voltage Set point Accuracy	Vin.nom, 50% Io,rated	-1.5		1.5	%Vout
Output Current Range		0 ³		3	ADC
Line Regulation	Vin.min to Vin max at Io,rated			±0.4	%Vout
Load Regulation	At Vin nom, Io from 0A to 3A			±0.5	%Vout
Total output voltage regulation	Over all input voltage, load, and temperature conditions			3.0	%Vout
Dynamic Regulation: Peak Deviation	50-25-50%Io,rated load step change		+/-20	+/-50	mVp-p

² Please see note 1 in the previous page.

³ At Io,min, the output may contain low frequency component that exceeds ripple specifications.



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Settling Time			30	200	μ S
Admissible Load Capacitance	Vin nom, Io, rated	1000			μ F
Output Current Limit Threshold ⁴	Vout $\leq$ 0.95Vout.nom	115		180	%Iout
Output short circuit	Vo<0.1V			2	Arms
Switching Frequency		250	300	340	kHz
Temperature Coefficient				0.01	%/ $^{\circ}$ C
Output Ripple and Noise	Vin nom, Io, rated		20 60	40 100	mVrms mVp-p
Trim Range	Vin nom, Io, rated	90		110	%Vout
External Capacitor (required) ⁵		4.7			μ F

Table 4. Feature Specifications

All specifications apply over specified input voltage, output load and temperature range, unless otherwise noted.

Parameter	Conditions/Description	Min	Nom	Max	Units
Shutdown (ON/OFF) Logic Low or floating Logic High	On/Off signal low – converter is ON On/Off signal high – converter is Off	0 Vin_min		0.5 Vin_max	VDC
Open circuit voltage			0		

Table 5. Regulatory Agency Compliance

STANDARD APPROVED TO	MARKING
UL69950/CSA60950-00	OSHA approved NRTL, and SCC certifier (Canada)
EN60950:2000	TUV Product Service Baurt mark
IEC60950:1999	CB report available. May use CE mark

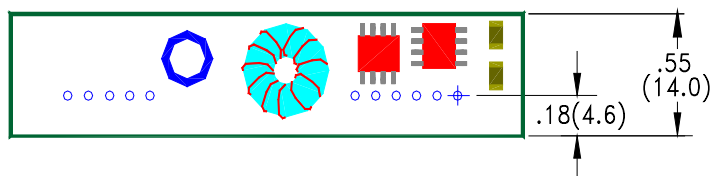
Table 6. Physical

Parameter				Units
Dimensions (horizontal version)	2.50 (63.50)	0.46 (11.68)	0.50 (12.7)	in. (mm)
Weight	8			g
Markings & labeling	Includes Part Number, Power-One Logo, Date Code			

⁴ Current foldback at constant current load with self-recovery.

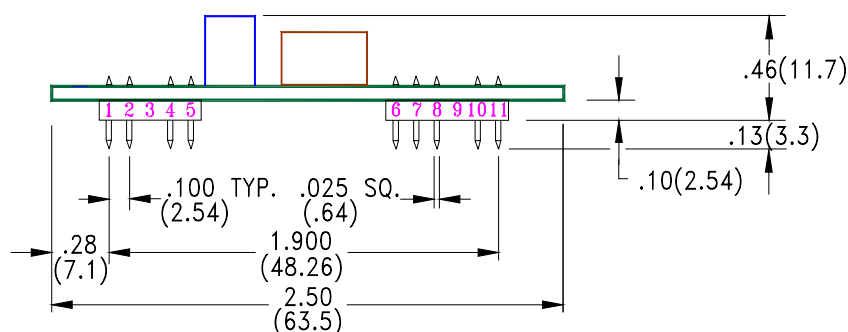
⁵ External capacitor to enhance stability, type of capacitor depends on the life required.

Mechanical Drawing Dimensions shown in inches (millimeters)



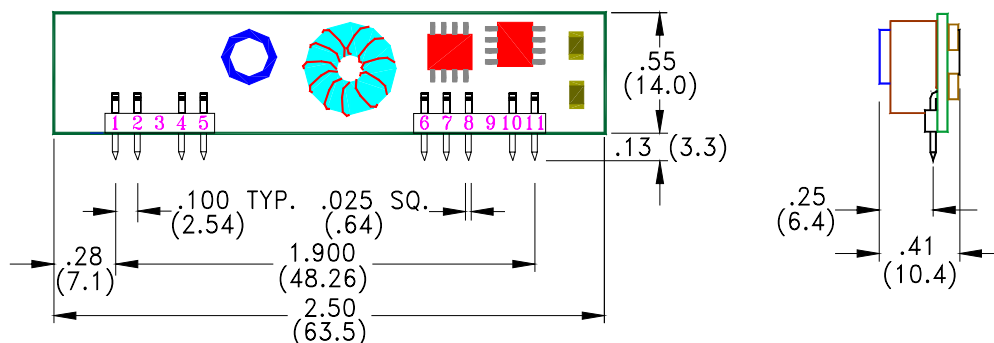
Tolerances:

 $.xx \pm 0.020"$ (0.5mm)

 $.xxx \pm 0.010"$ (0.25mm)


(a). Horizontal Mount Option

Pin	Function
1	Vo+
2	Vo+
3	Vo+ sense(option)
4	Vo+
5	GND
6	GND
7	Vin+
8	Vin+
9	No pin
10	trim
11	ON/OFF



(b). Vertical Mount Option

Fig.1 SIS03V series Mechanical data

Notes

1. Consult factory for the complete list of available options.
2. Power-One products are not authorized for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems without the express written consent of the President of Power-One, Inc.
3. Specifications are subject to change without notice.

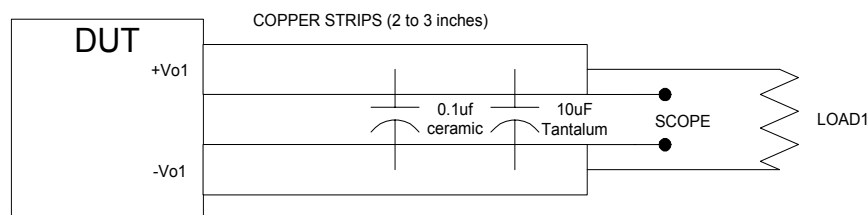


Figure 2: Output Ripple Measurement Test Set-up

Note: Use a 0.1uF ceramic and 10uF tantalum capacitor. Scope measurement should be made using a BNC socket. Position loads between 51 mm and 76 mm (2 in. and 3 in.) from module.

Output Voltage Trim

The trim feature allows the user to adjust each of the output voltages by +/-10% from the nominal.

The trim function

The trim mechanism⁶⁷ for the SIS03V series is a negative one. The output is trimmed up with a resistor from the TRIM pin to the GND pin and trimmed down with a resistor from the TRIM pin to the respective +Vout pin.

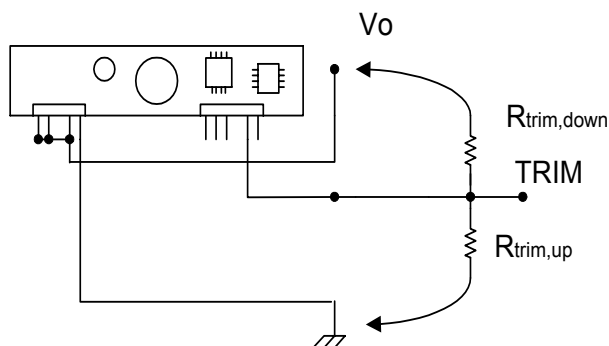


Fig.3 SIS03V series trim up / down schematic

The general equation for trimming the output voltage on the output as shown below:

⁶ When the output voltage is trimmed up, the output power from the converter must not exceed its maximum rating. This is determined by measuring the output voltage on the output pins, and multiplying it by the output current.

⁷ In order to avoid creating apparent load regulation degradation, it is important that the trim resistors are connected directly to the Vout and output GND pins, and not to the load or to traces going to the load.

$$R_{trim,UP} = \frac{R1 * 0.8}{V_{adj} - V_{out}} - 2 \text{ KOhm}$$

$$R_{trim,DOWN} = \frac{(V_{adj} - 0.8) * R1}{V_{out} - V_{adj}} - 2 \text{ KOhm}$$

R1 3.16 kOhm for SIS03VE;
 3.24 kOhm for SIS03VD;
 3.24 kOhm for SIS03V2.1;
 2.49 kOhm for SIS03VB
 3.32 kOhm for SIS03VA;
 1 kOhm for SIS03VY;