



## SHP5 SERIES

Single and dual output

- 3 to 5 Watts in DIL package
- 32 models including 2.1V and 3.3V outputs
- Wide input ranges 4.5-9V, 9-18V, 18-36V and 36-72V
- EN55022 conducted emissions level B
- Operating temperature range -25°C to +50°C
- Input voltage range to ETS300-132-2

The SHP5 Series of DC/DC converters is designed to offer the optimum cost/benefit power solution for a wide variety of applications including public and private telecommunications, industrial systems and process and test equipment. The series consists of 32 models in a DIL package with input voltages of 4.5-9VDC, 9-18VDC, 18-36VDC and 36-72VDC. The SHP5 offers standard 5V, 12V and 15V in single and dual outputs. 2.1V and 3.3V single outputs are also available suitable for low voltage logic applications. Optional filtering to EN55022 level B conducted emissions and low output ripple minimize design-in time, cost and eliminate the need for external components.

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## SPECIFICATION

All specifications are typical at nominal input, full load at 25°C unless otherwise stated

OUTPUT SPECIFICATIONS		
Voltage accuracy		±2.0%
Line regulation	LL to HL, all outputs	±0.1%
Load regulation	Min. load to full load	±0.3%
Cross regulation	Asymmetrical load 25% / 100% FL	4.0% max.
Minimum load	2.1V, 3.3V, 5V Single 12V, 15V Dual	50mA max. 80mA max. 80mA max.
Overshoot	At start-up	3.0% max.
Ripple and noise	20MHz bandwidth	1.0% pk-pk, max. 75mV rms
Transient response	25% load step	±10% max. dev., 1ms recovery to within ±1.0%
Temperature coefficient		±0.02%/°C
Short circuit protection	1 minute	Automatic recovery
INPUT SPECIFICATIONS		
Input voltage range	5VDC nominal, FL 12VDC nominal, FL 24VDC nominal, FL 48VDC nominal, FL	4.5 to 9VDC 9 to 18VDC 18 to 36VDC 36 to 72VDC
Input filter	Suffix '-F' See Note 1	Common mode and PI type
Input current		See table
Input reflected ripple	Single output Dual and triple outputs	20mA 20mA
Start-up time		5ms

EMC CHARACTERISTICS		
Conducted emissions	EN55022, EN55011, FCC Suffix '-F' versions, See Note 1	Level B
Radiated emissions	EN55022	Level B
GENERAL SPECIFICATIONS		
Efficiency		78% typ.
Isolation voltage	Input/output	500VDC
Isolation resistance	Input/output	10 <sup>9</sup> Ω
Isolation capacitance	Input/output	1nF
Switching frequency	Fixed	200 to 250kHz
Approvals and standards (pending)	Safety	VDE0805, EN60950 IEC950, UL1950 CSA C22.2 No. 950
Case material		Black coated, metal case
Material flammability		UL94V-0
Weight		16g (0.56oz)
MTBF	MIL-HDBK-217F	250,000 hours
ENVIRONMENTAL SPECIFICATIONS		
Thermal performance	Operating ambient (See derating curve) Extended temp., option, See Note 3 Non-operating amb. Case Derating Cooling	-25°C to +50°C -40°C to +50°C -25°C to +95°C +95°C max. See derating curve Free air convection cooled
Relative humidity	Non-condensing	30% to 95%
Altitude	Operating Non operating	10,000 feet max. 40,000 feet max.
Vibration	5Hz to 500Hz	2.5G rms (approx.)

## 3 to 5 Watt Wide input DC/DC converters

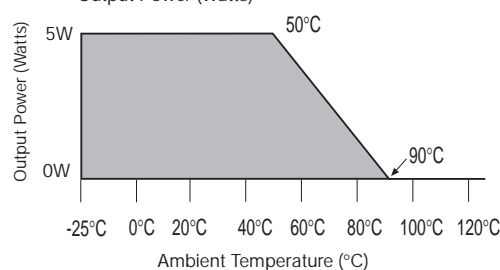
INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT	TYPICAL EFFICIENCY	REGULATION (Typ.)		MODEL NUMBER
					LINE	LOAD	
4.5-9VDC	2.1V	1000mA	724mA	58%	±0.1%	±0.3%	SHP5-05S2V1 <sup>(4)</sup>
4.5-9VDC	3.3V	1000mA	956mA	69%	±0.1%	±0.3%	SHP5-05S3V3 <sup>(4)</sup>
4.5-9VDC	5.0V	600mA	769mA	75%	±0.1%	±0.3%	SHP5-05S05 <sup>(4)</sup>
4.5-9VDC	12V	250mA	800mA	75%	±0.1%	±0.3%	SHP5-05S12 <sup>(4)</sup>
4.5-9VDC	15V	200mA	800mA	75%	±0.1%	±0.3%	SHP5-05S15 <sup>(4)</sup>
4.5-9VDC	±5.0V	±300mA	800mA	75%	±0.1%	±0.3%	SHP5-05D05 <sup>(4)</sup>
4.5-9VDC	±12V	±125mA	800mA	75%	±0.1%	±0.3%	SHP5-05D12 <sup>(4)</sup>
4.5-9VDC	±15V	±100mA	800mA	75%	±0.1%	±0.3%	SHP5-05D15 <sup>(4)</sup>
9-18VDC	2.1V	1000mA	287mA	61%	±0.1%	±0.3%	SHP5-12S2V1
9-18VDC	3.3V	1000mA	387mA	71%	±0.1%	±0.3%	SHP5-12S3V3
9-18VDC	5.0V	1000mA	534mA	78%	±0.1%	±0.3%	SHP5-12S05
9-18VDC	12V	420mA	534mA	78%	±0.1%	±0.3%	SHP5-12S12
9-18VDC	15V	350mA	534mA	78%	±0.1%	±0.3%	SHP5-12S15
9-18VDC	±5.0V	±300mA	333mA	75%	±0.1%	±0.3%	SHP5-12D05
9-18VDC	±12V	±210mA	545mA	77%	±0.1%	±0.3%	SHP5-12D12
9-18VDC	±15V	±170mA	551mA	77%	±0.1%	±0.3%	SHP5-12D15
18-36VDC	2.1V	1000mA	144mA	61%	±0.1%	±0.3%	SHP5-24S2V1
18-36VDC	3.3V	1000mA	193mA	71%	±0.1%	±0.3%	SHP5-24S3V3
18-36VDC	5.0V	1000mA	267mA	78%	±0.1%	±0.3%	SHP5-24S05
18-36VDC	12V	420mA	267mA	78%	±0.1%	±0.3%	SHP5-24S12
18-36VDC	15V	350mA	267mA	78%	±0.1%	±0.3%	SHP5-24S15
18-36VDC	±5.0V	±300mA	166mA	75%	±0.1%	±0.3%	SHP5-24D05
18-36VDC	±12V	±210mA	272mA	77%	±0.1%	±0.3%	SHP5-24D12
18-36VDC	±15V	±170mA	275mA	77%	±0.1%	±0.3%	SHP5-24D15
36-72VDC	2.1V	1000mA	71mA	61%	±0.1%	±0.3%	SHP5-48S2V1
36-72VDC	3.3V	1000mA	96mA	71%	±0.1%	±0.3%	SHP5-48S3V3
36-72VDC	5.0V	1000mA	133mA	78%	±0.1%	±0.3%	SHP5-48S05
36-72VDC	12V	420mA	133mA	78%	±0.1%	±0.3%	SHP5-48S12
36-72VDC	15V	350mA	133mA	78%	±0.1%	±0.3%	SHP5-48S15
36-72VDC	±5.0V	±300mA	83mA	75%	±0.1%	±0.3%	SHP5-48D05
36-72VDC	±12V	±210mA	136mA	77%	±0.1%	±0.3%	SHP5-48D12
36-72VDC	±15V	±170mA	136mA	77%	±0.1%	±0.3%	SHP5-48D15

### Notes

- 1 An optional internal filter is available, which will meet EN55022 level B. Add the suffix '-F' to the model number, e.g. **SHP5-12S05-F**. The suffix '-F' option is not available on the 5VDC input models.
- 2 This product is only for inclusion by professional installers within other equipment and must not be operated as a stand alone product.
- 3 Extended operating temperature range is available as an option. To specify a SHP5 that operates down to -40°C, add the suffix '-4' to the model number, e.g. **SHP5-12S05-4**.
- 4 5VDC input, max. 3 Watts output power.

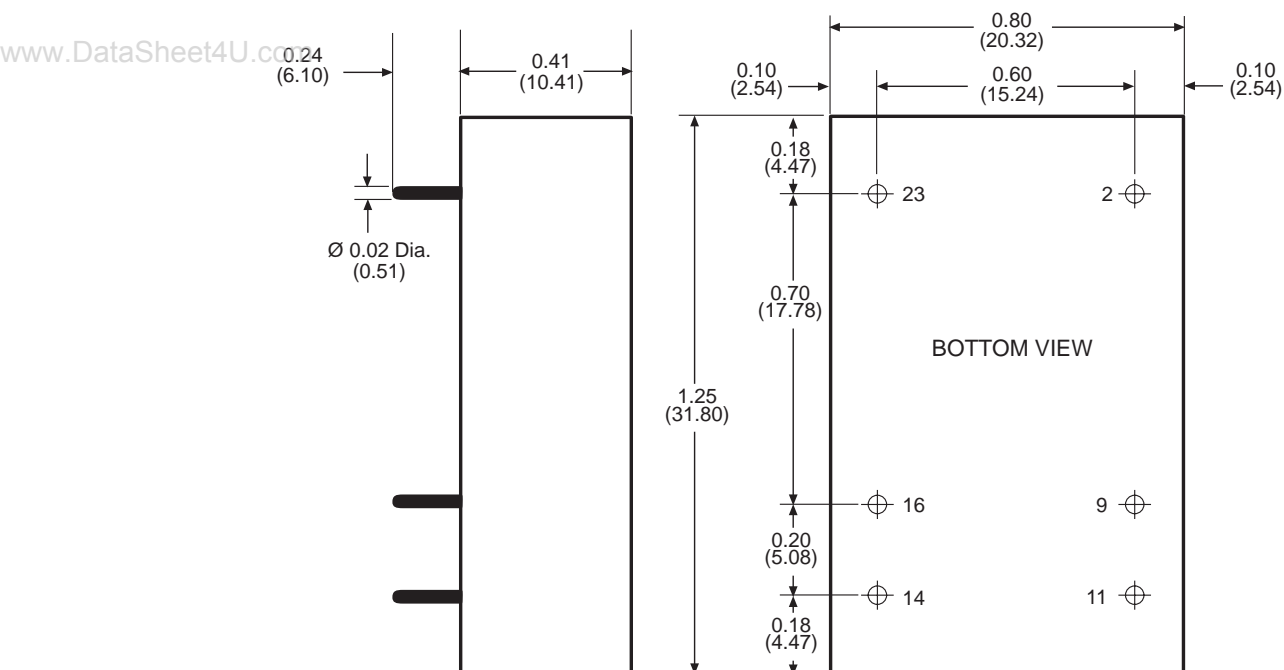
### DERATING CURVE

Output Power (Watts)



## 3 to 5 Watt Wide input DC/DC converters

PIN CONNECTIONS		
PIN NUMBER	SINGLE OUTPUTS	DUAL OUTPUT
2	- Input	- Input
9	No Connection	Common
11	No Pin	- Output
14	+ Output	+ Output
16	- Output	Common
23	+ Input	+ Input



ALL DIMENSIONS IN INCHES (mm)

Tolerance :  $\pm 0.008$  (0.2) max. on pin placement  
 $\pm 0.02$  (0.5) max. on outer dimensions