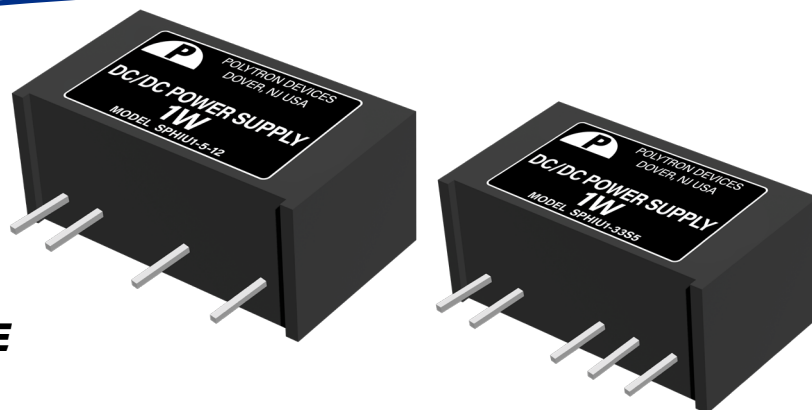


## DC/DC CONVERTERS

### 1 WATT, SINGLE & DUAL OUTPUT UNREGULATED SIP PACKAGE

#### UP TO 6KVDC ISOLATION VOLTAGE

#### SPHIU1 SERIES



#### FEATURES

- 7PIN SIP Package
- No-load input current as low as 5mA
- Continuous short-circuit protection
- High efficiency up to 87%
- Unregulated output types
- 1.5KVDC~ 6KVDC isolation
- Operating temperature: -40°C to +105°C
- Industry standard pinout
- Built to UL/CUL/IEC/EN 62368-1
- ROHS compliant

#### Single Output

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

Input Voltage Vdc	Output Voltage Vdc	Output Current mA	Efficiency % Typ.	Maximum Capacitor Load µF	Model Number
3.3	3.3	303	76	2400	SPHIU1-33S33
3.3	5	200	82	2400	SPHIU1-33S5
3.3	9	112	83	1000	SPHIU1-33S9
3.3	12	84	84	470	SPHIU1-33S12
3.3	15	67	84	330	SPHIU1-33S15
3.3	24	42	85	100	SPHIU1-33S24
5	3.3	303	76	2400	SPHIU1-5S33
5	5	200	82	2400	SPHIU1-5S33
5	9	112	83	1000	SPHIU1-5S9
5	12	84	84	470	SPHIU1-5S12
5	15	67	84	330	SPHIU1-5S15
5	24	42	85	100	SPHIU1-5S24
9	3.3	303	76	2400	SPHIU1-9S33
9	5	200	82	2400	SPHIU1-9S5
9	9	112	83	1000	SPHIU1-9S9
9	12	84	84	470	SPHIU1-9S12
9	15	67	84	330	SPHIU1-9S15
9	24	42	85	100	SPHIU1-9S24

## SPHIU1 SERIES

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

Input Voltage Vdc	Output Voltage Vdc	Output Current mA	Efficiency %	Maximum Capacitor Load $\mu$ F	Model Number
12	3.3	303	78	2400	SPHIU1-12S33
12	5	200	82	2400	SPHIU1-12S5
12	9	112	85	1000	SPHIU1-12S9
12	12	84	85	680	SPHIU1-12S12
12	15	67	87	330	SPHIU1-12S15
12	24	42	85	220	SPHIU1-12S24
15	3.3	303	78	2400	SPHIU1-15S33
15	5	200	82	2400	SPHIU1-15S5
15	9	112	85	1000	SPHIU1-15S9
15	12	84	85	680	SPHIU1-15S12
15	15	67	87	330	SPHIU1-15S15
15	24	42	85	220	SPHIU1-15S24
24	3.3	303	78	2400	SPHIU1-24S33
24	5	200	82	2400	SPHIU1-24S5
24	9	112	85	1000	SPHIU1-24S9
24	12	84	85	680	SPHIU1-24S12
24	15	67	87	330	SPHIU1-24S15
24	24	42	85	220	SPHIU1-24S24

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

Input Voltage Vdc	Output Voltage Vdc	Output Current mA	Efficiency % Typ.	Maximum Capacitor Load $\mu$ F	Model Number
3.3	$\pm$ 3.3	$\pm$ 151	76	$\pm$ 1200	SPHIU1-33-33
3.3	$\pm$ 5	$\pm$ 100	82	$\pm$ 1200	SPHIU1-33-5
3.3	$\pm$ 9	$\pm$ 56	83	$\pm$ 470	SPHIU1-33-9
3.3	$\pm$ 12	$\pm$ 42	84	$\pm$ 220	SPHIU1-33-12
3.3	$\pm$ 15	$\pm$ 34	84	$\pm$ 220	SPHIU1-33-15
3.3	$\pm$ 24	$\pm$ 21	85	$\pm$ 47	SPHIU1-33-24
5	$\pm$ 3.3	$\pm$ 151	76	$\pm$ 1200	SPHIU1-5-33
5	$\pm$ 5	$\pm$ 100	82	$\pm$ 1200	SPHIU1-5-5
5	$\pm$ 9	$\pm$ 56	83	$\pm$ 470	SPHIU1-5-9
5	$\pm$ 12	$\pm$ 42	84	$\pm$ 220	SPHIU1-5-12
5	$\pm$ 15	$\pm$ 34	84	$\pm$ 220	SPHIU1-5-15
5	$\pm$ 24	$\pm$ 21	85	$\pm$ 47	SPHIU1-5-24

## SPHIU1 SERIES

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

Input Voltage Vdc	Output Voltage Vdc	Output Current mA	Efficiency % Typ.	Maximum Capacitor Load μF	Model Number
9	±3.3	±151	76	±1200	SPHIU1-9-33
9	±5	±100	82	±1200	SPHIU1-9-5
9	±9	±56	83	±470	SPHIU1-9-9
9	±12	±42	84	±220	SPHIU1-9-12
9	±15	±34	84	±220	SPHIU1-9-15
9	±24	±21	85	±47	SPHIU1-9-24
12	±3.3	±151	78	±1200	SPHIU1-12-33
12	±5	±100	82	±1200	SPHIU1-12-5
12	±9	±56	85	±680	SPHIU1-12-9
12	±12	±42	85	±330	SPHIU1-12-12
12	±15	±34	87	±220	SPHIU1-12-15
12	±24	±21	85	±100	SPHIU1-12-24
15	±3.3	±151	78	±1200	SPHIU1-15-33
15	±5	±100	82	±1200	SPHIU1-15-5
15	±9	±56	85	±680	SPHIU1-15-9
15	±12	±42	85	±330	SPHIU1-15-12
15	±15	±34	87	±220	SPHIU1-15-15
15	±24	±21	85	±100	SPHIU1-15-24
24	±3.3	±151	78	±1200	SPHIU1-24-33
24	±5	±100	82	±1200	SPHIU1-24-5
24	±9	±56	85	±680	SPHIU1-24-9
24	±12	±42	85	±330	SPHIU1-24-12
24	±15	±34	87	±220	SPHIU1-24-15
24	±24	±21	85	±100	SPHIU1-24-24

**NOTE:**

For 1.5Vdc, no suffix is needed.(standard)

For 5.2KVDC, use suffix "H5"

For 6Kvdc, Use suffix: "H3"

## SPHIU1 SERIES

Input Specifications		Output Specifications	
Voltage range, %	±10 Typ.	$V_{o,lo}$ Nom @ $V_{in}$ :3.3V,5V,9V	
	±20 Typ.	$V_{o,lo}$ Nom@ $V_{in}$ :12V,15V,24V	
Filter	Capacitor		
		Voltage Tolerance, %	±5 Max 100% full load
		Short Circuit Protection	Continuous
		Line regulation, %	1.2 Typ. For 1.0% of $V_{in}$
		Load Regulation, %	15 Typ., 20 Max 3.3V (10% To 100% F.L)
			10 Typ., 15 Max 5V (10% To 100% F.L)
			8 Typ., 10 Max 9V (10% To 100% F.L)
			7 Typ., 10 Max 12V (10% To 100% F.L)
			6 Typ., 10 Max 15V (10% To 100% F.L)
		5 Typ., 10 Max 24V (10% To 100% F.L)	
		Ripple & Noise, mVp-p	30 Typ., 75 Max BW=DC To 20MHz @ $V_o$ :3.3V,5V,9V,12V,15V
			50 Typ., 100 Max BW=DC To 20MHz @ $V_o$ :24V

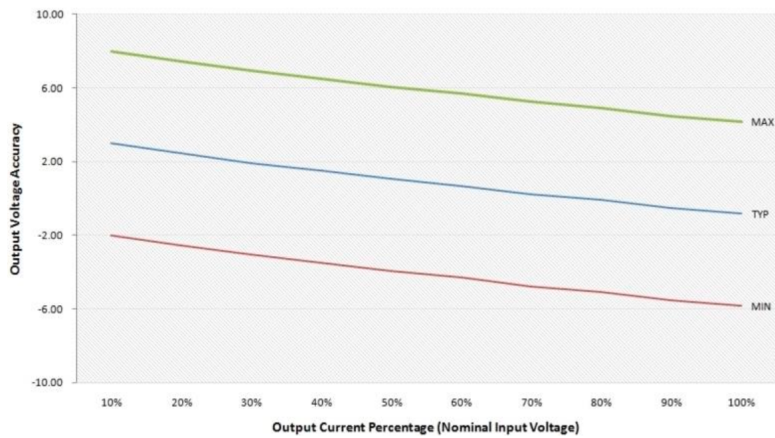
General Specifications			
Isolation resistance, M $\Omega$	500Vdc	1000 Min.	
Isolation capacitance, pF	Input-output, 100KHz/0.1V		20 Typ.
Switching frequency, kHz	Full load, nominal input @3.3V, 5V $V_{in}$	215/370 Typ.	
	Full load, nominal input @other $V_{in}$		250 Typ.

Environmental Specifications			
Operation Temperature, °C		-40 Min	105 Max
Storage temperature, °C		-55 Min	125 Max
Humidity, %	Non Condensing		95 Max
Cooling	Free Air Convection		

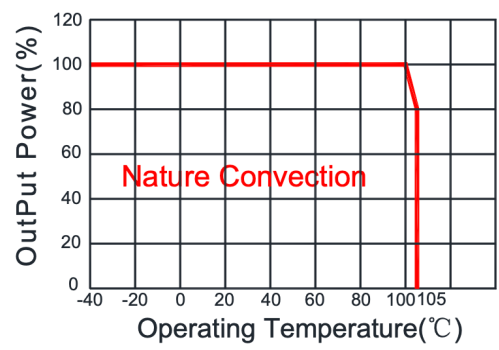
## SPHIU1 SERIES

Physical Specifications			EMC Specifications		
Design meet safety standard	IEC/EN/UL 62368-1		Specifications	Conditions	
Dimensions, mm	19.5x6.0x10.0Typ.		EMI	CE	CISPR32/EN55032 CLASS B (see Fig. 1 for recommended circuit)
Case material	DAP			RE	CISPR32/EN55032 CLASS B (see Fig. 1 for recommended circuit)
Weight, g	2.1 Typ.		EMS	ESD	IEC/EN61000-4-2 Air ±8kV , Contact ±6kV perf. Criteria B
MTBF, Hours	MIL-HDBK-217F@25°C	3,500,000 Min.			

### Tolerance Envelope Graph

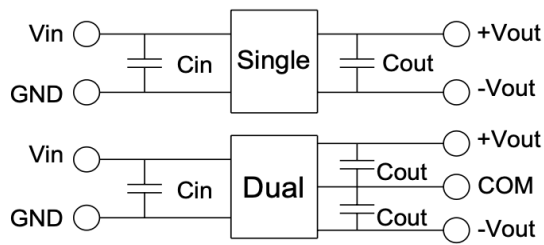


### Temperature Derating Graph



## SPHIU1 SERIES

### Recommended Test Circuit



Vin	Cin	Single Vout	Cout	Dual Vout	Cout
3.3 Vdc	4.7μF/25V	3.3 Vdc	10μF/16V	±3.3 Vdc	±4.7μF/25V
5 Vdc	4.7μF/25V	5 Vdc	10μF/16V	±5 Vdc	±4.7μF/25V
9 Vdc	4.7μF/25V	9 Vdc	2.2μF/16V	±9 Vdc	±1μF/25V
12 Vdc	2.2μF/25V	12 Vdc	2.2μF/25V	±12 Vdc	±1μF/25V
15 Vdc	2.2μF/25V	15 Vdc	1μF/25V	±15 Vdc	±1μF/25V
24 Vdc	1μF/25V	24 Vdc	1μF/50V	±24 Vdc	±1μF/25V

### EMC (CLASS B) Compliance Circuit

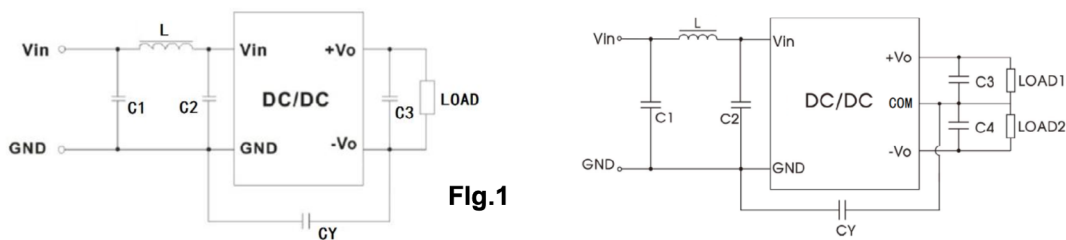
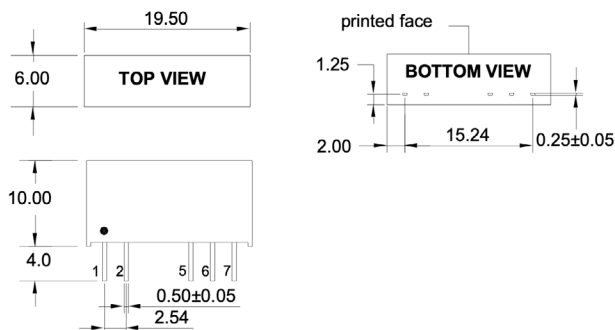


Fig. 1

EMC recommended circuit value table

EMI	Component	Value
	C1	4.7μF / 50V
	C2	4.7μF / 50V
	CY	1μF / 4kV
	C3	Recommended Test Circuit
	L	6.8μH

### Markings and Dimensions



PIN	1	2	4	5	6
Single	+Vin	-Vin	-Vout	No Pin	+Vout
Dual	+Vin	-Vin	-Vout	Com	+Vout

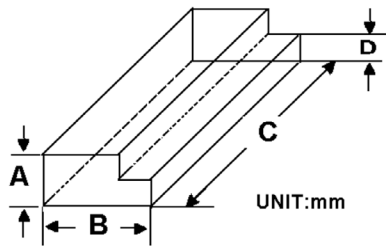
UNIT: mm

Unless otherwise specified, all tolerances are ±0.25

**SPHIU1 SERIES**

**PACKAGING**

TUBE-----25pcs



Size(mm)			
A	B	C	D
9.5	16.5	522	5.0