

VPG Foil Resistors

VFR • ALPHA ELEC. • POWERTRON • APR

**Consistent Precision
& Reliability**



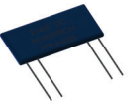
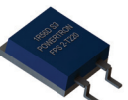
POWERTRON
A VPG Brand

Powertron Product Overview
High Precision Power CuNiMn Resistors
High Precision Power CuMnSN Resistors
High Power NiCr Foil Resistors

Thick Film Resistors
Special Custom Design Resistors

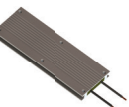
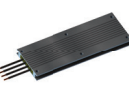
CuNiMn Current Sense Resistors

Powertron's high-precision power CuNiMn current sense resistors offer a wide range of capabilities for different applications and are available with any resistance value requested by the customer.

Product	Model	Configuration	Resistance Range	Best Tolerance	TCR (+20°C to +60°C)	Rated Power	Load Life Stability (1000 Hours, Under Power-Typical)
	FPR 2-1617 FPR 2-1623 FPR 2-2614	Precision Shunt Resistor	0.01 Ω to 100 Ω	$\pm 0.1\%$	to ± 50 ppm/°C	to 2 W	0.1%
	FPR 4-3316	Precision Shunt Resistor	0.001 Ω to 100 Ω	$\pm 0.1\%$	to ± 15 ppm/°C	to 2 W	0.1%
	PCS201 PCS202	Precision Shunt Resistor	0.001 Ω to 10 Ω	$\pm 0.1\%$	to ± 15 ppm/°C	to 2 W	0.1%
	FPR 4-6025	Precision Power Shunt Resistor	0.100 Ω to 10 Ω	$\pm 0.2\%$	to ± 15 ppm/°C	to 4 W	0.1%
	FPR 4-7022	Precision Shunt Resistor	0.100 Ω to 10 Ω	$\pm 0.1\%$	to ± 15 ppm/°C	to 5 W	0.1%
	FPS 2-T220	Precision Power Shunt SMD D2Pak Resistor	0.002 Ω to 10 Ω	$\pm 0.5\%$	to ± 50 ppm/°C	to 10 W	0.1%
	FPS 4-T220	Precision Power Shunt SMD D2Pak Resistor	0.002 Ω to 10 Ω	$\pm 0.1\%$	to ± 25 ppm/°C	to 10 W	0.1%
	FPR 2-T220 FPR 2-T221	Precision Power Shunt Resistor T-220 Housing	0.002 Ω to 10 Ω	$\pm 0.5\%$	to ± 50 ppm/°C	to 10 W	0.1%
	FPR 4-T220 FPR 4-T221	Precision Power Shunt Resistor TO-220 housing	0.002 Ω to 10 Ω	$\pm 0.1\%$	to ± 15 ppm/°C	to 10 W	0.1%
	FPR 2-T218	Precision Power Shunt Resistor T-218 (TO-247) Housing	0.002 Ω to 20 Ω	$\pm 0.25\%$	to ± 30 ppm/°C	to 25 W	0.1%
	FHR 2-3025 FHR 2-3818	Precision Power Shunt Resistor	0.01 Ω to 100 Ω	$\pm 0.25\%$	to ± 50 ppm/°C	to 20 W	0.1%

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	PCS301 PCS302	Precision Power Shunt Resistor	0.001 Ω to 10 Ω	$\pm 0.1\%$	to ± 3 ppm/°C (0°C to 60°C)	to 30 W	0.1%
	FHR 4-2321	Precision Power Shunt Resistor	0.001 Ω to 20 Ω	$\pm 0.1\%$	to ± 15 ppm/°C	to 15 W	0.1%
	FHR 4-3825	Precision Power Shunt Resistor	0.001 Ω to 100 Ω	$\pm 0.1\%$	to ± 15 ppm/°C	to 35 W	0.1%
	FHR 4-3825H	Precision Power Shunt Resistor	0.001 Ω to 100 Ω	$\pm 0.1\%$	to ± 15 ppm/°C	to 5 W	0.1%
	FHR 4-4618	Precision Power Shunt Resistor	0.001 Ω to 100 Ω	$\pm 0.1\%$	to ± 15 ppm/°C	to 35 W	0.1%
	FPR 2-T227 FNR 2-T227	Precision Power Shunt Resistor	0.01 Ω to 50 Ω	$\pm 0.1\%$	to ± 50 ppm/°C	to 30 W	0.1%
	FPR 4-T227 FNR 4-T227	Precision Power Shunt Resistor	0.001 Ω to 50 Ω	$\pm 0.1\%$	to ± 25 ppm/°C	to 30 W	0.1%
	FHR 2-8065 FHR 2-80110 FHR 2-80216 FHR 2-80320 FHR 2-80370	Precision Power Shunt Resistor	0.001 Ω to 200 Ω	$\pm 0.5\%$	to ± 50 ppm/°C	to 2500 W	0.1%
	FHR 4-8065 FHR 4-80110 FHR 4-80216 FHR 4-80320 FHR 4-80370	Precision Power Shunt Resistor	0.001 Ω to 200 Ω	$\pm 0.1\%$	to ± 25 ppm/°C	to 2500 W	0.1%
	FPN Networks FHN Networks	Precision Shunt Networks	0.01 Ω to 90 Ω	$\pm 0.1\%$	to ± 25 ppm/°C	to 20 W	0.1%

CuMnSn Current Sense Resistors

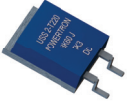
Powertron's high-precision power CuMnSn current sense resistors offer the best available TCR for high power current measurement. The devices are available as free-standing resistors with a metal plate for heat sink mounting as well as surface mount applications.

Product	Model	Configuration	Resistance Range	Best Tolerance	TCR (+20°C to +60°C)	Rated Power	Load Life Stability (1000 Hours, Under PowerTypical)
	SHLR 4-2321	High Precision Power Shunt Resistor	0.001 Ω to 0.005 Ω	$\pm 0.1\%$	to ± 5 ppm/°C	to 15 W	0.1% (2000 hrs)
	SHLR 4-3825H	High Precision Power Shunt Resistor	0.001 Ω to 0.005 Ω	$\pm 0.1\%$	to ± 10 ppm/°C	to 5 W	0.1%
	SHLR 4-3825	High Precision Power Shunt Resistor	0.001 Ω to 0.005 Ω	$\pm 0.1\%$	to ± 10 ppm/°C	to 35 W	0.1%
	SPS 4-T220	High Precision Power Shunt SMD D2Pak Resistor	0.005 Ω to 10 Ω	$\pm 0.1\%$	to ± 5 ppm/°C	to 10 W	0.1%
	SPR 4-T220 SPR 4-T221	High Precision Power Shunt Resistor T-220 Housing	0.005 Ω to 10 Ω	$\pm 0.1\%$	to ± 5 ppm/°C	to 10 W	0.1%
	SHR 4-2321	High Precision Power Shunt Resistor	0.005 Ω to 18.75 Ω	$\pm 0.1\%$	to ± 5 ppm/°C	to 15 W	0.1% (2000 hrs)
	SHR 4-4618	High Precision Power Shunt Resistor	0.005 Ω to 50 Ω	$\pm 0.1\%$	to ± 5 ppm/°C	to 35 W	0.1%
	SHR 4-3825	High Precision Power Shunt Resistor	0.005 Ω to 50 Ω	$\pm 0.1\%$	to ± 5 ppm/°C	to 35 W	0.1%
	SHR 4-3825 H	High Precision Power Shunt Resistor	0.005 Ω to 50 Ω	$\pm 0.1\%$	to ± 5 ppm/°C	to 5 W	0.1%
	SPR 4-T227 SNR 4-T227	High Precision Power Shunt Resistor	0.001 Ω to 50 Ω	$\pm 0.1\%$	to ± 5 ppm/°C	to 30 W	0.1%
	SHR 4-8065 SHR 4-80110 SHR 4-80216 SHR 4-80320 SHR 4-80370	High Precision Power Shunt Resistor	0.005 Ω to 100 Ω	$\pm 0.1\%$	to ± 5 ppm/°C	to 2500 W	0.1%
	SPN Networks SHN Networks	High Precision Shunt Networks	0.01 Ω to 90 Ω	$\pm 0.1\%$	to ± 2 ppm/°C	to 20 W	0.1%

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NiCr Foil Resistors

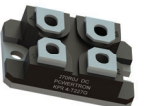
Powertron's NiCr foil resistors are specially designed for high power applications with power dissipation up to 50 W. These products also offer the best performance for TCR, load stability, and tolerance.

Product	Model	Configuration	Resistance Range	Best Tolerance	TCR (-55°C to +125°C)	Rated Power	Load Life Stability (1000 Hours, Under Power, Typical)
	USS 2-T220	High Precision Power SMD D2Pak Resistor	0.5 Ω to 150 k Ω	$\pm 0.01\%$	to ± 3 ppm/°C	to 15 W	0.01%
	UNS 2-T220		0.5 Ω to 100 Ω				
	USS 4-T220 UNS 4-T220	High Precision Power Shunt Resistor	0.2 Ω to 80 Ω	$\pm 0.01\%$	to ± 3 ppm/°C	to 15 W	0.01%
	USR 2-T220B USR 2-T221	High Precision Power Resistor TO-220 housing	0.5 Ω to 150 k Ω	$\pm 0.01\%$	to ± 3 ppm/°C	to 15 W	0.01%
	UNR 2-T220B UNR 2-T221		0.5 Ω to 100 Ω				
	USR 4-T220B USR 4-T221 UNR 4-T220B UNR 4-T221	High Precision Power Shunt Resistor	0.2 Ω to 80 Ω	$\pm 0.01\%$	to ± 1 ppm/°C	to 15 W	0.01%
	USR 4-3425 UNR 4-3425	High Precision Power Shunt Resistor	0.05 Ω to 650 Ω	$\pm 0.01\%$	to ± 1 ppm/°C	to 20 W	0.01%
	PCS331 PCS332	High Precision Power Shunt Resistor	0.05 Ω to 500 Ω	$\pm 0.01\%$	to ± 1 ppm/°C (0°C to 60°C)	to 20 W	0.01%
	USR 4-4020 UNR 4-4020	High Precision Power Shunt Resistor	0.05 Ω to 300 Ω	$\pm 0.01\%$	to ± 1 ppm/°C	to 20 W	0.01%

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Thick Film Resistors

Powertron thick film resistors are completing the power line of Powertron Foil resistors. They are available in standard housings and will be delivered with any resistance value.

Product	Model	Configuration	Resistance Range	Best Tolerance	TCR (-55°C to +125°C)	Rated Power	Load Life Stability (1000 Hours, Under Power, Typical)
	NPS 2-T126B	Power Resistor TO-126 housing	0.025 Ω to 10 k Ω	$\pm 1\%$	to ± 100 ppm/°C	to 20 W	0.5%
	NPS 2-T220 NHS 2-T220	Power Resistor TO-220 SMD housing	0.02 Ω to 100 k Ω	$\pm 1\%$	to ± 100 ppm/°C	to 50 W	0.5%
	NPR 2-T220 NHR 2-T221	Power Resistor TO-220 housing	0.02 Ω to 100 k Ω	$\pm 1\%$	to ± 100 ppm/°C	to 50 W	0.5%
	KPR 2-T218 KHR 2-T218	Power Resistor TO-218 housing	0.05 Ω to 100 k Ω	$\pm 1\%$	to ± 100 ppm/°C	to 100 W	1.0%
	KPR 2-T227 KHR 2-T227	Power Resistor TO-227 Housing	0.05 Ω to 5 M Ω	$\pm 1\%$	to ± 100 ppm/°C	to 200 W	1.0%
	KPR 4-T227 KHR 4-T227	Power Shunt Resistor TO-227 Housing	0.05 Ω to 5 M Ω	$\pm 1\%$	to ± 100 ppm/°C	to 200 W	1.0%
	KPN 2-T227 KHN 2-T227	Power Shunt Resistor TO-227 Housing	0.05 Ω to 5 M Ω	$\pm 1\%$	to ± 100 ppm/°C	to 200 W	1.0%

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Custom Designed Resistors

Powertron's special resistors are designed according to customer request and can vary in dimensions, resistive elements and technologies used, contacts and further parameters as needed.

Product	Model	Configuration	Resistance Range	Best Tolerance	TCR (+20°C to +60°C)	Rated Power	Load Life Stability (1000 Hours, Under Power-Typical)
	SHR 4-2820	Customized Shunt Resistor	0.001 Ω to 0.01 Ω	$\pm 0.5\%$	to ± 70 ppm/°C	to 10 W	0.5%
	SHR 4-4840H	Customized Power Resistor	0.300 $\mu\Omega$ to 1 m Ω	$\pm 1\%$	to ± 30 ppm/°C	to 10 W	0.1%

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