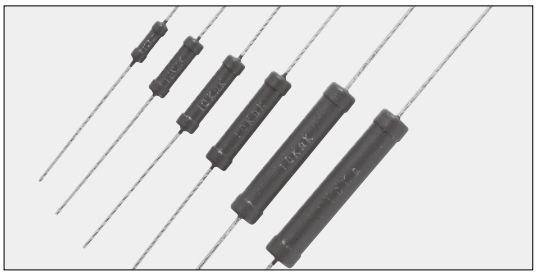
HPC Ceramic Resistors for Anti Pulse・Surge



Coating color：Reddish brown
Marking: Alphanumeric

■Features

- KOA original bulk ceramic resistors.
- Excellent in anti-pulse characteristics.
- Higher reliability against disconnection compared to wirewound resistors and film resistors.
- Products meet EU-RoHS requirements.
- Non-Inductive resistors.
- AEC-Q200 Tested.

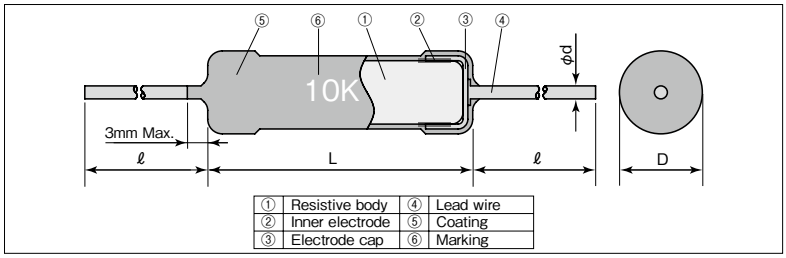
■Applications

- High voltage circuits for X-ray generators and electron microscopes.
- Power supply circuits for machine tools, etc.
- Active discharge resistors for EV.

■Reference Standards

IEC 60115-1
JIS C 5201-1

■Construction



①	Resistive body	④	Lead wire
②	Inner electrode	⑤	Coating
③	Electrode cap	⑥	Marking

■Dimensions

Type	Dimensions (mm)				Weight (g) (1000pcs)
	L±2	D±1	d (Nominal)	ℓ±3※1	
HPC1/2	11	3.5	0.8	38	690
HPC1	16	4.5			1260
HPC2	21	5.0			1780
HPC3	26	6.0			2830
HPC4	38	7.0	1.0		5880
HPC5	44	7.5			7930

※1 Lead length changes depending on taping type.

■Type Designation

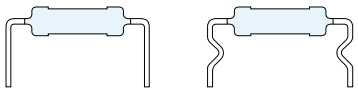
Example

HPC	1	C	T631	R	103	K
Product Code	Power Rating	Terminal Surface Material	Taping	Packaging	Nominal Resistance	Resistance Tolerance
	1/2:0.5W 1:1.0W 2:2.0W 3:3.0W 4:4.0W 5:5.0W	C:SnCu	See table Below	A:AMMO R:Reel Nil:BOX	3 digits	K:±10% M:±20%

Contact us when you have control request for environmental hazardous material other than the substance specified by EU-RoHS.
For further information on taping, please refer to APPENDIX C on the back pages.

■Taping

Type	Axial Taping	
	T52	T631
HPC1/2	○	—
HPC1	—	○



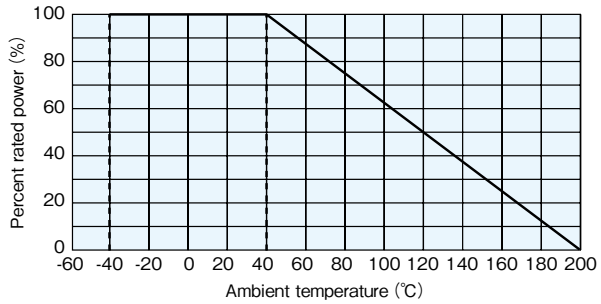
Contact us for lead forming details.

■Ratings

Type	Power Rating	Resistance Range (Ω)		T.C.R. (×10⁻⁶/K)	Max. Working Voltage	Max. Overload Voltage	Rated Ambient Temp.	Operating Temp. Range
		K：±10% E12	M：±20% E6					
HPC1/2	0.5W	10～390k	3.3～330k	−500～−1300：3.3Ω≦R<10Ω −600～−1500：10Ω≦R<100Ω −700～−1800：100Ω≦R<1kΩ −900～−1900：1kΩ≦R<100kΩ −900～−2000：100kΩ≦R<200kΩ −900～−2200：200kΩ≦R≦390kΩ	200V	400V	+40℃	−40℃～+200℃
HPC1	1W				300V	600V		
HPC2	2W				400V	800V		
HPC3	3W				450V	900V		
HPC4	4W				500V	1000V		
HPC5	5W				550V	1100V		

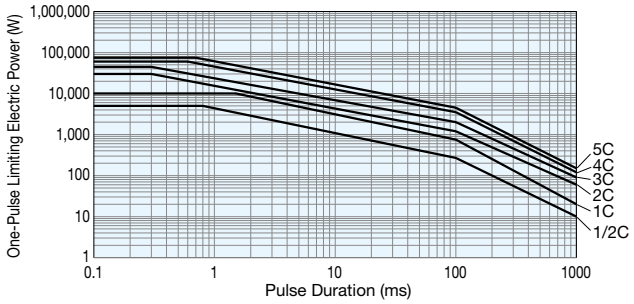
Rated voltage=$\sqrt{\text{Power Rating}\times\text{Resistance value}}$ or Max. working voltage, whichever is lower.

■Derating Curve



For resistors operated at the ambient temperature of 40℃ or higher, the power rating shall be derated in accordance with the above derating curve.

■One-Pulse Limiting Electric Power

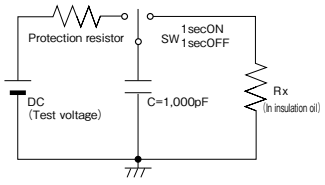


※The maximum applicable voltage is equal to the max. overload voltage.
Please ask us about the resistance characteristic of continuous applied pulse.The pulse endurance values are not assured values,so be sure to check the products on actual equipment when you use them.

■Performance

Test Items	Performance Requirements ΔR±(%+0.05Ω)		Test Methods
	Limit	Typical	
Resistance	Within specified tolerance	—	25℃ Resistance: Measuring voltage 3.3Ω≦R<10Ω: 0.3V 10Ω≦R<100Ω: 1.0V 100Ω≦R≦390kΩ: 3.0V
T.C.R.	−500~−1300:3.3Ω≦R<10Ω −600~−1500:10Ω≦R<100Ω −700~−1800:100Ω≦R<1kΩ −900~−1900:1kΩ≦R<100kΩ −900~−2000:100kΩ≦R<200kΩ −900~−2200:200kΩ≦R≦390kΩ	—	+25℃/−40℃ and +25℃/+125℃
Voltage coefficient (Apply for 1kΩ or over)	0~−0.2%/V (HPC1/2) 0~−0.1%/V (HPC1) 0~−0.05%/V (HPC2,3,4,5)	—	Rated voltage and rated voltage×10%
Overload (Short time)	2	0.4	Rated voltage×2.5 or Max. overload vol., whichever is lower, for 5s.
Resistance to pulse	Refer to the right table	—	The resistor mounted on to the test circuit as below is applied with high voltage impulse 10,000 cycles.
Resistance to soldering heat	2	0.8	350℃±10℃, 3.5s±0.5s
Rapid change of temperature	2	0.4	−40℃ (30min.) /+85℃ (30min.) 5 cycles
Moisture resistance	5	0.6	40℃±2℃, 90%~95%RH, 1000h 1.5h ON/0.5h OFF cycle
Load life	5	0.4	40℃±2℃, 1000h 1.5h ON/0.5h OFF cycle
High temperature exposure	5	1.7	+200℃, 1000h
Resistance to solvent	No abnormality in appearance. Marking shall be easily legible.	—	Dipping in IPA or Xylene for 3 min. and leaving for 10 min.after removing drops, then brushing 10 times.

Type	Test voltage	Performance Requirements ⊿R±(%+0.05Ω)
HPC1/2	8kV:3.3Ω≦R<30kΩ	5
	8kV:30kΩ≦R≦390kΩ	10
	5kV:30kΩ≦R≦390kΩ	5
HPC1	15kV:3.3Ω≦R<30kΩ	5
	15kV:30kΩ≦R≦390kΩ	10
	7kV:30kΩ≦R≦390kΩ	5
HPC2	25kV:3.3Ω≦R<30kΩ	5
	25kV:30kΩ≦R≦390kΩ	10
	15kV:30kΩ≦R≦390kΩ	5
HPC3,HPC4,HPC5	25kV	5



■Precautions for Use

- Under the environment where surge like thunders etc. is apt to happen, the resistors used for open circuit, resistors connected directly to input, output or ground, and resistors used for the circuit pulse applied to, may be destructed by surge or pulse. Therefore, the resistors need to be selected after sufficient check on the supposition of the worst condition against possible surge and pulse.
- The coating of this product is used to make the marking easy to see,and there is no electric characteristic (dielectric withstanding voltage etc,) .The coating of this product is weak to an external impact. So,the coating of the cap might peel off while transporting it. Please judge the product which reads the marking easily even if there are peeling off,a bruise,and a pinhole in the coating to be a non-defective unit.
- Be careful to handle these resistors because coating are weak to outer shock.please wash them to a minimum.No external force is given to the coating films until they are well dried because the coating films become weaker right after washing.Please pay attention not to apply any external force onto the coating film of resistors for 20 minutes after drying.Especially no PC boards shall be piled up.
- When overload is impressed continuously by the trouble of the circuit part because this product is hard to be snapped, a resistor body continues being overheated and emits smoke from a resistor and neighboring flammable materials and may catch fire. In a steady use state and heterology, please design the circuit so that the surface temperature of this product is not as above 200 degrees Celsius.