Alloy Shunt Resistors

Features

- Electron beam welding process,
- Ideal for pulse applications,
- Low resistance and high accuracy resistor for current detection,
- Low inductance,
- Pb-free, compliant to RoHS, reach requirements,
- Complies with AEC-Q200 reliability test,
- Custom specifications available

Applications

- DC-DC converters, battery packs, chargers, adapters,
- Industrial instruments and equipment,
- Automation control power supplies,
- Variable frequency drives and servo drive systems,
- Current sensing,
- Power management applications,
- Automotive electronic control systems

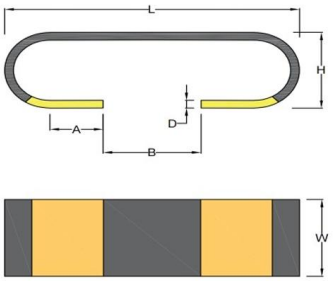
Part number system

EXAMPLE: AKP43125WFR001RK (4312 1mΩ ±1% 5W)

Company Code	Size	Power	Tolerance	Resistance	Packaging	Termination	Special
AKP	**4312**	**5W**	**F**	**R001**	**R**	**K**	
Akyga	4312 4320	3W = 3W 5W = 5W	D: ±0.5% F: ±1% G: ±2% J: ±5%	R001 = 1mΩ 0M50 = 0.5mΩ	T: 7” reel R: 13” reel B: bulk	M: CuMn K: Karma F: FeCrAl	blank: none

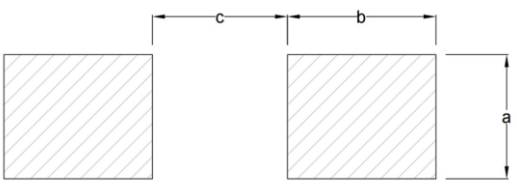
Dimensions

Product dimensions



Type	Resistance	Product dimensions					
		B	L	W	A	D	H
4312	2 ~ 50	4.2±0.1	11±0.3	3.1±0.3	2.8±0.2	0.12 ~ 0.7	2.7 ~ 4.0
4320	1 ~ 25	4.2±0.4	11±0.3	6.1±0.3	2.8±0.2	0.12 ~ 0.7	2.7 ~ 4.0

Recommended pad dimensions



Size	Resistance	Pad dimensions		
		c	a	b
4312	2 ~ 50	3.2	3.6	5.0
4320	1 ~ 25	3.2	6.5	5.0

Electrical characteristics

Type	Resistance [mΩ]	Element material	T.C.R. [PPM/˚C]	Power rating at P70 [W]	Tolerance [%]	Operating temperature [˚C]
4312	2 ~ 9	CuMn	2/3mΩ: ±240 ±50	3	±1%, ±2%, ±5%	-55 ~ 170
	10 ~ 50	Karma	±40	3: (10 ~ 15mΩ)		
	10 ~ 50	FeCrAl	±75	3: (10 ~ 15mΩ)±		
4320	1 ~ 4	CuMn	1mΩ: ±240 ±50	5		
	5 ~ 25	Karma	±40	5		
	5 ~ 25	FeCrAl	±40	5		

Marking

The resistance value of the product is expressed in two ways:

1. The decimal point of Ω is indicated by the character “R”,
2. Using “m” to indicate the decimal point of mΩ.

Eg.:

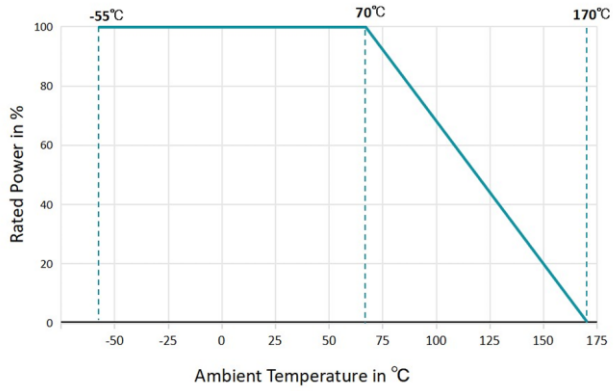
R001 1% = 1mΩ 1%;
0m50 1% = 0.5mΩ 1%;
2m50 1% = 2.5mΩ 1%

Performance

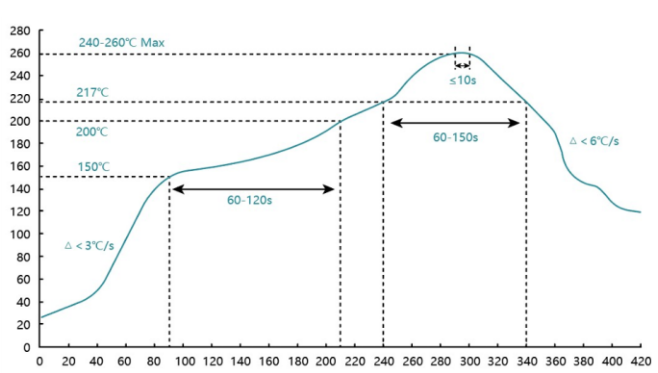
Test items	Reference	Conditions	Test limits
Temperature coefficient of resistance	AEC-Q200 TEST 19 IEC 60115-1 4.8	Measuring points 25°C and +125°C, reference point +25°C	see chart
High temperature exposure (storage)	AEC-Q200-REV D-Test 3 MIL-STD202 Method 108	T =170°C,1000, Measurement at 24h after test conclusion.	△R≤±1%
Temperature cycling	AEC-Q200-REV D-Test 4 JESD22 Method JA-104	1000 cycles (-55°C to 125°C) Measurement at 24hrs after test conclusion.	△R≤±0.5%
Short time overload	IEC60115-1 4.13	5 X rated power for 5s	△R≤±0.5%
Biased humidity	AEC-Q200-REV D-Test 7 MIL-STD-202 Method 103	10% Rated power at 85°C, RH:85%, 1000h, Measurement at 24h after test conclusion.	△R≤±0.5%
Load life	AEC-Q200-REV D-Test 8 MIL-STD-202 Method 108	1000h at +70°C, 1.5 h "ON", 0.5h "OFF", Measurement at 24h after test conclusion.	△R≤±1%
Resistance to soldering heat	AEC-Q200-REV D-Test 15 MIL-STD-202 Method 210	T=260±5°C solder, 10±1 sec dwell	△R≤±0.5%
Mechanical shock	AEC-Q200-REV D-Test 13 MIL-STD-202 Method 213	100g's, Normal duration is 6ms, half sine shock pulse	△R≤±0.5%
Solderability	AEC-Q200-REV D-Test 18 J-STD-002	Dip the terminal in a flux and then dip into a soldering bath at 245±5°C for 3±0.5s	>95% area covered

Characteristic curves

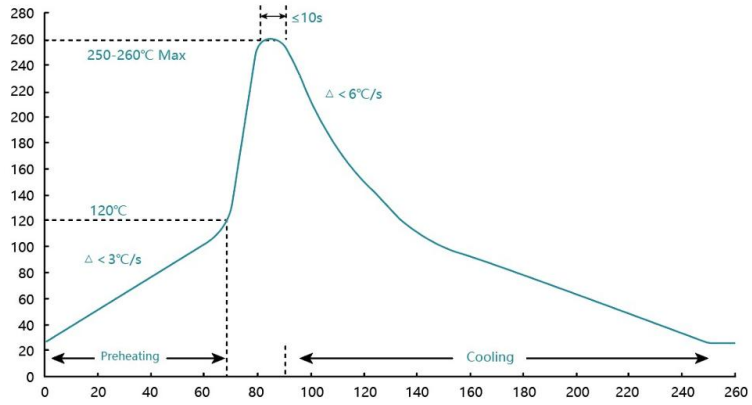
Derating curve



Recommend reflow soldering profile



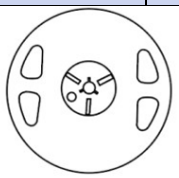
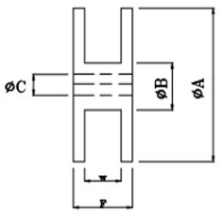
Recommend wave soldering profile

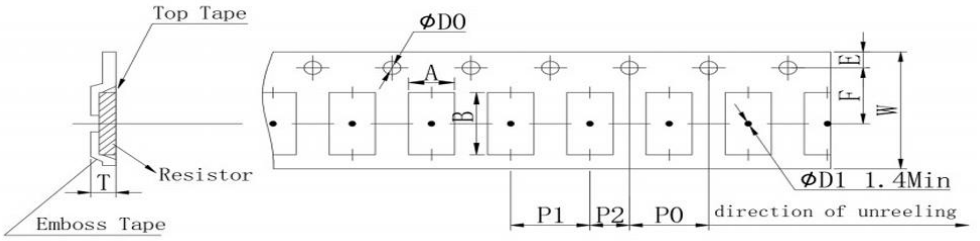


Hand soldering temperature

The iron temperature is 350±10℃, hand soldering time less than 3S. Avoid solder iron tip direct touch the components body.

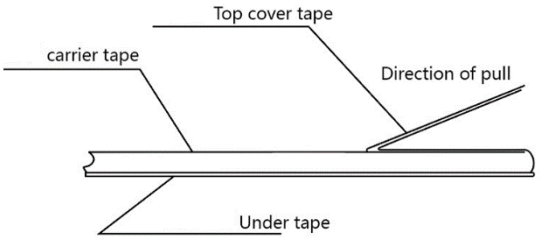
Tapping specifications

Reel dimensions								
Type	**Size**		**Unit**	**ΦA**	**ΦB**	**ΦC**	**F**	**W**
		Reel 						
4312	13”	2K/reel	mm	330±2.0	100±1.0	13.5±1.0	29.0±2.0	24.5±0.2
4320	13”	1K/reel	mm	330±2.0	100±1.0	13.5±1.0	29.0±2.0	24.5±0.2

Packing dimensions										
Size	A±0.2	B±0.2	W±0.2	E±0.1	F±0.1	P0±0.1	P1±0.1	P2±0.1	ΦD0	T
 unit: mm										
4312	4.3	12.5	24	1.75	11.5	4.0	8.0	2.0	1.5	3.7
4320	7.0	12.5	16	1.75	11.5	4.0	12	2.0	1.5	4.0

Peel force of top cover tape

The top cover tape is pulled at a speed of 200mm/min with the angle between the tape during peel and the direction of unreeling maintained at 165 to 180 degree as following picture. The peel force of paper carrier tape shall be 0.1N to 0.7N (10 to 70g), the peel force of plastic carrier tape shall be 0.3N to 1N (30 to 100g).



Instruction for use

Environmental Considerations

The use of products in the following environments may adversely affect performance:

1. High-temperature environments.
2. Coastal areas or environments containing corrosive gases, such as Cl_2, H_2S, NH_3, SO_2, and NO_2.
3. Exposure to liquids such as water, oil, chemicals, or organic solvents.
4. Encapsulation or coating of products with resin, paint, or other sealing materials.
5. Cleaning after soldering using water or water-soluble cleaning agents. Product compatibility with the cleaning process should be verified before use.
6.

Storage and Transportation Conditions

1. Storage temperature: 25±5°C
2. Relative humidity: 30% ~ 70% RH
3. Storage life: 2 years (FIFO recommended)
4. During storage and transportation, maintain the correct orientation of the packaging. Do not drop, impact, or stack packages improperly, as this may damage the product body or terminals.

Disclaimer

Akyga passive reserves the right to make changes without notice to any product specification herein, to make corrections, modifications, enhancements or other changes. Akyga passive or anyone on its behalf assumes no responsibility or liability for any errors or inaccuracies. Data sheet specifications and its information contained are intended to provide a product description only. "Typical" parameters which may be included on Akyga passive data sheets and/ or specifications can and do vary in different applications and actual performance may vary over time. Akyga passive does not assume any liability arising out of the application or use of any product or circuit. Akyga passive products are not designed, intended or authorized for use in medical, life-saving implant or other applications intended for life-sustaining or other related applications where a failure or malfunction of component or circuitry may directly or indirectly cause injury or threaten a life without expressed written approval of Akyga passive. Customers using or selling Akyga passive components for use in such applications do so at their own risk and shall agree to fully indemnify Akyga passive and its subsidiaries harmless against all claims, damages and expenditures.