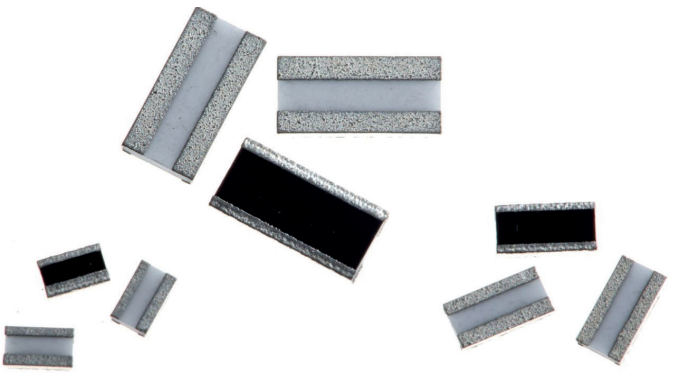
Thick Film High Power Chip Resistor

WHPC Series



Features

- Double the standard power for size
- Inverse terminated versions
- Small footprint
- Excellent pulse performance
- Extra-high-power range
- AEC-Q200 Qualified

All parts are Pb-free and comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

Electrical Data

Standard range		**1206**	**2010**	**0612**	**1020**	**1218**	**1225**
Power rating @70°C	watts	0.5	1.0	0.5	1.0		1.5
Resistance range	ohms	1R0 to 10M		1R0 to 1M			10R to 1M
Limiting element voltage	volts	200					
Standard values		E24 (1% & 5%) & E96 (1%)					
Tolerance	%	1, 5		≤10R:5 >10R:1, 5		1, 5	
TCR(-55ºC to 155ºC)	ppm/°C	≤10R: 200 >10R-1M0: 100 >1M0: 200		<10R: 400 10R-100R: 200 >100R: 100			
Ambient temperature range	°C	-55 to +155					
Pad / trace area *	mm²	50	60	40	50	50	90

*Recommended minimum pad & adjacent trace area for each termination for rated power dissipation on FR4 PCB

Extra-high-power range		**0508X**	**0612X**	**1020X**
Power rating @ 70°C	watts	1	1.5	2
Resistance range	ohms	1R0 to 1M		
Limiting element voltage	volts	200		
Standard values		E24 (1% & 5%) &E96 (1%)		
Tolerance	%	0.5, 1, 5		
TCR (-55°C to 155°C)	ppm/°C	<10: 150 ≥10: 100	100	<10: 150 ≥10: 100
Ambient temperature range	°C	-55 to +155		
Pad/trace area*	mm²	50	60	80

*Recommended minimum pad & adjacent trace area for each termination for rated power dissipation on FR4 PCB

General Note
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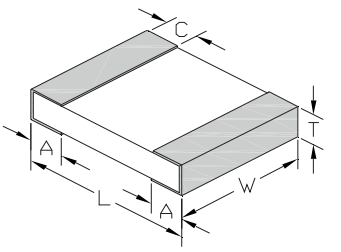
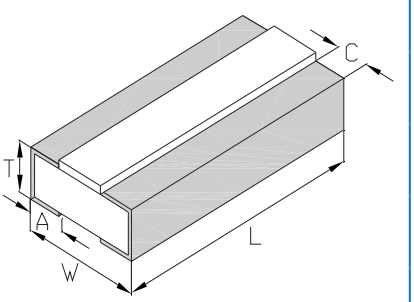
Physical Data

Dimensions (mm) & weight (mg)						
	L	**W**	**T**	**A**	**C**	**Wt.**
1206	3.1±0.1	1.55±0.1	0.55±0.1	0.5±0.2	0.5±0.25	9
2010	5.0±0.2	2.5±0.15	0.55±0.1	0.5±0.2	0.6±0.25	25
0508X	2.0±0.1	1.25±0.1	0.55±0.1	0.3±0.15	0.3±0.15	5
0612	3.2±0.15	1.6±0.15	0.55±0.1	0.3±0.2	0.45±0.2	10
0612X	3.0±0.15	1.55±0.1	0.55±0.1	0.25±0.15	0.4±0.15	9
1020	5.0±0.15	2.5±0.15	0.55±0.1	0.4±0.2	0.6±0.2	26
1020X	5.0±0.1	2.45±0.15	0.60±0.15	0.35±0.2	0.7±0.2	26
1218	4.6±0.15	3.1±0.1	0.55±0.1	0.4±0.2	0.45±0.2	27
1225	6.25±0.15	3.1±0.15	0.55±0.1	0.65±0.2	0.45±0.2	39





Construction

Thick-film electrodes, resistor material, overglaze and organic protection are screen printed on an alumina substrate. Wrap-around terminations have an electroplated nickel barrier and matt tin plating; this ensures excellent leach resistance properties and solderability.

Marking

5% parts are marked with 3 digits. The first two digits are significant figures and the third digit is the number of zeros to follow. The letter “R” represents a decimal point.

1% parts have four digits, the first three digits are significant figures and the fourth digit is the number of zeros to follow. The letter “R” represents a decimal point.

Solvent Resistance

The body protection is resistant to all normal industrial cleaning solvents suitable for printed circuits.

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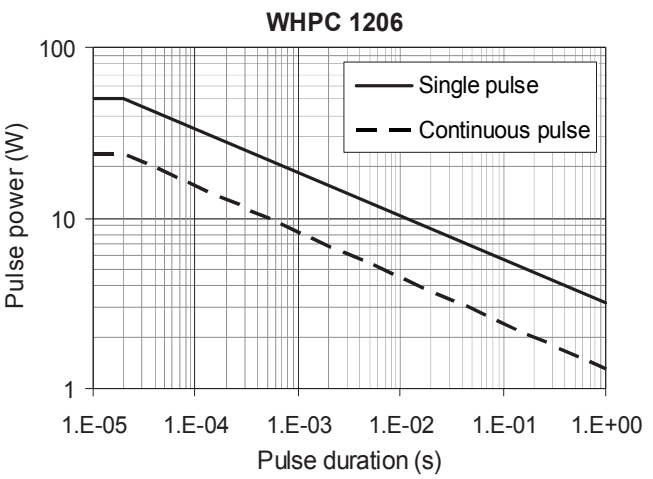
Performance Data

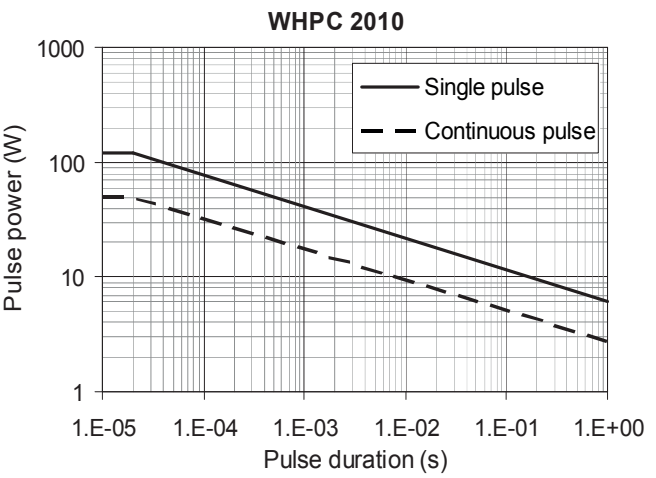
AEC-Q200 Table 7 ref.	Test	Method	Max. (+0.05Ω except where stated) Range:	Standard 1%	Standard 5%	Extra-high-power	Typ.
3	High Temp. Exposure *	MIL-STD-202 Method 108	±ΔR%	1	3	1	0.15
4	Temperature Cycling	JESD22 Method JA-104	±ΔR%	0.5	1.5 +0.1Ω	0.5	0.1
6	Moisture Resistance	MIL-STD-202 Method 106	±ΔR%	2 +0.1Ω	3 +0.1Ω	N/A	0.05
7	Biased Humidity *	MIL-STD-202 Method 103	±ΔR%	2	3 +0.1Ω	1+0.1Ω	0.2
8	Operational Life (Cyclic Load) *	MIL-STD-202 Method 108	±ΔR%	2	3 +0.1Ω	1+0.1Ω	0.2
14	Vibration	MIL-STD-202 Method 204	±ΔR%	0.5	1	0.5	0.1
15	Resistance to Soldering Heat *	MIL-STD-202 Method 210	±ΔR%	1		0.5	0.05
16	Thermal Shock *	MIL-STD-202 Method 107	±ΔR%	0.5	1	N/A	0.05
18	Solderability *	J-STD-002	>95% coverage				
21	Board Flex *	AEC-Q200-005	±ΔR%	1		1	0.25
22	Terminal Strength	AEC-Q200-006	no damage				
	Climatic *	Category 55/155/42	±ΔR%	2	3	N/A	0.2
	Short Term Overload *	6.25 x Pr or 2 x LEV for 5s	±ΔR%	1.5	2 +0.1Ω	1	0.15
	Pulse Loading Capability	10,000 pulses @70°C See graphs below	±ΔR%	2		N/A	0.5
	Insulation Resistance *	400V for 1 minute	≥10G				

1. Full AEC-Q200 qualification applies to 1206 and 2010 sizes, 0508X, 0612X & 1020X. Other sizes received the tests marked *.

Pulse Loading Capability

Test condition: 10,000 pulses at 70ºC. Single pulse condition has mean power ≤ 10% of Pr. Continuous pulse condition has mean power = Pr.





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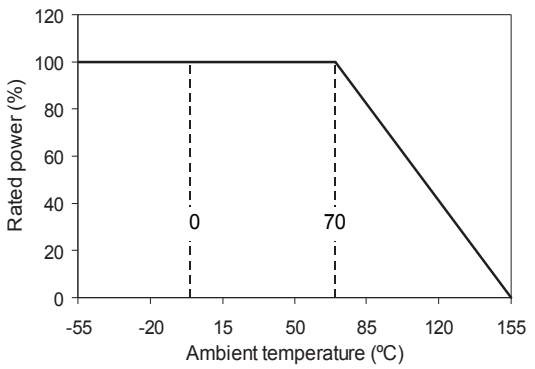
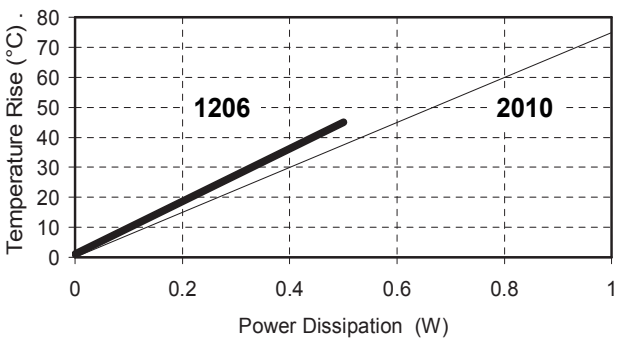
De-Rating Curve

WHPC All Sizes

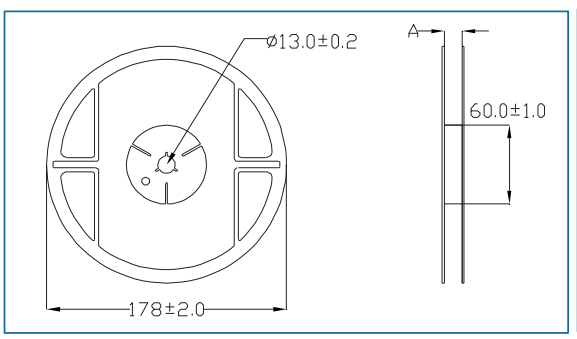


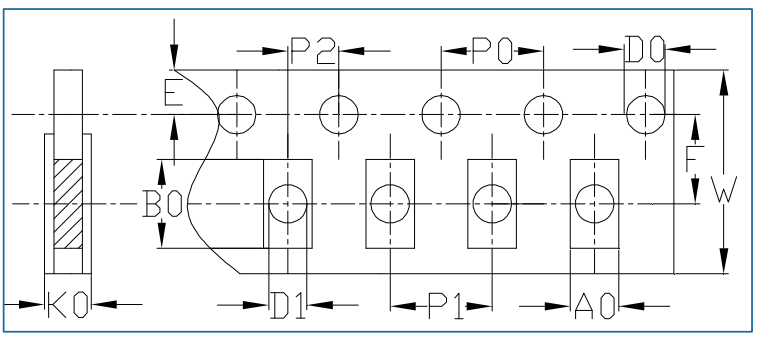
Temperature Rise (hotspot)

WHPC 1206 and 2010



Packaging





Tape dimensions in mm

Type	W ±0.3	P1 ±0.1	P0 ±0.1	P2 ±0.05	D0 ±0.1	D1 ±0.2	E ±0.1	F ±0.05	A0 ±0.2	B0 ±0.2	K0 ±0.1	A ±1
1206	8.0	4.0	4.0	2.0	1.5	1.0	1.75	3.5	1.9	3.5	0.85	9
2010	12.0	4.0	4.0	2.0	1.5	1.5	1.75	5.5	2.79	5.5	1.2	13.0
0508	8.0	4.0	4.0	2.0	1.5	N.A	1.75	3.5	1.6	2.4	0.85	12.5
0612	8.0	4.0	4.0	2.0	1.5	N.A	1.75	3.5	2.0	3.60	0.81	10.0
1020	12.0	4.0	4.0	2.0	1.5	N.A	1.75	5.5	2.8	5.40	0.75	13.8
1218	12.0	4.0	4.0	2.0	1.5	1.5	1.75	5.5	3.5	4.80	1.0	13.8
1225	12.0	4.0	4.0	2.0	1.5	1.5	1.75	5.5	3.5	6.70	1.0	13.8

Ordering Procedure

Example: WHPC1206-10KFT5 (WHPC1206, 10 kilohms ±1%, Pb-free)

W	H	P	C	1	2	0	6		-	1	0	K		F	T	5
1				2				3		4				5	6	

1 Series	2 Size	3 Range	4 Value	5 Tolerance	6 Packing		
WHPC	1206	Omit for Standard	E24 = 3/4 characters	F = ±1%	T5	1206, 0508, 0612	5000/reel
	2010	X = Extra-high-power	E96 = 3/4 characters	J = ±5%	T4	2010, 1020, 1218, 1225	4000/reel
	0508	(0508, 0612, 1020 only)	R = ohms				
	0612		K = kilohms				
	1020		M = megohms				
	1218						
	1225						

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