

## General Purpose Surface Mounted Resistors

### WCR Series

- Excellent reliability
- Wide range of sizes and ohmic values
- Wrap around terminations
- Inner electrode protection
- AEC-Q200 grade available



All parts are Pb-free and comply with EU Directive 2011/65/EU (RoHS2)

### Electrical Data

		0201	0402	0603	0805	1206	1210	2010	2512
Power rating @ 70°C	watts	0.05	0.063	0.1	0.125	0.25	0.25	0.5	1.0
Resistance range	ohms	10R to 1M0	1R0 to 1M0	1R0 to 10M					
Limiting element voltage	volts	25	50	150	200				
TCR*	ppm/°C	250	100		200				
Resistance Tolerance	%	1							
Standard values		E24 or E96							
Ambient temperature range	°C	-55 to 155							
Zero-ohm Jumper Chip Rating	amps	0.5	1	1.5	2				
Zero-ohm Jumper Chip Resistance	milliohms	<50							

\* Notes – TCR for low values 1R to 10R: -400 to +600ppm/°C, 11R to 100R: ±200ppm/°C  
TCR for high values 3M3 to 10M: ±300ppm/°C

### Physical Data

Dimensions (mm)					
Style	L	W	T	C	A
0201	0.6 ± 0.03	0.3 ± 0.03	0.23 ± 0.03	0.12 ± 0.05	0.15 ± 0.05
0402	1.0 ± 0.1	0.5 ± 0.05	0.35 ± 0.05	0.2 ± 0.1	0.25 ± 0.1
0603	1.6 ± 0.15	0.8 ± 0.15	0.5 ± 0.15	0.25 ± 0.2	0.25 ± 0.2
0805	2.0 ± 0.2	1.25 ± 0.2 - 0.1	0.5 ± 0.15 - 0.10	0.4 ± 0.2	0.4 ± 0.2
1206	3.2 + 0.1 - 0.25	1.6 + 0.1 - 0.15	0.55 + 0.15 - 0.1	0.5 + 0.2 - 0.25	0.5 + 0.2 - 0.25
1210	3.2 + 0.1 - 0.2	2.6 ± 0.15	0.55 + 0.15 - 0.1	0.5 ± 0.25	0.5 ± 0.2
2010	5.0 ± 0.15	2.5 ± 0.15	0.56 ± 0.15	0.60 ± 0.25	0.60 ± 0.25
2512	6.3 ± 0.15	3.2 ± 0.15	0.56 ± 0.15	0.60 ± 0.25	1.2 ± 0.85



Wrap-around terminations (3 faces)

### Construction

The chips have a high alumina substrate (96% minimum) with a ruthenium oxide resistance element and silver palladium, nickel and tin plated terminations. A glazed protection coat is applied to the resistive element (See Fig.1)

### Terminations

**Solderability** The terminations meet the requirements of IEC 115-1, Clause 4.17.3.2.

**Strength** The terminations meet requirements of IEC 68.2.21.

Figure 1



### General Note

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Marking

All resistors are individually marked with 3 digits. The first two digits are the significant figures and the third defines the number of added zeros. Jumpers are marked 000. Types 0201 and 0402 have no marking.

E96 1% components that can not be marked with 4 digits will be marked with a standard 3 digit code. Details can be supplied upon request.

Solvent Resistance

The protective epoxy lacquer and marking are resistant to all normal industrial cleaning fluids suitable for printed circuits.

Table 1

Resistance value ohms	Noise dB
≤100R	-10
>100R, ≤10K	0
>10K, ≤100K	+15
>100K, ≤1M0	+20
>1M0	+30

Performance Data

		Maximum Change							
		0201	0402	0603	0805	1206	1210	2010	2512
Load: 1000 hrs at 70°C	Δ R%	10R-100K : 1 >100K : 2	4R7-100K : 1 >100K : 2	1R-100K : 1 >100K : 2	1R-100K : 1 >100K : 2	1R-100K : 1 >100K : 2	1R-100K : 1 >100K : 2	1R-100K : 1 >100K : 2	3% + 0.1R
Shelf life: 12 months at room temp.	Δ R%	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Derate linearly to zero from 70°C		zero @ 155 °C							
Short term overload (6.25 x rated power)	Δ R%	2	2	2.5	2.5	2.5	2.5	2.5	5
Max voltage	volts	50	100	100	200	400	400	400	400
Climatic	Δ R%	3	3	3	3	3	3	3	3
Climatic Category		55/125/56							
Long term damp heat	Δ R%	1							
Temperature rapid change	Δ R%	1	1	1	1	1	1	1	1
Resistance to solder heat	Δ R%	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Vibration and bump	Δ R%	1	1	1	1	1	1	1	1
Noise		see table 1							
Insulation resistance	ohms	> 1G							
Voltage proof	volts		100	300	500	500	500	500	500

Packaging

All chips are tape mounted and supplied on standard 8mm tape reel, as IEC publication 286-3.

180mm (7 inch) reel is standard

250mm (10 inch) reel carrying double the standard quantity can be supplied by agreement.

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## Ordering Procedure

This product has two valid part numbers:

**European (Welwyn) Part Number: WCR1206-10KFI** (1206, 10 kilohms  $\pm 1\%$ , Pb-free)

W	C	R	1	2	0	6	-	1	0	K	F	I
1			2			3			4		5	

1 Type	2 Size	3 Value <sup>1</sup>	4 Tolerance <sup>1</sup>	5 Grade / Packing			
WCR	0201	E24 = 3 characters	F = $\pm 1\%$	I = Standard			
	0402	E96 = 4 characters		A = AEC-Q200 grade <sup>2</sup>			
	0603	R = ohms		Both grades use standard packing as follows:			
	0805	K = kilohms					
	1206	M = megohms				0201	20000/reel
	1210					0402	10000/reel
	2010					0603, 0805, 1206, 1210	5000/reel
	2512			2010, 2512	4000/reel		

Note 1: For zero ohm jumper chips use the dummy value & tolerance code **R005J**

Note 2: AEC-Q200 grade on resistor chips is not available in 0201 size.

**USA (IRC) Part Number: WCR-WCR1206LF-1002FPLT** (1206, 10 kilohms  $\pm 1\%$ , Pb-free)

W	C	R	-	W	C	R	1	2	0	6	L	F	1	0	0	2	F	P	L	T
1		2			3			4		5			6		7					

1 Family	2 Model	3 Size	4 Termination	5 Value	6 Tolerance	7 Packing		
WCR	WCR	0201	LF = Pb-free	3 digits + multiplier R = ohms for values <100 ohms	F = $\pm 1\%$	PLT = Paper Tape		
		0402				0201	20000/reel	
		0603				0402	10000/reel	
		0805				0603, 0805, 1206, 1210		5000/reel
		1206						
		1210						
		2010				ELT = Plastic Tape		
		2512				2512	4000/reel	

Note: For zero ohm jumper chips use value & tolerance code **R000J**

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