

# General Purpose Surface Mounted Resistors

## WCR Series

### Features

- 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 amended by (EU) 2015/863 (RoHS3)

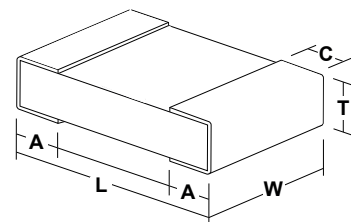
## Electrical Data

		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					
Resistance Range AEC-Q200	ohms	10R to 1M0							
Limiting element voltage	volts	25	50	75	150	200			
TCR*	ppm/°C	200	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							

## Physical Data

\* 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

Dimensions (mm)					
Style	L	W	T	C	A
0201	0.6 ± 0.03	0.3 ± 0.03	0.23 ± 0.03	0.1 ± 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 ± 0.1	0.8 ± 0.1	0.45 ± 0.1	0.3 ± 0.2	0.3 ± 0.2
0805	2.0 ± 0.15	1.25 + 0.15 - 0.1	0.55 ± 0.1	0.4 ± 0.2	0.4 ± 0.2
1206	3.1 ± 0.15	1.55 + 0.15 - 0.1	0.55 ± 0.1	0.45 ± 0.2	0.45 ± 0.2
1210	3.1 ± 0.1	2.6 ± 0.2	0.55 ± 0.1	0.5 ± 0.25	0.5 ± 0.2
2010	5.0 ± 0.1	2.5 ± 0.2	0.55 ± 0.1	0.60 ± 0.25	0.5 ± 0.2
2512	6.35 ± 0.1	3.2 ± 0.2	0.55 ± 0.1	0.60 ± 0.25	0.5 ± 0.2



Wrap-around terminations (3 faces)

### Construction

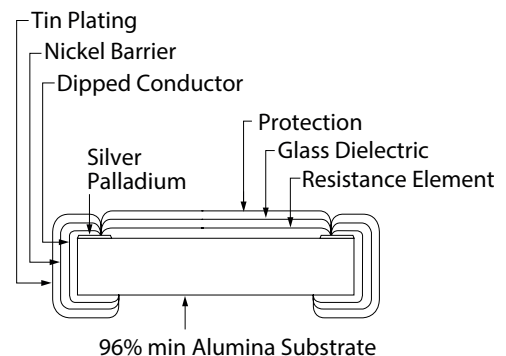
The chips have a high alumina substrate (96% minimum) with a ruthenium oxide resistance element and silver palladium, nickel and tin plated terminations. A glazed protection coat is applied to the resistive element (See Fig.1)

### Terminations

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

**Strength** The terminations meet requirements of IEC 68.2.2.1.

Figure 1



### General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

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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 in 1210 size and smaller are packed in 8mm paper tape, whilst 2010 and 2512 sizes are on 12mm plastic tape, reeled as IEC publication 286-3. The standard reel is 180mm (7 inch) but 250mm (10 inch) reels 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	2	3	4	5	
Type	Size	Value <sup>1</sup>	Tolerance <sup>1</sup>	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-1002-F-P-LT** (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										

Family	1	3	4	5	6	7	
	Model	Size	Termination	Value	Tolerance	Packing	
WCR	WCR	0201	LF = Pb-free	3 digits + multiplier	F = $\pm 1\%$	P-LT= Paper Tape	
		0402				0201	20000/reel
		0603		0402		10000/reel	
		0805		0603, 0805, 1206, 1210		5000/reel	
		1206		E-LT = Plastic Tape			
		1210		2010, 2512		4000/reel	
		2010					
		2512					

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