Resistors

Green Thick-Film Chip Resistors

GWCR Series

- Completely free of Pb and its compounds
- RoHS compliant without exemption
- Sizes 01005 to 2512
- Values 1R0 to 10M

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

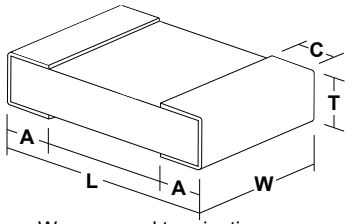
Electrical Data

		01005	0201	0402	0603	0805	1206	1210	1812	2010	2512
Power rating @ 70°C	watts	0.031	0.05	0.063	0.1	0.125	0.25	0.5	0.75		1
Resistance range	ohms	10R-1M0	1R0 – 10M								
Limiting element voltage	volts	15	25	50	75	150	200				250
TCR	ppm/°C	10R: ±600, 10R2- 100R: ±400, >100R: ±250	1R0 – 10R: ±400, >10R: ±200	1R0 – 10R: ±400, 10R2- 100R: ±200, >100R: ±100							
Resistance tolerance	%	±1									
Standard values		E24 or E96									
Ambient temperature range	°C	-55 to 155									
Dielectric withstand	volts	N/A		100	300	500					
Insulation resistance	ohms	N/A		≥1G0							
Zero-ohm jumper chip rating	amps	0.5		1		2					
Zero-ohm resistance	milliohms	<50									

Physical Data

Dimensions (mm) and Weight (mg)

	L	W	T	C	A	Wt (nom.)
01005	0.40 ± 0.02	0.2 ± 0.02	0.13 ± 0.05	0.10 ± 0.05	0.10 ± 0.03	0.2
0201	0.6 ± 0.03	0.30 ± 0.03	0.23 ± 0.05	0.10 ± 0.05	0.15 ± 0.05	0.3
0402	1.00 ± 0.10	0.50 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.25 ± 0.10	0.5
0603	1.60 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20	2.2
0805	2.00 ± 0.15	1.25 ± 0.15	0.55 ± 0.10	0.40 ± 0.20	0.40 ± 0.20	4.7
1206	3.10 ± 0.15	1.55 ± 0.15	0.55 ± 0.10	0.45 ± 0.20	0.45 ± 0.20	8.5
1210	3.10 ± 0.15	2.60 ± 0.20	0.55 ± 0.10	0.50 ± 0.20	0.50 ± 0.20	17.2
1812	4.50 ± 0.20	3.20 ± 0.20	0.55 ± 0.10	0.50 ± 0.20	0.50 ± 0.20	29.5
2010	5.00 ± 0.10	2.50 ± 0.10	0.55 ± 0.10	0.60 ± 0.25	0.50 ± 0.20	24.8
2515	6.35 ± 0.10	3.20 ± 0.10	0.55 ± 0.10	0.60 ± 0.25	0.50 ± 0.20	34.3

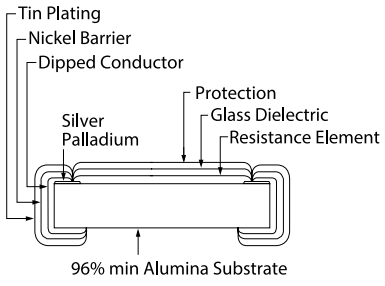


Wrap-around terminations
(3 faces)

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 fig1)

Figure 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

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.

BI Technologies IRC Welwyn

www.ttelectronics.com/resistors

GWCR Series

Marking

Where size permits, resistors are individually marked with three or four digits. The first two or three digits are the significant figures and the final one defines the number of added zeros. Lower values use "R" as a decimal point. Zero ohm jumpers are marked "0". E96 value 0603 parts are marked with the EIA-96 standard 3-character code. Sizes below 0603 have no marking.

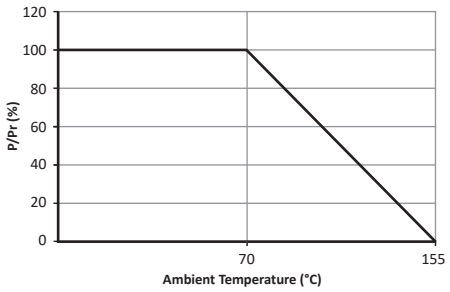
Solvent Resistance

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

Performance Data

		01005	0201	All other sizes
Load (1000 hrs @70°C)	**±ΔR%**	3	1	
Shelf life (12 months)	**±ΔR%**	0.2		
Short term overload (6.25x Pr or 2.5x LEV for 5s)	**±ΔR%**	2	1	
Climatic category		55 / 155 / 56		
Damp heat (240 hrs @40°C, 90-95%RH)	**±ΔR%**	3	0.5	
Damp heat load (1000 hrs @40°C, 90-95%RH)	**±ΔR%**	3	1	
Temperature cycle (5 cycles, -55/+155°C)	**±ΔR%**	1	0.5	
Resistance to solder heat (260±5°C for 10±1s)	**±ΔR%**	1		
Board flex (3mm/90mm for 60s)	**±ΔR%**	N/A		1

Derating Curve



Packaging

Sizes 01005 to 1210 are packed in 8mm wide paper tape. Sizes 1812 to 2512 are packed in 12mm plastic tape. All sizes are supplied on 178mm reels.

Ordering Procedure

Example: **GWCR1206-10KFT5** (GWCR1206 at 10 kilohms ±1%, Pb-free)

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

1 Type	2 Size	3 Value	4 Tolerance	5 Packing		
GWCR	01005	3/4 characters R = ohms K = kilohms M = megohms	F = 1%	T20	01005	20,000/reel
	0201		blank for zero ohm	T15	0201	15,000/reel
	0402			T10	0402	10,000/reel
	0603			T5	0603, 0805, 1206, 1210	5,000/reel
	0805	R000 = zero ohm		T4	1812, 2010, 2512	4,000/reel
	1206					
	1210					
	1812					
	2010					
	2512					

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