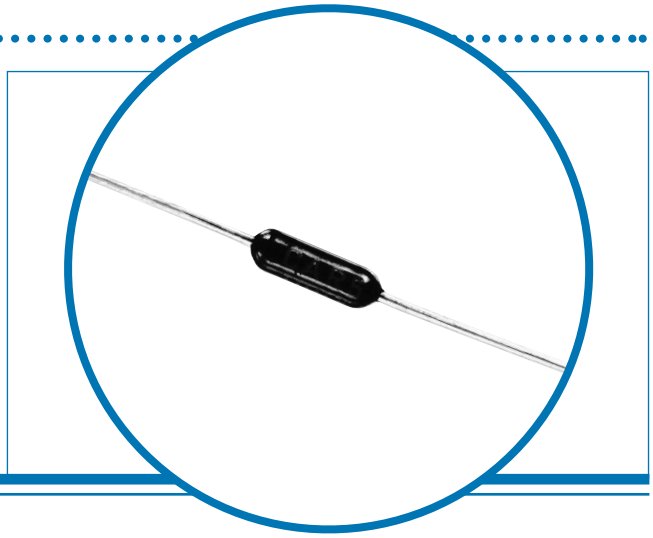
Ultra Precision Metal Film Resistors

TT electronics
Welwyn Components

CAR series

- **Tolerance down to 0.01%**
- **Low TCR's**
- **High reliability**
- **Superior moisture performance**
- **Non standard values available**
- **Highest stability metal film available**
- **Matched sets and networks**



Electrical Data

		CAR5	CAR6	CAR7	Notes
Power rating at 70°C	watts	0.25	0.33	0.5	
Power rating at 85°C	watts	0.125	0.25	0.33	
Resistance range	ohms	10R0 to 3M	10R0 to 5M	10R0 to 10M	
Limiting element voltage	volts	250	350	500	
TCR (20 to +70°C)	ppm/°C	5(V), 10(T), 15(Y), 25(D), 50(C)			See tolerance/TCR
Resistance tolerance	%	0.01(L), 0.02(P), 0.05(W), 0.1(B), 0.25(C), 0.5(D) & 1(F)			combinations
Standard values		E24, E96 preferred			below
Thermal impedance	°C/watt	110	70	60	
Ambient temperature range	°C	-55 to +155			

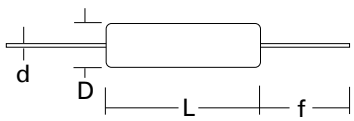
Table of Resistance Restrictions

	Tolerance								
TCR	**CAR5**			**CAR6**			**CAR7**		
ppm/°C	**0.01-0.02%**	**0.05%**	**0.1-1%**	**0.01/0.02%**	**0.05%**	**0.1-1%**	**0.01-0.02%**	**0.05%**	**0.1-1%**
5	50 to 300k	10 to 500k	10 to 500k	50 to 500k	10 to 500k	10 to 500k	50 to 750k	10 to 750k	10 to 750k
10	50 to 300k	10 to 1M	10 to 1M	50 to 500k	10 to 1M	10 to 1M	50 to 750k	10 to 1M	10 to 1.5M
15	50 to 300k	10 to 1M	10 to 1M	50 to 500k	10 to 1M	10 to 1M	50 to 750k	10 to 1M	10 to 3.5M
25	50 to 300k	10 to 1M	10 to 1.5M	50 to 500k	10 to 1M	10 to 3M	50 to 750k	10 to 1M	10 to 5M
50	50 to 300k	10 to 1M	10 to 3M	50 to 500k	10 to 1M	10 to 5M	50 to 750k	10 to 1M	10 to 10M

Physical Data

Dimensions (mm) and Weight (g)

Type	L Max	D Max	f min	d nom.	PCB mounting centres	Min Bend Radius	Wt. nom.
CAR5	7.2	2.5	30	0.6	10.2	0.6	0.24
CAR6	10.0	3.7	30	0.6	12.7	0.6	0.40
CAR7	15.5	5.5	30	0.8	18.4	1.2	1.15



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

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Welwyn
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TT electronics plc

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Construction

Ceramic rods are coated with a metal film and plated steel caps are force fitted. A helical cut is used to adjust the film to its final value.
Termination wires are welded to the caps and the resistor is protected with a specially formulated epoxy coating.

Terminations

Material Solder-coated copper wire.
Strength The terminations meet the requirements of IEC 68.2.21
Solderability The terminations meet the requirements of IEC 115-1, Clause 4.17.3.2

Marking

Type reference, TCR code, resistance value and tolerance code.
The resistance value marking conforms to IEC 62.

Solvent Resistance

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

Performance Data

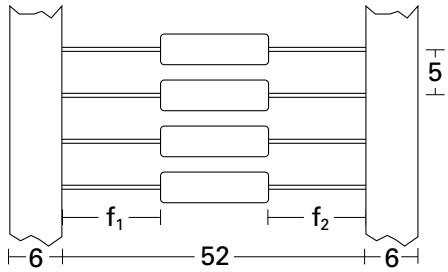
		Values 10 ≤ 250k		Values > 250k	
		Actual Performance		Actual Performance	
		Maximum	Typical	Maximum	Typical
Load at rated power : 1000 hrs at 70°C (or 85°C)	ΔR %	0.05	0.02	0.25	0.05
Dry heat : 1000 hrs at 155°C	ΔR %	0.15	0.08	1	0.2
Shelf life : 12 months at room temperature	ΔR %	0.01	0.003	0.04	0.02
Derating from rated power at 70°C (or 85°C)		Zero at 155°C		Zero at 155°C	
Short term overload	ΔR %	0.01	0.001	0.08	0.01
Climatic	ΔR %	0.05	0.02	0.2	0.05
Climatic category		55/155/56		55/155/56	
Long term damp heat	ΔR %	0.05	0.02	0.2	0.05
Temperature rapid change	ΔR %	0.04	0.02	0.25	0.05
Resistance to solder heat	ΔR %	0.02	0.003	0.05	0.005
Vibration and bump	ΔR %	0.02	0.002	0.06	0.02
Noise (in a decade of frequency)	μV/V	0.2	0.03	1	0.1
Voltage coefficient of resistance	ppm/V	0.3	<0.05	0.2	<0.05

Application Notes

Resistors can be supplied matched for tolerance and TCR down to ±0.005% and ±1ppm/°C, respectively, either as separate resistors or pre-assembled and encapsulated within a plastic box.

The individual resistors within a set or module can be manufactured with a tolerance of ±0.01% and a TCR of ±5ppm/°C.

Figure 1



Body location $f_1 - f_2 \leq 1.4$ mm

Standard Quantities Per Pack

Type	CAR5	CAR6	CAR7
Small box	250	125	25
Large box	1000	500	250
Reel	5000	2500	-
Ammo Pack	1000	1000	-

Packaging

CAR5 and CAR6 resistors are supplied taped (on reel or in ammo pack) or loose packed.
CAR7 resistors are supplied loose packed.

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