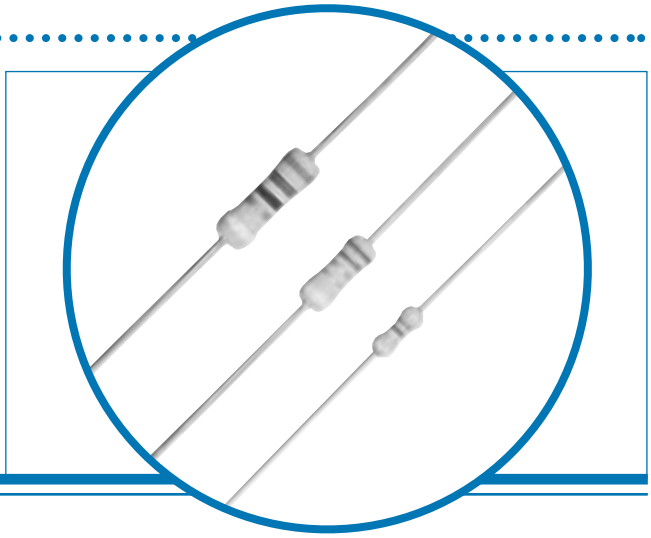
Fast Fusible Metal Film Resistors

TT electronics
Welwyn Components

WFF Series

- **Low power fusing**
- **Predictable fusing characteristics**
- **Flameproof protection**



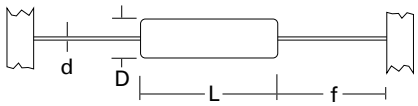
Electrical Data

		WFF1/4	WFF1/2	WFF1
Power rating at 70˚C	watts	0.25	0.5	1
Resistance range	ohms	0R1 - 10K	0R10 - 27K	0R2 - 1K5
Limiting element voltage	volts	250	350	350
TCR	ppm/˚C	250		
Resistance tolerance	%	5		
Standard values		E24 preferred		
Thermal impedance	˚C/watt	150	120	100
Ambient temperature range	˚C	-55 to 155		

Physical Data

Dimensions (mm) & Weight (g)

Type	L max	D max	f min	d nom	PCB mounting centres	Min. bend radius	Wt. nom
WFF1/4	6.2	2.5	21.0	0.6	10.2	0.6	0.3
WFF1/2	9.0	3.4	19.6	0.8	12.7	1.2	0.6
WFF1	12.5	4.2	17.8	0.8	18.4	1.2	0.9



Construction
The metal film is deposited on a high purity ceramic rod. End caps are force fitted and termination wires welded to the caps. The resistive film is adjusted to the required value by a special helical cut. A fuse aid coating is then applied. Finally a cement protection is applied to the resistor body prior to marking with indelible ink.

Terminations
Material Solder-coated copper wire.

Strength The terminations meet the requirements of IEC68.2.21.

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

Marking
Resistors are colour coded with 5 bands. Four of the bands are used to indicate values and tolerance, with IEC 62 colours being used. A fifth yellow band denotes constant voltage fusibility.

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

Flammability
The resistors will not burn or emit incandescent particles under any condition of applied temperature or power overload.

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.

Welwyn
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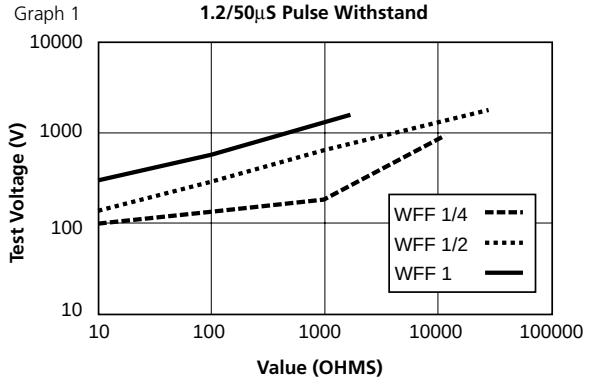
Performance Data

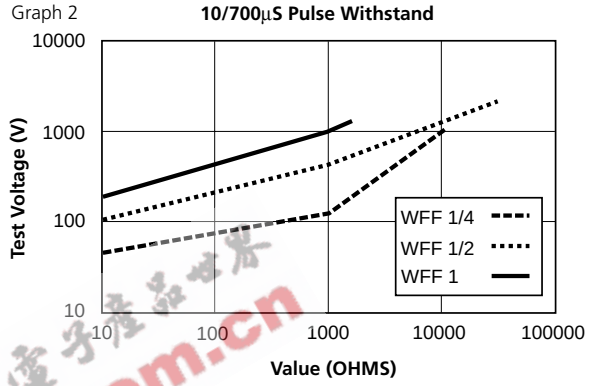
		Maximum
Load: 1000 hrs at 70˚C	ΔR%	3
Shelf life: 12 months at room temperature	ΔR%	2
Derating from rated power at 70˚C		zero at 155˚C
Temperature rapid change	ΔR%	0.5
Resistance to solder heat	ΔR%	0.5

Pulse Handling Graphs

Graph 1

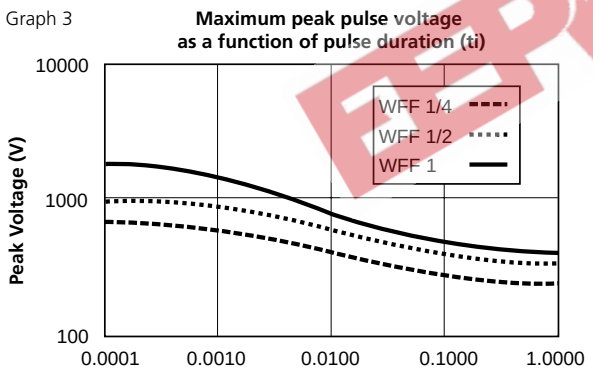


Graph 2

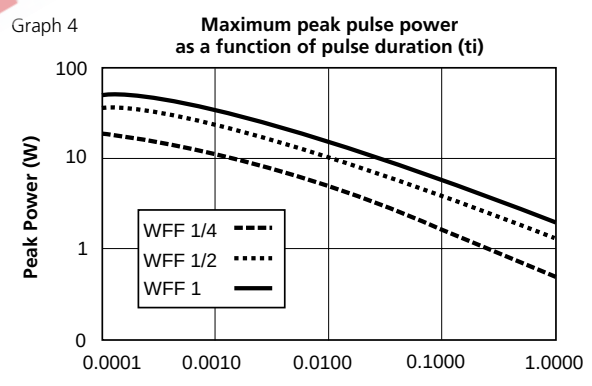


Above tests carried out in accordance with IEC 115.1. Change of value after test ±1%

Graph 3



Graph 4



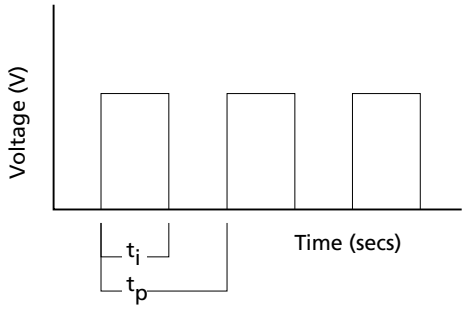
Test Method (for graph 3 and 4)

The resistor is subject to 10,000 pulses as shown in figure (1). Maximum resistance change due to test will not exceed 1%. Maximum pulse voltages are detailed in graph 3 above.

For any combination of power and pulse length (ti). tp is determined by the need to ensure that the average power does not exceed the rated power.

$$tp = \frac{\text{Applied Pulse Power}}{\text{Rated Power}} \times ti$$

Figure 1



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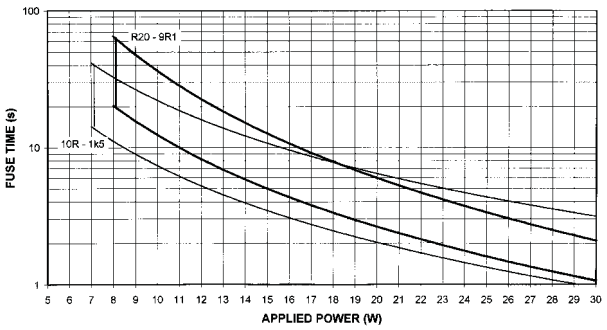
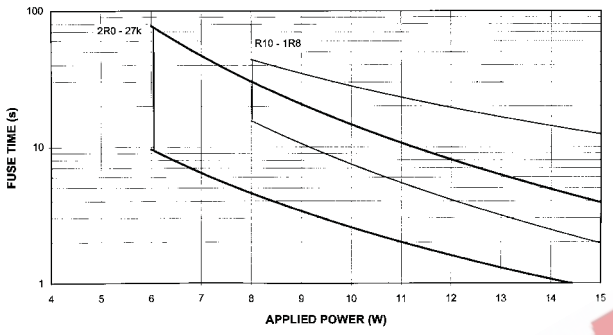
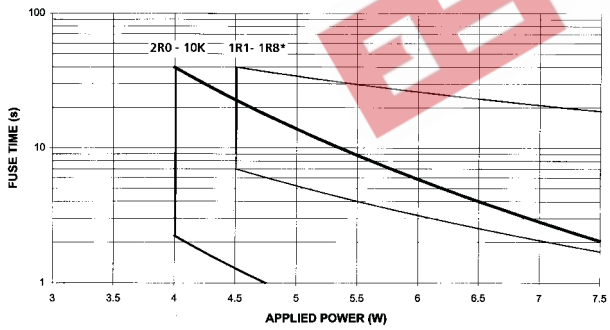
WFF1 FUSE TIMES



WFF1/2 FUSE TIMES



WFF1/4 FUSE TIMES



*Contact Welwyn for R10 - 1R0 fusing data

Fusing (Constant voltage)

After fusing the final resistance value will be ≥ 50 times the initial value.

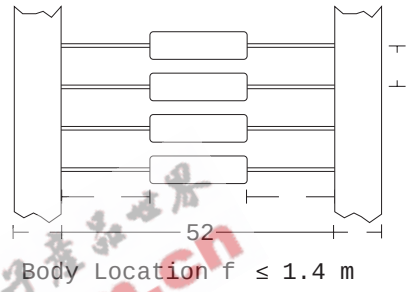
Packaging

All resistors are supplied tape packed ready for loading onto automatic sequencing and insertion machines.

The standard taping method and critical dimensions are shown in figure 2.

Lead Formed resistors can also be supplied. Standard options of Lancet, Radial and Goalpost forming are shown in Lead Form Information section.

Figure 2



Standard Quantities Per Package

Type	WFF1/4	WFF1/2	WFF1
Large ammo pack	5000	2500	1500

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