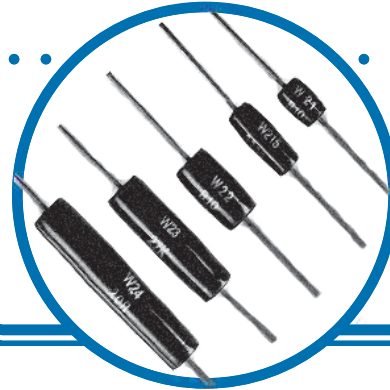


W20 Series

Vitreous Enamelled Wirewound Resistors

- High stability and reliability
- High purity ceramic substrate
- High power dissipation for size
- Suitable for harsh environments
- Rugged all-welded construction
- Impervious lead free vitreous enamel coating
- Overload characteristics ideal for protection circuits



Electrical Data

| IRC Type | Power Rating @ 25°C (watts) | Resistance Range (ohms) | Tolerance (±%) | TCR (-55°C to 200°C) (±ppm/°C) | Limiting Element Voltage (volts) | Thermal Impedance* (°C/watt) | Operating Temperature Range (°C) |
|----------|-----------------------------|-------------------------|----------------|--------------------------------|----------------------------------|------------------------------|----------------------------------|
| W21 | 3.0 | 1 - 10K | 1 | Typical: <+75 Maximum: +200 | 100 | 88 | -55 to 350 |
| | | 0.5 - 10K | 2 | | | | |
| | | 0.1 - 10K | 5 | | | | |
| W215 | 5.0 | 1 - 15K | 1 | Typical: <+75 Maximum: +200 | 160 | 58 | -55 to 350 |
| | | 0.5 - 15K | 2 | | | | |
| | | 0.1 - 15K | 5 | | | | |
| W22 | 7.0 | 1 - 20K | 1 | Typical: <+75 Maximum: +200 | 200 | 44 | -55 to 350 |
| | | 0.5 - 20K | 2 | | | | |
| | | 0.1 - 20K | 5 | | | | |
| W23 | 10.0 | 1 - 60K | 1 | Typical: <+75 Maximum: +200 | 500 | 29 | -55 to 350 |
| | | 1 - 60K | 2 | | | | |
| | | 0.15 - 60K | 5 | | | | |
| W24 | 14.0 | 1 - 100K | 1 | Typical: <+75 Maximum: +200 | 750 | 22 | -55 to 350 |
| | | 1 - 100K | 2 | | | | |
| | | 0.2 - 100K | 5 | | | | |

*See temperature rise graph

General Note

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

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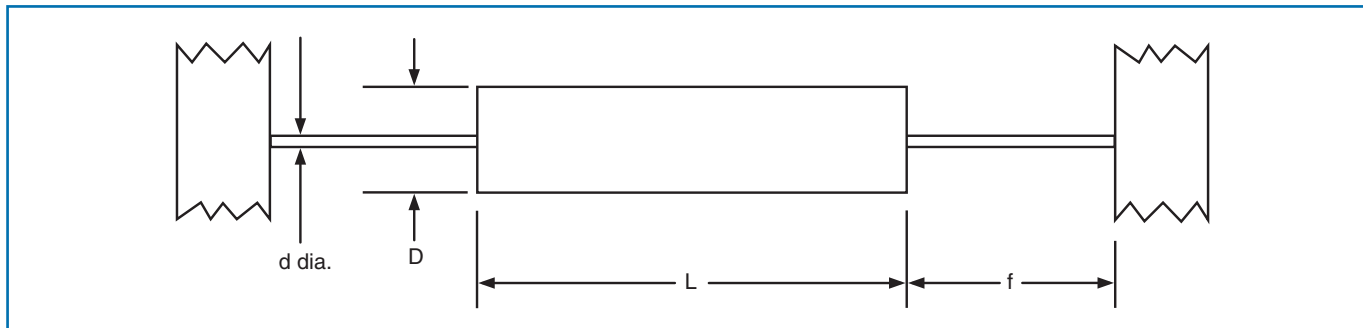
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W20 Series

Vitreous Enamelled Wirewound Resistors

Physical Data



Dimensions (mm) and Weight (g)

| IRC Type | L max | D max | f min | d nom | Wt. nom |
|----------|----------|----------|----------|----------|------------|
| W21 | 12.7 | 5.6 | 22.75 | 0.8 | 1 |
| W215 | 22.0 | 7.0 | 23.1 | 0.8 | 2 |
| W22 | 22.2 | 8.0 | 23.1 | 0.8 | 2 |
| W23 | 38.0 | 8.0 | --- | 0.8 | 3.5 |
| W24 | 53.5 | 8.0 | --- | 0.8 | 5 |

CONSTRUCTION

A high purity ceramic substrate is assembled with interference fit end caps to which are welded the termination wires. The resistive element is wound on the substrate and welded to the caps; the vitreous enamel protective coating is then applied.

TERMINATIONS

Material: Copper clad steel wire, nickel plated and solder-coated.

Length: W23's and W24's are not supplied on tape. Minimum length is 30mm.

MARKING

The resistors are legend marked with type reference, resistance value and tolerance.

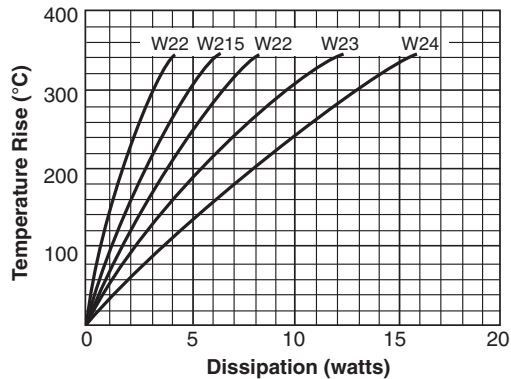
SOLVENT RESISTANCE

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

W20 Series

Vitreous Enamelled Wirewound Resistors

Temperature Rise Curve



Environmental Data

| Test | Actual Performance | |
|--|--------------------|----------|
| | Maximum | Typical |
| Load at Commercial Rating: 1000 Hours @ room temperature | $\Delta R\%$ 5 | 3.5 |
| Dry Heat: 1000 hours @ 200°C | $\Delta R\%$ 2 | 1 |
| Shelf Life: 12 months at room temperature | $\Delta R\%$ 0.03 | 0.02 |
| Short Term Overload | $\Delta R\%$.47 | 0.1 |
| Climatic | $\Delta R\%$ 0.5 | 0.2 |
| Long Term Damp Heat | $\Delta R\%$ 0.05 | 0.02 |
| Temperature Rapid Change | $\Delta R\%$ 0.5 | 0.2 |
| Resistance to Solder Heat | $\Delta R\%$ 0.25 | 0.03 |
| Vibration and Bump | $\Delta R\%$ 0.25 | 0.05 |
| Noise (In a Decade of Frequency) | $\mu V/V$ zero | zero |
| Robustness | $\Delta R\%$ 0.4 | 0.05 |
| Insulation Resistance | ohms >1 G ohm | >1 G ohm |
| Voltage Proof | volts 500 min | 500 min |

APPLICATION NOTES

The terminations should not be bent closer than 1.6mm from the body, and the recommended minimum bend radius is 1.2 mm. Terminations are solderable to within 4mm from the body.

When cold, vitreous enamel has excellent insulation resistance. In common with all insulations the specific resistance of the enamel decreases with increase in temperature. Therefore, resistors operated at near maximum temperature cannot be classed as insulated and should not be used in contact with any conducting material.

Care must be taken when determining clearance distance between the resistor body and printed circuit board or other components to ensure these are not overheated. Resistance is measured 6mm from the resistor body.

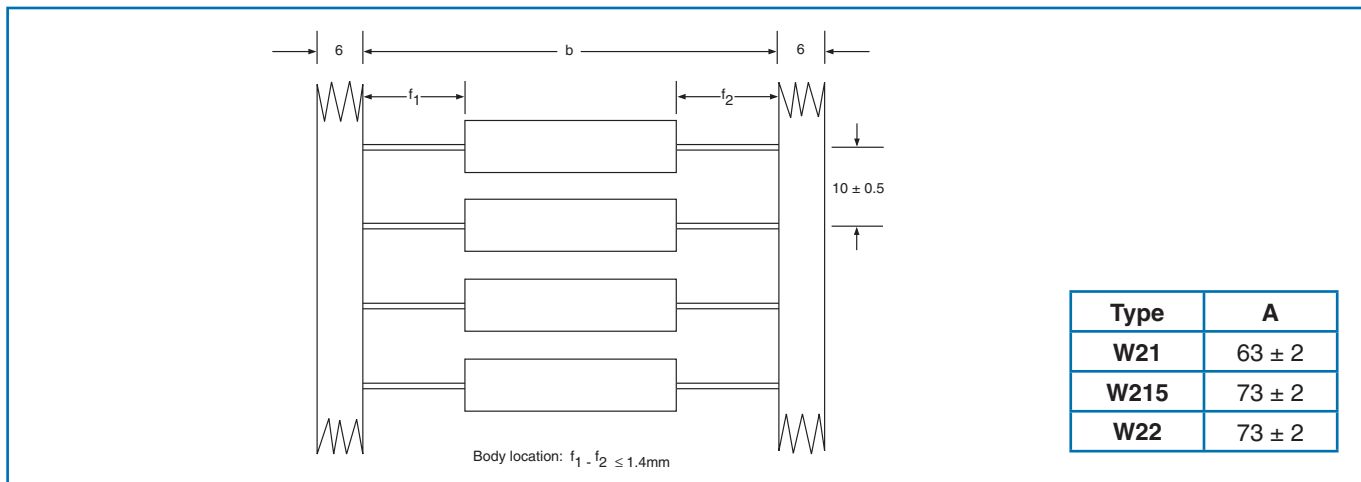
W20 Series

Vitreous Enamelled Wirewound Resistors

Packaging

For W21, W215, and W22 resistors the standard method of packaging is taped in ammo packs. Alternatives available by special request are:

- Taped and reeled
- Loose packed in boxes (minimum lead length 30mm). W23's and W24's are available only as loose packed in boxes.



Standard Quantities Per Package

| Type | Code | W21 | W215 | W22 | W23 | W24 |
|-----------|------|------|------|-----|-----|-----|
| Ammo Pack | A | 1000 | 600 | 500 | --- | --- |
| Reel | R | 1000 | 800 | 700 | --- | --- |
| Small Box | SB | 200 | 100 | 100 | 50 | 25 |
| Large Box | LB | 800 | 500 | 300 | --- | --- |

Ordering Data

Specify type, reference, etc. as indicated in this example of W21, 0.1KΩ, 5%, taped and ammo packed.

