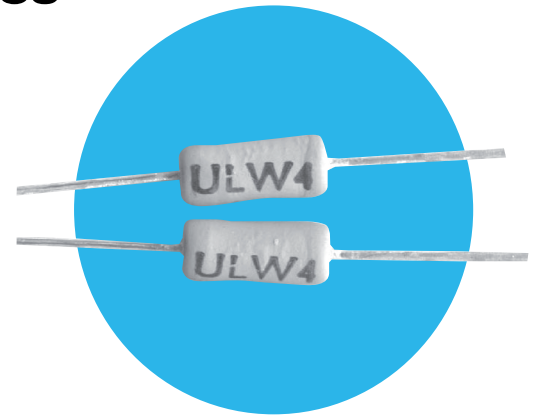


## UL Recognised Wirewound Resistors

### ULW Series

- UL1412 recognised fusible resistor \*
- Failsafe mains fusing at 120 / 240Vrms
- Inrush and surge withstanding
- UL94-V0 flameproof coating
- Surface mount ZI-form option

\* UL file number E234469.



All Pb-free parts comply with EU Directive 2011/65/EU (RoHS2)

### Electrical Data

		ULW2 / ULWP2R	ULW3	ULW4	ULW5
Power rating at 25°C	watts	2	3	4	5
5 second overload rating at 25°C	watts	10	15	20	25
Inrush / surge performance		See Pulse Performance graphs			
Resistance range	ohms	1R0 to 100R			
TCR	ppm/°C	±200			
Isolation voltage	volts	250	350	500	
Resistance tolerance	%	5			
UL recognised standard values	ohms	Any value in the range 1R0 to 100R is recognised. E24 preferred			
Thermal impedance	°C/watt	110	82	62	54
Ambient temperature range	°C	-55 to +155			

Note - no limiting element voltage applies; maximum continuous voltage is  $\sqrt{V(P.R)}$

### Physical Data

Dimensions (mm) and weight (g)								
Type	L Max	D Max	f min	d nom	PCB mount centres	Min bend radius	Wt. Nom	
ULW2	9.0	3.8	19.8	0.8	12.7	1.2	0.5	
ULW3	14.5	5.8	24.6		20.3		1.1	
ULW4	13	5.6	22.8		18.9		1.0	
ULW5	16.5	7.2	23.6		22.9		1.8	

### Construction

A high purity ceramic rod is assembled with interference fit end caps to which are welded the terminations. The surge withstanding resistive element is wound on the rod and welded to the caps. Flameproof fusible cement coating is applied prior to marking with indelible ink. The components are then leadformed if required and packed.

### Marking

ULW2, ULWP2R & ULW3 resistors are marked with five colour bands. The first four indicate value and tolerance in conformance with IEC62. The fifth yellow band denotes defined fusibility. ULW4 and ULW5 resistors are legend marked with type, value and tolerance.

### 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.

**ULW Series**

**Terminations**

Material: Hot tin dipped 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

**Solvent Resistance**

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

**Flammability**

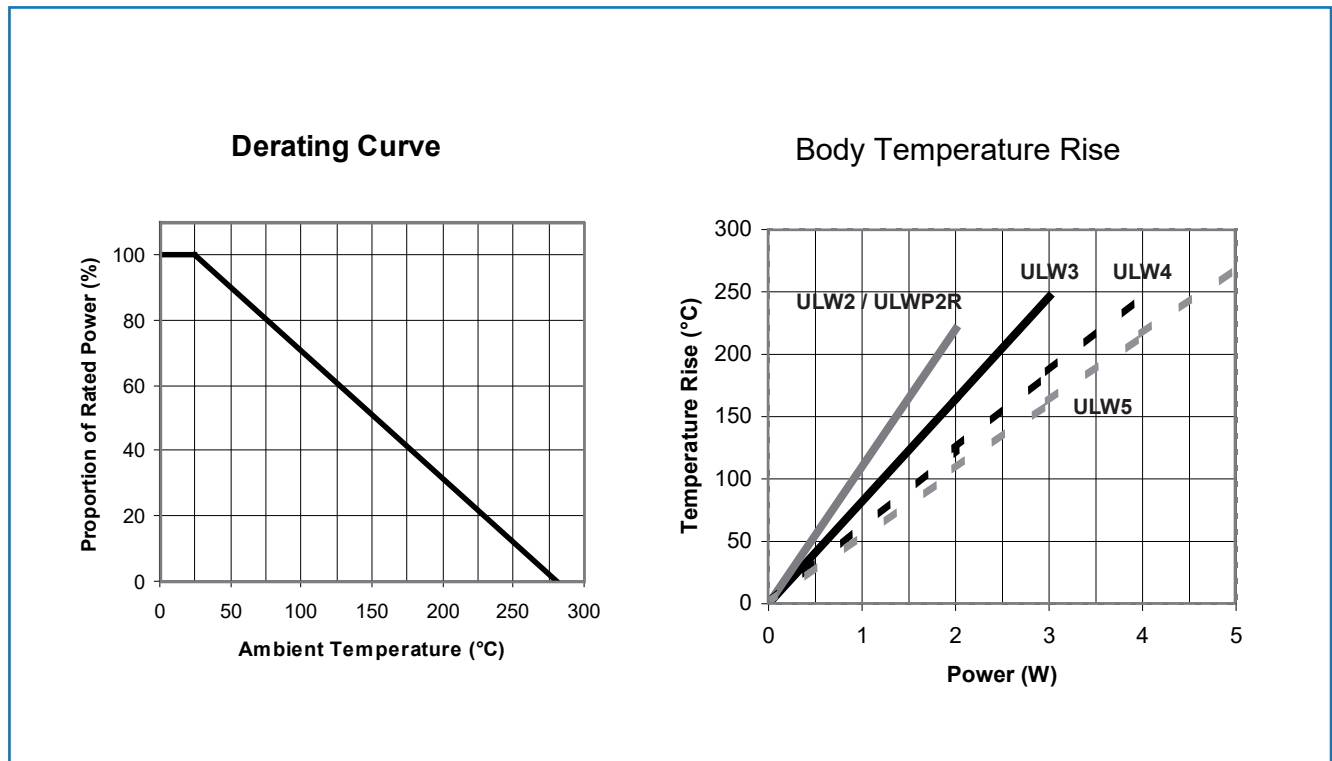
The resistor coating will not burn or emit incandescent particles under any condition of applied temperature or power overload.

**Performance Data**

		Maximum*	Typical
Load at rated power (1000 hours @ 25°C)	ΔR%	5	3
Short term overload (5 x Pr for 5 seconds)	ΔR%	5	1
Pulse (see Pulse Performance graphs)	ΔR%	5	2
Climatic	ΔR%	5	2
Long term damp heat (56 days)	ΔR%	5	1
Climatic category		55/200/56	
Temperature rapid change	ΔR%	5	1
Dry heat (1000 hours @ 200°C)	ΔR%	5	3
Vibration	ΔR%	5	1
Robustness & solder heat	ΔR%	5	1

\* Addition of 0.01Ω applies

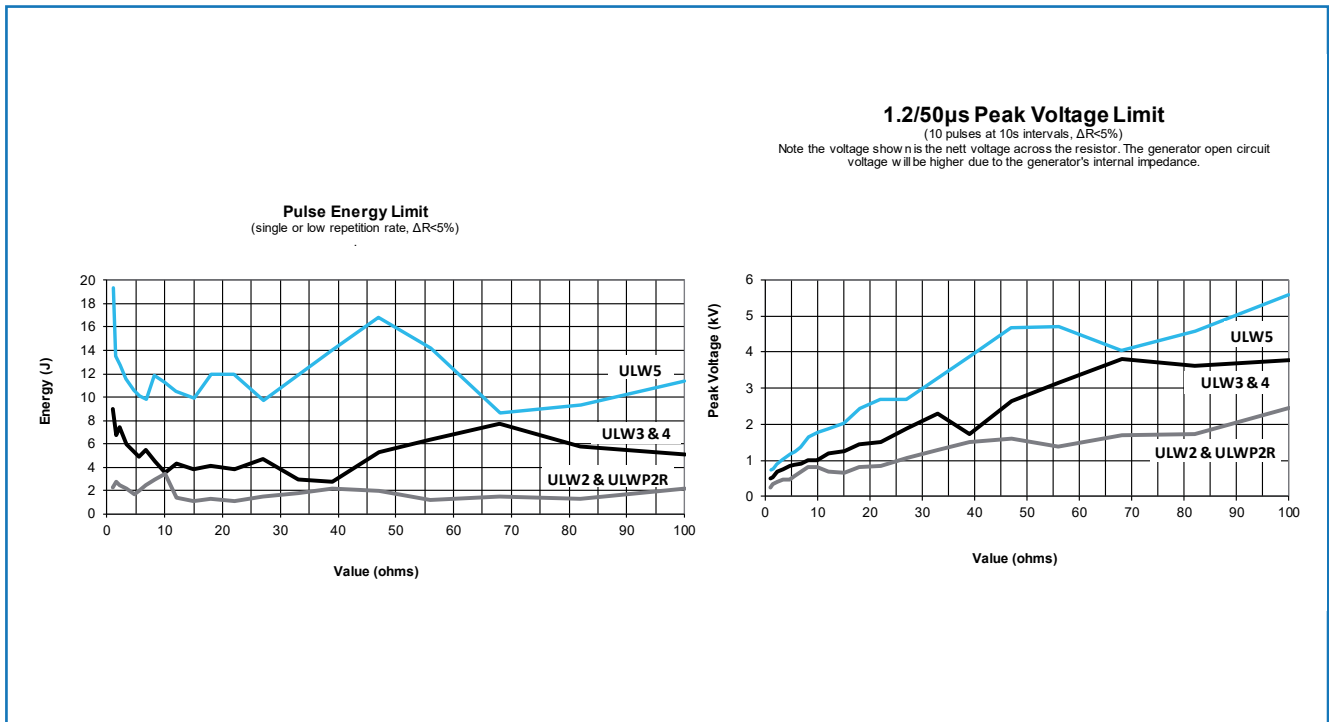
**Thermal Performance**



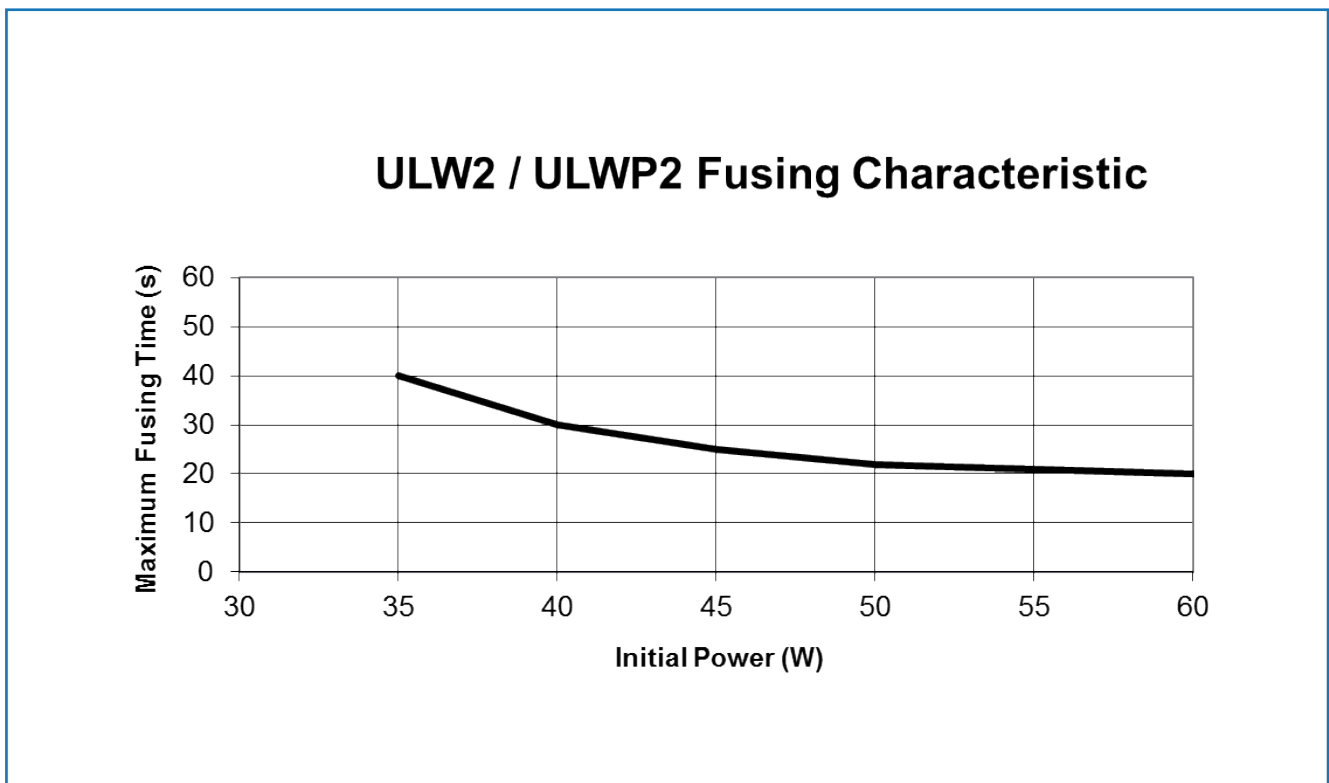
**General Note**

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## Pulse Performance



## Fusing Performance

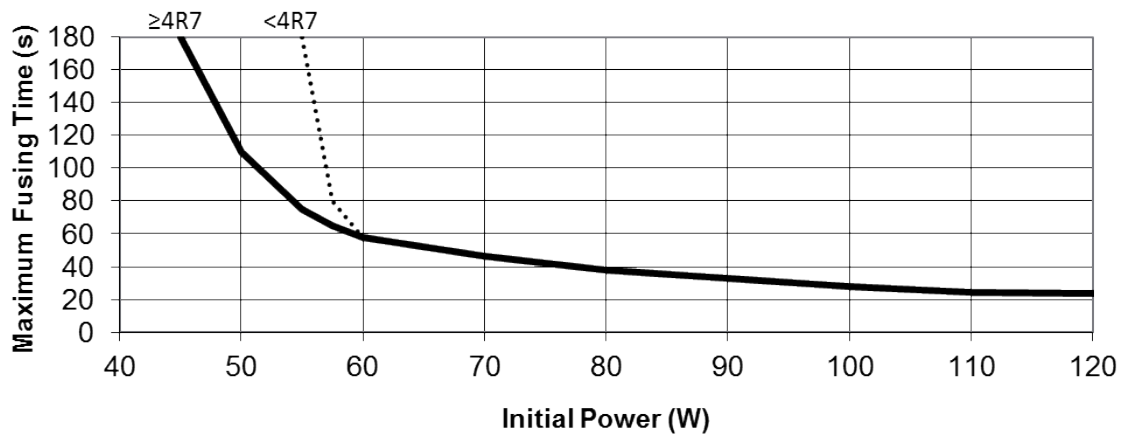


**General Note**

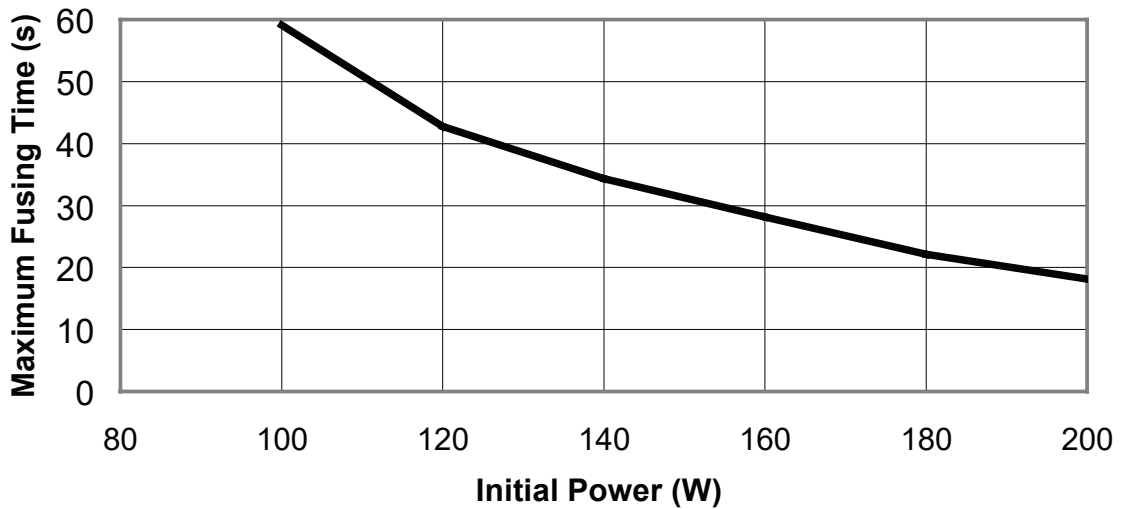
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## Fusing Performance

### ULW3 & ULW4 Fusing Characteristic



### ULW5 Fusing Characteristic



Notes:

1. Typical fusing times are around 1/3 of the maximum figures.
2. After fusing the resistance value is  $>100$  times the initial nominal value, provided the initial power is at least 20 x rated power.
3. Suitable for fusing at voltages up to 264Vrms.

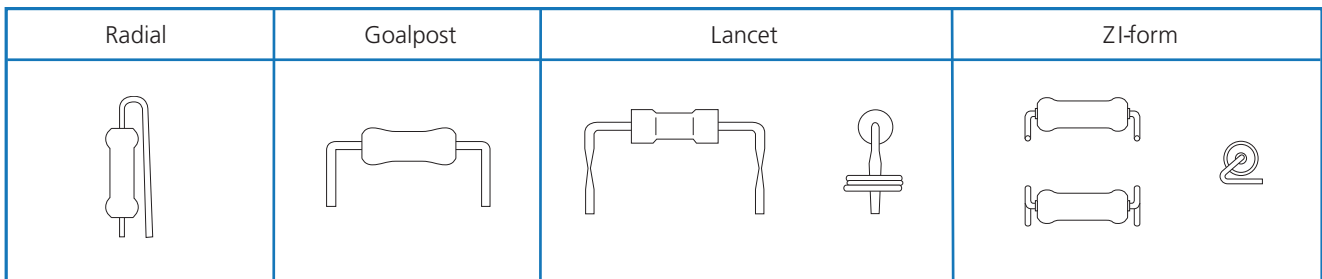
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ULW Series

## Application Notes

1. If the resistors are to dissipate full rated power, it is recommended that the terminations should not be soldered closer than 4mm from the body.
2. Due to operating temperature limits imposed by some PCB materials, derating may be necessary. An estimate of the temperature rise to be expected can be calculated using the thermal impedance figures given under Electrical Data.
3. For the purposes of UL approval, the following points should be observed:
  - 3.1 To protect against fire under all conditions of overload, a positive clearance of at least 13mm should be provided between the body of the resistor and any combustible materials.
  - 3.2 A positive clearance of 13mm should be provided between the resistor body or terminations and uninsulated parts of opposite polarity or uninsulated dead metal parts.
  - 3.3 Limited Short Circuit testing should be performed in the complete appliance.
4. ULW resistors can also be supplied with radial, goalpost or lancet pre-formed leads. In particular ULW2, ULW3, ULW4 and ULW5 are available in ZI-form SMD format packed in blister tape – see <http://www.ttelectronics.com/sites/default/files/resistors-datasheets/ZI-form.pdf>



Also a 2W radial taped version\* is available as shown below

ULWP2R Radial Taped Dimensions (mm)			
Dimension	Notation	Nominal	Tolerance
Component Body Length	L	10.0 Max	
Component Body Diameter	D	4.0 Max	
Terminal Lead Diameter	d	0.8 Nom	
Component Pitch	P	12.7	±0.5
Pitch of Holes	Po	12.7	±0.2
Distance between Hole & Component	P1	3.85	±0.3
	P2	5.85	±0.5
Lead Pitch	F	5.0	+0.75 -0.34
Width of Backing Strip	W	18.0	±0.3
Position of Hole	W1	9.0	±0.25
Diameter of Hole	Do	4.0	±0.3
Height to Lead Form	Ho	16.0	±0.3
Height from Lead Form	Ho1	21.7 Max	
Height to Resistor	Ho2	18.0 Max	
Width of Adhesive Tape	W2	15.0	±0.5
Length of protrusion	l	<2.5	
Form Dimensions	K1	2.0	±0.3
	K2	3.0	±0.5
	K3	1.5	±0.25
	K4	1.0	±0.2

\*Although body dimensions differ slightly, ULWP2R Performance and Electrical Data are identical to those of ULW2

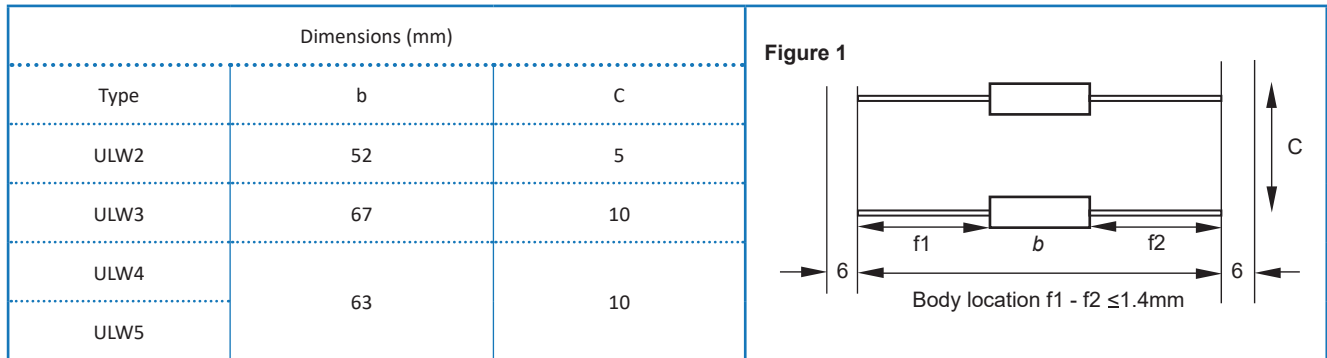
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ULW Series

## Packaging

The standard packaging for ULW is taped. The critical dimensions are shown in Figure 1. The component wires will not protrude beyond the outside edge of the tapes. Taped product is then packed into ammo boxes for ULW2, 3 and 4 or onto reels for ULW5. Alternative packaging is available by request. The standard packaging for ULWP2R is tape and reel. Pre-formed radial, goalpost & lancet resistors are supplied loose packed in plastic bags or boxes. ZI-form SMD are packed in blister tape – see <http://www.ttelectronics.com/sites/default/files/resistors-datasheets/ZI-form.pdf>



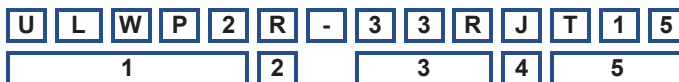
## Ordering Procedure

**Example: ULW2-33RJA25** (ULW2, 33 ohms ±5%, Pb-free)



1	2	3	4	5		
Type	Leadforming	Value	Tolerance	Packing		
ULW2	Optional code	3/4 characters	J = ±5%	A25	ULW2	Ammo pack, 2500/box
ULW3		R = ohms		A1	ULW3, ULW4	Ammo pack, 1000/box
ULW4				T075	ULW5	Tape & reel, 750/reel
ULW5						

**Example: ULWP2R-33RJT15** (ULWP2R radially formed & taped, 33 ohms ±5%, Pb-free)



1	2	3	4	5	
Type	Leadforming	Value	Tolerance	Packing	
ULWP2	R = Radial taped	3/4 characters	J = ±5%	T15	Tape & reel, 1500/reel
		R = ohms			

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