

# UAL Series

Aluminum Housed Power Wirewound Resistors



- Power Rating 5 to 300Watts
- High Temperature: -55°C to +275°C
- Excellent Pulse Handling
- Resistances from 0.01 to 250k Ohms
- Tolerance to  $\pm 0.01\%$
- Low TCR:  $\pm 20\text{ppm/K}$  Standard
- Various Terminal Option Available
- All Welded Construction

## SPECIFICATIONS

| Type                 | MIL-R-39009<br>MIL-R-18546<br>Style | Power Rating ( W @ 25°C ) |                  |          | Resistance<br>Range <sup>1</sup> |
|----------------------|-------------------------------------|---------------------------|------------------|----------|----------------------------------|
|                      |                                     | Commercial                | MIL              | Free Air |                                  |
| UAL-5                | RER-60 / RE-60                      | 7.5 <sup>a</sup>          | 5 <sup>a</sup>   | 4.5      | 0.01 to 22K                      |
| UAL-10               | RER-65 / RE-65                      | 10 <sup>a</sup>           | 10 <sup>a</sup>  | 7.5      | 0.01 to 47K                      |
| UAL-25               | RER-70 / RE-70                      | 25 <sup>b</sup>           | 20 <sup>b</sup>  | 12       | 0.01 to 90K                      |
| UAL-50               | RER-75 / RE-75                      | 50 <sup>c</sup>           | 30 <sup>c</sup>  | 20       | 0.01 to 250K                     |
| UAL-100 <sup>2</sup> |                                     | 100 <sup>d</sup>          | 75 <sup>d</sup>  | 40       | 0.01 to 70K                      |
| UAL-180 <sup>2</sup> | -                                   | 180 <sup>d</sup>          | -                | -        | 0.01 to 50K                      |
| UAL-250 <sup>2</sup> | RER-80 / RE-80                      | 250 <sup>d</sup>          | 120 <sup>d</sup> | 100      | 0.01 to 50K                      |
| UAL-300 <sup>2</sup> | -                                   | 300 <sup>e</sup>          | -                | 75       | 0.01 to 68K                      |

<sup>1</sup> For non-inductive windings, divide maximum resistance by 2

<sup>2</sup> E-24 / E-96, check with factory on availability of other values

<sup>a</sup> Heatsink Required : 0.040 [1.0] Alum. Plate, 129 in<sup>2</sup> [832 cm<sup>2</sup>] or equiv.

<sup>b</sup> Heatsink Required : 0.040 [1.0] Alum. Plate, 167 in<sup>2</sup> [1077 cm<sup>2</sup>] or equiv.

<sup>c</sup> Heatsink Required : 0.059 [1.5] Alum. Plate, 291 in<sup>2</sup> [1877 cm<sup>2</sup>] or equiv.

<sup>d</sup> Heatsink Required : 0.125 [3.2] Alum. Plate, 294 in<sup>2</sup> [1896 cm<sup>2</sup>] or equiv.

<sup>e</sup> Heatsink Required : 0.125 [3.2] Alum. Plate, 895 in<sup>2</sup> [5780 cm<sup>2</sup>] or equiv.

## Ordering Information

For Non-Inductive Windings / insert the letter "N" ( i.e. UALN-25 )

Part Description: Part Type - Resistance - Tolerance - TCR ( If not standard )

Example: UAL-25 10 Ohm 1%

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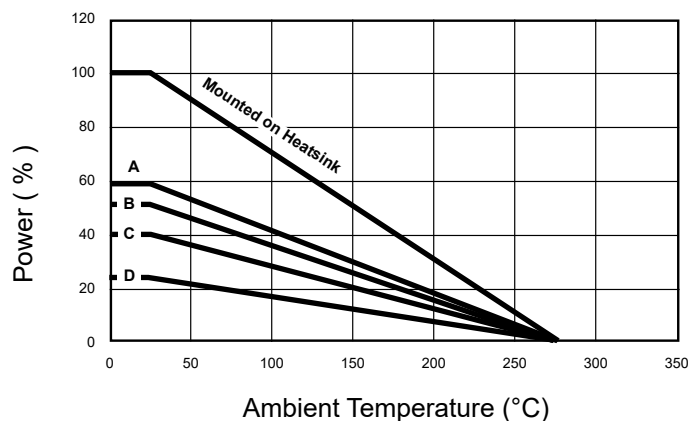


## SPECIFICATIONS (continued)

| Specification                              | Value                                                                                                                                                               |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tolerances                                 | $\pm 0.01\%$ to $\pm 10\%$ ( 1% Standard )                                                                                                                          |
| Temperature Coefficient                    | $>10\Omega$ : $\pm 20\text{ppm/K}$<br>$1\Omega$ to $10\Omega$ : $\pm 50\text{ppm/K}$<br>$<1\Omega$ : Call Factory                                                   |
| Temperature Range                          | $-55^\circ\text{C}$ to $+275^\circ\text{C}$                                                                                                                         |
| Dielectric Strength                        | UAL-5,10: 1500 VAC ; UAL-25: 2500 VAC ; UAL-50: 3500VAC ; Others: 5500VAC                                                                                           |
| Constuction                                | Centerless ground ceramic core<br>Matte Tin over Copper<br>High-temperature epoxy molding Compound, UL94-V0<br>Anodized aluminum housing<br>All welded terminations |
| Environmental Performance<br>(MIL-STD 202) | $\Delta R$                                                                                                                                                          |
| Dielectric                                 | $\pm 0.2\% + 0.05\Omega$                                                                                                                                            |
| Load Life                                  | $\pm 1\% + 0.05\Omega$                                                                                                                                              |
| Storage                                    | $\pm 0.2\% + 0.05\Omega$                                                                                                                                            |
| Moisture Resistance                        | $\pm 0.2\% + 0.05\Omega$                                                                                                                                            |
| Thermal Shock                              | $\pm 0.2\% + 0.05\Omega$                                                                                                                                            |
| 5X Overload ( 5s )                         | $\pm 0.2\% + 0.05\Omega$                                                                                                                                            |
| Shock                                      | $\pm 0.1\% + 0.05\Omega$                                                                                                                                            |
| Vibration                                  | $\pm 0.1\% + 0.05\Omega$                                                                                                                                            |
| Optional Lead Configuration                | Wire, Flexible, Teflon, Quick Disconnect, Flying Leads, Formed                                                                                                      |

\*Call factory for quote

Power Derating Curve



### Free-air Derating

A : UAL-5, UAL-10

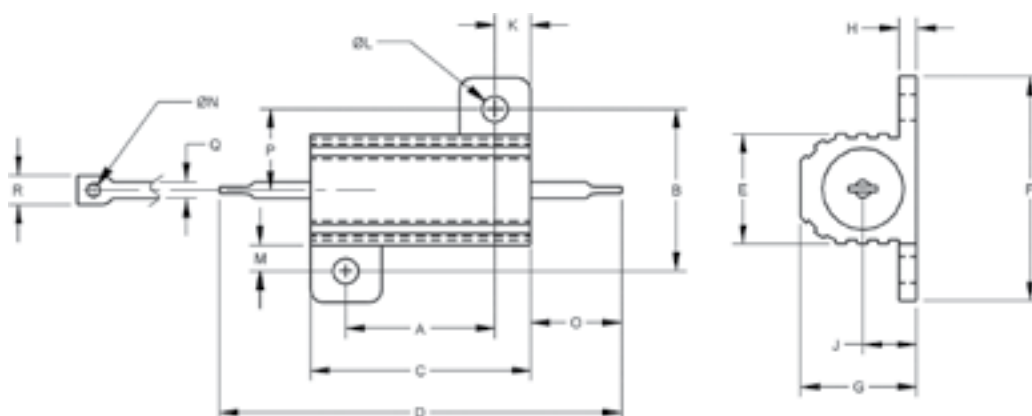
B : UAL-25

C : UAL-50, UAL-100, UAL-250

D : UAL-300

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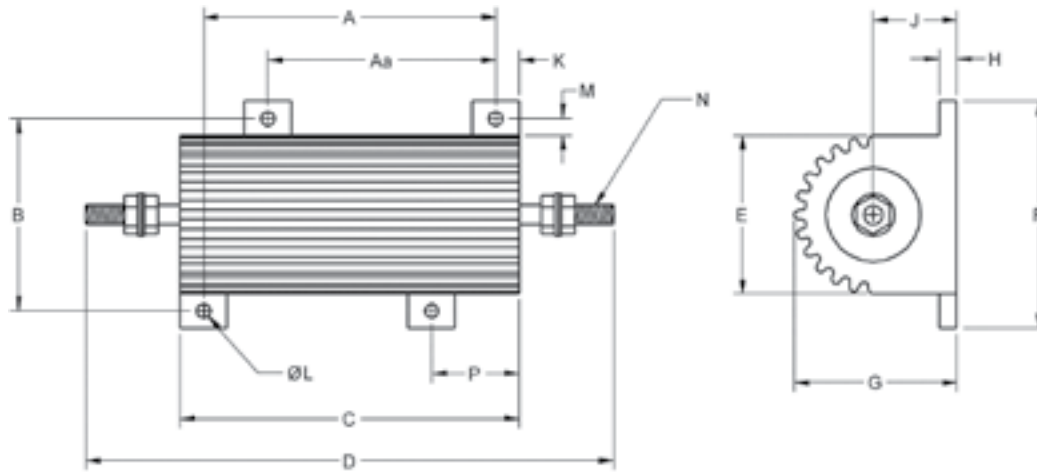
| Type   | A<br>±0.005<br>[±0.13] | B<br>±0.005<br>[±0.13] | C<br>±0.031<br>[±0.8] | D<br>±0.120<br>[±3.10] | E<br>±0.015<br>[±0.4] | F<br>±0.015<br>[±0.4] | G<br>±0.015<br>[±0.4] | H<br>±0.010<br>[±0.25] | J<br>±0.010<br>[±0.25] | K<br>±0.010<br>[±0.25] | L<br>±0.005<br>[±0.13] | M<br>±0.015<br>[±0.4] | N<br>±0.006<br>[±0.15] | O<br>±0.120<br>[±3.10] | P<br>±0.031<br>[±0.8] | Q<br>±0.002<br>[±0.05] | R<br>±0.031<br>[±0.8] |
|--------|------------------------|------------------------|-----------------------|------------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|------------------------|------------------------|-----------------------|------------------------|-----------------------|
| UAL-5  | 0.444<br>[11.3]        | 0.490<br>[12.4]        | 0.600<br>[15.2]       | 1.125<br>[28.5]        | 0.334<br>[8.5]        | 0.646<br>[16.4]       | 0.320<br>[8.1]        | 0.065<br>[1.7]         | 0.140<br>[3.6]         | 0.078<br>[2.0]         | 0.093<br>[2.4]         | 0.078<br>[2.0]        | 0.050<br>[1.3]         | 0.266<br>[6.8]         | 0.245<br>[6.2]        | 0.051<br>[1.30]        | 0.085<br>[2.2]        |
| UAL-10 | 0.562<br>[14.3]        | 0.625<br>[15.9]        | 0.750<br>[19.1]       | 1.320<br>[33.5]        | 0.430<br>[10.9]       | 0.800<br>[20.3]       | 0.400<br>[10.2]       | 0.075<br>[1.9]         | 0.190<br>[4.8]         | 0.093<br>[2.4]         | 0.093<br>[2.4]         | 0.102<br>[2.6]        | 0.080<br>[2.0]         | 0.312<br>[7.9]         | 0.312<br>[7.9]        | 0.098<br>[2.49]        | 0.160<br>[4.0]        |
| UAL-25 | 0.719<br>[18.3]        | 0.781<br>[19.8]        | 1.062<br>[27.0]       | 1.870<br>[47.5]        | 0.530<br>[13.5]       | 1.080<br>[27.4]       | 0.560<br>[14.2]       | 0.085<br>[2.2]         | 0.260<br>[6.6]         | 0.172<br>[4.4]         | 0.125<br>[3.2]         | 0.125<br>[3.2]        | 0.080<br>[2.0]         | 0.438<br>[11.1]        | 0.391<br>[9.9]        | 0.098<br>[2.49]        | 0.185<br>[4.7]        |
| UAL-50 | 1.563<br>[39.7]        | 0.844<br>[21.4]        | 1.968<br>[50.0]       | 2.720<br>[70.0]        | 0.615<br>[15.6]       | 1.140<br>[29.0]       | 0.615<br>[15.6]       | 0.085<br>[2.2]         | 0.300<br>[7.6]         | 0.196<br>[5.0]         | 0.125<br>[3.2]         | 0.125<br>[3.2]        | 0.080<br>[2.0]         | 0.438<br>[11.1]        | 0.422<br>[10.7]       | 0.098<br>[2.49]        | 0.185<br>[4.7]        |

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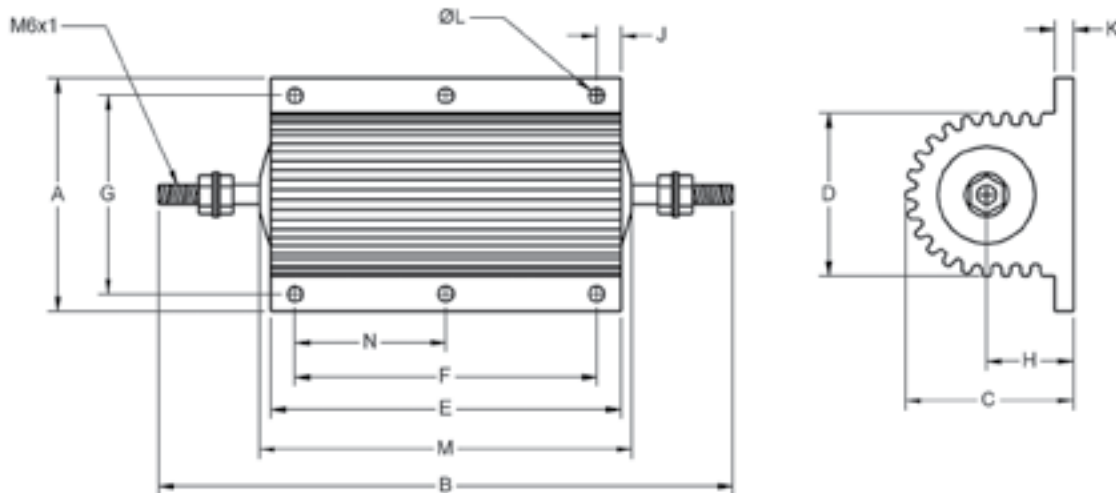


## Dimensions (continued)



| Type*   | A<br>±0.005<br>[±0.13] | Aa<br>±0.005<br>[±0.13] | B<br>±0.005<br>[±0.13] | C<br>±0.031<br>[±0.8] | D<br>±0.062<br>[±1.6] | E<br>±0.015<br>[±0.4] | F<br>±0.015<br>[±0.4] | G<br>±0.015<br>[±0.4] | H<br>±0.010<br>[±0.25] | J<br>±0.015<br>[±0.4] | K<br>±0.015<br>[±0.4] | L<br>±0.005<br>[±0.13] | M<br>±0.015<br>[±0.4] | N      | P<br>±0.015<br>[±0.4] | Mtg. Screw |
|---------|------------------------|-------------------------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|-----------------------|-----------------------|------------------------|-----------------------|--------|-----------------------|------------|
| UAL-100 | 2.750<br>[69.9]        | -                       | 2.250<br>[57.15]       | 3.500<br>[88.9]       | 5.478<br>[139]        | 1.800<br>[45.7]       | 2.813<br>[71.5]       | 1.750<br>[44.5]       | 0.188<br>[4.78]        | 0.800<br>[20.3]       | 0.375<br>[9.52]       | 0.188<br>[4.78]        | -                     | 12-24  | -                     | (2) #8     |
| UAL-180 | 2.750<br>[69.9]        | -                       | 2.500<br>[63.5]        | 3.500<br>[88.9]       | 5.480<br>[139]        | 2.125<br>[54]         | 3.000<br>[76.2]       | 2.190<br>[55.6]       | 0.250<br>[6.4]         | 0.950<br>[24.1]       | 0.375<br>[9.5]        | 0.188<br>[4.8]         | 0.200<br>[5.1]        | 12-24  | -                     | (2) #8     |
| UAL-250 | 3.875<br>[98.4]        | 3.000<br>[76.2]         | 2.500<br>[63.5]        | 4.500<br>[114]        | 7.000<br>[178]        | 2.125<br>[54]         | 3.00<br>[76.2]        | 2.190<br>[55.6]       | 0.250<br>[6.4]         | 1.000<br>[25.4]       | 0.312<br>[7.9]        | 0.188<br>[4.8]         | 0.200<br>[5.1]        | 1/4-20 | 1.188<br>[30.7]       | (4) #8     |

\*Built to Mil-Spec standard. Not for new design.



| Type*    | A<br>MAX        | B<br>MAX         | C<br>MAX        | D<br>MAX        | E<br>MAX         | F<br>±0.010<br>[±0.3] | G<br>±0.010<br>[±0.3] | H<br>MAX        | J<br>MAX        | K<br>MAX       | L<br>±0.010<br>[±0.3] | M<br>MAX         | N<br>±0.010<br>[±0.3] |
|----------|-----------------|------------------|-----------------|-----------------|------------------|-----------------------|-----------------------|-----------------|-----------------|----------------|-----------------------|------------------|-----------------------|
| UAL-250A | 2.854<br>[72.5] | 6.675<br>[167.0] | 1.646<br>[41.8] | 1.791<br>[45.5] | 4.319<br>[109.7] | 3.504<br>[89.0]       | 2.252<br>[57.2]       | 0.807<br>[20.5] | 0.409<br>[10.4] | 0.217<br>[5.5] | 0.260<br>[6.6]        | 4.819<br>[122.4] | 1.752<br>[44.5]       |
| UAL-300A | 2.854<br>[72.5] | 7.260<br>[184.4] | 1.646<br>[41.8] | 1.791<br>[45.5] | 5.028<br>[127.7] | 4.094<br>[104.0]      | 2.323<br>[59.0]       | 0.807<br>[20.5] | 0.488<br>[12.4] | 0.217<br>[5.5] | 0.260<br>[6.6]        | 5.567<br>[141.4] | 2.047<br>[52.0]       |

\*Commercial equivalent for new designs. Cost effective alternative.