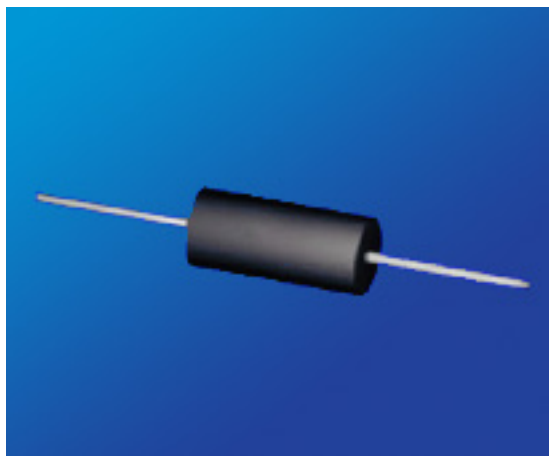


# RESISTOR WIREWOUND HIGH POWER RATING

## RWH SERIES



### KEY FEATURES

- Excellent Pulse Handling
- Resistance Tolerances to  $\pm 0.01\%$
- Resistance from 0.02 to 260kOhms
- MIL-R-26 / MIL-R-39007 Power Ratings
- Low TCR:  $\pm 20\text{ppm}/^\circ\text{C}$  Standard
- Non-Inductive Windings available

### APPLICATIONS

- HDVC Systems
- Braking Systems
- Power Supplies
- Fluid Heater

### PRODUCT SUMMARY

| PRODUCT SERIES (RWH) | POWER RATING (W) | DIELECTRIC STRENGTH                                  | TOLERANCE                                         | TEMPERATURE COEFFICIENT                                                                                                                                                                                                                                          | TEMPERATURE RANGE                                                                                |
|----------------------|------------------|------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Miniature Axial      | 1 to 15          | <b>500 VAC:</b><br>E01, E02, E03, E04, E05, E06      | $\pm 0.01\%$<br>to<br>$\pm 10\%$<br>(1% Standard) | <ul style="list-style-type: none"> <li>• <math>&gt;10\Omega : \pm 20\text{ppm}/^\circ\text{C}</math></li> <li>• <math>1\Omega \text{ to } 10\Omega : \pm 50\text{ppm}/^\circ\text{C}</math></li> <li>• <math>&lt;1\Omega : \text{Call Factory}</math></li> </ul> | -55°C to + 250°C                                                                                 |
| Axial                | 0.1 to 15        | <b>500 VAC:</b><br>F01, F02, F03, F04, F05, F06, F07 |                                                   |                                                                                                                                                                                                                                                                  | <b>Characteristic U:</b><br>-55°C to + 275°C<br><br><b>Characteristic V:</b><br>-55°C to + 350°C |

### HOW TO ORDER

| RWH                           | S                                 | E02                                                                                                                                              | T                                                                 | U                                                                                             | 003K8                                                                                                                                                                                                                                                                 | F                                                                                                                                     | S                           |
|-------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| RESISTOR WIREWOUND HIGH POWER | WINDINGS                          | PACKAGE CODE, WATTS, RESISTANCE                                                                                                                  | OPERATING TEMPERATURE                                             | TEMPERATURE COEFFICIENT OF RESISTANCE (TCR)                                                   | RESISTANCE                                                                                                                                                                                                                                                            | TOLERANCE                                                                                                                             | PACKING                     |
|                               | S = Standard<br>N = Non-Inductive | <b>Miniature Axial</b><br>E01, 1.0W, 33Vmax<br>E02, 1.0W, 33Vmax<br><br><b>Axial</b><br>F01, 0.1W, 8.5Vmax<br>F02, 0.4W, 20Vmax<br><br>See Table | T = -55°C to +250°C<br>U = -55°C to +275°C<br>V = -55°C to +350°C | U = $\pm 20\text{ppm}/^\circ\text{C}$<br>Q = $\pm 50\text{ppm}/^\circ\text{C}$<br>Z = Special | 0R038 = 0.038 $\Omega$<br>003K8 = 3.8K $\Omega$<br>038K0 = 38.0K $\Omega$<br>380K0 = 380.0K $\Omega$<br>003M8 = 3.8M $\Omega$<br><br>Letter denotes decimal place.<br>R = decimal, "K" $10^3$ , "M" $10^6$<br><br>Remaining 4 digits are significant or placeholders. | T = $\pm 0.01\%$<br>Q = $\pm 0.02\%$<br>A = $\pm 0.05\%$<br>B = $\pm 0.1\%$<br>F = $\pm 1.0\%$<br>J = $\pm 5.0\%$<br>K = $\pm 10.0\%$ | S = Bulk<br>T = Tape & Reel |

For Tin/Lead coated leads, add "- Pb" to part number.

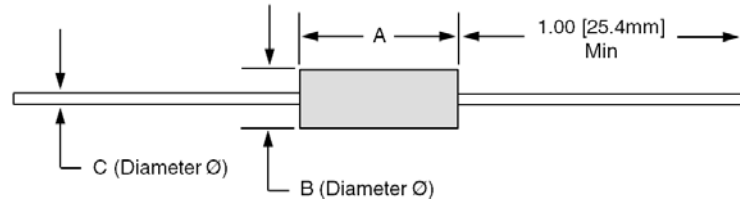
Standard Termination Finish: Matte Tin (Sn)

Example P/N: RWHSE02TU003K8FS is Resistor Wirewound High Power, Standard, 1.0W, 33V, -55°C to +250°C,  $\pm 20\text{ppm}/^\circ\text{C}$ , 3.8K $\Omega$ ,  $\pm 1.0\%$ , bulk

# RESISTOR WIREWOUND HIGH POWER RATING

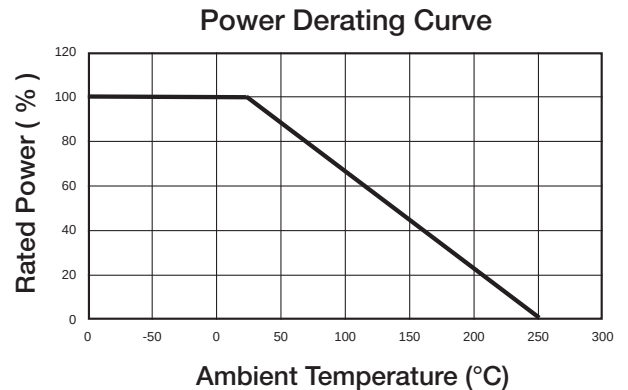
## RWH SERIES

### MINIATURE AXIAL



| Package Code                             |                                                    | E01             | E02             | E03             | E04             | E05              | E06              | E07             | E08              | E09              |
|------------------------------------------|----------------------------------------------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|-----------------|------------------|------------------|
| Max Resistance ( $\Omega$ ) <sup>1</sup> |                                                    | 3.4k            | 3.4k            | 7.5k            | 7.5k            | 10k              | 10k              | 12.5k           | 25k              | 32k              |
| Max Working Voltage (V)                  |                                                    | 33              | 33              | 42              | 42              | 80               | 80               | 135             | 162              | 194              |
| Power Rating (W)                         |                                                    | 1               | 1               | 1.5             | 1.5             | 2                | 2                | 3               | 4                | 5                |
| Dimensions<br>Inches [mm]                | A<br>$\pm 0.062"$<br>[ $\pm 1.57$ mm]              | 0.250<br>[6.35] | 0.250<br>[6.35] | 0.312<br>[7.92] | 0.312<br>[7.92] | 0.406<br>[10.31] | 0.406<br>[10.31] | 0.350<br>[8.89] | 0.560<br>[14.22] | 0.500<br>[12.70] |
|                                          | B<br>$\pm 0.031"$<br>[ $\pm 0.79$ mm]              | 0.085<br>[2.16] | 0.085<br>[2.16] | 0.078<br>[1.98] | 0.078<br>[1.98] | 0.094<br>[2.39]  | 0.094<br>[2.39]  | 0.156<br>[3.96] | 0.187<br>[4.75]  | 0.218<br>[5.54]  |
|                                          | C <sup>2</sup><br>$\pm 0.002"$<br>[ $\pm 0.05$ mm] | 0.020<br>[0.51] | 0.025<br>[0.64] | 0.020<br>[0.51] | 0.025<br>[0.64] | 0.025<br>[0.64]  | 0.020<br>[0.51]  | 0.032<br>[0.81] | 0.032<br>[0.81]  | 0.040<br>[1.02]  |
| MIL-R-26 / MIL-R-39007                   |                                                    | RW-81<br>RWR-81 | RW-81<br>RWR-81 | RWR-82          | RWR-82          | RW-80<br>RWR-80  | RW-80<br>RWR-80  |                 |                  |                  |

| Package Code                             |                                                    | E10              | E11              | E12              | E13              |
|------------------------------------------|----------------------------------------------------|------------------|------------------|------------------|------------------|
| Max Resistance ( $\Omega$ ) <sup>1</sup> |                                                    | 50k              | 95k              | 150k             | 260k             |
| Max Working Voltage (V)                  |                                                    | 258              | 425              | 607              | 1050             |
| Power Rating (W)                         |                                                    | 6                | 7                | 10               | 15               |
| Dimensions<br>Inches [mm]                | A<br>$\pm 0.062"$<br>[ $\pm 1.57$ mm]              | 0.625<br>[15.88] | 0.875<br>[22.23] | 1.220<br>[30.99] | 1.780<br>[45.21] |
|                                          | B<br>$\pm 0.031"$<br>[ $\pm 0.79$ mm]              | 0.250<br>[6.35]  | 0.312<br>[7.92]  | 0.312<br>[7.92]  | 0.375<br>[9.53]  |
|                                          | C <sup>2</sup><br>$\pm 0.002"$<br>[ $\pm 0.05$ mm] | 0.040<br>[1.02]  | 0.040<br>[1.02]  | 0.040<br>[1.02]  | 0.040<br>[1.02]  |
| MIL-R-26 / MIL-R-39007                   |                                                    |                  | RW-84            |                  |                  |



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

<sup>2</sup> Lead Diameter:

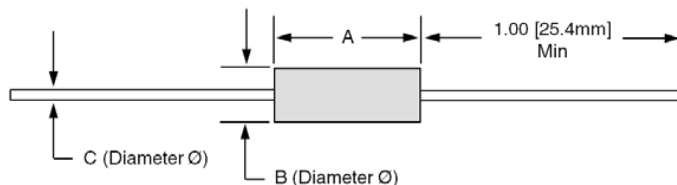
18 AWG = 0.040" / 20 AWG = 0.032" / 22 AWG = 0.025" / 24 AWG = 0.020"

# RESISTOR WIREWOUND HIGH POWER RATING

## RWH SERIES



AXIAL



| Package Code                             |                                                    | F01             | F02             | F03             | F04             | F05             | F06              | F07              | F08             | F09              | F10              |
|------------------------------------------|----------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|-----------------|------------------|------------------|
| Max Resistance ( $\Omega$ ) <sup>1</sup> |                                                    | 500             | 2.5k            | 2.5k            | 7.5k            | 7.5k            | 10k              | 10k              | 12.5k           | 22k              | 22k              |
| Max Working Voltage (V)                  |                                                    | 8.5             | 20              | 20              | 29              | 29              | 52               | 52               | 60              | 130              | 140              |
| Power Rating (W)                         | U                                                  | 0.1             | 0.4             | 0.4             | 0.75            | 0.75            | 1.0              | 1.0              | 1.5             | 2.5              | 3.0              |
|                                          | V                                                  | 0.25            | 0.5             | 0.5             | 0.9             | 0.9             | 1.5              | 1.5              | 2.0             | 3.0              | 3.75             |
| Dimensions Inches [mm]                   | A<br>$\pm 0.062"$<br>[ $\pm 1.57$ mm]              | 0.150<br>[3.81] | 0.250<br>[6.35] | 0.250<br>[6.35] | 0.330<br>[8.38] | 0.330<br>[8.38] | 0.406<br>[10.31] | 0.406<br>[10.31] | 0.350<br>[8.89] | 0.500<br>[12.70] | 0.560<br>[14.22] |
|                                          | B<br>$\pm 0.031"$<br>[ $\pm 0.79$ mm]              | 0.078<br>[1.98] | 0.094<br>[2.39] | 0.094<br>[2.39] | 0.094<br>[2.39] | 0.094<br>[2.39] | 0.094<br>[2.39]  | 0.094<br>[2.39]  | 0.156<br>[3.96] | 0.187<br>[4.75]  | 0.187<br>[4.75]  |
|                                          | C <sup>2</sup><br>$\pm 0.002"$<br>[ $\pm 0.05$ mm] | 0.018<br>[0.45] | 0.020<br>[0.51] | 0.025<br>[0.64] | 0.020<br>[0.51] | 0.025<br>[0.64] | 0.020<br>[0.51]  | 0.025<br>[0.64]  | 0.032<br>[0.81] | 0.032<br>[0.81]  | 0.032<br>[0.81]  |
| MIL-R-26 / MIL-R-39007                   |                                                    |                 |                 |                 |                 |                 | RW-70            | RW-70            |                 | RW-69            | RW-79            |

| Package Code                             |                                                    | F11              | F12              | F13              | F14              | F15              | F16              | F17              | F18              | F19              | F20              |
|------------------------------------------|----------------------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Max Resistance ( $\Omega$ ) <sup>1</sup> |                                                    | 40k              | 40k              | 30k              | 45k              | 45k              | 91k              | 65k              | 95k              | 150k             | 100k             |
| Max Working Voltage (V)                  |                                                    | 140              | 140              | 140              | 210              | 210              | 360              | 390              | 504              | 650              | 590              |
| Power Rating (W)                         | U                                                  | 3.0              | 3.0              | 3.0              | 4.0              | 4.0              | 5.0              | 5.0              | 5.0              | 7.0              | 7.0              |
|                                          | V                                                  | 4.0              | 4.0              | 3.5              | 5.5              | 5.5              | 6.5              | 6.5              | 6.5              | 9.0              | 9.0              |
| Dimensions Inches [mm]                   | A<br>$\pm 0.062"$<br>[ $\pm 1.57$ mm]              | 0.500<br>[12.70] | 0.500<br>[12.70] | 0.500<br>[12.70] | 0.675<br>[17.15] | 0.675<br>[17.15] | 0.875<br>[22.23] | 0.970<br>[24.64] | 1.025<br>[26.04] | 1.375<br>[34.93] | 1.400<br>[35.56] |
|                                          | B<br>$\pm 0.031"$<br>[ $\pm 0.79$ mm]              | 0.250<br>[6.35]  | 0.250<br>[6.35]  | 0.200<br>[5.08]  | 0.270<br>[6.68]  | 0.270<br>[6.68]  | 0.312<br>[7.92]  | 0.250<br>[6.35]  | 0.312<br>[7.92]  | 0.375<br>[9.52]  | 0.312<br>[7.92]  |
|                                          | C <sup>2</sup><br>$\pm 0.002"$<br>[ $\pm 0.05$ mm] | 0.040<br>[1.02]  | 0.032<br>[0.81]  | 0.032<br>[0.81]  | 0.040<br>[1.02]  | 0.032<br>[0.81]  | 0.040<br>[1.02]  | 0.032<br>[0.81]  | 0.040<br>[1.02]  | 0.040<br>[1.02]  | 0.032<br>[0.81]  |
| MIL-R-26 / MIL-R-39007                   |                                                    |                  |                  |                  |                  |                  | RW-74            |                  | RW-67            |                  |                  |

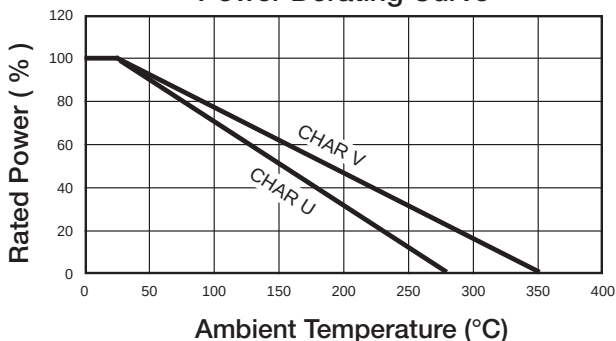
| Package Code                             |                                                    | F21              | F22              | F23              |
|------------------------------------------|----------------------------------------------------|------------------|------------------|------------------|
| Max Resistance ( $\Omega$ ) <sup>1</sup> |                                                    | 154k             | 260k             | 320k             |
| Max Working Voltage (V)                  |                                                    | 620              | 850              | 1500             |
| Power Rating (W)                         | U                                                  | 7.0              | 10               | 15               |
|                                          | V                                                  | 9.0              | 13               | -                |
| Dimensions Inches [mm]                   | A<br>$\pm 0.062"$<br>[ $\pm 1.57$ mm]              | 1.200<br>[30.99] | 1.780<br>[45.21] | 1.810<br>[45.95] |
|                                          | B<br>$\pm 0.031"$<br>[ $\pm 0.79$ mm]              | 0.312<br>[7.92]  | 0.375<br>[9.52]  | 0.510<br>[12.95] |
|                                          | C <sup>2</sup><br>$\pm 0.002"$<br>[ $\pm 0.05$ mm] | 0.040<br>[1.02]  | 0.040<br>[1.02]  | 0.050<br>[1.27]  |
| MIL-R-26 / MIL-R-39007                   |                                                    |                  | RW-78            |                  |

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

<sup>2</sup> Lead Diameter:

18 AWG = 0.040" / 20 AWG = 0.032" / 22 AWG = 0.025" /  
24 AWG = 0.020" / 25 AWG = 0.018"

Power Derating Curve



# RESISTOR WIREWOUND HIGH POWER RATING

## RWH SERIES

### ENVIRONMENTAL PERFORMANCE

| Environmental Performance<br>(MIL-STD 202) | $\Delta R$                                   |                            |                            |
|--------------------------------------------|----------------------------------------------|----------------------------|----------------------------|
|                                            | Miniature Axial                              | Axial - Characteristic U   | Axial - Characteristic V   |
| Vibration                                  | $\pm 0.1\% + 0.05\ \Omega$                   | $\pm 0.1\% + 0.05\ \Omega$ | $\pm 0.2\% + 0.05\ \Omega$ |
| Load Life                                  | To 1% Depending on Resistance Value and Size | $\pm 1\% + 0.05\ \Omega$   | $\pm 3\% + 0.05\ \Omega$   |
| Moisture Resistance                        | $\pm 0.2\% + 0.05\ \Omega$                   | $\pm 0.2\% + 0.05\ \Omega$ | $\pm 2\% + 0.05\ \Omega$   |
| Dielectric                                 | $\pm 0.2\% + 0.05\ \Omega$                   | $\pm 0.2\% + 0.05\ \Omega$ | $\pm 0.2\% + 0.05\ \Omega$ |
| Storage                                    | $\pm 0.2\% + 0.05\ \Omega$                   | $\pm 0.2\% + 0.05\ \Omega$ | $\pm 2\% + 0.05\ \Omega$   |
| Shock                                      | $\pm 0.1\% + 0.05\ \Omega$                   | $\pm 0.1\% + 0.05\ \Omega$ | $\pm 0.2\% + 0.05\ \Omega$ |
| Thermal Shock                              | $\pm 0.2\% + 0.05\ \Omega$                   | $\pm 0.2\% + 0.05\ \Omega$ | $\pm 2\% + 0.05\ \Omega$   |
| 5X Overload (5s)                           | $\pm 0.2\% + 0.05\ \Omega$                   | $\pm 0.2\% + 0.05\ \Omega$ | $\pm 2\% + 0.05\ \Omega$   |

#### CONSTRUCTION NOTES:

- Centerless ground ceramic core
- Tinned copper or copperweld leads
- All welded terminations
- High Temperature / trivalent / inorganic silicone coating

### PACKAGING INFORMATION

MINIATURE AXIAL: Bulk Only

AXIAL:

| Package Code | F01               | F02  | F03  | F04  | F05  | F06  | F07  | F08  | F09  | F10  | F11  | F12  | F13  |
|--------------|-------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Bulk         | Bulk Only, No T&R | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 10" Reel     |                   | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 500  | 500  | 500  | 500  | 500  |
| 12" Reel     |                   | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 1500 | 1500 | 1000 | 1000 | 1000 |
| 14" Reel     |                   | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 | 3000 | 3000 | 1500 | 1500 | 1500 |

| Package Code | F14  | F15  | F16  | F17  | F18  | F19  | F20  | F21  | F22  |
|--------------|------|------|------|------|------|------|------|------|------|
| Bulk         | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 10" Reel     | N/A  | N/A  | N/A  | 500  | N/A  | N/A  | N/A  | N/A  | N/A  |
| 12" Reel     | 500  | 500  | 500  | 1000 | 500  | 500  | 500  | 500  | 500  |
| 14" Reel     | 1000 | 1000 | 1000 | 1500 | 1000 | 750  | 750  | 750  | 750  |

Moisture Sensitivity Level: MSL-1

### AVAILABLE OPTIONS (Consult Factory)

- Special Testing Requirements
- Special Pulse Requirements

This datasheet is subject to change without notice.

