

# WH/WN Series

## Miniature Molded Wirewound



### FEATURES

- WH precision series
- WN Aryton Perry winding Non-Inductive series: Inductance <1nH at 1MHZ test,
- Designed to meet MIL-R-26F, MIL-STD-202 standard requirements
- Manufacturing process -Wire winding/ Spot Welding- by Computer Numerical Control (CNC) machine tools to ensure consistency of product quality.
- Encapsulated by epoxy molding compound
- Advanced IC encapsulation mold/die technologies

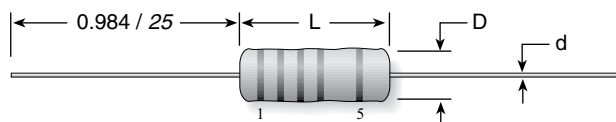
### SERIES SPECIFICATIONS

| Type | Power Rating (watts) | Resistance Range ( $\Omega$ ) | Weight (g/1000pc) |
|------|----------------------|-------------------------------|-------------------|
| WHA  | 0.5                  | 0.100 - 1.0K                  | 216               |
| WNA  |                      | 0.100 - 250                   |                   |
| WHB  | 1                    | 0.100 - 4.0K                  | 296               |
| WNB  |                      | 0.100 - 1.0K                  |                   |
| WHC  | 2                    | 0.10 - 8.0K                   | 712               |
| WNC  |                      | 0.10 - 2.0K                   |                   |
| WHD  | 3                    | 0.10 - 25K                    | 1160              |
| WND  |                      | 0.10 - 5.0K                   |                   |
| WHE  | 5                    | 0.10 - 50K                    | 2920              |
| WNE  |                      | 0.10 - 10K                    |                   |

### CHARACTERISTICS

|                                         |                                                                                                                        |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Ceramic Core</b>                     | CeramTec Rubalit® 85% alumina                                                                                          |
| <b>End Caps</b>                         | Stainless steel, precision formed                                                                                      |
| <b>Leads</b>                            | Copper wire, 100% Sn (lead free) coated                                                                                |
| <b>Resistance Wire</b>                  | ISA OHM® wire TC $\pm 20$ ppm/°C                                                                                       |
| <b>Encapsulation</b>                    | SUMICON 1100/1200 Epoxy molding compound for IC encapsulation                                                          |
| <b>Standard Tolerance</b>               | D (0.5%), F (1.0%), J (5.0%)                                                                                           |
| <b>Temperature Coefficient (ppm/°C)</b> | $\pm 90$ for 0.100 $\Omega$ -0.99 $\Omega$ , $\pm 50$ for 1.00 $\Omega$ -10.00 $\Omega$ , $\pm 20$ for >10.00 $\Omega$ |
| <b>Maximum Working Voltage</b>          | $(P \times R)^{1/2}$                                                                                                   |
| <b>Derating</b>                         | Linearly from 100% @ +70°C to 0% @ +150°C.                                                                             |
| <b>Operating Temp</b>                   | -55°C to +150°C                                                                                                        |

### DIMENSIONS



| Type  | Wattage | L             | D            | d            |
|-------|---------|---------------|--------------|--------------|
| WH/NA | 0.5     | 5.08 / 0.200  | 2.54 / 0.100 | 0.60 / 0.024 |
| WH/NB | 1       | 7.00 / 0.276  | 3.30 / 0.130 | 0.60 / 0.024 |
| WH/NC | 2       | 11.4 / 0.450  | 4.57 / 0.180 | 0.80 / 0.031 |
| WH/ND | 3       | 13.54 / 0.530 | 5.50 / 0.216 | 0.80 / 0.031 |
| WH/NE | 5       | 20.00 / 0.790 | 7.50 / 0.295 | 1.00 / 0.039 |

### Packaging

| Tape Width | Pitch       | Reel Diam.  | Pc/ reel |
|------------|-------------|-------------|----------|
| 64 / 2.520 | 5.0 / 0.197 | 290 / 11.41 | 1000     |
| 64 / 2.520 | 5.0 / 0.197 | 290 / 11.41 | 1000     |
| 64 / 2.520 | 10 / 0.393  | 290 / 11.41 | 1000     |
| 84 / 3.307 | 10 / 0.393  | 290 / 11.41 | 500      |
| 84 / 3.307 | 10 / 0.393  | 290 / 11.41 | 500      |

(continued)

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### PERFORMANCE CHARACTERISTICS

| Test                                   | Conditions of Test                                                                                                         | Performance                             |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Thermal shock</b>                   | Environmental chamber, -55°C +0°C, -3°C to 150°C +3°C, -0°C, 5 cycles, minimum 15 min. at each extreme                     | $\pm(1.0\% + 0.5m\Omega)\Delta R$       |
| <b>Short-time overload</b>             | Overload voltage 5x rated wattage for 5 sec.                                                                               | $\pm(0.5\% + 0.5m\Omega)\Delta R$       |
| <b>Solderability</b>                   | Bath temp. 260°C $\pm 5^\circ$ , immersion time 5 sec. $\pm 0.5$ , JIS C 5201 4.18                                         | >90% of contact face covered new solder |
| <b>Resistance to solder heat</b>       | Bath temp. 260°C $\pm 5^\circ$ , immersion time 5 sec. $\pm 0.5$ , JIS C 5201 4.18                                         | $\pm(0.5\% + 0.5m\Omega)\Delta R$       |
| <b>Dielectric withstanding voltage</b> | Magnitude of test voltage >500 volts rms.; duration 1 min.                                                                 | Pass                                    |
| <b>Insulation resistance</b>           | Magnitude of test voltage 500 volts rms. $\pm 10\%$ ; duration 1 min.                                                      | $>10^9\Omega$                           |
| <b>High Temperature Exposure</b>       | Exposed to an ambient temperature of 175°C +5°/-0° for 250 $\pm 8$ hours                                                   | $\pm(1.0\% + 0.5m\Omega)\Delta R$       |
| <b>Low Temperature Storage</b>         | At a temperature of -65°C $\pm 2^\circ$ for a period of 24 hours $\pm 4$                                                   | $\pm(0.5\% + 0.5m\Omega)\Delta R$       |
| <b>Life</b>                            | Test temp. at 70°C $\pm 2^\circ$ , rated DC continuous working voltage applied, 1.5 hours on and 0.5 hours off, 1000 hours | $\pm(2.0\% + 0.5m\Omega)\Delta R$       |

### HOW TO ORDER

H = Inductive  
N = Non Inductive  
RoHS compliant

**WHA10RFE - T**

Series: W, H, A, 10, R, F, E, T  
Power: A = 0.5, B = 1, C = 2, D = 3, E = 5  
Ohms: 10  
Tolerance: F = 1%, J = 5%, D = 0.5%  
Package: T = Tape blank = 25pc pack

**Part marking:**  
0.50, 1.0, 2.0 watt parts marked with 5-band color code, 3.0 and 5.0 watt parts marked with part number stamping

#### Standard part numbers

| Wattage: | 0.5      | 0.5      | 1.0      | 1.0      | 2.0      | 2.0      | 3.0      | 3.0      | 5.0      | 5.0      |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Series:  | WHA      | WNA      | WHB      | WNB      | WHC      | WNC      | WHD      | WND      | WHE      | WNE      |
| Ohms     |          |          |          |          |          |          |          |          |          |          |
| 0.1      | WHAR10FE | WNA10FE  | WHBR10FE | WNB10FE  | WHCR10FE | WNC10FE  | WHDR10FE | WNR10FE  | WHER10FE | WNER10FE |
| 0.25     | WHAR25FE | WNA25FE  | WHBR25FE | WNB25FE  | WHCR25FE | WNC25FE  | WHDR25FE | WNR25FE  | WHER25FE | WNER25FE |
| 0.5      | WHAR50FE | WNA50FE  | WHBR50FE | WNB50FE  | WHCR50FE | WNC50FE  | WHDR50FE | WNR50FE  | WHER50FE | WNER50FE |
| 0.75     | WHAR75FE | WNA75FE  | WHBR75FE | WNB75FE  | WHCR75FE | WNC75FE  | WHDR75FE | WNR75FE  | WHER75FE | WNER75FE |
| 1        | WHA1R0FE | WNA1R0FE | WHB1R0FE | WNB1R0FE | WHC1R0FE | WNC1R0FE | WHD1R0FE | WND1R0FE | WHE1R0FE | WNE1R0FE |
| 2        | WHA2R0FE | WNA2R0FE | WHB2R0FE | WNB2R0FE | WHC2R0FE | WNC2R0FE | WHD2R0FE | WND2R0FE | WHE2R0FE | WNE2R0FE |
| 4        | WHA4R0FE | WNA4R0FE | WHB4R0FE | WNB4R0FE | WHC4R0FE | WNC4R0FE | WHD4R0FE | WND4R0FE | WHE4R0FE | WNE4R0FE |
| 5        | WHA5R0FE | WNA5R0FE | WHB5R0FE | WNB5R0FE | WHC5R0FE | WNC5R0FE | WHD5R0FE | WND5R0FE | WHE5R0FE | WNE5R0FE |
| 10       | WHA10RFE | WNA10RFE | WHB10RFE | WNB10RFE | WHC10RFE | WNC10RFE | WHD10RFE | WND10RFE | WHE10RFE | WNE10RFE |
| 15       | WHA15RFE | WNA15RFE | WHB15RFE | WNB15RFE | WHC15RFE | WNC15RFE | WHD15RFE | WND15RFE | WHE15RFE | WNE15RFE |
| 25       | WHA25RFE | WNA25RFE | WHB25RFE | WNB25RFE | WHC25RFE | WNC25RFE | WHD25RFE | WND25RFE | WHE25RFE | WNE25RFE |
| 51       | WHA51RFE | WNA51RFE | WHB51RFE | WNB51RFE | WHC51RFE | WNC51RFE | WHD51RFE | WND51RFE | WHE51RFE | WNE51RFE |
| 75       | WHA75RFE | WNA75RFE | WHB75RFE | WNB75RFE | WHC75RFE | WNC75RFE | WHD75RFE | WND75RFE | WHE75RFE | WNE75RFE |
| 100      | WHA100FE | WNA100FE | WHB100FE | WNB100FE | WHC100FE | WNC100FE | WHD100FE | WND100FE | WHE100FE | WNE100FE |
| 150      | WHA150FE | WNA150FE | WHB150FE | WNB150FE | WHC150FE | WNC150FE | WHD150FE | WND150FE | WHE150FE | WNE150FE |
| 200      | WHA200FE | WNA200FE | WHB200FE | WNB200FE | WHC200FE | WNC200FE | WHD200FE | WND200FE | WHE200FE | WNE200FE |
| 250      | WHA250FE | WNA250FE | WHB250FE | WNB250FE | WHC250FE | WNC250FE | WHD250FE | WND250FE | WHE250FE | WNE250FE |
| 330      | WHA330FE |          | WHB330FE | WNB330FE | WHC330FE | WNC330FE | WHD330FE | WND330FE | WHE330FE | WNE330FE |
| 470      | WHA470FE |          | WHB470FE | WNB470FE | WHC470FE | WNC470FE | WHD470FE | WND470FE | WHE470FE | WNE470FE |
| 560      | WHA560FE |          | WHB560FE | WNB560FE | WHC560FE | WNC560FE | WHD560FE | WND560FE | WHE560FE | WNE560FE |
| 750      | WHA750FE |          | WHB750FE | WNB750FE | WHC750FE | WNC750FE | WHD750FE | WND750FE | WHE750FE | WNE750FE |
| 1K       | WHA1K0FE |          | WHB1K0FE | WNB1K0FE | WHC1K0FE | WNC1K0FE | WHD1K0FE | WND1K0FE | WHE1K0FE | WNE1K0FE |
| 2.5K     |          |          | WHB2K5FE |          | WHC2K5FE |          | WHD2K5FE | WND2K5FE | WHE2K5FE | WNE2K5FE |
| 5K       |          |          |          |          |          |          | WHD5K0FE |          | WHE5K0FE | WNE5K0FE |
| 10K      |          |          |          |          |          |          | WHD10KFE |          | WHE10KFE | WNE10KFE |
| 25K      |          |          |          |          |          |          |          |          | WHE25KFE |          |