

## Water Insoluble Nitride Thin Film Precision Chip Resistors

### WIN Series

- TaN thin film technology
- Inherent moisture protection superior to that of passivated nichrome chip resistors
- High stability in humid and polluted environments
- Typical 85°C, 85%RH biased humidity 2000 hour stability <0.1%
- Typical moisture resistance stability  $\pm 100$ ppm
- Precision  $\pm 0.05\%$  tolerance and  $\pm 10$ ppm/°C
- Anti-sulfur terminations
- 100% screened by automated optical inspection



All Pb-free parts comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

## Electrical Data

|  |            | T0402                   | T0603                            | T0805      | T1206     |
|--|------------|-------------------------|----------------------------------|------------|-----------|
| Power rating @ 70°C                        | watts      | 0.05                    | 0.1                              | 0.25       | 0.33      |
| Resistance range                           | ohms       | 7R5 to 30K              | 5R to 100K                       | 5R to 267K | 5R to 1M0 |
| Limiting element voltage (maximum voltage) | Vdc or rms | 75                      | 75                               | 100        | 200       |
| Resistance tolerance                       | %          | $\pm 0.1 \pm 0.5 \pm 1$ | $\pm 0.05 \pm 0.1 \pm 0.5 \pm 1$ |            |           |
| TCR  | ppm/°C     | $\pm 50 \pm 25$         | $\pm 10 \pm 15 \pm 25 \pm 50$    |            |           |
| Standard values                            |            | E24, E96, E192          |                                  |            |           |
| Ambient temperature range                  | °C         | -65 to +150             |                                  |            |           |

## Physical Data

| Dimensions in mm & (inch) and weight in mg |  |  |  |  |                 |  |         |
|--|--|--|--|--|-----------------|--|---------|
|  | L                                      | W                                      | T                                      | C                                      | B min           | A                                      | Wt. nom |
| T0402                                      | 1.02 $\pm$ 0.05<br>(0.04 $\pm$ 0.002)  | 0.53 $\pm$ 0.05<br>(0.021 $\pm$ 0.002) | 0.3 $\pm$ 0.08<br>(0.012 $\pm$ 0.003)  | 0.2 $\pm$ 0.05<br>(0.008 $\pm$ 0.002)  | 0.44<br>(0.017) | 0.25 $\pm$ 0.05<br>(0.01 $\pm$ 0.002)  | 0.9     |
| T0603                                      | 1.58 $\pm$ 0.15<br>(0.062 $\pm$ 0.006) | 0.80 $\pm$ 0.10<br>(0.031 $\pm$ 0.004) | 0.45 $\pm$ 0.10<br>(0.018 $\pm$ 0.004) | 0.27 $\pm$ 0.20<br>(0.011 $\pm$ 0.008) | 0.82<br>(0.032) | 0.34 $\pm$ 0.20<br>(0.013 $\pm$ 0.008) | 2.0     |
| T0805                                      | 2.02 $\pm$ 0.15<br>(0.080 $\pm$ 0.006) | 1.28 $\pm$ 0.15<br>(0.050 $\pm$ 0.006) | 0.45 $\pm$ 0.10<br>(0.018 $\pm$ 0.004) | 0.31 $\pm$ 0.20<br>(0.012 $\pm$ 0.008) | 1.1<br>(0.043)  | 0.40 $\pm$ 0.20<br>(0.016 $\pm$ 0.008) | 4.3     |
| T1206                                      | 3.15 $\pm$ 0.15<br>(0.124 $\pm$ 0.006) | 1.57 $\pm$ 0.15<br>(0.062 $\pm$ 0.006) | 0.50 $\pm$ 0.15<br>(0.020 $\pm$ 0.006) | 0.45 $\pm$ 0.25<br>(0.018 $\pm$ 0.010) | 2.03<br>(0.08)  | 0.52 $\pm$ 0.25<br>(0.020 $\pm$ 0.010) | 9.6     |



## Construction

Conductors, thin film resistive element and epoxy outer protection are applied to an alumina substrate. The chips are supplied with wrap-around terminations suitable for soldering. The terminations have an electroplated nickel barrier and either 100% matt tin or 60/40 SnPb finish.

## Marking & Solvent Resistance

WIN resistors have no marking on the component body. The body protection is resistant to all normal cleaning solvents suitable for printed circuits

## Screening

WIN resistors can be screened to any tests identified in MIL-PRF-55342 and AEC-Q200 to provide components suitable as a COTS equivalent to MIL products or screened product subject to harsh operating environments.

### 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.

## Manufacturing Capabilities Data

| TCR<br>ppm/°C | Tolerance % |           |           |            |           |            |         |  |
|---------------|-------------|-----------|-----------|------------|-----------|------------|---------|--|
|               | T0402       |           | T0603     |            | T0805     |            | T1206   |  |
|               | 0.1-1       | 0.05      | 0.1-1     | 0.05       | 0.1-1     | 0.05       | 0.1-1   |  |
| 10            |             | 5kΩ-10kΩ  |           | 5kΩ-40kΩ   |           | 5kΩ-80kΩ   |         |  |
| 15            |             | 100Ω-50kΩ |           | 100Ω-100kΩ |           | 100Ω-400kΩ |         |  |
| 25            | 10Ω-30kΩ    | 50Ω-50kΩ  | 10Ω-100kΩ | 50Ω-100kΩ  | 10Ω-267kΩ | 50Ω-400kΩ  | 10Ω-1MΩ |  |
| 50            | 7.5Ω-30kΩ   |           | 5Ω-100kΩ  |            | 5Ω-267kΩ  |            | 5Ω-1MΩ  |  |

## Performance Data

| Test                         | Method  | ΔR                            |                                 |
|------------------------------|---|-------------------------------|---------------------------------|
|                              |   | MIL-PRF-55342<br>Limits (max) | WIN actual<br>performance (typ) |
| Thermal Shock                | MIL-PRF-55342 4.8.3 (MIL-STD-202 107G cond. F: 5 cycles in air, +150 / -65°C) | ± 0.1%                        | ± 0.01%                         |
| Thermal Shock - Extended     | MIL-STD-202 107G cond. F-3: 100 cycles in air, +150 / -65°C                   | ± 0.1%                        | ± 0.02%                         |
| Low Temp. Operation          | MIL-PRF-55342 4.8.5 (-65°C)   | ± 0.1%                        | ± 0.02%                         |
| Short Time Overload          | MIL-PRF-55342 4.8.6 (lesser of 6.25 x Pr or 2 x LEV for 5 seconds)            | ± 0.1%                        | ± 0.02%                         |
| High Temp. Exposure          | MIL-PRF-55342 4.8.7 (+150°C for 100 hours)                                    | ± 0.1%                        | ± 0.02%                         |
| High Temp. Exposure Extended | +150°C for 1000 hours   | N/A                           | ±0.1%                           |
| Resistance to Solder Heat    | MIL-PRF-55342 4.8.8   | ± 0.2%                        | ± 0.02%                         |
| Moisture Resistance          | MIL-PRF-55342 4.8.9 (MIL-STD-202 106G: 10 cycles, 65±2°C, 95±5% RH)           | ± 0.2%                        | ± 0.01%                         |
| Load Life                    | MIL-PRF-55342 4.8.11 (MIL-STD-202 108A: Pr at 70°C for 2000 hours)            | ± 0.5%                        | ± 0.08%                         |
| Biased Damp Heat             | 85°C, 85%RH, 10% Pr bias, for 2000 hours                                      | N/A                           | ± 0.08%                         |
| Flower of Sulfur             | ASTM B-809 (modified) 105°C Dry, 1000 Hours                                   |                               | Pass                            |



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## Ordering Procedure

This product has two valid part numbers:

European (Welwyn) Part Number: WINT1206LF031001B3 (1206, ±25ppm/°C, 1 kilohm ±0.1%, Pb-free)



| 1      | 2     | 3            | 4              | 5   | 6          | 7                    |
|--------|-------|--------------|----------------|---|------------|----------------------|
| Series | Type  | Termination  | TCR            | Value   | Tolerance  | Packing              |
| WIN    | T0402 | PB = SnPb    | 12 = ±10ppm/°C | 3 digits + multiplier<br>R = ohms for<br>values <100 ohms | A = ±0.05% | Tape & reel          |
|        | T0603 | LF = Pb free | 11 = ±15ppm/°C |   | B = ±0.1%  | 3 3000/reel Standard |
|        | T0805 |              | 03 = ±25ppm/°C |   | D = ±0.5%  | Blank 1000/reel      |
|        | T1206 |              | 02 = ±50ppm/°C |   | F = 1%     |                      |

USA (IRC) Part Number: WIN -T1206LF-03-1001-B3 (1206, ±25ppm/°C, 1 kilohm ±0.1%, Pb-free)



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|        | T0603 | LF = Pb free | 11 = ±15ppm/°C |   | B = ±0.1%  | 3 3000/reel Standard |
|        | T0805 |              | 03 = ±25ppm/°C |   | D = ±0.5%  | Blank 1000/reel      |
|        | T1206 |              | 02 = ±50ppm/°C |   | F = 1%     |                      |

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