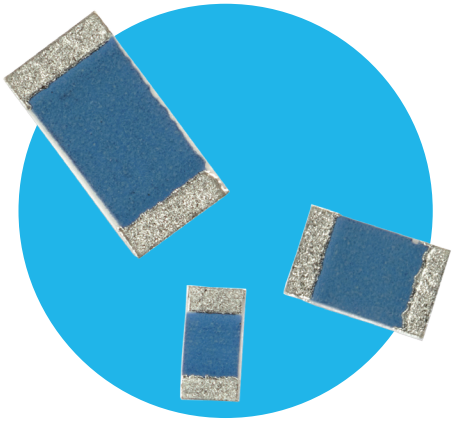
# Resistors

## 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 ±100ppm
- Precision ±0.05% tolerance and ±10ppm/°C
- Anti-sulfur terminations
- 100% screened by automated optical inspection

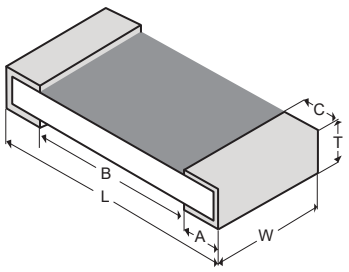
All Pb-free parts comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

## 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 | % | ±0.1 ±0.5 ±1 | ±0.05 ±0.1 ±0.5 ±1 | | |
| TCR | ppm/°C | ±50 ±25 | ±10 ±15 ±25 ±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±0.05 (0.04±0.002) | 0.53±0.05 (0.021±0.002) | 0.3±0.08 (0.012±0.003) | 0.2±0.05 (0.008±0.002) | 0.44 (0.017) | 0.25±0.05 (0.01±0.002) | 0.9 |
| T0603 | 1.58 ± 0.15 (0.062 ± 0.006) | 0.80 ± 0.10 (0.031 ± 0.004) | 0.45 ± 0.10 (0.018 ± 0.004) | 0.27 ± 0.20 (0.011 ± 0.008) | 0.82 (0.032) | 0.34 ± 0.20 (0.013 ± 0.008) | 2.0 |
| T0805 | 2.02 ± 0.15 (0.080 ± 0.006) | 1.28 ± 0.15 (0.050 ± 0.006) | 0.45 ± 0.10 (0.018 ± 0.004) | 0.31 ± 0.20 (0.012 ± 0.008) | 1.1 (0.043) | 0.40 ± 0.20 (0.016 ± 0.008) | 4.3 |
| T1206 | 3.15 ± 0.15 (0.124 ± 0.006) | 1.57 ± 0.15 (0.062 ± 0.006) | 0.50 ± 0.15 (0.020 ± 0.006) | 0.45 ± 0.25 (0.018 ± 0.010) | 2.03 (0.08) | 0.52 ± 0.25 (0.020 ± 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**

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BI Technologies IRC Welwyn

www.ttelectronics.com/resistors

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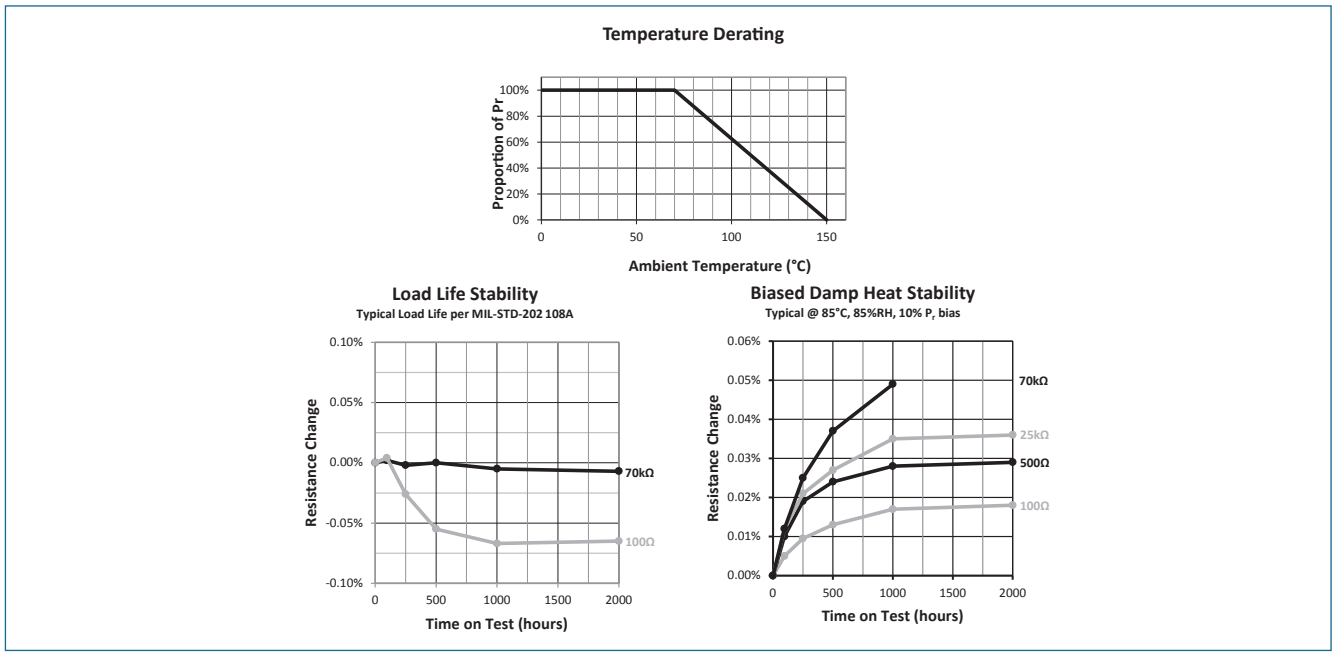
# Manufacturing Capabilities Data

| TCR 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 Limits (max) | WIN actual 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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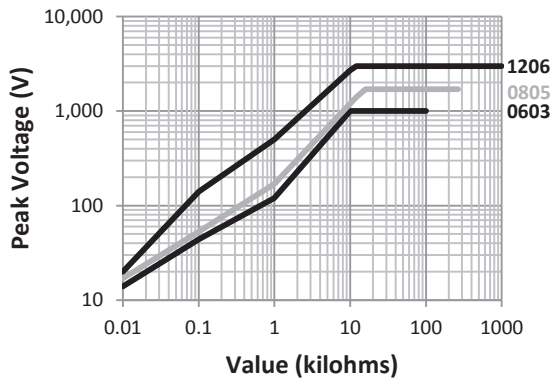
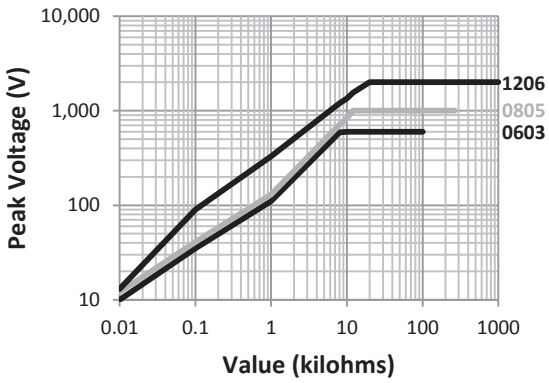
### 1.2/50µs Pulse Performance

IEC60 115-1, 5 pulses, |ΔR|<0.1%




### 10/700µs Pulse Performance

IEC60 115-1, 10 pulses, |ΔR|<0.1%




**Pulse performance for 0402 to be advised.**

# Ordering Procedure

This product has two valid part numbers:

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

| W | I | N | T | 1 | 2 | 0 | 6 | L | F | 0 | 3 | 1 | 0 | 0 | 1 | B | 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | 2 | | | | 3 | | 4 | | | 5 | | | 6 | 7 |

| 1 Series | 2 Type | 3 Termination | 4 TCR | 5 Value | 6 Tolerance | 7 Packing | | |
|---|---|---|---|---|---|---|---|---|
| WIN | T0402 | PB = SnPb | 12 = ±10ppm/°C | 3 digits + multiplier R = ohms for 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)

| W | I | N | - | T | 1 | 2 | 0 | 6 | L | F | - | 0 | 3 | - | 1 | 0 | 0 | 1 | - | B | 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | 2 | | | | | 3 | | | 4 | | | 5 | | | | | 6 | 7 |

| 1 Series | 2 Type | 3 Termination | 4 TCR | 5 Value | 6 Tolerance | 7 Packing | | |
|---|---|---|---|---|---|---|---|---|
| WIN | T0402 | PB = SnPb | 12 = ±10ppm/°C | 3 digits + multiplier R = ohms for 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% | | | |

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