

## TFHP Series



### Features:

- Power rating 6W in 2512 size
- Power rating 2W in 1206 size
- Aluminium nitride substrate
- Large termination soldering area
- Precision to 0.1%, 25ppm/°C



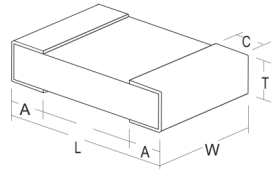
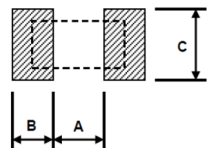
All parts are Pb-free and comply with EU Directive 2011/65/EU amended by (EU) 2015/863

## Electrical Data

|                                   |        | 1206              | 2512 |
|-----------------------------------|--------|-------------------|------|
| Power rating <sup>1</sup> at 70°C | W      | 2                 | 6    |
| Limiting element voltage          | V      | 100               |      |
| Resistance range                  | Ω      | 50R to 30K1       |      |
| Resistance tolerance              | %      | 0.1, 0.25, 0.5, 1 |      |
| TCR                               | ppm/°C | 25, 50            |      |
| Standard values                   |        | E24 & E96         |      |
| Ambient temperature range         | °C     | -55 to +155       |      |

Note: 1. Dependent on mounting conditions.

## Physical Data

| Dimensions in mm and weight in mg         |            |            |             |            |            |          |  |
|---|------------|------------|-------------|------------|------------|----------|---|
|   | L          | W          | T           | A          | C          | Wt. nom. |   |
| 1206                                      | 3.05 ± 0.2 | 1.55 ± 0.2 | 0.43 ± 0.15 | 1.2 ± 0.2  | 0.5 ± 0.15 | 11.0     |   |
| 2512                                      | 6.3 ± 0.2  | 3.1 ± 0.2  |             | 1.6 ± 0.25 | 0.7 ± 0.25 | 42.3     |   |
| Recommended mounting pad dimensions in mm |            |            |             |            |            |          |  |
|   | A          | B          |             |            | C          |          |   |
| 1206                                      | 0.6        | 1.9        |             |            | 1.8        |          |   |
| 2512                                      | 2.77       | 2.31       |             |            | 3.2        |          |   |

### Construction

A thin-film material is selectively deposited on an aluminium nitride substrate together with metallic contacts at each end of the resistor. The unadjusted resistors are heat treated to give the required TCR and stability, then a precisely controlled laser trim process adjusts the resistance value. Epoxy protection is applied, and wrap-around terminations are added and tin (Sn) plated. Each resistor is measured immediately before packing into tape.

### Marking

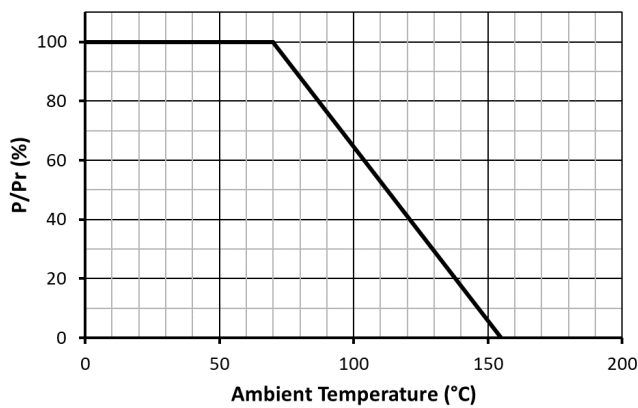
TFHP resistors are marked white on black with 3 or 4 characters indicating ohmic value.

### Performance Data

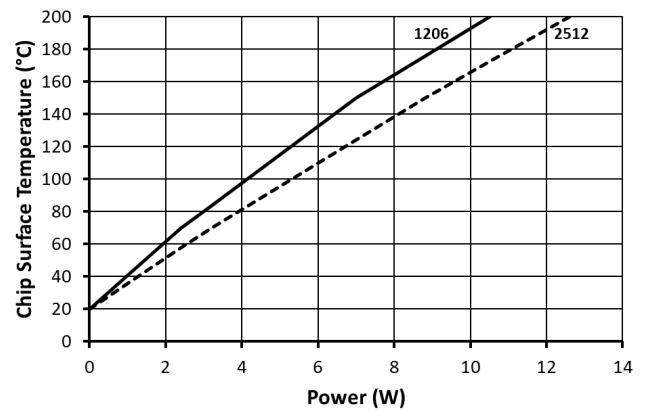
| Test                      | Method   |                 | Maximum              |
|---------------------------|--|-----------------|----------------------|
| Load Life                 | 1000 hours, cyclic load $P_r$ at $T_A = 70^\circ\text{C}$      | $\pm\Delta R\%$ | 1                    |
| Short Term Overload       | Lesser of $6.25 \times P_r$ or $2 \times \text{LEV}$ for 2 s   | $\pm\Delta R\%$ | 0.5                  |
| Damp Heat with Load       | 1000 hours, cyclic load $P_r$ at $40^\circ\text{C}$ , 90-95%RH | $\pm\Delta R\%$ | 0.4                  |
| Low Temperature Operation | 1 hour at $-55^\circ\text{C}$ , 45 minutes $P_r$               | $\pm\Delta R\%$ | 0.2                  |
| High Temperature Exposure | 1000 hours at $+155^\circ\text{C}$                             | $\pm\Delta R\%$ | 0.2                  |
| Thermal Shock             | 100 cycles, $-55$ to $+155^\circ\text{C}$                      | $\pm\Delta R\%$ | 0.2                  |
| Resistance to Solder Heat | $260 \pm 5^\circ\text{C}$ , $10 \pm 1\text{s}$                 | $\pm\Delta R\%$ | 0.2                  |
| Solderability             | $245 \pm 5^\circ\text{C}$ , 3s                                 |                 | $\geq 95\%$ coverage |
| Insulation Resistance     | $100V_{dc}$ , 60s  |                 | $\geq 10G$           |

### Thermal Performance Data

Temperature Derating



Chip Surface Temperature



### Mounting

The above chip surface temperature readings were made by thermal camera under room temperature conditions with the component mounted at the centre of a 40 x 90mm test board with double sided 70 $\mu\text{m}$  (2oz) copper connected with thermal vias.

### Packaging

TFHP resistors are packed in tape which is paper for 1206 and plastic for 2512, on 178mm reels. For full details of tape and reel dimensions see <https://www.ttelectronics.com/ttelectronics/media/productfiles/applicationnotes/ps001-packing-of-general-purpose-chip-resistors.pdf>

### Ordering Procedure

Example: TFHP2512D-1K54FT4 (2512, 25ppm/ $^\circ\text{C}$ , 1.54 kilohms  $\pm 1\%$ , Pb-free )



| 1    | 2    | 3                                     | 4   | 5  | 6                 |
|------|------|---------------------------------------|---|--|-------------------|
| Type | Size | TCR                                   | Value                                     | Tolerance  | Packing           |
| TFHP | 1206 | $D = \pm 25\text{ppm}/^\circ\text{C}$ | E24 or E96                                | $B = \pm 0.1\%$                                      | T5 1206 5000/reel |
|      | 2512 | $C = \pm 50\text{ppm}/^\circ\text{C}$ | 3/4 characters<br>R = ohms<br>K = kilohms | $C = \pm 0.25\%$<br>$D = \pm 0.5\%$<br>$F = \pm 1\%$ | T4 2512 4000/reel |