

## **Listing of PCNs**

### **Introduction**

This file contains PCN information for the product(s) referenced by the file name.

Note that the file may contain multiple PCNs. If this is the case, they are arranged in chronological order, so to see the most recent PCN scroll to the end.

# Resistors Product Change Notification

|   |   |
|---|---|
| <b>PCN Number</b>                         | PCN-2023-RBU02  |
| <b>PCN Title</b>                          | Datasheet Update – 4500, 4530, HVD & HVP Series   |
| <b>PCN Date</b>                           | 7 <sup>th</sup> February 2023   |
| <b>Type of Change</b>                     | <input type="checkbox"/> End of Life Notification <input type="checkbox"/> Manufacturing Facility Change or Addition <input checked="" type="checkbox"/> Datasheet Specification Change <input type="checkbox"/> Other: <input type="checkbox"/> Material Change <input type="checkbox"/> Process Change <input type="checkbox"/> Design Change |
| <b>Manufacturing Location(s) Affected</b> | TT Electronics Bedlington   |
| <b>Date of Change Implementation</b>      | 7 <sup>th</sup> February 2023   |

| Products Affected |   |
|-------------------|---|
| TT Series         | Datasheet Link  |
| 4500 Series       | <a href="https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/4500.pdf">https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/4500.pdf</a> |
| 4530 Series       | <a href="https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/4530.pdf">https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/4530.pdf</a> |
| HVD Series        | <a href="https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/HVD.pdf">https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/HVD.pdf</a>   |
| HVP Series        | <a href="https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/HVP.pdf">https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/HVP.pdf</a>   |

| Change Detail  |   |
|--|---|
| <b>Description of Change</b>                           | Update to the 4500, 4530, HVD & HVP Series Datasheets to reflect changes to the upper resistance value & tolerance limits.<br>There will be no change to the product form, fit or function and this PCN is for notification only. See Appendix 1 for details.   |
| <b>Reason for Change</b>                               | To ensure datasheets are in line with current manufacturing process capability.   |
| <b>Implementation Plan</b>                             | With immediate effect   |
| <b>Customer Impact</b>                                 | Product form, fit or function is unchanged. Upper Resistance value limit is 1Gohm.  |
| <b>Recommendations</b>                                 | Please contact your local Sales / FAE team for assistance if required.  |
| <b>Availability of Previously Manufactured Product</b> | N/A   |
| <b>Availability of Approval Samples</b>                | N/A   |
| <b>Sales Contacts</b>                                  | Americas: Kevin Marzano <a href="mailto:kevin.marzano@ttelectronics.com">kevin.marzano@ttelectronics.com</a><br>Europe: Claudia Patzak-Kruger <a href="mailto:Claudia.patzak@ttelectronics.com">Claudia.patzak@ttelectronics.com</a><br>Asia: Janson Chuen <a href="mailto:janson.chuen@ttelectronics.com">janson.chuen@ttelectronics.com</a> |

| Approvals   |                  |                       |                   |
|-------------|------------------|-----------------------|-------------------|
|             | Name             | Title                 | Date              |
| Issued by   | Mark Beeston     | Product Line Manager  | 7th February 2023 |
| Approved by | Heather Baird    | VP Product Management | 7th February 2023 |
| Approved by | Klaus Zwerschina | VP Sales              | 7th February 2023 |

Appendix 1

Before Version

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

Electrical Data


|                                    |        | 4501                                 | 4502        | 4503        | 4504      | 4505      | 4506      | 4507         |
|------------------------------------|--------|--------------------------------------|-------------|-------------|-----------|-----------|-----------|--------------|
| Power rating at 70°C               | watts  | 1                                    | 1.7         | 2           | 3         | 2.8       | 3.6       | 4.5          |
| Resistance range                   | ohms   | 20k to 500M                          | 36k to 750M | 36k to 750M | 62k to 1G | 51k to 1G | 82k to 1G | 180k to 1.5G |
| Limiting element voltage           | volts  | 10k                                  | 10k         | 15k         | 15k       | 20k       | 20k       | 20k          |
| TCR (20°C to 70°C)                 | ppm/°C | 100, 150 (see table below for 50ppm) |             |             |           |           |           |              |
| Resistance tolerance               | %      | 1, 2, 5                              |             |             |           |           |           |              |
| Values                             |        | Any value to order                   |             |             |           |           |           |              |
| Ambient temperature range          | °C     | -55 to 125                           |             |             |           |           |           |              |
| Value ranges for TCR of 100 ppm/°C |        | <150M                                | <270M       | <270M       | <470M     | <390M     | <680M     | <1.5G        |
| Value ranges for TCR of 150 ppm/°C |        | >150M                                | >270M       | >270M       | >470M     | >390M     | >680M     |              |
| Value ranges available for         |        |                                      |             |             |           |           |           |              |
| TCR of 50ppm/°C                    |        | <100M                                | <150M       | <200M       | <250M     | <250M     | <300M     | <600M        |

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

Electrical Data

|                             |        | 4531*              | 4532*       | 4533*       | 4534*       | 4535*       | 4536*       | 4537*        |
|-----------------------------|--------|--------------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Power rating at 70°C        | watts  | 1.0                | 1.7         | 2.0         | 3.0         | 2.8         | 3.6         | 4.5          |
| Resistance range            | ohms   | 20K to 130M        | 36K to 250M | 36K to 250M | 62K to 450M | 51K to 370M | 82K to 660M | 180K to 1.4G |
| Limiting element voltage    | volts  | 6.5K               | 6.5K        | 10K         | 10K         | 15K         | 15K         | 15K          |
| TCR (20°C to 70°C)          | ppm/°C | 100                |             |             |             |             |             |              |
| Resistance tolerance        | %      | 1, 2, 5            |             |             |             |             |             |              |
| Resistance ratio tolerances | %      | 1, 2, 5            |             |             |             |             |             |              |
| Standard values             |        | Any value to order |             |             |             |             |             |              |
| Ambient temperature range   | °C     | -55 to 125         |             |             |             |             |             |              |

\*5th or 6th digit determines protection and lead type (see marking)

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

### Electrical Data

|   |        | HVD08   | HVD12    | HVD15     | HVD20     | HVD30 |
|---|--------|---|----------|-----------|-----------|-------|
| Power rating at 70°C                        | watts  | 0.75  | 1.5      | 2.5       | 3.5       | 4.5   |
| Limiting element voltage in air dc or ac pk | kV     | 7.5   | 10       | 15        | 20        | 30    |
| Resistance value                            | ohms   | 10K - 1G  | 50K - 2G | 100K - 2G | 100K - 5G |       |
| Resistance tolerance                        | %      | 1, 5  |          |           |           |       |
| Ratio tolerance                             | %      | 0.25, 0.5, 1  |          |           |           |       |
| TCR (20°C to 70°C)                          | ppm/°C | 50, 100   |          |           |           |       |
| Tracking TCR (20°C to 70°C)                 | ppm/°C | 25, 50  |          |           |           |       |
| Standard values                             |        | E24 preferred for (R1 + R2) and R2                    |          |           |           |       |
| Ambient temperature range                   | °C     | -55 to +155   |          |           |           |       |
| Insulation resistance at 500V               | ohms   | >10G  |          |           |           |       |
| Dielectric strength of insulation           | volts  | Screen printed protection: >1000 Powder coated: >2000 |          |           |           |       |

### Electrical Data

|   |        | HVP04   | HVP06           | HVP08      | HVP10      | HVP15      | HVP20      |
|---|--------|---|-----------------|------------|------------|------------|------------|
| Power rating at 70°C in air                     | watts  | 0.4   | 0.6             | 0.8        | 1          | 1.5        | 2          |
| Power rating at 25°C in oil                     | watts  | 0.6   | 0.9             | 1.2        | 1.5        | 2.25       | 3          |
| Resistance range                                | ohms   | 1K0 to 250M   | 1K5 to 1G0      | 2K0 to 1G0 | 3K0 to 2G0 | 4K0 to 5G0 | 5K0 to 10G |
| Limiting element voltage in air (dc or ac peak) | kV     | 2   | 5               | 7.5        | 10         | 15         | 20         |
| Limiting element voltage in oil (dc or ac peak) | kV     | 4   | 10              | 15         | 20         | 30         | 40         |
| TCR (20°C to 70°C)                              | ppm/°C | 100   | 100, 50, 25     |            |            |            |            |
| Resistance tolerance                            | %      | 0.5, 1, 5   | 0.25, 0.5, 1, 5 |            |            |            |            |
| Values  |        | E24 preferred   |                 |            |            |            |            |
| Ambient temperature range                       | °C     | -55 to 155  |                 |            |            |            |            |
| Insulation resistance at 500V                   | ohms   | >10G  |                 |            |            |            |            |
| Dielectric strength of insulation               | volts  | Screen printed protection: >1000 Powder coated: >2000 |                 |            |            |            |            |

Other resistance, tolerance and TCR values are available on request.

**After Version**

**Electrical Data**

|                                    |        | 4501                                 | 4502        | 4503        | 4504      | 4505      | 4506      | 4507       |
|------------------------------------|--------|--------------------------------------|-------------|-------------|-----------|-----------|-----------|------------|
| Power rating at 70°C               | watts  | 1                                    | 1.7         | 2           | 3         | 2.8       | 3.6       | 4.5        |
| Resistance range                   | ohms   | 20k to 500M                          | 36k to 750M | 36k to 750M | 62k to 1G | 51k to 1G | 82k to 1G | 180k to 1G |
| Limiting element voltage           | volts  | 10k                                  | 10k         | 15k         | 15k       | 20k       | 20k       | 20k        |
| TCR (20°C to 70°C)                 | ppm/°C | 100, 150 (see table below for 50ppm) |             |             |           |           |           |            |
| Resistance tolerance               | %      | 1, 2, 5                              |             |             |           |           |           |            |
| Values                             |        | Any value to order                   |             |             |           |           |           |            |
| Ambient temperature range          | °C     | -55 to 125                           |             |             |           |           |           |            |
| Value ranges for TCR of 100 ppm/°C |        | ≤150M                                | ≤270M       | ≤270M       | ≤470M     | ≤390M     | ≤680M     | ≤1.5G      |
| Value ranges for TCR of 150 ppm/°C |        | >150M                                | >270M       | >270M       | >470M     | >390M     | >680M     |            |
| Value ranges available for         |        |                                      |             |             |           |           |           |            |
| TCR of 50ppm/°C                    |        | <100M                                | <150M       | <200M       | <250M     | <250M     | <300M     | <600M      |

**Electrical Data**

|                             |        | 4531*              | 4532*       | 4533*       | 4534*       | 4535*       | 4536*       | 4537*      |
|-----------------------------|--------|--------------------|-------------|-------------|-------------|-------------|-------------|------------|
| Power rating at 70°C        | watts  | 1.0                | 1.7         | 2.0         | 3.0         | 2.8         | 3.6         | 4.5        |
| Resistance range            | ohms   | 20K to 130M        | 36K to 250M | 36K to 250M | 62K to 450M | 51K to 370M | 82K to 660M | 180K to 1G |
| Limiting element voltage    | volts  | 6.5K               | 6.5K        | 10K         | 10K         | 15K         | 15K         | 15K        |
| TCR (20°C to 70°C)          | ppm/°C | 100                |             |             |             |             |             |            |
| Resistance tolerance        | %      | 1, 2, 5            |             |             |             |             |             |            |
| Resistance ratio tolerances | %      | 1, 2, 5            |             |             |             |             |             |            |
| Standard values             |        | Any value to order |             |             |             |             |             |            |
| Ambient temperature range   | °C     | -55 to 125         |             |             |             |             |             |            |

\*5th or 6th digit determines protection and lead type (see marking)

**Electrical Data**

|   |        | HVD08   | HVD12      | HVD15       | HVD20 | HVD30 |
|---|--------|---|------------|-------------|-------|-------|
| Power rating at 70°C                        | watts  | 0.75  | 1.5        | 2.5         | 3.5   | 4.5   |
| Limiting element voltage in air dc or ac pk | kV     | 7.5   | 10         | 15          | 20    | 30    |
| Resistance value                            | ohms   | 10K – 1G  | 50K to 1G0 | 100K to 1G0 |       |       |
| Resistance tolerance                        | %      | 1, 5  |            |             |       |       |
| Ratio tolerance                             | %      | 0.25, 0.5, 1  |            |             |       |       |
| TCR (20°C to 70°C)                          | ppm/°C | 50, 100   |            |             |       |       |
| Tracking TCR (20°C to 70°C)                 | ppm/°C | 25, 50  |            |             |       |       |
| Standard values                             |        | E24 preferred for (R1 + R2) and R2                    |            |             |       |       |
| Ambient temperature range                   | °C     | -55 to +155   |            |             |       |       |
| Insulation resistance at 500V               | ohms   | >10G  |            |             |       |       |
| Dielectric strength of insulation           | volts  | Screen printed protection: >1000 Powder coated: >2000 |            |             |       |       |

Other resistance, tolerance and TCR values are available on request.

## Electrical Data

|   |        | HVP04   | HVP06                                | HVP08      | HVP10       | HVP15      | HVP20      |
|---|--------|---|--------------------------------------|------------|-------------|------------|------------|
| Power rating at 70°C in air                     | watts  | 0.4   | 0.6                                  | 0.8        | 1           | 1.5        | 2          |
| Power rating at 25°C in oil                     | watts  | 0.6   | 0.9                                  | 1.2        | 1.5         | 2.25       | 3          |
| Resistance range                                | ohms   | 1K0 to 250M   | 1K5 to 1G0                           | 2K0 to 1G0 | 3K0 to 1G0  | 4K0 to 1G0 | 5K0 to 1G0 |
| Limiting element voltage in air (dc or ac peak) | kV     | 2   | 5                                    | 7.5        | 10          | 15         | 20         |
| Limiting element voltage in oil (dc or ac peak) | kV     | 4   | 10                                   | 15         | 20          | 30         | 40         |
| TCR (20°C to 70°C)                              | ppm/°C | 100   | ≤500M: 25, 50, 100<br>>500M: 50, 100 |            | 25, 50, 100 |            |            |
| Resistance tolerance                            | %      | 0.5, 1, 5   | <500M: 0.25, 0.5, 1, 5 ≥500M: 1, 5   |            |             |            |            |
| Values  |        | E24 preferred   |                                      |            |             |            |            |
| Ambient temperature range                       | °C     | -55 to 155  |                                      |            |             |            |            |
| Insulation resistance at 500V                   | ohms   | >10G  |                                      |            |             |            |            |
| Dielectric strength of insulation               | volts  | Screen printed protection: >1000 Powder coated: >2000 |                                      |            |             |            |            |

Other resistance, tolerance and TCR values are available on request.